

# *Splitters Creek Catchment Plan*

*October 2011*

# Splitters Creek



Front Cover: Splitters Creek Catchment looking from Loves Hill

## ***Acknowledgements***

The authors are most grateful all those who have contributed to the Splitters Creek Catchment Plan in particular, we wish acknowledge the following groups and individuals.

The Splitters Creek Community and the Splitters Creek Community Environment Group, Murray CMA , Albury City Council.

The consultants; Chris Dwyer from Sinclair, Knight & Mertz and Damian Michael from Ecotone Wildlife and Habitat Assessment.



**Catchment Management  
Authority**  
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# 1. Overview of the Splitters Creek Catchment

## 1.1. A catchment in context

A catchment is any area of land which drains to a common point (Adams and Hillan, 1997). Catchments can be defined at a range of scales from 1000's of square kilometres (i.e. Murray Darling Basin) to several hectares (catchment of a farm dam). Catchments are often used to define land units for planning purposes as land use undertaken in one part of a catchment has potential flow on impacts for other landholders in the catchment. In this way a catchment community manages a shared resource and shared responsibility for assets and values provided by the catchment. In a small, well defined catchment such as Splitters Creek the close proximity of landholders means the feeling of sharing a common space is more strongly emphasised.

## 1.2. Why a Catchment Plan?

This plan is a guiding document to help shape decisions for resource management and community activity in the Splitters Creek area. It is a living document and changes will inevitably be made over time as priorities and issues shift. In addition, new research findings and resource data may throw light on some issues leading to a change in the document being required.

The purpose of implementing this plan is:

- To provide for appropriate multiple use of the area
- To identify, conserve and enhance the biodiversity values of the area
- To encourage and foster community appreciation of the area
- To maintain good water quality both for consumption and discharge
- To limit the impact of development on the catchment environment

Any improvement in these areas would be a good outcome, but the ultimate would be to create a pleasant and productive environment where the economic and social features of the area can be maintained in balance with a healthy physical environment.

### 1.3. Splitters Creek Catchment

The Splitters Creek and its tributaries flow through a discrete valley on the edge of the Western Slopes and into the Murray River, approximately 7kms west of Albury, NSW (Figure 1: Location Map). It consists of 34.2kms of waterways with a land catchment area of approx 3,100ha. Splitters Creek, which is approx 7km long, has two tributaries, one from the NE and one from the NW which join at about a third of its length. Further south Bretton Creek and another unnamed creek near Griffith Drive join from the east. The catchment is bounded by Dight's Hill to the west, Albury City Council Municipal boundary to the north and the iconic Murray River to the south. Wonga Wetlands, part of Albury City's water treatment plant, is located within the catchment on the south eastern boundary. The catchment is subdivided in 168 land parcels owned by approximately 90 landholders.

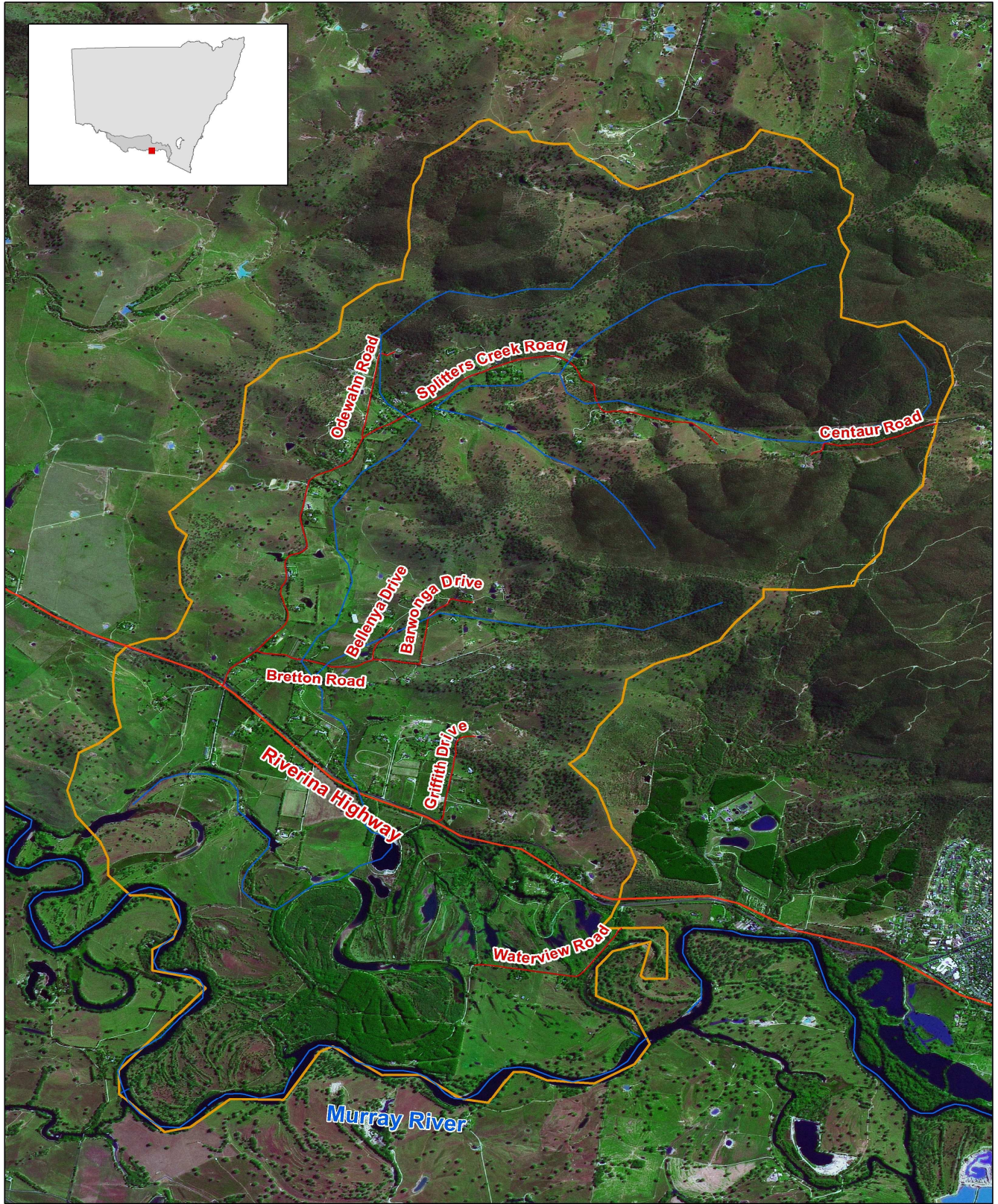
### 1.4. History of the Area

The original residents of Splitters Creek were members of the Wiradjuri people who used the river and the surrounding areas to provide food (fish, birds, animals and plants) as well as dwelling places. A canoe tree is still seen at the Wonga Wetlands. From the 1830s, selectors such as John Dight and the Ortlipp family brought cattle and sheep to the area and began changing the landscape to suit these animals.

With the Black Range gold mining boom, many prospectors searched the valley for gold and some mineshafts can still be seen in the hills. The mining activity would have some effect on the valley's ecology, especially on the trees which were used for firewood and even fuel for the paddle steamers plying the river. Few of the trees in Splitters Creek are more than 100 years old. The introduction of rabbits and feral animals had a huge impact on the environment and also changed the flora of the valley to a large extent.

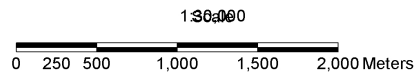
The valley was owned by the Griffith family earlier in the 20<sup>th</sup> Century (homestead at Delaware). Among other things, they operated five dairies in the Splitters Creek area. Paddy Clarke worked on one of these in the late twenties, living in a small slab hut located beside the peppercorn trees behind the Eckford house and raising turkeys. It is understood that Paddy died whilst crossing Splitters Creek on his way home ('... and his ghost may be heard.')

