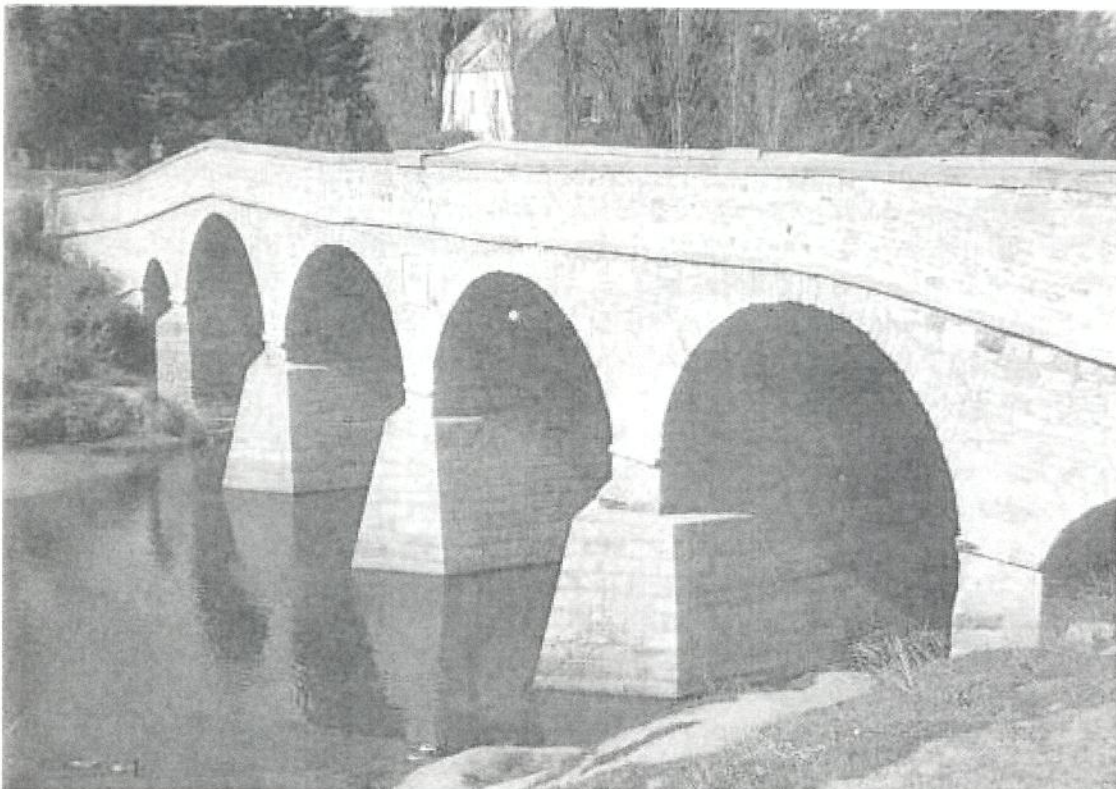


# Coal River Catchment

## A summary of water quality and riparian work



Coal River Bridge, Richmond, Tasmania, built in 1823 (Source: *Tasmanian Tourist Bureau*)

Jessica Coad



## **Introduction**

The Coal River catchment incorporates the South East Irrigation Scheme, resulting in the construction of Craighourne Dam (DPIWE 2003a) in 1986 (DPIWE 2000, 2003b). The lower Coal catchment supports intensive irrigated crops and due to a rainshadow over the catchment, relies heavily on the provision of water from the Craighourne Dam (DPIWE 2003a). practising

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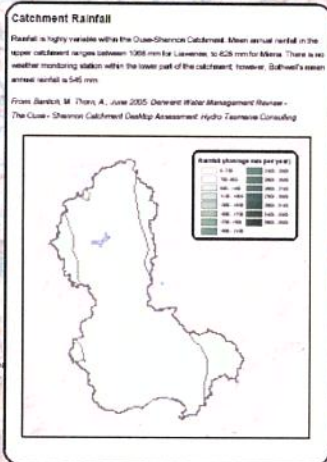
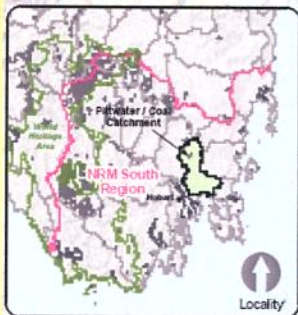
- DPIWE (2000) Environmental Management Goals for Tasmanian Surface Waters - Southern Midlands Catchments
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- Mendham N (2002) Willow Management and River Improvement - Coal Valley
- Mendham N (2005) Continued Implementation of the Coal Rivercare Plan
- Mendham N (2005) Riparian Rehabilitation of the Coal River at Campania

