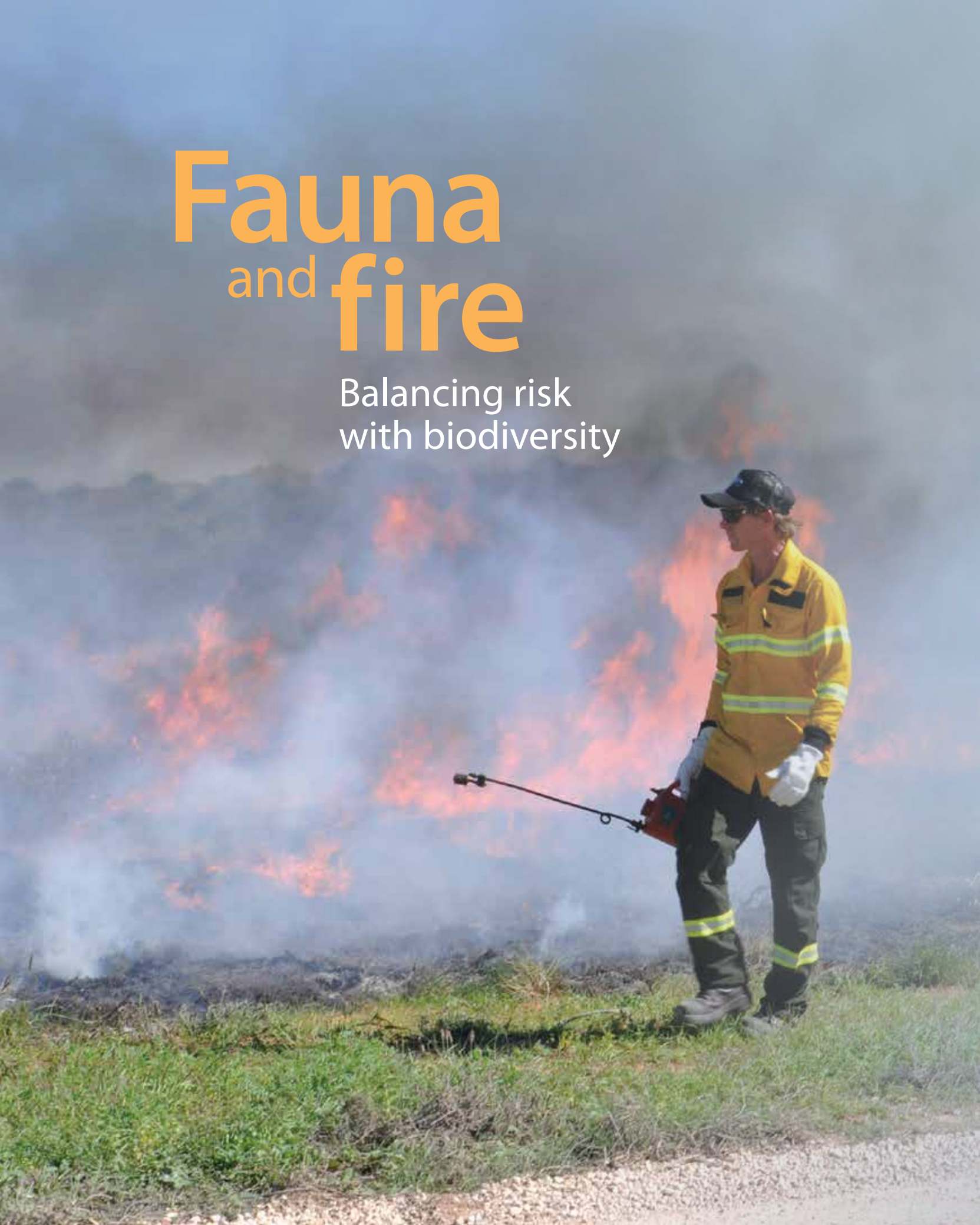
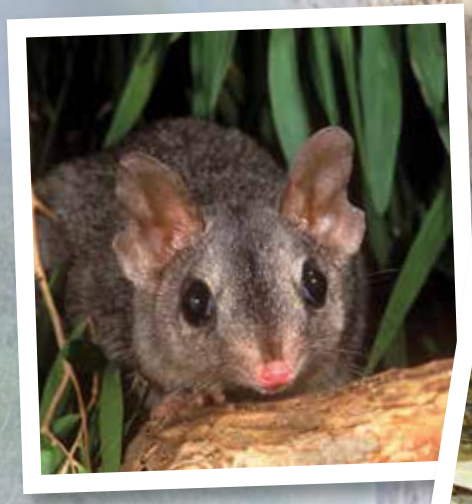
Fauna and fire

Balancing risk with biodiversity



Fire is a part of the south-western Australian landscape and many native plants, animals and ecosystems respond to and recover from fire with some level of flexibility and adaptability. However, large and intense bushfires have the potential to have long-lasting impacts on biodiversity, so land managers in Western Australia are continually learning and improving methods to minimise the impacts.

by Chenée Kett



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Main Prescribed burning in Kalbarri.
Photo – DBCA
Right Female Carnabys cockatoo (*Zanda latirostris*) in a tree nesting hollow.
Inset left Brush-tailed phascogale (*Phascogale tapoatafa*).
Photos – Jiri Lochman
Inset right Quokka on the mainland (*Setonix brachyurus*).

