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

Report
Rollingstone Creek Sub Basin

November 2009

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The previous chapters

6. Rollingstone Creek Sub Basin

The Rollingstone Creek Sub Basin the Rollingstone Creek, unnamed, Surveyors Creek, Wild Boar Creek, Station Creek, Saltwater Creek, Cassowary Creek and Leichhardt Creek catchments. There are also a number of smaller waterways that have been included in the catchments of these larger creeks (see Figure 6.1 and Figure 6.2).

Figure 6.1 Rollingstone Creek Sub Basin and Drainage

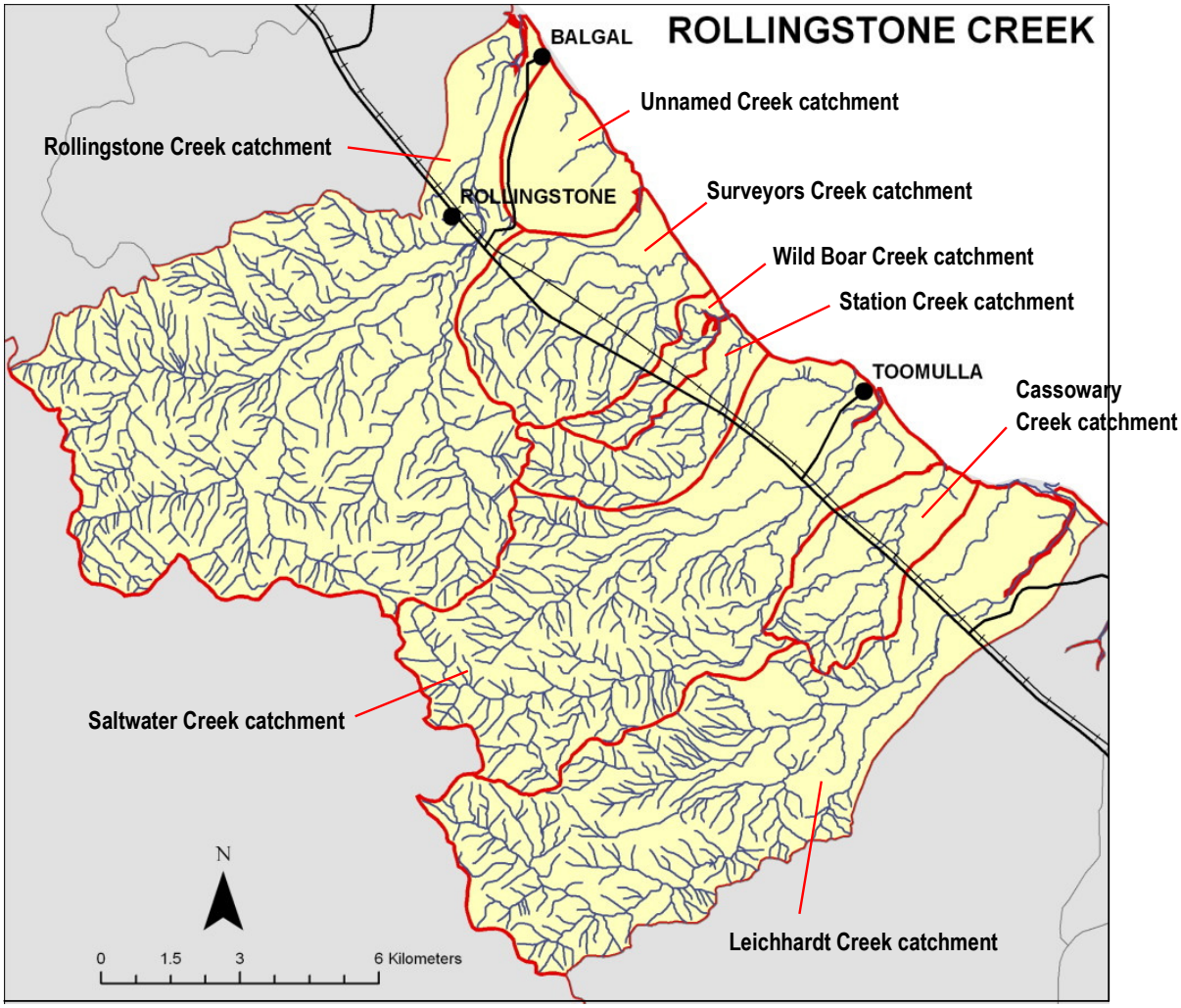
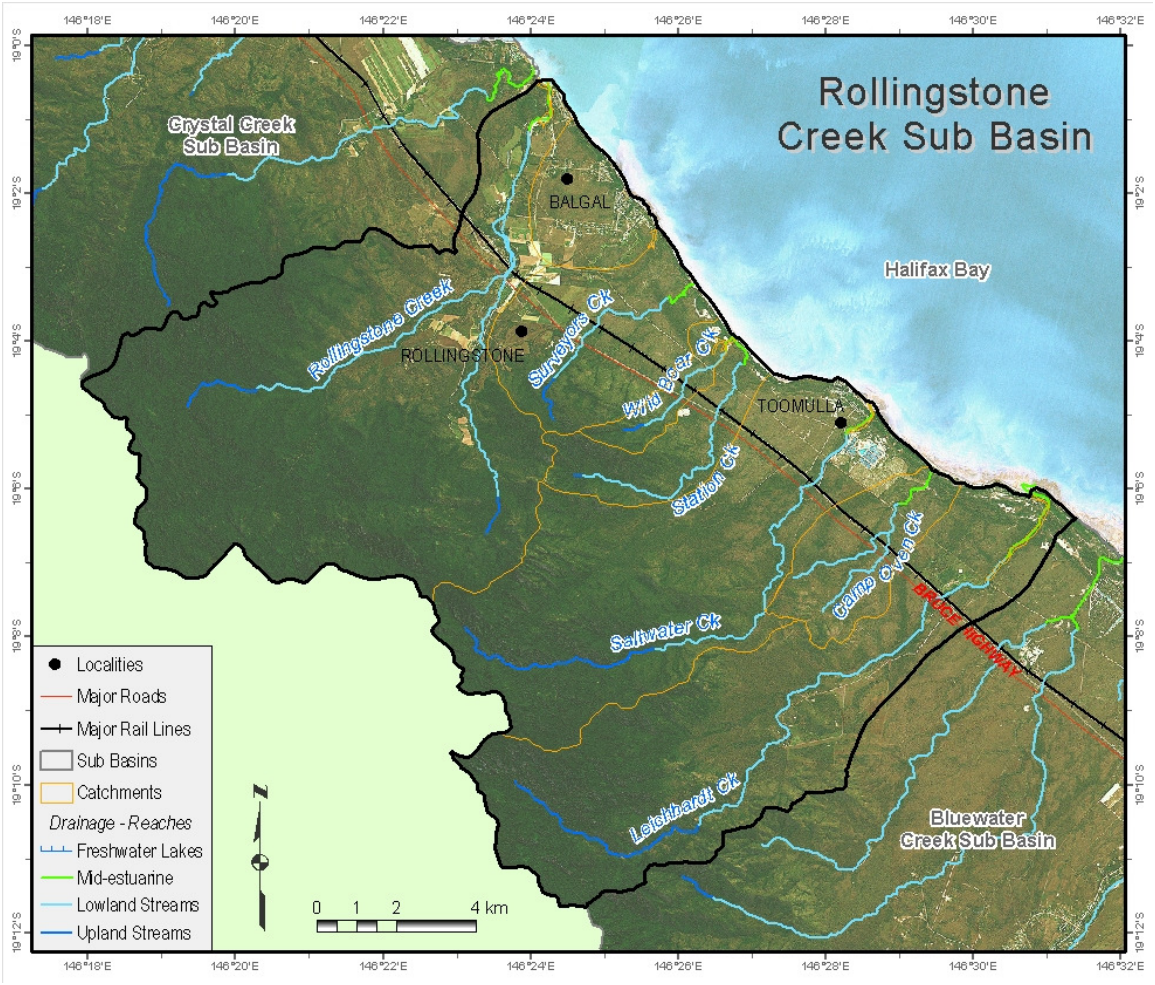


