Basins, Catchments and Receiving Waters of the Black Ross Water Quality Improvement Plan Area

Chapter 14
Magnetic Island Sub Basin

November 2009

Acknowledgements

This publication was funded by the Australian Government's Coastal Catchments Initiative through the Department of Environment, Water, Heritage and the Arts.

Australian Government

creektocoral
our waterways – our responsibility

Document disclaimer statement

City of Townsville

Townsville City Council advises that this publication contains information based on scientific research, knowledge and understanding as well as perceptions and interpretations of the authors. The reader is advised that such information may be incomplete or unsuitable to be used in certain situations. While all care has been taken in the preparation of this document, Townsville City Council accepts no liability for any decisions or actions taken on the basis of the information contained in this document, or from conclusions drawn from interpreting the information. Readers should be aware that some information might be superseded with further scientific studies and evolving technology and industry practices.

This document can be cited as:
Gunn, J., and Manning, C. 2009, *Basins, Catchments and Receiving Waters of the Black Ross Water Quality Improvement Plan Area (Chapter 14)*, Townsville City Council - Creek to Coral, Townsville.

Contents

Tables

Figures

Document Control

Document ID:

Rev No	Date	Revision Details	Typist	Author	Verifier	Approver
14	May 2010	Final revision	JG	JG	CM/GB	C2C

