2. ISSUES AND STRATEGIES

A series of workshops were held throughout the catchment in 1995 where 12 management issues were identified. The *Mitchell River Watershed Management Plan* (this document) refers to issues by their manifestations, such as weeds, land degradation and water quality. This is for ease and simplicity of problem identification for the various stakeholders in the catchment.

Out of these workshops a discussion paper was produced and distributed as widely as possible in the catchment along with a survey to facilitate feedback on the 12 issues to be addressed in the Strategy. The results of the survey were collated and incorporated in formulating a set of actions for each of the 12 management issues.

Another series of workshops were held in Dec 98-Jan 99 to further develop these actions and set the scene for the final draft of this, the *Mitchell River Watershed Management Plan*.

The management issues are:

1. Water Quality and Quantity
2. Weeds
3. Fire Management
4. Grazing Management
5. Feral Animals
6. Mining
7. Land Degradation
8. Nature Conservation
9. Agriculture
10. Fisheries Management
11. Tourism and Recreation
12. Cultural Heritage

This section discusses these 12 issues and details their associated management strategies and actions from the workshops. The strategies are presented as tables and the actions in these were prioritised during the workshops.

The Management strategies that appear in the following sections are listed in Table I. They have been prioritised with the model shown in equation [1] and have been ranked in order of this derived priority. These strategies are also presented in Table II (section 3).

Table I ***Priority ranking of the 69 strategies pertaining to the 12 management issues.***

Mgmt Strategy	No Actions in Mgmt Strategy	No of ★	No of ★★	No of ★★★	priority index	RANK
WQ1	7	3	4		1.57	24
WQ2	3	1	1	1	2.00	56
WQ3	5	1	4		1.80	52
WQ4	6	2	3	1	1.83	55
WQ5	4	3	1		1.25	3
WQ6	6	2	4		1.67	31
WQ7	4	1	3		1.75	42
WE1	4	3	1		1.25	3
WE2	4	1	2	1	2.00	56
WE3	4	1	3		1.75	42
WE4	4	3	1		1.25	3
WE5	6	4	2		1.33	9
WE6	10	4	6		1.60	25
FM1	5	3	1	1	1.60	25
FM2	6	1	3	2	2.17	62
FM3	4	2	2		1.50	16
FM4	3	1	2		1.67	31
FM5	4			4	3.00	69
FM6	3	1	2		1.67	31
GM1	3	1	2		1.67	31
GM2	4	2	2		1.50	16
GM3	5	2	3		1.60	25
GM4	3		2	1	2.33	65
GM5	2	1	1		1.50	16
FA1	5	2	3		1.60	25
FA2	3	1		2	2.33	65
FA3	7	2	5		1.71	41
FA4	3	2		1	1.67	31
FA5	5	2	3		1.60	25
MM1	4	3	1		1.25	3
MM2	4	1	2	1	2.00	56
MM3	3	1	2		1.67	31
MM4	3	1	2		1.67	31
MM5	2	1	1		1.50	16
LD1	5	2	2	1	1.80	52
LD2	3	1	2		1.67	31
LD3	4	2	1	1	1.75	42
LD4	3	1	2		1.67	31
LD5	2	1	1		1.50	16
NC1	4	2	2		1.50	16
NC2	4	1	3		1.75	42
NC3	3	2	1		1.33	9
NC4	6	3	3		1.50	16
NC5	3		2	1	2.33	65
NC6	3		2	1	2.33	65
AG1	3	2	1		1.33	9
AG2	6	4	2		1.33	9
AG3	2	1	1		1.50	16
AG4	2		2		2.00	56
AG5	4	1	3		1.75	42
AG6	5	2	3		1.60	25
AG7	4	3	1		1.25	3
AG8	2	2			1.00	1
FI1	4	3	1		1.25	3
FI2	4		3	1	2.25	63
FI3	3	2	1		1.33	9
FI4	4	1	3		1.75	42
FI5	3		3		2.00	56
TR1	4	1	3		1.75	42
TR2	3	1	2		1.67	31
TR3	3	2	1		1.33	9
TR4	5	2	2	1	1.80	52
TR5	4	1	3		1.75	42
TR6	3	2	1		1.33	9
CH1	4	1	3		1.75	42
CH2	2	2			1.00	1
CH3	4		3	1	2.25	63
CH4	4	1	3		1.75	42
CH5	2		2		2.00	56

