



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

## **Chapter 10 Lower Ross River Sub Basin**

**November 2009**



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The previous chapters

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## 10. Lower Ross River Sub Basin

The Lower Ross River Sub Basin (see Figure 10.1 and Figure 10.2) includes the Pallarenda, Mundy Creek, Esplanade, Ross Creek and Ross River (below the dam) catchments. There are also a number of smaller waterways that have been included in the catchments of the larger waterways.

Figure 10.1 Lower Ross River Sub Basin and Drainage

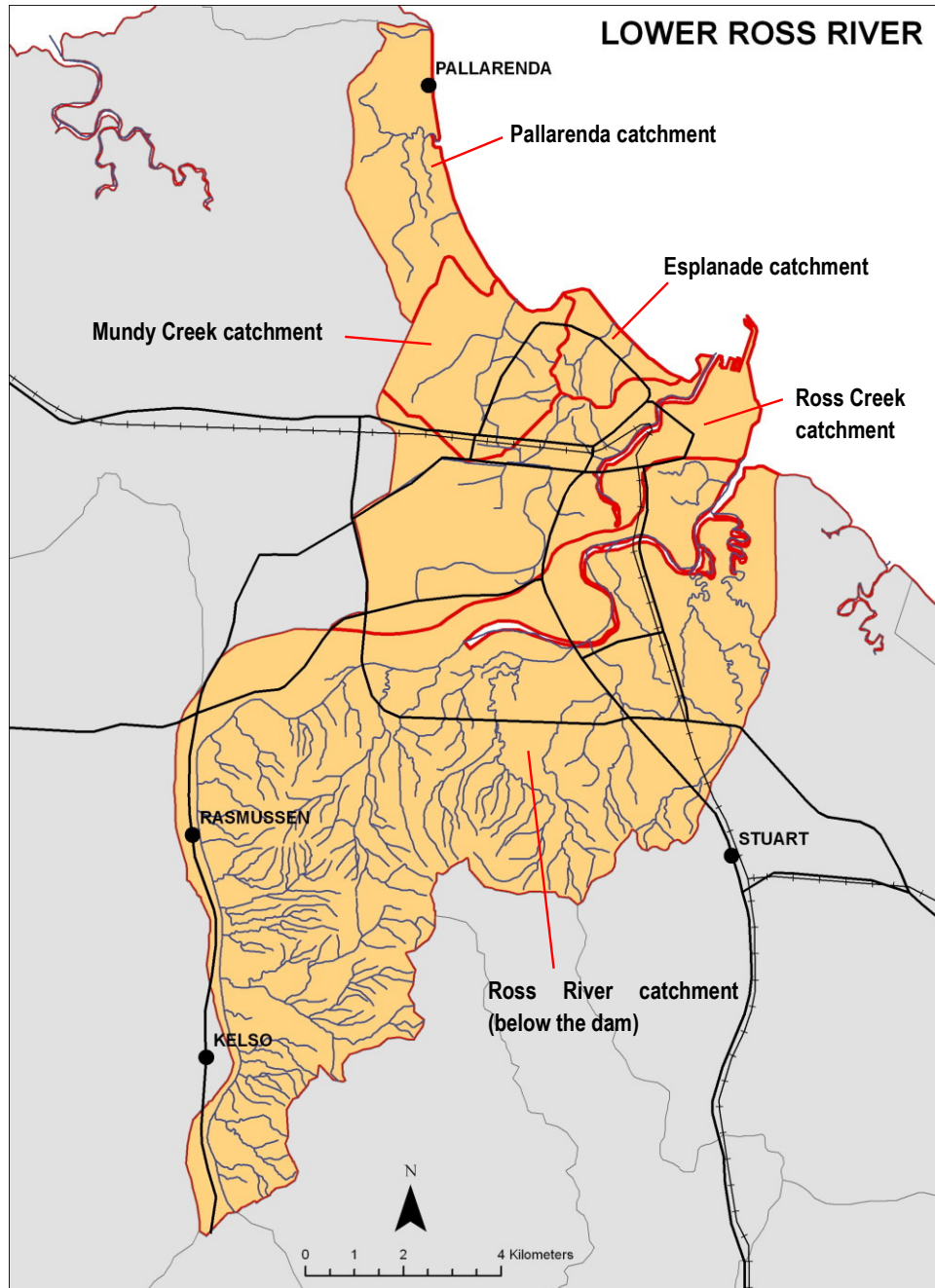




Figure 10.2 Lower Ross River Sub Basin Imagery

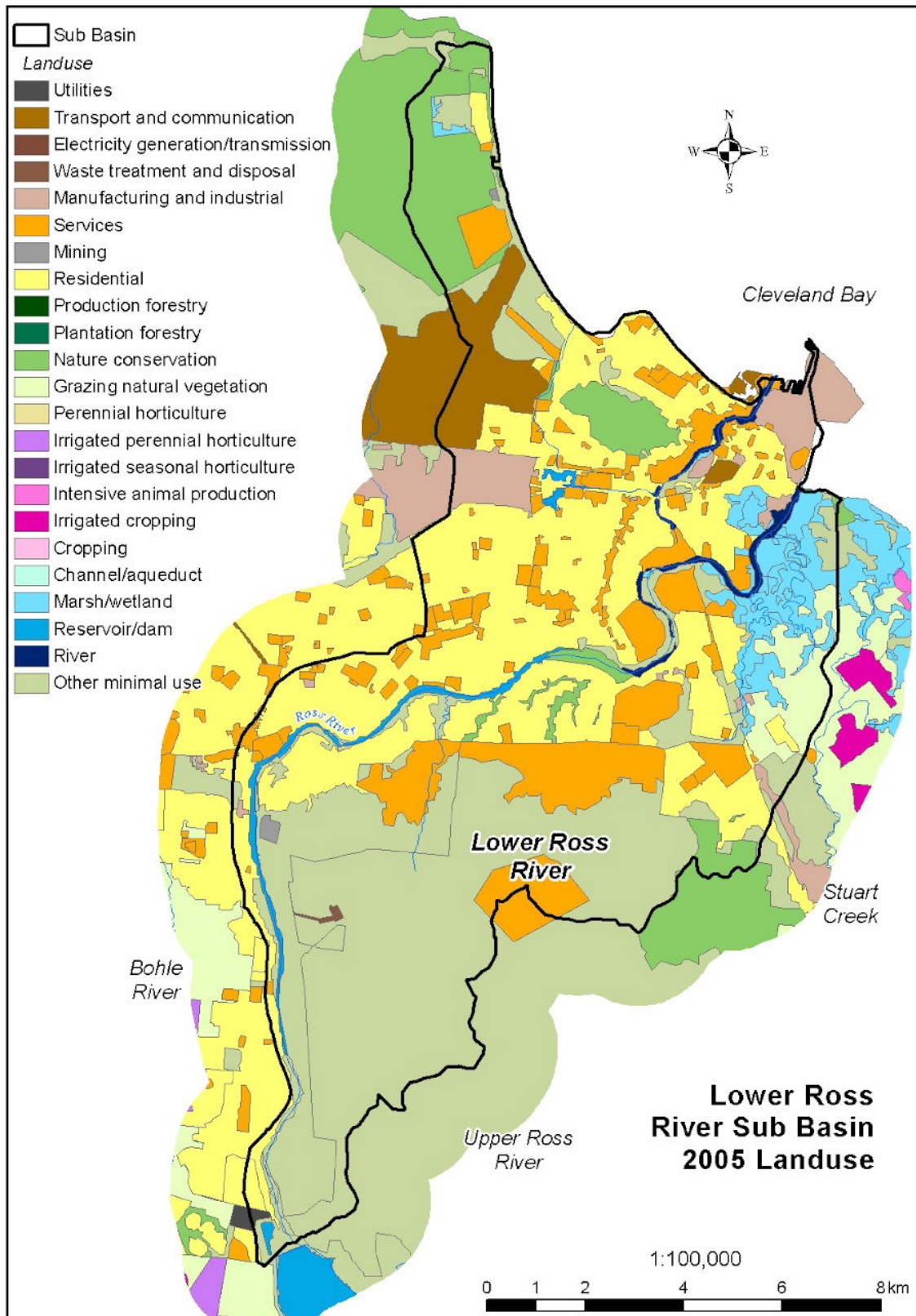


### 10.1 Lower Ross River Sub Basin Land Use

The Lower Ross River Sub Basin is approximately 135 square kilometres in size (~13,500 hectares). Residential and associated urban land uses are dominant in the Lower Ross River Sub Basin. Other minimal use (34%) (Defence land) and nature conservation (Town Common and Castle Hill) and are also significant land uses in the Lower Ross River Sub Basin (see Figure 10.3 and Table 10.1).