## ***Abbreviations***

SoR – State of Rivers

µS/cm – microSiemens per centimetre



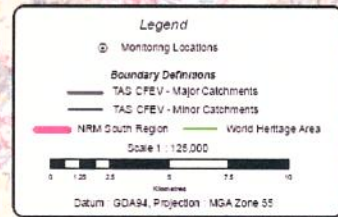


### The Pittwater - Coal catchment

The Pittwater - Coal catchment is located in south-west Tasmania and contains only one significant river (the Coal River) and a number of small agricultural streams (White Kangaroo, Criffan and Sorell rivers and Iron Creek). The catchment area is approximately 370 km<sup>2</sup> and the Coal River is a 8<sup>th</sup> order stream which empties into Pitt Water estuary.

Most of the catchment is drained by the Coal River and White Kangaroo River, and together these waterways contribute the bulk of water to the South East Irrigation Scheme which supplies water to farmers in the valley for irrigation. During dry periods, water for this scheme is provided by releases from Craigston Dam, an artificial reservoir head of about 12,000 ML situated in the middle reaches of the Coal River at Caledonia. The catchment lies within the coastal region of Tasmania, and receives only about 600 - 800 mm of rainfall each year. As a consequence, intensive agriculture is limited mainly to the area within the South East Irrigation Scheme, where vegetable crops, stone fruits, turf and vineyard enterprises operate. The gradual removal of native vegetation since European settlement and the increasing level of agriculture has been widely become a significant issue within the catchment.

Source: CPMW 2004 Allweays Monitoring Report. Pittwater - Coal catchment with additional information derived by NTC from the CFEV data base.



This project forms part of the NRM South Natural Resource Management Strategy implementation, with funding from the Australian Government's Natural Heritage Trust under National Action Plan for Safety and Water Quality (enhancement applicable).



## Pittwater / Coal Catchment Topography, Catchment Profile and Water Quality Monitoring Sites



The GIS used to create this map incorporates data from Department of Primary Industries and Water & Hydro Tasmania. Please note that while all reasonable care has been taken in collecting and recording the information displayed, Hydro Tasmania assumes no liability resulting from any errors or omissions in this information or from its use in any way.



## **Water Quality**

In summary of the Coal River Catchment Natural Resource Assessment (1997) and State of Rivers report for the period from 1999 to 2001, the Coal River was reported as having degraded water quality, with high salinity, nutrient loads, turbidity and low dissolved oxygen (DPIWE 2003b). Salinity is a major concern for landuse and irrigation as the catchment has a large natural store of salt in the soil and groundwater (Gallagher 1997; DPIWE 2003b). Surface water conductivity at many locations measured as part of the State of River was well in excess of 1500  $\mu\text{S}/\text{cm}$ , and far above the level recommended for Tasmanian rivers (DPIWE 2003b). Gallagher (1997) reported all mean results to be below 1500  $\mu\text{S}/\text{cm}$  and conductivity to gradually increase as the water moves from high in the catchment to the lower reaches. White Kangaroo rivulet was reported to have had a diluting effect on the Coal River (Gallagher 1997). The transfer of salt in water for use in Stage 2 of the South East Irrigation Scheme is likely to have serious implications for the long-term sustainability of agriculture in this part of the catchment (DPIWE 2003b).

The nutrient concentrations in the waterways are generally low, with occasional turbidity and suspended solids peaks linked to rainfall events in the catchment (DPIWE 2000). Occasional high nitrate and phosphate concentrations may indicate pollution by animal or human waste, or fertiliser run-off (Gallagher 1997). Of concern is the regular annual occurrence of algal blooms in Craighourne Dam (DPIWE 2003a) since the mid-1990's, impacting on water use (DPIWE 2003b). Gallagher (1997) reported the first occurrence of a blue-green algal bloom in Craighourne Dam to be in June 1997. It was suggested by DPIWE (2003b) that a significant proportion of nutrients and sediment being generated from the upper catchment are likely to be trapped in Craighourne Dam and utilised by algae. Gallagher (1997) report the major cations (calcium, magnesium, sodium and potassium) to be present at relatively low concentrations.