# Splitters Creek Catchment Area



**Legend**

- Roads
- Rivers & creeks
- Splitters Creek Project Area



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Figure 1: Splitters Creek Catchment Location Map

## 1.5. Land use in the Splitters Creek Catchment (peri urban)

Over time, as the city of Albury has expanded and developed, demand for rural lifestyle blocks has increased, resulting in many of the fringe areas of the municipality becoming home to 'hobby farm' style subdivision. This type of development is often referred to as peri-urban, and can be described as those areas that are neither fully urbanised, nor completely rural, but comprise a middle band of land with particular characteristics.

Commercial farming in the Splitters Creek catchment has significantly reduced over time with most landowners now having off-farm incomes and keeping small numbers of stock, mostly cattle or horses. There is one small vineyard within the catchment.

## 1.6. The Splitters Creek Community

The Splitters Creek valley as noted above is a peri urban environment and consistent with other areas around the country many residents within the Splitters Creek Community (SCC) are actively involved in participating in 'care' networks, and there is a history of Landcare projects already implemented.



Figure 2: Stabilisation works and flood gates installed with funding obtained through Landcare along Bretton road in Splitters creek

The Splitters Creek Landcare Group has been established for over 10 years and it remains affiliated with the Bungowannah Landcare Incorporated. In 2002, the residents of the catchment formed the Splitters Creek Community Incorporated, and an environmental sub-group was also formed. The environmental sub group was guided by the larger community and priority issues were identified as:

- The need to more accurately define and quantify environmental and planning issues with particular reference to erosion sites
- The need to adopt a coordinated approach to actions implemented on the ground.

## 2. Splitters Creek Information Sources

Information has been gathered from a range of sources in developing the Splitters Creek Catchment Plan. In addition to the Splitters Creek Community local input, information was sought through a range of sources including specifically commissioned studies of biodiversity and geomorphology.

Main sources are listed below and where possible referenced for further information.

### 2.1. Biodiversity Assessment

Much of the specific biodiversity assets and recommendations identified in the plan have been drawn from a biodiversity study undertaken by Ecotone Wildlife and Habitat Assessment. The study was commissioned in May 2009 by the Murray CMA and included an assessment of vegetation and fauna in the Splitters Creek catchment. The assessment comprised:

- A Literature review on the flora and fauna of the catchment and surrounding area.
- An evaluation of the flora and fauna records held by local residents.
- A field survey to identify flora and fauna species (excluding fish and invertebrates).
- A report on the assets and significant threats to biodiversity.

Michael, D (2009) *Splitters Creek Biodiversity Study: Report to the Murray Catchment Management Authority of New South Wales*. Ecotone Wildlife & Habitat Assessment. Available through Murray CMA.



## 2.2. Geomorphology Assessment

A geomorphology study was commissioned by the Murray CMA in May 2009 and undertaken by Chris Dwyer on behalf of Sinclair Knight Mertz (SKM) to assess the condition of the land resources of the Splitters Creek catchment (including the hill slopes, riparian vegetation and the beds and banks of waterways) and to recommend works that will protect or improve the resource.

The scope of the geomorphology study included:

- conduct a field study of the watershed
- describe and group areas with similar characteristics
- recommend practical, cost-effective management actions to protect or improve land condition

Sinclair Knights & Mertz (2009) *Splitters Creek Geomorphic Investigation*. SKM Wangaratta. Available through Murray CMA.

## 2.3. Sediment modelling

SedNet is a hydrological model used to understand sediment movement in the Eastern Murray Catchment. SedNet uses information such as land use, gully mapping, average rainfall and elevation to calculate a sediment budget. The model is able to distinguish the different sediment supply areas, i.e. sediment from hills, gullies and stream banks. Results from sediment modelling with SedNet for the Splitters Creek Catchment are available through Murray CMA.

## 2.4. Albury City Council, Local Environment Plan

The Albury Local Environmental Plan 2010 (ALEP 2010) is the legal document (comprising a text document and associated maps) that provides the rules and guidelines that control the use of private and public land. Through zoning and development controls, it allows Albury City Council to manage the way in which land is used. The ALEP 2010, although prepared by Council, was vetted by the State Government to ensure consistency with the *Environmental Planning and Assessment Act, 1979* and relevant State Environmental Planning Policies before gazettal by the Minister for Planning.

The ALEP 2010 includes the legal definitions of a wide range of land use activities and land use tables divided into different zones to describe what uses are permissible, or prohibited under the given zones. The plan also contains a number of provisions to address such issues as environmental management, heritage conservation, and subdivision.

The Albury Development Control Plan 2010, prepared in accordance with the *Environmental Planning and Assessment Regulation 2000* supports the objectives of the ALEP 2010 by providing detailed land use requirements for certain development types contained within specific zones in terms of building design, siting and setback requirements, as well as measures aimed at ensuring the protection of natural and environmental features.

Biodiversity certification was conferred on the Albury Local Environmental Plan 2010 (ALEP2010) in February 2011, providing protection for environmental areas and certainty for the community. Overall 5,262ha of Endangered Ecological Communities and threatened species habitat, representing 82% of all medium–high quality extant vegetation (6,406ha), was retained in the Natural Areas (zoned E2 and E3), where the protection and management of the environment is a key objective of ALEP2010. Offsets for all losses of low conservation value vegetation and habitat in developable areas are achieved completely within the Natural Areas of the LEP. A significant area of Splitters Creek comprises these Natural Areas (zoned E2 and E3), where the land use objectives of the zones are to protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values; and to ensure the long term viability of populations of threatened species, populations and ecological communities by protecting and improving the condition of wildlife habitats and wildlife corridors. Splitters Creek also borders the largest continuous area of E2 – Environmental Conservation zoned land within the Albury local government area.

The Albury City website ([www.alburycity.nsw.gov.au](http://www.alburycity.nsw.gov.au)) provides Council's current and historical strategic land-use policies that set out the requirements for land in the Albury area, as well as strategic policy documents including the Albury Local Environmental Plan 2010 and the Albury Development Control Plan 2010 that will guide and assist the development of Albury in the future.

## 2.5. South West Slopes Revegetation Guide

The Revegetation Guide is an important source of local information about the vegetation types and specific species that are currently found across the area and those that could be expected to have occurred here prior to European settlement. Its vegetation profile descriptions provide the underpinning principals which guide species selection for revegetation within the catchment.

The General Native Vegetation Profile for the Splitters Creek district is attached to this plan as Appendix 1.