Figure 10.3 Lower Ross River Sub Basin Land Use



Source: 2005 land use update generated by Connell Wagner using QLUMP 1999 data (DNRW), 2005 aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics).

**Table 10.1 Lower Ross River Sub Basin Land Use**

Land Use	QLUMP 1999		2005 Update	
	Area (ha)	Area (%)	Area (ha)	Area (%)
Grazing natural vegetation	316	2.4	316	2.4
Manufacturing and industrial	268	2.0	381	2.8
Marsh/Wetland	516	3.8	515	3.8
Mining	21	0.2	21	0.2
Nature conservation	944	7.0	944	7.0
Other minimal use	5,016	37.2	4,584	34.0
Reservoir/Dam	149	1.1	149	1.1
Residential	3,737	27.7	4,046	30.0
River	92	0.7	91	0.7
Services	2,017	15.0	2,004	14.9
Transport and communication	390	2.9	416	3.1
Utilities	9	<0.1	9	<0.1
	13,475	100	13,475	100

Source: QLUMP 1999 calculations from CSIRO and 2005 update figures generated by Connell Wagner using QLUMP 1999 data (DNRW), 2005 aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

## **10.2 Lower Ross River Sub Basin Demographics**

The 2006 Census counted 76,541 people resident within the Lower Ross River Sub Basin. The sub basin extends from Pallarenda in the north to the Ross River Dam wall in the south, including Townsville's major inner urban suburbs, the Port and CBD precincts. It also includes major new residential development in the Fairfield Waters (Idalia) and Douglas areas, plus the Laverack Army Base.

Housing in the Lower Ross River Sub Basin has a higher percentage of flats and units than other sub basins in the WQIP area with 6,025 dwellings of the 27,757 dwellings in the sub basin being flats, units or apartments. Single-family dwellings account for 19,895 of the dwellings in the sub basin (see Table 10.3)

The median age of the Lower Ross River sub-basin population is reported at 34 years (2006 Census). Family characteristics vary throughout the sub basin, with a higher proportion of families with children living in more recently established suburban areas, including at Douglas.

Over 26% of total households in the sub basin report only one person usually resident. Average household size at 2.6 people per household is lower than the average occupancy of 2.8 people for the Townsville local government area.

Future growth in the Lower Ross Sub Basin is likely to include urban infill with an intensification of residential density through redevelopment. No large 'greenfield' sites suitable for significant residential development remain within the sub basin.

Selected medians and averages from the 2006 Census for the Lower Ross River Sub Basin are presented in Table 10.2



**Table 10.2 Selected Medians and Averages <sup>1</sup>**

Description	Lower Ross River	Townsville
Median age of persons	34	33
Median individual income (\$/weekly)	538	531
Median family income (\$/weekly)	1,270	1,237
Median household income (\$/weekly)	1,067	1,101
Median housing loan repayment (\$/monthly)	1,217	1,231
Median rent (\$/weekly)	185	190
Average household size	2.6	2.8

Source: ABS 2006 Census of Population and Housing

Notes: Figures are based on place of usual residence. Lower Ross River is the Lower Ross River Customised Region and Townsville is Townsville City Council local government area.

**Table 10.3 Count of Occupied Private Dwellings(a) and Persons in Occupied Private Dwellings**

Dwelling Type	Dwellings		Resident Persons	
	Count	%	Count	%
Separate house	19,895		54,627	
Semi-detached, row or terrace house, townhouse etc:				
One storey	1,045		1,624	
Two or more storeys	510		903	
Semi-detached, etc Total	1,555		2,527	
Flat, unit or apartment:				
In one or two storey block	4,726		8,033	
In a three storey block	631		1,123	
In a four or more storey block	661		1,221	
Attached to a house	7		26	
Flat, unit or apartment Total	6,025		10,403	
Other dwelling:				
Caravan, cabin, houseboat	193		295	
Improvised home, tent, sleepers out	41		46	
House or flat attached to a shop, office, etc.	37		84	
Other dwelling Total	271		425	
Dwelling structure not stated	11		14	
<b>Totals</b>	<b>27,757</b>		<b>57,996</b>	

Source: ABS 2006 Census of Population and Housing

Notes: (a) Excludes 'Visitors only' and 'Other not classifiable' households. Figures are for the Lower Ross River Customised Region.

