

WATER AND ATMOSPHERE

Introduction

2003 was the International Year of Freshwater. Water issues in the Shire affect recreation and livelihoods, through the degradation of aquatic ecosystems and the abundance of marine species. Air quality similarly impacts on the community, through health, and quality of life effects. More serious is the impact that atmospheric pollution has towards global climate change.



News

Productivity Commission Report

The Productivity Commission completed work on the report on 'Industries, Land Use and Water Quality in the Great Barrier Reef Catchment'.

It concluded that there has been a decline in water quality since European settlement, not only in rivers, but to waters surrounding reefs and sea grass beds in the GBR lagoon. This is from nutrient and sediment discharges. Diffuse sources, particularly crop production and cattle grazing are the most significant contributors of pollutants. Opportunities exist to manage water quality impacts. Present levels of agricultural management vary; from very good to worst.

Locally, the inner reefs off the Johnstone Shire are amongst those considered to be at the highest risk from terrestrial runoff.

According to the report, the North and South Johnstone rivers have the highest river pollution index of all the rivers in the GBR catchment. This is due to high levels of fertiliser used in the Shire and the amount of discharge from the river.

RWQPP

The Reef Water Quality Protection Plan was completed in a cooperative effort between Federal and Queensland State Governments.

The balance of evidence is that sediment and nutrients from land-based sources are impacting the inner reefs and seagrass areas of the Reef. The vast majority of the 2900 reefs that make up the Great Barrier Reef are in good condition but some of the 450 inshore reefs are showing impacts consistent with a decline in water quality.

The RWQPP aims to assist in halting and

Pressure

- Waterways, the oceans and the atmosphere have traditionally been dumping grounds for human by-products and wastes. This has been the result of the idea that the 'solution to pollution is dilution'.

Unfortunately, as our awareness of the connectivity of systems has grown, it has become obvious that the pollution has continued to cause problems which are returning to affect us and other life on Earth.

The pollution from our Shire falls into two major categories:

- Artificial substances—such as chemicals and compounds from industry. These can be toxic to organisms, can affect natural processes such as the ozone layer, or can detract from the quality of life in the Shire.
- Naturally occurring substances—chemicals and compounds found in nature, but which are at elevated levels or are occurring in unnatural locations. This will change the state of the natural systems they are foreign to. An example can be soil from erosion causing reduced light levels in a normally clear creek.

The onus on human beings is therefore to minimise and control the by-products of human activities before they impact on natural systems.

reversing the decline in the quality of water entering the Reef. The focus of actions in the RWQPP is on relatively low cost measures to encourage good planning and to assist landholders in adopting best management practices that are both profitable and

environmentally sustainable. The RWQPP acknowledges the past work undertaken by landholders, cooperatively with Government and Industry and builds on the strategies and plans already in progress.

The RWQPP will effect funding over ten years to government bodies and industries to achieve the goals set out.

NHT

The Natural Heritage Trust contributed \$190,000 to promote eco-efficiency to Queensland cane growers through the COMPASS program. The aim is to improve water quality and protect the reef.

South Johnstone River Management Plan

Work progressed on the South Johnstone River Management Plan. This will be released by the JRCMA in March 2004. The plan comprises a whole of river approach and is based on green engineering techniques. This will ensure that the costs will be reduced, and that riparian groups and landholder groups will be able to afford to conduct the work required. Restoration will be to enhance stream function for biodiversity, rather than to maximise drainage.

Promotion

Council

Promotion was conducted by Council on water issues, by hosting an art exhibition and interpretive display during National Water Week in October. A number of street drains around the town centre were also stencilled with a barramundi and an environmental message—to promote awareness of pollution through litter and wastes entering stormwater. This concept has been extended to a regional effort through the FNQ Regional Organisation of Councils, who initiated discussion to permanently imprint concrete street drains in a similar manner.

Brochures promoting stormwater management were developed and will be released in 2004.

JRCMA

The JRCMA acquired funding for a video production. The video will demonstrate the benefits of riparian revegetation, showing site successes and the process of establishing riparian vegetation.

Implications

- The states of the water we use and the atmosphere affect our health and the health of the flora and fauna of the Shire.

They also affect industries such as fisheries and tourism, which depend on healthy ecosystems as a resource.

