



BIODIVERSITY

Biodiversity is a measure of the variety within and between all species of plants, animals and micro-organisms and the ecosystems within which they live and interact. Biodiversity enables ecosystems to function and plays a pivotal role in processes that support the provision of direct benefits to humans. For example:

- climate regulation keeps temperature at ranges suitable for humans and provides rainfall for the ACT's water supply
- nutrient cycling supports plant growth and food production
- carbon sequestration and breakdown of chemicals in soils take care of many by-products of human societies.

Measuring biodiversity

Measuring biodiversity is extremely challenging. This is because only a small proportion of total species are known, let alone counted, and because biodiversity can be quantified at many levels from the molecular to the ecosystem. There are several methods to measure components of biodiversity that serve as indicators of how it might be changing. The *ACT State of the Environment Report (SoER) 2015* uses the following indicators:

State and trends

- Extent and abundance of threatened flora and fauna species
- Extent and condition of threatened ecological communities
- Connectivity of threatened terrestrial native vegetation
- Extent and health of protected areas
- Extent and condition of rare and insufficiently known species and ecological communities

Pressures

- Extent and abundance of pest species
- Altered fire regimes
- Direct and indirect environmental offsets



Berried *Euastacus rieki* located in July 2014 in a subalpine bog in Namadgi National Park. This is the first female with eggs ever to be recorded – a tremendous leap towards filling the huge knowledge gaps on this species. Photo: ACT Government

MAIN FINDINGS

State and trends

A significant proportion of the ACT environment – 55.22% of the Territory's total 235 813 hectares is contained in areas permanently designated as either nature reserve or national park. In terms of the National Reserve System, which contains Australia's network of areas protected for conservation, the ACT has the most extensive system of protected areas of any jurisdiction.

Notwithstanding the existence of these protected areas and despite progress in conserving natural resources like land, soil and water, progress in conservation of biodiversity habitats and species



remains a challenge. In addition, pressures leading to habitat loss and modification threaten the ACT's biodiversity.

The extent and condition of threatened flora and fauna species and ecological communities was assessed by the State of the Environment Report as poor with mixed foreseeable prospects of these trends improving. There are currently 16 species listed as vulnerable and 18 listed as endangered under the ACT Nature Conservation Act 2014. A further seven species are listed by the Scientific Committee as rare and six as insufficiently known; these are species for which the Committee has a watching brief.

Notable trends for **vulnerable species** during the reporting period (2011–2015) include a decline in Brown Treecreeper, Glossy Black Cockatoo and Scarlet Robin recordings and an increase in Hooded Robin, Superb Parrot and White-Winged Triller recordings. Surveys of Pink-Tailed Worm Lizard habitat have shown stable populations in Mount Taylor Nature Reserve, Belconnen–Ginninderra Creek, Pialligo and the Molonglo River Corridor. Surveys of Striped Legless Lizard habitat in Crace, Mulangarri and Gungaharra Grassland nature reserves and adjoining open spaces also identified abundant populations. For aquatic species, Murray River Crayfish has low population numbers in the Murrumbidgee River and remains at risk, but Two-Spined Blackfish numbers are improving in the Cotter River Catchment.

For **endangered species**, trends include a decline in Regent Honeyeater, Grassland Earless Dragon and Northern Corroboree Frog recordings. Recordings of Brindabella Midge Orchid, Canberra Spider Orchid and Tarengo Leek Orchid have shown an increase. Surveys of Golden Sun Moth in the ACT show a total of 1800 ha of moth habitat in the ACT; 47% within protected areas, 21% approved or proposed for clearance, and 23% on Commonwealth land.