Dissolved oxygen, pH, biological oxygen demand, cations, colour and metals are typically within ANZECC guidelines (DPIWE 2000). Gallagher (1997) reported the highest pH waters to be from the Coal River at Craighourne (8.6) and Native Hut Rivulet (8.5), while the lowest was at Baden (7.2).

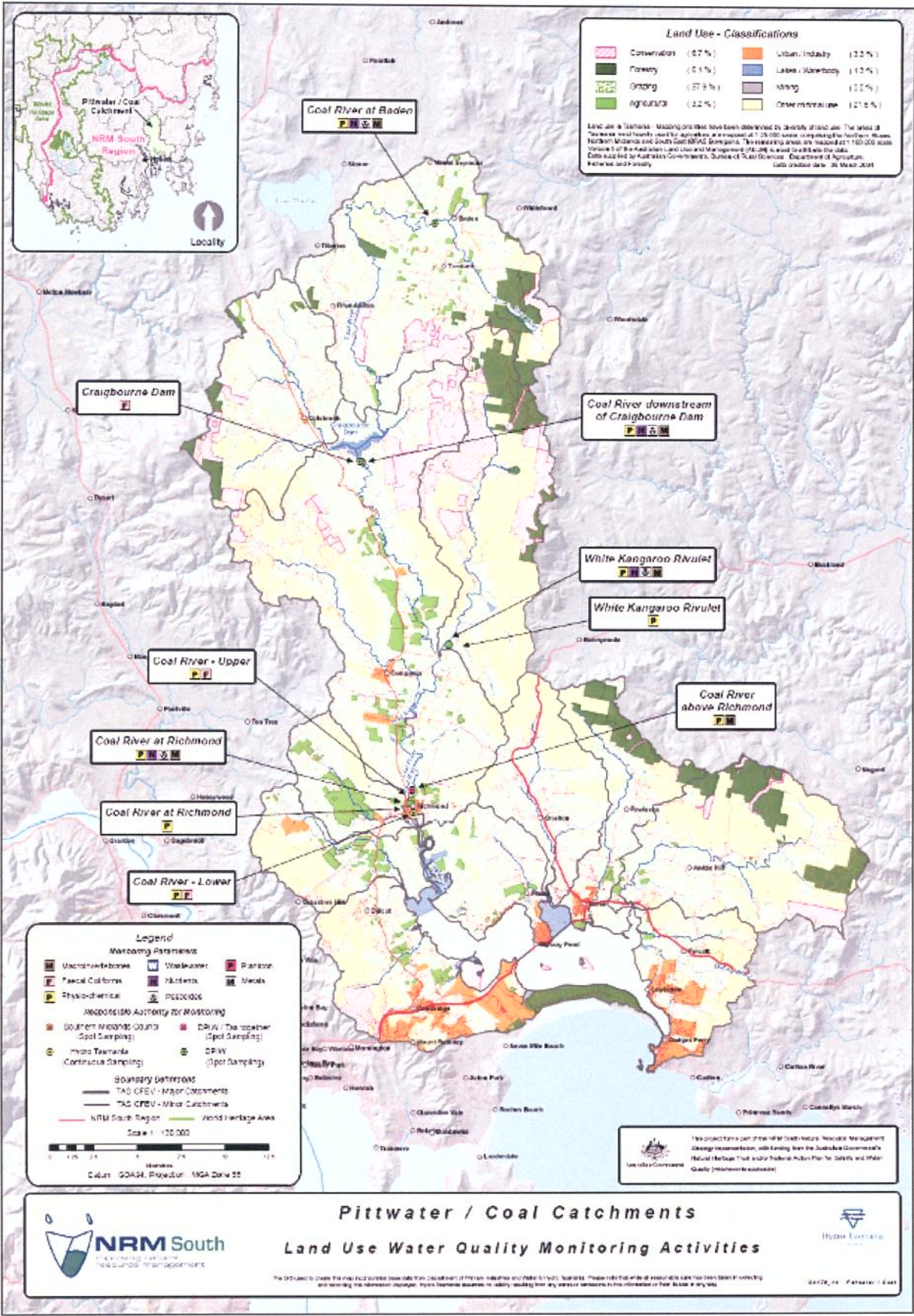
The ephemeral nature of the Coal catchment influences a variety of water quality parameters, with the tributary streams often reduced to a series of ponds and stagnant pools. During these periods, water quality is often extremely poor, with elevated conductivity, turbidity and nutrient concentrations, and depleted oxygen levels.

