



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

## **Chapter 13 Alligator Creek Sub Basin**

**November 2009**



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### 13. Alligator Creek Sub Basin

The Alligator Creek Sub Basin (see Figure 13.1 and Figure 13.2) includes the Alligator Creek, Crocodile Creek, Cocoa Creek and Cape Cleveland catchments (see sections 13.3.1 to 13.3.4). There are a number of tributaries and smaller waterways that have been included in these catchments.

Figure 13.1 Alligator Creek Sub Basin and Drainage

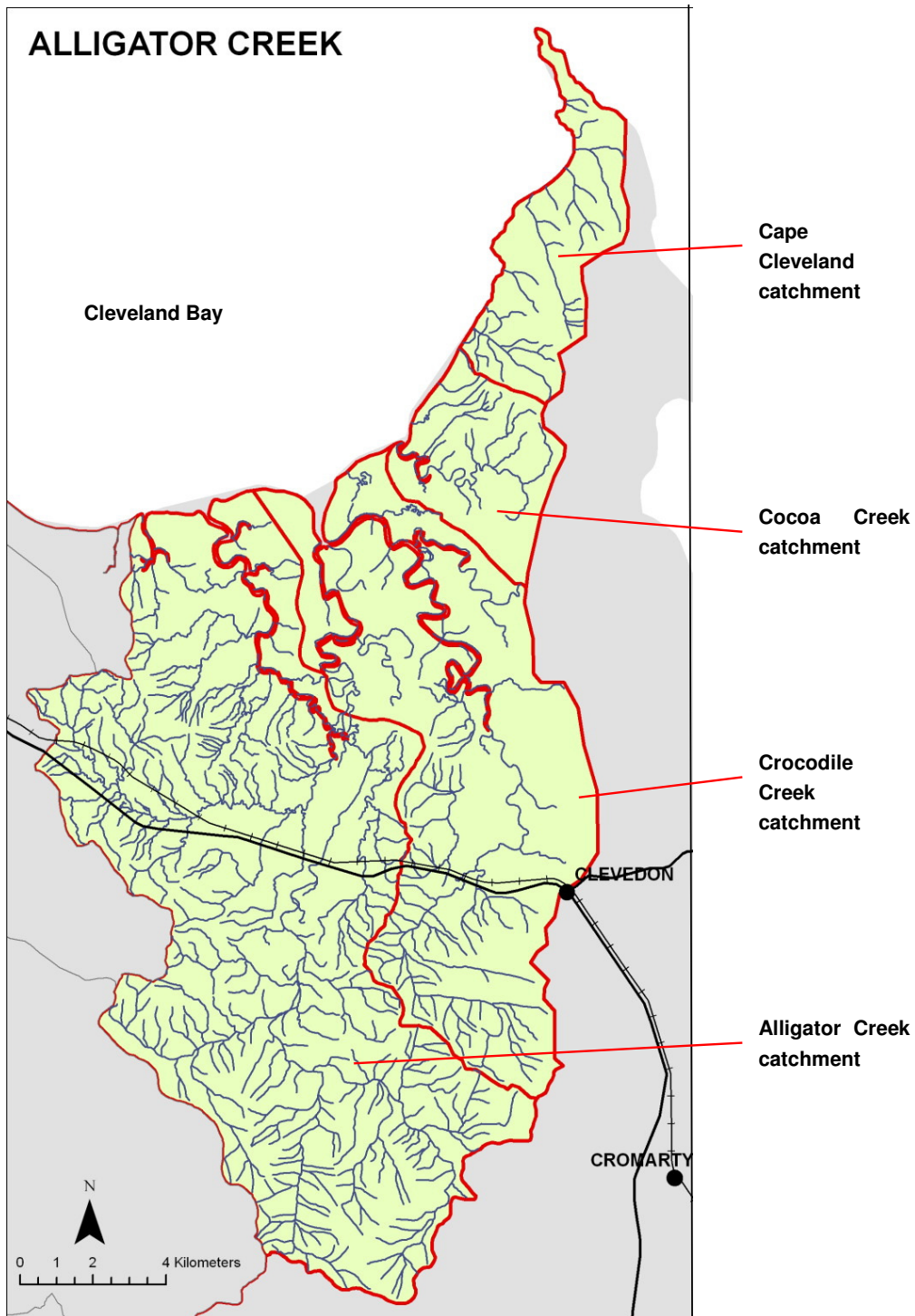
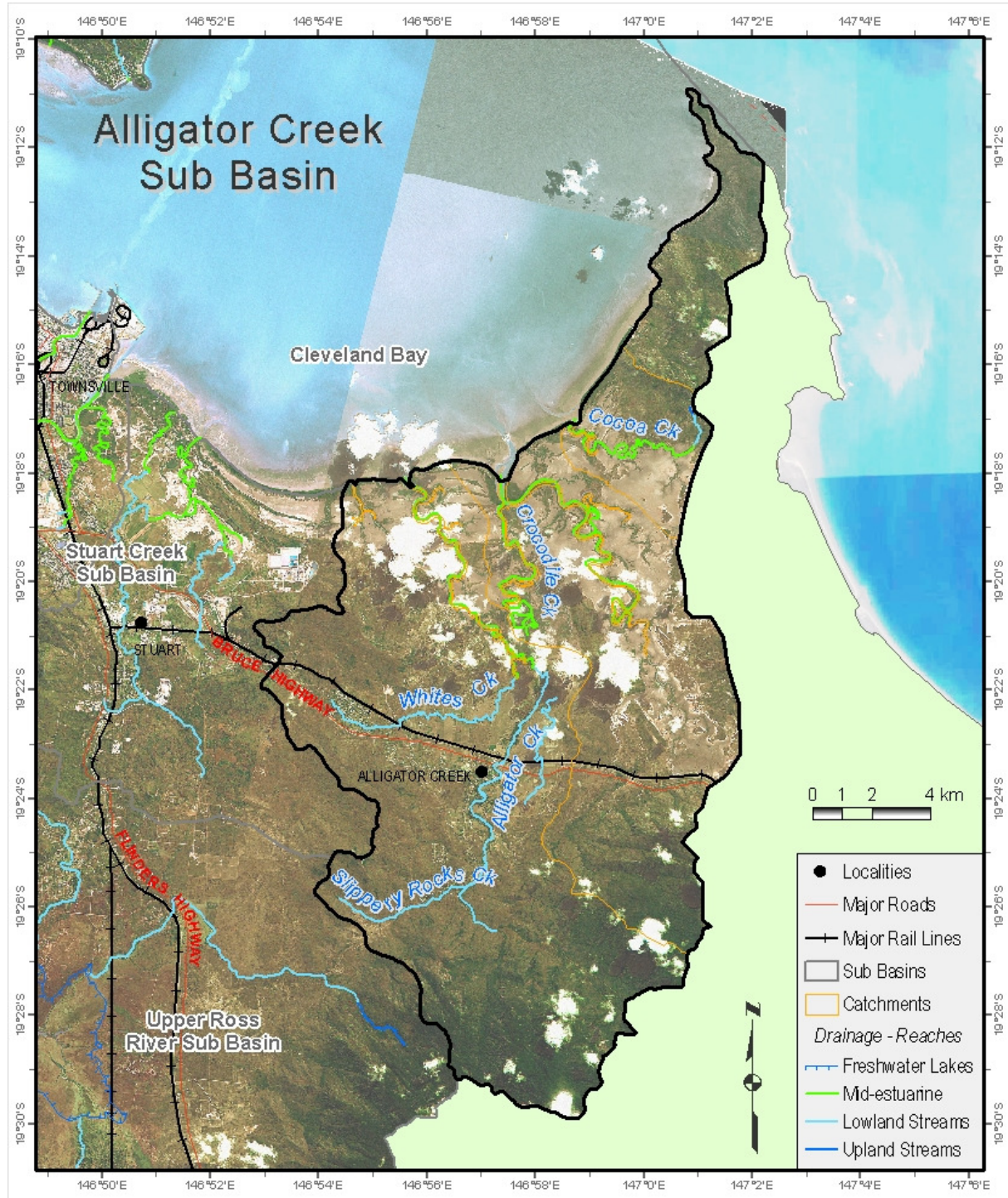