Above Prescribed burning in the Perth Hills.
Photos – DBCA

Native Western Australian animals depend on their environment for food, water, shelter and space to live and reproduce. However, fire is an extremely effective force in not only destroying and recreating these resources but changing the patterns, places and times that they occur.

Intense summer bushfires can often be extreme in both rate of spread and intensity, and the impacts to biodiversity can be severe and-long lasting in the landscape.

Prescribed burning is Western Australia's principal strategy for protecting the community and the environment from the devastating impacts of large bushfires. The aim is to reduce fuel loads so that when bushfires occur, as they inevitably do, their speed, intensity and impact on the environment is reduced.

Some native animals have behavioural, ecological and physiological ways to respond to fire in bushfire-prone environments. Some are highly mobile and can move out of the path of a bushfire. Others are able to burrow, climb or take refuge in hollows and other sheltered sites.

While animals can evolve to suit their environment over time, all species have a tolerance threshold for changes to their environment. Their capacity to survive a disturbance such as fire depends on the amount and rate of change to their environment.

MANAGING FIRE

Fire has a fundamental role in generating and maintaining biodiversity and can also provide positive biodiversity conservation outcomes.

Managing bushfire risk is challenging and complex, and land managers do not always get it right. Sometimes things don't go to plan but having sound science and professionals that are always willing to learn and improve is essential to delivering best practice.

Biodiversity conservation is the science and art of achieving 'the right balance' with respect to working within the tolerance thresholds of plants and animals within a highly modified and changing environment.

From a biodiversity perspective, prescribed burning is undertaken to maintain a range of wildlife habitat types through the creation of low-fuel areas in a mosaic across the landscape.

Prescribed burns are carried out under more favourable conditions than intense summer bushfires, providing more opportunities for animals to safely move into areas of unburnt vegetation and various plant species opportunities to regenerate. The impacts of low intensity burns benefit animals by leading to fewer plant deaths and fewer hollow logs and tree hollows lost that are used as habitat for animals.

Changed fire regimes are one of the greatest threats to many threatened species. Interactions with other factors such as climate change, feral predators and other forms of disturbance also play an important part in biodiversity conservation outcomes.

BALANCING BIODIVERSITY

Plant species and communities vary in their response to fire and the frequency of bushfire is a critical factor in their life cycle and regeneration. The plant response to fire is fundamentally linked to fauna survival as plants provide shelter and food. Some wildlife recover quickly following a low intensity, patchy fire but are slower to recover after high intensity, large fires that can burn the entire landscape.

Native animal species' response to fire varies over space and time depending on the timing, intensity, frequency, size, history and landscape of the fire, as well as the innate and unique characteristics of the individuals and populations.

When Department of Biodiversity, Conservation and Attractions' (DBCA) Parks and Wildlife Service officers plan burns, their knowledge of life histories,

Learn more about native wildlife and fire

Scan this QR code or visit Parks and Wildlife Service's '*LANDSCOPE*' playlist on YouTube.

traits, sensitive periods (seasons), tolerable intervals and the habitat needs of native plants and animals are essential considerations.

It's a combination of more than 60 years of operational experience, local knowledge and risk management, underpinned by good science—a delicate balancing act and something that isn't taken lightly.

ALL IN THE TIMING

Increased levels of moisture in the soil and vegetation are particularly advantageous in protecting animal habitat, which is why prescribed burns are mostly conducted in autumn and spring when the weather is mild and fire behaviour is moderate and easier to manage.

"The hollows of logs and trees won't keep burning when there is enough residual moisture in the wood," said DBCA's Fire Management Services Manager, Stefan de Haan.

"It means that the flames will go out without consuming the entire log, which provides habitat for native animals. In summer, everything is so dry that often the entire habitat is lost when a high intensity bushfire comes through."

Years of planning can go into each prescribed burn, with careful consideration given to the burn location, vegetation type and biodiversity values. Wind direction and forecast conditions are evaluated in consultation with the Bureau of Meteorology prior to ignition.

"For specific plant and animal values we might also look at some areas being excluded from the burn or only burning those areas at certain times of the year," Stefan said.

"With the benefit of years of planning, ultimately we're dealing with a living, changing ecosystem. We look at specific

Top left Western brush wallaby (*Notamacropus irma*).
Photo – Jiri Lochman

Above left Planning for a prescribed burn.
Photo – Jennifer Eliot/DBCA

Top Recovery is slow after a devastating bushfire.

