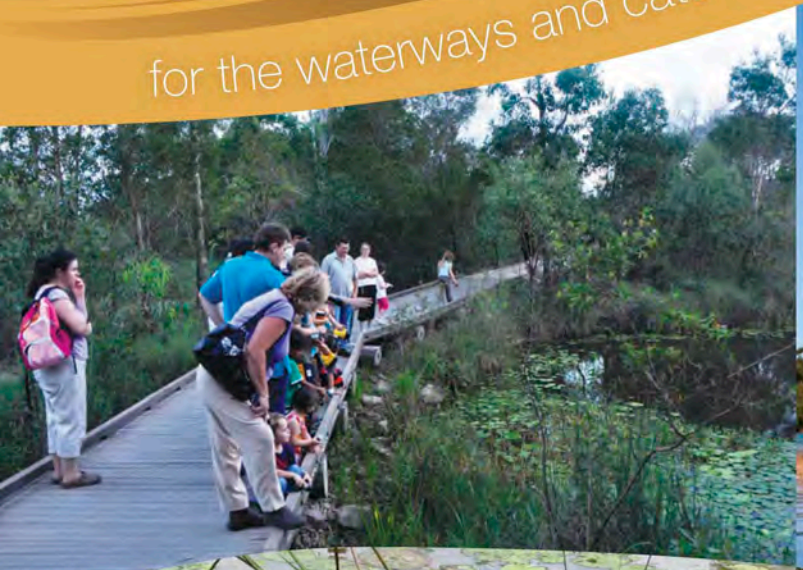
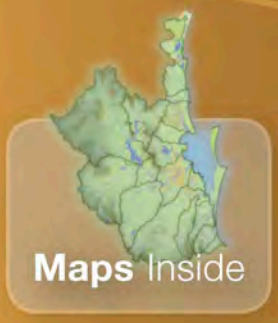
2011 Report Card

for the waterways and catchments of South East Queensland





HEALTHY WATERWAYS

EcosystemHealth Monitoring Program

Queensland Government · SEQ Catchments · Griffith University · The University of Queensland · CSIRO · seqwater · WaterSecure · JBS · Cement Concrete & Aggregates Australia · Incitec Pivot · Queensland Prawn Farmers · GHD · allconnex water · Queensland Urban Utilities · Unitywater · Redland City Council · Logan City Council · Sunshine Coast Council · Toowoomba Regional Council · City of Ipswich · Moreton Bay Regional Council · Scenic Rim Regional Council · Somerset Regional Council

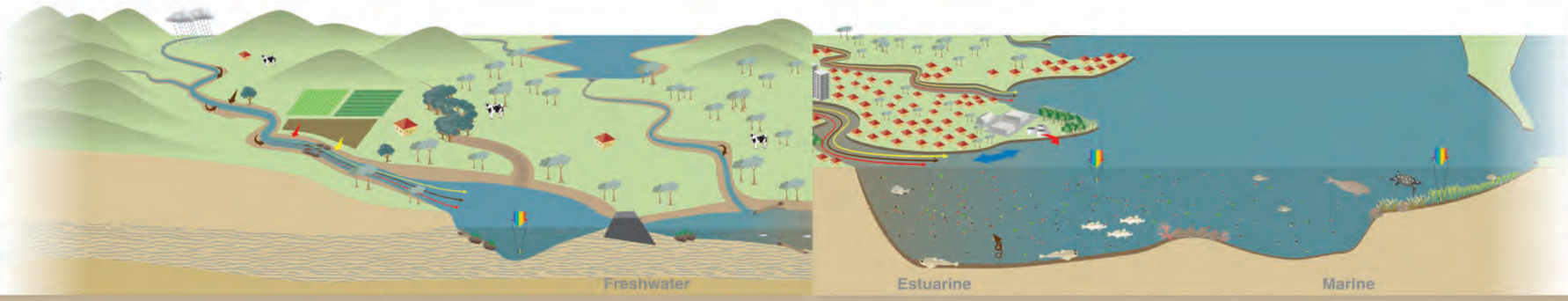
Impacts of the 2011 January Flood

Freshwater

Estuarine and Marine

Pre-flood

- Early rainfall saturated the catchments and transported minimal sediment, nutrients and pollutants into waterways. Water clarity was generally good.
- Gullies and riparian (riverbank) zones that had good vegetation cover were less vulnerable to erosion.
- Rocks and vegetation provided in-stream habitat for fish.