Pollution has effects up to the global level, cooperative management is a responsibility that affects our Shire as part of the whole world.

Johnstone Ecological Society

The Johnstone Ecological Society, in conjunction with the Roman Catholic Church, organised interpretive information to educate the community on wetland issues. Wetlands in the Shire are in a poor condition due to drainage changes and the invasion of weeds.

Freshwater

Stormwater Monitoring

2003 saw the Johnstone and Eacham Shire Councils initiate Stormwater Monitoring. The monitoring program analyses water from the North and South Johnstone Rivers, the Beatrice River, and Peterson Creek. These monitoring points are part of the Johnstone River Catchment. The data gathered from the rivers is compared to ANZECC 2000 water quality guidelines and exceedences of these standards noted. It is apparent that levels of nutrients are commonly above the guidelines. Pesticides were not a problem. The following numbers of the 11 sites exceeded the ANZECC Guidelines in 2003.

	Feb	Jun	Sept	Nov
Total Oxidised Nitrogen ¹	8	All	9	7
Total Nitrogen ¹	6	10	8	10
Filterable Reactive Phosphorous ¹	7	2	5	7
Total Phosphorous ¹	All	6	All	2
Pesticides ¹	0	0	0	0
Faecal Coliforms ²	10	8	6	8

¹ For aquatic ecosystems

² For primary recreational contact (swimming)

Fish

The DPI Queensland Fisheries Service continued to conduct the Long-term Monitoring Program. Species diversity appears to have remained stable over the last few years.

Johnstone River Fish	2001	2002	2003	2004
No. of species recorded	43	41	42	40

Source: QFS long term monitoring program.

Note: This does not represent Total Diversity, as some species are not susceptible to the electro-fishing method utilised by the QFS. The data is indicative.

The introduced pest fish species known as Tilapia (*Tilapia mariae* and *Oreochromis mossambicus*) remain present in the Johnstone River.

Water Use Efficiency

JRCMA

Water use efficiency was promoted by the JRCMA to agricultural landholders. A study was commenced to determine the minimum water requirements of farmers with banana, papaya and dairy pasture. This was on the basis of high yield results for production, rather than a focus on stream ecological function.

The study arose in response to the present over-allocation of water resources. Licensing is based on a Mega Litre per hectare system, and does not reward water use efficiency. It is hoped that the findings will enable NRM&E to better determine allocation. The pressure upon streams being utilised for irrigation may thereby be lessened.

Water Allocation

Because the past years have been extremely dry there has been great contention over water allocation management. Water levels in a number of creeks caused the NRM&E to ban extraction for short periods of time.

There is no practical manner yet established to control water usage and to promote efficiency.

Water Entitlements -Source: South Johnstone NRM&E

Year	99	00	01	02	
	-00	-01	-02	-03	
Applications received	233	256	184	346	
Entitlements and Permits Issued from Application	New	34	42	17	114
	Renewals	170	80	49	57
	Amendment	3	7	10	4
	Transfer	73	39	33	60
Total	280	168	109	235	

River Flow

The NRM&E conduct regular monitoring of flow volumes in some of the major rivers and creeks. As can be seen, 2003 was a relatively dry year,

Water Quantities in the Rivers	Megalitres, Oct 2002 - Oct 2003	Average (over last ~30 years)
North Johnstone River (Glen Allyn)	70,898 ML	168,972 ML
North Johnstone River (Tung Oil)	539,441 ML	1,732,923 ML
South Johnstone River (Central Mill)	215,945 ML	785,823 ML
Liverpool Creek	44,139 ML	150,921 ML
Fisher creek	10,339 ML	30,164 ML

Source: NRM&E Watershed website—www.nrme.qld.gov.au/watershed/index.html

with flows of half to a third of average volumes.

Pollution

The EPA laid charges against Malanda Dairy Pty Ltd over two spills of factory effluent into the North Johnstone River. The spills were the result of an effluent pipeline cracking.

Council commenced reporting on emissions from its facilities to the National Pollutant Inventory (NPI). The facilities include the Sewage Treatment Plant, open and closed Landfills, and the Water Treatment Plant. All of these facilities release some emissions either to ground or surface water, or to the air. Despite treatment, the sewage treatment plant contributes significant Nitrogen and Phosphorous nutrients to waterways. Development of a plan for tertiary treatment at the plant is in progress, with studies being conducted to set targets for acceptable nutrient release.