Above Low intensity prescribed burn in the karri forest.
Photos – Bron Anderson/DBCA

Minimising the impact

Eight thousand hectares of forest were impacted by the 2021 bushfires near Leeuwin-Naturaliste National Park. In the middle of the burnt landscape is a patch of green coastal heath. It's the only area that wasn't impacted by bushfire thanks to a prescribed burn that had been carried out five years earlier. Side by side, the before and after photos illustrate the benefits of reducing fuel loads to minimise the impact of intense summer bushfires.

biodiversity values of threatened plant and animal populations associated with the burn and whether there are certain conditions that we have to burn under, or actions we need to take prior to commencing."

In the south-west corner of the State, in places like the damp forests near Denmark, prescribed burning is undertaken in summer.

"Summer is the only time that the karri forests are dry enough to allow for the effective and safe use of prescribed burning to manage fuel loads and biodiversity values," District Fire Coordinator Ed Hatherley said.

Above Firefighters battling a bushfire near Leeuwin-Naturaliste National Park.

Inset above Patch of green coastal heath previously prescribed burnt in 2016 protected from bushfire.
Photos – DBCA

Above right Quokka (*Setonix brachyurus*).
Photo – Jiri Lochman

"Compared with large-scale summer bushfires, prescribed burning is conducted in smaller areas, at a lower intensity, resulting in a mosaic of burnt and unburnt patches that allow animals to move to safety or find refuge," he said.

"We also commonly undertake additional feral animal baiting after the burn to ensure any impacts on native species are minimised."

FRIEND NOT FOE

For some species, like the mainland quokka (*Setonix brachyurus*), prescribed burns can have benefits. The persistence of quokkas on the mainland relies on feral animal control efforts and the use of prescribed burning to manage their habitat.

Quokkas use dense vegetation in the moist parts of the landscape, and it is important that these areas are not frequently burnt. When vegetation cover is removed by fire, quokkas are vulnerable to predation due to increased hunting efficiency of cats and foxes.

"It has to be the right amount of fire," DBCA's senior research scientist Dr Adrian Wayne said.

"If a bushfire comes through and wipes out all the vegetation, the quokkas are left exposed and vulnerable," he said.

"But without fire, the habitat becomes too thick and dense, meaning they're unable to move around to source food. Prescribed burning allows us to find that happy medium."

In 2015, the mainland quokka population was severely impacted by a bushfire in Northcliffe, in WA's south-west. The bushfire covered an area of approximately 98,000 hectares and damaged a large area of known quokka habitat. Surviving quokkas sought refuge in swampy vegetation within the fire-affected areas, or in unburnt sites near the fire edge.

When determining a burn location, fire officers exclude habitat deemed healthy and utilised by quokkas prior to prescribed fire being introduced.

TAKING CARE

There are many complex factors at play that aren't predictable when it comes to prescribed burning and there is always an element of risk associated with it. There are some fauna species that are more sensitive to fire, such as the western ringtail

possum, also known as ngwayir, pronounced n-wa-yir (*Pseudocheirus occidentalis*). To accommodate more sensitive species, fire managers vary the frequency, intervals, seasons, intensities and scales of prescribed burns so these more vulnerable species and their habitats are maintained.

Specific flora and fauna considerations, in particular threatened species, are factored into all stages of planning. Depending on the specific values identified, existing datasets can be used to confirm known population locations, liaise with adjacent property owners, ground truth known locations within and adjacent to the planned burn site, carefully preparing sites ahead of time.

In the case of species such as numbats, burns are undertaken outside of the periods where their young are in their dens, which is typically from winter through to November. This timing ensures that younger animals are mature enough to access refuge areas during and after the burn period.

AFTER THE FIRE

DBCA scientists and conservation staff are developing tools to map the variation in fire intensity, fuel consumption and unburned fuels remaining after patchy fires, as well as collaborating with other organisations to better understand patterns of soil dryness and fuel availability.

Techniques such as camera surveillance are used for monitoring specific fauna populations. Following a prescribed burn that was conducted near Perup in the Upper Warren area in autumn 2021 that resulted in some areas being burnt at a higher intensity than planned, a post-burn fauna monitoring program was put in place. Recent surveys show several recordings of numbats as well as woylies (*Bettongia penicillata*), tammar wallabies (*Notamacropus eugenii*), quenda (*Isoodon fusciventer*), western brush wallaby (*Notamacropus irma*) and brush-tailed phascogale (*Phascogale tapoatafa*).

To help protect these species, DBCA is continuing to conduct post-burn fox baiting and fauna monitoring in the area as part of its broader native fauna management program in the Upper Warren area.

MOVING FORWARD

Bushfire is an inevitable part of life in Western Australia, whether through ignition by lightning, accidental activities or arson.

What is important for biodiversity conservation is that the fire regimes that our plants and animals experience are within their tolerance ranges that allow their populations and ecosystems to thrive. It is vital that firefighters continue to manage fuel loads in ways that conserve our wildlife and keep our communities safe.

Above left Fauna monitoring is conducted by Parks and Wildlife Service conservation staff before and after a prescribed burn.
Photo – DBCA

Above Western ringtail possum (*Pseudocheirus occidentalis*).
Photo – Jiri Lochman

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