

Figure 59: Riparian Systems of Sleeper Log/ Christmas Creeks Upper Reaches

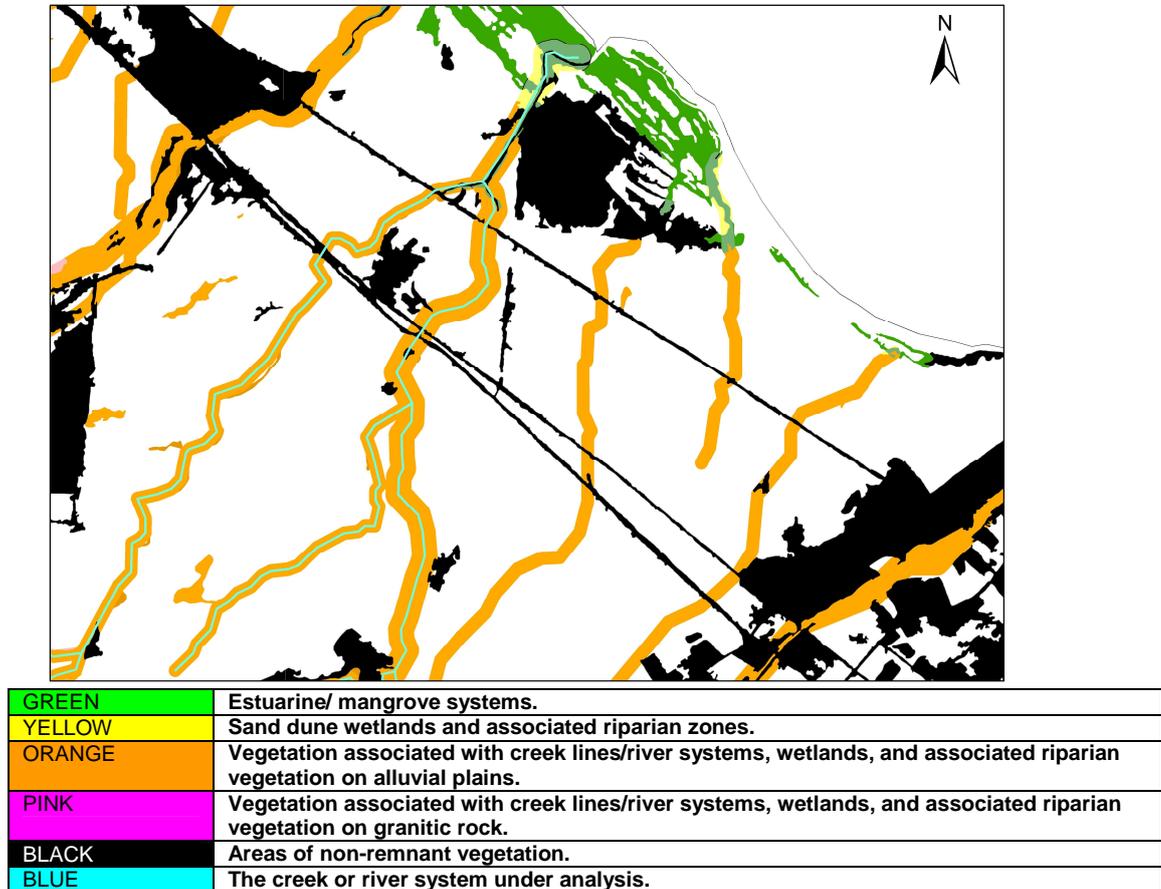


GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.1.19.1 SLEEPER LOG/ CHRISTMAS CREEKS UPPER REACHES, RIPARIAN CONDITION

The riparian condition of the upper reaches of Sleeper Log/ Christmas Creeks is moderate. The granitic slopes are in pristine condition with no incursion into the designated buffer zone. Minimal clearing has taken place in the majority of the drainage channels. However, where clearing has occurred, it has been extensive. Clearing in the southern section on the alluvial plains can be attributed to agricultural purposes and possibly for construction of a World War 2 airstrip.

