

Reaching for Waterway Recovery

A Strategy for Redland City Council to 2030

October 2012.

Acknowledgements

Disclaimer

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Executive Summary

In Redland we love our creeks and the Bay, and none of us want to see their condition deteriorate. Yet the waterways in Redlands are not in good condition, and until recently their condition had been declining.

Council for its part, through the Environment Policy (POL 2644), has worked to “*halt and reverse the declining trend in the health of Redlands waterways and Moreton Bay, returning the native fish and macro-invertebrates to our (freshwater) waterways*” for well over a decade.

This document takes stock of where we are now with our efforts, what we have learnt about our local creeks and how together, Council and the Redland community can fix them. *Reaching for Waterway Recovery* includes a:

- ‘*Waterway Recovery Strategy to 2030* and;
- *Waterway Recovery Action Plan 2013 to 2018* that implement the strategy over the next five years.

The Strategic Objectives for waterway recovery are:

- Prevent pollution (mainly nutrients) from entering waterways and manage waterways to limit the in-stream release of nutrients.
- Manage Council land to achieve no negative impacts on waterways.
- Retain sediment on-site and prevent sediment moving into waterways.
- Control development to avoid, mitigate and manage negative impacts on waterways.
- Manage artificial water bodies or remove them from the landscape.
- Recover healthy plant and animal populations in waterways.
- Maintain a comprehensive network of connected, shaded and weed free waterway corridors across the city.
- Provide places, activities and opportunities for the community to connect with waterways and become involved in local recovery efforts.
- Drive improvement in waterway health through regular reporting and evaluation of waterway condition.

Council has direct control to implement actions that address these strategic objectives on Council land, and under its statutory obligations for example for development control, management of environmentally relevant activities, and responsibility for minor water pollution. On private land and government controlled lands, Council can only influence land management to achieve the strategic objectives through liaison, extension, and communication activities. This strategy provides Council with no additional powers to require or enforce compliance with the strategic objectives on private lands.

Reaching for Waterway Recovery has a lot to offer all citizens of Redland. Any landowner could apply the guiding principles in managing waterways. These principles come from our local experience with what the causes of waterway decline are and what works on the ground to fix these problems and what doesn't. In addition, the first in a series of recovery ‘recovery profiles’ are presented for catchments, based on our learnings about that particular catchment and how we understand what must be done to improve waterway health.

The effectiveness of this strategy will be monitored, evaluated and reviewed to ensure it is meeting the expectations of Council and the community.

The first priority of the strategy must be for Council to take a leadership role in managing the creeks under its control, on Council land as an integral part of Council's business. However, in the current climate of financial constraint in a Council concerned with a 'back to basics' approach, we cannot place further pressure on Council operational and capital budgets. Indeed, the purpose of this strategy must be to better co-ordinate action, deliver only the highest priority outcomes, and rationalise Council efforts to gain efficiencies and cost savings. The first 5 year plan (2013 to 2018) must focus on Council land and assets, and continue to focus on what works well - managing all catchments at once, investigating local problems, finding and fixing hotspots, reporting performance and trials of cost-effective local solutions to the problems.

The second priority of the strategy is to influence, motivate and assist other landowners to improve their land management as well.

These documents are on public display and during 2013 comments are invited from the community, industry, commerce and government. The Strategy and Action Plan will be reviewed and returned to Council should there be any significant amendments in 2014.

Mayor's Signature quote



CEO's Signature quote



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Part One: Context

1. Introduction

In Redland we love our creeks and the Bay, and none of us want to see their condition deteriorate. The waterways are part of what makes the Redlands unique, they are part of the lifestyle. Our community consistently identifies a healthy natural environment and clean healthy waterways as high priority aspirations. This is confirmed by people of all ages and from every part of Redlands who participated in the far-reaching Redlands 2030 community consultation.

Yet the waterways in Redlands are not in good condition, and until recently their condition had been declining. Every year the Healthy Waterways Report Card for Southeast Queensland rates our waterways as unhealthy.

Council, for its part, through the Environment Policy (POL 2644) has worked to “*halt and reverse the declining trend in the health of Redlands waterways and Moreton Bay, returning the native fish and macro-invertebrates to our (freshwater) waterways*” for well over a decade. There are also community initiatives dating back more than a decade before that to 1990. Redland City is an active participant in the major efforts underway through the Healthy Waterways Network to repair the damage done to the wider Brisbane catchment and improve the health of Moreton Bay and other coastal waters of the Sunshine Coast and Gold Coast.

So, what have we learnt?

Why are our waterways in trouble, and can we really hope to fix them?

What have we achieved so far?

Is it working?

Part One of Reaching for Waterway Recovery takes us on a journey of discovery about our waterways and some of the answers to these questions - and the news is pretty good!

Part Two summarises the work we currently do, and a little of what has been done in the past.

Part Three is about the main game, and the most important question of all - what should we be doing differently about these problems now? The strategy presented is pitched at outcomes the Council can reasonably expect to achieve by 2030 without spending any more than we do now and potentially delivered with cost savings. Integral to this is the Council’s view of what we as a community can achieve.

Every resident can find interesting and useful information in this document. The whole document provides some guidance for everyone in the community, but there isn’t the space here to go into detail.

2. What is the Role of this Strategy and Action Plan?

The current climate of financial constraint and the concern in Council to deliver a ‘back to basics’ approach make this a challenging time to deliver a Strategy and Action Plan. Even more so, to deliver an approach that inspires better management of our creeks without placing further pressure on Council budgets and therefore expanding the cost to the community. In places the strategy does herald changes in the way we approach management and how and where we place priorities for action.

It also describes whole new areas of land and creek management that must be tackled by Council. It is therefore important to be clear about the role of this document in reconciling such challenging requirements.

The role of the Strategy is to:

1. Explain the requirements on Council to manage the waterways under its direct control and explain where Council can only influence waterway management and recovery;
2. Describe the multiple legislative and policy outcomes that our waterway management must deliver;
3. Provide direction and advice for Council Officers and the community on how these requirements may best be met;
4. Provide a communication tool that Council and Officers at all levels and in all areas of Council may use, and that Council may in turn use with the community;
5. Provide a clear line of implementation of Redlands 2030 Community Plan, and Council's Corporate Plan and Corporate Environment Policy requirements;
6. Minimize strategic risks and provide a due diligence approach to the above requirements.

It is not the role of the strategy or the action plan to allocate annual priorities or budgets for operational activities. Nor does the document in itself set the level of service standards, or the methods used by operational areas of Council to carry out their activities. Rationalising operational activity under the strategy and gaining efficiencies are part of annual operational planning.

The Strategy and Action Plan are the means by which we collectively communicate an agreed agenda that meets the requirements and obligations before Council and provides sufficient detail for 'getting on with' implementation in a coordinated approach across Council teams. It is only when Council audits implementation against outcomes of the strategy that we understand what provides the best return on activity and funding levels.

3. Can we fix the creeks?

This strategy has a positive message, based on our experience. Recovery of our waterways is possible within twenty years – by 2030. Indeed, we are on the cusp of seeing improvements now from the considerable work done to date. After much investigation we understand how the small coastal creeks of the Redlands come to be so unique and what causes their poor health. For the first time, we can say with some confidence that we know what needs to be done and are much more certain about where that needs to be done. Better still, we have tested and applied local solutions with some success.

