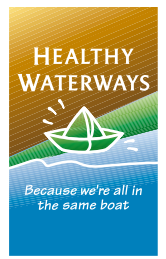


Ecosystem health

MONITORING PROGRAM



Ecosystem Health Report Card 2002

South East Queensland Waterways

SEQ supports one of the fastest growing populations in Australia and increasing human pressures are impacting on the health of our waterways. Since 1994, there has been increasing commitment by Federal and State Government agencies, local councils, industry and the community to improve and manage the waterways of SEQ. Significant activities to improve ecosystem health, such as sewage treatment plant upgrades, improved stormwater control devices, riparian protection and rehabilitation activities, are being undertaken by local councils, State agencies, industry and community.

The Ecosystem Health Monitoring Program (EHMP) aims to evaluate the effectiveness of these management actions in improving and protecting the health of SEQ waterways and Moreton Bay. Ecosystem health monitoring assesses the response of the ecosystem to natural and human inputs using a range of biological, physical and chemical indicators. These indicators reflect the environmental values that have been derived by the community.

This year's report card provides ecosystem health grades for the freshwater, estuarine and marine regions of our waterways. In addition, the report card highlights some of the management actions undertaken to help restore waterway health.

Freshwater

This is the second ecosystem health report produced for SEQ freshwater rivers and streams. The grades were largely derived using physical, chemical and biological indicators of ecosystem health (see back page) at more than 70 sites throughout the region. The scores for most freshwater catchments are the same as last year's. However, minor improvements, that may be due to year-to-year variability, were observed in the Logan-Albert, upper Brisbane and lower Brisbane waterways.



A healthy South East Queensland freshwater creek

Estuarine/Marine

Ecosystem health in Moreton Bay improved during 2001-02. This improvement is due to factors such as reduced sewage nitrogen plumes, less *Lyngbya majuscula* (toxic cyanobacterium) and the absence of a flood event. Because of the improved health of Moreton Bay, there are now no regions within the bay failing ecosystem health (i.e. no 'F' within the bay). Ecosystem health for most river-estuaries remained unchanged since the 2001 report card.

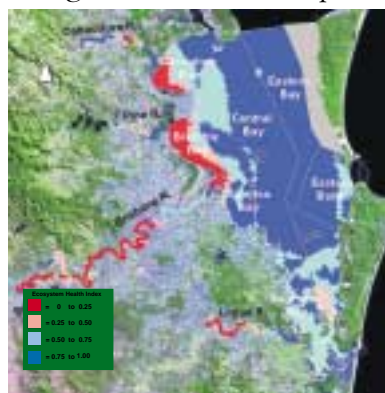
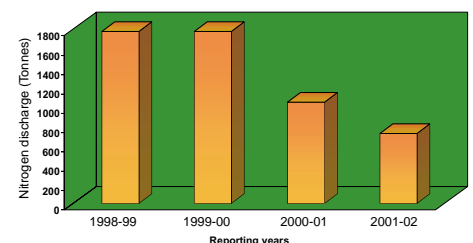


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Ecosystem health of Moreton Bay and estuaries

Management Responses

Numerous actions and initiatives have commenced to maintain or improve the health of our waterways. The 2001-02 year saw substantial reductions in nitrogen loads from some of our wastewater treatment plants. This is the result of substantial investment by Local and State Governments in wastewater treatment plant upgrades. Some of these upgrade works are still underway and a number of additional upgrades are expected to occur in the near future.



Total nitrogen reduction in some of SEQ's wastewater treatment plants (Luggage Point, Redcliffe, Ipswich, and Gold Coast)

EHMP Partners



Management Responses 2002

Actions to improve our waterways

In response to the challenges facing our waterways, cooperative actions involving all levels of government, the community and industry are being implemented to halt the current decline of our waterways and restore their ecological health. Many of these are outlined in the *South East Queensland Regional Water Quality Management Strategy* which was released in September 2001.



