During the past decade, the western ground parrot has undergone a precipitous decline, causing alarm bells to ring with the South Coast Threatened Birds Recovery Team, the Friends of the Western Ground Parrot community group and staff from the Department of Environment and Conservation (DEC) who are working together to conserve this unique bird. There is also concern that a range of other threatened animals on the south coast may be at risk from the same factors that are threatening the parrots.

A parrot in peril

Historically, the western ground parrot (kyloring to the Nyoongar Aboriginal people) was found throughout near-coastal south-western Australia, occupying heaths and swamps from north of Badgingarra to Nuytsland Nature Reserve, east of Esperance. By about 1990, the species was restricted to about 400 individuals in three geographically distinct locations: the Waychinicup-Manypeaks area, Fitzgerald River National Park, and Cape Arid National Park and the adjoining Nuytsland Nature Reserve. Currently, there are fewer than 140 individuals known to be alive and the western ground parrot is classified as critically endangered.

Concern for the plight of the western ground parrot led to the formation of a recovery team in the early 1990s. Protection from wildfires and introduced predators (especially foxes) were identified as the priorities for research and management. Funding was a major challenge, but some progress was made in developing improved fire management for the species, and fox baiting on the south coast started under the *Western Shield* program in 1996.

In late 2003, the Western Ground Parrot Recovery Project was fortunate to receive funding from South Coast Natural Resource Management, which provided for the employment of the first full-time team to work on this species. During the four years of this project, much work was done surveying populations across the south coast, looking for new populations, and studying the behaviour of this cryptic species (see 'The secret life of the western ground parrot', *LANDSCOPE*, Spring 2005).

Rarely seen and almost never photographed (see 'Wild with delight', *LANDSCOPE*, Summer 2005–06), the western ground parrot is a challenge to monitor. Counts are usually made through listening surveys carried out at dawn and dusk, when the parrots move from their daytime feeding areas to their night-time roosts.

While the original intention of the recovery project was to concentrate on translocating birds into former habitat, it quickly became apparent that the population in Fitzgerald River National Park—which had been considered one of the strongholds of the species—had declined to the point where removing birds was not an option.

On the brink

The project team turned its focus to survey work and, by analysing the results, was able to assess population densities across the range of the species. Despite considerable effort, no birds have been heard or seen in the Waychinicup-Manypeaks area since 2003 and this population is now considered locally extinct. Numbers in Fitzgerald River National Park have also

The western ground parrot may be the 'canary in the coal mine', warning of imminent fauna collapse on the south coast. A major integrated predator control program is currently under way to save this area's unique fauna.

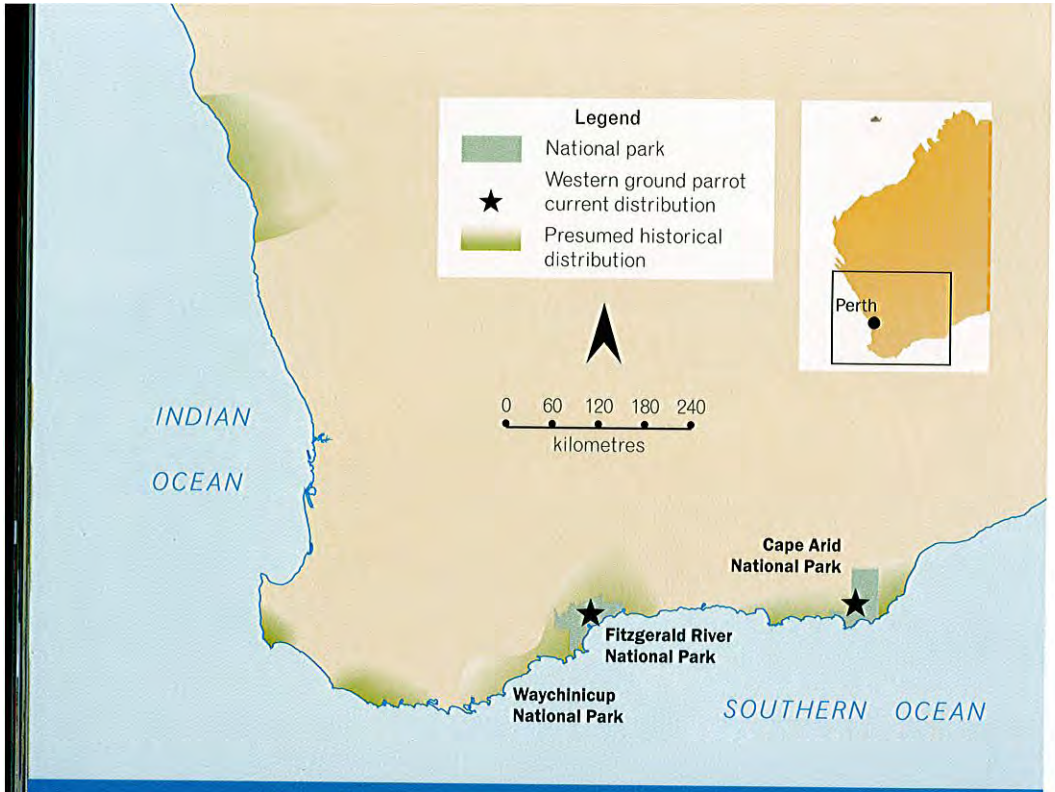
by Sarah Comer, Allan Burbidge, Cameron Tiller, Abby Berryman and Deon Utber