Council has a big role to play – perhaps the biggest role. The way we manage Council land in the coming years will make a huge difference. But the Strategy is also about the whole community we serve. It's about what we've learnt are the most important actions to focus on, getting the basics right and passing this knowledge onto other landholders. It isn't just Council that needs to do them, every resident and every landowner has some responsibility and something to contribute.

4. What's a waterway?

The City shares some 150 km of shoreline along Moreton Bay, including the islands. The area of Moreton Bay within Redland City includes all of the bay waterways from the Logan River and Russell Island in the south, to a line stretching approximately from Tingalpa Creek on the mainland to Amity Point on North Stradbroke Island. This area is a significant marine national park home to extensive seagrass meadows, turtles, dugongs and whales, significant cultural heritage and indigenous history, abundant water-based recreation and commercial and recreational fishing.

5. How does this Strategy relate to the Total Water Cycle Management Plan?

Council is currently preparing its Total Water Cycle Management Plan (TWCM Plan) as required by the *Environmental Protection (Water) Policy 2009* by July 2013. This legislative requirement recognizes a local government's responsibility for water management following SEQ water reforms.

The TWCM Plan has a broad scope to identify and investigate issues arising for management of the water cycle in urban and rural areas within Redland City, including: water quality, availability and quality of bulk water supplies, population growth and climate change impacts, flooding, network limitations, protection of public health, legislative and reporting requirements, risk management, the governance arrangement for water management after the water reform process, and the impacts of effluent and stormwater on receiving waters. The Plan identifies potential options for remediation of the negative environmental impacts.

The Waterway Recovery Strategy and Action Plan is a small subset of the concerns covered by the TWCM Plan. It focuses only on waterway health and on the best approach to remediation of the negative environmental impacts that are already apparent in Redland City. Therefore it has an important role to play in describing this approach and providing sufficient detail to adequately tally the costs involved. This is vital information for coordinated Council action, and it provides important details for developing any offset or nutrient trading schemes contemplated under the TWCM Plan. These might operate across the City where the investment required by one polluter, to gain improvements in effluent standards or pollution load, is better spent in another part of a catchment (or in another catchment) where it can return significantly greater improvements; for example, investment in activities on rural lands to improve waterway health offer great potential for offsetting the cost of upgrading wastewater treatment or retrofitting stormwater treatment in urban areas.

6. Definitions

Waterways: The term 'waterways' includes:

- 22 freshwater creeks
- freshwater lakes and dams (1500+)
- freshwater wetlands;
- natural drainage lines;
- Moreton Bay (Peel Is to Panakin Is.)
- saltwater creek estuaries
- brackish wetlands;
- foreshores and intertidal areas
- exposed coast of North Stradbroke Island

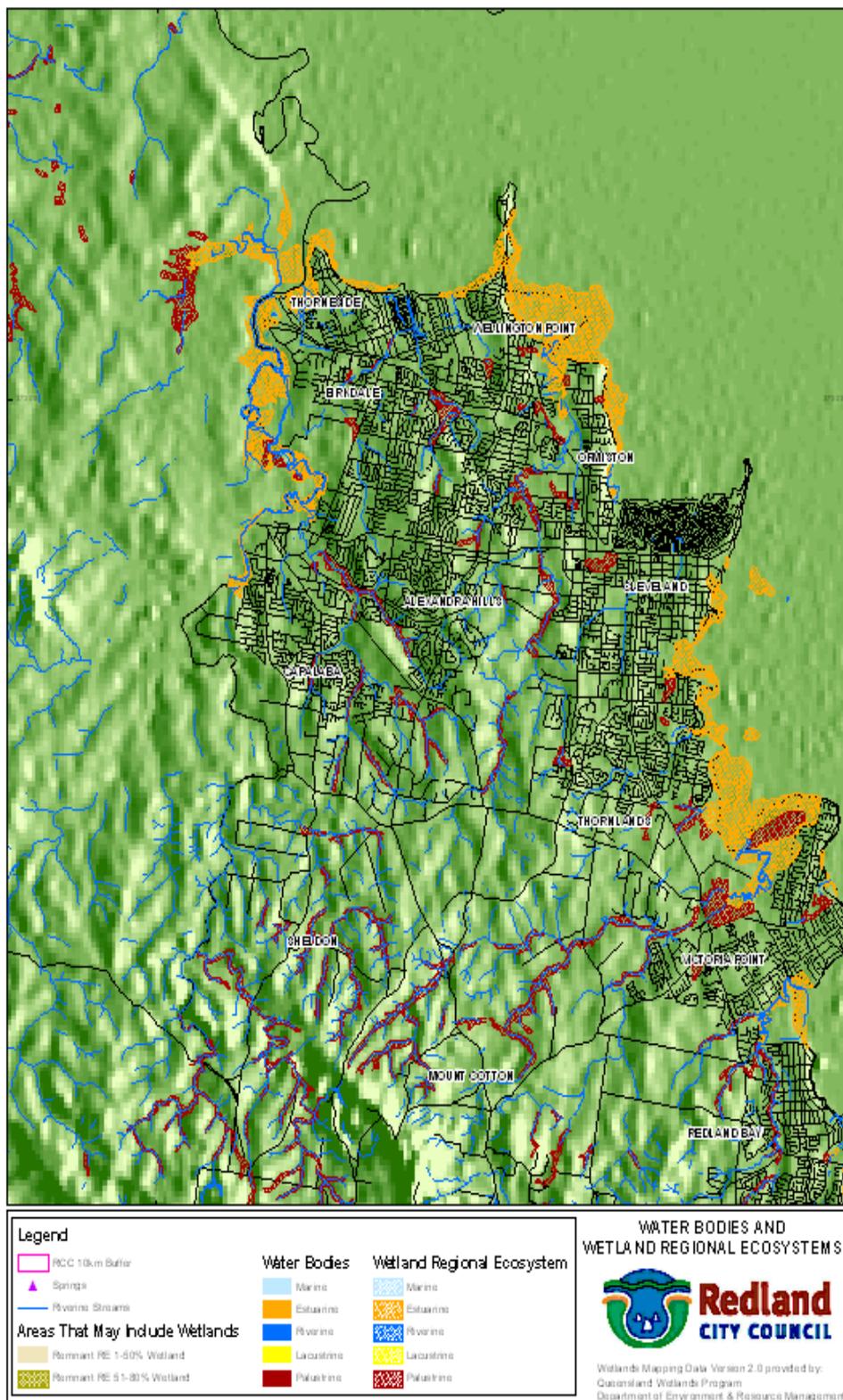


Figure 1 shows the outline of each waterway catchment in the City.

Our mainland creeks are very small (by regional standards), rising in the Mt Cotton hills from only 230m above sea level, and flowing only occasionally during heavy summer storms. Twelve are on the mainland and ten on the islands. Nineteen flow directly into Moreton Bay, and three (California Creek Native Dog Creek and Serpentine Creek) reach the Bay via the lower Logan River.

There are no large rivers, although the lower Logan River forms a small part of our City's southern boundary.

Water quality

Refers to the physical, chemical and biological characteristics of water in a waterway.

Waterway health

Refers to the condition of the waterway as a whole, including the condition of bed and banks, water, vegetation and aquatic organisms.