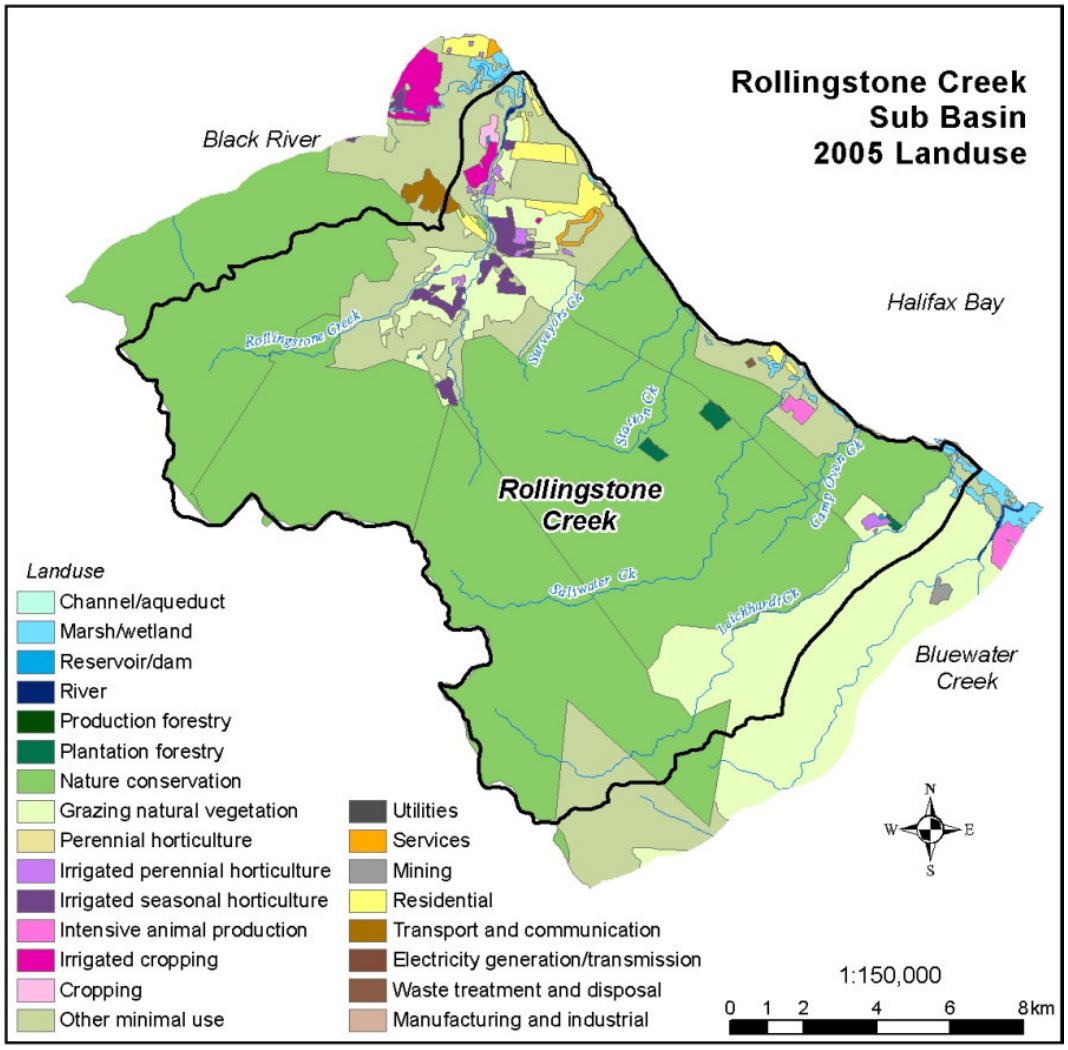
Figure 6.2 Rollingstone Creek Sub Basin Imagery