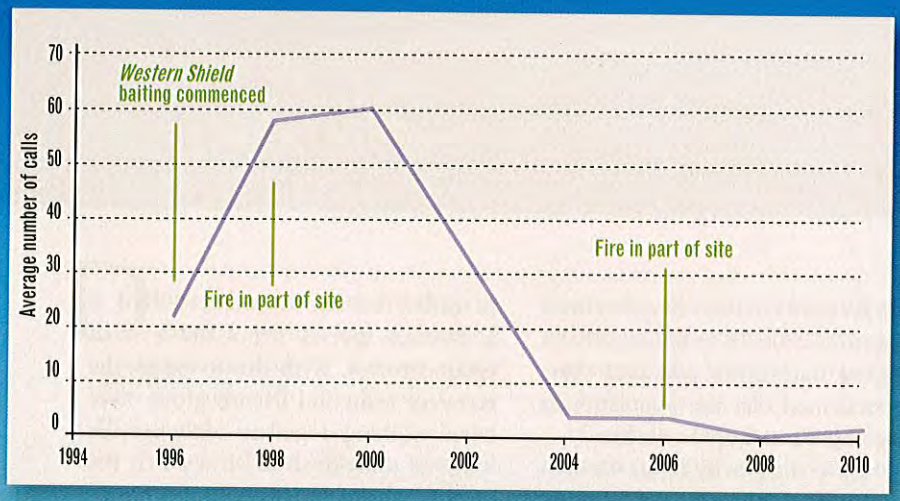
declined drastically, with what were once robust populations now either gone or supporting just a few individuals. In Cape Arid National Park ground parrots are faring slightly better, with these populations now considered the stronghold of the species. There may still be a small number of birds in Nuytsland Nature Reserve but these have not been located since 2006. In summary, surveys conducted during the past four years have confirmed that the population is undergoing a catastrophic decline.

To add to the gravity of the western ground parrot story, recent genetic work has indicated that, contrary to earlier beliefs, the western bird is a distinct species from the eastern ground parrot. With this in mind, the recovery team and friends group have been working together with a wide range of individuals to ensure that the western ground parrot has a future. The numbers are so low that, without careful management, the western ground parrot is likely to become extinct in the next decade—possibly the first modern-day bird extinction in Australia.

Above and opposite page
Main Fitzgerald River Inlet.
Photo – Jiri Lochman
Inset Caught on film—the first photograph of a wild, unrestrained western ground parrot.