<sup>1</sup> **Median calculations - PLEASE NOTE** - For this customised Basic Community Profile, medians have been calculated from confidentialised and perturbed 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

### 10.3 Lower Ross River Sub Basin Land Use by Catchment

Land use summaries for the main catchments of the Lower Ross River Sub Basin are provided below. Where the 1999 and 2005 land use information is unchanged only the 2005 land use is provided. Additional catchment profile information, kindly provided by DERM/EPA Townsville, is included in Appendix E.

#### 10.3.1 6-1 Pallarenda

The Pallarenda catchment is approximately 960 hectares (~10 square kilometres) in area with the main land use being conservation and natural environments (76%), including water. The remainder of the catchment consists of urban land uses.

**Table 10.4 Pallarenda Catchment Land Use 2005**

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Natural feature protection	520	54.0
		Other conserved area	24	2.5
	Other minimal use		165	17.1
Intensive uses	Residential		43	4.5
	Services	Recreation and culture	92	9.5
	Transport and communication	Airports/aerodromes	100	10.3
	Mining		4	0.4
Water	Marsh/wetland		17	1.7
Total			963	

Source: 2005 land use figures generated by Connell Wagner using QLUMP 1999 data (DNRW), 2005 aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

#### 10.3.2 6-2 Mundy Creek

The Mundy Creek catchment is approximately 970 hectares (~10 square kilometres) in area. The main land uses are urban associated with residential areas accounting for 38% of the catchment. Nature conservation and minimal use areas account for 23% of the catchment.

**Table 10.5 Mundy Creek Catchment Land Use 1999 and 2005**

Secondary Land Use - Tertiary Land Use		QLUMP 1999		2005 Update	
		Area (ha)	%	Area (ha)	%
Nature conservation	Other conserved area	94	9.6	93	9.6
Other minimal use		143	14.7	118	12.1
	Remnant native cover	15	1.6	15	1.6
Manufacturing and industrial		13	1.3	32	3.2
Residential		365	37.5	366	37.7
Services		5	0.5	5	0.5
	Commercial services	32	3.2	14	1.4
	Recreation and culture	38	3.9	63	6.4
Transport and communication	Airports/aerodromes	260	26.8	260	26.8
Reservoir/dam		8	0.8	6	0.7
Total		971		971	

Source: QLUMP 1999 calculations from CSIRO and 2005 calculation from land use update generated by Connell Wagner using QLUMP 1999 data (DNRW), 2005 aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

### 10.3.3 6-3 Esplanade

The Mundy Creek catchment is approximately 290 hectares (~3 square kilometres) in area. The main land use is residential (61%).

**Table 10.6 Esplanade Catchment Land Use 2005**

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Other conserved area	44	15.1
	Other minimal use	Remnant native cover	8	2.7
Intensive uses	Residential		179	61.2
	Services		38	13.1
		Commercial services	12	4.1
		Recreation and culture	11	3.8
Total			292	

Source: 2005 land use figures generated by Connell Wagner using QLUMP 1999 data (DNRW), 2005 aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

### 10.3.4 6-4 Ross Creek

The Ross Creek catchment is approximately 2,220 hectares (~22 square kilometres) in area. The main land uses are urban associated with residential areas accounting for 57% of the catchment.

**Table 10.7 Ross Creek Catchment Land Use 1999 and 2005**

Secondary Land Use - Tertiary Land Use		QLUMP 1999		2005 Update	
		Area (ha)	%	Area (ha)	%
Nature conservation	Other conserved area	77	3.4	7	3.4
Other minimal use		18	0.8	16	0.7
Manufacturing and industrial		201	9.1	296	13.3
Residential		1,315	59.1	1,274	57.2
Services		60	2.7	64	2.9
	Commercial services	301	13.5	235	10.6
	Recreation and culture	148	6.6	159	7.2
Transport and communication	Airports/aerodromes	32	1.5	32	1.5
	Railways	24	1.1	24	1.1
Reservoir/dam		13	0.6	14	0.6
River		36	1.6	34	1.5
Marsh/wetland	Marsh/W conservation	0.9	<0.1	0.9	<0.1
Total		2,225		2,225	

Source: QLUMP 1999 calculations from CSIRO and 2005 calculation from land use update generated by Connell Wagner using QLUMP 1999 data (DNRW), 2005 aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

### 10.3.5 6-5 Ross River (below the dam)

The Ross River catchment below the dam is approximately 9,020 hectares (~90 square kilometres) in area with the largest single land use being minimal use (47%) with Defence land comprising most of this area and accounting for 31% of the catchment. Urban areas comprise around 40% of the catchment with residential being the dominant urban land use category occupying 24% of the catchment area.