Hotspot

Refers to locations that have unexplained water quality results. Special investigations are undertaken to investigate where the source of very high pollutant loads occur after significant rainfall events. Knowing where the hot spots occur enables council to strategically direct on-ground waterway recovery management action in priority catchments.

7. Our Vision for Waterways

The *Redlands 2030 Community Plan: Creating Our Future* was forged from the thousands of contributions from local residents, businesses and organisations, and expresses the shared visions and values that will drive city planning in the Redlands over the next 10 years.

Our vision is:

In 2030, the Redlands will be a well-designed, vibrant city of mainland and island communities, each with distinctive character, heritage and lifestyles. Our shared values will shape the way we care for each other and how we protect the land, seas and waters where we choose to be.

The Plan includes goals for:

Healthy Natural Environment: A diverse and healthy natural environment, with an abundance of native flora and fauna and rich ecosystems will thrive through our awareness, commitment and action in caring for the environment.

Goal 5: Clean, healthy bay, waterways and catchments – all the aquatic-based ecosystems of the Redlands are healthier due to improved water quality in creeks, waterways, aquifers and wetlands.

Goal 3: Extensive wildlife linkages and corridors – strong physical linkages of ecosystems across the landscape form a natural web which sustains and regenerates the biodiversity of flora and fauna within the Redlands and into surrounding regions.

Goal 8: Getting around in nature – walking trails and cycling networks in natural areas are sensitively designed to bring people close to nature and keep nature safe with people.

Embracing the Bay: The benefits of the unique ecosystems, visual beauty, spiritual nourishment and coastal lifestyle provided by the islands, beaches, foreshores and water catchments of Moreton Bay will be valued, protected and celebrated.

Goal 1: Significant areas of high environmental quality – *planning and decision-making about coastal and resource management protects the integrity and the international and regional significance of Moreton Bay's dunes, wetlands, foreshores, estuaries, seagrass and mangrove habitats.*

Aerial photo of Redland City (mainland and islands) showing the catchment boundaries, waterways and wetlands

8. Benefits of Recovered Waterways

Realising recovered waterways could result in significant benefits and opportunities for Redland City, for every landowner, and for visitors. These include:

- protecting Moreton Bay waters through improved water quality in the mainland creeks that flow into Moreton Bay,
- attracting economic benefits through greater tourism and ecotourism opportunities,
- maintaining a healthy and rich diversity of plants and animals associated with recovered waterways,
- having places for people and recreation,
- connecting places in the landscape via waterway corridors,
- supporting abundant plant and animal diversity,
- supporting cultural and indigenous heritage, and
- supporting ecotourism visitation to Redland City. Redland City could be the destination for a great walk and other nature based activities, from the hills to the coast, through establishing connected trails along waterway corridors and through public land, with limited low impact overnight camping. Aligning the *Open Space, 7Cs Connections and Waterways Recovery Strategies*.

9. What we know about the health of our waterways

The name of this Strategy highlights the need for a recovery in the generally poor health of our creeks. However, the downward trends in water quality and waterway health data have stabilised in the last two years and in some catchments there are improvements.

Redland City Council has monitored water quality and waterway health for the last decade, and the results are now also published annually in the Redlands Waterway Recovery Reports. There is a wealth of data and information in these reports intended mainly for use in the Redlands by local people (available at Council's website). The reports provide an annual creek-by-creek snapshot of condition based on:

- water quality data;
- twice-yearly fish and macro-invertebrate data;
- event monitoring for nutrients and sediment; and
- detailed analysis of management, protection and rehabilitation priorities.

This has led to greater understanding and allows Council to:

- protect creeks currently in good condition;
- prevent further degradation of creeks in poor condition;
- track local-scale improvements in waterway health;
- identify and target areas (hotspots) where management actions are most needed;
- improve city-wide planning, and
- better assess development applications.

The overall ratings for the period 2004 to 2012 provide a good indication of trend in waterway health in each catchment and should be read in conjunction with the annual report card that compares the health of the waterways across south east Queensland - produced by Healthy Waterways Network. This regional reporting is based on a decade of monitoring (under the EHMP program). The report for the ecosystem health of Redlands freshwater creeks has been a 'fail' rating for the past

eight years. This is based on limited sampling twice a year at seven sites across four of the 12 mainland catchments – Erapah (2 sites), Hilliards (2), Tingalpa (2) and Moogurrapum (1). The results of the monitoring program are standardised and averaged across the city and based on methods developed in large south east Queensland river catchments. The EHMP does not provide priorities or direction for improving waterway health at the local scale.

Overall Water Quality Rating							
City Wide							
Creek/Catchment	2004-05	2005-06	2006-07	2007-08	2009-10	2010-11	2011-12
Tarradarrapin	B	B	B	C	D	B	C
Hilliards	B	C	B	C	-	B	B
Cleveland	C	C	C	C	C	B	D
Thornlands	-	-	-	-	C	B	C
Erapah	C	D	C	D	C	D	C
Moogurrapum	C	C	C	D	C	C	C
Weinam	A	B	B	D	-	C	C
Torquay	-	-	-	-	-	-	-
Serpentine	-	-	-	-	C	D	C
Native Dog	-	-	-	-	C	C	C
California	-	-	-	-	-	-	-
Upper Tingalpa	B	B	B	B	C	C	B
Coolwynpin	C	B	B	C	B	C	B
North Stradbroke	-	-	-	-	-	-	-
Macleay					C	D	C
Lamb					B	D	B
Karragarra					C	C	
Russel	-	-	-	-		C	C
Coochiemudlo	-	-	-	-	-	-	-

Extract from the 2012 Redland City Waterway Recovery Report.