Figure 60: Riparian Systems of Sleeper Log/ Christmas Creeks Lower Reaches



3.1.19.2 SLEEPER LOG/ CHRISTMAS CREEKS, RIPARIAN CONDITION

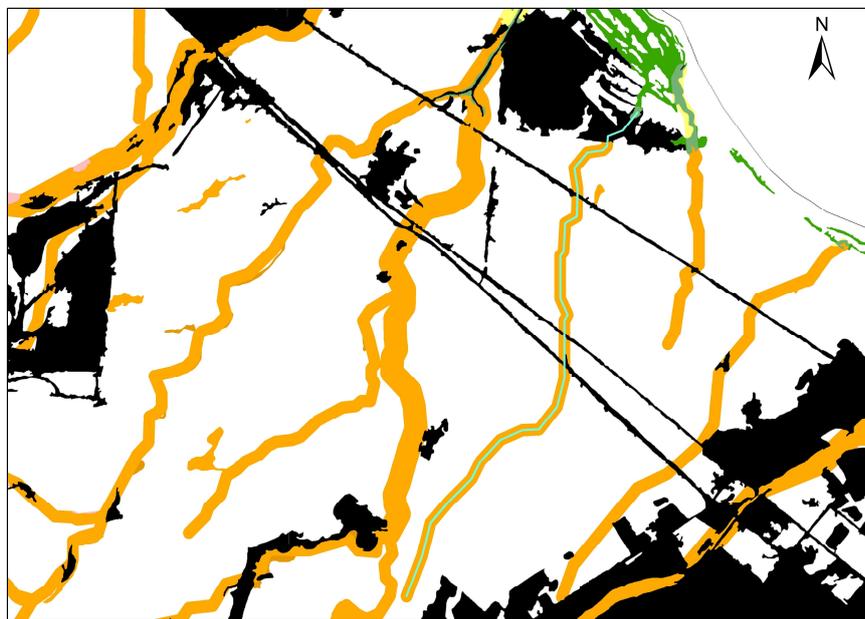
The lower reaches of the Sleeper Log/ Christmas Creeks system are in moderate to good condition with minimal incursion into designated buffer zones. Breaches within the designated buffer zones include road and rail corridors and some minor clearing for agriculture and other purposes. Creeks that traverse these areas have no riparian coverage with water traveling over non-vegetated surfaces. These cleared areas could compromise water quality. However, apart from these minor incursions, there is no major compromise of the designated buffer zone

3.1.20 Two Mile Creek

Figure 61: Location of Two Mile Creek



Figure 62: Riparian Systems of Two Mile Creek



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.



3.1.20.1 *TWO MILE CREEK, RIPARIAN CONDITION*

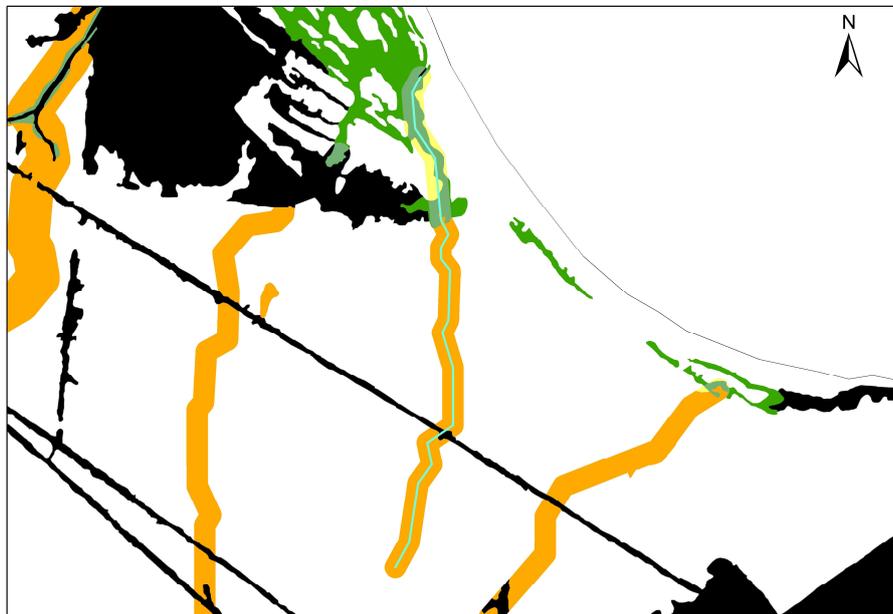
The riparian system of Two Mile Creek is in good condition with minimal incursion into the designated buffer zone. The only breaches of the designated buffer zone are road and rail corridors, with some minor clearing for aquaculture purposes in the estuarine sand dune zone. Apart from these minor incursions there is very little compromise of the designated buffer zone

3.1.21 Creek 7 (Name Unknown)

Figure 63: Location of Creek 7



Figure 64: Riparian Systems of Creek 7



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.



3.1.21.1 CREEK 7

Creek 7 has pristine riparian vegetation. The only breach within the designated buffer zone is the railway corridor.