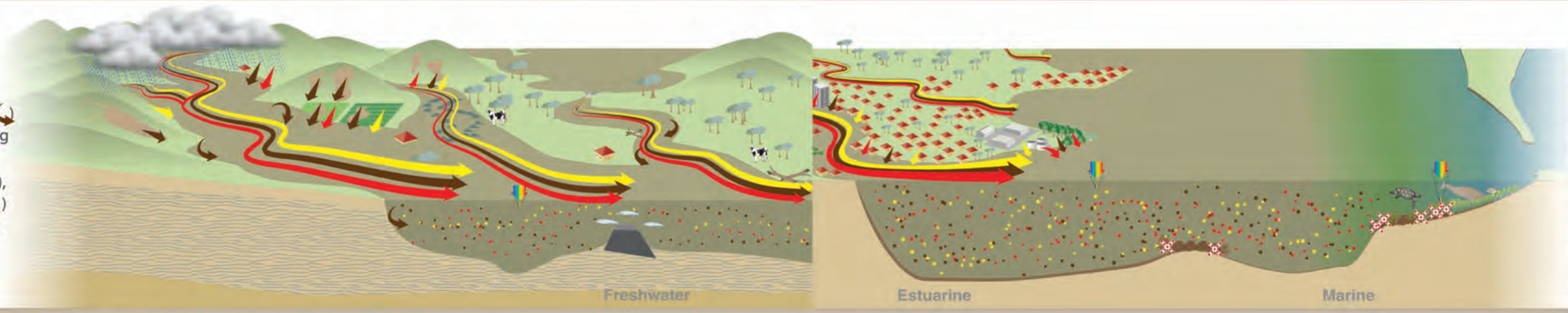


Pre-flood

- Minimal sediment, nutrients and pollutants from the freshwater catchments entered Moreton Bay.
- Areas with good water clarity, supported coral, seagrass, turtles and dugongs.
- Point source nutrients were a dominant impact on estuaries and western bay.

During flood

- Intense rainfall in an already saturated catchment caused flooding.
- The force of the flood eroded gullies and riverbanks, changing the shape of river channels.
- Large amounts of sediment, nutrients and pollutants flowed into waterways causing poor water clarity. High water levels allowed fish to migrate.



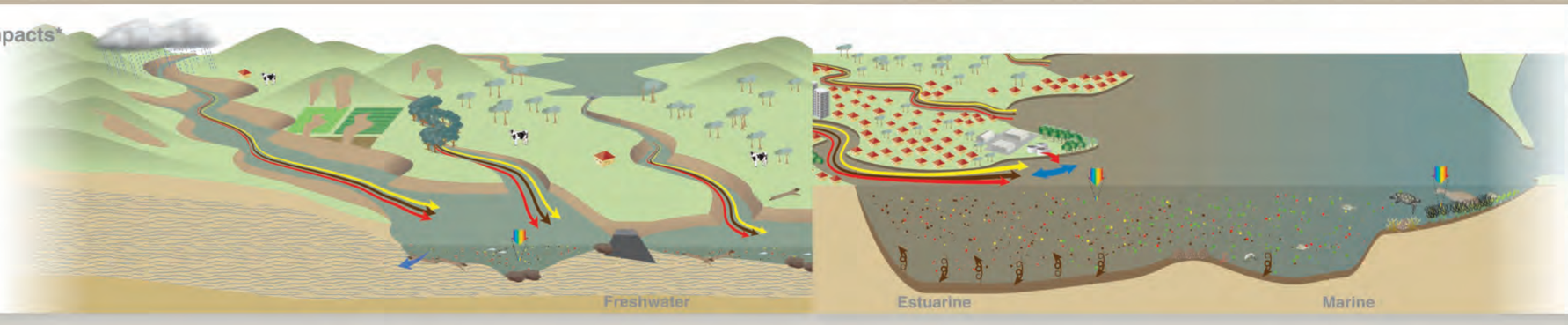
During flood

- Flooding caused a large freshwater plume to extend across most of the bay.
- The plume contained high levels of sediment, nutrients and pollutants from the catchments, causing poor water clarity.
- Some seagrass and coral were smothered by sediment, affecting their ability to survive.

