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

## Chapter 8
## Black River Sub Basin

## November 2009

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Australian Government


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# 8. Black River Sub Basin

The Black River Sub Basin (see Figure 8.1 and Figure 8.2) includes the Black River and Alice River catchments. There are also a number of smaller waterways that have been included in the catchments of these larger waterways.

**Figure 8.1 Black River Sub Basin and Drainage**

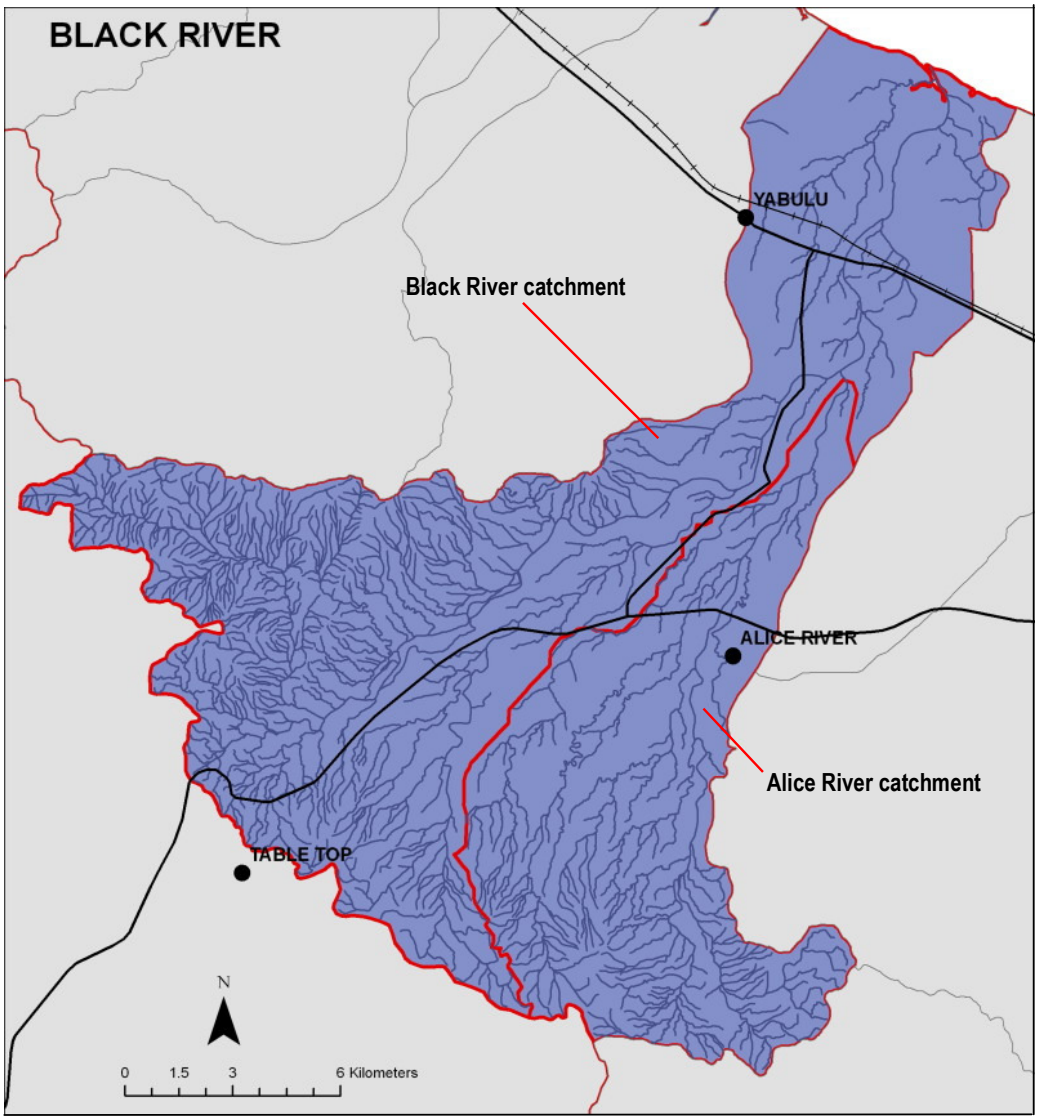
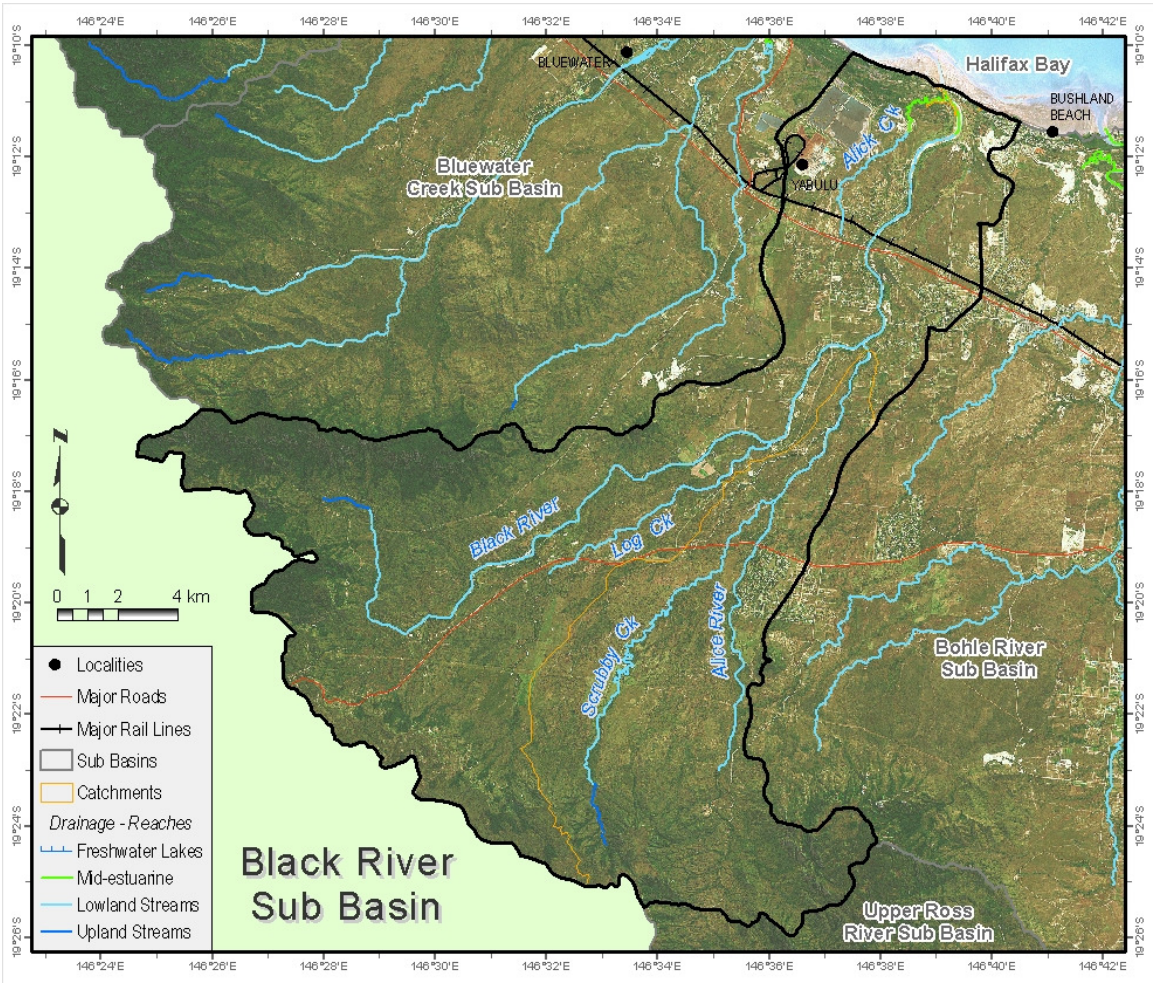