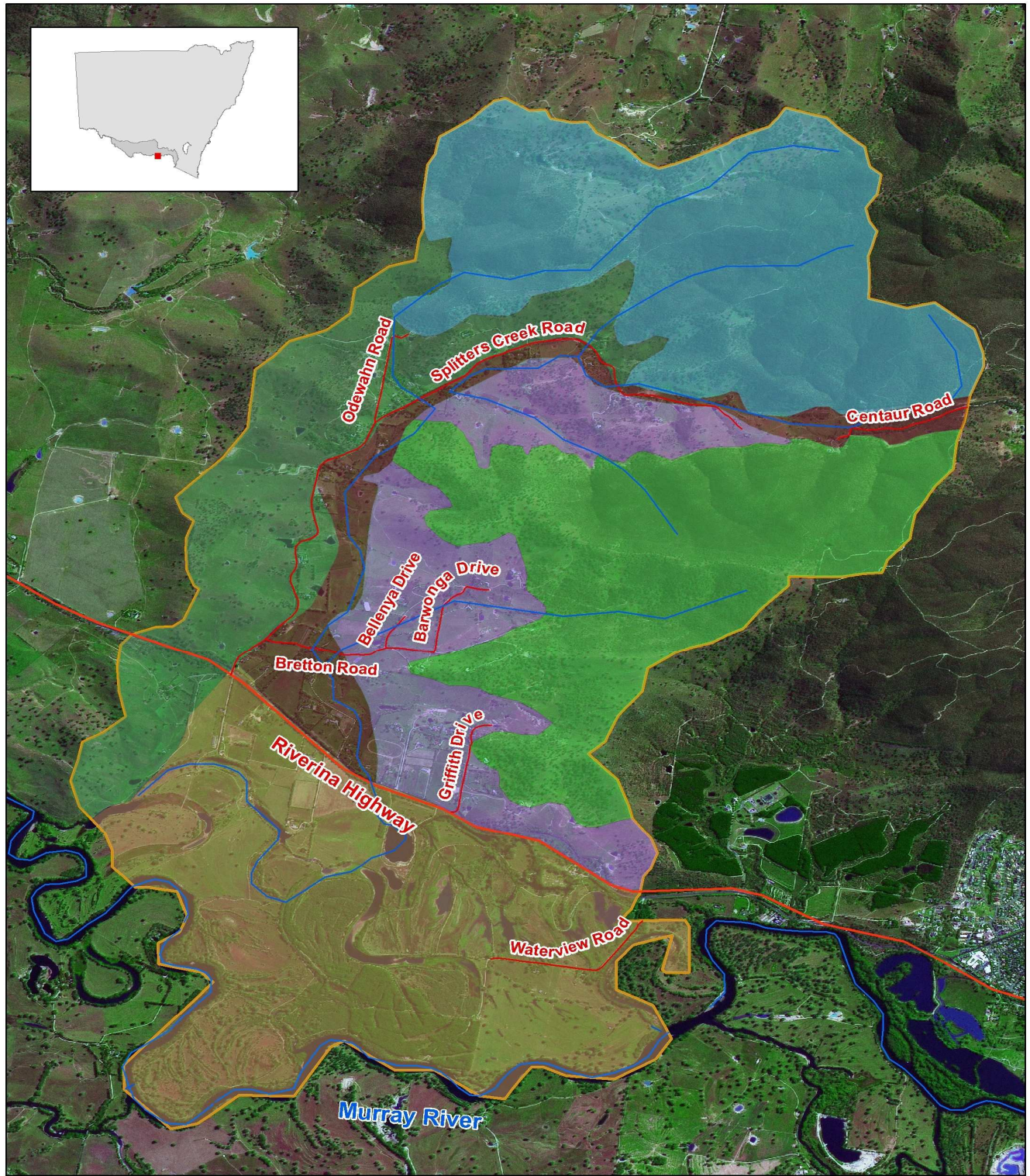
Murray Catchment Management Committee & Dept of Land and Water Conservation. (1998) *South West Slopes Revegetation Guide*. Albury NSW (Fleur Stelling). Available for purchase through Murray CMA.



Figure 3 (left): White Box (*Eucalyptus albens*) Bretton Rd  
Figure 4 (above): White Cyprus Pine (*Callitris glaucophylla*)

# 3. Splitters Creek Catchment Management Units

## Splitters Creek Management Units



### Legend

- Western Catchment
- Northern Catchment
- Murray River Floodway
- Eastern Cleared Catchment
- Eastern Forested Catchment
- Splitters Creek Main Channel
- Roads
- Rivers & creeks
- Splitters Creek Project Area

Scale 1:30,000

0 250 500 1,000 1,500 2,000 Meters



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Figure 5: Splitters Creek Catchment management units

The Splitters Creek Catchment is divided into six management units to assist with the field assessments. The management units were part of the geomorphology study and are determined from biophysical features such as like streams, soil type, land use and topography.

<b>Management Unit</b>	<b>Description</b>
<b>1</b>	Splitters Creek Main Channel
<b>2</b>	Western Catchment
<b>3</b>	Northern Catchment
<b>4</b>	Eastern Forested Catchment
<b>5</b>	Eastern Cleared Catchment
<b>6</b>	Murray River Floodplain

### 3.1. Management Unit Descriptions

#### ***3.1.1. Management Unit 1 - Splitters Creek Main Channel***

This management unit contains the main Splitters Creek channel and its floodplain. The Splitters Creek and associated riparian vegetation is owned and managed by private landholders.

Due to the floodplain, historical sediment deposition and particular channel morphology, Splitters Creek significantly decreases downstream of the Riverina Highway and becomes less defined. The channel of the creek becomes undefined on the lower floodplain, with flows entering a series of ox-bow lagoons. These lagoons have been formed from former channels of the Murray River. Floodplain flow from the Murray River has the major influence over the geomorphic features of this reach rather than any flow coming from Splitters Creek (Sinclair Knight Mertz, 2009).



Figure 6: Splitters Creek

### ***3.1.2. Management Unit 2 - Western Catchment***

This catchment is predominantly cleared, and includes several gullies which originate at the top of the catchment and flow directly into Splitters Creek. There are several farmlets and houses in the catchment, however these developments, appear less prevalent than in other parts of the Splitters Creek catchment, however subdivisions have been approved so this will not be the case in the future.

### ***3.1.3. Management Unit 3 - Northern Catchment***

This management unit is characterised by a predominantly forested catchment with gorges and rocky valleys a common feature. Here, steep-sided valleys are lined by basalt and boulder strewn creek beds and support moist seepages, small waterfalls, rock pools, rock platforms and rock shelves.

### ***3.1.4. Management Unit 4 - Eastern Forested Catchment***

The Nail Can Hill Flora and Fauna Reserve, crown land reserves and adjoining land parcels are managed by the Land and Property Management Authority, the Albury City Council as well as private landholders. The land is rocky and therefore relatively stable, indicative of the geology. It is not suitable for farming, and therefore remains well forested as it hasn't been cleared for pasture.

### ***3.1.5. Management Unit 5 - Eastern Cleared Catchment***

This Management Unit is the most densely populated in the study area. It is characterised by relatively small farmlets, and property land management practices vary significantly.



Figure 7: Blakely's Redgum woodland typical of Eastern Forested Catchment

### **3.1.6. Management Unit 6 - Murray River Floodplain**

Wonga Wetlands is a facility owned and operated by Albury City as part of its ecologically sustainable wastewater management and reuse scheme. During the warmer months the reclaimed wastewater is used for irrigation while in wetter months the water is directed to the wetlands. These wetlands assist in filtering pollutants from the wastewater while providing significant habitat for conservation purposes and also offering a recreational opportunity to members of the public. The wetlands together with the Aquatic Environment Education Centre are a significant asset to the Splitters Creek catchment.

## **3.2. Identified Assets and Values**

A range of natural and community assets and values have been identified by the Splitters Creek Community and through the commissioned studies on biodiversity and geomorphology. The following section discusses the assets and values which exist in the catchment.

Conservation values within the Splitters Creek catchment were identified as being “exceptionally high” and the sub-catchment itself is considered a biologically important asset within the Albury Local Government area and broader Murray River catchment area according to the Biodiversity Assessment undertaken by Ecotone Wildlife and Habitat Assessments.

*“This study has revealed a diverse and rich biodiversity within the Splitters Creek watershed. The number of threatened species, as well as the total number of plant and animals species documented in this study, highlights the high conservation value of the watershed. Few places exist in the Murray River catchment management area that support as many threatened species as the Splitters Creek watershed.”* Michael, D (2009)

In particular the area supports a rich diversity of birds with 202 species currently known and potentially occurring in the Splitters Creek watershed.





Figure 8: Diamond Firetail

The riparian corridor along the Spitters Creek main channel begins in the Albury Hills and terminates on the Murray floodplain. This vegetation corridor is important for the following reasons:

- The mid to upper sections of Splitters Creek support a significant population of Squirrel Gliders and provides suitable habitat for a range of other threatened species including Brown Treecreepers and Carpet Pythons
- It has the potential to facilitate movement by native fauna from the hills to the floodplain.
- The vegetation along the creek helps prevent erosion and enhances water quality.

In the Western Catchment area, Dight's Hill roadside is managed by the Albury City Council and is situated along the Riverina Highway. The road reserve and adjoining woodland area is important for the following reasons:

- It contains high densities of large hollow-bearing trees and natural regrowth.
- It is an excellent example of high quality grassy Box-gum woodland in the catchment.
- It contains an area of Kangaroo Grass suitable for seed collection.
- It supports a population of the threatened Brown Treecreeper.
- It forms part of an important habitat corridor linking vegetation with Wonga Wetlands.