3.1.22 Creek 8 (Name Unknown)

Figure 65: Location of Creek 8

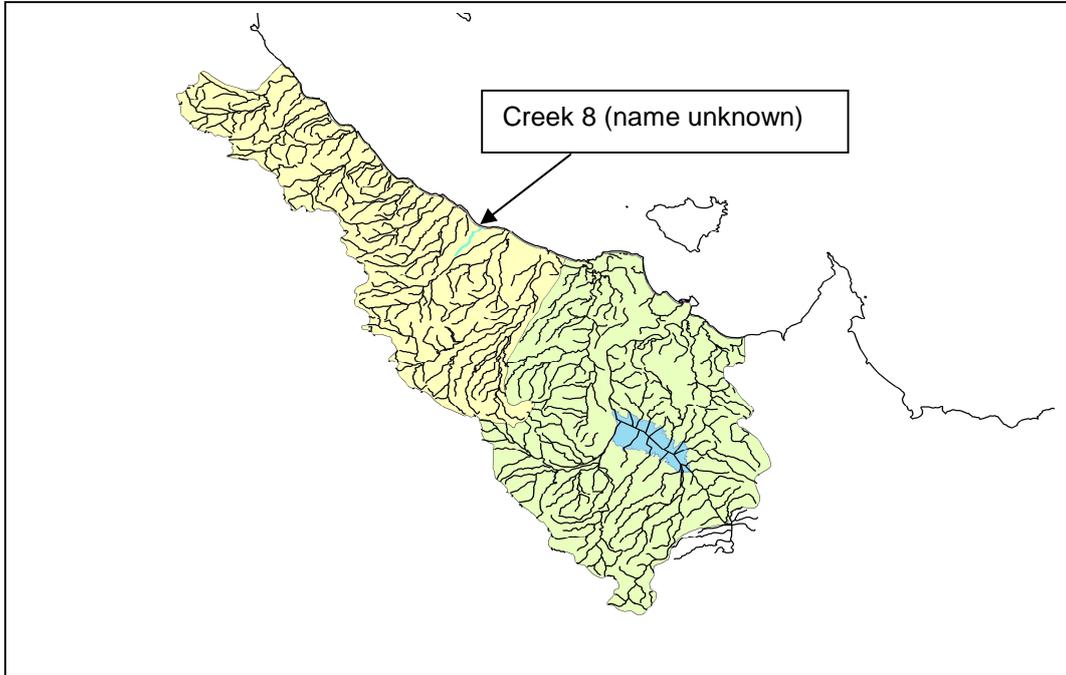


Figure 66: Riparian Systems of Creek 8



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.



3.1.22.1 CREEK 8, RIPARIAN CONDITION

Creek 8 has good riparian condition with minimal incursion into the designated buffer zone. The only breach of the designated buffer zone is for road and rail corridors. Apart from these minor incursions there is little compromise of the designated buffer zone