6.1 Rollingstone Creek Sub Basin Land Use

The Rollingstone Creek Sub Basin is approximately 220 square kilometres in size (~22,000 hectares). Land use is dominated by nature conservation and minimal use totalling 85% of the land area, with grazing (11%), horticulture (2%) and residential (1%) also being relatively significant land uses (see Figure 6.3 and Table 6.1) in the sub basin.

Figure 6.3 Rollingstone Creek 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 6.1 Rollingstone Creek Sub Basin Land Use

Land Use	QLUMP 1999		2005 Update	
	Area (ha)	Area (%)	Area (ha)	Area (%)
Cropping (Dryland)	28	0.1	28	0.1
Grazing natural vegetation	2,392	10.8	2,382	10.8
Intensive animal prod./Aquaculture	0	0	40	0.2
Irrigated cropping	50	0.2	52	0.2
Irrigated perennial horticulture	70	0.3	70	0.3
Irrigated seasonal horticulture	210	1	215	1
Marsh/Wetland	95	0.4	96	0.4
Nature conservation	15,997	72.3	15,865	72.1
Other minimal use	2,906	13.1	2,863	13.0
Plantation forestry	70	0.3	70	0.3
Production forestry	2	<0.1	2	<0.1
Reservoir/Dam	5	<0.1	5	<0.1
Residential	247	1.1	253	1.2

River	10	0.1	10	<0.1
Services	34	0.2	34	0.2
Transport and Communication	15	<0.1	15	<0.1
Waste Treatment and Disposal	5	<0.1	5	<0.1
Total	22,136	100	22,003	100

Source: QLUMP 1999 calculations from CSIRO and 2005 land use 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.

6.2 Rollingstone Creek Sub Basin Demographics

The 2006 Census counted 863 people resident within the Rollingstone Creek Sub Basin area with settlement mainly confined to the townships of Rollingstone and Balgal Beach (>700 people) and the beachside area of Toomulla.

Residential development, with urban allotments ranging in size from around 600m² through to 2,000m², plus rural residential holdings make up the bulk of the settlement type. Dispersed settlement is associated with small scale rural cropping on the coastal plain, including pineapples, exotic tropical fruits and some sugar cane.

Settlement in the Rollingstone Creek Sub Basin consists predominantly of single family dwellings (98.5% of total dwelling stock) (see Table 6.3).

Rollingstone Creek Sub Basin has a mature age population, reflected in the high median age of 53 years, with a high percentage of couple families without children (68%). The average household size at 2.4 persons is below the average occupancy of 2.8 for the Townsville local government area. 1

A small proportion (3%) of Rollingstone Creek Sub Basin residents reported that they worked from home, with a very high proportion (64.5%) reliant on private vehicle (as the driver) for their journey to work.2

The location and geography, along with current land zonings for the area indicate that urban expansion for residential land use may occur in and around current centres.

The Urban Growth Boundaries identified in the Planning Scheme for the City of Thuringowa, which accommodate the City's future urban growth, include a very large area encompassing the hinterland surrounding Rollingstone and Balgal Beach, plus an area surrounding the settlement of Toomulla.

Inclusion within the Urban Growth boundary identifies land as being "*suitable for residential development and supporting community and commercial facilities, and can be effectively provided with infrastructure services*," however, the distance from established urban areas and reliance on the national arterial route for connection to Townsville's centres of employment and service, are important development considerations.

