
9. Appendices

Appendix I

Biomass calculations

Biomass calculations are based on the following:

Weight of soil in 1 hectare (10 cm deep)

1 hectare of soil (10 cm deep) = $10^4 \text{ cm} \times 10^4 \text{ cm} \times 10 \text{ cm} = 10^9 \text{ cm}^3$

Assuming a bulk density = 1 g/cm^3

Weight of soil in 1 hectare (10 cm deep) = 10^9 g

Assumptions

Average weight of dairy cows = $\sim 500 \text{ kg}$

Average stocking rates = 2 cows/ha or 1000 kg or 1 T/ha

Weight of bacteria

Soil bacterial numbers = $10^6 - 10^9 \text{ cells/gm soil}$.

Soil bacterial numbers in 1 hectare of soil = $10^{15} - 10^{18} \text{ cells/ha}$

Average bacterial weights = $1 \times 10^{-12} \text{ g/cell}$

Soil bacterial weights in 1 hectare (10 cm deep) soil = $10^3 - 10^6 \text{ g/ha}$
= $1 - 1000 \text{ kg/ha}$

Weight of earthworms

Average earthworm biomass = $140.385 \text{ g/m}^2 \text{ soil (to 20 cm deep)}$
or $70.2 \text{ g/m}^2 \text{ soil (to 10 cm deep)}$

1 hectare of soil = $100 \text{ m} \times 100 \text{ m} = 10^4 \text{ m}^2$

Earthworm biomass in 1 hectare of soil (10 cm deep) = $70.2 * 10^4 \text{ g}$
= 702 kg

Appendix II

Case-study catchment flora and fauna species lists

1. List of flora species in the Bear Creek Catchment
2. List of fauna species in the Bear Creek Catchment
3. List of flora species in the Coorimungle Creek Catchment
4. List of fauna species in the Coorimungle Creek Catchment

1. Flora species recorded in the Bear Creek Catchment using the catchment-based search (*Introduced species)

Botanic name	Common name
<i>Critesion murinum ssp. Glaucum*</i>	Blue Barley-grass
<i>Ilex aquifolium*</i>	Holly
<i>Carduus pycnocephalus*</i>	Slender Thistle
<i>Senecio jacobaea*</i>	Ragwort
<i>Orobanche minor*</i>	Lesser Broomrape
<i>Aphanes arvensis*</i>	Parsley Piert

2. Fauna species recorded in the Bear Creek Catchment using the catchment-based search.

Scientific name	Common name
<i>Phascolarctos cinereus</i>	Koala
<i>Tadorna tadornoides</i>	Australian Shelduck
<i>Chenonetta jubata</i>	Australian Wood Duck
<i>Anas castanea</i>	Chestnut Teal
<i>Aythya australis</i>	Hardhead
<i>Anas superciliosa</i>	Pacific Black Duck
<i>Egretta novaehollandiae</i>	White-faced Heron
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo
<i>Vanellus miles</i>	Masked Lapwing
<i>Corvus coronoides</i>	Australian Raven
<i>Rhipidura fuliginosa</i>	Grey Fantail
<i>Carduelis chloris</i>	European Greenfinch
<i>Dacelo novaeguineae</i>	Laughing Kookaburra
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Malurus cyaneus</i>	Superb Fairy-wren
<i>Phylidonyris pyrrhoptera</i>	Crescent Honeyeater
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater
<i>Turdus merula</i>	Common Blackbird
<i>Colluricincla harmonica</i>	Grey Shrike-thrush
<i>Acanthiza pusilla</i>	Brown Thornbill
<i>Acanthiza lineata</i>	Striated Thornbill
<i>Sericornis frontalis</i>	White-browed Scrubwren
<i>Passer montanus</i>	Eurasian Tree Sparrow
<i>Neochmia temporalis</i>	Red-browed Finch
<i>Pelecanus conspicillatus</i>	Australian Pelican
<i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe
<i>Platycercus elegans</i>	Crimson Rosella
<i>Gallinula tenebrosa</i>	Dusky Moorhen
<i>Fulica atra</i>	Eurasian Coot
<i>Threskiornis molucca</i>	Australian White Ibis
<i>Zosterops lateralis</i>	Silvereye
<i>Nannoperca australis</i>	Southern Pigmy Perch
<i>Megascolides australis</i>	Giant Gippsland Earthworm
<i>Euastacus kershawi</i>	Gippsland Spiny Cray