Post flood - short term impacts*

- Newly eroded gullies and riparian zones are prone to further erosion.
- Sediment, nutrients and pollutants remain in the water causing continued poor water clarity.
- Groundwater systems are recharged, providing water for the future.

* 6-12 months



Post flood - short term impacts*

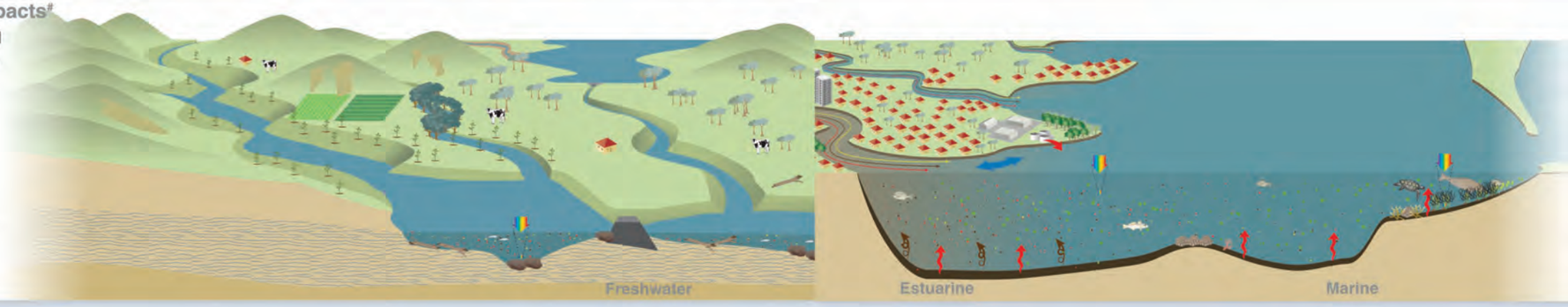
- Water clarity improves due to sediment settling and tidal flushing.
- The sediment settles on the bottom of the bay forming a mud layer. When the mud layer is resuspended it reduces water clarity.
- Increased nutrients causes algal blooms such as *Lyngbya* which prevents seagrass and coral growth.

* 6-12 months

Post flood - long term impacts#

- Sediment, nutrients and pollutant levels may return to pre-flood conditions, improving water clarity.
- Rocks and vegetation moved during the flood provide in-stream habitat for fish.
- Protected and re-vegetated riparian zones are less likely to erode.

\# 12 months and beyond



Post flood - long term impacts#

- As the plume disperses, water clarity will improve.
- Seagrass dependant animals such as fish, turtles, and dugongs may be affected due to loss of food and habitat.

\# 12 months and beyond

Freshwater Report Card 2011

Ecosystem Health Monitoring Program

The Ecosystem Health Monitoring Program (EHMP) is one of the most comprehensive freshwater, estuarine and marine monitoring programs in Australia. The EHMP delivers a regional assessment of the ambient ecosystem health for each of South East Queensland's (SEQ) 19 major catchments, 18 river estuaries and nine zones in Moreton Bay.

Healthy Waterways manages the program on behalf of our member organisations, and it is delivered by a large team of experts from the Queensland Government, universities and CSIRO.

Report Card Grades – What do they mean?

For over 10 years, the EHMP has produced an annual Ecosystem Health Report Card to highlight whether the health of our waterways is improving or declining. Ecosystem health is assessed against water quality guidelines, resulting in a single grade for each freshwater, estuarine and marine system.

A total of 389 sites are monitored across SEQ and Moreton Bay: 135 freshwater sites are monitored biannually, and 254 estuarine and marine sites are monitored monthly.

The 2011 Report Card grades ('A' to 'F') are based on analysis of data collected from July 2010 to June 2011.