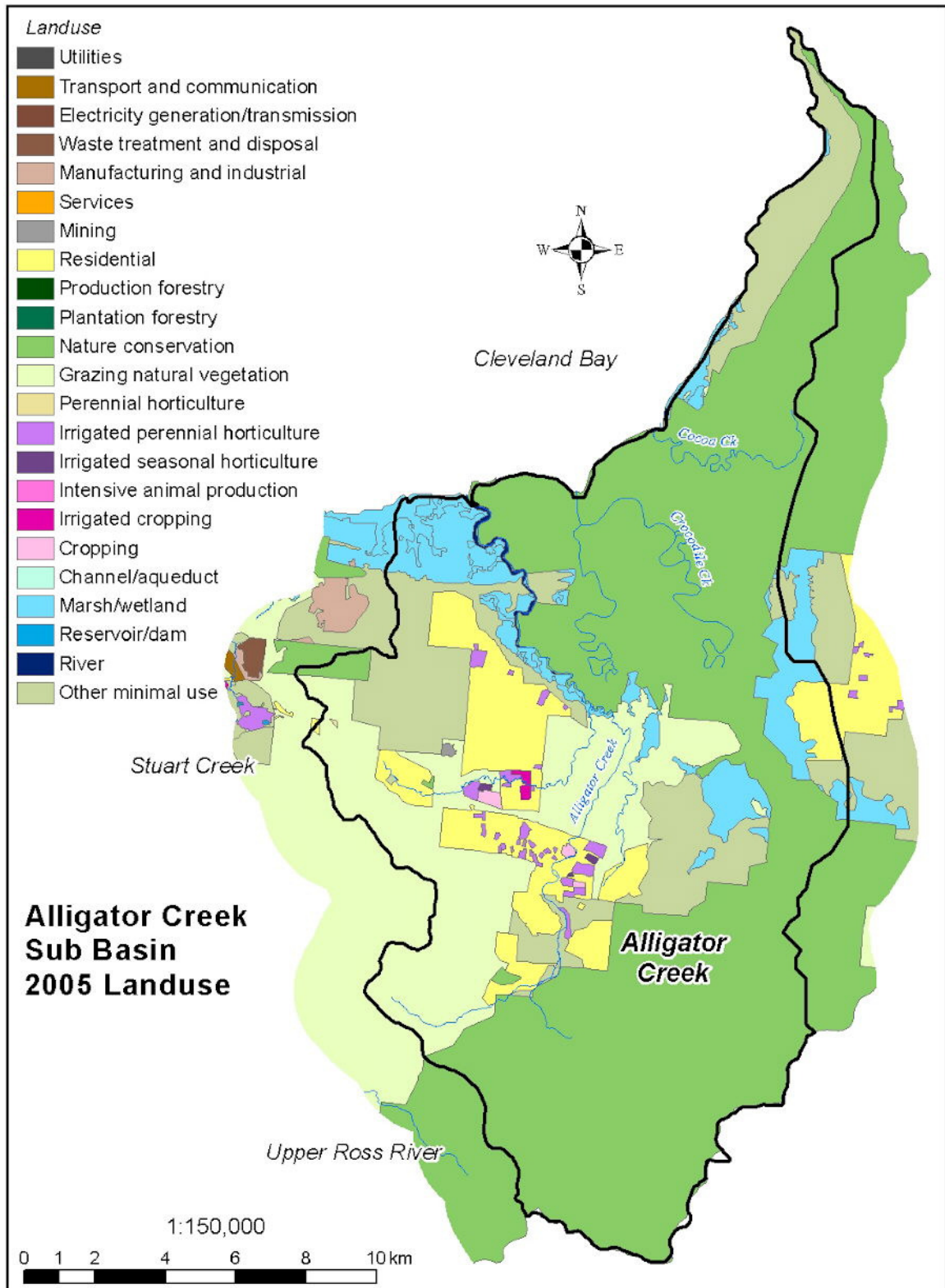
Figure 13.2 Alligator Creek Sub Basin Imagery



### 13.1 Alligator Creek Sub Basin Land Use

The Alligator Creek Sub Basin is approximately 265 square kilometres in size (26,500 hectares). Nature conservation and other minimal use (including wetlands) land uses dominate the Alligator Creek Sub Basin accounting for approximately 75% of the sub basin area. Grazing (natural vegetation) (15%) and residential (9%), i.e. mostly rural residential and peri-urban settlement, are also significant land uses in the Alligator Creek Sub Basin (see Figure 13.3 and Table 13.1).

