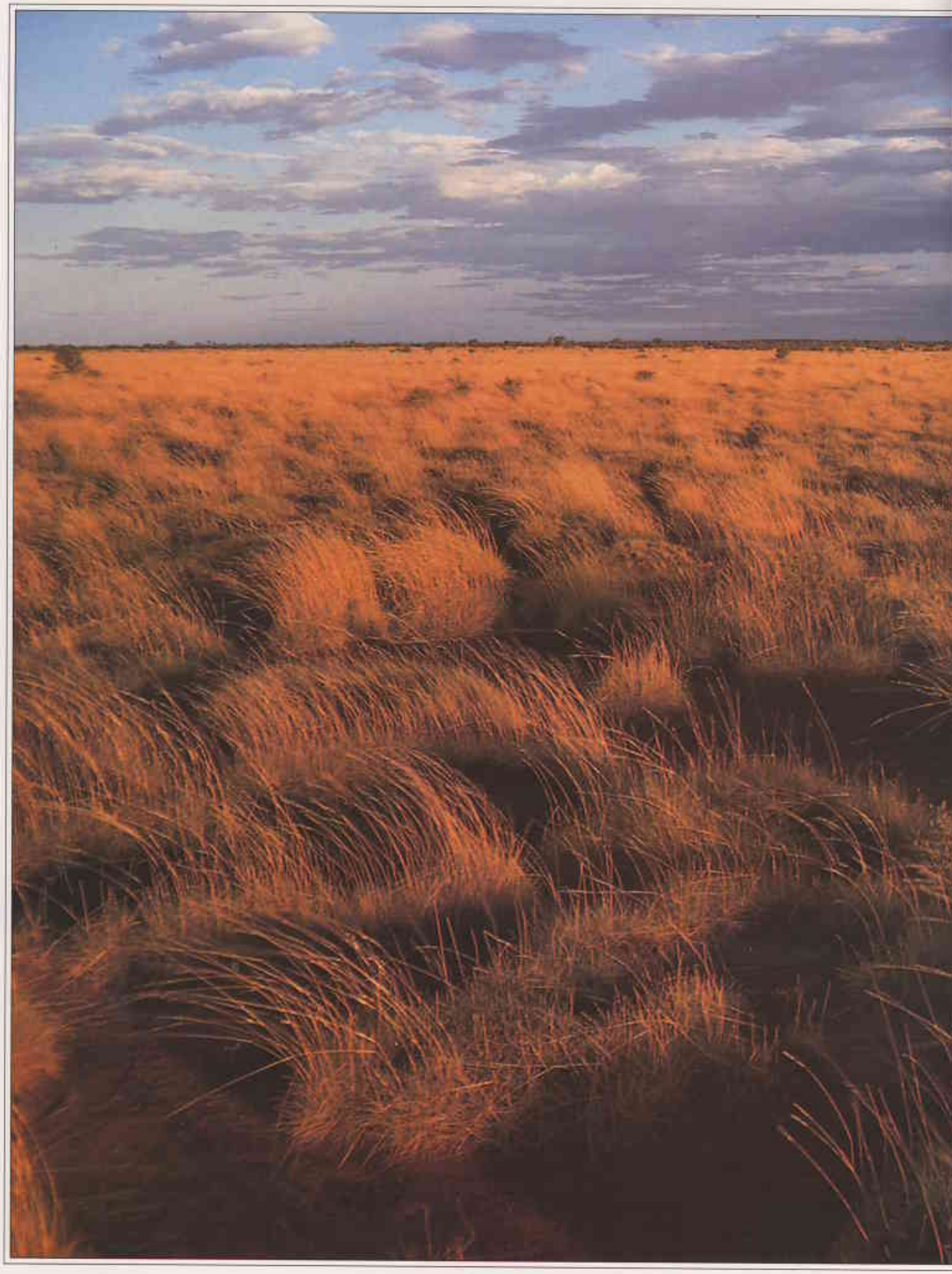


DESERT DREAMING

THE REINTRODUCTION OF RARE AND ENDANGERED ANIMALS TO THE GIBSON DESERT

by Neil Burrows and Carolyn Thomson

WHEN several pairs of rare burrowing bettongs and golden bandicoots are airlifted from Barrow Island in the far north of WA, and reintroduced into the Gibson Desert Nature Reserve in central Western Australia, it will be the culmination of many years of painstaking labour.