The following provides a summary of some of the work undertaken by Local and State Government, the community and industry to achieve the Healthy Waterways Vision for South East Queensland's waterways and Moreton Bay by 2020.

The Healthy Waterways Vision:

By 2020, our waterways and catchments will be healthy ecosystems supporting the livelihoods of people in South East Queensland, and will be managed through collaboration between community, government and industry.

Science and Research

The Moreton Bay Waterways and Catchments Partnership Science Program continues to provide a sound scientific basis for actions to address the problems facing our waterways and achieve the Healthy Waterways Vision.



In 2002-03 State and Local Government and industry stakeholders have invested in excess of \$3.7 million to continue research into the causes of deterioration in ecosystem health in South East Queensland. This builds upon the \$15 million dollars that has been spent by Local, State and Commonwealth Governments on research in this area since 1996.



Scientists sampling our freshwater catchments as part of the Stage 3 Science Program. Source: Centre for Catchment and In-Stream Research

The findings of the science and research program are contained in the *1998 Moreton Bay Study* and *Crew Member's Guide*, the *2001 Discover the Waterways Guide* and the *South East Queensland Healthy Catchments Healthy Waterways* science report (soon to be released).

Catchment Planning and Management

Catchment and waterways plans provide the strategies, actions and milestones for the journey towards the Healthy Waterways Vision. These Management plans assist in setting priorities for catchment and waterways protection or rehabilitation works. Environmental values and water quality objectives for local catchment areas are contained in these plans and provide the long-term targets that we are working towards.

Integrated Catchment Management

Local Governments and Catchment Associations (networks of community, industry, Local and State Government stakeholders) are leading the way in the development of catchment and waterways management plans in South East Queensland.



Across the region 13 major catchment areas have been defined. To date Catchment Associations, Local Government and State Government have developed catchment or waterways management plans for seven of these

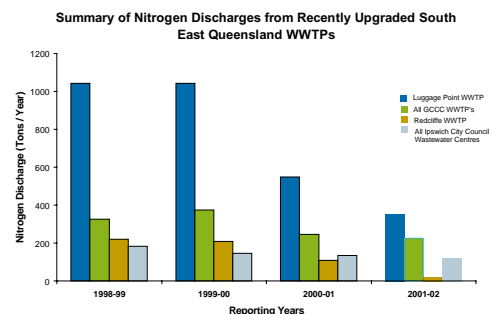
catchment areas. Two of these plans have been reviewed and updated in the last 12 months. The development of management plans for the remaining six catchment areas has commenced, with plans to be developed and implemented by 2010.

In excess of \$3.3 million has been allocated by community groups, industry organisations and Commonwealth, State and Local Governments for the development of catchment or waterway management plans in South East Queensland. Within some of the 13 major catchments, the development and implementation of local scale (sub-catchment specific) plans has already commenced. A number of regional plans and/or studies have also been completed.

Sewage Management

Recent Wastewater Treatment Plant Upgrades

Nitrogen has been identified as a limiting nutrient in tidal and some fresh waterways. During dry times the major source of nitrogen is treated sewage effluent discharges which, for example, contribute 90% of point source nitrogen loads to Moreton Bay. Local Governments in South East Queensland have commenced a major program of wastewater treatment plant upgrades which aim to reduce the amount of nitrogen entering our waterways from these treatment plants. Over \$300 million has been allocated by Local Government and State Government to these plant upgrades in recent years.



Wastewater treatment plant upgrades across the region have reduced the total nitrogen discharge to our waterways by more than 1100 tonnes per year. This is equivalent to more than 120 truck loads per year. Nitrogen load reductions of 35-90% have been achieved from these plants. Many of these upgrades have also resulted in substantial reductions in phosphorous loads.

Water Recycling

The appropriate recycling of treated effluent is a cost-effective way of significantly reducing nitrogen (and other contaminant) loads to the waterways. Many Local Governments in South East Queensland are investing in water recycling schemes to reduce treated effluent flows to our waterways. This is consistent with the Queensland Water Recycling Strategy which was released in December 2001.