The NPI contains data on 90 priority substances that are emitted to the environment. The substance list was determined by consideration of health and environmental risks in Australia.

15 business facilities in the Johnstone Shire reported emissions to the NPI and 5 diffuse sources were calculated in 2002-2003. This has increased from only 5 facilities reporting in 2001-2002.

The amounts of emissions in kilograms is tabulated on the following page. Where there are dashes the substance has not been recorded as emitted. The increased list for 2002-2003 is due to the addition of the new businesses reporting.

Implications

- Climate Change

There is growing concern and evidence that the release of energy trapping gases from human activities is contributing to the present accelerated increases in global temperature. If this trend continues, the elevated temperature is likely to have the following major effects:

- changing local weather patterns;
- changes in rainfall and run-off;
- raising of the cloud level;
- greater probability of large and damaging floods;
- changes in soil moisture during the growing season;
- shifts in bioclimatic zones;
- changes in the distribution and abundance of native flora and fauna;
- coral bleaching;
- local and regional extinction of species;
- increased plant growth due to CO₂ fertilisation;
- increase in diseases; and
- increased frequency of natural hazards such as bush fires.

Complaints received by Council regarding pollution 2003

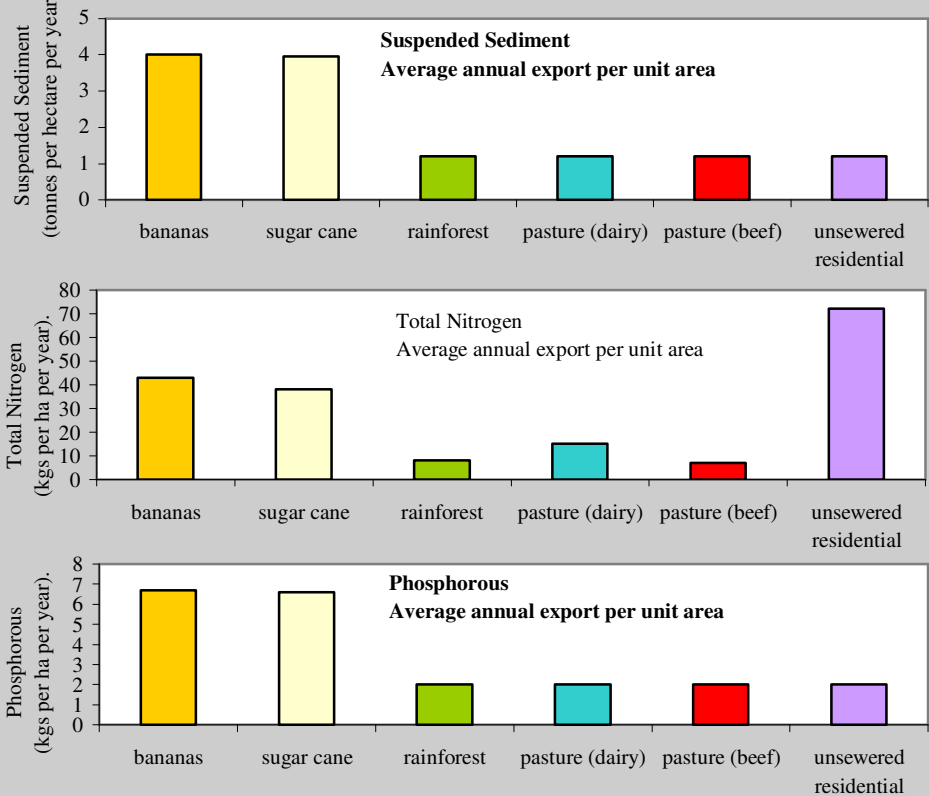
Air	5
Odour	17
Noise	18
Water	2
Waste	8
Rubbish	70
Oil Spills	1
Dust	6
Beach	11
Other	8