- **A** — **Excellent:** Conditions meet all set ecosystem health values. All key processes are functional and all critical habitats are in near pristine condition.
- **B** — **Good:** Conditions meet all set ecosystem health values in most of the reporting region. Most key processes are functional and most critical habitats are intact.
- **C** — **Fair:** Conditions meet some of the set ecosystem health values in most of the reporting region. Some key processes are functional and some critical habitats are impacted.
- **D** — **Poor:** Conditions meet few set ecosystem health values in most of the reporting region. Many key processes are not functional and many critical habitats are impacted.
- **F** — **Fail:** Conditions do not meet set ecosystem health values. Most key processes are not functional and most critical habitats are severely impacted.

Indicators used for assessing ecosystem health

Freshwater

Five ecological indicator groups are measured:

- physical chemical
- nutrient cycling
- ecosystem processes
- aquatic macroinvertebrates
- fish.

Estuarine and Marine

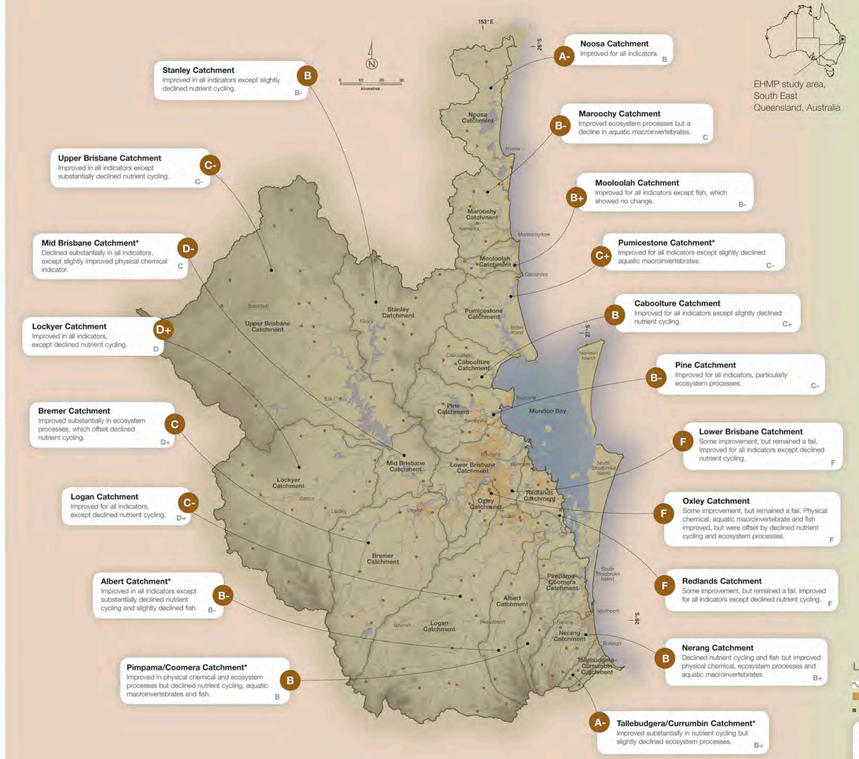
Ecological Health Index indicators measured are:

- algae (phytoplankton)
- *Lyngbya*
- secchi depth (water clarity)
- total phosphorus } (nutrients)
- total nitrogen } (nutrients)
- sewage nitrogen signal
- turbidity
- dissolved oxygen.