3.1.23 Bluewater Creek

Figure 67: Location of Bluewater Creek

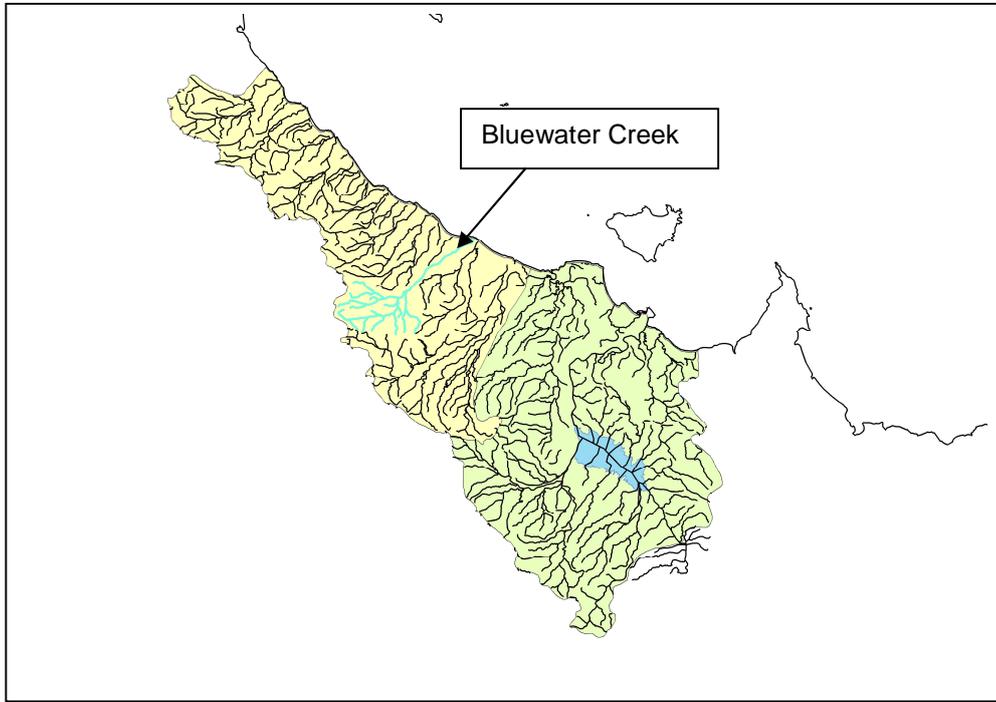
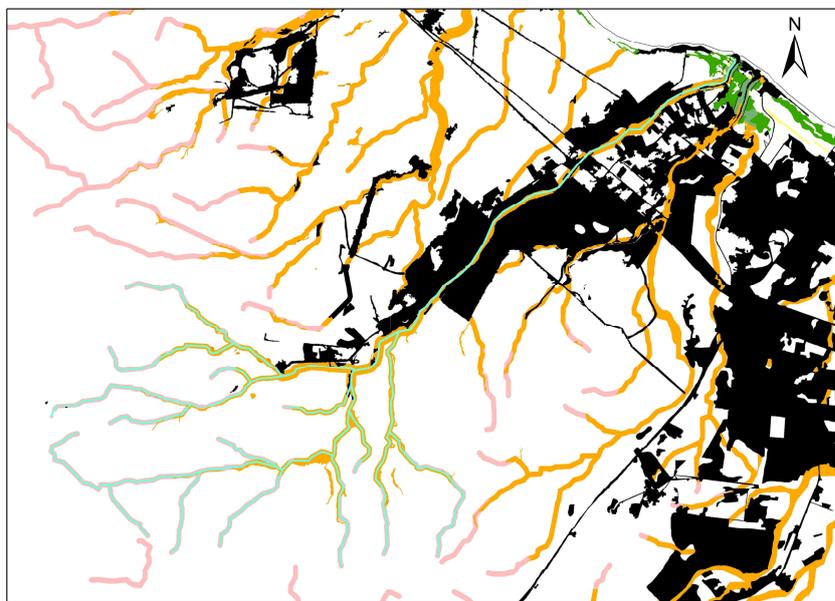
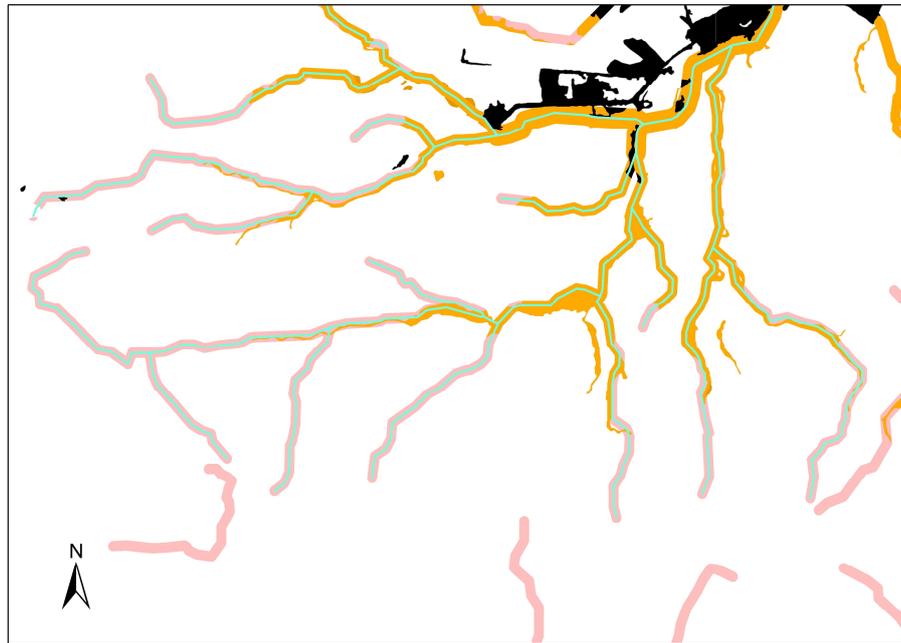


Figure 68: Riparian Systems of Bluewater Creek



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

Figure 69: Riparian Systems of Bluewater Creek Upper Reaches



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.1.23.1 BLUEWATER CREEK UPPER REACHES

The riparian system of the upper reaches of Bluewater Creek is in good condition. On the upper granitic slopes there is no incursion into the designated buffer zone and only minimal disturbance at the base of the scarp with some minor encroachments into the riparian vegetation. These disturbances are for small agricultural farms and access tracks. Apart from these minor incursions there is no breach of the designated buffer system.

