

## 3.3 State of our Catchment

### DROUGHT & THE 2003 BUSHFIRES

The southern ACT catchment has been affected by drought since at least 2001 through to 2007. After a severe lack of rainfall between May 2002 and May 2004 the ACT was declared as an Exceptional Circumstance (EC) area by the Australian Government in 2004. This status was extended in 2006 and producers in the ACT are eligible for full Australian Government drought assistance until 31st March 2008.

Drought conditions have a severe impact on the environment. Low rainfall in 2002 and 2003 contributed to a reduction of flows in most rivers in the southern ACT catchment and led to a decline in ground cover.

In early January 2003 lightning strikes from a dry thunderstorm created over 150 forest fires across the highlands of the ACT, NSW and Victoria. By the 18th January strong winds and high temperatures caused several of these fires to merge into a huge fire front to the west of the ACT. By mid afternoon the fires had entered the suburbs of Canberra and nearby residences were evacuated. The fires destroyed homes and burnt infrastructure in Chapman, Duffy, Holder, Rivett, Kambah, Torrens, Weston, Curtin and Lyons. Almost 70% of the ACT was severely damaged, 500 homes were destroyed and four people died as a result of the fires. Over 90% of the southern ACT catchment was damaged by the fires.

Environmentally, the severity of the 2003 bushfire in combination with the effects of the on-going drought has resulted in a degraded catchment area. According to the 2003 State of the Environment Report over 840 kilometres of stream banks were changed as a result of fire damage to native and introduced riparian vegetation.

Impacts throughout the catchment included:

- general decline in water health
- reduction of water quantity
- loss of vegetation cover
- soil erosion
- increase in stream temperatures
- increased sediment and nutrient loads in our waterways
- decreased oxygen concentrations
- increase in algae populations
- increased runoff