The previous chapters

v.
Fl
Nu

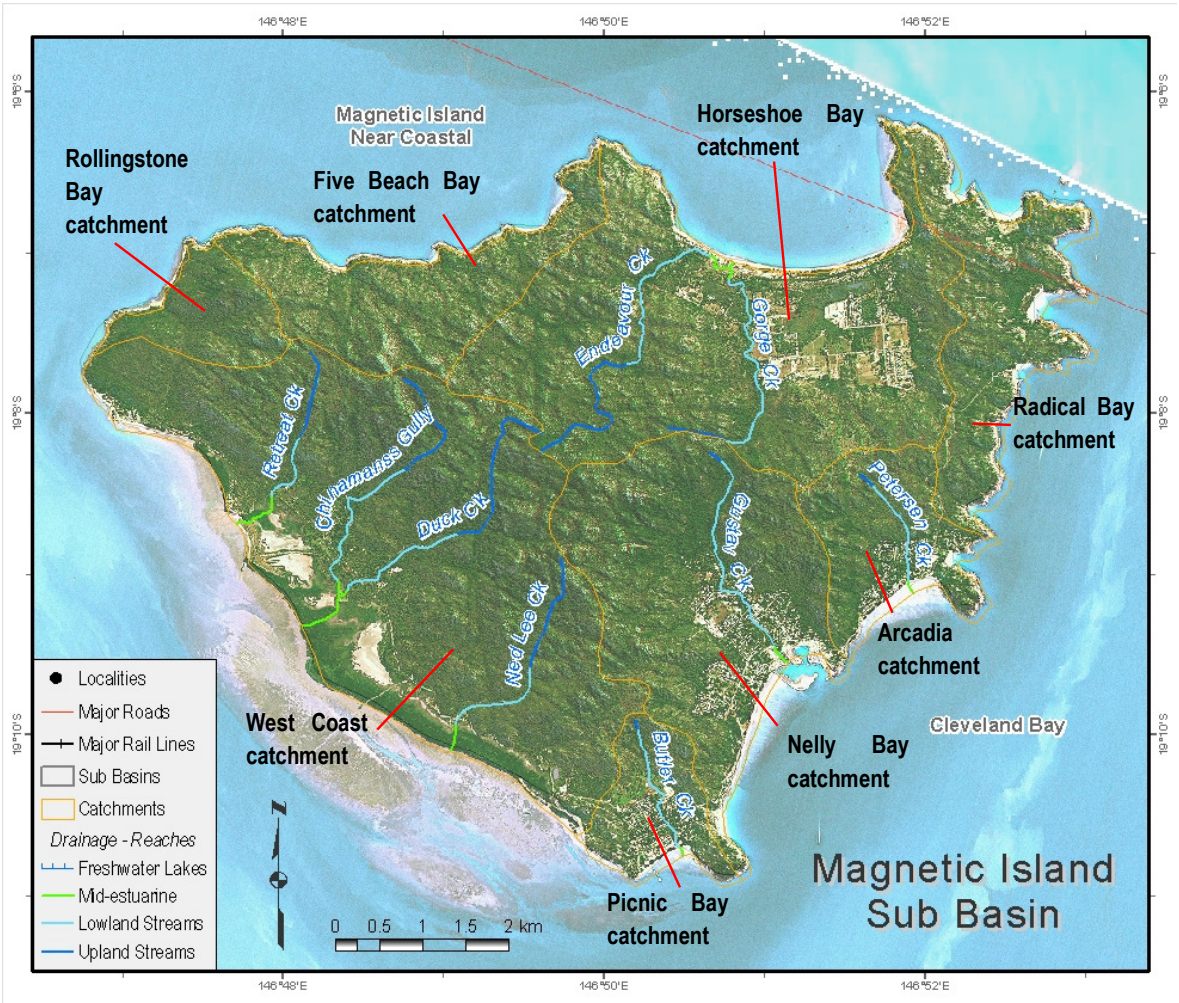
Pr

Pr

14. Magnetic Island Sub Basin

The Magnetic Island Sub Basin includes the West Coast, Picnic Bay, Nelly Bay, Arcadia, Radical Bay, Horseshoe Bay, Five Beach Bay and Rollingstone Bay catchments (see Figure 14.1).

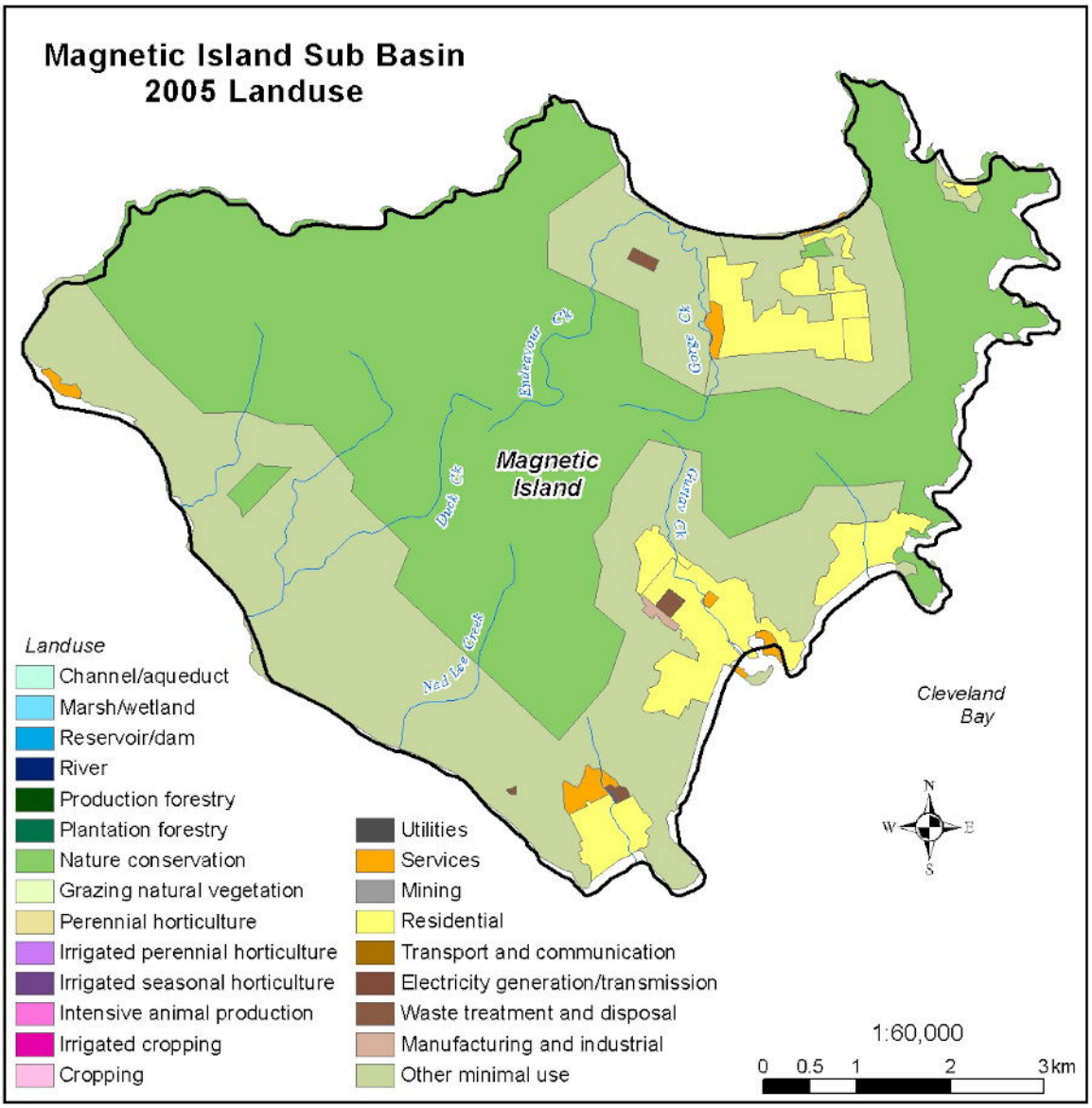
Figure 14.1 Magnetic Island Sub Basin Imagery