Substance ((kilograms)	2000-2001	2001-2002	2002-2003
Acetone	-	-	36
Acrylonitrile	-	-	29
Ammonia (total)	-	-	87,000
Antimony & Compounds	-	-	13
Arsenic & compounds	5.3	1.7	2.9
Benzene	110	22	120
Beryllium & compounds	-	0.0020	0.98
Cadmium & compounds	0.46	0.14	2.9
Carbon disulfide	-	-	3.9
Carbon monoxide	1,200,000	1,200,000	1,800,000
Chlorine	-	-	120,000
Chloroethane	-	-	7.1
Chloroform	-	-	6.2
Chlorophenols (di, tri, tetra)	-	-	0.10
Chromium (III) compounds	-	0.033	8.6
Chromium (VI) compounds	0.98	0.31	3.7
Copper & compounds	-	0.027	11
Cumene	3.1	15	1.1
1,2-Dichloroethane	-	-	5.6
Dichloromethane	-	-	200
Ethanol	-	-	17,000
Ethylbenzene	6.2	-	57
Fluoride compounds	1.8	0.57	0.030
n-Hexane	130	24	93
Hydrogen Sulfide	-	-	110
Hydrochloric acid	-	93	-
Lead & compounds	36	11	13
Mercury & compounds	0.030	0.0060	0.13
Methyl ethyl ketone	-	-	45
Nickel & compounds	-	-	35
Oxides of nitrogen	320,000	320,000	480,000
Particulate matter	160,000	240,000	350,000
Phenol	-	-	190
Polychlorinated dioxins & furans	-	-	0.000065
Polycyclic aromatic hydrocarbons	440	450	670
Sulphur dioxide	150,000	140,000	150,000
Toluene	100	93	1,400
Total Nitrogen	-	-	1,200,000
Total Phosphorous	-	-	260,000
Total volatile organic compounds	7,900	5200	7,600
1,1,2-Trichloroethane	-	-	1.2
Vinyl Chloride Monomer	-	-	48
Xylenes	35	30	-
Zinc & compounds	-	-	140

Adapted from the NPI website (www.npi.gov.au)

Pressure

- The Natural Heritage Trust commissioned a study into water quality in the Johnstone Basin in 2001. The findings of this study can help explain the sources of water pollution. A comparison can be made between human activity and the equivalent area of natural rainforest.



Source: Natural Heritage Trust Report - Land Use Impacts on Water Quality in the Johnstone River Catchment

The businesses reporting to the NPI were - Bundaberg Sugar Ltd. Mourilyan Mill, Bundaberg Sugar Ltd. South Johnstone Mill, Centrel P/L Innisfail depot (Reliance Petroleum), Consolidated Meat Group Pty Ltd, Northern Iron and Brass Foundry Pty Ltd., Johnstone Shire Council Sewage Treatment Plant, Johnstone Shire Council - 1 operating and 8 closed Landfills.

The landfill data shows that our waste doesn't just disappear when buried; it is still contributing pollutants to the environment as it breaks down. Tertiary treatment to remove nutrients is planned for the sewage treatment plant.

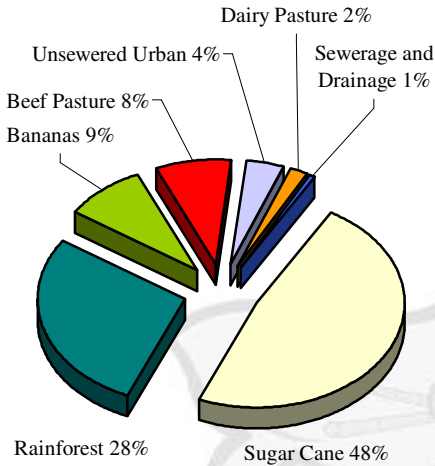
Diffuse Emissions

Diffuse source N and P Emissions from Beef and Dairy Pasture, Cane and Banana Farming, as well as from Rainforest and from Unsewered Areas have been added by the NPI.

The rainforest data enables calculation of total emissions to the GBR lagoon, but it should be noted that rainforest contributes very little per unit of land area compared to horticulture. The area of rainforest for the Johnstone River Catchment has been calculated as ~52% of the land.

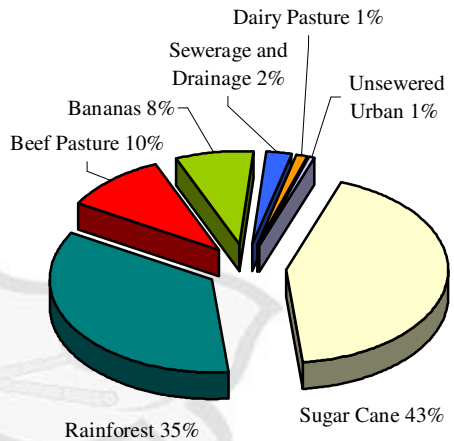
A comparison of the total amounts being released indicates that targeting sugar cane with better farm management will have the greatest effect towards reducing nutrient emissions from our Shire.