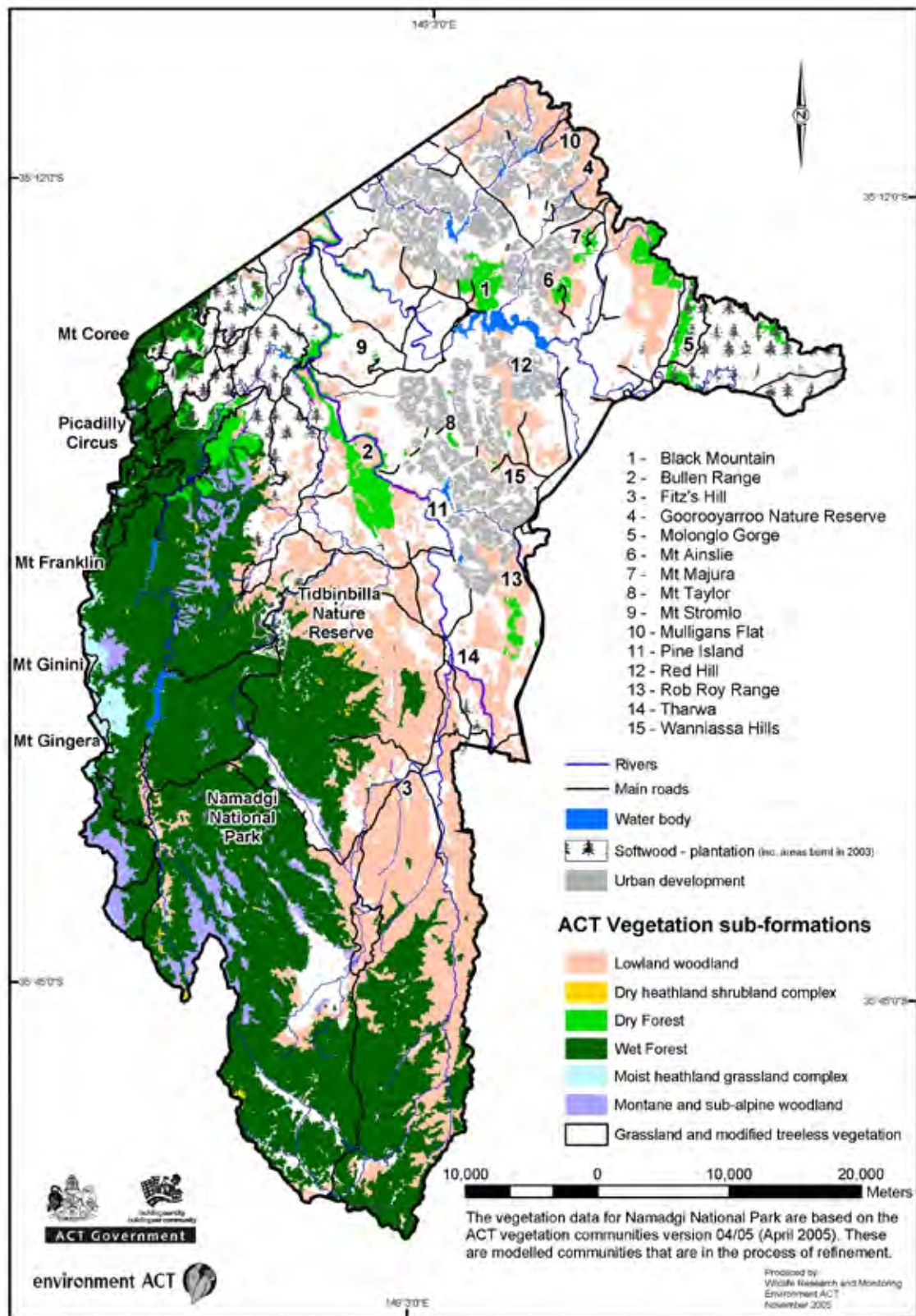
## VEGETATION

Vegetation is a general term that refers to the groundcover provided by plants within a region and is the most abundant biotic element of the biosphere. Vegetation serves several critical functions, including the regulation of numerous biogeochemical cycles (e.g. Water, Carbon, and Nitrogen) that are of great importance in maintaining climatic balances. Vegetation also affects soil characteristics and is a habitat and an energy source for both humans and animals.


The vegetation of the southern ACT catchment area ranges from expanses of natural grasslands in the flatter, colder valley floors bordered by savannah woodlands with Yellow box-Red gum woodlands occurring on the higher slopes. Yellow box-Red gum woodland is listed as endangered and occurs in a relatively narrow band (600–900 m) between the valley floors and merges into highly modified woodlands along the Murrumbidgee (at Lanyon-Lambrigg) and into dry sclerophyll and black cypress forests on the steeper slopes of Namadgi National Park and Tidbinbilla Nature Reserve. From 1100 m upwards into the highlands of Namadgi National Park the vegetation moves to montane and sub-alpine woodlands, complemented by wetlands, sphagnum moss bogs and fens, dry rocky heath communities, sub-alpine heathlands and frost pocket grasslands.



Creek line in Pierces Creek forest after the fire (May 2004)



Map 5



Since European settlement the vegetation in the region has been considerably altered resulting in modified grassland areas and a reduction of tree densities. The planting of exotic species in the suburbs and the introduction of pine plantations has contributed to this change in vegetation. Although there has been a major alteration of natural vegetation within the region, the ecological connectivity is generally good with land only broken by rural roads, the village of Tharwa and small areas of farmland from which trees have been cleared. Once we enter into the urban area the vegetation becomes more highly modified across the nature parks and into the suburbs.

## WATER RESOURCES

Water is an essential chemical component to all known forms of life. It perpetually moves through a cycle of evaporation and precipitation and has many distinct properties that are critical in the replication of life as a solvent, for photosynthesis and respiration and as a habitat for many species.

With the current drought, water has become an important item on the environmental agenda for both conservation and supply. The lakes and rivers within the catchment provide urban and rural water supply, recreation and an outlet for stormwater discharges. They also provide important plant and animal habitat and have aesthetic values for southern ACT residents and visitors.

The southern ACT catchment is a watershed for flows into the Murrumbidgee River. Flows start in the highlands of Namadgi National Park to the south and the west of Canberra and feed into the Murrumbidgee River through several sub-catchments and are formed mainly from melting snow and rainfall. During this process the flows may pass through highly modified urban and rural areas that impact on the quality and quantity of the water through land use, pollutants, extraction and evaporation.