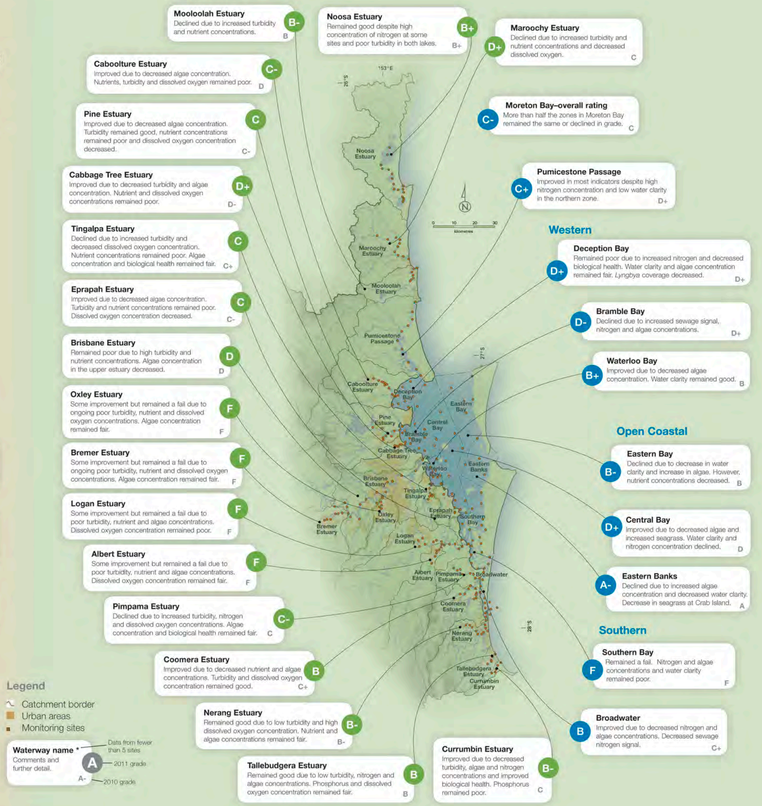
Biological Health Rating indicators measured are:

- seagrass
- coral
- nutrient processing
- sewage nitrogen signal
- riparian condition.

For more information, please refer to the 2011 Report Card Methods on our website www.healthywaterways.org.



Estuarine and Marine Report Card 2011



Key Messages of the 2011 Report Card

The 2011 Report Card results provide insight into the health of our waterways and Moreton Bay, using data collected before and after the January 2011 flood. Most regions in South East Queensland experienced higher than average rainfall from July 2010 through to March 2011 as shown in Figure 1.

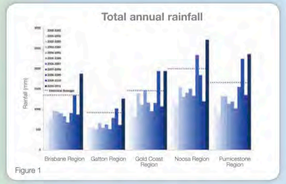


Figure 1

Intense rainfall during December and January, especially in the northern and western catchments, led to the largest regional flood event since 1974.

The 2011 Report Card grades are more positive than expected, considering the magnitude of the flood. However, the grades do not necessarily reflect the full impact of the flood on waterway health because 1) half of the data for the reporting year was collected before the flood and 2) the EHMP is designed to monitor long-term trends in ecosystem health. To understand the full impact of the flood, ongoing monitoring is being undertaken by Healthy Waterways members to assess the short, medium and long-term effects.

The 2011 Report Card shows some freshwater streams and estuaries improved in grade, reflecting the positive influence of high water flows. However, Moreton Bay experienced the full force of the flood, which moved a significant amount of sediment and nutrients from the catchments out into the bay.

The impact of major rainfall events on waterway health highlights the need to build the resilience of our catchments. We must prepare our catchments for rainfall events by managing erosion, stabilising creek channels, rehabilitating riparian (or riverbank) areas, investing in good agricultural practices. In addition, we need to sustainably manage urban water (especially construction runoff, stormwater and sewage) within a total water cycle framework.

Moreton Bay

The overall grade for Moreton Bay declined from a C to C- as shown in Figure 2. This is the third consecutive year that Moreton Bay has fallen below its long-term average of a B grade.

Moreton Bay has been struggling to recover since the drought breaking rain in 2009 caused increased sediment and nutrients to enter the bay from degraded catchments. As a result, the overall grade for Moreton Bay in 2009 declined from a B- to a D.

Most of the pollution transported by the January 2011 flood was deposited on the western side of the bay, north of the Brisbane River, causing a decline in Bramble Bay (D+ to D-). Other zones impacted by the flood plume also declined including Eastern Bay (B to B-) and Eastern Banks (A to A-).

Some zones in Moreton Bay that were not significantly impacted by the flood plume improved in grade. For example, Pumicestone Passage had the greatest improvement (D+ to C+), reversing its decline in 2010 (C+ to D+).