Figure 13.3 Alligator 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 13.1 Alligator Creek Sub Basin Land Use**

Land Use	QLUMP 1999		2005 Update	
	Area (ha)	Area (%)	Area (ha)	Area (%)
Cropping	43	0.16	43	0.16
Grazing Natural Vegetation	4,111	15.50	4,111	15.52
Irrigated Cropping	26	0.10	26	0.10
Irrigated Perennial Horticulture	184	0.69	185	0.70
Irrigated Seasonal Horticulture	15	0.06	15	0.06
Marsh/wetland	1,755	6.62	1,755	6.62
Mining	11	0.04	11	0.04
Nature Conservation	14,229	53.65	14,194	53.59
Other Minimal Use	3,676	13.86	3,663	13.83
Perennial Horticulture	3	0.01	3	0.01
Residential	2,427	9.15	2,439	9.21
River	43	0.16	43	0.16
	26,523	100	26,489	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.

### 13.2 Alligator Creek Sub Basin Demographics

The 2006 Census showed the resident population of the Alligator Creek Sub Basin to be approximately 2,100 people.

The majority of the settlement in the basin is associated with the rural residential areas of Alligator Creek and Nome, although there is dispersed settlement associated with grazing activity and other rural land uses. Settlement in the Alligator Creek Sub Basin consists predominantly of single-family dwellings (93%), reflecting the low-density nature of rural residential land use with 714 dwellings being separate houses out of a total 764 dwellings in the area.

Alligator Creek Sub Basin has a high median age of 41 years, with a high percentage of couple families without children (44.6%). The average household size at 2.8 persons is on par with the average occupancy for the Townsville local government area. <sup>1</sup>

A small number of Alligator Creek Sub Basin residents reported that they worked from home (<1% of respondents), with a very high proportion (66%) reliant on private vehicle transport (as the driver) for their journey to work.<sup>2</sup>

Summary demographic data for the Alligator Creek Sub Basin is provided in Table 13.2 (selected medians and averages) and Table 13.3 (housing type and occupancy rates).

<sup>1</sup> All Dwelling, Household, and Median data is sourced from the 2006 Census Population and Housing Customised Basic Community Profile

<sup>2</sup> 2006 Census Population and Housing Customised Basic Community Profile (method of travel to work)



**Table 13.2 Selected Medians and Averages 3**

Description	Alligator Creek	Townsville
Median age of persons	41	33
Median individual income (\$/weekly)	531	531
Median family income (\$/weekly)	1,324	1,237
Median household income (\$/weekly)	1,154	1,101
Median housing loan repayment (\$/monthly)	1,165	1,231
Median rent (\$/weekly)	151	190
Average household size	2.8	2.8

Source: ABS 2006 Census of Population and Housing

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

**Table 13.3 Count of Occupied Private Dwellings<sup>(a)</sup> and Persons in Occupied Private Dwellings**

Dwelling Type	Dwellings		Resident Persons	
	Count	%	Count	%
Separate house	714	93.5	1,959	96.3
Flat, unit or apartment:				
In a one or two storey block	3	0.4	0	
In a three storey block	0		0	
In a four or more storey block	0		0	
Attached to a house	3	0.4	5	0.2
Flat, unit or apartment Total	6	0.8	5	0.2
Other dwelling:				
Caravan, cabin, houseboat	38	5.0	61	3.0
Improvised home, tent, sleepers out	6	0.8	9	0.4
House or flat attached to a shop, office, etc.	0		0	
Other dwelling Total	44	5.8	70	3.4
<b>Totals</b>	<b>764</b>		<b>2,034</b>	

Source: ABS 2006 Census of Population and Housing

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

<sup>3</sup> **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

### 13.3 Alligator Creek Sub Basin Land Use by Catchment

Land use summaries for the main catchments of the Alligator 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

#### 13.3.1 9-1 Alligator Creek

The Alligator Creek catchment is approximately 14,800 hectares (148 square kilometres) in area with the main land use being conservation and minimal use (approximately 51% of the catchment). Grazing accounts for about 26% of the catchment and rural residential land use about 15% of the catchment (see Table 13.4).

**Table 13.4 Alligator Creek Catchment Land Use 1999 and 2005**

Secondary Land Use - Tertiary Land Use		QLUMP 1999		2005 Update	
		Area (ha)	%	Area (ha)	%
Nature conservation	National park	5,684	38.4	5,649	38.3
	Other conserved area	133	0.9	133	0.9
Other minimal use		1,282	8.7	1,282	8.7
	Remnant native cover	493	3.3	480	3.2
Grazing natural vegetation		3,816	25.8	3,816	25.8
Cropping		43	0.3	43	0.3
Perennial horticulture		3	<0.1	3	<0.1
Irrigated cropping		26	0.2	26	0.2
Irrigated perennial horticulture	Irrigated tree fruits	184	1.2	185	1.3
Irrigated seasonal horticulture	Irrigated vegetables & herbs	15	0.1	15	0.1
Residential	Rural residential	2,196	14.8	2,208	14.9
Mining		11	0.1	11	0.1
River		43	0.3	43	0.3
Marsh/wetland		659	4.5	659	4.5
	Marsh/W Conservation	214	1.4	214	1.4
Total		14,802		14,767	

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.