Advanced Water Recycling Demonstration Plant - Part of the Queensland Water Recycling Strategy Initiatives

Through these water recycling schemes Local Government prevent more than 12,600 ML of treated effluent from directly entering the waterways of South-East Queensland. This equates to more than 6700 Olympic sized swimming pools per year. Many of the Local Governments in the western areas of our catchments have achieved 100% recycling of effluent from their wastewater treatment plants. These recycling schemes have appropriate management plans in place as determined through licencing procedures under the *Environmental Protection Act 1994*. Many additional water recycling initiatives are planned for the future.

Protecting and Restoring Riparian Areas

Intact riparian zones are vital in maintaining or improving water quality and ecosystem health, particularly in headwater streams. Recently completed science has indicated that one of the most effective actions for improving water quality is to protect and rehabilitate riparian areas, particularly in headwater streams, so that degradation and erosion is minimised during flood events.

Community groups and Local Government have started the process of protecting and restoring the estimated 16,000 km of streams in south-east Queensland. This includes projects that aim to revegetate and restore degraded riparian areas, stabilise banks and projects to remove or control environmental weeds and allow native vegetation to re-establish.

Overview of Riparian Management Projects in South East QLD

Number of sites	Area Restored (ha)	No. of Plants Installed	Length of waterways restored or protected (km)
279	390	130,000	284

More than 280 km of riparian area has been protected or managed in south-east Queensland (the majority of which was carried out between 1999 and 2002). This is equivalent to a distance greater than the return trip between Brisbane and Toowoomba.

The majority of these projects have been undertaken over the past three years by landholders, catchment groups and/or landcare groups. The groups located in the western catchments of the Bremer River, Lockyer Creek, Stanley River and Upper Brisbane Catchment are currently leading the way by restoring or protecting over 200 km of riparian area.

However, the long-term nature of these projects means that often their benefits will not be seen immediately. Community groups, individual landholders, industry organisations and Commonwealth, State and Local Governments have allocated more than \$5.8 million to riparian management projects in south east Queensland since 1995. The majority of this funding was allocated between 1999 and 2002. This funding does not include the ongoing contributions that are required to maintain the riparian areas until plants are established or weed control is no longer required.

Stormwater Quality Improvement

Stormwater management has been identified as a priority action in the south-east Queensland Region. In the urban areas of our catchments Local Governments have been installing a range of stormwater quality improvement devices (SQIDs) which aim to reduce the amount of sediment and litter entering our waterways. Some initiatives, such as constructed wetlands, may also remove nutrients and other contaminants from stormwater, preventing them from entering our waterways.

Overview of SQIDs Installed in South East Queensland

Type of system	Number Installed	Estimated Sediment Capture Efficiency	Estimated Litter Capture Efficiency
End of Line SQID	153	75% (coarse sediment) 25% (fine sediment)	60% - 90%
Stormwater Wetland	8	60%-65% (fine sediment)	-
Gully Pit Baskets	158	-	80% - 90%

Note: These figures do not include SQIDs installed by the development industry.

Local Government's have expended close to \$15 million installing SQIDs across South East Queensland. This funding does not include the significant ongoing maintenance costs associated with these SQID's. Erosion and sediment control programs that are being undertaken by Local Government and the building/development industry are complementing these projects. They aim to address problems at the source by preventing sediment leaving construction sites both during construction and once the works have been completed.

Local Governments, community groups and catchment groups have also been active in undertaking educational activities to support improvements in stormwater quality. For example children's entertainment programs, school based activities and stencilling of stormwater infrastructure.

Future Actions

The above summary provides a snapshot of some of the actions that have been taken to maintain or enhance the Report Card ratings. There are significant challenges ahead if we are to achieve the Healthy Waterways vision. Some of the actions that will need to be addressed in the immediate future include:

- An increased focus on riparian areas and stormwater management, particularly on sources of funding to assist the community and rural landholders with waterways protection or restoration projects.
- Improvements in design and form of our urban areas, such as the use of water sensitive design philosophy to better manage our use of water at different points in the water cycle.
- Raising the awareness of all members of the community about the consequences of our everyday actions and how our lifestyle choices impact on our waterways.