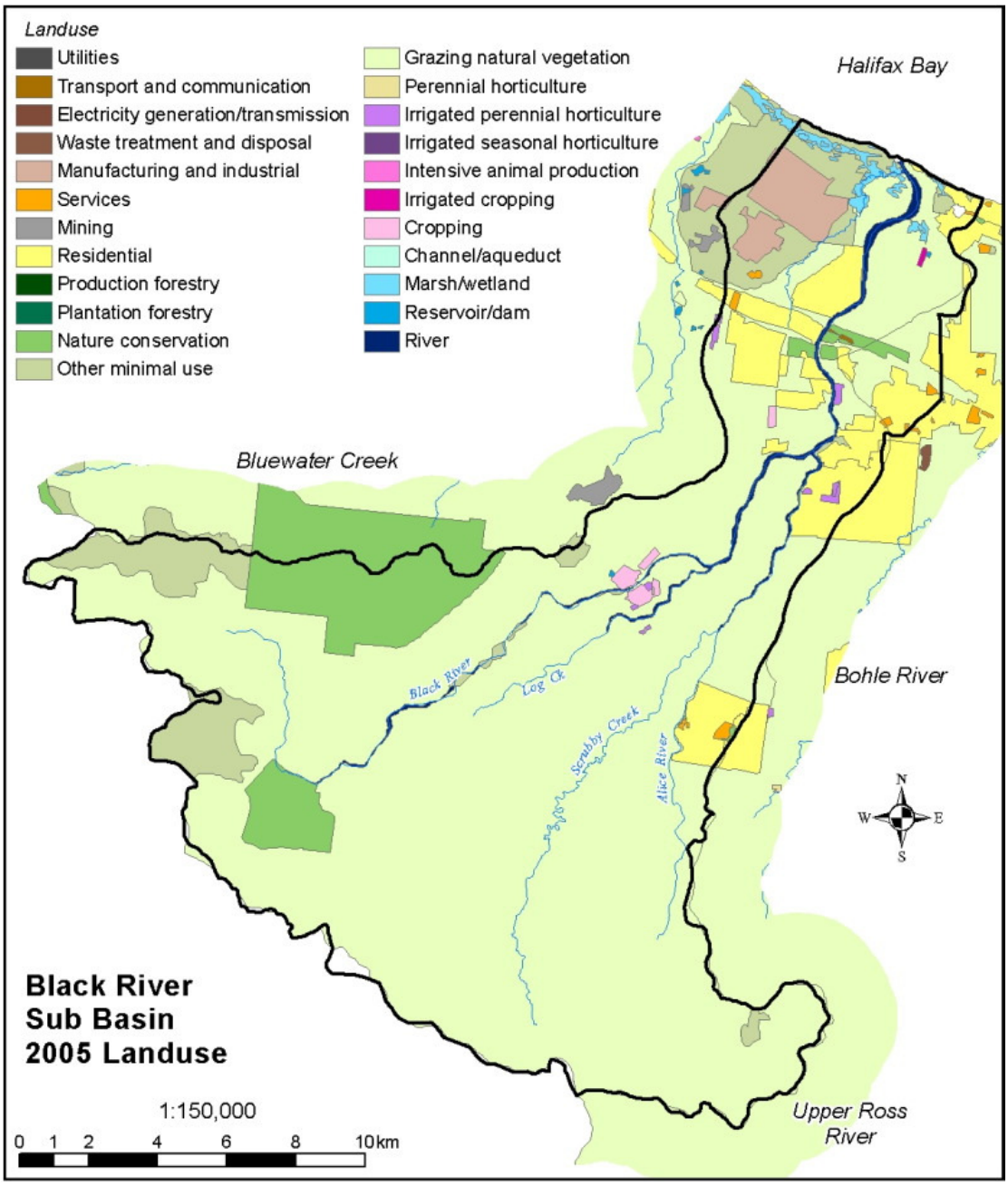
**Figure 8.2 Black River Sub Basin Imagery**




## 8.1 Black River Sub Basin Land Use

The Black River Sub Basin is approximately 304 square kilometres in size (~30,400 hectares). Land use in the Black River Sub Basin is dominated by grazing (76%). Nature conservation and other minimal use (13%) is the next most prolific land use followed by residential (7%) (see Figure 8.3 and Table 8.1).