At Balgal Beach there are large land parcels with potential for future development, either for tourist or possibly residential use. However, lack of infrastructure services, particularly reticulated sewerage and costs associated with supply, represent barriers for urban residential development. Demand in the tourism industry, fuel costs and future availability of public transport will be key factors affecting the pace of future development, for an area remote from the main Townsville urban centre and its service and employment opportunities.

Tenure and ongoing use for nature conservation restrict future urban settlement for significant areas (almost 90%) of the Rollingstone Creek Sub Basin.

Selected medians and averages for the Rollingstone Creek Sub Basin are shown in Table 6.2.

[1] All Dwelling, Household, and Median data is sourced from the 2006 Census Population and Housing Customised Basic Community Profile

[2] 2006 Census Population and Housing Customised Basic Community Profile (method of travel to work)

Table 6.2 Selected Medians and Averages [3]

Description	Rollingstone Creek	Townsville
Median age of persons	53	33
Median individual income ($/weekly)	351	531
Median family income ($/weekly)	895	1,237
Median household income ($/weekly)	614	1,101
Median housing loan repayment ($/monthly)	973	1,231
Median rent ($/weekly)	151	190
Average household size	2.4	2.8

Source: ABS 2006 Census of Population and Housing

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

Table 6.3 Count of Occupied Private Dwellings(a) and Persons in Occupied Private Dwellings

Dwelling Type	Dwellings		Resident Persons	
	Count	%	Count	%
Separate house	351		734	
Flat, unit or apartment:				
Flat, unit or apartment Total	0		0	
Other dwelling:				
Caravan, cabin, houseboat	5		3	
Improvised home, tent, sleepers out	0		0	
House or flat attached to a shop, office, etc.	0		0	
Other dwelling Total	5		3	
Totals	**356**		**737**	

Source: ABS 2006 Census of Population and Housing

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

[3] **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

6.3 Rollingstone Creek Sub Basin Land Use by Catchment

Land use summaries of the main catchments of the Rollingstone Creek 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.

6.3.1 2-1 Rollingstone Creek catchment

The Rollingstone Creek catchment is approximately 7,700 hectares in area (~77 square kilometres) with the main land use being nature conservation and minimal use (90%).

Table 6.4 Rollingstone Creek Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National park	2,543	32.9
		Natural feature protection	2,767	35.8
		Other conserved area	435	5.6
	Other minimal use		6	0.1
		Remnant native cover	1,201	15.5
Production from relatively natural environments	Grazing natural vegetation		425	5.5
Production from dryland agriculture and plantations	Cropping		28	0.4
Production from irrigated agriculture and plantations	Irrigated cropping	Irrigated sugar	50	0.6
	Irrigated perennial horticulture	Irrigated tree fruits	32	0.4
	Irrigated seasonal horticulture	Irrigated fruits	152	2.0
Intensive uses	Residential		21	0.3
		Rural residential	26	0.3
	Transport and communication	Airports/aerodromes	15	0.2
Water	Reservoir/dam		3	0.0
	River		10	0.1
	Marsh/wetland		<1	<0.1
		Marsh/W Conservation	18	0.2
		Total	7,732	

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.

6.3.2 2-2 An unnamed Creek

The unnamed creek catchment is approximately 730 hectares in area (~7 square kilometres) with the main land use being nature conservation and minimal use (50%). Grazing occupies 19% of the catchment with residential and associated services occupying 29%.

Table 6.5 Unnamed Creek Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Other conserved area	5	0.6
	Other minimal use		32	4.4
		Remnant native cover	328	44.9
Production from relatively natural environments	Grazing natural vegetation		140	19.2
Production from irrigated agriculture and plantations	Irrigated perennial horticulture	Irrigated tree fruits	8	1.1
	Irrigated seasonal horticulture	Irrigated fruits	4	0.5
Intensive uses	Residential		112	15.3
		Rural residential	68	9.3
	Services	Recreation and culture	31	4.3
Water	Marsh/wetland		4	0.5
		Total	731	

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.