Left One of the only photographs of a wild adult western ground parrot, taken while trying to locate a nest in 2006.
Photos – Brent Barrett





Managing fire for ground parrots

Since 1985, there have been numerous surveys of ground parrots, initially by Birds Australia, and more recently by DEC and the Friends of the Western Ground Parrot. The data from these surveys have been used by the recovery team and DEC fire managers as a basis for informed fire management in the bird's habitat. While the exact relationship between preferred fire age (time since habitat has been burnt) and ground parrot usage of these areas is not known, it is known that frequent fire is a problem for them, as is extensive bushfire, but they are often found using habitat close to more recently burnt areas. The few remaining populations are found in areas containing at least some long unburnt vegetation (more than 40 years old in places), and it is hypothesised that this provides an important refuge, and possibly important areas for breeding. However, birds have also been recorded in more recently burnt country immediately adjacent to older vegetation, in some areas as soon as three years post fire, and it is thought that this may be due to the rapid production of seed from early successional species of plants. It is quite probable that the combination of older and younger vegetation is necessary to sustain populations.

Staff from DEC's Science and Nature Conservation divisions and the recovery team have worked with fire managers both in the development of prescription burns to provide protection for key areas of habitat, and in wildfire suppression. This approach has been extremely effective in recent years, and no major bushfires have affected areas occupied by ground parrots despite a significant number of fires starting near areas occupied by the birds.

Are cats the culprits?

In spite of improved fire management, the population decline continued, leading the recovery team to focus on other possible factors

Left Western ground parrot habitat in Cape Arid National Park.
Photo – Sarah Comer/DEC

What is adaptive management?

Adaptive management is management designed to facilitate learning. Essentially, decisions are made on the desired management outcome (for example, maintenance of an intact ecosystem), key threats are identified, and management actions are set up as experimental treatments at normal operational scales. The impacts of the actions are measured in such a way that understanding increases of both the ecological system and the way in which the management action influenced the outcome. This is done to enable evaluation of success and, most importantly, provide feedback to either change, stop or improve the management action as necessary.

Above left An adult western ground parrot.
Photo – Brent Barrett

Above Setting up mist nets in Cape Arid National Park.
Photo – Abby Berryman/DEC

impacting on ground parrots. In 2004, a preliminary assessment of feral cat numbers in Fitzgerald River National Park found a high abundance of feral cats, and it was recommended that some measures of cat control be trialled.

As no large-scale baiting targeting cats had been conducted in the south-west, it was important to identify non-target species that might be affected by the use of *Eradicat*® baits developed for feral cat and fox control. A number of other threatened species in the area, including the red-tailed phascogale (*Phascogale calura*), dibbler (*Parantechinus apicalis*) and chuditch (*Dasyurus geoffroii*), could potentially consume the bait. While the 1080 poison used in baits is derived from the native poison pea plant which is not usually toxic to native species, *Eradicat*® has a higher concentration of 1080 than the fox baits currently used. It is also a fresh meat bait, which means the baits might be more palatable to native species (see 'Controlling introduced predators in the rangelands: the conclusion', *LANDSCOPE*, Winter 2010). In order to identify any issues with native fauna potentially being affected by the use of the *Eradicat*® bait, two non-target trials were conducted with non-toxic baits.

With this work completed, staff from DEC and the South Coast Threatened Birds Recovery Team discussed emergency actions required to protect the remaining ground parrot populations. They identified predator control as the most likely effective action. The working hypothesis formed was that mesopredator release had resulted in an increase in the number of feral cats in the parks. Mesopredator release (see 'Will curiosity kill the cat?', *LANDSCOPE*, Autumn 2007) is a term used to describe the increase in abundance of subordinate predators when a top-level predator is removed or controlled within an area (see also 'Fauna recovery in the wheatbelt' on page 56). In this case, it was suspected that the removal of foxes under the *Western Shield* program reduced constraints on the feral cat population. If this was the case, then various other threatened species, including the red-tailed phascogale, dibbler, chuditch, western bristlebird and malleefowl, might also be at risk.

These discussions led to a project to control both feral cats and foxes, developed in an adaptive management framework (see box above), with the hope that funds might be available to implement the program. Together, Fitzgerald River National Park and the Cape Arid–Nuytsland area cover more than 600,000 hectares and so the proposal to bait both areas for feral cats and foxes entailed a major effort to address predation on a landscape scale. Ensuring that there was an opportunity to learn from this baiting was a priority.