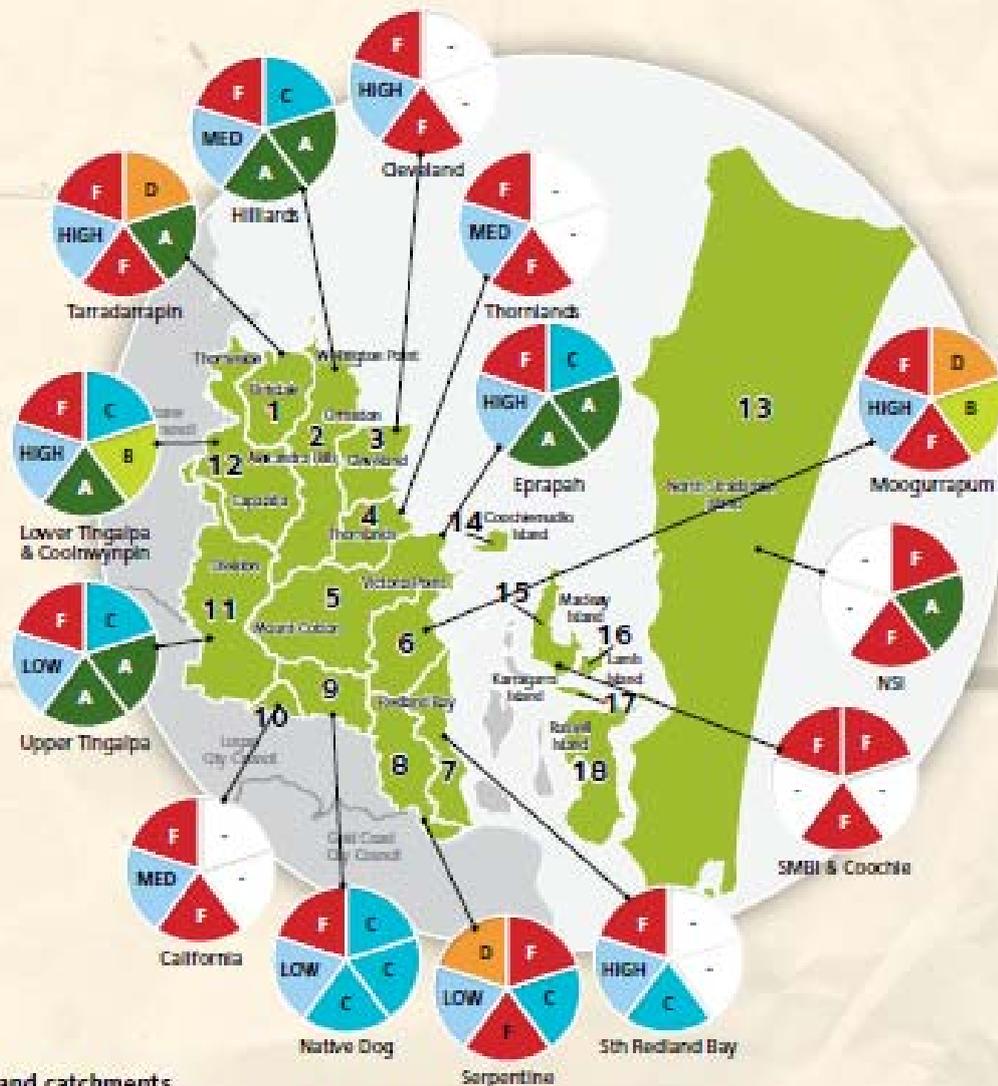
The 2011 Waterways Health Summary said:

“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 waterways. 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 Erapah 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 Erapah has improved to an A which is very good.

A snapshot of the health of Redland creeks

The map below gives an overview of the health of Redland freshwater creeks using ratings from the 2010 and (unreleased) 2011 update of the Redlands Waterway Recover Report.

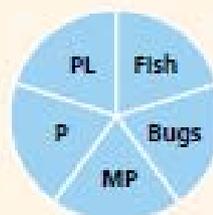
Note: Values shown are based on both 2008 and 2011 monitoring results



Redland catchments

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

Legend



Explanation of abbreviations

PL = Water pollutant loads
 Fish = Fish Indicators
 Bugs = Water bug Indicators
 MP = Management plans
 P = Catchment priority ranking for protection and management

Colour coded rating segments

A		D	
B		F	
C		-	

10. What unhealthy waterways have in common and what's the fix

Protect the creeks, protects the Bay

Per capita, Redlanders contribute just as much pollution to the Bay as anyone else in Southeast Queensland. Protecting our creeks and improving their health will improve the quality of runoff waters entering Moreton Bay. Fix the creeks and you fix the Bay.

So what do we need to do? – If you recreate, boat on, paddle on, fish or just look at the Bay, take responsibility for your local creek, your part of the creek. If you don't, who will?

Too much nutrient, too little oxygen

Describes how excess nutrients from runoff waters entering the creeks deprive the waterways of oxygen and over long periods organisms die off.

Excess nutrients often come from inputs of organic matter during rainfall events. Organic matter in waterways is often decaying plant matter, dust, sediment, animal waste, dead animals and fertiliser. Bacteria then attacks (eats) the organic matter to break it down often using up all the oxygen.

So what do we need to do? – stop nutrients entering the waterways, oxygenate the water, contain organic matter in compost bins, on pastures and by vegetation plantings. Apply less fertiliser and re-use nutrient rich stormwaters back onto the land.

Dirt in the water

Describes how sediment washes into the creeks during rainfall and stays in suspension, blocking light for plant growth, building up on dam and pool bottoms, clogging up creeks,

Keeping dirt from our land out of our waterways also helps to reduce nutrients because they are often attached to the dirt.

So what do we need to do? – cover bare soil, use sediment fencing, use straw bales and mulch to cover eroding areas, manage pasture cover, manage runoff on unsealed roads and tracks, plant close to creeks to stop overland transport.

Big lazy pools

During dry spells the creeks stop flowing and the pools become isolated. Without flushing they store up nutrients and become more and more putrid and eventually toxic to life.

So what do we need to do? – String of putrid pools or string of pearls? Maintain flows, recognise its natural and part of the way the creek functions. Manage differently in the dry season.

Too many dams, too few managed

Dams behave in a similar way to lazy pools. There are about 2000 dams in Redland City. Most are not needed any more and many are no longer managed. Many of these dams are in poor condition and storing putrid water.

So what do we need to do? – Do you really need the dam? Manage it or get rid of it! You can remove the dam. Oxygenate the dam water. Establish floating and fringe

plants. Dewater dams with a pump (irrigate onto pasture or sports fields) when the creeks stop flowing - clean the dam out (reset) every few years. Get rid of pest fish and pest water plants.

Bare creek banks mean no habitat

Bare creek banks are a problem because they have no habitat, are unstable and easily eroded during rainfall events, contributing unnecessary dirt and nutrients to downstream waterways.

So what do we need to do? – re-plant with trees, shrubs and ground cover, establish buffer zones, replant the bank for stability, shade and shelter etc.

Use electric fencing to control stock access, establish off-stream watering points for stock.

Begin at the top of the creek

Pest plants and in stream animals like pest fish have to be removed from the top of the catchment down – it's no good starting at the bottom.

So what do we need to do? – work together to coordinate any pest fish and plant removal across the landscape. Be neighbourly and talk to each other about the problem. Replace pest fish with native fish, and pest plants with native plants.

Manage and plan rural blocks

Poor land management on small rural properties fringing our towns can have significant impact on creeks. This is especially true where people keep stock or use fertilisers. Many people are new to managing land and have little time available. In addition, fencing, pasture management, revegetation, off-stream watering, dam management, nutrient control and erosion control are all different on different soil types.

So what do we need to do? – Undertake property planning and find out what the best practices are for your land. Council has programs that work with private landholders to help them get access to the right information and advice. Contact the Waterways Extension Program through Indigiscapes.

Urban stormwater

Stormwater from urban areas is a persistent source of pollutants. What we do in our back yard, commercial premises and property often ends up in stormwater. Changing the way we do things reduce the pollutants in stormwater.

So what do we need to do? – There are a lot of new ideas and methods for establishing rain gardens, gross pollutant traps, biofilters and swales that can be applied at any scale – from back yards to farmland. Stormwater storage, and re-use on gardens and playing fields helps by absorbing nutrients on re-use. New estates and developments must meet strict stormwater management conditions, but these are also progressively being applied in existing urban areas through retro-fit programs.

11. Creek Recovery Profiles

In 2004, Council stopped producing Waterway Management Plans for individual catchments because we found that the problems above were common to all waterways and we didn't need a plan to find them and fix them – especially on Council land. We began researching the incidence of sediment, nutrient and pollutant runoff to creeks, dams and wetlands, erosion, fish and bug populations, pest fish and weeds, creek function, fish barriers and other issues across the whole of the city.