14.1 Magnetic Island Sub Basin Land Use

The Magnetic Island Sub Basin is approximately 51 square kilometres in size (~5,100 hectares). Nature conservation (53%) and minimal use (39%) are the main land uses of the Magnetic Island Sub Basin (see Figure 14.2 and Table 14.1).

Figure 14.2 Magnetic Island Sub Basin Land Use



Source: 2005 land use generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics).

Table 14.1 Magnetic Island Sub Basin Land Use

Land Use	Area (ha)	Area (%)
Manufacturing and industrial	5	0.1
Nature conservation	2,639	52.9
Other minimal use	1,924	38.6
Residential	383	7.7
Services	27	0.5
Waste treatment and disposal	13	0.3
	4,990	100

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.2 Magnetic Island Sub Basin Demographics

The 2006 Census counted 2,111 people resident on Magnetic Island (Sub Basin). Tourism is a key activity for Magnetic Island, and in the 2006 Census visitors swelled the total island population to 3,246[1] people.

In terms of the total population (residents and visitors), Census data indicates Magnetic Island experienced a slight population decline from 2001 to 2006, with the downturn attributed to a lower visitor count. However, 2006 Census data may not present an accurate picture for visitor numbers over an annual period, as the Census provides a 'snapshot' for a single night. Data from Tourism Queensland indicates that visitor numbers to Townsville for the year to December 2006 were slightly above 2001 figures.

The average annual residential population growth rate for Magnetic Island at 1.02% for the five years 2001-2006, is around half the average annual growth rate experienced in Townsville LGA (2.07%) during the same period.

Median age of Magnetic Island residents at 45 years is significantly higher than the Townsville median of 33 years. A significant percentage (14.4%) of Island residents are aged 65 years and above.

Average household size at 2.5 persons is significantly lower for Magnetic Island than for Townsville (2.8). Couple-only households are predominant on the Island (see Table 14.3). These statistics are fairly typical of an area that holds appeal for retirement living.

For Magnetic Island, total numbers of private dwellings increased between 2001 and 2006, however Census data shows the total number of occupied dwellings fell during the same period.

At the 2006 Census Magnetic Island housing was predominantly single-family dwellings, however, recent unit development at Nelly Bay Harbour may not have been captured at this time (714 dwellings are separate houses out of a total 845 dwellings in the area).

A number of Magnetic Island residents reported that they worked from home (84 people out of a total of 971 respondents), with a further 104 people reporting that they did not go to work.

Selected information for Magnetic Island from the 2006 Census is included in Table 14.2 and Table 14.3.

Table 14.2 Selected Medians and Averages [2]

Description	Magnetic Island	Townsville
Median age of persons	45	33
Median individual income ($/weekly)	449	531
Median family income ($/weekly)	1,024	1,237
Median household income ($/weekly)	789	1,101
Median housing loan repayment ($/monthly)	1,321	1,231
Median rent ($/weekly)	186	190
Average household size	2.5	2.8

[1] Total population, Magnetic Island SLA, Source: Australian Bureau of Statistics 2006 Census of Population and Housing