#### 13.3.2 9-2 Crocodile Creek

The Crocodile Creek catchment is approximately 8,000 hectares (80 square kilometres) in area with the main land use being conservation and minimal use (approximately 93% of the catchment). There are relatively small amounts of grazing (4%) and rural residential (3%) land use in the catchment also (see Table 13.5).

**Table 13.5 Crocodile Creek Catchment Land Use 2005**

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National Park	5,794	72.5
	Other minimal use	Remnant native cover	903	11.3
Production from relatively natural environments	Grazing natural vegetation		289	3.6
Intensive uses	Residential	Rural residential	232	2.9
Water	Marsh/wetland		768	9.6
		Marsh/W conservation	10	0.1
Total			7,995	

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.

### 13.3.3 9-3 Cocoa Creek

The Cocoa Creek catchment is approximately 1,717 hectares (17 square kilometres) in area with the predominant land use, accounting for nearly 100% of the catchment, being conservation and minimal use (see Table 13.6).

**Table 13.6 Cocoa Creek Catchment Land Use 2005**

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National Park	1,597	93.0
	Other minimal use	Remnant native cover	39	2.3
Production from relatively natural environments	Grazing natural vegetation		5	0.3
Water	Marsh/wetland		20	1.1
		Marsh/W conservation	56	3.2
Total			1,717	

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.

### 13.3.4 9-4 Cape Cleveland

The Crocodile Creek catchment is approximately 2,010 hectares (20 square kilometres) in area with the main land use being conservation and minimal use. As with the Cocoa Creek catchment this land use accounts for nearly 100% of the catchment (Table 13.7).

**Table 13.7 Cape Cleveland Catchment Land Use 2005**

Primary Land Use	Secondary Land Use	Tertiary Land Use	Area (ha)	%
Conservation and natural environments	Nature conservation	National Park	1,021	50.8
	Other minimal use	Remnant native cover	959	47.7
Production from relatively natural environments	Grazing natural vegetation		2	0.1
Water	Marsh/wetland		9	0.5
		Marsh/W conservation	20	1.0
Total			2,011	

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 13.8 Catchments Land Use Summary**