6.3.3 2-3 Surveyors Creek

The Surveyors Creek catchment is approximately 1,674 hectares in area (~17 square kilometres) with the main land use being nature conservation and minimal use (75%). Grazing land use occupies around 21% of the catchment.

Table 6.6 Surveyors Creek Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Natural feature protection	434	25.9
		Other conserved area	448	26.8
	Other minimal use		1	<0.1
		Remnant native cover	371	22.2
Production from relatively natural environments	Grazing natural vegetation		353	21.1
Production from irrigated agriculture and plantations	Irrigated perennial horticulture	Irrigated tree fruits	10	0.6
	Irrigated seasonal horticulture	Irrigated fruits	55	3.3
Intensive uses	Services	Recreation and culture	2	0.1
		Total	1,674	

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.

6.3.4 2-4 Wild Boar Creek

The Wild Boar Creek catchment is approximately 345 hectares in area (~3.5 square kilometres) with the only land use being nature conservation (100%).

Table 6.7 Wild Boar Creek Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Natural feature protection	157	45.5
	Nature conservation	Other conserved area	188	54.5
		Total	345	

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.

6.3.5 2-5 Station Creek

The Station Creek catchment is approximately 880 hectares in area (~9 square kilometres) with the main land use being nature conservation and minimal use (99%).

Table 6.8 Station Creek Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Natural feature protection	160	18.2
	Nature conservation	Other conserved area	687	77.9
	Other minimal use	Remnant native cover	26	2.9
Production from dryland agriculture and plantations	Plantation forestry		6	0.7
Water	Marsh/wetland		2	0.3
		Total	882	

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.

6.3.6 2-6 Saltwater Creek

The Saltwater Creek catchment is approximately 4,660 hectares in area (~47 square kilometres) with the main land use being nature conservation and minimal use (97%).

Table 6.9 Saltwater Creek Catchment Land Use 1999 and 2005

Secondary Land Use - Tertiary Land Use		QLUMP 1999		2005 Update	
		Area (ha)	%	Area (ha)	%
Nature conservation	Natural feature protection	1,775	37.9	1,753	37.6
	Other conserved area	2,386	50.9	2,386	51.2
Other minimal use		51	1.1	12	0.3
	Remnant native cover	357	7.6	354	7.6
Production forestry		2	<0.1	2	<0.1
Plantation forestry		54	1.2	54	1.2
Intensive animal production	Aquaculture			40	0.9
Residential		20	0.4	22	0.5
Waste treatment and disposal		5	0.1	5	0.1
Marsh/wetland		16	0.3	16	0.3
	Marsh/W Conservation	18	0.4	18	0.4
	Total	4,684		4,662	

Source: QLUMP 1999 calculations from CSIRO and 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.

6.3.7 2-7 Cassowary Creek

The Cassowary Creek catchment is approximately 997 hectares in area (~10 square kilometres) with the main land use being nature conservation and minimal use (~100%).

Table 6.10 Cassowary Creek Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Natural feature protection	279	28.0
		Other conserved area	640	64.2
	Other minimal use	Remnant native cover	76	7.6
Water	Marsh/wetland	Marsh/W Conservation	2	0.2
		Total	997	

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.

6.3.8 2-8 Leichhardt Creek

The Leichhardt Creek catchment is approximately 5,000 hectares in area (~50 square kilometres) with the main land use being nature conservation and minimal use (69%). Grazing accounts for most of the remainder of the catchment land use (30%).

Table 6.11 Leichhardt Creek Catchment Land Use 2005

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	Natural feature protection	2,204	44.2
		Other conserved area	779	15.6
	Other minimal use	Remnant native cover	458	9.2
Production from relatively natural environments	Grazing natural vegetation		1,473	29.6
Production from dryland agriculture and plantations	Plantation forestry		10	0.2

Production from irrigated agriculture and plantations	Irrigated perennial horticulture	Irrigated tree fruits	20	0.4
Water	Reservoir/dam		2	<0.1
	Marsh/wetland		5	0.1
		Marsh/W Conservation	30	0.6
		Total	4,981	

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.