**Table 10.8 Ross River (below the dam) Catchment Land Use 1999 and 2005**

Secondary Land Use - Tertiary Land Use		QLUMP 1999		2005 Update	
		Area (ha)	%	Area (ha)	%
Nature conservation	Other conserved area	186	2.1	186	2.1
Other minimal use		1,697	18.8	1,353	15.0
	Defence	2,853	31.6	2,823	31.3

	Remnant native cover	91	1.0	87	1.0
Grazing natural vegetation		316	3.5	316	3.5
Manufacturing and industrial		53	0.6	53	0.6
Residential		1,804	20.0	2,154	23.9
	Rural residential	30	0.3	30	0.3
Services		431	4.8	430	4.8
	Commercial services	51	0.6	48	0.5
	Recreation and culture	385	4.3	381	4.2
	Defence facilities	352	3.9	371	4.1
	Research facilities	64	0.7	71	0.8
Utilities	Electricity generation/transmission	9	0.1	9	0.1
Mining		17	0.2	17	0.2
Waste treatment and disposal				11	0.1
Reservoir/dam		129	1.4	129	1.4
River		56	0.6	56	0.6
Marsh/wetland		222	2.5	222	2.5
	Marsh/W Conservation	277	3.1	275	3.0
	Total	9,026		9,023	

Source: QLUMP 1999 calculations from CSIRO and 2005 calculation from land use update generated by Connell Wagner using QLUMP 1999 data (DNRW), 2005 aerial photography (Townsville City Council) and SPOT imagery (NQ Dry Tropics). Figures have been rounded to the nearest hectare.

**Table 10.9 Catchments Land Use Summary**

Land Use	Pallarenda (6-1)		Mundy Creek (6-2)		Esplanade (6-3)		Ross Creek (6-4)		Ross River (btd) (6-5)	
	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
Conservation and natural areas	709	73.6	225	23.2	52	17.9	92	4.1	4,449	49.3
Grazing	0		0		0		0		316	3.5
Rural residential	0		0		0		0		30	0.3
Intensive agriculture	0		0		0		0		0	
Urban	238	24.7	739	76.1	240	82.2	2,084	93.6	3,545	39.3
Water and wetlands	17	1.8	6	0.7	0	0.0	49	2.2	682	7.6
Totals	963		971		292		2,225		9,023	