2.1. WATER QUALITY AND QUANTITY

The Mitchell River, being a large catchment in the Tropics, is greatly affected by the monsoonal wet and dry seasons. During the summer, monsoon flooding is common and overland transport is restricted. The watershed has one of the largest annual run-off rates in Australia. Drainage from the Eastern Highlands is relatively rapid, creating extensive flooding in the lower, western flood plains. In the dry season many tributaries cease flowing which greatly reduces the flow of the Mitchell. This highlights the importance of access to, and management of perennial creeks and waterholes in the catchment.

There are numerous dams in the watershed, mostly small and associated with stock water, irrigation or mining operations. There are a few larger referable dams (dams requiring special permits due to size or hazard of contents) throughout the catchment. Most of these are associated with mining activity, with the notable exception of Lake Mitchell near Mareeba. The Walsh River contains a network of weirs within the Mareeba-Dimbulah Irrigation Area (MDIA). Currently irrigation water is delivered across the Great Dividing Range from Tinaroo Falls Dam in the Barron River catchment. There is potential, as part of the irrigation scheme, to build a large dam on the Walsh River. As Cairns and the Atherton Tablelands develop, it is likely that the Upper Mitchell and Walsh Rivers will receive increasing attention for development and water conservation works.

Water quality in the Mitchell River catchment is generally good, however there are localised instances of polluted discharges into tributaries. This is known to occur at the Chillagoe Smelter and at numerous derelict mines near Irvinebank. Many other derelict mines in the Mitchell are known and recorded as contaminated sites.

The relatively small area of cultivated land required for high value crops such as tobacco has in many ways limited the environmental impact of agriculture in the region. The decline of tobacco and the introduction of a wide array of horticultural and broadacre crops such as sugar cane are now changing the environmental effects of agriculture. Unless carefully managed and monitored, increasing areas of land in the MDIA going into production will have the potential to reduce water quality in the Walsh River and similarly in the upper reaches of the Mitchell River near Biboohra and in Rifle Creek at Julatten.

Maintenance of water quality in the catchment must begin with monitoring. Water quality information is rapidly accumulating via National Heritage Trust funded monitoring projects. This information will provide a baseline for surface water quality data from which future changes can be assessed.

Furrow irrigation, as has been practised on sugar cane, can result in thousands of megalitres of tail water entering the river annually that can transport nutrients and agricultural chemicals into creeks. Soil erosion, fertilisers and biocides all have potential, if poorly managed, to affect water quality and the biological diversity of the Mitchell River. Improved irrigation practices including tailwater recycling and overhead irrigation should minimise the impact on water quality in the streams of the upper Mitchell Catchment.

Other potential effects on water quality include the disposal of sewage effluent from sewage treatment plants such as the proposed plant at Two Mile Creek. Also semi-domestic septic systems such as at the Rifle Creek camping reserve and effluent from aquaculture facilities have the potential to reduce water quality in the catchment.

As well as modifying surface hydrology it has become evident that extensive tree clearing and irrigation regimes affect subsurface hydrology and groundwater quality, particularly in the Cattle Creek sub-catchment.

Variations in groundwater quality occur throughout the Mitchell River Watershed. In some restricted areas groundwater resources show high levels of various heavy metals and other contaminants. The rich mineralisation in the Eastern Highlands of the Mitchell Watershed has produced high background levels of metals (such as arsenic or cadmium) in some geologic waters - these appear to be highly localised. High levels of aluminium occur in many bores on the Coastal Plains.

While much of the MDIA is free of serious salinity risk, there are areas of concern. Localised groundwater quality problems are known to occur in the Leadingham and Cattle Creek sub-catchments of the Walsh River, and in areas of the Upper Mitchell.