Our research has uncovered findings unique to each catchment that tell us that at a detailed level they are all different and their recovery can be approached differently. We call this the 'recovery profile' of each catchment. Here, in a nutshell, are those recovery profiles. Look up your catchment and see what must be done to recover its health.

Recovery Profiles focus on the unique problems and solutions in each catchment and are based on our current understanding. The profile has not been completed for some catchments but will be by 2014 and will be added to the strategy when they are completed.

Tarradarrapin

The 2012 overall water quality rating for Tarradarrapin Creek is C¹. The ratings in the Waterways Recovery Report indicate that the waterway is in fair condition, and the overall water quality trend is slightly declining (2004-2012).

What's the unique problem here?

The end of this catchment is a modified estuary that is channelled and hard lined into canals and artificial water bodies – Sovereign Waters and EGW Woods constructed water bodies.

Tarradarrapin Creek and its tributaries are narrow waterway corridors in a completely urbanised catchment receiving urban storm water inputs.

New declared weed (Cabomba) found.

In-stream waters regularly experience excess algal growth, high organic matter and depleted oxygen in the water.

What are some unique causes?

There are hundreds of stormwater end structures (culvert, headwalls, stormwater outlet pipes) that channel stormwater flows into the waterways during rainfall events.

Elevated phosphorous inputs are most likely feeding algae growth.

High organic matter most likely from urban storm water inputs carry dust, sediment, decaying plant matter, animal waste, dead animals and fertiliser.

Processing and breakdown of organic matter is most likely contributing to low dissolved oxygen.

What unique solutions will improve the creek health?

Stormwater management solutions – stormwater harvesting, street rain gardens, backyard management of leaf litter and lawn clippings,

¹ Water quality ratings contained in Waterways Recovery Report 2012.

Waterway corridor widening and planting up with vegetation to filter storm water inputs.

Hilliards

The 2012 overall water quality rating for Hilliards Creek is B². The ratings in the Waterways Recovery Report indicate the creek is in good condition and the overall water quality trend is slightly improving (2004-2012).

What's the unique problem here?

The creeks are very small and during dry weather conditions there is no flow and some sections dry up. Isolated water holes build up contaminants and are then flushed downstream with first summer rains.

The upper catchment is mostly non urban with many dams, lifestyle blocks and agricultural activities – poultry farms, mixed intensive agriculture and horse stables.

The lower catchment is urbanised. Cleveland Wastewater Treatment Plant located in lower catchment.

Phosphorous and dissolved oxygen levels exceed guideline values at Boundary Road.

What are some unique causes?

Upstream reaches – many dams and agricultural activities most likely contributing elevated nutrients particularly during rainfall events as evidenced by exceeding guideline values at Boundary Road.

STP irrigation fields and point source outfall above and below Finucane Road is associated with pasture along drainage lines that used to be vegetated creeks.

Prevailing southerly winds in winter deposit dust and sediment on the landscape and then flushed into waterways during first summer rains.

Urban storm water inputs – some more local and intense than others.

What unique solutions will improve the creek health?

Focus on dam management, property management and riparian filters with landholders in upper reaches through the waterways extension program.

Trial dam de-watering program in upper catchment.

Focus on WSUD solutions in the lower catchment for treatment of urban storm water inputs.

Cleveland

The 2012 overall water quality rating for the Cleveland Creeks is D. The rating indicates that the waterways are in poor condition and the overall water quality trend is beginning to decline (2004-2012).

What's the unique problem here?

Most of Ross Creek is a hard lined drain, flowing into a modified estuary that is channelled into hard lined canals. There is no flow during dry weather conditions. Waterway is unable to process nutrients. Primary function of creek is to convey storm/flood water during rainfall events.

² Water quality ratings contained in Waterways Recovery Report 2012

Very elevated nutrients, very high dissolved oxygen, and low levels of algae.

Unique Ramsar Wetland in Black Swamp.

Mostly urbanised and infill/unit development is now occurring and this catchment will trend toward higher urban densities over time.

What are some unique causes?

Highly urbanised catchment delivering pollutants in urban storm water – road gutter, sediments, nutrients, organic matter, metals, hydrocarbons, litter.

Excess algae and plant growth in-stream could be contributing to super saturated dissolved oxygen.

Highly modified waterways – few natural functions remaining.

What unique solutions will improve the creek health?

Focus on urban storm water management to reduce nutrients.

Streetscaping – rain gardens.

Better maintenance of sediment trap devices – not bypassing.

Urban extension program

Thornlands

The 2012 overall water quality rating for Thornlands is C. This rating indicates that the creek is in fair condition and the overall water quality trend is steady (2004-2012).

What's the unique problem here?

Northern half of catchment very urbanised

Southern half of catchment - large lots, lifestyle blocks, horse stables, horticulture, many farm dams and artificial water bodies.

Nutrients are very elevated and most likely feeding very high algae growth.
Dissolved oxygen is good.

What are some unique causes?

Farm dams overflowing during rainfall events and agricultural activities generating nutrient inputs.

Urban lots and backyards contributing nutrients in storm water inputs.

Narrow waterways corridors unable to filter and capture flows high in nutrients.

What will improve the creek health?

Focus on nutrient reduction from urban and non urban sources.

Focus on dam management – Rural Extension

Corridor, maintenance and connections through rehabilitation.

Eprapah

The overall 2012 water quality rating for Eprapah Creek is C. This rating indicates that the creek is in fair condition and the overall water quality trend is steady (2004-2012).

What's the unique problem here?

Sandy Creek and Little Eprapah Creek – riddled with dams – chain of ponds

Soil types and geology – source of high sediments

High total phosphorous levels most likely bound to sediments.

Elevated total nitrogen levels most likely from high organic matter entering waterways – rural inputs. Algae growth is also very high most likely fed by high nutrients.

Dissolved oxygen and sediments are moderately elevated.

What are some unique causes?

Peri-urban lifestyle block land use – livestock, chook farms, cropping, horticulture, septics, farm dams.

High organic matter inputs to waterways – potentially historical inputs as well.

High incidence of pest plants and animals in-stream.

Localised sediment sources – erosion gullies, eroding banks,

What will improve the creek health?

Focus on erosion management - fix and stabilise eroding sites on Council land in upper catchment and Sandy Creek Conservation Area.

Focus on reducing nutrients – work with landholders through WEP.

Focus on dam management – Little Eprapah Ck and Sandy Creek focus area,

Trials and investigations - oxygenation of dams and sections of creek,

Riparian and in-stream maintenance – weed removal, revegetation,

Moogurrapum

The overall water quality rating for Moogurrapum Creek is C. This rating indicates that the creek is in fair condition and the overall water quality trend is steady (2004-2012).

What's the unique problem here?

Lifestyle peri-urban blocks in upper catchment with many poultry farms.

Intensive urban development in eastern half of catchment.

Some areas of large reserve in upper catchment headwaters.

High phosphorous levels and very low dissolved oxygen.

Low suspended solids and low algae counts.

What are some unique causes?

Many farm dams, poultry farms, agricultural activities could be contributing to high nutrient levels.

Organic matter is coming from decaying plant matter, animal waste, dead animals and fertiliser most likely contributes to low dissolved oxygen. This could be made worse by low flow conditions.

Urban storm water inputs deliver organic matter and nutrients.

What will improve the creek health?

Focus on reducing nutrients and organic matter inputs.