Figure 70: Riparian Systems of Bluewater Creek Middle Reaches



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.1.23.2 BLUEWATER CREEK MIDDLE REACHES, RIPARIAN CONDITION

The middle reaches of Bluewater Creek have a poor riparian condition. This reach is highly modified with major breaches into the designated buffer zone. This poor condition is mainly due to residential development along the northern bank and pastoral usage along the southern bank. Compromises to water quality are likely from this area from a combination of overland flow in combination with the dispersive and erosive soils of the adjacent area.

Figure 71: Riparian Systems of Bluewater Creek Lower Reaches



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.1.23.3 BLUEWATER CREEK LOWER REACHES, RIPARIAN CONDITION

The riparian condition of the Lower Reaches of Bluewater Creek is moderate. Significant areas adjacent to 3rd and 4th order streams have been cleared within the designated buffer zone, although little of this clearing is directly adjacent to the channel. The majority of the clearing within this zone has been for rural residential purpose. Previous usage was pastoral, with some grazing still being undertaken. While there is a possibility of overland flow resulting in compromised water quality, this is more likely to emanate from the middle reaches of the creek.

3.1.24 Deep/ Althaus/ Healy Creeks

Figure 72: Location of Deep/ Althaus/ Healy Creek System

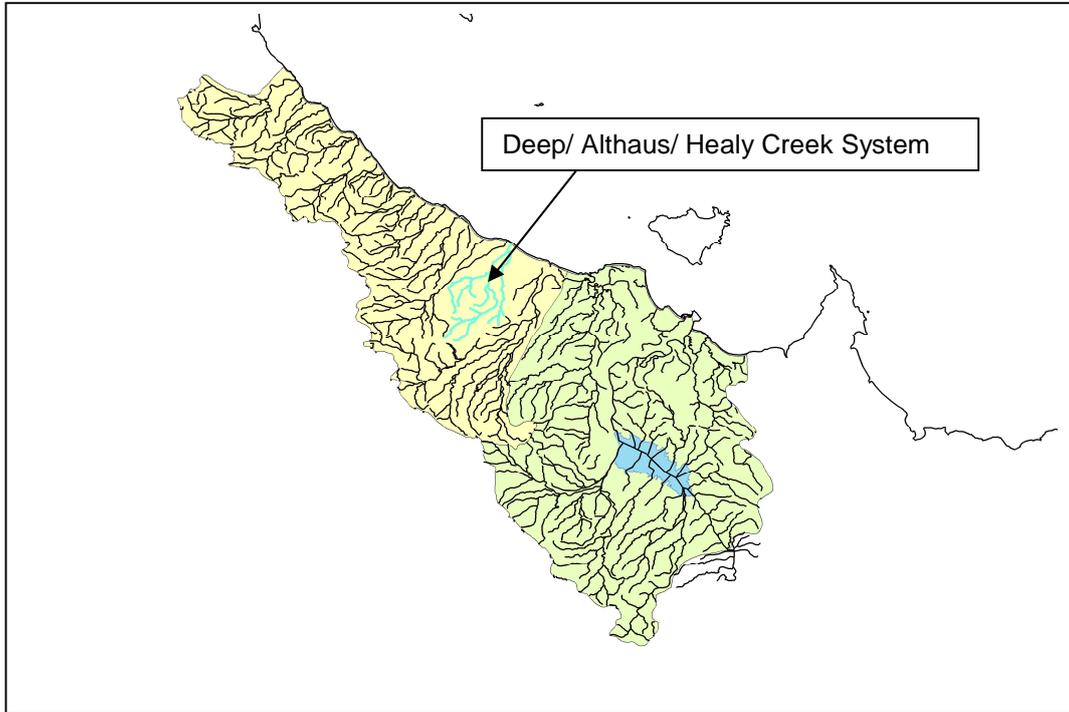
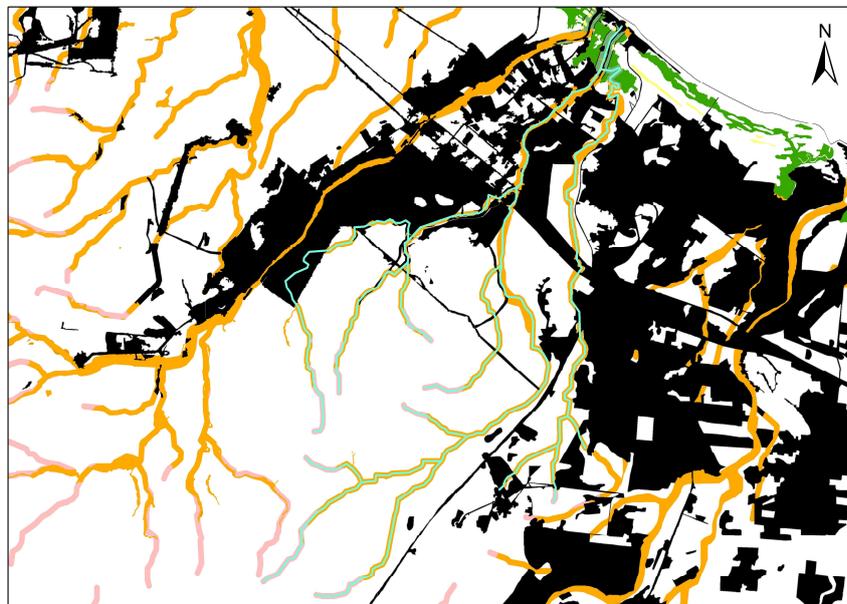