Whether the problems are in our urban areas, rural catchments or Moreton Bay, the answers require our collective efforts. Only through working together can we halt the decline in our waterways and catchments and restore their health - *because we're all in the same boat.*

Freshwater report Card 2002



Noosa

- Most rivers in very good condition
- Some major tributaries in fair condition due to increased sedimentation
- Excellent riparian vegetation in National Park
- 2001 grade: A-

A-



Maroochy - Mooloolah

- Most rivers in fair condition
- Excessive algal production in small streams cleared of vegetation
- Water weeds dominant in some sub-catchments
- 2001 grade: C+

C+



Stanley - Kilcoy

- Upland streams in excellent condition, lowland rivers in fair condition
- Major dams affect fish communities
- Sedimentation causes habitat loss in some systems
- 2001 grade: B-

B-



Caboolture - Pumicestone

- Most streams in fair condition
- Excess sediment in some small coastal sub-catchments due to clearing
- Good riparian vegetation on upland streams, fair on lowland reaches
- 2001 grade: C

C



Upper Brisbane

- Lowland streams in fair to poor condition
- Some smaller upland streams in good condition
- Loss of riparian vegetation has led to excessive algal growth
- 2001 grade: D

D+



Pine

- Most streams in fair to good condition
- Fish communities in some streams dominated by introduced species
- High algal productivity in some streams
- 2001 grade: C

C



Mid Brisbane

- River in fair to poor condition
- Some changes to fish community
- Altered flow regime reduces opportunity for fish recruitment
- 2001 grade: C

C



Lower Brisbane (tributaries)

- Most creeks in fair to poor condition
- Fish communities dominated by introduced species
- Creeks often choked with introduced weeds
- 2001 grade: D-

D



Lockyer

- Major streams in very poor condition, some upland streams good
- Stream flow reduced by water extraction, particularly during dry years
- Channels lack suitable riparian vegetation and often choked with weeds
- 2001 grade: F

F



Logan - Albert

- Rivers in fair to poor condition
- Some upland streams in very good condition
- Introduced fish species prevalent, especially carp
- 2001 grade: D

D+



Bremer

- Major streams in very poor condition
- Stream flow reduced by water extraction, particularly during dry years
- Channel erosion in some areas
- 2001 grade: F

F



Gold Coast

- River and stream condition varies from very good to poor
- Waterweeds choke channels in some sub-catchments
- Very high algal growth in small streams cleared of vegetation
- 2001 grade: B-

B-

Catchments of SEQ

Legend

- Catchment border
- State forest
- Protected areas
- Urban areas



River Estuary Report Card 2002

Ecosystem
MONITORING



Noosa River

- Extensive seagrass meadows
- Low nutrient and sediment loads
- Very low sewage nitrogen signal
- 2001 grade: A-

*A-



Maroochy River

- Remnant seagrass meadows
- Poor biological nutrient processing
- Sewage nitrogen signal in middle reaches
- 2001 grade: C

*C



Mooloolah River

- Extensive mangrove communities in mid/upper reaches
- No seagrass meadows
- Channel and river bank modifications in lower reaches
- 2001 grade: B-

*B



Pumicestone Passage

- Extensive seagrass, mangrove and saltmarsh areas
- Generally good water quality
- No sewage nitrogen signal
- 2001 grade: B

*A-



Caboolture River

- High level of biological nutrient processing
- Elevated phytoplankton & total nitrogen
- High sewage nitrogen signal
- 2001 grade: C

C



Pine Rivers

- Some biological processing of nutrient
- Small increase in phytoplankton biomass
- Moderate sewage nitrogen signal
- 2001 grade: D+

D+



Brisbane River

- High nutrient and sediment loads
- Biological processing of nutrients during winter
- Highest sewage nitrogen signal in the region
- 2001 grade: D-