3. Flora species recorded in the Cooriemungle Creek Catchment using the catchment-based search.

Botanic name	Common name
<i>Acacia dealbata</i>	Silver Wattle
<i>Acacia longifolia</i> ssp. <i>longifolia</i>	Sallow Wattle
<i>Acacia melanoxylon</i>	Blackwood
<i>Acacia obliquinervia</i>	Mountain Hickory Wattle
<i>Acacia pravissima</i>	Ovens Wattle
<i>Acaena agnipila</i>	Hairy Sheep's Burr
<i>Acaena novae-zelandiae</i>	Bidgee-widgee
<i>Acetosella vulgaris</i>	Sheep Sorrel
<i>Aira cupaniana</i>	Quicksilver Grass
<i>Ajuga australis</i>	Austral Bugle
<i>Ammannia multiflora</i>	Jerry-jerry
<i>Anagallis arvensis</i>	Pimpernel
<i>Arthropodium milleflorum</i> s.l.	Pale Vanilla-lily
<i>Asperula conferta</i>	Common Woodruff
<i>Asplenium bulbiferum</i> ssp. <i>gracillimum</i>	Mother Spleenwort
<i>Asplenium flabellifolium</i>	Necklace Fern
<i>Australina pusilla</i> ssp. <i>muelleri</i>	Shade Nettle
<i>Bedfordia arborescens</i>	Blanket-leaf
<i>Bergia trimeria</i>	Small Water-fire
<i>Billardiera longiflora</i> var. <i>longiflora</i>	Purple Apple-berry
<i>Billardiera scandens</i>	Common Apple-berry
<i>Blechnum chambersii</i>	Lance Water-fern
<i>Blechnum minus</i>	Soft Water-fern
<i>Blechnum nudum</i>	Fishbone Water-fern
<i>Blechnum patersonii</i> ssp. <i>patersonii</i>	Strap Water-fern
<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	Soft Brome
<i>Callitriche stagnalis</i>	Common Starwort
<i>Cardamine</i> spp.	Bitter Cress
<i>Carex appressa</i>	Tall Sedge
<i>Cassinia aculeata</i>	Common Cassinia
<i>Cassinia longifolia</i>	Shiny Cassinia
<i>Cassytha melantha</i>	Coarse Dodder-laurel
<i>Centaurium erythraea</i>	Common Centaury
<i>Cerastium glomeratum</i> s.l.	Common Mouse-ear Chickweed
<i>Chiloglottis gunnii</i> s.l.	Common Bird-orchid
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Cirsium vulgare</i>	Spear Thistle
<i>Clematis aristata</i>	Mountain Clematis
<i>Conyza bonariensis</i>	Flaxleaf Fleabane
<i>Coprosma hirtella</i>	Rough Coprosma
<i>Coprosma quadrifida</i>	Prickly Currant-bush
<i>Correa lawrenceana</i>	Mountain Correa
<i>Craspedia glauca</i> spp. <i>agg.</i>	Common Billy-buttons
<i>Cullen tenax</i>	Tough Scurf-pea
<i>Cymbonotus preissianus</i>	Austral Bear's-ear
<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue
<i>Cyperus lucidus</i>	Leafy Flat-sedge
<i>Daucus glochidiatus</i>	Australian Carrot
<i>Daviesia latifolia</i>	Hop Bitter-pea
<i>Daviesia ulicifolia</i>	Gorse Bitter-pea
<i>Derwentia derwentiana</i>	Derwent Speedwell
<i>Desmodium gunnii</i>	Southern Tick-trefoil
<i>Deyeuxia frigida</i>	Forest Bent-grass
<i>Deyeuxia scaberula</i>	Rough Bent-grass
<i>Dianella tasmanica</i>	Tasman Flax-lily
<i>Dicksonia antarctica</i>	Soft Tree-fern
<i>Dipodium punctatum</i> s.l.	Hyacinth Orchid
<i>Echinopogon ovatus</i>	Common Hedgehog-grass
<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	Grey Willow-herb
<i>Eragrostis brownii</i>	Common Love-grass
<i>Eucalyptus camphora</i> ssp. <i>humeana</i>	Mountain Swamp-gum