In the north of the Western Catchment the Splitters Creek community have identified a seasonal waterfall and associated granite outcrop and rock pool area along Greens Creek, as a specific asset. This area holds value to the community because of its aesthetics, natural beauty, seclusion and wide diversity of flora and fauna.

The Northern Catchment area contains vegetation communities that are important for the following reasons:

- They provide a moist environment for plants such as Necklace Fern, Blanket-leaf Fern, sedges and other species that require cool, damp micro-environments.
- They provide habitat for frog species such as Bibron's Toadlet, Smooth Toadlet and the Wrinkled Toadlet.
- They provide a relatively undisturbed environment with numerous rock crevices and large hollow-bearing trees suitable for the Inland Carpet Python.
- The rock pools provide an important source of water for fauna.

Also in the Northern Catchment a multi-aged Mugga Ironbark community was a surprising discovery. *"Finding the Ironbark stand was surprising as the nearest known populations are in Chiltern National Park, Victoria, approximately 25 km to the south-west. The stand consisted of approximately 150 tree stems spread over a 5 ha area along a rocky ridge line. At least 10 trees measured greater than 80 cm diameter at breast height (DBH) and contained large dead branches with hollow-bearing cavities. These trees may be in excess of 150-180 years old. A second cohort of trees measured between 20 cm – 30 cm DBH and was found growing on old, mining spoil dumps. The combination of old growth trees with hollows, post mining regenerated trees and recently regenerated saplings, suggest this patch of Ironbarks represents a remnant community situated between the Chiltern and the NSW Ladysmith populations"* Michael, D (2009).

The stand of trees is important for the following reasons:

- Ironbark trees often flower during winter months and are an important food source for threatened species, including Painted and Regent Honeyeaters, Swift Parrots and Squirrel Gliders
- The numerous cavities provide den-sites for Squirrel Gliders and shelter sites for Carpet Pythons.
- It is the only known stand of remnant Ironbark trees in the entire (NSW and Victorian) Murray catchment.



Figure 9: Mugga Ironbark (*Eucalyptus sideroxylon*) growing on historic mullock heap which is evidence of earlier gold mining

The hills within the Eastern Forested Catchment unit were identified as important for the following main reasons:

- They contain significant areas of a threatened ecological vegetation community known as White Box, Yellow Box, and Blakely's Red Gum Woodland.
- They are the most significant area of continuous native vegetation in the Albury Local Government area.
- They contain threatened plants such as the Woolly Ragwort and Crimson Spider Orchid.
- They contain the largest known population of the threatened Pink-tailed Worm Lizard in NSW.
- They contain significant habitat for threatened birds, including the Brown Treecreeper, Hooded Robin, Speckled Warbler, Barking Owl and Turquoise Parrot.

The hills area of Eastern Forested Catchment area contains crown land forming part of Nail Can Hill. In addition to its biodiversity values, Nail Can Hill is valued by the Splitters Creek community for its aesthetic and recreational attributes including bushwalking, viewing wild flowers, bird watching, horse riding and cycling. Access to this area from the Splitters Creek catchment is via crown road reserve off Barwonga Drive. Maintenance of this access route is an important consideration to the Splitters Creek Community in the enjoyment of the Nail Can Hill area.

Gold Dust Corner is another area identified by the community as significant. It is an area of approximately 2 ha of creek and shale ridgeline which supports a wide variety of indigenous plants, some of which are found in very few places in the Murray Catchment including a variety of orchids and lilies. The site is important to the community for its beauty and educational value and uses such as nature photography. It is also an important source of local provenance native seed for use in revegetation activities across the area.



Figure 10: Sun Orchid (*Thelymitra pauciflora*) amongst Milkmaids, Sticky Everlasting Daisy in a Grassy Box Woodland

The NSW State Forests manage 80 ha of irrigated Flooded and River Red Gum plantations situated in the Murray River Floodplain unit. These plantations are important for the following reasons:

- They filter water from the Albury wastewater treatment ponds and run off from the Splitters Creek catchment.
- They support an abundant suite of small insectivorous bird species that are comparatively less common on the Albury ranges. Some of which include, the Red-capped Robin, Brown-headed Honeyeater, Red-browed Finch, Superb Fairy Wren, Silvereye and Striated Thornbill.
- They support mammal and reptile species that are comparatively less common on the Albury ranges, such as the Black Wallaby, Yellow-footed Antechinus, Ring-tailed Possum and Garden Skink.
- They provide significant foraging habitat for the threatened Squirrel Glider.
- They provide an ideal release site for rehabilitated species because of water availability, distance from roads, access to hollows and adequate cover.
- They may play a significant role in sequestering carbon in the catchment.

The Wonga Wetlands managed by the Albury City Council are also situated within the Murray River Floodplain management unit. The wetlands are important for the following reasons:

- They filter water from the Albury wastewater treatment ponds and run-off from the Splitters Creek catchment.
- They are an important stopover and foraging environment for international migratory wading birds.
- They contain numerous large hollow-bearing trees and support high densities of arboreal marsupials.
- They contain significant populations of the Platypus.
- They contain significant populations of the Broad-shelled Turtle.
- They contain a number of records of threatened species, including the Squirrel Glider, Australasian Bittern, Sloane's Froglet, Brown Treecreeper, Barking Owl, Austral Pillwort and Swamp Wallaby Grass.
- They contain sites of aboriginal cultural significance including scar trees possibly used for canoes.

In addition to the natural and physical value of the wetlands the community also values the educational and recreational opportunities this unique area provides. It is highly valued by the Splitters Creek and broader Albury communities for its walking tracks, educational facilities and activities such as bird watching.

The community have identified the Splitters Creek Community Centre and Fire Shed as a significant built asset which holds high social and public amenity value. It is the most significant public infrastructure in the catchment and is valued as a hub for social gathering and as local meeting place for the community for events, meetings, functions and importantly as a community refuge in the event of bushfire.



Figure 11: Members of the Splitters Creek community assembling for the “Spring Walk” at the new community centre, September 2011



Figure 12: Tree of Heaven  
(*Ailanthus altissima*)

### 3.3. Issues and Threats

This section identifies the broad major issues in the Splitters Creek catchment with regard to negative impact on the values that have been identified in the previous section.

An overarching issue was identified by the community as the general lack of baseline information and understanding of the status of important processes occurring within the catchment that contribute to the overall health of the catchment. For example understanding the current status of salinity, water quality and soil acidification in the catchment can have an impact on how parts of the catchment might be managed to protect some of the assets identified in the previous section. The presence of pest plants and animals and the progress of natural regeneration of native plants were also seen as important and the lack of monitoring to show what was happening was seen as an issue.

Broadly the main issues and threats concerned with biodiversity of this area include:

- Discontinuous vegetation, particularly along riparian corridors which can inhibit the movement of some fauna species for foraging and breeding.
- Damage to stream bank vegetation from unrestricted stock access and overgrazing. This issue has a wide range of detrimental impacts on:
  - wildlife such as ground-dwelling frogs which use the area for shelter, breeding and egg-laying sites, and other species which rely on this riparian zone for foraging and clean water,
  - water quality for both the immediate stream and also eventually the Murray River. This can be in the form of increased sediment in streams and also increased harmful chemicals and nutrients entering the stream which would previously have been filtered by riparian vegetation,
  - bank stability which is compromised due to physical damage from stock traffic and removal of vegetation which helps to protect soil from erosive processes
- Invasion of riparian areas, wetlands and remnant vegetation areas by woody weeds such as the European Olive, Asparagus, Tree of Heaven, False Acacia (*Acacia robinia*) and Sweet Briar which can compete with native species and choke wetlands.