Focus on working with landholders - Waterways Extension Program

Focus on urban stormwater management

Trials and investigations - enzyme and good bacteria seeding of waterways to increase rate of organic matter breakdown. Better understand in-stream processing.

Weinam and Torquay

The overall water quality rating for Weinam Creek is C. This rating indicates that the creek is in fair condition and the overall water quality trend is declining.

What's the unique problem here?

High phosphorous levels, very high algae counts, low levels of dissolved oxygen and high levels of total suspended solids

Headwaters of the catchments are in reserves.

Recent intensive urban development

Strong urban bush care group/s

What are some unique causes?

Soils types, previously full and bypassing GPTs and recent land clearing for on-going urban development could be contributing high sediments in waterways.

Artificial water bodies in poor condition could be contributing high nutrients when overflow.

Poor riparian corridors in places

Land clearing for urban development

What will improve the creek health?

Focus on sediment management

Significant length of creek is now master planned

Regular program of GPT maintenance now in place

Continue to support community bushcare and waterway rehabilitation projects

Serpentine

The overall water quality rating for Serpentine Creek is C. This rating indicates that the creek is in fair condition and the overall water quality trend is steady.

What's the unique problem here?

Two thirds of the catchment is National Park or Reserve land (includes Council's Days Road Conservation Area.

Carbrook Wetlands. Melaleuca vegetation contributing humic acid from tannins.

Very elevated nutrients, algae counts, and sediments. Dissolved oxygen is good.

What are some unique causes?

Localised stream bank instability contributing to sediments in waterways.

Tracks and trails in reserve areas could also be a source of sediments.

High nutrients in the systems most likely bound to sediments. High nutrients most likely feeding algal growth.

What will improve the creek health?

Fix localised erosion sources on Council land. Collaborate with National Parks.

Focus on nutrient management, prevent entry to waterways to control algae growth in waterways.

Better understand natural processes associated with Melaleuca Wetlands.

Native Dog

The overall water quality rating for Native Dog Creek is C. This rating indicates that the creek is in fair condition and the overall water quality trend is steady.

What's the unique problem here?

Catchment soils

Upper western catchment – poultry farms (possible air borne dust and nutrients), lifestyle blocks, agricultural activities, farm dams, unsealed rural roads

Upper eastern catchment, mostly flows through reserve land.

This year's rating is influenced by high levels of total suspended solids. During rainfall events, extremely high levels of all nutrients and sediments experienced at one monitoring site.

What are some unique causes?

High mobilisation of sediments during storm events from rural and urban areas most likely from eroding soil type, bare earth and unsealed roads.

High nutrients attached to sediments and in the water most likely feeding algal growth.

Organic matter and nutrient inputs from farm dams and agricultural activities. Processing and breakdown of organic matter most likely contributing to depleted dissolved oxygen.

GPTs were full and bypassing.

What will improve the creek health?

GPTs cleaned and regular maintenance program implemented.

Intensive hotspot investigation to better understand source of high loads.

Continue WEP program with landholders in western and northern parts of catchment and work more closely with poultry farmers to understand air borne dust and nutrients

Manage dams to reduce nutrients entering waterways.

Fix eroding soils and gullies on Council land

Upper Tingalpa

The overall 2012 water quality rating for Upper Tingalpa Creek is B. This rating indicates that the creek is in good condition and the overall water quality trend is steady (2004-2012).

What's the unique problem here?

Sediments and possible air borne dust

Lower catchment – lifestyle blocks, small farm dams, septic systems. Two poultry farms

Lot of reserve land in the upper catchment area

Salvinia weeds, presence of pest plants and animals.

What are some unique causes?

Moderate to high sediments in the water.

Utility easements, Quarry, Unsealed rural roads, tracks and trails on reserve land and eroding banks and gullies are all potential sources contributing to elevated sediments.

Moderate to low dissolved oxygen levels

Moderate amounts of organic matter within the waterway. Processing and breakdown of organic matter most likely contributing to low dissolved oxygen.

What will improve the creek health?

Fix unstable and eroding soils on Council land to prevent sediments entering waterways.

In-stream improvements and pest management.

Focus on management of nutrient and organic matter inputs.

To be developed in 2013

California

Coolnwynpin

Southern Moreton Bay Islands – Macleay, Lamb, Karragarra, Russel, Coochiemudlo

North Stradbroke Island

Box 1: Follow the science and monitoring

The best sources of science behind our understanding of waterways are available through the Healthy Waterways Network in Southeast Queensland. For further information, visit: www.healthywaterways.org

Links to be added

Recent HWN reports on the Bay

Links to be added

Recent HWN reports on the Queensland floods

Links to be added

Council Waterway Recovery Reports – are available at:

www.redland.qld.gov.au/EnvironmentWaste/Water/Waterways/Pages/Waterway-

12. Council is not in this alone

The first priority of the strategy must be for Council to take a leadership role in managing the creeks under its control, on Council land which is mainly in the lower, urbanised parts of each catchment. *Reaching for Waterway Recovery* describes how such work is now an integral part of Council's business. Our increasing population and further planned infill development are a considerable challenge for the future and Council's experience suggests that this management will be a demanding task.

The second priority of the strategy is to influence, motivate and assist other landowners to improve their land management as well. Most of the upper rural areas of most catchments are privately owned, and Council can only support good management practices.

The financial constraints on Council mean that we must focus on what can realistically be done and where activities can be rationalised. For example weeding and maintenance activities must achieve outcomes for waterways, koala habitat, pest management and maintaining Council assets. The first 5 year plan (2013 to 2018) must focus on Council land and continue to focus on what works well - managing all catchments at once, investigating local problems, finding and fixing hotspots, reporting performance and trialling cost-effective local solutions to the problems.

Comments and submissions about the strategy are invited from the community, industry, commerce and government up to the end of 2013. The Strategy and Action Plan will be reviewed after and returned to Council should there be any significant amendments in late 2014.

13. Management Principles

There are some fundamental principles that underpin Council's approach. The Strategy can only be achieved if the following principles are followed:

- **Understand the health of the waterways.** Knowing where the waterway health issues are in the landscape and testing management solutions is the key to informing recovery and maintenance of our waterways.
- **Recover the health of waterways.** Recovery is the priority (main game), so that we can continue to enjoy and value our waterways long into the future.
- **Test, inform and guide our actions.** People and budget are limited so our actions for management and protection must be prioritised so that maximum benefits for dollars available is realised as improvements in waterways health.
- **Protect receiving waters of Moreton Bay.** Moreton Bay is mostly a Marine Park and of great conservation, recreation and commercial value, so ensuring that the waterways flowing into the Bay are healthy will help to maintain these values.
- **Link to related strategies.** Aligning with other strategies will help to achieve waterways health recovery - Open Space Strategy and 7Cs Connection Strategies, Total Water Cycle Management Planning, Local Area Plans, Master Plans.
- **Work together and to our strengths.** Collaboration and partnerships between public, private and corporate landholders and state/local government will be necessary to support waterway recovery. Leveraging off the work of others in the region and working within the resources we have (not waiting for the resources to be provided) will also be vital for success of waterways recovery.

- **Act now.** Making the easier 'low hanging fruit' investments and actions for waterway health today will always be less expensive than doing them tomorrow.