**Figure 8.3 Black 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 8.1 Black River Sub Basin Land Use**

| Land Use | QLUMP 1999 | | 2005 Update | |
|---|---|---|---|---|
| | Area (ha) | Area (%) | Area (ha) | Area (%) |
| Cropping | 103 | 0.3 | 103 | 0.3 |
| Grazing natural vegetation | 23,295 | 76.2 | 23,063 | 75.9 |
| Irrigated cropping | 7 | <0.1 | 7 | <0.1 |
| Irrigated perennial agriculture | 58 | 0.2 | 58 | 0.2 |
| Manufacturing and industrial | 119 | 0.4 | 564 | 1.9 |

| | | | | |
|---|---|---|---|---|
| Marsh/Wetland | 165 | 0.5 | 165 | 0.5 |
| Nature conservation | 1,963 | 6.4 | 1,962 | 6.5 |
| Other minimal use | 2,284 | 7.5 | 1,962 | 6.5 |
| Reservoir/Dam | 183 | 0.6 | 5 | <0.1 |
| Residential | 1,979 | 6.5 | 2,081 | 6.9 |
| River | 343 | 1.1 | 343 | 1.1 |
| Services | 53 | 0.2 | 58 | 0.2 |
| Transport and communication | 7 | <0.1 | 7 | <0.1 |
| Total | 30,559 | 100 | 30,377 | 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.

### 8.2 Black River Sub Basin Demographics

The 2006 Census counted 4,917 people resident within the Black River Sub Basin. The sub basin stretches from Herveys Range to the coast and includes the northern parts of the Bushland Beach residential area, the majority of the Queensland Nickel Industry (QNI) Yabulu manufacturing and refining plant, and rural residential estates including most of Rupertswood (Alice River).

Housing in the Black River Sub Basin consists predominantly of single family dwellings with 1,602 dwellings being separate houses out of a total 1619 dwellings in the area (see Table 8.3).

At the 2006 Census the median age of the Black River Sub Basin population is reported at 36 years. There is a high percentage of couple families without children (38%) and an equally high percentage (38%) with children under 15 years old.

Average household size at 3.2 people per household is well above the average occupancy of 2.8 for the Townsville local government area. Overall, 36% of Black River households are comprised of four people, or more.[1]

The majority of employed Black River Sub Basin residents reported that they travel to work as the driver of a private motor vehicle, indicating a very strong commuter trend.[2]

Current development approvals suggest that significant urban residential development is likely to occur in the Black River Sub Basin, within the very near future, particularly in and around the Bushland Beach / Beachholm area, with expansion to the north of Mt Low Parkway.

Expansion and/or intensification of existing rural residential use is likely to occur along the Black River Road area and at Alice River.

Future intensified development related to the existing nickel refinery may also occur in the future despite the winding back of activity during the 2008/09 economic downturn.

Selected medians and averages for the Black River Sub Basin from the 2006 Census are included in Table 8.2.

[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 8.2 Selected Medians and Averages** [3]

| Description | Black River | Townsville |
|---|---|---|
| Median age of persons | 36 | 33 |
| Median individual income ($/weekly) | 576 | 531 |
| Median family income ($/weekly) | 1,361 | 1,237 |
| Median household income ($/weekly) | 1,332 | 1,101 |
| Median housing loan repayment ($/monthly) | 1,273 | 1,231 |
| Median rent ($/weekly) | 268 | 190 |
| Average household size | 3.2 | 2.8 |

Source: ABS 2006 Census of Population and Housing

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

**Table 8.3 Count of Occupied Private Dwellings(a) and Persons in Occupied Private Dwellings**

| Dwelling Type | Dwellings | | Resident Persons | |
|---|---|---|---|---|
| | Count | % | Count | % |
| Separate house | 1,602 | | 4,735 | |
| | | | | |
| Semi-detached, row or terrace house, townhouse etc: | | | | |
| One storey | 3 | | 7 | |
| Semi-detached, etc Total | 3 | | 7 | |
| | | | | |
| Flat, unit or apartment: | | | | |
| Flat, unit or apartment Total | 0 | | 0 | |
| | | | | |
| Other dwelling: | | | | |
| Caravan, cabin, houseboat | 11 | | 26 | |
| Improvised home, tent, sleepers out | 3 | | 5 | |
| House or flat attached to a shop, office, etc. | 0 | | 0 | |
| Other dwelling Total | 14 | | 31 | |
| | | | | |
| **Totals** | **1,619** | | **4,773** | |