<i>Eucalyptus chapmaniana</i>	Bogong Gum
<i>Eucalyptus delegatensis</i> ssp. <i>delegatensis</i>	Alpine Ash
<i>Eucalyptus dives</i>	Broad-leaved Peppermint
<i>Eucalyptus globulus</i>	Southern Blue-gum
<i>Eucalyptus largiflorens</i>	Black Box
<i>Eucalyptus mannifera</i> ssp. <i>mannifera</i>	Brittle Gum
<i>Eucalyptus radiata</i> s.l.	Narrow-leaf Peppermint
<i>Eucalyptus viminalis</i>	Manna Gum
<i>Exocarpos cupressiformis</i>	Cherry Ballart
<i>Exocarpos strictus</i>	Pale-fruit Ballart
<i>Galium migrans</i>	Wandering Bedstraw
<i>Galium propinquum</i>	Maori Bedstraw
<i>Geranium solanderi</i> s.l.	Austral Cranesbill
<i>Glycine clandestina</i>	Twining Glycine
<i>Gonocarpus micranthus</i> ssp. <i>micranthus</i>	Creeping Raspwort
<i>Gonocarpus tetragynus</i>	Common Raspwort
<i>Hedycarya angustifolia</i>	Austral Mulberry
<i>Helichrysum rutidolepis</i> s.l.	Pale Everlasting
<i>Hibbertia obtusifolia</i>	Grey Guinea-flower
<i>Holcus lanatus</i>	Yorkshire Fog
<i>Hydrocotyle hirta</i>	Hairy Pennywort
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
<i>Hypericum gramineum</i>	Small St John's Wort
<i>Hypericum perforatum</i>	St John's Wort
<i>Hypochoeris radicata</i>	Cat's Ear
<i>Joycea pallida</i>	Silvertop Wallaby-grass
<i>Juncus alexandri</i> ssp. <i>alexandri</i>	Mountain Rush
<i>Juncus amabilis</i>	Hollow Rush
<i>Juncus bufonius</i>	Toad Rush
<i>Juncus gregiflorus</i>	Green Rush
<i>Juncus tenuis</i>	Slender Rush
<i>Lagenophora stipitata</i>	Common Bottle-daisy
<i>Leptinella filicula</i>	Mountain Cotula
<i>Leptospermum grandifolium</i>	Mountain Tea-tree
<i>Leucopogon hookeri</i>	Mountain Beard-heath
<i>Lobelia gibbosa</i> s.l.	Tall Lobelia
<i>Lomandra filiformis</i>	Wattle Mat-rush
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
<i>Lomatia fraseri</i>	Tree Lomatia
<i>Lomatia ilicifolia</i>	Holly Lomatia
<i>Luzula meridionalis</i>	Common Woodrush
<i>Mentha laxiflora</i>	Forest Mint
<i>Mentha pulegium</i>	Pennyroyal
<i>Mimulus moschatus</i>	Musk Monkey-flower
<i>Myosotis australis</i>	Austral Forget-me-not
<i>Myosotis exarrhena</i>	Sweet Forget-me-not
<i>Navarretia squarrosa</i>	Californian Stinkweed
<i>Notelaea ligustrina</i>	Privet Mock-olive
<i>Olearia argophylla</i>	Musk Daisy-bush
<i>Olearia erubescens</i>	Moth Daisy-bush
<i>Olearia phlogopappa</i>	Dusty Daisy-bush
<i>Parentucellia latifolia</i>	Red Bartsia
<i>Paspalum dilatatum</i>	Paspalum
<i>Persoonia confertiflora</i>	Cluster-flower Geebung
<i>Picris angustifolia</i>	Native Picris
<i>Pimelea axiflora</i>	Bootlace Bush
<i>Pittosporum bicolor</i>	Banyalla
<i>Plantago lanceolata</i>	Ribwort
<i>Platylobium formosum</i>	Handsome Flat-pea
<i>Poa annua</i>	Annual Meadow-grass
<i>Poa helmsii</i>	Tall Mountain Tussock-grass
<i>Poa sieberiana</i>	Grey Tussock-grass
<i>Polyscias sambucifolia</i>	Elderberry Panax

<i>Polystichum proliferum</i>	Mother Shield-fern
<i>Pomaderris aspera</i>	Hazel Pomaderris
<i>Poranthera microphylla</i>	Small Poranthera
<i>Prostanthera lasianthos</i>	Victorian Christmas-bush
<i>Prunella vulgaris</i>	Self-heal
<i>Pteridium esculentum</i>	Austral Bracken
<i>Pultenaea juniperina s.l.</i>	Prickly Bush-pea
<i>Ranunculus lappaceus</i>	Australian Buttercup
<i>Ranunculus scapiger</i>	Hairy Buttercup
<i>Ranunculus sessiliflorus</i>	Annual Buttercup
<i>Rosa rubiginosa</i>	Sweet Briar
<i>Rubus parvifolius</i>	Small-leaf Bramble
<i>Rubus spp.</i>	Bramble
<i>Schoenus maschalinus</i>	Leafy Bog-sedge
<i>Senecio glomeratus</i>	Annual Fireweed
<i>Senecio hispidulus</i>	Rough Fireweed
<i>Senecio linearifolius</i>	Fireweed Groundsel
<i>Senecio quadridentatus</i>	Cotton Fireweed
<i>Sonchus asper s.l.</i>	Rough Sow-thistle
<i>Stackhousia monogyna</i>	Creamy Stackhousia
<i>Stegostyla gracilis</i>	Musk Hood
<i>Stellaria pungens</i>	Prickly Starwort
<i>Stylidium graminifolium s.l.</i>	Grass Trigger-plant
<i>Tasmannia lanceolata</i>	Mountain Pepper
<i>Tetradlea ciliata</i>	Pink-bells
<i>Thelymitra media s.l.</i>	Tall Sun-orchid
<i>Thysanotus patersonii</i>	Twining Fringe-lily
<i>Thysanotus tuberosus</i>	Common Fringe-lily
<i>Trifolium campestre var. campestre</i>	Hop Clover
<i>Trifolium repens var. repens</i>	White Clover
<i>Urtica incisa</i>	Scrub Nettle
<i>Veronica notabilis</i>	Forest Speedwell
<i>Viola betonicifolia ssp. betonicifolia</i>	Showy Violet
<i>Viola hederacea sensu Willis</i>	Ivy-leaf Violet
<i>Vulpia bromoides</i>	Squirrel-tail Fescue
<i>Wahlenbergia gracilis s.l.</i>	Sprawling Bluebell
<i>Wahlenbergia multicaulis</i>	Branching Bluebell
<i>Wahlenbergia stricta</i>	Tall Bluebell