The beginnings of the project can be traced to the work of scientists Andrew Burbidge and Norm McKenzie from the Department of Conservation and Land Management (CALM) and Ken Johnson of the Conservation Commission of the Northern Territory in desert regions of WA and the NT in the 1970s. They became alarmed at the rapid extinction of medium-sized mammal species (those in the critical weight range of between 35 grams and 5.5 kilograms) in arid areas. Strangely, they found that this massive decline was comparatively recent. It had only occurred over the last 30 to 50 years. The WA Museum and early explorers had reported and collected many mammal species that could no longer be found in these areas.

The extinction of animal species in modern times is usually associated with human activities. However, Europeans hadn't been directly active in these areas - the country appeared to be virtually pristine. So scientists had to look for some other explanation for the vanishing stock of desert mammals.

By a process of elimination, scientists formed the idea that the extinction of mammal species primarily resulted from Aborigines leaving the land and ceasing their traditional burning practices. Like Aborigines in other parts of Australia, Aborigines of the Gibson Desert used to burn to bring up green feed for mammal species they hunted and to "clean the land". The frequent, mostly small fires they lit resulted in many areas of vegetation of different ages. An aerial photograph from the 1940s clearly shows this patchwork burning pattern.

Changes in desert fire regimes were described in an article in *Landscope* Winter 1987: "As Aborigines moved to European settlements and the deserts became depopulated a 'natural' fire regime took over - one of infrequent but very extensive hot summer wildfires, usually started by lightning. This change is thought to have had a profound effect on the mammals, depriving them of diversity of shelter and feeding areas, and leading to rapid decline and local or total extinction."

Although the Gibson Desert seems pristine many changes have recently occurred: feral animals have invaded, Aboriginals have left the land and many mammal species have declined or disappeared.
Photo - Neil Burrows▲

Previous page:
Spinifex landscape
Photo - David Pearson
Burrowing bettong *(Bettongia lesueur)*
Photo - Jiri Lochman

A huge fire during the hotter months could burn out thousands of hectares. Mammals such as the burrowing bettong would probably survive such a fire, as they live in a network of warrens and could shelter underground. However, with the vegetation temporarily removed, they wouldn't have had anything to eat and would be easier prey for predators.

Other mammals, such as the rufous hare-wallaby, need vegetation of differing ages. They feed on the soft, green shoots of young spinifex, shrubs and herbs that emerge after fire. They shelter in mature spinifex, which makes an excellent hide but does not offer much nourishment. Such animals would be adversely affected by larger, less regular fires that create large areas with vegetation of a uniform age.