Three out of the four dams and several major river bodies that supply water to the ACT are located within the southern ACT catchment area. The 2003 bushfires had a major impact on, and posed threats to, the water within the catchment area. The fires removed large quantities of vegetation cover in riparian zones exposing streams to increased erosion and sedimentation rates, an increase in water temperatures, higher runoff levels and an increase in nutrients levels. After the fires, water from the Cotter River Catchment was so deteriorated that an upgrade of the existing water treatment plant at Mt Stromlo was required to provide both direct filtration and dissolved air flotation and filtration methods to allow for effective water treatment.

Groundwater is another factor in the management of the ACT's Water resources. An ongoing concern is the lack of data regarding the location, volume and extraction of groundwater in the ACT. Groundwater can be a long term 'reservoir' for water supply as it is naturally replenished by surface water through streams and rivers. Threats to groundwater supply are caused through urban development, over extraction and pollution.

## SOILS

Soil composition is a particularly complex system of colours, textures and structures that influence the many physical aspects of soil behaviour. Soil formation is constantly changing through various processes that can take up to thousands of years to fully develop. The impact of human activity in these processes creates a highly fragile system easily prone to land degradation through acidification, contamination, desertification, erosion and salination.

The soils of the ACT are inherently acidic in most areas and have been described as highly variable and generally infertile.

The principal soils within the southern ACT catchment are lithosols, gradational soils and texture contrast soils.

### Lithosols

Located on the steeper slopes of the south and the west of the ACT and regarded as nutritionally poor. These soils are highly susceptible to erosion with the removal of native vegetation or if they are disturbed by mechanical means.

### Gradational soils

Located on the north-east plains of the ACT these soils are relatively resistant to erosion except in areas of steeper gradients. They are the principal soil types under the Limestone Plains of old Canberra and have a deep and relatively fertile structure that made them highly suitable for early settlement. They are common in the Cotter River catchment in the west of the ACT and are characterised by a gradual increase in clay content with depth.

### Texture contrast (or duplex) soils

These soils dominate the ACT, particularly the urban areas. They are vulnerable to erosion on the slopes in the south of the ACT and in areas of urban development. They are characterised by a distinct change in particle size at a depth of 15-30cm with the topsoil being lighter in colour, coarsely textured and often quite sandy. The subsoils are reddish on the hills and yellow in the valleys, quite clayey and often shrink and swell with water content change, presenting various engineering problems as the surface structure of these soils is fragile so that if cultivated or overgrazed the topsoil becomes relatively impermeable and hard setting. These soils are responsible for the formation of large erosion gullies in Murrumbidgee, Naas and Paddy's river catchments and for high turbidity levels within Canberra's lakes and stormwater drains.

## BIODIVERSITY

Biodiversity or biological diversity refers to the variety of life forms: the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. Biological diversity is usually considered at three different levels:

- Genetic diversity refers to the variety of genetic information contained in all of the individual plants, animals and micro-organisms. Genetic diversity occurs within and between populations of species as well as between species.
- Species diversity refers to the variety of living species.
- Ecosystem diversity relates to the variety of habitats, biotic communities, and ecological processes, as well as the tremendous diversity present within ecosystems in terms of habitat differences and the variety of ecological processes.

Within the southern ACT catchment, Namadgi National Park is of regional significance for comprehensive representation of a diverse range of regional ecological communities within a contiguous area. The communities are predominantly forest-based, the Park being covered substantially by subalpine and montane woodland, interspersed with limited areas of wet sclerophyll forest, redgum/yellow box grassy woodland, and black cypress. These are complemented by wetlands, dry rocky heath communities, alpine and frost pocket grasslands. Over 700 species of indigenous flora and 222 species of vertebrate fauna have been recorded to date with 10 threatened species and over 40 rare or uncommon species, including a range of non-migratory native aquatic species.



Vanilla Lily (*Arthropodium milleflorum*)  
on MtGinini

## THREATENED SPECIES

Threatened species are animals and plant species which are of high conservation value due to declining population numbers making them vulnerable to extinction in the near future. The term threatened is generally used to refer to three categories, critically endangered, endangered and vulnerable. Ensuring the survival of threatened species is an important part in maintaining the functions of ecological systems. In recognising the potential threats for population decline in a specific species we are able to prevent the future decline of other potential threatened species that inhabit similar ecosystems.