The fish community of the Coal River is poor, with very low diversity and abundance of native fish species and a relatively high proportion of introduced exotic fish (DPIWE 2003b). Construction of instream barriers, changes in the flow regime, increased sedimentation and infestation of the river channel by willows are thought to contribute to a marked decline in the overall abundance of fish since the 1970's, as well as the ephemeral nature of the streams (DPIWE 2003b).

AusRivAS assessment of rivers and stream in the Coal River catchment found macroinvertebrate communities to be impacted in most places, with a loss of up to 34% of taxa at the family level (DPIWE 2003b). Most communities were dominated by taxa that are tolerant to poor water quality or habitat degradation (DPIWE 2003b). Leading to the poor water quality or habitat degradation includes; elevated turbidity and high conductivity coupled with poor habitat quality due to increased sedimentation, channelisation, clearance of riparian vegetation and/or infestation of the riparian zone by weeds and exotic species.

Water temperature in the Coal River increases with the reduction in altitude (Gallagher 1997). Coldest water temperatures are from June to August (3-5 °C in the upper catchment and 5-7 °C in the lower catchment) and warmest temperatures (around 20°C) during January and February (Gallagher 1997). Gallagher (1997) regarded the discharge of cold water from Craighourne Dam over summer as a possible problem for downstream habitats.





**Table 1. Sample and continuous water quality sites monitored by the Department of Primary Industries and Water within the Coal River Catchment.**

<p>COAL RIVER AT BADEN-StationNo3203  <b>Stream Flow Measured in: Cumecs (Cubic Metres Per Second)</b>  Daily Averages  13/07/1971 to 13/07/1975</p>
<p><b>Field Measurements</b>  COAL RIVER AT BADEN - Station No. 3203  01/05/1990 to 05/11/2007</p>
<p><b>Nutrients</b>  COAL RIVER AT BADEN - Station No. 3203  02-02-2000-to-05-11-2007</p>
<p><b>Metals</b>  COAL RIVER AT BADEN - Station No. 3203  02-02-2000-to-18-07-2007</p>
<p><b>Bacterial</b>  COAL RIVER AT BADEN - Station No. 3203  02-02-2000-to-18-07-2007</p>
<p><b>Pesticides</b>  COAL RIVER AT BADEN - Station No. 3203  07-07-2005-to-03-10-2007</p>
<p>COAL RIVER AT RICHMOND-Station No. 3208  <b>Stream Flow Measured in: Cumecs (Cubic Metres Per Second)</b>  Daily Averages  26/01/1995 to 26/01/1999</p>
<p>COAL RIVER AT RICHMOND-Station No. 3208  <b>Water Temperature Measured in: Deg C (Degrees Celsius)</b>  Daily Averages  26/01/1995 to 10/10/2007</p>
<p>COAL RIVER AT RICHMOND-Station No. 3208  <b>Electrical Conductivity Measured in: uS/cm (MicroSeimens Per Centimeter)</b>  Daily Averages  26/01/1995 to 10/10/2007</p>
<p>COAL RIVER AT RICHMOND-Station No. 3208  <b>Stream Turbidity Measured in: NTU</b>  Daily Averages  25/03/1995 to 10/10/2007</p>
<p><b>Field Measurements</b>  COAL RIVER AT RICHMOND - Station No. 3208  01-05-1990-to-05-11-2007</p>
<p><b>Nutrients</b>  COAL RIVER AT RICHMOND - Station No. 3208  17-01-1990-to-05-11-2007</p>
<p><b>Metals</b></p>



COAL RIVER AT RICHMOND - Station No. 3208 17-01-1990-to-18-07-2000
<b>General Ions</b> COAL RIVER AT RICHMOND - Station No. 3208 17-01-1990-to-13-11-2001
<b>Bacterial</b> COAL RIVER AT RICHMOND - Station No. 3208 02-02-2000-to-18-07-2000
<b>Pesticides</b> COAL RIVER AT RICHMOND - Station No. 3208 23-06-1994-to-10-10-2007