[2] **Median calculations - PLEASE NOTE -** For this customised Basic Community Profile, medians have been calculated from confidentialised and pertebated Census data. Medians have been calculated based on the assumption of a uniform distribution between ranges. Care should be taken when using these figures.
Median age of persons excludes overseas visitors.
Median individual income is applicable to persons aged 15 years and over.
Median household income is applicable to occupied private dwellings. It excludes households where at least one member aged 15 years and over did not state an income and households.
Median housing loan repayment is applicable to occupied private dwellings being purchased and includes dwellings being purchased under a rent/buy scheme. It excludes 'Visitors only' and 'Other not classifiable' households.
Median rent is applicable to occupied private dwellings being rented. It excludes 'Visitors only' and 'Other not classifiable' households.
Average number of persons per bedroom is applicable to occupied private dwellings. It excludes 'Visitors only' and 'Other not classifiable' households

Source: ABS 2006 Census of Population and Housing
Notes: Figures are based on place of usual residence. Magnetic Island is the Magnetic Island Customised Region and Townsville is Townsville City Council local government area.

Table 14.3 Count of Occupied Private Dwellings(a) and Persons in Occupied Private Dwellings

Dwelling Type	Dwellings		Resident Persons	
	Count	%	Count	%
Separate house	714		1,687	
Semi-detached, row or terrace house, townhouse etc:				
One storey	28		67	
Two or more storeys	17		35	
Semi-detached, etc Total	45		102	
Flat, unit or apartment:				
In one or two storey block	75		128	
Flat, unit or apartment Total	75		128	
Other dwelling:				
Caravan, cabin, houseboat	8		5	
Improvised home, tent, sleepers out	3		3	
House or flat attached to a shop, office, etc.	0		0	
Other dwelling Total	11		8	
Totals	**845**		**1,925**	

Source: ABS 2006 Census of Population and Housing
Notes: (a) Excludes 'Visitors only' and 'Other not classifiable' households. Figures are for the Magnetic Island Customised Region.

14.3 Magnetic Island Sub Basin Land Use by Catchment

Land use summaries of the main catchments of the Magnetic Island Sub Basin are provided below.

14.3.1 10-1 West Coast

The West Coast catchment is approximately 1,630 hectares in area (~16 square kilometres) with the main land use being conservation and minimal use (98%).

Table 14.4 West Coast Catchment land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	702	43.0
		Other conserved area	17	1.0
	Other minimal use		908	55.6
Intensive uses	Residential		5	0.3
	Service	Recreation and culture	<1	<0.1
	Waste treatment and disposal	Sewage	<1	<0.1
		Total	1,633	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.3.2 10-2 Picnic Bay

The Picnic Bay catchment is approximately 180 hectares in area (~2 square kilometres) with the main land use being minimal use (62%). The catchment also has a large residential component (28%).

Table 14.5 Picnic Bay Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	<1	0.2
	Other minimal use		109	61.8
Intensive uses	Residential		49	27.6
	Service	Recreation and culture	15	8.7
	Waste treatment and disposal	Landfill	3	1.8
		Total	177	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.3.3 10-3 Nelly Bay

The Nelly Bay catchment is approximately 780 hectares in area (~8 square kilometres) with the main land uses being nature conservation (39%) and minimal use (41%). The residential component accounts for 16 per cent of the catchment area.

Table 14.6 Nelly Bay Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	303	39.09
	Other minimal use		319	41.16
Intensive uses	Manufacturing and industrial		5	0.59
	Residential		122	15.75
		Rural residential	20	2.53
	Service	Commercial services	4	0.56
		Recreation and culture	<1	0.03
	Waste treatment and disposal	Sewage	5	0.68
		Total	777	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.3.4 10-4 Arcadia

The Arcadia catchment is approximately 260 hectares in area (~3 square kilometres) with the main land use being conservation and minimal use. Residential areas account for approximately 20 per cent of the catchment.

Table 14.7 Arcadia Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	117	44.4
	Other minimal use		92	34.8
		Defence	3	1.0
Intensive uses	Residential		52	19.7
		Total	264	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.3.5 10-5 Radical Bay

The Radical Bay catchment is approximately 370 hectares in area (~4 square kilometres) with the main land use being conservation and minimal use (99%).

Table 14.8 Radical Bay Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	354	95.1
	Other minimal use		15	4.0
Intensive uses	Residential	Rural residential	3	0.9
		Total	372	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.3.6 10-6 Horseshoe Bay

The Horseshoe Bay catchment is approximately 1,220 hectares in area (~12 square kilometres) with the main land use being conservation and minimal use (88%). Residential areas occupy approximately 11per cent of the catchment.