D-



Bremer River

- Highest nutrient and sediment loads in region
- Elevated phytoplankton & low dissolved oxygen
- High sewage nitrogen signal
- 2001 grade: F

F



Logan River

- High nutrient and sediment loads
- Biological processing of nutrients during winter
- High sewage nitrogen signal
- 2001 grade: D

D-

Albert River

- 2001 grade: D

#D

Coomera River

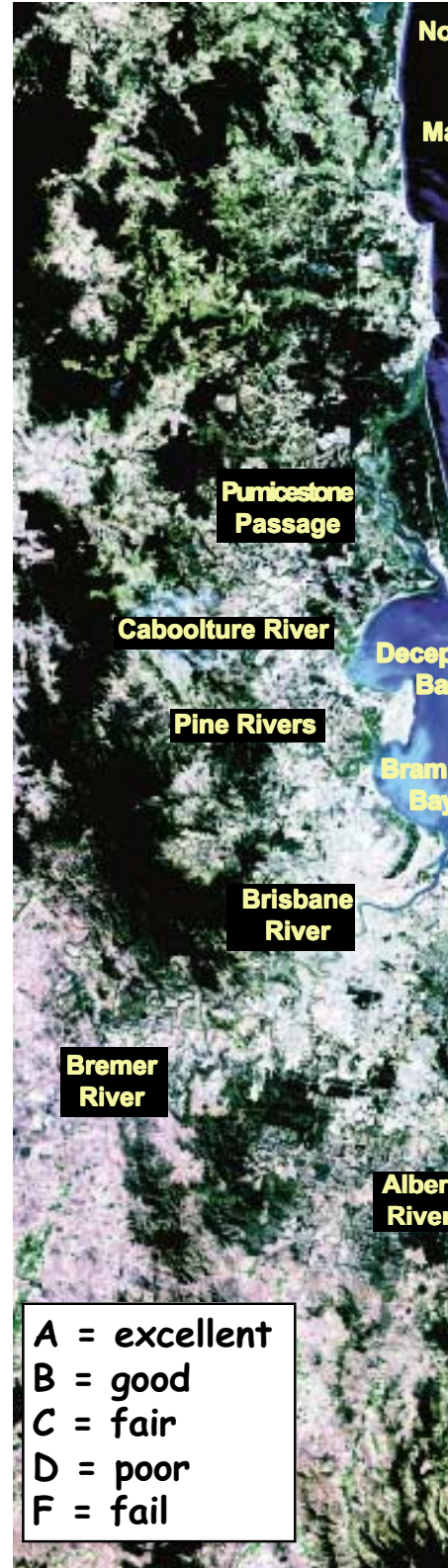
- 2001 grade: B

*B

Nerang River

- 2001 grade: B

#B



A = excellent
B = good
C = fair
D = poor
F = fail


* Grades based on limited data set (e.g. only 2001)
Insufficient ecosystem health data

Moreton Bay Report Card 2002




B Overall Rating

- The health of Moreton Bay improved
- No flood event
- Reduced sewage nitrogen plume
- 2001 grade: C




C- Deception Bay

- Evidence of seagrass in southern bay
- *Lyngbya* blooms present in northern bay
- Poor water quality in southern bay
- 2001 grade: D (southern) D- (northern)




D Bramble Bay

- Highest nutrient and phytoplankton concentrations in Moreton Bay
- No seagrass recovery
- Sewage nitrogen plume decreased
- 2001 grade: F




A- Central Bay

- Relatively good water quality
- Corals present but have low coverage
- No sewage nitrogen signal
- 2001 grade: B




B Eastern Banks

- *Lyngbya* bloom present but less extensive than 2000-01
- Dense coral at Myora Springs
- 2001 grade: C




A- Eastern Bay

- Extensive seagrass beds
- Diverse & dense corals north of Peel Island
- Localised *Lyngbya* bloom south of Peel Island
- 2001 grade: A-




B- Waterloo Bay

- No sewage nitrogen signal
- Corals present but have low coverage
- Extensive but shallow seagrass meadows
- 2001 grade: B-