The populations of these species are decreasing in number for a variety of reasons including land management practices, introduced species (weeds and pest animals), habitat destruction and pollution.

The Nature Conservation Act 1980 established a process for identifying and protecting threatened species and ecological communities within the ACT. The southern ACT catchment area is home 22 declared threatened species and several threatened ecological communities. The table below lists these threatened species and ecological communities declared through the Nature Conservation Act 1980 and their current category

COMMON NAME	SCIENTIFIC NAME	CATEGORY
A subalpine herb	<i>Gentiana baeuerlenii</i>	endangered
Brindabella Midge Orchid	<i>Corunastylis ectopa</i>	endangered
Brown Treecreeper	<i>Climacteris picumnus</i>	vulnerable
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	endangered
Button Wrinklewort	<i>Rutidosis leptorrhynchoides</i>	endangered
Hooded Robin	<i>Melanodryas cucullata</i>	vulnerable
Macquarie Perch	<i>Macquaria australasica</i>	endangered
Murray River Crayfish	<i>Euastacus armatus</i>	vulnerable
Natural Temperate Grassland	<i>An ecological community</i>	endangered
Northern Corroboree Frog	<i>Pseudophryne pengilleyi</i>	endangered
Painted Honeyeater	<i>Grantiella picta</i>	vulnerable
Silver Perch	<i>Bidyanus bidyanus</i>	endangered
Small Purple Pea	<i>Swainsona recta</i>	endangered
Smoky Mouse	<i>Pseudomys fumeus</i>	endangered
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	vulnerable
Swift Parrot	<i>Lathamus discolor</i>	vulnerable
Trout Cod	<i>Maccullochella macquariensis</i>	endangered
Tuggeranong Lignum	<i>Muehlenbeckia tuggeranong</i>	endangered
Two-spined Blackfish	<i>Gadopsis bispinosus</i>	vulnerable
Varied Sitella	<i>Daphoenositta chrysoptera</i>	vulnerable
White-winged Triller	<i>Lalage sueurii</i>	vulnerable
Yellow Box/Red Gum Grassy Woodland	<i>An ecological community</i>	endangered

Table 6

The following species are recognised by the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as threatened within the ACT region and may extend to areas within the Southern ACT Catchment. It is therefore important to recognise these species within our planning framework to help in their future protection and conservation.

COMMON NAME	SCIENTIFIC NAME	CATEGORY
Australian Painted Snipe	<i>Rostratula australis</i>	vulnerable
Golden Sun Moth	<i>Synemon plana</i>	critically endangered
Grassland Earless Dragon	<i>Tympanocryptis pinguicolla</i>	endangered
Green and Golden Bell Frog	<i>Litoria aurea</i>	vulnerable
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	vulnerable
Murray Cod	<i>Maccullochella peelii peelii</i>	vulnerable
Pink-tailed Worm-lizard	<i>Aprasia parapulchella</i>	vulnerable
Regent Honeyeater	<i>Xanthomyza phrygia</i>	endangered
Striped Legless Lizard	<i>Delma impar</i>	vulnerable
Superb Parrot	<i>Polytelis swainsonii</i>	vulnerable
Yellow-spotted Tree/Bell Frog	<i>Litoria castanea</i>	endangered

Table 7



Egg & Bacon Bush (*Daviesia mimosiodes*)



The Nature Conservation Act 1980 requires the Conservator of Flora and Fauna to prepare an Action Plan in response to each declaration of a threatened species, ecological community or threatening process. An Action Plan outlines conservation and protection proposals for the species or community concerned. A summary of each Action Plan is available as an information sheet for the following:

