DREAMING OF A FUTURE

The re-introduction of rare and endangered animals to the Gibson Desert

By Neil Burrows and Carolyn Thomson 1990

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

The project really began as a result of work by scientists Andrew Burbidge, Norm McKenzie and Ken Johnson in desert regions of the State in the 1970s. They became alarmed at the rapid extinction of mammal species in arid areas. Strangely, this massive decline was comparatively recent. It had only occurred over the last 30 to 50 years. The WA Museum and early explorers reported and collected many mammal species that could no longer be found in these areas.

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

Another possible explanation was 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.

By a process of elimination, research scientists formed the theory that the extinction of mammal species 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 small fires that they lit resulted in vegetation stands of different ages. An aerial photograph from the 1940s clearly shows this patchwork burning pattern.

The changes in the fire regime were decribed 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."

A huge fire at the wrong time of the year 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, but with the vegetation devastated they wouldn't have anything had to eat.

Other mammals, such as the rufous hare-wallaby, need vegetation of differing ages. They like to feed on the soft, green shoots of spinifex that has been burnt in the last two or three years. They live in the old spinifex, which makes an excellent hide but does

not offer much nourishment. Such animals would not be favoured by less regular, larger fires that created large areas with vegetation of a uniform age.

It seemed that the Aborigines of the Gibson Desert were the "key" to the mystery, so 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 question, taking notes," said Andrew.

They learnt that more than one-third of the mammal species of central Australia had vanished and gathered a large amount of biological information about many of these species.

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

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

The Gibson Desert was chosen for the program because a lot was already known about the vegetation, landforms and existing fauna

of the area. For instance, it is known that the burrowing bettong lived there until fairly recently, as the warrens and burrows of these animals can still be seen. It is land managed by CALM, it is reasonably accessible and feral animals are in fairly low numbers out there.

The Gibson Desert Nature Reserve covers 1.8 million hectares, 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 dunes, occasional breakaways and low rocky ranges.

The release is scheduled for May 1991, but before it can become a reality much more groundwork has to be done. Action must be taken to secure the mammals' habitat from predators. Scientists David Algar and Tom Leftwich have surveyed, sexed and aged fox populations and analysed their stomach content to find out what they are eating (they have found that native mammals form a large part of their diet). Foxes, cats and other feral animals will be baited and their numbers monitored.

CALM has also commenced a burning program to prepare the habitat for the introduction of the mammals. 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 was a far cry from the lush and majestic karri forest of the South-West.

There were none of the resources used for fire management in more

populated areas. Roads and tracks to the Reserve were rough and often inaccessible. There were no firebreaks and no way of putting out the fire once it started.

A specific type of fire was needed; one that would leave a patchwork pattern of vegetation of different ages across the landscape; from recently regenerated herbfields to long unburnt patches of spinifex, providing suitable animal habitat and preventing the development of massive wildfires.

CALM fire researchers had to study the behaviour of spinifex fires in order to predict when and how spinifex would burn and under what weather conditions fires would self-extinguish. This was important to achieve 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 would not spread in the most flammable spinifex when wind speed was less than about 12-15 km/h. Other important factors determining the behaviour of spinifex fires included 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 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 the small incendiaries dropped from the aeroplane

would spread. Winds were expected to ease during the day and, by mid-afternoon, fires would go out by themselves.

So in September 1988 the first 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 and fuels common in the Reserve were represented within the trial site and ground access was possible along Gary Highway.

Satellite imagery (Landsat) provided very useful vegetation and landform maps needed for the trial. With some ground work, the satellite images could be used to locate fuel and 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.

Incendiaries were dropped from an aircraft, resulting 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 preparing plans for other desert reserves.

"We are looking at the whole ecosystem, including the plants and animals - not just mammals - and the effects of fire and feral animals on them," said David Pearson, who, along with Janet Gardiner, is studying lizards in the desert community.

CALM scientists Per Christensen and Graeme Liddelow are currently studying the effects of fire on small mammals and Andrew Burbidge and Phillip Fuller are studying desert birds.

These scientists have established sites to study the effects of patch burning on birds, mammals and reptiles. Eight study plots of one square kilometre have been marked: four in burnt and four in adjacent unburnt areas of each vegetation type. For example, two were situated in mulga country, two in sand-dunes and two in spinifex. Research scientists return in different seasons to record the numbers and types of animals using the areas.

"Because of the lack of summer rains this year the burnt areas do not have many birds using them. However, a couple of years ago we did some experimental burning by lighting small fires. When we returned the following year after the summer rains there had been a dramatic change: the burnt area was a mass of flower and seed," said Phillip Fuller.

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 logistics are enormous and the program is costly so CALM has had to approach large mining companies for some financial help.

The two animals selected for release are the burrowing bettong and

the golden bandicoot, now found only on isolated offshore islands of WA. The burrowing bettong is found on Barrow, Bernier and Dorre Islands and the golden bandicoot is now found only on Barrow Island and nowhere else in the world. Both were once much more widespread before they became extinct on the mainland.

"Once the animals have been landed no effort will be spared to ensure they survive. Research scientists will be on their tails for 24 hours of the day. We will supplement their 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," said Per Christensen.

The only other place such an ambitious program has been undertaken is in the Tanami Desert in the Northern Territory. Here, the Conservation Commission built fenced compounds for the rufous hare-wallabies they were seeking to reintroduce. However, they did have some setbacks, for example a fox got into one of the compounds and ate all the animals, but the animals are now doing well.

And through all this CALM is keeping the Aboriginal custodians involved and informed. Lizard researcher 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 a significant part of their mythology and

culture," said David.

He takes the Aboriginal people out to view aerial burning to explain what CALM is doing and why.

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

OLD FLAMES

On the 13th September 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.

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 HF radio to the Gibson Desert at 0845 hours and again at 1445 hours. 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 worth attempting an aircraft 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 the desert.

By about 1330 hours, the wind had eased and the fires slowed and went 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, dropping capsules filled with potassium permanganate and injected with glycol 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 spinifex; a high success rate attributed to capsules

bouncing across the ground and catching in spinifex clumps - Dambusters style.

Over the next nine days, some 75 000 hectares of the Gibson Desert Nature Reserve was successfully patch burnt by aerial ignition. Overall, about 10 to 15 per cent of the total area flown, actually burnt.

The resulting patchiness of these burns resembles the fire patterns created by Aborigines shown on early aerial photographs of areas inhabited by Aboriginal people.