Figure 73: Riparian Systems of Deep/ Althaus / Healy Creeks



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

Figure 74: Riparian Systems of Deep / Althaus / Healy Creeks, Upper Reaches



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.1.24.1 DEEP/ALTHAUS/HEALY CREEKS, UPPER REACHES, RIPARIAN CONDITION

The upper reaches of Deep / Althaus / Healy Creeks have a moderate riparian condition. Several 1st and 2nd order streams have little to no riparian vegetation within the designated buffer zone. The majority of clearing within this reach has been for cattle grazing. Where clearing has occurred it has been to the high bank. These cleared areas are on sodic and erodible soils which may result in compromises to water quality.

Figure 75: Riparian Systems of Deep/ Althaus /Healy Creek Lower Reaches



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.1.24.2 DEEP/ ALTHAUS/HEALY CREEK LOWER REACHES, RIPARIAN CONDITION

The riparian condition of the lower reaches of the Deep/ Althaus/ Healy Creek system is poor/moderate. Significant areas adjacent to 3rd and 4th order streams have been cleared within the designated buffer zone. However, little of this clearing is directly adjacent to the channel. The majority of the clearing within this zone has been for rural residential purposes. Previous usage was pastoral and some grazing is still being undertaken in the region. There is a possibility of overland flow compromising water quality, although this is more likely to occur in the middle reaches rather than the lower reaches.

3.2 ALLIGATOR CREEK

The Alligator Creek Catchment is within the Townsville City Council boundary, but is not part of the designated Black and Ross River Basins. It is included in this study because of its proximity to Townsville and its impact on Cleveland Bay. The Alligator Creek Catchment in its regional context is shown in Figure 76 below.

Figure 76: Alligator Creek Catchment.