Figure 13: An eroding gully with very little vegetation cover



Figure 14: A bank stabilised by remnant Gold dust wattle and native grasses



- Increasing numbers of hares, rabbits and kangaroos are having an impact on the natural regeneration of native plant species. Seedling acacias and other shrubs are particularly vulnerable because they are highly palatable.
- High presence of aggressive noisy miners impacts on the likelihood and ability of other small birds to colonise and thrive in the area.
- Road-killed wildlife. Turtles, especially the Broad-shelled Turtle are hit by traffic along the Riverina Highway adjacent to the wetlands. These events are common following summer rainfall and mostly involve females carrying eggs. Unfortunately this has also been observed with wallabies and echidna as well as a wide range of bird species
- Pollution of the seasonal rock pools along waterways by domestic animal faeces, reducing water quality for aquatic plants and wildlife and therefore impacting on the value of these places for wildlife but also for their aesthetic values within the community.
- Bush rock removal and firewood collection which removes important habitat for ground dwelling birds, mammals reptiles and the insects bugs they rely on to survive.
- Removal of living and dead aged hollow trees. These aged trees provide habitat for birds, gliders and bats.
- Predation on reptiles, turtles and their eggs, birds and small mammals by foxes, feral and domestic cats and unrestrained domestic dogs.
- Inappropriate grazing practices in native vegetation areas which results in a range of potential negative impacts such as:
  - o Suppression of native plant regeneration,
  - o Introduction and encouragement of weeds where overgrazing creates a niche for weeds to establish by removing native plant competition
  - o Accumulation of nutrients in heavily trafficked stock camp areas which favours the growth of weeds over native species which often thrive in less rich soil environments
  - o Damage to established vegetation if stock remove bark and browse heavily
- Barbed-wire on fences entangling wildlife, including gliders, wallabies, kangaroos and bats. Squirrel Gliders have been found entangled in barbed-wire fencing along Waterview Road. Preliminary measures have since been taken to prevent this from occurring in one area but it remains an issue across much of the Splitters Creek catchment.

- Development resulting in native vegetation clearing. Some areas of the catchment are subject to new development, which poses a threat in the form of native vegetation clearance and soil erosion. Development in the catchment must be in accordance with the development controls provided in the Albury Local Environmental Plan 2010 and the Albury Development Control Plan 2010. These documents can be accessed via Albury City's website or by Contacting Albury City Council's Customer Service on (02) 6023 8111.

As well as the general issues outlined there was also a specific biodiversity issue identified:

- Lack of recent regeneration of ironbark trees in the significant stand in the Northern Catchment. This may be caused by unsuitable site conditions such as grazing pressure from domestic stock, rabbits or native grazers such as kangaroos and wallabies or from lack of viable seed produced by the existing trees.

In addition to the biodiversity related issues which have been identified, a range of other water quality and soil management issues have also been defined which may also threaten the significant values of the Splitters Creek Catchment. Issues such as farm dams, grazing and peri-urban development are influencing broader soil and creek morphology and processes.

- Minor and localised erosion in stream characterised by an overhang with water falling into a deep hole (e.g. a waterfall) can be seen in places in the catchment however the presence of rock bars is controlling the extent to which the creek can deepen (Sinclair Knight Mertz, 2009).
- Bank erosion is clearly present in places throughout the catchment which results in sediment entering the waterway, a widening of the streams and therefore an erosion of the adjoining 'useful' land and a potential disruption to land use on the property due to reduced access to areas of the properties.

- In the middle and lower reaches of Splitters Creek, runoff from feeder gullies has been affected by the number of farm dams. This is having an unknown impact on the hydrology of the creek. It would be expected these dams have reduced flows in the creek by capturing and storing water, and also reducing the peak flows, thereby reducing the rate of change in the creek. Reduced flows could reduce erosion but also impacts on silt loads, geomorphic diversity of the creek, viability of native vegetation and the potential for the creek to sustain macro-invertebrates, aquatic fauna (fish, turtles) and mammals (Sinclair Knight Mertz, 2009). Also of concern was an observation where a farm dam did not have a defined spillway. This raises the need for existing or future dams to be well designed to reduce the risk of failure, which could cause significant damage to property downstream.
- Localised gully erosion is evident especially along Splitters Creek and its tributaries. Some sheet erosion is evident above and to the east of Griffith Drive.
- Access tracks in the Nail Can Hill crown land area for public use are not well defined and therefore sometimes dictated by where the traffic chooses to go. This results in potential damage to flora and fauna and also can create an opportunity for erosion processes to take hold.
- Over grazing in general across the catchment removes all ground cover and exposes the topsoil and increases rates of erosion which degrades this land further and increases sediment loads in the gullies downstream. This also creates bare areas for opportunistic weeds.
- Bushfire was identified as a threat of high concern by the Splitters Creek community. The semi-rural nature of the area and the natural setting that defines the catchment as a special place to live also brings with it the inherent risk associated with wildfire. The community is highly aware of this threat and works closely with the Rural Fire Service to enact good planning practices to manage the risks.
- Lack of awareness of the presence of gold mining heritage sites and therefore a lack of activities to protect them and appreciate their significance was noted as a potential threat to the ongoing value they could offer to the community in the form of understanding the history and development of the area.

### 3.3. Recommendations

The following table of recommendations has been derived from recommendation made in the Biodiversity and Geomorphology Assessments, information drawn from existing resources listed in the reference section of this plan, technical advice from experts in the relevant fields and local input from people within the Splitters Creek catchment community. They occur here in no particular order of priority. The list of recommendations may be used as a starting point to provide direction for actions within the catchment. Some recommendations are explored in more detail in the Biodiversity and Geomorphology Assessments. Where this is the case they have been listed in the information sources column of the table along with other potential local resources.

Recommendations	Support/Advice
<p>Identify indicators of catchment health that are important and establish baseline information at property or sub-catchment scales to monitor the progress of any action taken towards improving those issues.</p> <p>Useful short term baseline information which would assist in assessing changes in catchment health include:</p> <ul style="list-style-type: none"> <li>• Vegetation assessments of areas identified as assets to record current condition and measure changes in condition</li> <li>• Wildlife surveys</li> <li>• Water quality monitoring of key sites on streams</li> <li>• Basic soil tests on agricultural areas to assist landholders monitor soil health factors such as acidity</li> <li>• Baseline pest plant and animal populations to record the effectiveness of control measures</li> </ul>	<p>Murray CMA, Livestock Health &amp; Pest Authority, NSW Department of Primary Industry</p>
<p>Develop a noxious and environmental weed control program. Undertake control activities to remove invasive woody weeds from waterways, riparian zones and areas of existing native vegetation.</p> <p>Community members may consider undertaking training in weed identification and control methods, especially where chemical control or mechanical removal is required in sensitive areas.</p>	<p>Michael, D (2009), Albury City Council,</p>
<p>Undertake awareness activities to provide landholders with information on the impact of bush rock removal and firewood collection on native wildlife, in particular 'plate-sized' surface rocks used by the Pink-tailed Legless Lizard.</p>	<p>Murray CMA, OEH, Albury City Council Michael, D (2009)</p>

Recommendations	Support/Advice
<p>Undertake rabbit and other pest animals control activities. Control activities such as poisoning and fumigating should be employed where appropriate to reduce existing populations. Rabbit burrows should be destroyed where possible to make it difficult for them to become established in the area. Rabbit burrows should only be ripped during winter months when pythons are least likely to be sheltering in them. Pythons rely almost entirely on introduced species such as mice and rabbits for food. They also spend time sheltering in rabbit burrows during the summer months and will usually migrate into hilly areas during the winter months, where they shelter in rock crevices or tree hollow and logs.</p>	<p>Murray CMA, Livestock Health &amp; Pest Authority Michael, D (2009)</p>
<p>Where possible encourage removal of barbed-wire from fencing to reduce the possibility of species like gliders, kangaroos and birds becoming entangled. Glider flight paths along the creek typically span 40 m - 60 m and contain areas with large, hollow-bearing trees, wattle species and introduced native species such as Spotted Gum, Yellow-scented Gum and Ribbon Gum.</p> <p>Barbed-wire fencing that bisects these types of habitat should be immediately covered with plastic poly-pipe. Install nest boxes, specifically designed for gliders, along Splitters Creek to compensate for lack of den sites due to low numbers of hollow bearing trees in this area.</p>	<p>Michael, D (2009) Murray CMA Thurgoona TAFE</p>
<p>Maintain a check on localised head ward erosion, ensuring rock bars can maintain a relatively stable gradient.</p> <p>Where possible localised active gully erosion should be treated with rock grade control to stabilize the area and prevent further degradation.</p> <p>Revegetation and exclusion of stock from gully lines should be encouraged to slow down water flows through the area, improve sediment retention and protect against new erosion issues occurring.</p>	<p>Sinclair Knight Mertz, (2009), Murray CMA, Land and Property Management Authority</p>
<p>To raise awareness of species that occur in the catchment encourage landholders to report sightings of native species, particularly gliders and Carpet Pythons to the NSW Office of Environment and Heritage (OEH) or Murray CMA. Increased awareness can lead to improved appreciation for the species and enable beneficial actions to be more effectively targeted and carried out.</p>	<p>Murray CMA OEH</p>