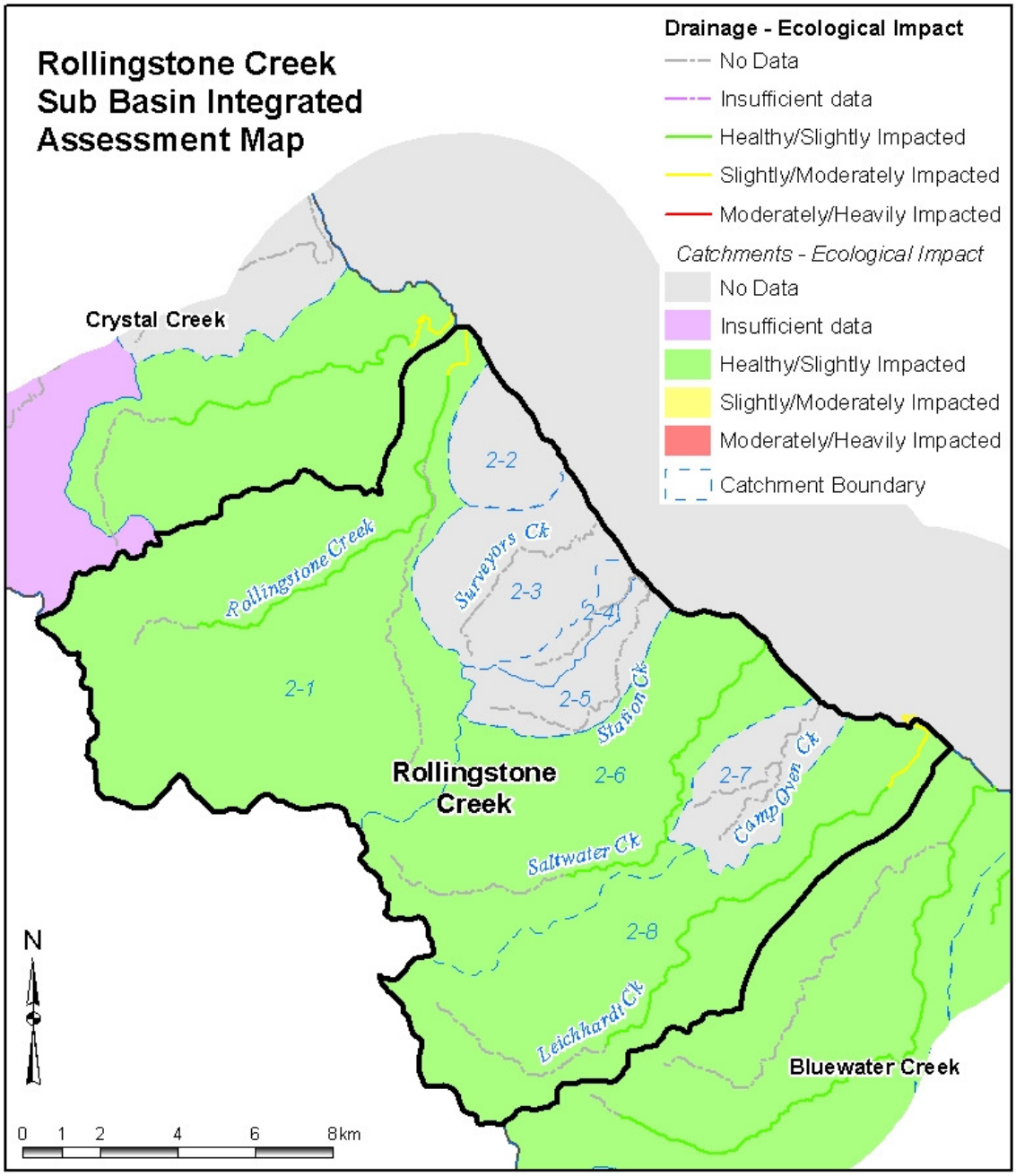
Table 6.12 Catchments Land Use Summary

Land Use	Rollingstone Creek (2-1)		unnamed Creek (2-2)		Surveyors Creek (2-3)		Wild Boar Creek (2-4)	
	Ha	%	Ha	%	Ha	%	Ha	%
Conservation and natural areas	6,952	89.9	364	49.9	1,254	74.9	344	100
Grazing	425	5.5	130	17.8	353	21.1	0	
Rural residential	26	0.3	68	9.3	0		0	
Intensive agriculture	262	3.4	18	2.4	65	3.9	0	
Urban	36	0.5	147	20.1	2	0.1	0	
Water and wetlands	31	0.4	4	0.5	0		0	
Totals	7,732		731		1,674		344	
Land Use	**Station Creek (2-5)**		**Saltwater Creek (2-6)**		**Cassowary Creek (2-7)**		**Leichhardt Creek (2-8)**	
	Ha	**%**	**Ha**	**%**	**Ha**	**%**	**Ha**	**%**
Conservation and natural areas	873	99.0	4,505	96.6	995	99.8	3,440	69.1
Grazing	0		2	0.0	0		1,473	29.6
Rural residential	0		0		0		0	
Intensive agriculture	6	0.7	54	1.2	0		30	0.6
Urban	0		67	1.4	0		0	
Water and wetlands	2	0.3	34	0.7	2	0.2	37	0.8
Totals	882		4,662		997		4,981	

6.4 Rollingstone Creek 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 was generally indicative of an ecologically healthy lowland stream system (see Figure 6.4). However, the data also suggested that dissolved oxygen was consistently low and total suspended sediment was generally high across all the catchments of the sub basin.

Figure 6.4 Rollingstone Creek Sub Basin Ecological Impact



6.5 Water Quality and Water Quality Objectives (WQOs)