**Nitrogen Emissions (kg)
to the Johnstone River, 2002-2003**



□ Sugar Cane	- 580,000 kg
■ Rainforest	- 340,000 kg
■ Bananas	- 110,000 kg
■ Pasture for Beef Production	- 98,000 kg
■ Unsewered Urban	- 53,000 kg
■ Pasture for Dairy Production	- 22,000 kg
■ Sewerage and Drainage Services	- 6,800 kg

**Phosphorous Emissions (kg)
to the Johnstone River, 2002-2003**



□ Sugar Cane	- 110,000 kg
■ Rainforest	- 90,000 kg
■ Pasture for Beef Production	- 27,000 kg
■ Bananas	- 20,000 kg
■ Sewerage and Drainage Services	- 6,100 kg
■ Pasture for Dairy Production	- 3,000 kg
■ Unsewered Urban	- 1,300 kg

Marine and Estuarine

GBRMPA

2003 saw significant progress towards protection of the Great Barrier Reef, with the public release of the draft GBR rezoning plan. The rezoning plan will increase the area of reef protected, and will control human impacts on representative areas to better protect the reef's biodiversity. These representative areas include all the differing habitats and species communities of the reef. A minimum of 20% of each type of area will be protected by 'no-take' zoning (green zoning) which prevents impacts from fishing or other utilisation.

July 2004 will see the implementation of the new reef zones. Until this time the previous zoning plan remains in effect.

AIMS

The Australian Institute of Marine Science

(AIMS) conducts long term monitoring of the Great Barrier Reef, for hard and soft coral coverage. Coral coverage was at a very low level in 2003, following degradation by a Crown of Thorns Starfish (CoTS) outbreak.

Monitoring of more of the inshore reefs is planned for the future.

Raised nutrient levels from human activities of land have been linked to CoTS outbreaks. Nutrient availability promotes the growth of oceanic algae. These algae are food for many reef species at the early stages of development, such as CoTS. Increasing the survival rate of the CoTS larvae affects the outbreaks of the adult population.

Coral bleaching is a threat presently affecting the GBR. It is thought that climate change and increasingly hot weather conditions are raising sea temperatures. Corals are sensitive to elevated

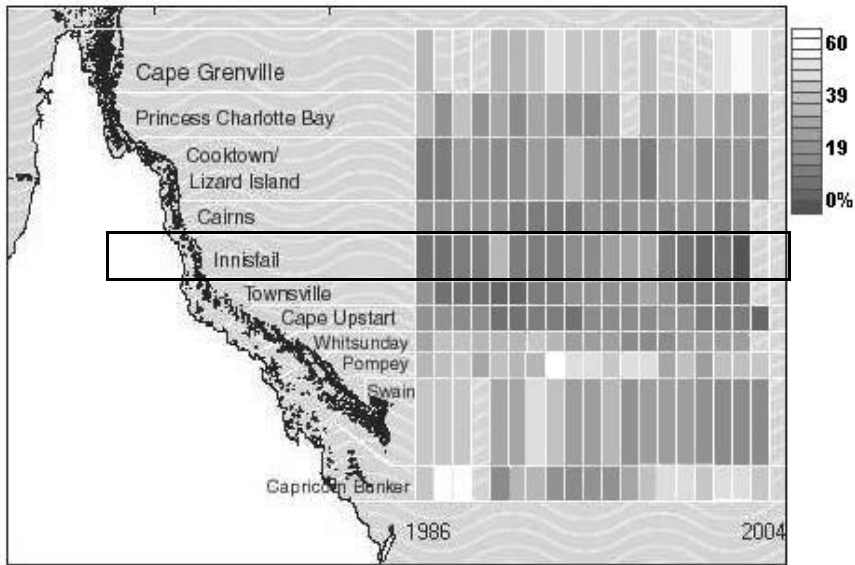
temperature, and die back. 1998 and 2002 have seen the worst cases of mass area coral bleaching, affecting inshore and outer reefs. Coral bleaching is occurring globally, and there is concern that global climate change will have disastrous consequences for the reef.