COAL RIVER AT CRAIGBOURNE Station No. 3204 <b>Stream Flow Measured in: Cumecs (Cubic Metres Per Second)</b> Daily Averages 01/01/1980 to 08/01/1986
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COAL RIVER AT CRAIGBOURNE ROAD Station No. 3201 <b>Stream Flow Measured in: Cumecs (Cubic Metres Per Second)</b> Daily Averages 06/07/1961 to 01/01/1970
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COAL RIVER DOWNSTREAM CRAIGBOURNE DAM Station No. 3206 <b>Stream Flow Measured in: Cumecs (Cubic Metres Per Second)</b> Daily Averages 29/10/1986 to 02/01/2008
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COAL RIVER DOWNSTREAM CRAIGBOURNE DAM Station No. 3206 <b>Water Temperature Measured in: Deg C (Degrees Celsius)</b> Daily Averages 23/09/2004 to 03/10/2007
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COAL RIVER DOWNSTREAM CRAIGBOURNE DAM Station No. 3206 <b>Electrical Conductivity Measured in: uS/cm (MicroSeimens Per Centimeter)</b> Daily Averages 23/09/2004 to 03/10/2007
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COAL RIVER DOWNSTREAM CRAIGBOURNE DAM Station No. 3206 <b>Stream Turbidity Measured in: NTU (Nephelometric Turbidity Units)</b> Daily Averages 23/09/2004 to 26/10/2005
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<b>Field Measurements</b> COAL RIVER DOWNSTREAM CRAIGBOURNE DAM - Station No. 3206 14-06-1990-to-05-11-2007
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<b>Nutrients</b> COAL RIVER DOWNSTREAM CRAIGBOURNE DAM - Station No. 3206 04-03-1999-to-05-11-2007
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<b>Metals</b> COAL RIVER DOWNSTREAM CRAIGBOURNE DAM - Station No. 3206 02-02-2000-to-18-07-2000
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<p><b>General Ions</b>          COAL RIVER DOWNSTREAM CRAIGBOURNE DAM - Station No. 3206          28-08-1997-to-02-10-2001</p>
<p><b>Bacterial</b>          COAL RIVER DOWNSTREAM CRAIGBOURNE DAM - Station No. 3206          02-02-2000-to-18-07-2000</p>
<p><b>Pesticides</b>          COAL RIVER DOWNSTREAM CRAIGBOURNE DAM - Station No. 3206          07-07-2005-to-03-10-2007</p>

<p>WHITE KANGAROO RIVULET – Station No. 3209  <b>Stream Flow Measured in: Cumecs (Cubic Metres Per Second)</b>          Daily Averages          09/05/1990 to 21/12/2007</p>
<p>WHITE KANGAROO RIVULET – Station No. 3209  <b>Water Temperature Measured in: Deg C (Degrees Celsius)</b>          Daily Averages          28/08/2004 to 03/09/2007</p>
<p>WHITE KANGAROO RIVULET – Station No. 3209  <b>Electrical Conductivity Measured in: uS/cm (MicroSeimens Per Centimeter)</b>          Daily Averages          28/08/2004 to 03/09/2007</p>
<p>WHITE KANGAROO RIVULET – Station No. 3209  <b>Stream Turbidity Measured in: NTU (Nephelometric Turbidity Units)</b>          Daily Averages          28/08/2004 to 02/09/2007</p>

<p><b>Field Measurements</b>          WHITE KANGAROO RIVULET - Station No. 3209          04-06-1990-to-05-11-2007</p>
<p><b>Pesticides</b>          WHITE KANGAROO RIVULET - Station No. 3209          07-07-2005-to-10-10-2007</p>
<p><b>Nutrients</b>          WHITE KANGAROO RIVULET - Station No. 3209          17-01-1990-to-05-11-2007</p>
<p><b>Metals</b>          WHITE KANGAROO RIVULET - Station No. 3209          17-01-1990-to-18-07-2000</p>
<p><b>General Ions</b>          WHITE KANGAROO RIVULET - Station No. 3209          17-01-1990-to-13-11-2001</p>
<p><b>Bacterial</b>          WHITE KANGAROO RIVULET - Station No. 3209          02-02-2000-to-18-07-2000</p>