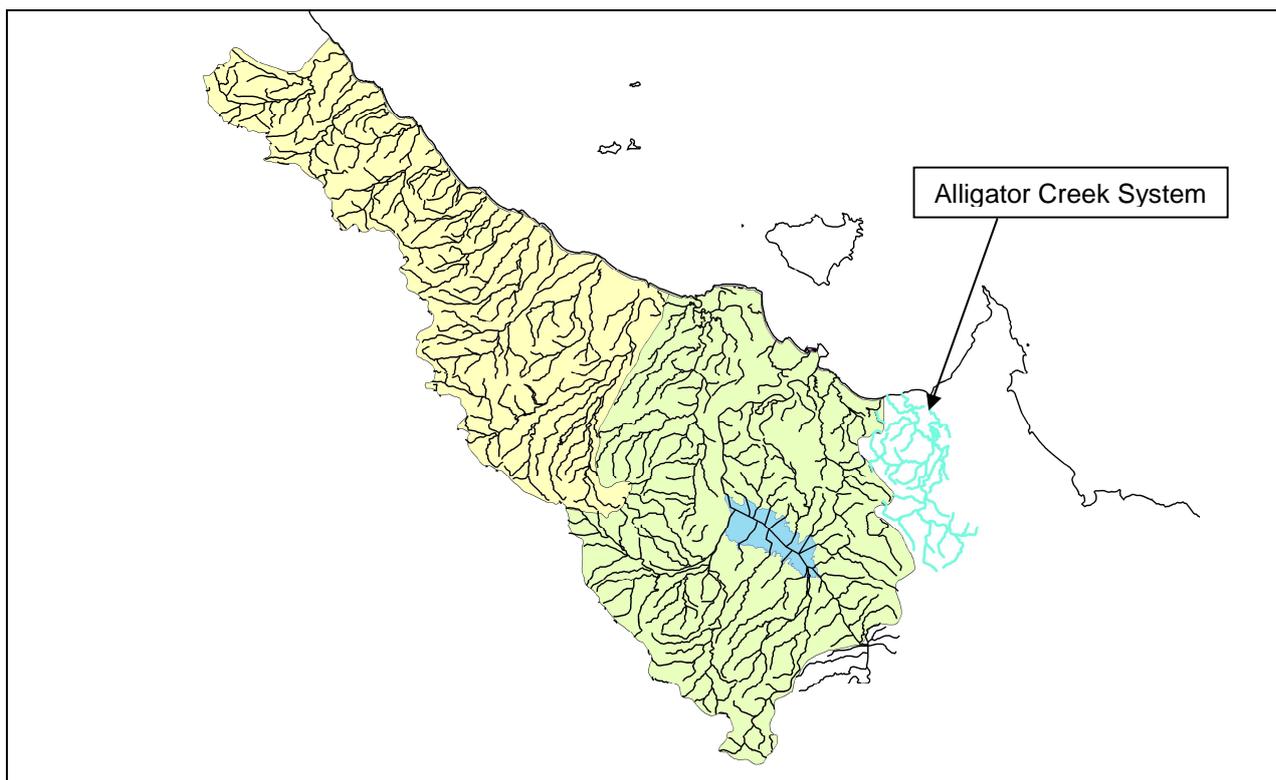
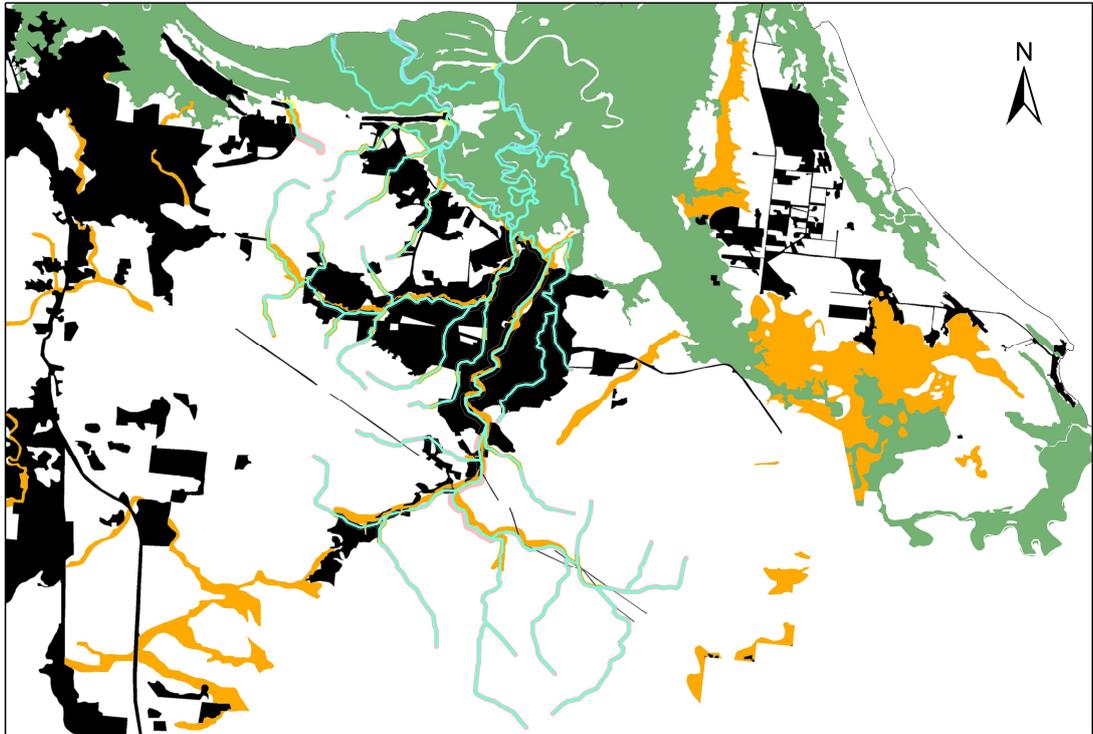