14. Community in action

It is important to acknowledge and chronicle that for many years, community volunteers have given thousands of hours to remove weeds, replant waterway corridors, monitor water quality, inspire and educate others to manage and recover the health of our waterways. Industry and governments have also supported and invested in healthy waterways. This section is a highlighted account of our community efforts to protect, improve the health and measure the recovery of our waterways.

Eprapah Creek Catchment Landcare Association (Inc) (ECCLA)

Formed in 1990, ECCLA is a group of volunteers dedicated to improve the environmental condition of Eprapah Creek catchment. Members collaborate with local stakeholders including landowners, industry groups, wildlife groups, local and state governments. ECCLA raised the alarm with authorities of a Tributyl Tin (TBT) contamination of Eprapah Creek estuary that led to a clean-up. The group has:

- run community and school water quality monitoring and training (Waterwatch);
- revegetated Eprapah Creek – Eprapah Environmental Education Centre, Karingal Scout Campsite, Mt Cotton and improving wildlife corridors and connections along a 16 km section of creek, and 7000 seedlings planted by end of 2003. Bushcare
- Coastcare for a Sea Eagle interpretive platform and nature trail that also protected against severe erosion near the estuary of Eprapah Creek; and a flora and fauna inventory of Eprapah Creek Estuary
- Caring For Country for weed control and revegetation at the Kingfisher Road bridge crossing. A small group of members continue to monitor and weed this site, targeting the Maderia vine, the main environmental weed at this site.
- Redland City Council supports ECCLA contributing labour, advice, expertise and small grants

Bushcare

Groups involved in Bushcare activities carry out weed removal and revegetation often near waterways. Currently, 44 groups are active across Redland City and receive support from the Bushcare Program for coordination, training, tools, equipment and seedlings. Some examples of significant and varied community volunteer achievements include:

- Grevillia Street at Redland Bay is focussed on weed removal and revegetation of upper Wienam Creek.
- Cow Bay Bushcare Group is active on Macleay Island for the last 4 years and produced a Plant Identification Guide for the Bay Islands (Volumes I and II, Volume III is planned). This represents significant local community knowledge of plants on the Bay Islands.
- Russell Island Bushcare Group and the Mercen Road project involved community volunteers to plant 1700 plants of endangered scribbly gum on red soil habitat (12.5.3) Collected wetland ferns, wallum nursery, grew own stock to re-plant as part of wetland conservation and management. Weed control is also undertaken over the road.
- In the 2011/12 financial year, community groups planted approximately 20,000 trees across the City.

- Council supports the Bushcare Program, now in its seventeenth year. In addition to supporting local groups, Council facilitates three Community Planting Day events each year. The approximate number of trees planted each year is 1400 to 1700 Koala food trees, 4000 for National Tree Day and 1000 for Glossy Black Cockatoo habitat on the Bay Islands.

Creek Crew

The Creek Crew volunteers focus on water quality monitoring in Coolnwynpin and Hilliards Creeks. Ten volunteers are involved in regular monitoring of water quality.

Creek Crew volunteers are supported with a trained coordinator employed by Council, and access the HARIBA probe to measure water quality parameters. The volunteers collect data and it goes onto the SEQ Catchments community data web site.

Landholder Actions – Waterways Extension

Up to 60 landholders participate in the Waterways Extension Program. This program offers technical, practical and financial advice to landholders who are willing to partner with Council to enhance conditions on their land and contribute to improved water quality downstream. In three short years, private landholders in rural areas have made many changes to improve waterway health. In future, it is anticipated many more landholders will participate and continue the positive on-ground efforts towards recovery of waterway health.

A whole-of-property management approach for animal waste, soils, ground cover (pastures) and dams is highlighted from one of the program participants, on Kingfisher Road. Road base was used to control areas of erosion, structures were built to contain collected horse manure, ground cover was increased through re-spreading of composted manure. This led to improved pastures helping to prevent soil erosion, sediments and nutrients flowing downstream.

Dam management is a major focus of the Waterways Extension Program. Generally dams present multiple challenges for landholders as they can be:

- High in nutrients – contribute to blue green algae outbreaks;
- High sediment loads – water looks murky/dirty; and
- Void of edge (riparian) vegetation – vegetation acts as a filter for nutrients, sediments and other pollutants.

Landholder actions focused on dam management include revegetating the edges of dams, spillways and in-stream, fencing of dams, removing aquatic weeds, and trialling different land management practices to improve water quality.

Program participants have trialled floating wetlands on private dams. A floating wetland made up of 12 panels (24m/sq) was trialled on one dam and many more participants are planning to use this method to improve dam water quality.

Land for Wildlife, Koala Agreements, Conservation Agreements

Actions aimed at wildlife, koalas and conservation agreement often coincide with and involve waterways. Wildlife and waterways benefit.

15. Council Land Management

Council is responsible for managing land under its control, whether it is freehold land or state land vested in Council for management. A large portion of this land is conservation estate with varying needs for maintenance, rehabilitation of erosion gullies and revegetation of cleared and degraded waterways. During the 2010/11 financial year, 4.6 hectares of land adjoining creek banks and wetlands within conservation estate land was revegetated. Some examples include:

- Lower Coolnwynpin Creek – revegetation, maintenance and weed removal.
- Tarradarrapin Creek adjacent to Judy Holt Sportsfield and landfill – revegetation and maintenance.
- Hilliards Creek and Lorrieket Drive – revegetation, maintenance and weed removal.

16. Stormwater Management

As cities urbanise and the landscape hardens, water moves at greater speed and volume, carrying and distributing whatever it has collected along the way. During rainfall events, this becomes flood or storm water. We do not see all of the storm water flow until it reaches a creek, because it moves hidden from view, through an underground network of pipes. Industry invests significantly to construct special structures to retain, store and filter stormwater in retention ponds, bio-filters or wetlands. These types of storm water management structures try to mimic natural ponds and wetlands, and help to improve waterway health by trapping and preventing nutrients and sediments from entering downstream waterways. This method of stormwater management creates co-benefits for local habitat, environment and amenity values.

There are several model examples across Redland City where the urban development industry has constructed stormwater management structures that help to recover waterway health. These type of structures need to be designed to best practice standards and regularly maintained to ensure maximum effectiveness.

17. Dams - artificial water bodies

About 1,400 dams or artificial water bodies (AWBs) dot the Redland City landscape, varying in size from small farm dams to substantial lakes and wetlands. Up to 140 of these water bodies are on public land that provide important public amenity and open space values. Most dams were built long before we had good design, construction and management guidelines and many dams are now degraded or face future health failure. Unhealthy and degraded dams risk the health of downstream waterways each time they overflow during rainfall events.

Through multiple investigations and trials to manage and reverse poor health of AWBs, Council has acquired a good understanding and now has cost effective, practical and flexible tools for future assessment, management and restoration of AWBs across the city. These tools will be turned into guidelines and the knowledge shared with private land owners to reduce the risk of degraded water bodies impacting on the health of downstream waterways.

18. Monitoring and reporting waterway health

Community, industry and governments have monitored the health of Redland's waterways for many years. Unfortunately, not a lot of monitoring data gets into public reports. Council commenced public annual reporting of waterway health monitoring in 2010, followed by the

2011 report and the 2012 report is due soon. Redland City Council is a member, since 1995 of the Healthy Waterways Network and contributes towards the SEQ Regional Annual Waterway Health Report Card.