The adaptive management project design was focused not only on obtaining information on the response of introduced predators to the introduction of baiting with the new *Eradicat*® bait, but also on examining the response of a suite of native species. To look at the effectiveness of the baiting program, sand plots were established in both areas to record the level of predator activity before and after baiting and were checked for cat and fox tracks each morning for four days to provide an index

of predator abundance. In addition, a number of feral cats were fitted with radio collars carrying a GPS device to both determine bait uptake and look at the use of habitat by feral cats. This information will be used to refine future bait delivery protocols.

At the same time as the cat work was occurring, a number of chuditch, dibbler and bush rats (*Rattus fuscipes*) in the baiting area were fitted with radio collars to determine if they were consuming the baits and, if they were, if a lethal dose of the baits was being ingested. All of the baits dropped were injected with rhodamine B, a dye bio-marker that causes fluorescence in whiskers if animals ingest it. The first trial involving the baiting of Fitzgerald River National Park using toxic *Eradicat*® baits was conducted during autumn 2010, with preliminary results supporting the previous work that found that while some native species were likely to sample baits, they don't take a lethal dose.

The results of the various monitoring programs will be fed back into the project design regularly, enabling adjustments to be made as required. A steering committee has been established to guide the project, with representatives from DEC's South Coast Region, Science Division and *Western Shield* program.

Captive breeding: an insurance

Although the ideal is to conserve the western ground parrot in its preferred habitat by managing threatening processes (particularly predation and fire), captive management was identified as an important insurance measure should the new baiting program be ineffective or an uncontrolled bushfire wipe out the remaining populations.

Top far left Sweating *Eradicat*® baits near Ravensthorpe prior to aerial delivery to Fitzgerald River National Park.
Photo – Cameron Tiller/DEC

Top left A feral cat in Fitzgerald River National Park.
Photo – Neil Hamilton/DEC

Above far left An endangered dibbler with a radio collar.

Above left Preparing sand pads in Cape Arid National Park.
Photos – Louisa Bell/DEC

Above Volunteers and DEC officers take part in the *Western Shield* fauna monitoring program in Cape Arid National Park.
Photo – Sarah Comer/DEC

Left Releasing a collared chuditch.
Photo – Cameron Tiller/DEC

Right A red-tailed phascogale.
Photo – Jiri Lochman

Below right A western ground parrot.
Painting – Wendy Binks

The western ground parrot has not been kept in captivity before. Therefore, the first step towards a full-scale captive breeding program was to take a small number of birds into captivity as a pilot husbandry project to refine techniques for captive management. Three birds taken into captivity in late 2009 have so far been kept successfully. Maintaining the health and well-being of the birds in captivity is one challenge of this contingency strategy and the recovery team has had significant support and advice from specialist staff from within DEC and Perth Zoo to assist in this process. The long-term goal is to shift to a breeding program, which will require significant funding. Captive breeding also relies on suitable habitat being available for releasing birds back into the wild—hence the importance of developing good landscape-scale management regimes to address threats.

The challenges of conserving the western ground parrot are significant but the individuals and organisations that have come together to take on this challenge are committed to ensuring a successful outcome for the parrot and to demonstrating that controlling feral cats and foxes in south coast systems has multiple benefits. While the ground parrot can be viewed as the 'canary in the coal mine' that has set alarm bells ringing, many other threatened species are expected to benefit from the landscape-scale approach to integrating control of introduced predators, including the chuditch, dibbler, red-tailed phascogale, western bristlebird and malleefowl. The results of the program will take a number of years to become apparent. However, if successful, the long-term benefits of establishing a truly integrated predator management regime will not only secure the future of the ground parrot but may also result in the restoration of a suite of native species to their former habitats on the south coast.

Multiple collaborators

Such a complex project would not be successful without input from a range of people with specialist skills and attributes. The past 10 years of the Western Ground Parrot Recovery Project have seen cooperation and collaboration with a number of partners including the Friends of the Western Ground Parrot, South Coast Natural Resource Management (NRM), Department of Environment and Conservation (DEC), Exetel, Perth Zoo, the Australian Department of the Environment, Water, Heritage and the Arts, State NRM, Birds Australia WA, Dr David Edmonds, Australian Wildlife Conservancy, CSIRO and Murdoch University. Numerous volunteers have played a major role in supporting this project.

People interested in assisting in the predator management program, taking part in surveys, or who have reports of the western ground parrot (particularly in other locations) should contact Sarah Comer.

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