Source: ABS 2006 Census of Population and Housing

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

## 8.3 Black River Sub Basin Land Use by Catchment

Land use summaries for the main catchments of the Black River Sub Basin are provided below.

### 8.3.1 4-1 Black River Catchment

The Black River catchment is approximately 20,400 hectares in area (~204 square kilometres) with the main land use being grazing in native pasture (67%).

**Table 8.4 Black River Catchment Land Use 2005**

| Primary Land Use | Secondary Land Use | Tertiary Land Use | Area (ha) | % |
|---|---|---|---|---|
| Conservation and natural environments | Nature conservation | Other conserved area | 1,953 | 9.6 |
| | Other minimal use | | 595 | 2.9 |
| | | Remnant native cover | 1323 | 6.5 |
| Production from relatively natural environments | Grazing natural vegetation | | 13,646 | 66.9 |
| Production from dryland agriculture and plantations | Cropping | | 103 | 0.5 |
| Production from irrigated agriculture and plantations | Irrigated cropping | | 7 | <0.1 |
| | Irrigated perennial horticulture | | 35 | 0.2 |
| | | Irrigated tree fruits | 18 | 0.1 |
| Intensive uses | Manufacturing and industrial | | 564 | 2.8 |
| | Residential | | 650 | 3.2 |
| | | Rural residential | 979 | 4.8 |
| | Services | Recreation and culture | 29 | 0.1 |
| | | | 7 | <0.1 |
| | Transport and communication | Railways | 7 | <0.1 |
| Water | Reservoir/dam | | 5 | <0.1 |
| | River | | 304 | 1.5 |
| | Marsh/wetland | | 82 | 0.4 |
| | | Marsh/W Conservation | 83 | 0.4 |
| | | Total | 20,389 | |

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.

### 8.3.2 4-2 Alice River

The Alice River catchment is approximately 10,000 hectares in area (~100 square kilometres) with the main land use being grazing in native pasture (94%).