Recommendations	Support/Advice
<p>Encourage responsible pet ownership and conduct education campaign to encourage landholders to keep cats indoors at night. This can reduce predation on native wildlife and allow population numbers to increase or re-establish in the area.</p>	<p>Albury City Council</p>
<p>Where possible fence both sides of creeks and waterways to allow for revegetation and to provide control for stock access. Allow only short-term light grazing for fuel reduction and weed control purposes.</p> <p>Revegetate cleared sections of the creek with local native plant species to increase connectivity and restore a range of feeding and nesting habitats for birds, reptiles and small mammals. Revegetate the understorey with local species such as Bursaria, Kangaroo Thorn and Golden Wattle to improve structure and habitat value.</p> <p>In addition to improving biodiversity values, revegetating riparian areas will assist to protect stream banks from erosion and act as a filter to intercept sediment, nutrients and chemicals which may be washed from adjoining areas.</p>	<p>Landcare Murray CMA Michael, D (2009)</p>
<p>Encourage revegetation of the upper hill slopes using native species to protect them from erosion, soil creep, landslides and improve the visual aspect of the valley.</p> <p>Investigate options to encourage landholders generally to undertake revegetation on cleared land throughout the catchment to enhance a wide range of biodiversity, erosion and aesthetic values.</p>	<p>Landcare Murray CMA</p>
<p>Careful consideration should be given to the need for the establishment of new dams in the catchment and where possible additional dams should be avoided to maintain and improve flows in the creeks.</p> <p>Improved flows in the creek can also be achieved through modifying dam capacity via installation of trickle pipes or modification to spillway levels. If alterations or repairs to existing dams need to be made, these factors should be considered where possible.</p> <p>Consideration should be given to the removal or decommissioning of dams where they have become redundant but only after technical advice as to potential erosion control benefit has been sought.</p>	<p>NSW Office of Water, OEH, Land and Property Management Authority Albury City Council, Sinclair Knight Mertz, (2009).</p>

Recommendations	Support/Advice
<p>Encourage the installation of road signage along the Riverina Highway depicting this area as a wildlife crossing and consider a campaign to emphasise awareness of the damage to wildlife through road kills in the area.</p>	<p>Albury City Council Road Traffic Authority Michael, D (2009)</p>
<p>Where further development is to occur in this catchment, measures should be undertaken to protect the streamside zone, and improve vegetation to preserve the health of the waterways. Consideration should be given to including vegetated buffer zones when into any development proposal.</p>	<p>Sinclair Knight Mertz, (2009), Albury City Council</p>
<p>Fence off the Ironbark stand and monitor seedling recruitment. Encourage management of areas containing mining sites does not include high impact activities such as excavation.</p>	<p>Landcare, Murray CMA</p>
<p>Limit the construction of track and fire trails in vegetated parts of the hills and ensure adequate erosion and sediment controls are installed for any existing tracks.</p> <p>There is potential to improve public access, directing the public to those zones less vulnerable to public access (i.e. bushwalking, bikes, trail bikes, horses etc). Formalise access tracks to less vulnerable zones so traffic is appropriately catered for and that impacts can be controlled. Encourage landholders to report illegal off-road bike activity.</p>	<p>Albury City Council Land and Property Management Authority</p>
<p>Landholders should be encouraged to undertake responsible land management to ensure that activities undertaken on their parcel of land do not have negative impacts on other areas within the catchment. Landholders capacity to manage their land responsibly can be increased through awareness raising and training activities.</p> <p>Appropriate topics include:</p> <ul style="list-style-type: none"> <li>• Animal health and appropriate stocking rates</li> <li>• Appropriate use of fertiliser and soil amendments to address issues such as plant health and soil acidity</li> <li>• Pest plant and animal control</li> <li>• Maintenance of ground cover for soil health and erosion prevention</li> </ul>	<p>Murray CMA, Livestock Health &amp; Pest Authority, NSW Department of Primary Industry</p>
<p>Ensure that dead, hollow-bearing trees are left standing as they will continue to provide important den-sites for Squirrel Gliders and other hollow-dependant fauna.</p>	<p>Murray CMA, OEH</p>

## 4. Contacts for Advice and Funding

For advice on	Organisation to Contact	Contact Details
Funding for local and community based projects.	Murray Catchment Management Authority <a href="http://www.murray.cma.nsw.gov.au">www.murray.cma.nsw.gov.au</a>	(02) 6051 2200
On-ground works for: <ul style="list-style-type: none"> <li>• Native vegetation protection and improvement</li> <li>• Pest and weed control</li> <li>• Soil health</li> <li>• Biodiversity conservation.</li> </ul>	NSW Environmental Trust <a href="http://www.environmentaltrust.nsw.gov.au">www.environmentaltrust.nsw.gov.au</a>  Caring for our Country (C4OC) <a href="http://www.nrm.gov.au">www.nrm.gov.au</a>	(02) 8837 6093
Controlled burns and fire ban information	NSW Rural Fire Service <a href="http://www.rfs.nsw.gov.au">www.rfs.nsw.gov.au</a>	Splitters Ck Fire brigade
Soil conservation earthworks	Land and Property Management Authority <a href="http://www.lpma.nsw.gov.au">www.lpma.nsw.gov.au</a>	Henty (02) 6929 3170
Revegetation programs	Greening Australia <a href="http://www.greeningaustralia.org.au">www.greeningaustralia.org.au</a>	
Local conservation and rehabilitation projects	Landcare <a href="http://www.landcareonline.com.au">www.landcareonline.com.au</a>	
Planning policies, Building applications, Weed and pest control, Vegetation removal	Albury City Council <a href="http://www.alburycity.nsw.gov.au">www.alburycity.nsw.gov.au</a>	02 6023 8111
Protection of native vegetation - state parks	NSW Forestry <a href="http://www.dpi.nsw.gov.au/forests">www.dpi.nsw.gov.au/forests</a>  NSW National Parks and Wildlife Service <a href="http://www.nationalparks.nsw.gov.au">www.nationalparks.nsw.gov.au</a>	
Biodiversity conservation programs	Nature Conservation Council <a href="http://www.nccnsw.org.au">www.nccnsw.org.au</a>	Sydney (02) 9279 2466
Livestock management	NSW DPI Agriculture <a href="http://www.dpi.nsw.gov.au/agriculture">www.dpi.nsw.gov.au/agriculture</a>	Albury (02) 6051 7700
Fishing permits, Recovery programs for native fish	NSW DPI Fisheries <a href="http://www.dpi.nsw.gov.au/fisheries">www.dpi.nsw.gov.au/fisheries</a>	Albury (02) 6042 4200
Feral animal control	Livestock Health & Pest Authority <a href="http://www.lhpa.org.au">www.lhpa.org.au</a>	Albury (02) 6040 4210
Location of underground cables and utilities	Dial Before You Dig <a href="http://1100.com.au">1100.com.au</a>	
Training	Farm Ready <a href="http://www.farmready.gov.au">www.farmready.gov.au</a>	
Threatened species	NSW Department of Environment & Heritage <a href="http://www.threatenedspecies.environment.nsw.gov.au">www.threatenedspecies.environment.nsw.gov.au</a>	



## **The Murray Catchment Management Authority**

The Murray Catchment Management Authority's key role and responsibilities are to:

- provide for natural resource planning at a catchment level
- ensure that decisions about natural resources take into account appropriate catchment issues
- take into account State-wide standards
- involve communities in each catchment in decision making and to make best use of catchment knowledge and expertise
- ensure the proper management of natural resources in the social, economic and environmental interests of the State
- apply sound scientific knowledge to achieve a fully functioning and productive landscape
- provide a framework for financial assistance and incentives to landholders in connection with natural resource management.