<p><b>Metals</b>          AARONS CREEK @ STONOR RD - Station No. 3504</p>
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02-02-2000-to-18-07-2000
<b>Bacterial</b> AARONS CREEK @ STONOR RD - Station No. 3504 02-02-2000-to-18-07-2000
<b>Nutrients</b> AARONS CREEK @ STONOR RD - Station No. 3504 02-02-2000-to-11-09-2001
<b>Field Measurements</b> AARONS CREEK @ STONOR RD - Station No. 3504 03-03-1999-to-05-12-2001

<b>Field Measurements</b> COAL RIVER @ ELDON RD BRIDGE - Station No. 3499 03-03-1999-to-05-12-2001
<b>Nutrients</b> COAL RIVER @ ELDON RD BRIDGE - Station No. 3499 03-03-1999-to-05-12-2001
<b>General Ions</b> COAL RIVER @ ELDON RD BRIDGE - Station No. 3499 03-03-1999-to-21-08-2001
<b>Bacterial</b> COAL RIVER @ ELDON RD BRIDGE - Station No. 3499 02-02-2000-to-18-07-2000
<b>Metals</b> COAL RIVER @ ELDON RD BRIDGE - Station No. 3499 02-02-2000-to-18-07-2000

<b>Field Measurements</b> COAL RIVER @ NEW COUNTRY MARSH RD - Station No. 3506 04-03-1999-to-05-12-2001
<b>Nutrients</b> COAL RIVER @ NEW COUNTRY MARSH RD - Station No. 3506 03-02-2000-to-10-07-2001
<b>Metals</b> COAL RIVER @ NEW COUNTRY MARSH RD - Station No. 3506 03-02-2000-to-18-07-2000
<b>Bacterial</b> COAL RIVER @ NEW COUNTRY MARSH RD - Station No. 3506 03-02-2000-to-18-07-2000
<b>General Ions</b> COAL RIVER @ NEW COUNTRY MARSH RD - Station No. 3506 24-04-2001-to-10-07-2001

<b>Field Measurements</b> COAL RIVER @ RIVER RD - Station No. 3505 04-03-1999-to-05-12-2001
<b>Nutrients</b> COAL RIVER @ RIVER RD - Station No. 3505



02-02-2000-to-21-08-2001
<b>General Ions</b> COAL RIVER @ RIVER RD - Station No. 3505 02-02-2000-to-21-08-2001
<b>Bacterial</b> COAL RIVER @ RIVER RD - Station No. 3505 02-02-2000-to-18-07-2000
<b>Metals</b> COAL RIVER @ RIVER RD - Station No. 3505 02-02-2000-to-18-07-2000

<b>Field Measurements</b> COAL RIVER @ WATTLE HILL RD - Station No. 3503 03-03-1999-to-05-12-2001
<b>Nutrients</b> COAL RIVER @ WATTLE HILL RD - Station No. 3503 03-03-1999-to-05-12-2001
<b>General Ions</b> COAL RIVER @ WATTLE HILL RD - Station No. 3503 03-03-1999-to-02-10-2001
<b>Bacterial</b> COAL RIVER @ WATTLE HILL RD - Station No. 3503 02-02-2000-to-18-07-2000
<b>Metals</b> COAL RIVER @ WATTLE HILL RD - Station No. 3503 02-02-2000-to-18-07-2000

<b>Field Measurements</b> CRAIGBOURNE CREEK @ LINK RD - Station No. 3501 04-02-1999-to-05-12-2001
<b>Nutrients</b> CRAIGBOURNE CREEK @ LINK RD - Station No. 3501 02-02-2000-to-18-07-2000
<b>Metals</b> CRAIGBOURNE CREEK @ LINK RD - Station No. 3501 02-02-2000-to-18-07-2000
<b>Bacterial</b> CRAIGBOURNE CREEK @ LINK RD - Station No. 3501 02-02-2000-to-18-07-2000

<b>Field Measurements</b> DUCKHOLE RIVULET @ COLEBROOK RD - Station No. 3496 05-02-1999-to-05-12-2001
<b>Nutrients</b> DUCKHOLE RIVULET @ COLEBROOK RD - Station No. 3496 05-02-1999-to-05-12-2001
<b>Metals</b> DUCKHOLE RIVULET @ COLEBROOK RD - Station No. 3496

02-02-2000-to-18-07-2000
<b>General Ions</b> DUCKHOLE RIVULET @ COLEBROOK RD - Station No. 3496 03-03-1999-to-02-10-2001
<b>Bacterial</b> DUCKHOLE RIVULET @ COLEBROOK RD - Station No. 3496 02-02-2000-to-18-07-2000