The Canberra Spider Orchid occurs on Mount Ainslie and Mount Majura and within the Majura Valley. Photo: Ester Beaton, ACT Government



Relatively little is known about the habitat of distribution of the Perunga Grasshopper. Photo: Emma Cook, ACT Government

Box-Gum Woodland and Natural Temperate Grassland are the largest and most significant of the ACT's **threatened ecological communities**. There were some improvements to the extent of these communities over the reporting period. For instance the area of Box-Gum Woodland has increased by 1206 ha since mapping began in 2004. There has also been a general and significant improvement in the condition of these woodlands; 52% of woodlands had moved to the highest condition class with a 20% reduction in woodlands in the lowest condition class. In contrast, Natural Temperate Grassland is degraded, highly fragmented and greatly reduced in area. It is confined to 38 small and isolated patches which are embedded in highly degraded grasslands dominated by weeds. About 1000 ha of these patches is in a more or less natural condition and a further 550 ha in poorer condition.

The **diversity and resilience of ecological communities** relates directly to their spatial configuration, patch size, contiguity (adjacent communities) condition and connectivity. Connectivity conservation seeks to improve wildlife habitat and links across the landscape. The extent and spatial arrangement of habitat and canopy are essential to



understanding wildlife movement, and how connectivity can be protected and most readily restored. In 2012, available vegetation and land-use data and innovative fine-scale modelling techniques and tools were used to model fauna habitat and connectivity values across the ACT. The analysis reveals the parts of the landscape that are key to existing wildlife movement and the areas where functioning connections can be restored with the least effort. It also highlights areas of key habitat or linkage value that need special consideration. The data can be applied to restoration and development efforts and conservation assessment such as in the Majura Valley and Gungahlin.

The Scientific Committee included the Crested Shrike-Tit in the **rare species** working category given that it is becoming increasingly stressed and is reliant on woodlands. Currently seven species are listed in the rare category: Eastern Bent-Wing Bat, Australian Painted Snipe, Black Falcon, Crested Shrike-Tit, Powerful Owl, White-Bellied Sea-Eagle and Kydra Dampiera.

The Committee also reviewed the species and **ecological communities listed as insufficiently known** during the reporting period. The Committee agreed to include the Masked Owl in this category, given the limited information available on this species. The current list of species is: Diamond Firetail, Dusky Woodswallow, Flame Robin, Masked Owl, Black Gum, Snow Gum– Candlebark tableland woodland.

Pressures

The Driving Forces of climate change and human needs including population increase, consumption and waste emissions pose increasing challenges for both the extent and condition of the ACT's biodiversity. More directly measurable pressures which can be managed include plant and animal pest species, altered fire regimes and direct and indirect offsets.

The report considers pest plants and animals to be a major threat to biodiversity, particularly in urban and peri-urban areas of the ACT. Cats and Indian Mynas especially appear to be having major impacts; however confidence, in either grade or trend, cannot be high because there is little specific assessment of the effects of pest animals or weeds on biodiversity.