## **Albury City Council**

In NSW development and zoning issues are Local Governments responsibility with planning and development control for their council areas. Zoning and rezoning matters are for council to determine in consultation with the community. Rezoning decisions are also subject to a final decision by the Minister for Planning, on the recommendation of the Department of Planning. Further information is available from the Department of Planning.

Due to the alteration of municipal boundaries in 2004 and the current NSW planning reforms, a new LEP has been prepared for Albury City. The LEP delivers planning controls and zonings that protect natural assets, built and natural heritage, future growth corridors and opportunities for industry, residential and commercial development. The structure and content of the LEP is based on the Land Use Strategy. The LEP basically determines where the different land use zones are located within the municipality and provides broad objectives for these and what type of activities are suitable for each zone.

## NSW Fire Service

Fire protection in NSW remains the landholder's responsibility. Support is offered by the local Rural Fire Service to identify the best fire protection strategies for individual properties and circumstances. While there are elements of bush fire that cannot be controlled, like the weather, there is a wide range of planning and preparation activities that can be undertaken to dramatically increase the chances of survival in the event of a bush fire, including the maintenance of adequate levels of insurance.

*Prepare. Act. Survive* publications may be found at the web address <http://www.rfs.nsw.gov.au>.

The Rural Fires Act (1997) provides for:

- the prevention, mitigation and suppression of bush and other fires in local government areas (or parts of areas) and other parts of the State constituted as rural fire districts
- the co-ordination of bush fire fighting and bush fire prevention throughout the State
- the protection of persons from injury or death, and property from damage, arising from fires
- the protection of the environment by requiring certain activities to be carried out having regard to the principles of ecologically sustainable development listed in section 6 (2) of the *Protection of the Environment Administration Act 1991*.

## 5. Useful References

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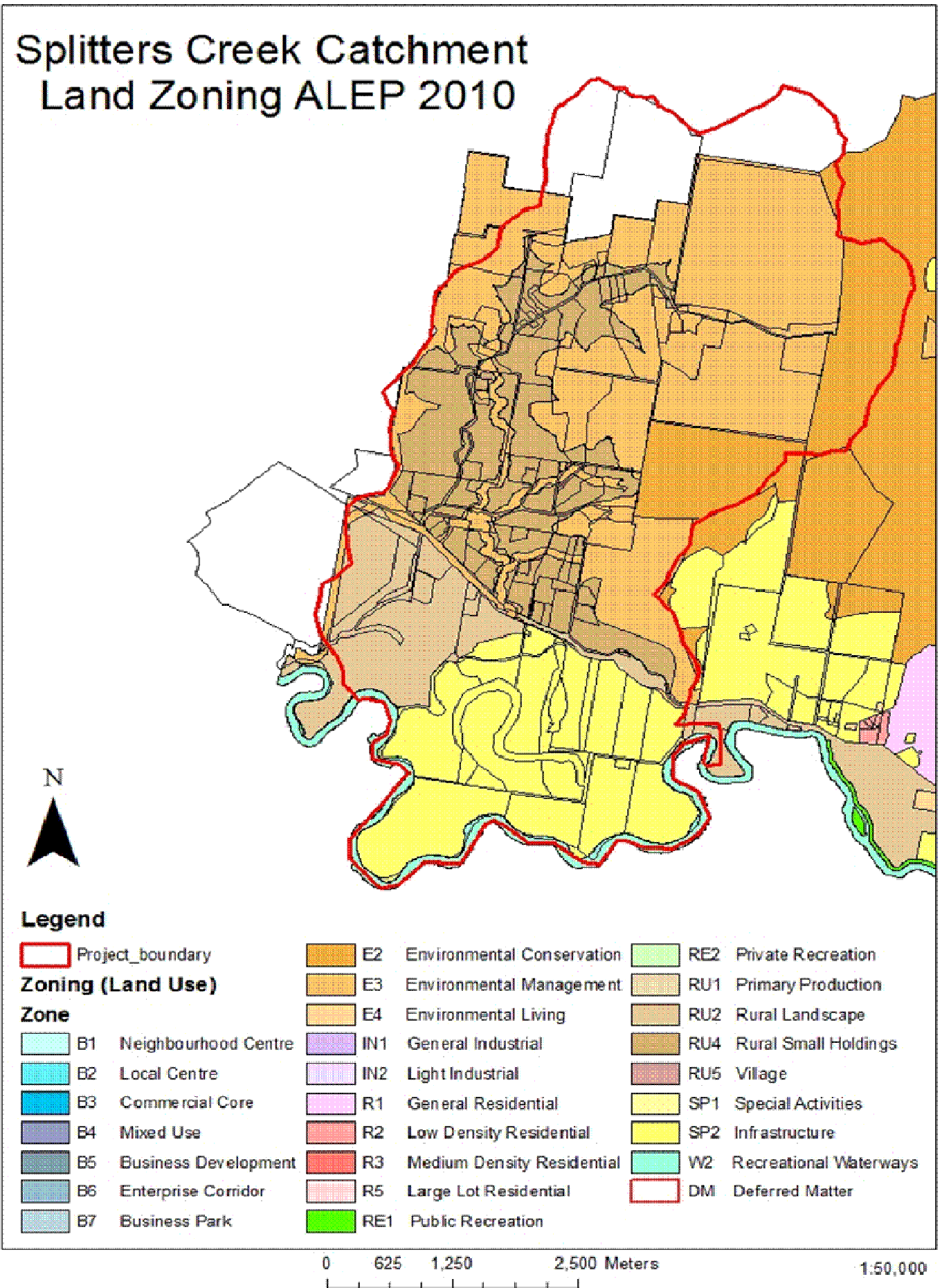
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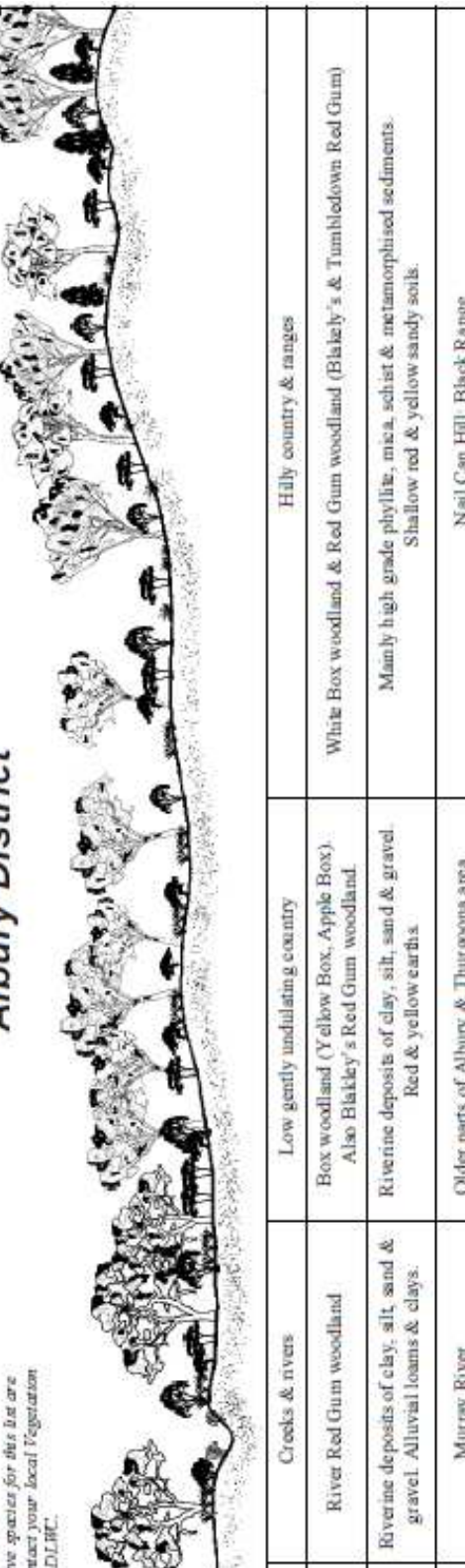
# Appendix 1 - Splitters Creek Catchment Land Zoning



# Appendix 2 - Splitters Creek Native Vegetation Profile

(an excerpt from the South West Slopes Revegetation Guide

www.murray.cma.nsw.gov.au/swsrguide).