Table 14.9 Horseshoe Bay Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	615	50.3
		Other conserved area	5	0.4
	Other minimal use		460	37.6
Intensive uses	Residential		39	3.2
		Rural residential	98	8.0
	Service	Commercial services	2	0.1
	Waste treatment and disposal	Sewage	4	0.4
		Total	1223	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.3.7 10-7 Five Beach Bay

The Five Beach Bay catchment is approximately 385 hectares in area (~4 square kilometres) with the only land use being nature conservation (National Park).

Table 14.10 Five Beach Bay Catchment land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	386	100
		Total	386	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

14.3.8 10-8 Rollingstone Bay

The Five Beach Bay catchment is approximately 160 hectares in area (~2 square kilometres) with the entire land use being a combination of conservation and minimal use (100%).

Table 14.11 Rollingstone Bay Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	141	89
	Other minimal use		18	11
		Total	159	

Source: 2005 land use figures generated by Connell Wagner using 2005 Townsville City Planning Scheme zoning, aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

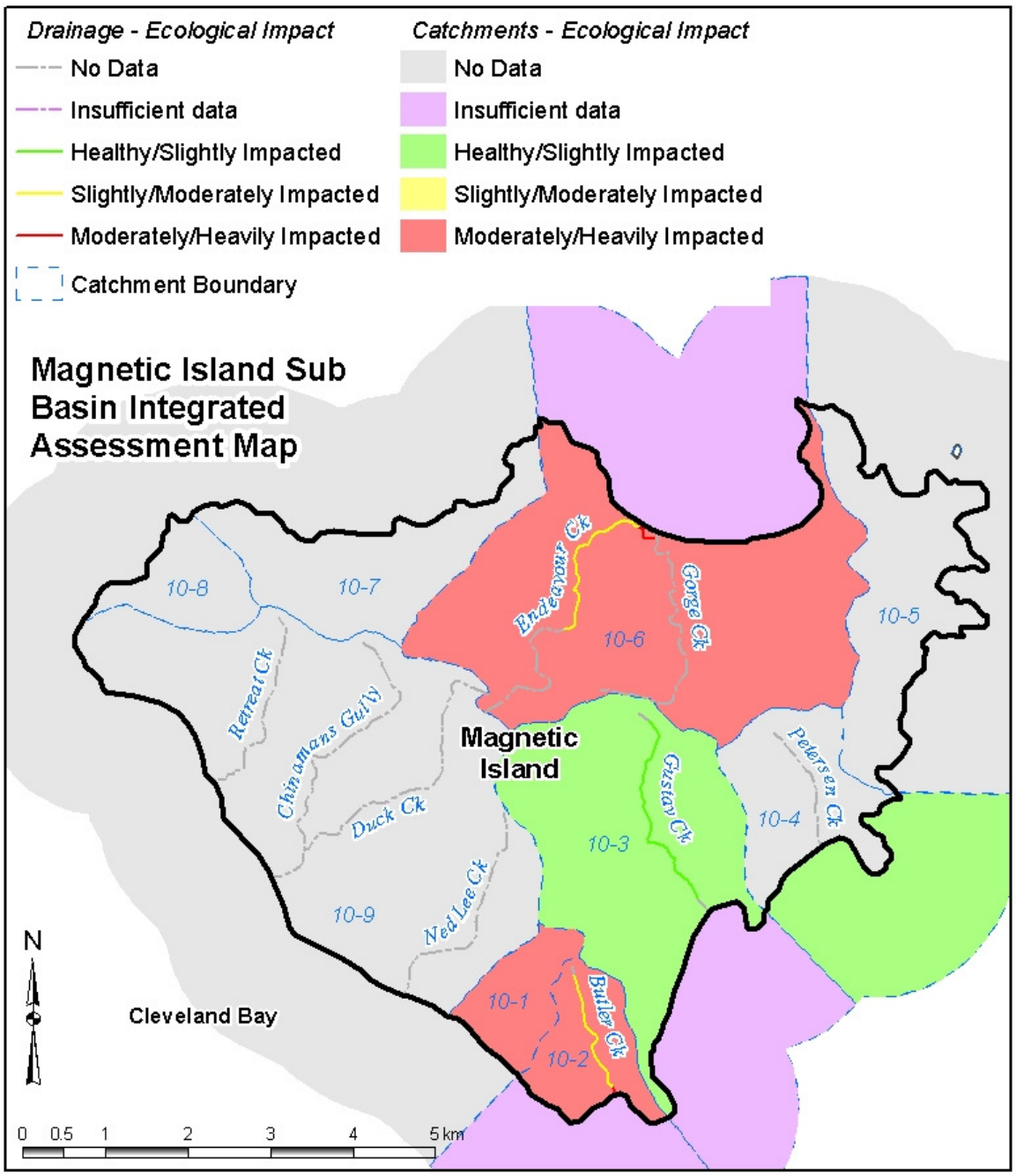
Table 14.12 Catchments Land Use Summary

Land Use	West Coast (10-1)		Picnic Bay (10-2)		Nelly Bay (10-3)		Arcadia (10-4)	
	Ha	%	Ha	%	Ha	%	Ha	%
Conservation and natural areas	1,626	99.7	109	61.8	621	80.0	212	80.3
Grazing	0		0		0		0	
Rural residential	0		0		20	2.5	0	
Intensive agriculture	0		0		0		0	
Urban	6	0.4	67	38.0	136	17.5	52	19.7
Water and wetlands	0		0		0		0	
Totals	1,632		177		777		264	
Land Use	**Radical Bay (10-5)**		**Horseshoe Bay (10-6)**		**Five Beach (10-7)**		**Rollingstone Bay (10-8)**	
	Ha	**%**	**Ha**	**%**	**Ha**	**%**	**Ha**	**%**
Conservation and natural areas	369	99.2	1,080	88.3	386	100.0	159	100.0
Grazing	0		0		0		0	
Rural residential	3	0.9	98	8.0	0		0	
Intensive agriculture	0		0		0		0	
Urban	0		45	3.7	0		0	
Water and wetlands	0		0		0		0	
Totals	372		1,223		386		159	

14.4 Magnetic Island Sub Basin Resource Condition