Freshwater

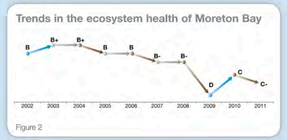


Figure 2

All freshwater streams either improved in grade or remained the same, except for declines in Mid Brisbane (C to D-) and Nerang (B+ to B). As a result, some freshwater streams (such as Maroochy and Pine catchments) received their highest grade since monitoring began in 2000. Higher water levels have improved fish migration, resulting in greater numbers of native species in some streams. The Lower Brisbane, Oxley and Redland catchments remained a fail (F), despite improvements in most indicators. For 12 of the 19 catchments, there were improvements in all indicators, except for the nutrient cycling indicator which declined.

Estuaries

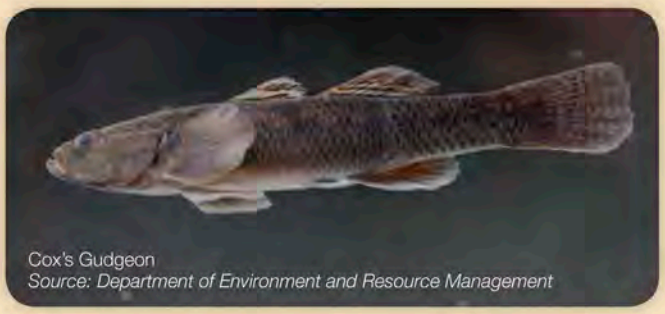
The Report Card grades for 14 of the 18 estuaries either improved or stayed the same. The force of the flood flushed pollutants out of many estuaries. Noosa continued to receive the highest ecosystem health grade (B+) and the greatest improvements occurred in Coomera (C+ to B) and Currumbin (C to B+). The grades for Maroochy, Mooloolah, Tingalpa and Pimpama estuaries declined. The Oxley, Bremer, Logan and Albert estuaries continued to fail, despite overall improvements in most indicators.

Flood plume near the western side of Moreton Island. Source: Healthy Waterways

Flood impacts: the good and the bad

Native fish found for the first time in 70 years

High river flows during 2010–11 enabled greater fish migration. As a result, a freshwater fish species that scientists believed was locally extinct, Cox's Gudgeon, has been found in the Brisbane River. There has been no record of the species since 1941 when a specimen was sent to the Queensland Museum. The species was found at many sites along the Brisbane River and Sunshine Coast. This highlights the positive influence a flood can have on the survival of native fish species.



Cox's Gudgeon
Source: Department of Environment and Resource Management

Moreton Bay mud layer doubles

The millions of tonnes of sediment that entered Moreton Bay during the flood have now settled on the floor of the bay, causing the existing mud layer to almost double in size to more than 100 km^2.

The impacts of this mud will continue to be seen in the summer months when winds and warmer weather re-suspend the sediment, increasing turbidity, nutrients and algal blooms. This may result in a reduction of food availability for turtles and dugongs due to loss of seagrass.

Image: This core sample from Moreton Bay shows the 6 cm thick layer of mud covering the sandy floor of the bay.
Source: Alistair Grinham

Check out the 2011 Report Card grades on your iPhone.

Search for '2011 Report Card' in the App Store now!

Or for more detailed information on Report Card results, check out our website: **www.healthywaterways.org**

Waterway health monitoring in the future

Developing a broader monitoring framework

The January 2011 flood highlighted the need to monitor waterways for organisms (pathogens) that may affect human health. Healthy Waterways is working with our members to develop a Human Health Risk Monitoring Program. The program will identify potential waterway health risks, allowing the community to make informed decisions about using waterways for recreation.

This program will form part of a broader Monitoring and Evaluation Framework currently being developed by Healthy Waterways to address regional monitoring needs.

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Front cover images (clockwise left to right): Logan City Council's 'Community frog identification workshop' at Berrinba Wetlands; Unitywater Sampling Officer collecting environmental waterway samples; Ipswich City Council working with Powerlink on a GreenWorks project at Purga Nature Reserve; Redland City Council Waterway Extension Officer revegetating wetland macrophytes.

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