Figure 78: Riparian Systems of the Alligator Creek Catchment



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

Figure 79: Riparian Systems of Alligator Creek Upper Reaches

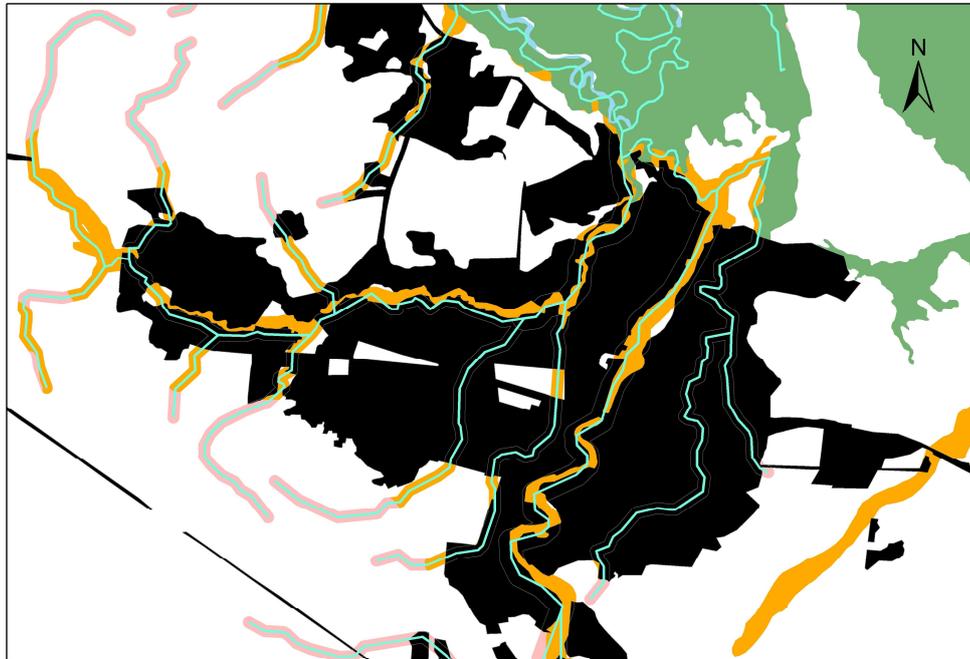


GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.2.19.1 ALLIGATOR CREEK UPPER REACHES, RIPARIAN CONDITION

The riparian condition of the upper reaches of Alligator Creek is moderate conditions. All the areas within the Bowling Green Bay National Park are in pristine condition with only minimal incursion into the designated buffer zone. Riparian condition is compromised in the western anabranches with an unconfirmed land use and cattle grazing taking place within this part of the catchment. However these land use are not extensive throughout this reach.

Figure 80: Riparian System of Alligator Creek Middle Reaches



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.2.19.2 ALLIGATOR CREEK MIDDLE REACHES, RIPARIAN CONDITION

The middle reaches of Alligator Creek are in poor condition. Clearing for grazing and rural residential purposes has resulted in little to no natural riparian vegetation along large areas in both 1st/2nd order streams, and 3rd/4th order streams. This combined with moderately sodic soils and the resulting likelihood of overland flows on gentle undulating slopes could result in a compromise in water quality. The expansion of rural residential development and future reliance on groundwater could further degrade the riparian condition with in the hyporheic zones associated with streams within this area.

Figure 81: Riparian System of Alligator Creek Lower Reaches



GREEN	Estuarine/ mangrove systems.
YELLOW	Sand dune wetlands and associated riparian zones.
ORANGE	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on alluvial plains.
PINK	Vegetation associated with creek lines/river systems, wetlands, and associated riparian vegetation on granitic rock.
BLACK	Areas of non-remnant vegetation.
BLUE	The creek or river system under analysis.

3.2.19.3 ALLIGATOR CREEK LOWER REACHES, RIPARIAN CONDITION

The lower estuarine reaches of Alligator Creek are in good condition. The majority of the reach is bordered by mangroves grading to sparsely vegetated estuarine salt flats. This is the natural condition of these estuarine areas. Minimal clearing and modification has taken place in this area and vast expanses of marine vegetation adjoining Alligator, Crocodile, Coco and numerous other unnamed creeks.



4 DISCUSSION AND RECOMMENDATIONS

4.1 *RECOMMENDATIONS*

Ideally, native riparian vegetation should be retained and it is strongly recommended that future development should conform to the requirements of the Nature Conservation Act (1992), the Vegetation Management Act (1994), and all Regulations and Guidelines relevant to the retention of riparian zones.

Consideration should be given to revegetating areas that have been cleared, in particular where there is a specific problem such as streambank erosion.