B- Southern Bay

- High phytoplankton biomass
- *Lyngbya* bloom near Victoria Point
- No sewage signal from Logan River
- 2001 grade: C-

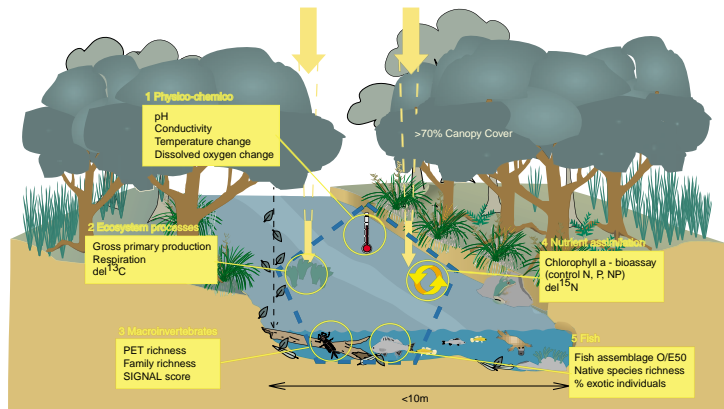


#A- South Broadwater

(Avg. 9 months data in northern region)
 (Results based on water quality only)

Assessing Ecosystem Health

Freshwater



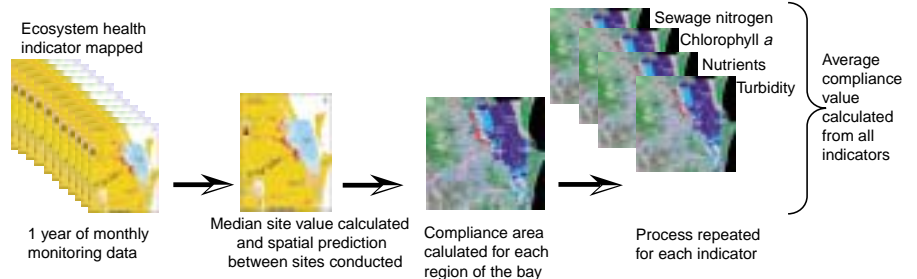
The indicators recommended for assessing the ecosystem health of freshwaters in SEQ fall into five categories. Each category is equally important and reflects different attributes of ecosystem health (see conceptual model). Within each category, there are two or three indices (or scores) that can be used for reporting. A site is considered to be in very good health when all five categories reveal scores indicative of a healthy ecosystem.

EHMP Monitoring Regions: freshwater, river estuary and marine

Estuarine/Marine

How grades are generated

Ecosystem health grades are primarily based on the area of the waterway that meets the management objectives; these areas are referred to as **'compliance zones'**. Compliance zones are determined by mapping the annual median value for each health indicator (e.g. turbidity). The spatial extent for which the indicator is below the management objective is calculated as a proportion of the whole area. The results from each indicator are averaged to create an integrated ecosystem health measure, which is then converted into a report card grade (A to F).



Moreton Bay Report Card Regions

The seven regions of Moreton Bay are:

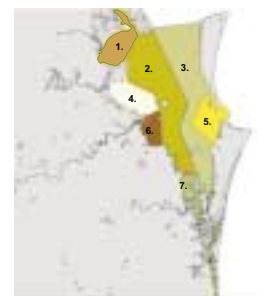
1. Deception Bay
2. Central Bay
3. Eastern Bay
4. Bramble Bay
5. Eastern Banks
6. Waterloo Bay
7. Southern Bay

These regions are differentiated by water depth and residence time (rate of water exchange).

Indicators used

Ecosystem health indicators include:

- Turbidity
- Chlorophyll *a* content
- Nutrient concentrations
- Sewage nitrogen distribution
- Dissolved oxygen
- Lyngbya* cover (toxic cyanobacterium)
- Seagrass distribution and depth
- Coral cover
- Nutrient processing



www.healthywaterways.org



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