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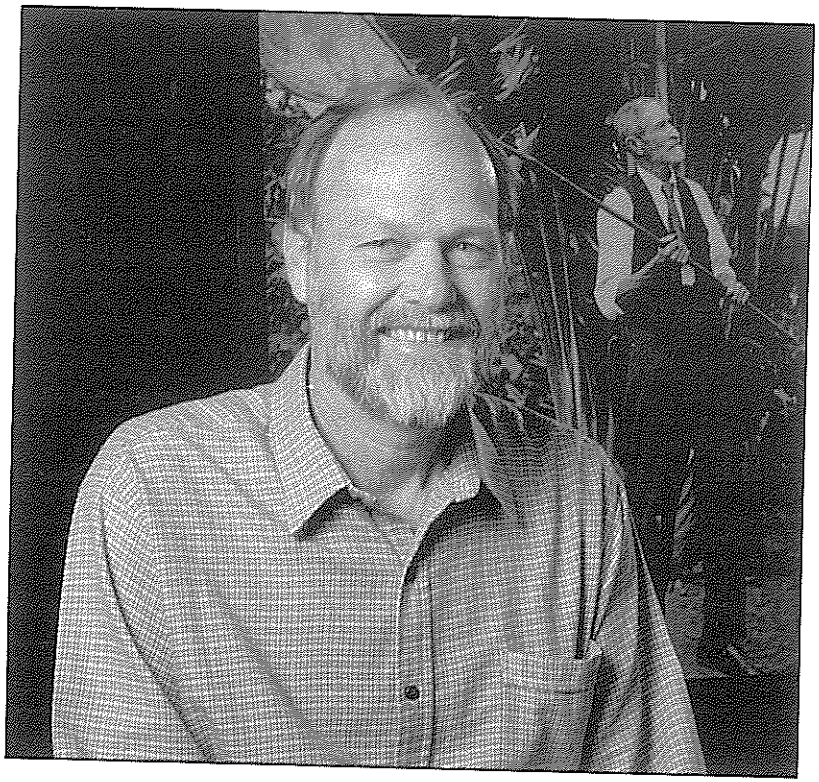

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Introduction of the Sugar Glider *Petaurus breviceps* into Re-established Forest of the Organ Pipes National Park, Victoria

Robert Irvine[1] and Robert Bender[2]

Abstract

In 1989, 13 Sugar Gliders *Petaurus breviceps* were introduced into the Organ Pipes National Park, a re-afforested valley, 26 km north-west of Melbourne, Victoria. These Sugar Gliders were relocated from a nearby (20 km) State Forest at Pyrete Range, Toolern Vale. This initial release was followed up in 1990 with the release of a further 24 animals. Due to the absence of natural tree hollows, 24 nesting boxes were installed prior to the release, spread over a 10 ha area. Introduced glider population densities varied from 0.8 ha^{-1} to 5 ha^{-1} from February 1989 to October 1992. In June 1993, 43 Sugar Gliders were trapped and nesting boxes were installed over a wider area. By May 1995, 31 Sugar Gliders were trapped, marked with 'electronic chips' and some were found nesting in boxes specifically designed for bats. Although there had been a number of reintroduction's at other locations in Victoria, namely Tower Hill, Blackburn Lake and Coolart, this was the first time wild Sugar Gliders had been trapped and relocated. Due to senescence amongst Black Wattles *Acacia mearnsii* at Organ Pipes National Park, food sources may have reduced during the study period. Despite this, the data indicate that the population may have been successfully established.

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Introduction

This study documents the introduction of wild Sugar Gliders into Organ Pipes National Park (OPNP) from 1989 to 1995 and makes comparisons with other Sugar Glider release programs in Victoria. It was conducted to estimate the survival of those released *Petaurus breviceps* into Organ Pipes National Park, and uses available data kept during this period. Recommendations are made for future management of this Sugar Glider population at Organ Pipes National Park and other release programs in Victoria.

The study area

The Organ Pipes National Park (OPNP) (37° 40' S, 144° 45' E) (Figs 1-3) was declared in 1972 and it currently has a total area of 121 ha. A continuing rabbit problem has meant that, until very recently, almost no young trees have naturally regenerated and there is almost no understorey. As a result, the area has many well-grown trees of nearly the same age (Kemp and Irvine 1993. Nevertheless, a preliminary evaluation of the alluvial flats concluded that the habitat had become adequate for a fauna release program and could support a small population of Sugar Gliders (FOOP Nov 1987, Feb 1988). The release area was set as the alluvial flat in the bend of Jackson's Creek opposite the Organ Pipes formation. This is divided in two by a steep ridge along which the main track into the valley has been constructed. There are about 5 ha of alluvial flat either side of the central ridge.