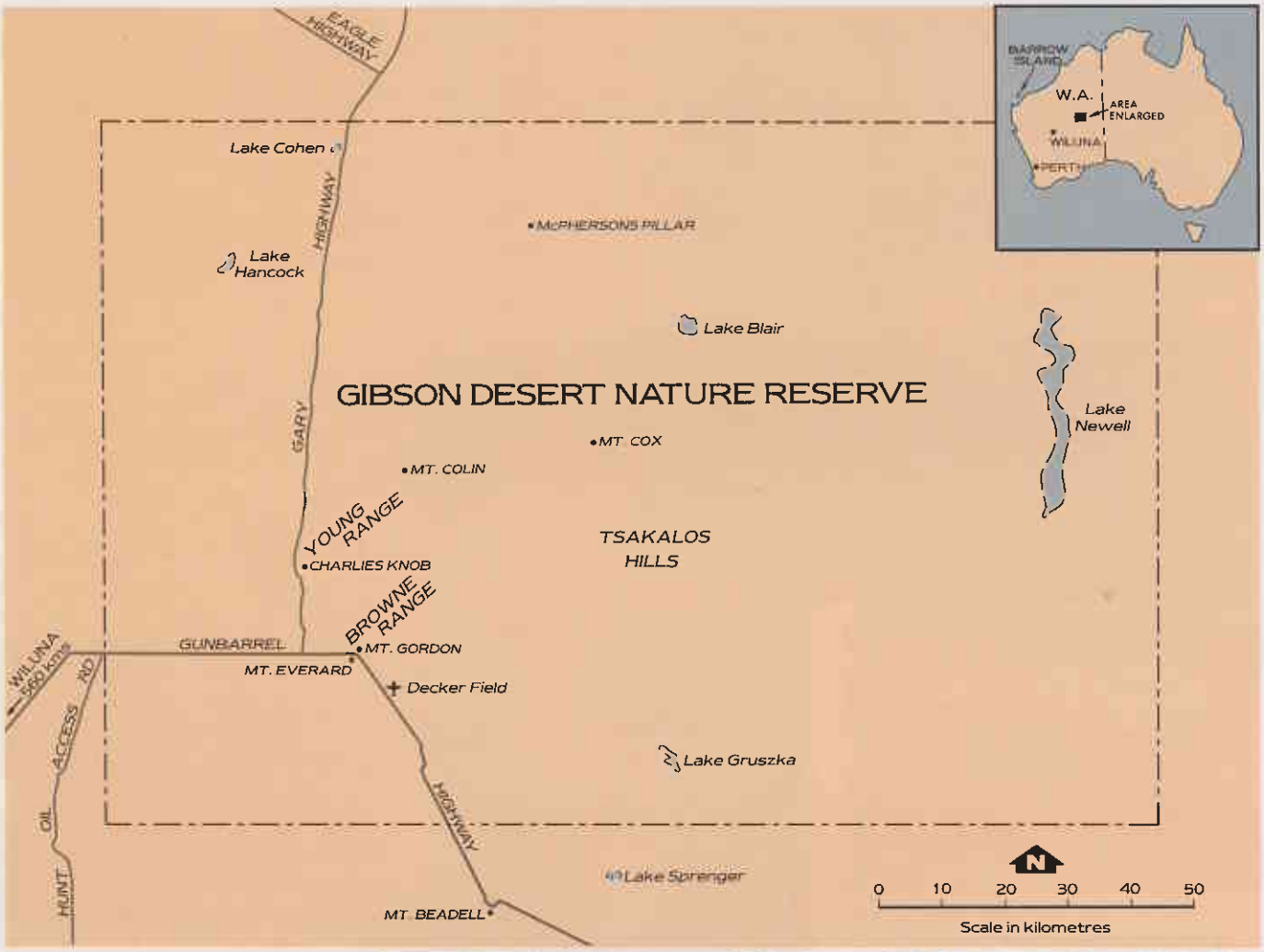
Another possible explanation was that the extinction was the result of the introduction of feral animals such as foxes and cats. However, cats were present for a long time without having much effect and foxes did not become established in some areas until after the mammals became extinct. However, foxes probably speeded the extinction by removing relict populations of mammals left after big fires, and preventing them from spreading again if conditions became suitable.

It seemed that the Aborigines of the Gibson Desert were the key to the mystery, so CALM's Research Director Andrew Burbidge and other research scientists returned to the desert to talk to them.

"During 1982-1985 we visited many Aboriginal communities throughout Australia's central deserts seeking information about desert mammals. We talked to groups of old people, showing them mammal skins, asking questions, taking notes," said Andrew.

These studies showed that more than one-third of the mammal species of central Australia had vanished. The scientists also gathered a large amount of biological information about many of these species.

As a result of this work, CALM research staff embarked on an ambitious project to reintroduce certain mammal species to the Gibson Desert.



The golden bandicoot or Pakuru *(Isoodon auratus)*, one of the mammals that scientists are seeking to reintroduce (right), and the patterns that symbolise its travels in the Dreamtime (far right).
Photo - Bert and Babs Wells
Painting - Benny Tjapaltjarri

Although nature conservation concerns in the desert do not have a very high profile in the public eye, they are a high priority for CALM. More than half of all land managed by the Department is in the arid zone - over 10 million hectares.

The Gibson Desert was chosen for the project because something was already known about the vegetation, landforms and existing fauna as a result of survey work in the area. It is land managed by CALM, it is reasonably accessible, and contains fairly low numbers of feral animals.

The Gibson Desert Nature Reserve covers 1.8 million hectares, and is 600 kilometres east of Wiluna. It includes vast, undulating spinifex plains, interspersed with mulga. In places there are extensive salt lakes, small freshwater lakes, small spinifex-covered sand-dunes and low rocky ranges with occasional breakaways.

The mammal release is scheduled for May 1991, but before it can become a reality, much groundwork has to be done.

Action must be taken to secure the mammals' habitat from predators. Foxes will be controlled and their numbers monitored. CALM Researchers David Algar and Tom Leftwich have surveyed, sexed and aged Gibson Desert fox populations and analysed their stomach contents.