General Native Vegetation Profile: Albury District			
LANDFORM	Creeks & rivers	Low gently undulating country	Hilly country & ranges
<b>VEGETATION TYPE</b>	River Red Gum woodland	Box woodland (Yellow Box, Apple Box). Also Blakely's Red Gum woodland	White Box woodland & Red Gum woodland (Blakely's & Tumbledown Red Gum)
<b>GEOLOGY &amp; SOILS</b>	Riverine deposits of clay, silt, sand & gravel. Alluvial loams & clays.	Riverine deposits of clay, silt, sand & gravel. Red & yellow earths.	Mainly high grade phyllite, mica, schist & metamorphosed sediments. Shallow red & yellow sandy soils.
<b>LOCATION EXAMPLE</b>	Murray River	Older parts of Albury & Thurgoona area	Nail Can Hill, Black Range
<b>TREES &gt; 8 m</b>	<i>Acacia dealbata</i> <i>Eucalyptus comulidensis</i> Silver Wattle River Red Gum	<i>Acacia dealbata</i> <i>Brachycthon populneus</i> <i>Callitris glaucophylla</i> <i>Eucalyptus albens</i> <i>E. blakelyi</i> <i>E. bradburiana</i> <i>E. melliodora</i> <i>E. polyanthemus</i> Silver Wattle Kurrajong White Cypress Pine White Box Blakely's Red Gum Apple Box Yellow Box Red Box	<i>Acacia dealbata</i> <i>A. implexa</i> <i>Allocasuarina verticillata</i> <i>Brachycthon populneus</i> <i>Callitris glaucophylla</i> <i>Eucalyptus albens</i> <i>E. blakelyi</i> * mainly lower slopes <i>Acacia gurnu</i> <i>A. parviflora</i> <i>A. rubida</i> <i>A. verticifolia</i> <i>Bursaria spinosa</i> <i>Correa reflexa</i> var. <i>reflexa</i> <i>Davsonia lasiophylla</i> <i>Dalrymplea retorta</i> spp. complex <i>Dodonaea viscosa</i> subsp. <i>angustissima</i> <i>Dumetia</i> spp. <i>Dumetia revoluta</i> <i>Duchopogon strictus</i> <i>Dalrymplea sericea</i> <i>Gompholobium laevis</i> <i>Glycyne elandantina</i> <i>G. tinctoria</i> <i>Hardenbergia violacea</i> <i>Hibbertia obtusifolia</i> <i>H. sparsa</i> Silver Wattle Kurrajong White Cypress Pine White Box Blakely's Red Gum Apple Box Yellow Box Red Box Apple Box Tumbledown Gum Long-leaf Box Red Stringbark Yellow Box Red Box Naive Cherry * mainly N-NW aspect + mainly S-SE aspect
<b>SHRUBS 1.5 - 8 m</b>	<i>Bursaria spinosa</i> <i>Callistemon corymbosus</i> <i>Hymenocallis densata</i> <i>Leptopogon obovatum</i> Sweet Bursaria River Bottlebrush Tree Violet River Tea-tree	<i>Acacia gemmifolia</i> <i>A. gurnu</i> <i>Acacia parviflora</i> <i>A. rubida</i> <i>A. verticifolia</i> <i>Bursaria spinosa</i> <i>Dodonaea viscosa</i> subsp. <i>angustissima</i> <i>Grevillea alpina</i> <i>G. lanigera</i> + <i>Leptopogon</i> continentale Spreading Wattle Ploughshare Wattle Kangaroo Thorn Red-stemmed Wattle Varnish Wattle Sweet Bursaria Narrow-leaf Hop-bush Cat's Claws Woolly Grevillea Prickly Tea-tree	<i>Acacia gurnu</i> <i>A. parviflora</i> <i>A. rubida</i> <i>A. verticifolia</i> <i>Bursaria spinosa</i> <i>Correa reflexa</i> var. <i>reflexa</i> <i>Davsonia lasiophylla</i> <i>Dalrymplea retorta</i> spp. complex <i>Dodonaea viscosa</i> subsp. <i>angustissima</i> Ploughshare Wattle Kangaroo Thorn Red-stemmed Wattle Varnish Wattle Sweet Bursaria Common Correa Hop Bitteroon Small-leaf Parrot pea Narrow-leaf Hop-bush Cat's Claws Woolly Grevillea Tick Indigo Austral Indigo Handsome Flat-pea Bush-pea Twiggy Bush-pea
<b>GROUND COVERS</b>	<i>Carex breviculmis</i> <i>C. tereticaulis</i> <i>Juncus</i> spp. <i>Microcladia apoides</i> <i>Phragmites australis</i> <i>Poa labillardieri</i> <i>Typha</i> spp. Sedge Sedge Rush Weeping Grass Common Reed Tussock Grass Cumbungi	<i>Arthropogon muris</i> <i>Austropanax</i> spp. <i>Brachyotum diphyoides</i> <i>Burmannia australis</i> <i>Bulbine bulbosa</i> <i>Burchardia umbellata</i> <i>Carex</i> spp. <i>Chryscephalum apiculatum</i> Small Vanilla-lily Spear Grass Daphne Heath Sticky Everlasting Blue Pincushion Bulbine Lily Milkmaids Sedge Yellow Buttons	<i>Florea laevis</i> <i>Leucopogon virgatus</i> <i>Leucanthes</i> spp. <i>Metelopus arcolobus</i> <i>Microcladia apoides</i> <i>Pycnela lanifolia</i> <i>Poa</i> spp. <i>Themada straminea</i> <i>Wahlenbergia</i> spp. <i>Warmbeia stricta</i> Common Hoovea Common Beard-heath Mat-rush Um Heath Weeping Grass Slender Rice-flower Tussock Grass Kangaroo Grass Blakely Early Nancy

Note: For general re-planting (creekbanks, unbrushed etc.), select 50% trees and at least 50% shrubs. If enhancing sites with remnant trees, select shrubs only and allow trees to regenerate. Additions of locally native species for this list are gratefully accepted. Contact your local Vegetation Management Officer at DLWC.

# Glossary

***Biodiversity:*** the diversity and variability amongst living things. It is the sum of species, ecosystems and genetic diversity.

***Catchment:*** an area of land, bound by hills or mountains from which all runoff water flows to a common low point. (Sydney Metropolitan Catchment Management Authority, 2011).

***Geomorphology:*** the study of landforms, their origin and evolution, the investigation of relationships between landform development and processes that shape and configure these landforms such as tectonic movement, volcanism, erosion and deposition cycles (Victorian Department of Primary Industries, 2011).

***Invertebrate:*** animals without a backbone such as spiders, insects, worms, snails and slugs.

***Provenance:*** used to describe something's origin or source. This term is also broadened to describe the patterns of variation exhibited by a species over its range reflecting its evolutionary history (The Regional Institute Ltd, 2011).

***Riparian:*** an area of land next to rivers, creeks or streams, including the land surrounding gullies and drainage lines.

***Topography:*** refers to the characteristics of the land in terms of slope, elevation and orientation.

## ***Bungowannah—Splitters Creek Landcare Group***

The Bungowannah—Splitters Creek Landcare Group can be contacted via:

[www.splitterscreek.net.au](http://www.splitterscreek.net.au)

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