4. Fauna species recorded in the Cooriemungle Creek Catchment using the catchment-based search

Scientific name	Common name	Scientific name	Common name
<i>Canis vulpes</i>	Red Fox	<i>Falco berigora</i>	Brown Falcon
<i>Oryctolagus cuniculus</i>	European Rabbit	<i>Dacelo novaeguineae</i>	Laughing Kookaburra
<i>Wallabia bicolor</i>	Black Wallaby	<i>Hirundo neoxena</i>	Welcome Swallow
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	<i>Larus novaehollandiae</i>	Silver Gull
<i>Rattus fuscipes</i>	Bush Rat	<i>Malurus cyaneus</i>	Superb Fairy-wren
<i>Rattus lutreolus</i>	Swamp Rat	<i>Phylidonyris pyrrhoptera</i>	Crescent Honeyeater
<i>Isodon obesulus</i>	Southern Brown Bandicoot	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater
<i>Phascolarctos cinereus</i>	Koala	<i>Turdus merula</i>	Common Blackbird
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	<i>Colluricincla harmonica</i>	Grey Shrike-thrush
<i>Circus approximans</i>	Swamp Harrier	<i>Sericornis frontalis</i>	White-browed Scrubwren
<i>Anas rhynchotis</i>	Australasian Shoveler	<i>Passer domesticus</i>	House Sparrow
<i>Tadorna tadornoides</i>	Australian Shelduck	<i>Phalacrocorax carbo</i>	Great Cormorant
<i>Cygnus atratus</i>	Black Swan	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant
<i>Oxyura australis</i>	Blue-billed Duck	<i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant
<i>Anas gracilis</i>	Grey Teal	<i>Phalacrocorax varius</i>	Pied Cormorant
<i>Aythya australis</i>	Hardhead	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe
<i>Biziura lobata</i>	Musk Duck	<i>Podiceps cristatus</i>	Great Crested Grebe
<i>Anas superciliosa</i>	Pacific Black Duck	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe
<i>Ardea alba</i>	Great Egret	<i>Platycercus elegans</i>	Crimson Rosella
<i>Egretta novaehollandiae</i>	White-faced Heron	<i>Platycercus eximius</i>	Eastern Rosella
<i>Gymnorhina tibicen</i>	Australian Magpie	<i>Fulica atra</i>	Eurasian Coot
<i>Strepera versicolor</i>	Grey Currawong	<i>Porphyrio porphyrio</i>	Purple Swamphen
<i>Strepera graculina</i>	Pied Currawong	<i>Sturnus vulgaris</i>	Common Starling
<i>Cacatua roseicapilla</i>	Galah	<i>Threskiornis molucca</i>	Australian White Ibis
<i>Cacatua tenuirostris</i>	Long-billed Corella	<i>Threskiornis spinicollis</i>	Straw-necked Ibis
<i>Vanellus miles</i>	Masked Lapwing	<i>Notechis scutatus</i>	Tiger Snake
<i>Corvus coronoides</i>	Australian Raven	<i>Litoria ewingii</i>	Southern Brown Tree Frog
<i>Rhipidura fuliginosa</i>	Grey Fantail	<i>Crinia signifera</i>	Common Froglet
<i>Grallina cyanoleuca</i>	Magpie-lark	<i>Geocrinia laevis</i>	Southern Smooth Froglet
<i>Rhipidura leucophrys</i>	Willie Wagtail	<i>Geocrinia victoriana</i>	Victorian Smooth Froglet
<i>Falco longipennis</i>	Australian Hobby		