Landcare, government agencies, industry and local community members have been working together to address the issue of groundwater management in Cattle Creek. In 1993 the Cattle Creek Groundwater Management Strategy Committee (CCGMSC) prepared an action plan to deal with the groundwater situation. Groundwater studies have now been undertaken to model the system and improve decision-making capabilities. The Cattle Creek Landcare Group in conjunction with the MRWMG recently developed a Groundwater Management Plan for the Cattle Creek Catchment. Cooperative programs involving government and community stakeholders are underway to monitor ground water

bores, surface water quality and quantity and assess potential contributions to the groundwater.

Tree planting programs are ongoing to provide natural groundwater pumps. So far, more than 8000 trees have been planted in strategic locations within the Cattle Creek sub-catchment. Irrigation efficiency is being improved by the increased use of low volume irrigation systems and tail water recycling dams. Irrigators are also being encouraged to pump water from drainage lines to decrease the amount of poorer quality water reaching the river downstream where people depend on it not only for irrigation but for domestic purposes.

Figure 5 ***Obtaining water quality information using an electronic datalogger and by collecting a water sample for laboratory analysis. Photo courtesy of: Mitchell River Water and Environmental Quality Project***

Figure 6 ***Electrofishing is an effective way of surveying freshwater fish. Photo courtesy of: Mitchell River Water and Environmental Quality Project***

Goal:

To maintain a standard of water quality and quantity acceptable to human, stock, agricultural and ecological health

Objectives:

- Achieve a high level of community involvement in water resource management
- Management plans to accommodate rural, urban and environmental water quantity demands
- A coordinated approach to maintain water quality throughout the catchment
- An increased stakeholder understanding of the hydrology of the river system
- Preservation of aquatic ecosystems and biodiversity within the catchment

Strategies:

Education

WQ1 Improve community awareness of water quality issues and efficient water use

Information and Communication

WQ2 Develop a better understanding of the hydrology of the Mitchell River Watershed

WQ3 Establish a comprehensive and coordinated approach to water quality monitoring in the catchment

Improving Resource Management

WQ4 Encourage and support the development of Water Allocation Management Plans for high water-use areas of the catchment

WQ5 Ensure that water management strategies allow for the preservation of aquatic ecosystems within the catchment

WQ6 Support the development of a management plan for ground water in the catchment

Adopting a Cooperative Approach

WQ7 Encourage the involvement of the community in the development and implementation of strategies

Outcomes:

Achievement of these strategies will provide the following outcomes:

- Efficient water use throughout the catchment
- A coordinated approach to water quality and quantity management
- Raised community awareness of water management issues
- Healthy aquatic ecosystems and a greater community awareness and understanding of their importance

Strategy WQ1

Improve community awareness of water quality issues and efficient water use.

Actions	Stakeholders	Performance Indicators	Priority	Cross Reference to
Hold information days to educate and empower the community to use water efficiently	DNR, Waterwise, MRWMG, Lgov	1/year	★★	
Develop extension material to encourage efficient use of fertilisers and chemicals	MRWMG, DNR, DPI Waterwatch	Articles, Displays at field days,	★	AG1
Hold public interest meetings in regard to Waterwatch or other surface and groundwater monitoring programs	DNR DPI EPA LCG, MRWMG, Schools JCU, Waterwatch	2 ea in upper & lower catchment	★	
Involve community in development of best management guidelines	MRWMG, Lgov, DNR		★★	WQ7
Encourage the use of non-polluting agents in urban, industrial and rural sectors	DNR, LCG, Industry groups		★	
Promote community understanding of downstream effects of runoff quantity and quality	MRWMG, DNR, Lgov		★★	AG2
Encourage the inclusion of water quantity and quality issues in PMPs	DPI, DNR,LCG		★★	AG6

Strategy WQ2

Develop a better understanding of the hydrology of the Mitchell River Watershed

Actions	Stakeholders	Performance Indicators	Priority	Cross Reference to
Collate and compile existing hydrology information	MRWMG, DNR, DME, EPA,	A report on available data	★	WQ5
Establish sound environmental flows	DNR, EPA, MRWMG		★★	WQ6 WQ5
Develop a hydrological model of the catchment	DNR, MRWMG,		★★★	