When the water quality data was assessed against the water quality objectives (WQOs) derived from the Queensland Water Quality Guidelines (EPA 2006) for the Central Coast region for lowland streams (see Table 6.13), the water quality condition of the streams of the Rollingstone Creek sub basin met virtually all of the corresponding WQOs. The only exception was total suspended solids (TSS) in Saltwater Creek.

Table 6.13 Comparing WQOs (Central Coast values) with Water Quality

Rollingstone Creek Sub Basin	DIN	Org N	TN	FRP	TP	TSS
Rollingstone Creek 2-1	√ 50%	√ 29%	√ 28%	ND	√ 60%	√ 20%
Saltwater Creek 2-6	√ 81%	√ 52%	√ 55%	√ 75%	√ 60%	X 40%
Leichhardt Creek 2-8	√ 63%	√ 29%	√ 34%	ND	√ 60%	√

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.

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

When comparing water quality condition to the WQOs derived from the Queensland Water Quality Guidelines (EPA 2006) based on the values for the Wet Tropics region lowland streams (adopted in the Black Ross WQIP for the two northern sub basins), the streams only meet WQOs for 40-50% of the water quality indicators (see Table 6.14).

Table 6.14 Comparing WQOs (Wet Tropics values) with Water Quality

Rollingstone Creek Sub Basin	DIN	Org N	TN	FRP	TP	TSS
[1]Rollingstone Creek 2-1	√	X 100%	X 50%	ND	X 100%	√ 20%
[1]Saltwater Creek 2-6	√ 65%	√	√ 7%	X 25%	X 100%	X 40%
[1]Leichhardt Creek 2-8	√ 25%	X 100%	X 38%	ND	X 100%	√

[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)]