To prepare the habitat for the reintroduction of the mammals, CALM has also commenced a prescribed patch burning program in the Gibson Desert. This is no easy task. Fire management in the populated and well-resourced areas of the South-West has evolved to a high level of sophistication and organisation, but the vast expanse of the Gibson Desert

Landsat imagery of part of the Gibson Desert Nature Reserve - the red-brown patches show recently burnt areas.
Photo - Department of Land Administration▲▲

The effects of fire on lizards, such as this dragon, are being studied.
Photo - Jiri Lochman▲

Scientist David Pearson measuring a small mammal in the Reserve.
Photo - Janet Gardner▶

is a far cry from the jarrah and karri forests of the South-West.

None of the resources used for fire management in more populated areas exist. Roads and tracks to the reserve are rough and sometimes inaccessible. There are no firebreaks and there is no way of putting out a fire once it starts.

A specific type of fire regime is needed, one that leaves a patchwork pattern of vegetation of different ages across the landscape: from recently regenerated herbfields to long-unburnt patches of spinifex. This would provide suitable animal habitat and prevent the development of massive wildfires.

CALM fire researchers Neil Burrows, Alex Robinson, Bruce Ward and Karan Maisey studied the behaviour of spinifex fires to predict when and how spinifex would burn and under what weather conditions fires would self-extinguish. This was critical to achieving the desired system of "patch" burns. Igniting spinifex under the wrong weather conditions could result in a large wildfire, or, at the other extreme, no fires at all.

Wind speed was found to be the critical weather element controlling fire behaviour. Fires will not spread in even the most flammable spinifex if wind speed is less than about 12-15 km/h. Other important factors determining the behaviour of spinifex fires include the patchiness of the spinifex clumps, the size of bare patches of ground, air temperature, relative humidity and the moisture content of the spinifex.

Historical weather records from the Giles Meteorological Station showed researchers that September was likely to have the most suitable weather for patch burning. Strong winds early in the day would ensure that fires ignited by small incendiaries dropped from an aeroplane would spread. Winds could be expected to ease during the day and, by mid to late afternoon, fires would go out by themselves.

In September 1988, the first aerial research burn took place in the Gibson Desert. An area to the west of the Gary "Highway" (a rough track joining the Gunbarrel "Highway" and the Canning Stock Route) was chosen for the trial. Vegetation types common in the reserve were represented within the trial site and ground access was possible along Gary Highway.

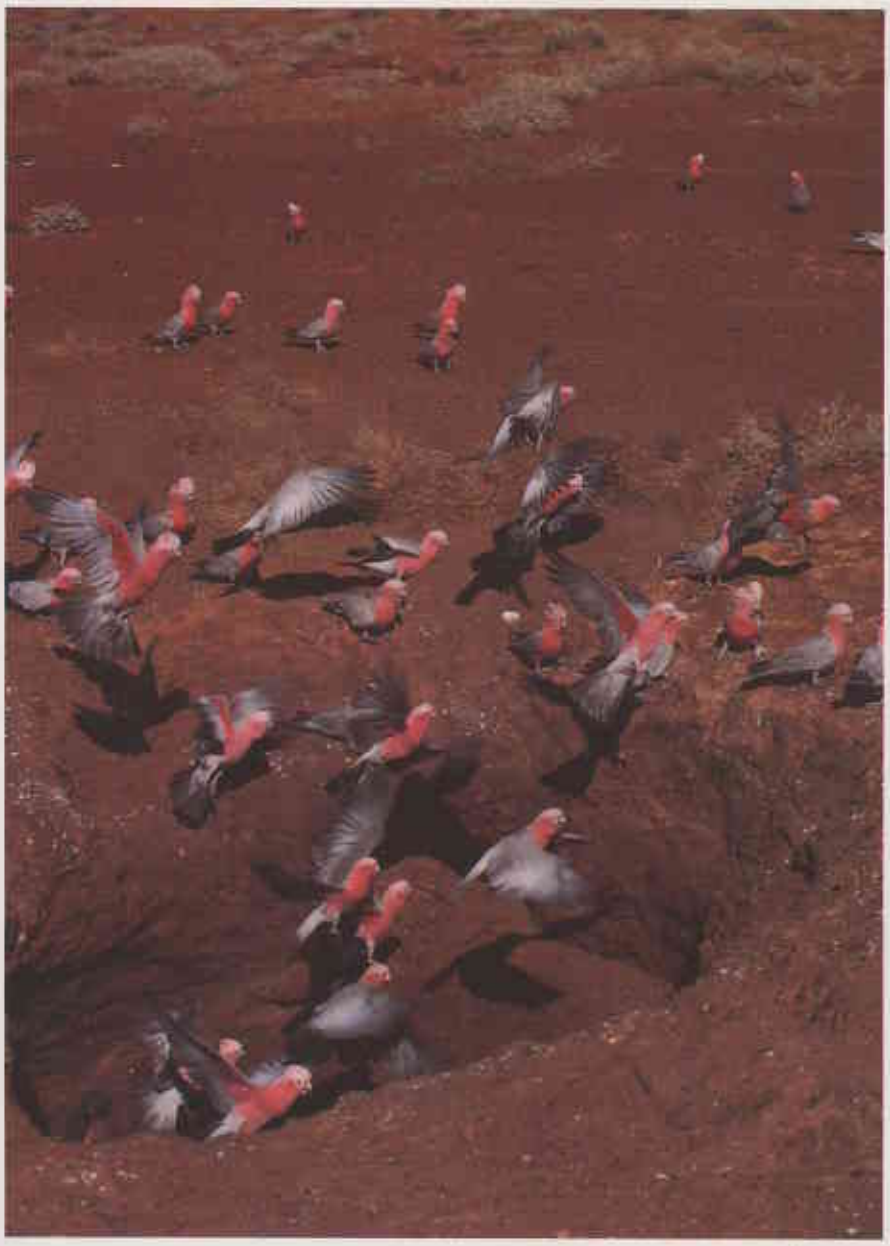
Landsat satellite imagery provided useful vegetation and landform maps needed for the trial. With some ground work, the satellite images could be used to locate vegetation types, lakes, claypans, recently burnt areas and other features. Detailed descriptions of the major vegetation types were made and representative areas were photographed from the ground and from the air.