DECLARED THREATENED SPECIES AND ECOLOGICAL COMMUNITIES IN THE ACT	
A Subalpine Herb ( <i>Gentiana baeuerlenii</i> )	Regent Honeyeater ( <i>Xanthomyza 62uggera</i> )
Brindabella Midge Orchid ( <i>Corunastylis ectopa</i> )	Silver Perch ( <i>Bidyanus bidyanus</i> )
Brown Treecreeper ( <i>Climacteris picumnus</i> )	Small Purple Pea ( <i>Swainsona recta</i> )
Brush-tailed Rock-wallaby ( <i>Petrogale penicillata</i> )	Smoky Mouse ( <i>Pseudomys fumeus</i> )
Button Wrinklewort ( <i>Rutidosia leptorrhynchoides</i> )	Spotted-tailed Quoll ( <i>Dasyurus 62uggerano</i> )
Canberra Spider Orchid ( <i>Arachnorchis actensis</i> )	Striped Legless Lizard ( <i>Delma impar</i> )
Ginninderra Peppergrass ( <i>Lepidium ginninderrense</i> )	Superb Parrot ( <i>Polytelis swainsonii</i> )
Grassland Earless Dragon ( <i>Tympanocryptis pinguicollis</i> )	Swift Parrot ( <i>Lathamus 62uggerano</i> )
Golden Sun Moth ( <i>Synemon plana</i> )	Tarengo Leek Orchid ( <i>Prasophyllum petilum</i> )
Hooded Robin ( <i>Melanodryas cucullata</i> )	Trout Cod ( <i>Maccullochella macquariensis</i> )
Macquarie Perch ( <i>Macquaria australasica</i> )	Tuggeranong Lignum ( <i>Muehlenbeckia 62uggeranong</i> )
Murray River Crayfish ( <i>Euastacus armatus</i> )	Two-spined Blackfish ( <i>Gadopsis bispinosus</i> )
Natural Temperate Grassland	Varied Sitella ( <i>Daphoenositta chrysoptera</i> )
Northern Corroboree Frog ( <i>Pseudophryne pengilleyi</i> )	White-Winged Triller ( <i>Lalage sueurii</i> )
Painted Honeyeater ( <i>Grantiella picta</i> )	Yellow Box-Red Gum Grassy Woodland
Perunga Grasshopper ( <i>Perunga ochracea</i> )	

Table 8

## PEST MANAGEMENT

There are many exotic animal and plant species that have been identified as 'pests' within the southern ACT catchment area. The term pest is most often characterised as an organism (plant or animal) that is regarded as injurious or unwanted most often because it causes damage to its environment. Any type of pest that causes disruption to the balance of the natural ecosystem is considered a threat to our environmental assets. Pest species within the southern ACT catchment area include noxious weeds, feral (and some native animals) and introduced plant species.

Feral dogs, cats, myna birds, the European wasp and foxes are the most identifiable animal pests, especially in the urban catchments. Concerns have been expressed by rural landholders about the numbers of wild dogs and dingoes in the Cotter, Gudgenby,

Paddys, Naas and Tennant sub-catchments. Kangaroos are recognised as a significant issue, especially in the rural areas where large population numbers are of concern to land-managers. The general public have also raised concerns about kangaroos as a motoring hazard in urban areas.

Despite the best efforts of localised re-stocking programs and riverine restoration works, competition from introduced species (such as carp) have caused native fish numbers to decline.

Pest plants or weeds are common through most of the southern ACT catchment area in nature reserves, urban open space, backyard gardens and road verges. The types of weeds present include identified 'Weeds of National Significance', other introduced exotics and Australian native plant species. In the ACT weed management is the responsibility of the land manager (government or private) although interested groups are invited to contribute to developing and participating in weed control programs.

Serrated Tussock, African Lovegrass, Chilean Needle Grass, Broom, Alligator Weed, Willow spp, Blackberry and St John's Wort pose the most significant weed problems in the southern ACT catchment. Garden plants escaping into nearby 'natural' areas are also of concern. The ACT Weeds Working Group in their "Garden Plants Going Bush" pamphlet advise the following garden plants to be avoided:

<b>ENVIRONMENTAL WEEDS FROM GARDEN ESCAPES</b>	
<b>Aquatic Weeds</b>	<b>Shrubs and Trees</b>
Parrots Feather	Cootamundra Wattle
Water Lettuce	Scotch Broom
Salvinia	White Poplar or Cottonwood
Cabomba	False Acacia
Water Hyacinth	Tree of Heaven
Alligator Weed	Montpellier Broom
	Lombardy Poplar
	Willows
	Common or Black Alder
	Privet
	Firethorns
	Box elder
	WA Bluebell Creeper
<b>Creepers and Climbers</b>	<b>Herbs and Grasses</b>
English Ivy	Common Horsetail
Wandering Jew	Pampas Grass
Japanese Honeysuckle	Bamboo
Blue Periwinkle	

Table 9