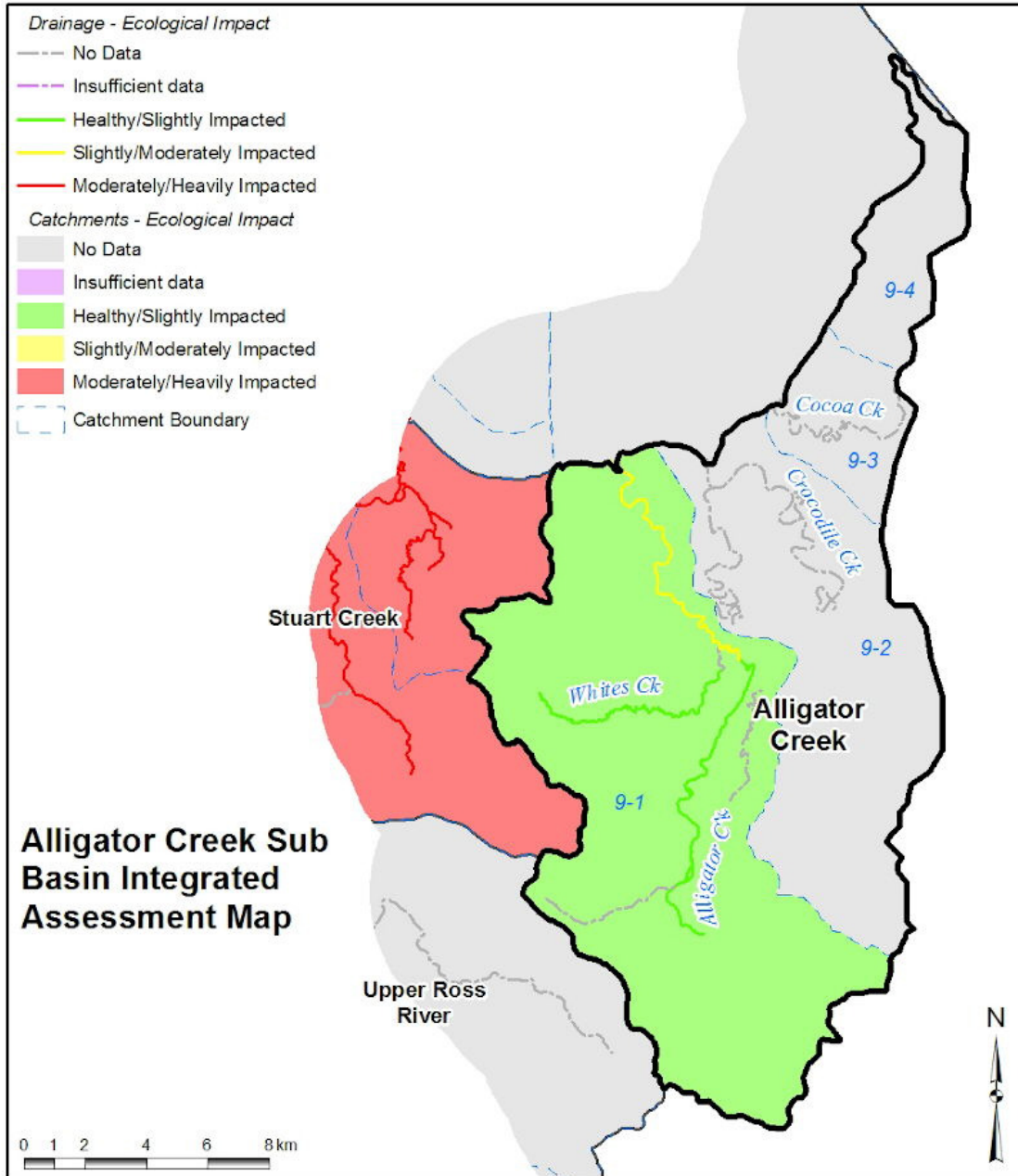
Land Use	Alligator Creek Catchment (9-1)		Crocodile Creek Catchment (9-2)		Cocoa Creek Catchment (9-3)		Cape Cleveland Catchment (9-4)	
	Ha	%	Ha	%	Ha	%	Ha	%
Conservation and natural areas	7,544	51.1	6,697	83.8	1,636	95.3	1,980	98.5
Grazing	3,816	25.8	289	3.6	5	0.3	2	0.1
Rural residential	2,208	14.9	232	2.9				
Intensive agriculture	272	1.9						
Urban	11	0.1						
Water and wetlands	916	6.2	778	9.7	76	4.3	29	1.5
Totals	14,767		7,996		1,717		2,011	

### 13.4 Alligator Creek Sub Basin Resource Condition

The Black Ross WQIP area water quality condition assessment (Connell Wagner 2008) using a range of data collected between 1972 and 2007 indicated that the water quality of this sub basin was ecologically healthy. This result is confined to the Alligator Creek catchment, as the remainder of the catchments had no water quality data to analyse (see Figure 13.4).

The most recent data from the Alligator Creek catchment indicates that there has been a significant deterioration in water quality over the last five years when compared with the previous decade. This is most likely the result of increased human activity in the peri-urban areas of the catchment.

**Figure 13.4 Alligator Creek 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 and mid estuaries)



It is assumed that water quality condition would be good, in the three unmonitored catchments in the Alligator Creek sub basin, and the streams ecologically healthy due to the limited amount of disturbance and human activity in those catchments.

### 13.5 Water Quality Objectives (WQOs)

The Alligator Creek catchment water quality (lowland streams) meets all the WQOs according to the available water quality monitoring data (see Table 13.9). Mid estuary water quality data only meets one of the four parameters measured based on 'old' data.

**Table 13.9 Comparing WQOs with water resource condition**

Alligator Creek Sub Basin	DIN	Org N	TN	FRP	TP	TSS
Alligator Creek 9-1 (Lowland)	✓ 63%	✓ 46%	✓ 34%	✓ 25%	✓ 40%	✓ 20%
Alligator Creek 9-1 (Mid estuary)	✗ 50%	✗ 15%	✗ 10%	ND	✗ 17%	✓ 50%

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