Researchers decided to use aircraft for the burn because of the large area to be burned, its inaccessibility and cost-effectiveness. Incendiaries dropped from a plane resulted in a large number of small fires with patches of unburnt areas in between - in effect mimicking the traditional Aboriginal burning pattern.

Scientists are now monitoring the ecological effects of these patch burns and are preparing plans for prescribed burning in other desert reserves.

"We are looking at the whole ecosystem, not just mammals - and how fire affects them," said CALM's David Pearson, who, along with Janet Gardner, is studying lizards and small mammals in the spinifex community.

Andrew Burbidge and Phillip Fuller have established sites to study the effects of patch burning on birds. Eight study



Flocks of galahs can be seen in the Gibson Desert after rain, but move out of the area in periods of drought.
Photo - David Pearson◄

The desert mouse *(Pseudomys desertor)* still persists in the Gibson Desert.
Photo - David Pearson▲▲

Aborigines who have traditional associations with the Gibson Desert have been sharing their knowledge about animals in the area with scientists.
Photo - David Pearson▲

plots, each of one square kilometre, have been marked: four in burnt and four in adjacent unburnt areas of each vegetation type. One pair is situated in mulga country, one in sand-dunes and two in two different types of spinifex. They are returning in different seasons to record the numbers and types of birds using the areas.

"Because of the poor summer rains in 1988 and 1989 the burnt areas do not have many birds using them," said Phillip Fuller.

"However, a couple of years ago we did some experimental burning by lighting small fires. When we returned the following year after good summer rains there had been a dramatic change: the burnt area was a mass of flowers and seeds."

Work has advanced to such a stage that in May this year scientists will select the release sites and survey fox numbers and their distribution. In September 1990 the release areas will be baited to remove foxes and cats.

The two mammal species selected for release are the burrowing bettong and the golden bandicoot. The burrowing bettong is found only on Barrow, Bernier and Dorre Islands and the golden bandicoot is now found only on Barrow Island and in remote parts of the north Kimberley. Both animals were once widespread on the mainland.

CALM scientists Per Christensen and Graeme Liddelow will oversee the releases.

"Once the animals have been landed we will do our utmost to ensure they survive," said Per.

"We will be following their progress for 24 hours of the day. We will supplement the mammals' diet if they run short of food. We will record their behaviour and foraging habits, when and where they move about, how far they travel to find food, what habitat they adopt and every facet of their breeding behaviour.

"Although the released animals will be given every chance of surviving, there is a possibility that they won't. If they don't, we will at least be in a position to know why and be better prepared for future attempts at fauna reintroduction," he said.

CALM will be building on experience gained during its successful numbat, woylie and Noisy Scrub-bird reintroduction projects in the South-West. The only other place where such an ambitious program has been undertaken in the desert is in the Tanami Desert in the Northern Territory. Here, the Conservation Commission has built a fenced compound for the rufous hare-wallabies they are seeking to reintroduce.