<b>Field Measurements</b> HUNTERS SWAMP CREEK @ RHYNDASTON RD - Station No. 3502 04-03-1999-to-05-12-2001
<b>Nutrients</b> HUNTERS SWAMP CREEK @ RHYNDASTON RD - Station No. 3502 02-02-2000-to-18-07-2000
<b>Metals</b> HUNTERS SWAMP CREEK @ RHYNDASTON RD - Station No. 3502 02-02-2000-to-18-07-2000
<b>Bacterial</b> HUNTERS SWAMP CREEK @ RHYNDASTON RD - Station No. 3502 02-02-2000-to-18-07-2000

<b>Field Measurements</b> INVERQUHARITY RIVULET @ PROSSERS RD - Station No. 3498 03-03-1999-to-05-12-2001
<b>Nutrients</b> INVERQUHARITY RIVULET @ PROSSERS RD - Station No. 3498 02-02-2000-to-18-07-2000
<b>Metals</b> INVERQUHARITY RIVULET @ PROSSERS RD - Station No. 3498 02-02-2000-to-18-07-2000
<b>Bacterial</b> INVERQUHARITY RIVULET @ PROSSERS RD - Station No. 3498 02-02-2000-to-18-07-2000

<b>Field Measurements</b> PAGES CREEK @ COMMERCIAL RD - Station No. 3497 03-03-1999-to-05-12-2001
<b>Nutrients</b> PAGES CREEK @ COMMERCIAL RD - Station No. 3497 02-02-2000-to-18-07-2000
<b>Metals</b> PAGES CREEK @ COMMERCIAL RD - Station No. 3497 02-02-2000-to-18-07-2000
<b>Bacterial</b> PAGES CREEK @ COMMERCIAL RD - Station No. 3497 02-02-2000-to-18-07-2000

COAL RIVER DOWNSTREAM CRAIGBOURNE DAM – Station No. 3206
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**Stream Flow Measured in: Cumecs (Cubic Metres Per Second)**

Daily Averages

28/10/1986 to

**IRON CREEK UPSTREAM ARTHUR HIGHWAY – Station No. 2203**

Stream Flow Measured in: Cumecs (Cubic Metres Per Second)

Daily Averages

24/05/1962 to 01/07/1992

**COAL RIVER UPSTREAM WHITE KANGAROO RIVULET – Station No. 3202**

Stream Flow Measured in: Cumecs (Cubic Metres Per Second)

Daily Averages

23/07/1963 to 20/08/1993

**ORIELTON RIVULET U/S BRINKTOP ROAD – Station No. 2211**

Stream Flow Measured in: Cumecs (Cubic Metres Per Second)

Daily Averages

22/08/1972 to 12/12/1996

### **Riparian**

Loss of riparian vegetation and the degradation that has occurred to stream beds and banks through stock access and erosion has impacted on both water quality and instream habitat for aquatic biota (DPIWE 2003b). In many part of the lower catchment, native vegetation has either been totally removed or has been replaced by undesirable exotic weed species such as willow and Cumbungi (DPIWE 2003b). It was reported in the State of River (2000) report that revegetation of the riparian zone and the rehabilitation of rivers and stream within the catchment may improve ecological health, but if occurrence of extended dry periods continues to increase, it is likely to create conditions that will result in poor water quality, particularly with regard to waterway salinity.

In September 1997, it was reported that willow infestation of the Coal River had resulted in flooding occurring more readily and frequently along affected stretches (Lisson *et al.* 1997). Channel movement and erosion of adjacent irrigated cropland had resulted from the flooding (Lisson *et al.* 1997).

Previous to 1997, approximately 6km of willows along the Coal river were treated on eight separate properties. Descriptions of three sites follows:

*Site 1:*

Riverside: Colebrook Road

Lloyd Fox

The Coal river broke its bank during a severe flood in 1963 and created an erosion gully through a previously productive river flat. Activities to ensure the problem did not worsen were made by willow removal, stabilisation of the river bank and erosion gully with planted trees and construction of a diversion bank across the top of the gully (Lisson *et al.* 1997). Further works to re-establish the former course have been carried out with assistance from the Land and Water Resources Division of the DPIF.