**Table 8.5 Alice River Catchment Land Use 1999 and 2005**

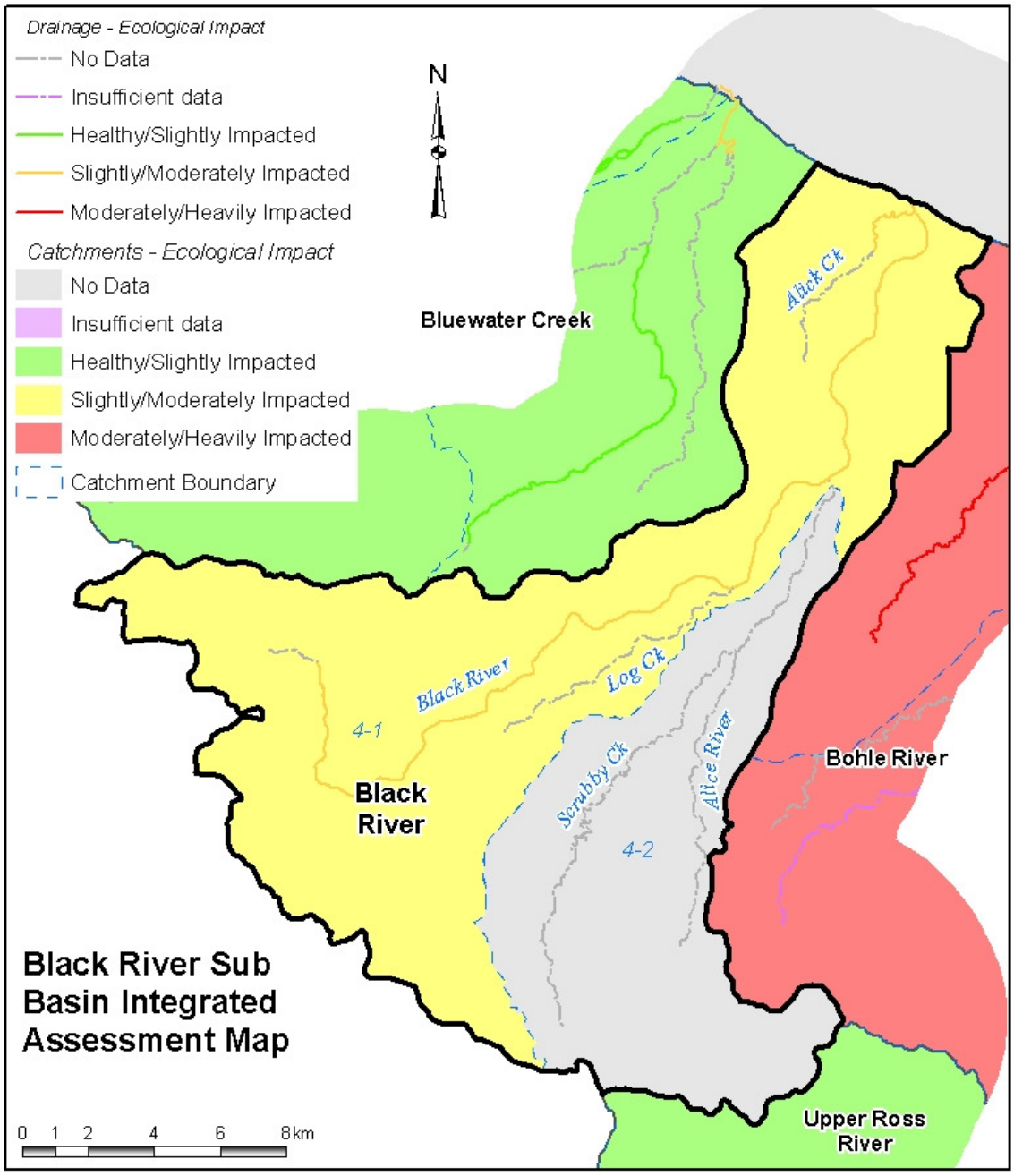
| Secondary Land Use - Tertiary Land Use | | QLUMP 1999 | | 2005 Update | |
|---|---|---|---|---|---|
| | | Area (ha) | % | Area (ha) | % |
| Nature conservation | Other conserved area | 8 | 0.1 | 8 | 0.1 |
| Other minimal use | Remnant native cover | 44 | 0.4 | 44 | 0.4 |
| Grazing natural vegetation | | 9,453 | 94.5 | 9,417 | 94.3 |
| Irrigated perennial horticulture | | 5 | 0.1 | 5 | 0.1 |
| Residential | | 295 | 2.9 | 312 | 3.1 |
| Residential | Rural residential | 140 | 1.4 | 140 | 1.4 |
| Services | Recreation and culture | 23 | 0.2 | 23 | 0.2 |
| River | | 39 | 0.4 | 39 | 0.4 |
| | | 10,007 | | 9,988 | |

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.

## 8.4 Black River 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 slightly impacted (see Figure 8.4). The limited data available for this sub basin showed that total suspended solids (sediment) (TSS) for the Black River was above the guideline. Recent data for the Black River indicates that TSS is trending higher. Confirmation of this assessment through additional water quality monitoring is recommended.

**Figure 8.4 Black 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)

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

When comparing water quality condition data with the WQOs for the Black River we can see that the WQOs are met for some of the water quality indicators including total nitrogen and total phosphorus. The water quality condition data was above the WQOs for filterable reactive phosphorus (FRP) and total suspended solids (TSS) (see Table 8.6).

**Table 8.6 Comparing WQOs with Water Quality**

| Black River Sub Basin | DIN | Org N | TN | FRP | TP | TSS |
|---|---|---|---|---|---|---|
| Black River 4-1 | √* 50% | √ 28% | √* 33% | X 75% | √* 36% | X 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.

[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)]