OLD FLAMES

On September 13 1988, all was ready for the first attempt at aerial patch burning in the desert. CALM staff from the Goldfields Regional Office in Kalgoorlie had upgraded a disused mining company airstrip (by dragging it with a large piece of iron behind a four-wheel-drive!) and arranged for aircraft fuel to be trucked out from Wiluna. An aircrew, with long experience in aerial burning in the jarrah and karri forests, had arrived and was ready for action.

The day dawned clear and cool. The early morning wind blew from the north-west at about 12 km/h. Weather forecasts were relayed via telephone to Kalgoorlie and by high frequency radio to the Gibson Desert at 0845 hours and again at 1445 hours. Lee-Anne Martin in the Kalgoorlie Office relayed that the morning forecast was for winds from the north-west at 12-15 km/h, backing west at 10 km/h by 1400 hours. Conditions were marginal for fire spread, but just right for attempting the first patch burn. At 1127 hours, the first incendiary tumbled from the aeroplane and lit the spinifex. For the first time in probably 40 years, flames once again licked this part of the desert.

By about 1330 hours, the wind had eased and the fires slowed and began to go out. Aerial observations confirmed that the pattern of burnt patches had met with the prescription. The fires had behaved as expected. As a means of ignition, the incendiary capsules exceeded expectations. Because of the high proportion of bare ground, researchers had only expected about two or three capsules out of 10 to ignite the spinifex. However, up to 80 per cent of capsules ignited. The high success rate was attributed to capsules bouncing across the ground and catching in spinifex clumps - Dambusters style.

Over nine days, some 75 000 hectares of the Gibson Desert Nature Reserve were successfully patch burned by aerial ignition. Overall, about 10 to 15 per cent of this area actually burned. Patch size varied from a few square metres to more than 50 hectares. Fires often burned in narrow strips downwind - ideal firebreaks for preventing the build-up of summer wildfires.

The resulting patchiness of these burns resembles the fire patterns created by nomadic Aborigines shown on early aerial photographs.

CALM scientists make regular field trips to the Gibson Desert to undertake research, despite the lack of facilities.
Photo - David Pearson ▲

And through all this CALM is keeping the local Aboriginal communities involved and informed. Scientist David Pearson also has the task of liaising with the Aboriginal communities of Warburton and surrounding areas.

"The mammal fauna of the desert was very important to Aboriginal people for food and is a significant part of their mythology and culture," said David.

He takes Aboriginal people out to view aerial burning to explain what CALM is doing and why. CALM would also like to involve Aborigines in the tracking of the reintroduced mammals.

Aboriginal people have also been employed over the last few years to search for remnant populations of mammals such as the dalgyte and the black-footed rock wallaby on Aboriginal reserves, vacant Crown land and nature reserves.

Ultimately, it is hoped that this work will halt further extinctions and ensure that currently endangered animal species will populate the deserts of Western Australia for thousands of years to come.

Neil Burrows is a CALM Senior Research Scientist and the co-ordinator of the program to reintroduce endangered mammals to the Gibson Desert. He has also been studying fire behaviour in the desert community. He can be contacted at Como on (09) 367 0333.

Carolyn Thomson is a CALM Communications Officer and *Landscope* Editor. She can be contacted at CALM Public Affairs Branch, (09) 389 8644.

Rock-wallabies threw down the gauntlet to scientists trying to trap them for research. Who ended up winning the catch-me-if-you-can contest?
See page 35.

Shells, tiny crabs and sundry other creatures are sure to please the curious naturalist who invades the intertidal zone at low tide. Explore the place where the shore meets the sea on page 23.

Waterbirds flock to the Vasse-Wonnerup wetlands in their tens of thousands, some travelling over 10 000 kilometres from summer breedings grounds in northern China and Siberia. Turn to page 17.

LANDSCOPE

VOLUME FIVE NO 3 AUTUMN EDITION 1990

Scientists will use modern technology to restore two rare and endangered mammals to an area in the Gibson Desert from which they have become extinct.
See page 10.

It's the burning question! Is prescribed burning in spring or autumn better for the jarrah forest? Or is there another alternative?
See page 28.

FEATURES

REGULARS

COVER

The designs of desert artist Benny Tjapaltjarri show events associated with the Pakuru or golden bandicoot dreaming in the Gibson Desert. The three central roundels depict rockholes and the others represent hills. The background dots show the vegetation of the area.

Managing Editor: Ron Kawalilak
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