*Site 2:*

Laburnum Park: Fingerpost Road

Peter Dunn

Also prone to flooding due to willows, two short sections of the river were completely cleared of willow, leaving native stands. Banks were left to regenerate naturally, resulting in a good groundcover of grasses. Grazing by sheep occurs, limiting willow regrowth, however regrowth from stumps was an issue that required further action since 1997 (Lisson *et al.* 1997).

*Site 3*

Weavers Lane, Campania

Kevin Moore

Complete removal of willows from within the riverbed, while retaining a portion of the original willow along the banks occurred. Banks were left to regenerate naturally, resulting in good grass coverage and the occasional blackwood seedling. Willow regrowth was being controlled by follow up herbicide spraying (Lisson *et al.* 1997).

Willow was removed from Eliza Farm, Campania, in April 1999. Stumps in the river were removed and those on the bank painted with herbicide and left for stabilisation. Willows away from the river were left.



Campania House removed willow, leaving remnant blackwoods and eucalypts in July 1999. Blackwoods had regenerated after willow removal near the bridge at Campania House in December 2002.

Rosedale Campania in December 2002.

Mallow Campana December 2002, with regeneration tea trees and plantings of blackwoods and eucalypts on banks.

Coal River near the bridge at Mallow was cleared, resulting in clear water, willow stumps holding banks, colonisation by rushes, grasses and shrubs with remnant eucalypts.

In December 2002, Cumbungi was noted, while willow stumps, rushes and remnant blackwoods stabilised the banks at Coal river at Barton Vale.

Barton Vale also undertook willow removal.

Work was undertaken in the winters of 1999 and 2000 to clear willows from most of the river under the funded project titled 'Willow Management and River Improvement', and ran from April 1998 until December 2002. Follow-up work for this group of work and previous sections was completed, including cut willow stumps immediately (within minutes of tree cutting) being treated with herbicide. Some revegetation and fencing was also undertaken, although delayed due to concentration on willow removal (Mendham 2002b). Approximately 12km of willows were moved, and 4km of fencing and revegetation completed during the April 1998 to December 2000 time period, estimated to benefit 15km of downstream waterway and involving 30 riparian landowners (Mendham 2002b). The Coal Rivercare Plan was produced in 1998 and further funding was received and used from March 2002 until December 2002 to implement the plan. The Rivercare Plan proposed a five year program of works to improve the ecological health of the river by gradually removing willows, fencing, and either planting native species or encouraging natural regeneration (Mendham 2002a). Some of the work conducted in 2002 was mostly close to the Richmond township, on smaller area properties. Approximately 6.5 km of river was cleared during 2002, leaving about 3km to be done later, while 5 km of fencing, and 2500 trees were planted where landowners were able to water, otherwise deferred to next winter due to dry conditions (Mendham

2002a). It was estimated that 75 ha of native vegetation works was complete, 20 ha remnant rehabilitation, and 2ha revegetation (Mendham 2002a). The 'Continued Implementation of the Coal Rivercare Plan' occurred from July 2004 until December 2005. Only Lynwood was complete in this time period, meaning that Lynbrae was not done and Sunnyside was not complete. Follow-up willow control, fencing, revegetation and regeneration continued through this time period. A total of 5.1 km of river was cleared of willow, as per the Rivercare Plan, rehabilitation of 5.1 km, and fencing of 4 km (Mendham 2005a). Also during 2005, funding was provided to clear approximately 800 m of willows, plant 2600 trees and fence 2km, as well as follow-up willow control and maintenance of rehabilitated areas (Mendham 2005b).

## ***Appendix***

### **Electrical Conductivity (EC)**

Most crops can survive salinity levels up to 700  $\mu\text{S}/\text{cm}$  without loss of yield.

It is recommended that drinking water contain less than 800  $\mu\text{S}/\text{cm}$ .

### **Dissolved Oxygen**

Levels below 5 mg/L will place stress on aquatic biota.

Levels below 2 mg/L will cause death of fish.

### **Turbidity**

Turbidity levels exceeding 20 NTU is regarded as an excessive level.

### **Total Phosphorus**

Less than 0.008 mg/L is very low

Between 0.008 and 0.025 mg/L is low

Between 0.025 and 0.050 mg/L is fair

Above 0.050 mg/L is high.

### **Nitrate**

Less than 0.05 mg/L is very low

Between 0.05 and 0.1 mg/L is low

Between 0.1 and 0.2 mg/L is fair



Above 0.2 mg/L is high.

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