The state of coral coverage further affects fish and other reef life which depend on the coral for food and habitat.

Mourilyan Harbour

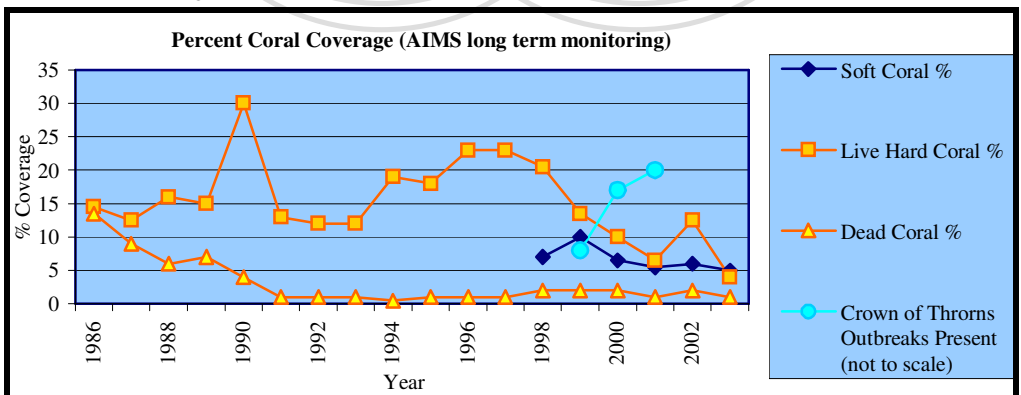
The Ports Corporation Of Queensland (PCQ), in conjunction with the DPI, conducts a regular monitoring program of sea grass in Mourilyan Harbour. At the end of 2002, December monitoring reported a significant reduction in intertidal *Halophila* seagrass on Seaforth Bank. The DPI considers this to be due to regional climatic conditions rather than the localised influence of the harbour. *Zostera* seagrass meadows remained stable and healthy.

Percent Cover of Hard Coral— AIMS Broadscale Survey



Source: AIMS website — www.aims.gov.au

It can be seen that the latest surveyed coral coverage in the Innisfail section is the lowest amongst all the other monitoring times and locations.



Conclusion

2003 saw significant progress towards the reduction of pollution to both water and atmosphere.

Strategies and goals were set to encourage better practice, and better information was being collected to monitor the effectiveness of any changes.

The state of the environment did not improve greatly during the year, but further progress is expected, due to continually increasing support from the community, industry, and the agricultural sector.

Future Direction

Recreation, Tourism and the Aquatic Industries will benefit in the long term from the work being initiated to mitigate pressures on the environment. Impacts to waterways may be reduced if there is downsizing of the agricultural sectors. This may occur due to the difficulties cane farming and bananas are currently facing.

Whether or not this is the case, best practice farming must still be encouraged.

Atmospheric pollutant data will continue to be gathered. It is likely this information will influence future policy decisions at the National level and help encourage industries to reduce emissions.

Report Card for Water and Atmosphere**OVERALL GRADE****B**

Criteria	Grade	Recommendation Group	Explanation
Action on recommendations 6 of 7 recommendations actioned to date	A	Balanced assessment of causes and extent of nutrients and sediment. Water monitoring. Water allocation.	Undertaken through State and Federal assessments of effects to the GBR. Stormwater monitoring. Monitoring of flow volumes by NRM&E.
Filling deficiencies in data	A	NPI reporting Coral Coverage Freshwater fish Stormwater monitoring	Council included analysis and public reporting on its pollution emissions. The NPI has included estimates of riverine pollution. AIMS continued to monitor the reef. DPI fisheries continued the long-term monitoring program. Council implemented monitoring of the Johnstone catchment's major rivers.
State of the Shire	D	Pollution Freshwater Marine	Reporting may help change practices in the future. Pollution loads remain above guideline levels. Water allocation management is not occurring. The reef in the Shire's area is highly degraded.
Goal Achievement	A	All	State and Federal Plans completed. Implementation of stormwater monitoring. Implementation of NPI reporting. Work towards the rezoning of the GBR.
Community Awareness	C+	All	Promotion of the International Year of Freshwater, and stormwater management. Promotion by community groups.