Strategy WQ3

Establish a comprehensive and coordinated approach to water quality monitoring in the catchment

Actions	Stakeholders	Performance Indicators	Priority	Cross Reference to
Maintain awareness of water quality monitoring programs	MRWMG, Lgov		★	
Establish water quality targets for specific target areas	DNR, MRWMG, Lgov	Database of targets	★★	WQ6 WQ5
Investigate funding opportunities for development and maintenance of monitoring programs	NHT, CCLG, CSIRO, MRWMG	ID of possible funding sources	★★	WQ6
Provide a network for communication between water monitoring bodies	CSIRO, DNR, Univ MRWMG, EPA,		★★	
Encourage the identification of water quality issues in all stages of development planning	MRWMG, Lgov, DME, DNR		★★	

Strategy WQ4

Encourage and support the development of a Water Allocation Management Plan (WAMP) for high water-use areas of the catchment

Actions	Stakeholders	Performance Indicators	Priority	Cross Reference to
Assess the total resource available	DNR		★	
Assess the total demand from all users and environmental and recreational requirements and predict future requirements	DNR, Lgov, EPA		★	WQ6
Identify areas of overcommitment and limited availability	DNR, MRWMG,		★★	
Develop an allocation plan taking into account present and future available resource and user demand	DNR, MRWMG, Lgov	A WAMP plan	★★	
Investigate possible future water harvesting schemes	DNR, Industry		★★★	
Review and update the supply and demand on a regular basis	DNR, MRWMG, EPA, Lgov	Reveiw every 2years	★★	

Priorities Achieved By:

★ 1 - 2 years ★★ 2 - 3 years ★★★ 3 - 5 years

Strategy WQ5

Ensure that water management strategies allow for the preservation of aquatic ecosystems within the catchment

Actions	Stakeholders	Performance Indicators	Priority	Cross Reference to
Collate all information concerning aquatic ecosystems of the catchment	EPA, DNR, QFMA, DPI		★	NC4 FI1 WQ4
Determine minimum water quantity and quality necessary to maintain aquatic ecosystems	EPA, DNR		★	WQ3 WQ4
Identify environmentally significant aquatic habitat areas	DPI, MRWMG	Series of reports	★	NC2 NC4 FI2
Identify key research areas to enable aquatic ecosystems to be well managed	MRWMG		★★	FI2 WQ4

Strategy WQ6

Support the development of a management plan for groundwater in the catchment

Actions	Stakeholders	Performance Indicators	Priority	Cross Reference to
Identify water table problem areas using scientific research and local knowledge	DNR, EPA, Landholders, DME		★	
Map problem areas and boundaries on GIS	DNR	Detailed map	★★	
Establish Limits of Acceptable Change for water table levels	DNR,DPI, Landcare		★★	
Assist in the development of a works plan for groundwater management in Cattle Creek Catchment	CCLCG, DNR, DPI, MRWMG, Landholders		★	AG7
Investigate funding opportunities for a works program in Cattle Creek Catchment	MRWMG, CCLCG, DPI, DNR		★★	LD4 AG7
Ensure the development of a contingency plan for potential groundwater problems	CCLCG, DNR, DPI MRWMG, Landholders		★★	

Strategy WQ7

Encourage the involvement of the community in the development and implementation of strategies

Actions	Stakeholders	Performance Indicators	Priority	Cross Reference to
Actively involve stakeholders in development and implementation of water management programs	MRWMG, Lgov, DNR, Industry		★★	WQ1
Develop Codes of Practice for water-use, highlighting water conservation and quality	MRWMG, DNR, Lgov, Industry	Codes of Practice Doc.	★★	
Participate in the preparation of routine reports on water management issues	DNR, industry, MRWMG	Quarterly report	★★	WQ1 WQ3
Encourage research bodies to inform the public of their activities	CSIRO, BSES, Univ DNR, EPA, DME,		★	

Priorities Achieved By:

★ 1 - 2 years ★★ 2 - 3 years ★★★ 3 - 5 years