The Black Ross WQIP area water quality condition assessment (Connell Wagner 2008) indicated that the water quality of this sub basin is heavily impacted (see Figure 14.3). Three of the nine catchments are rated as heavily impacted with one catchment, Gustav Creek, being slightly impacted. There is insufficient data to assess the remaining five catchments.

Figure 14.3 Magnetic Island Sub Basin Ecological Impact



(Note: Water quality data was assessed against water quality objectives (WQOs) derived from the Queensland Water Quality Guidelines (EPA 2006) for the Central Coast region for lowland streams)

14.5 Water Quality and Water Quality Objectives (WQOs)

Water quality condition data for the Magnetic Island sub basin is variable and paints a mixed picture in relation to the WQOs for most of the water quality indicators (see Table 14.13).

Table 14.13 Comparing WQOs with Water Quality

Magnetic Island Sub Basin	DIN	Org N	TN	FRP	TP	TSS
Cockle Creek 10-1	ND	ND	X 26%	√* 100%	X 110%	X 70%
Butler Ck (Picnic Bay) 10-2	ND	ND	X 14%	√* 100%	X 140%	X 100%
Gustav Creek10-3	ND	ND	√* 55%	√* 50%	√* 60%	√* 30%
Endeavour Creek 10-6	X 13%	ND	X 90%	√* 100%	X 100%	X 590%

Notes: Tick / cross denotes if the WQO is met (tick) or not (cross) for the waterway based on the median value for the water quality indicator. The percentage indicates the amount by which the WQO is met or not met (the difference between the WQO and water quality condition median as a percentage of the WQO). No % is listed if the water quality condition is the same as the WQO. ND is no data.

DIN is dissolved inorganic nitrogen, Org N is organic nitrogen, TN is total nitrogen, FRP is filterable reactive phosphorus, TP is total phosphorus and TSS is total suspended solids (sediment).

* indicates inconsistency or a wide variation in the data, or insufficient data to calculate percentiles.

[1] indicates data is dated and may not reflect current condition.

[More information about water quality conditions and WQOs can be found in; *Environmental Values, Water Quality Objectives and Targets for the Black Ross Water Quality Improvement Plan* (Gunn, Manning, and McHarg 2009), and *Water Quality Condition of the Black and Ross River Basins* (Connell Wagner 2008)]