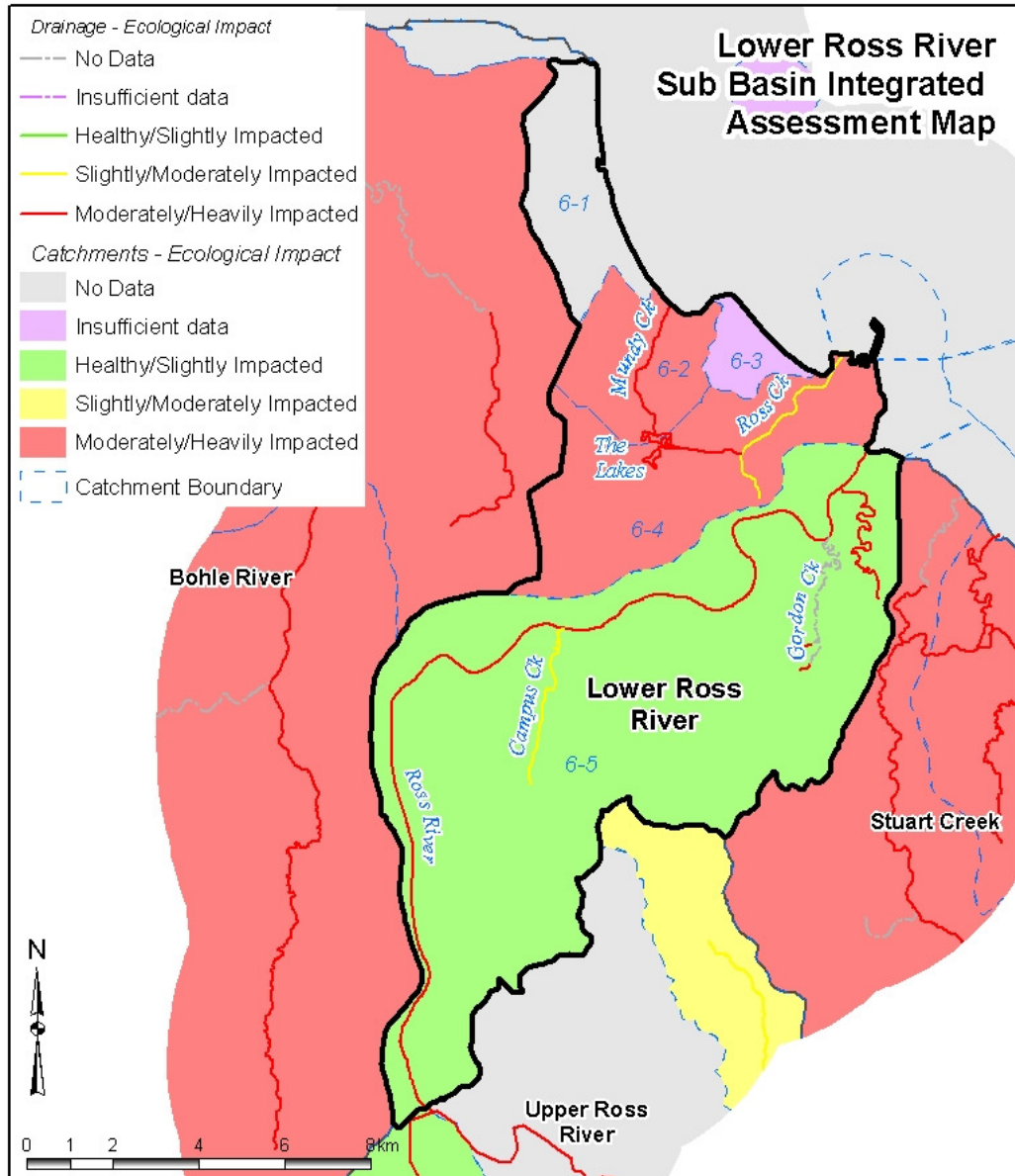


#### 10.4 Lower Ross River Sub Basin Resource Condition

The Black Ross WQIP area water quality condition assessment (Connell Wagner 2008) indicated that the water quality of the Ross River Sub Basin was moderately to heavily impacted (see Figure 10.4). Poor water quality in The Lakes was the main reason that the Ross Creek catchment was assessed as heavily impacted.

Historic data suggests that the Ross River catchment below the dam was slightly impacted but this is not consistent with recent data, which indicates that the Ross River catchment is now moderately to heavily impacted. This is probably reflective of the continual expansion of urban land uses within this catchment.

**Figure 10.4 Lower Ross River 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)

### 10.5 Water Quality and Water Quality Objectives (WQOs)

While the combined water quality condition data seems to compare reasonably with the WQOs (see Table 10.10), the data is often inconsistent or dated.

More recent data for the Ross River sub basin shows deterioration in water quality and the need for a more comprehensive monitoring program to assess the current condition of Townsville's urban waterways and identify the key pollutant sources contributing to the suspected degradation.

**Table 10.10 Comparing WQOs with Water Quality**

Lower Ross River Sub Basin	DIN	Org N	TN	FRP	TP	TSS
Mundy Creek 6-2	ND	✓ 15%	X 28%	X 590%	X 390%	X 50%
<sup>1</sup> Esplanade 6-3	✓ 63%	✓* 29%	✓* 31%	ND	✓ 20%	ND
Ross Creek 6-4	✓ 29%	✓ 33%	✓ 29%	✓	✓* 20%	X 80%
Ross River (below Dam) 6-5	✓* 50%	✓* 20%	✓* 14%	✓ 40%	✓ 6%	X 50%

Notes: Tick / cross denotes if the WQO is met (✓) or not (X) 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.

<sup>1</sup> 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)]