These annual reports show the trend in waterway health since 2004 and include rainfall events and sources of high pollution in the freshwater creeks. Investigations to identify pollution hot spots have focussed on Eprapah, Hilliards and Tarradarrapin catchments and methods are continually improved to implement 'hot-spot fixes'.

Part Two: Waterway Recovery Strategy

What does the Strategy do?

We need to chart a course for waterways recovery that is smart, cost effective and has real world impact in all the right places. We need an almost ‘surgical’ approach to improving the current health of our waterways.

The right course for waterways recovery is about getting the basics right and recognising that everyone has a job to do. The future health of our waterways is a whole of community responsibility and this document broadly identifies what we need to do, where and by whom. The basics are to limit pollutants entering our waterways and improve management of public land, encourage and facilitate action on private land, recover healthy plant and animal populations, and improve public access to and opportunities for nature-based recreation and appreciation of our waterways.

Ultimately, the purpose of *Waterway Recovery Strategy* is to guide the community and focus our collective efforts to return our waterways to a healthy state by 2030.

The document outlines nine high-level objectives that guide what we need to do, and provides the strategic outcomes to 2030 for each objective that Council will be seeking - effectively establishing a road map for waterways recovery by 2030.

Waterway Recovery Strategy

Head of Power

This head of power for this strategy is provided by Council’s Corporate Environment Policy (POL 2644) that in regard to waterways commits Council to:

“halt and reverse the declining trend in the health of Redlands waterways and Moreton Bay, returning the native fish and macro-invertebrates to our (freshwater) waterways”

Council’s Corporate Plan 2010 – 2015 outlines a strategy for a Healthy Natural Environment to:

“Address the decline in the health of Redlands waterways and improve water quality, aquatic populations and their biodiversity.”

Objectives

The high level objectives to 2030 are to:

1. Preventing pollution (mainly nutrients) from entering waterways and managing waterways to limit the in-stream release of nutrients.
2. Managing public land to achieve no negative impacts on downstream waterways.
3. Retaining sediment on-site and preventing sediment moving into waterways.
4. Controlling development to avoid, mitigate and manage negative impacts on downstream waterways.
5. Managing artificial water bodies or removing them from the landscape.

6. Recovering healthy plant and animal populations in mainland and island waterways.
7. Maintaining a comprehensive network of connected, shaded and weed-free waterway corridors across the city.
8. Providing places, activities and opportunities for the community to connect with waterways and becoming involved in local recovery efforts.
9. Driving improvement in waterways health through regular reporting and evaluation of waterways condition.

Council has direct control to implement actions that address these strategic objectives on Council land, and under its statutory obligations for example for development control, management of environmentally relevant activities, and responsibility for minor water pollution. Outside of these statutory obligations, on private land and government controlled lands, Council can only influence land management to achieve the strategic objectives through liaison, extension, and communication activities. This strategy provides Council with no additional powers to require or enforce compliance with the strategic objectives on private lands.

Strategic Outcomes

For each of the objectives, a number of strategic outcomes are identified. These are action-focussed statements that tell us exactly what we need to accomplish if we are to achieve the above objectives by 2030.

Action Plan

A separate Action Plan is developed every 5 years to implement this Strategy.

Waterway Recovery Strategy to 2030: Objectives and Strategic Outcomes

	Strategic Objective		Strategic Outcomes to 2030
1	<i>Prevent pollution (mainly nutrients) from entering waterways and manage waterways to limit the in-stream release of nutrients.</i>	1.1	Hot-spots in the landscape are better managed so that pollutants are prevented from entering waterways.
		1.2	Visual pollution (e.g. litter) is prevented from entering waterways.
		1.3	Urban catchments are retrofitted with Water Sensitive Urban Design (WSUD) structures to prevent nutrients and sediments from entering waterways in urban storm water.
		1.4	Treatment of overland flow through rural and urban landscapes better captures pollutants on land and prevents entry of sediments and nutrients to waterways.
2	<i>Manage public land to achieve no negative impacts on downstream waterways.</i>	2.1	Council leads by example to achieve a high standard of environmental performance in its operations so that potential pollutants are retained on-site.
		2.2	Major erosion scars, gullies, stream bank slumping and instability are repaired and removed from Council land.
		2.3	Healthy riparian vegetation and aquatic habitats are established and maintained on Council land in waterway corridors.
3	<i>Retain sediment on-site and prevent sediment moving into waterways.</i>	3.1	Landholders are motivated and better able to stabilise erosion and maintain ground cover (pastures, riparian vegetation) on private and government lands.
		3.2	A high standard of erosion and sediment control is maintained at all times on all construction sites, retaining sediment on-site.
4	<i>Control development to avoid, mitigate and manage negative impacts on downstream waterways.</i>	4.1	The Redland Planning Scheme Review achieves a high level of protection for waterway health outcomes.
		4.2	Planning across Council supports a higher level of waterways protection and management
		4.3	Model local laws regulate activity that is non-development to maintain protection and management of waterways.
		4.4	Council officers continue to collaborate internally and externally to maintain knowledge on policy, planning and management protection and management of waterways.
5	<i>Manage artificial water bodies or remove them from the landscape.</i>	5.1	Water stored in artificial water bodies on Council and private land is wherever possible recycled and used elsewhere in the landscape to prevent high concentrations of sediments and nutrients

			overflowing into downstream waterways.
		5.2	Artificial water bodies are routinely assessed and removed from Council land where they are identified as surplus to needs, or unsuitable to maintain.
		5.3	Artificial water bodies on Council land are better managed to achieve no negative impacts on downstream waterways.
		5.4	Council promotes and assists landholders to reduce the number of artificial water bodies in the landscape, seasonally de-water dams or recycle dam water to achieve no negative impacts on downstream waterways.
6	<i>Recover healthy plant and animal populations in mainland and island waterways.</i>	6.1	Native plant and animal populations have been recovered in priority habitat locations.
		6.2	Pest and invasive plants and animals have been managed or removed from priority waterways.
		6.3	The importance and value of iconic waterway species is communicated and promoted to the community
7	Maintain a comprehensive network of connected, shaded and weed free waterway corridors across the city.	7.1	Riparian vegetation has continuous coverage on creek banks on Council and private lands especially where these are presently degraded.
		7.2	A system of public multiple-use paths and trails along waterways and through Council land is developed to encourage appreciation and understanding of waterways and attract ecotourism visitors.
8	<i>Provide places, activities and opportunities for the community to connect with waterways and become involved in local recovery efforts.</i>	8.1	Council provides services that recognise the community's values of waterways and appreciation of adjacent open space natural environments.
		8.2	Council encourages stewardship of waterways and supports local neighbourhood activities focussed on waterways.
9	<i>Drive improvement in waterways health through regular reporting and evaluation of waterways condition.</i>	9.1	Council's waterways monitoring program continues to successfully inform priorities for management and influence priorities for capital and operational work programs across Council.
		9.2	Council has established partnerships with universities, SEQ networks and local specialists to support investigations, research, innovative and cost-effective solutions for waterways management and recovery.
		9.3	Council continues to provide public reports about waterways recovery and activities through various media.
		9.4	Council is increasingly recognised as a local government leader for recovery and management of waterways.

END