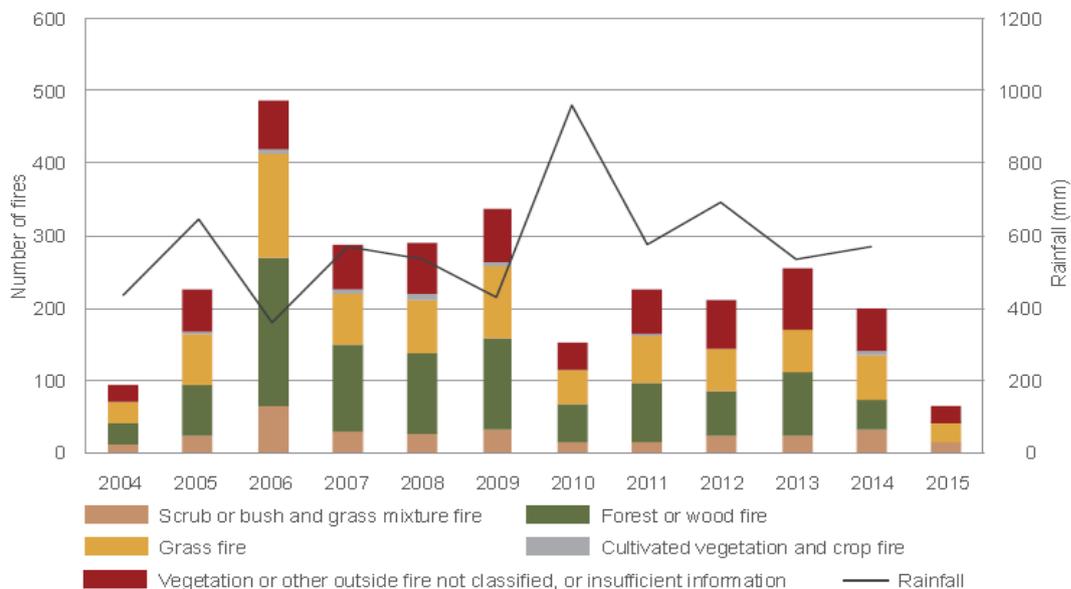


Figure 2: Unplanned fires and yearly rainfall in the ACT, 2004 - 2015 Source: 2015 ACT SoER

The ACT's biological diversity has evolved in the presence of fire. However, altered fire regimes resulting from management approaches or climate change can disturb biodiversity. Frequent burning can result in the dominance of more fire-tolerant species and weeds and disturb the composition of fauna. Unplanned fires have declined overall since reporting began in 2004 however



the proportion of unplanned fires occurring within each vegetation type has remained relatively stable. Fires in grassland and mixed vegetation (scrub–bush–grass) are typically larger than forest or woodland fires, though in 2014 and 2015 records diverge from this pattern. It is too early to tell whether this will become an established pattern. It appears that fire planning and management has limited and will limit the adverse impact of fire on biodiversity within the ACT. Uncertainty about grade and trend comes from the limited data on effects of fire on biodiversity in the ACT.

In the ACT **offsets** provide “environmental compensation” for a development that is likely to have adverse effect on an identified protected matter. **Direct offsets** have been used in the ACT SoER 2015 as an indicator of areas of nationally significant ecological communities given over to development and also of land added to the reserve system. **Indirect offsets**, such as education and training or research projects, are intended to produce a “conservation gain”. By definition, it is assumed by the ACT Government that offsets will result in a net zero or positive impact on biodiversity in the long term. However, confidence in grade and trend is limited by the lack of data collected to enable assessment of the cumulative impacts of multiple offsets. Furthermore, no investigations were identified to permit assessment of whether indirect offsets have achieved their desired outcomes.

The ACT SoER 2015 denoted that ACT systems supporting biodiversity are not highly resilient. Adequate resourcing for monitoring programs to build knowledge of key thresholds and for systemic and adaptive management remain challenges to the **resilience of biodiversity** in the ACT. Investment has tended to concentrate on species or communities under threat. The strong support networks underpinning management and engagement with universities, other stakeholders and the public are vitally important to achieving progress.

Response

The ACT’s commitment to biodiversity protection is evidenced by a level of protection 10% higher than any other Australian jurisdiction in terms of total land included in the National Reserve System. In the Territory 55.22% is protected in perpetuity as part of this system, significantly higher than the national average of 17.88%.

The ACT also has legislative and policy frameworks to conserve, maintain and improve biodiversity within protected areas. While progress outside protected areas is evident, conservation of habitats and species remains a challenge with habitat loss and modification remaining as particular threats.

Specific efforts have been made to support several endangered species:

- Trout Cod have been stocked in the upper and mid-reaches of the Murrumbidgee River, after dying out in the region in the 1970s.
- The Brush-Tailed Rock-Wallaby was last recorded in the wild in the ACT in 1959. The captive breeding colony at Tidbinbilla Nature Reserve successfully breeds animals for reintroduction in Victoria and New South Wales. The ACT Government is investigating possible reintroduction sites in the ACT; however any reintroduction of this species to the ACT will need long-term fox control.
- Seeds and plant material of Ginninderra Peppercreess, Murrumbidgee Bossiaea and Tuggeranong Lignum have been collected to support propagation and translocation efforts.
- Captive breeding program for Northern Corroboree Frog resulted in juveniles being released back to sphagnum moss bogs in Namadgi National Park in 2011 and 2012.

More information on this topic is available in the *ACT State of the Environment Report 2015*

<http://reports.envcomm.act.gov.au/actsoe2015>