[1] 11 Mudie Ave, Sunbury, Victoria 3429.
[2] 9 Bailey Grove, Ivanhoe, Victoria 3079.

Climate

Climatic records for OPNP have been maintained since 1972 and show the area

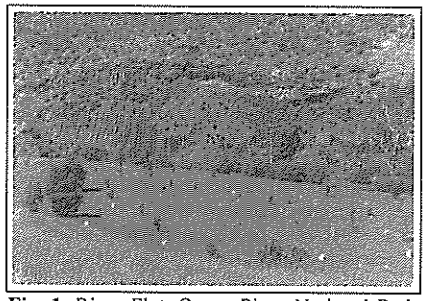

Fig. 1. River Flat, Organ Pipes National Park, September 1978. Photo: D. Marsh.

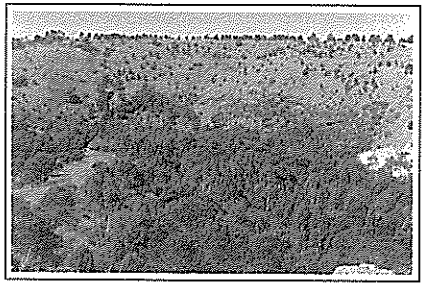

Fig. 2. Organ Pipes National Park, October 1990.

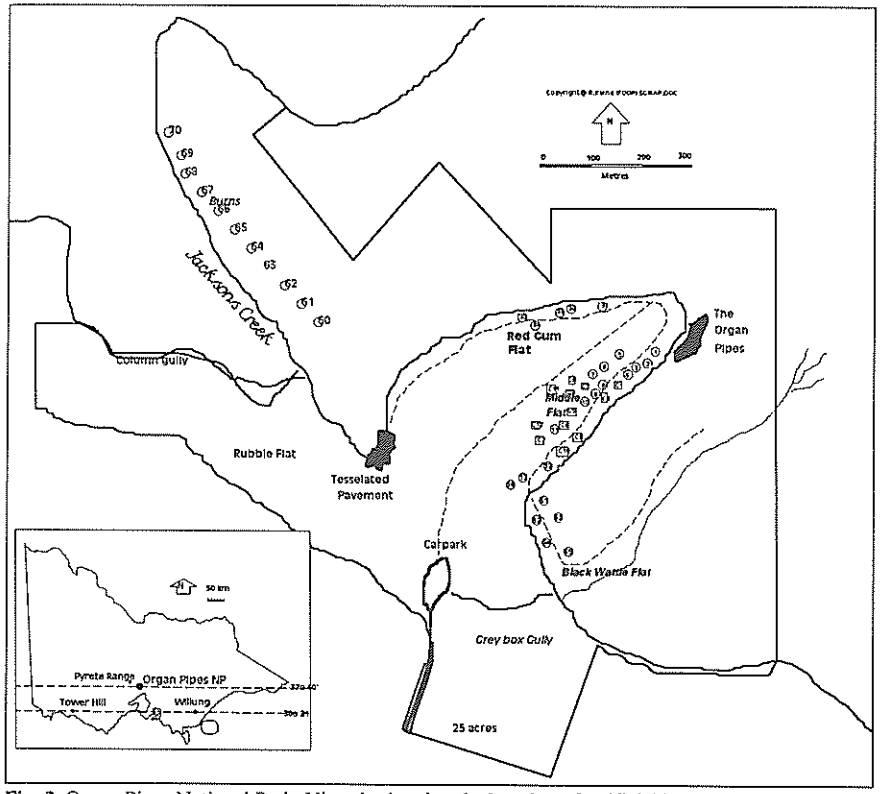

Fig. 3. Organ Pipes National Park, Victoria showing the location of artificial hollows in 1992.

to be a rain shadow, with a mean annual rainfall of 575 mm. This is considerably drier than Tower Hill (730 mm) and Willung (750 mm), where wild Sugar Glider populations were studied by Suckling (1983), and both sites were at more southerly latitudes than OPNP. Mean temperatures are similar (20°C at OPNP and 18°C at Tower Hill in February), with a mean of 10°C at both places in July. In late spring and summer, evaporation exceeds rainfall (Willis 1964) and moderate frosts occur during winter. A full account of the climate is given by McDougall (1987) and Wilk *et al.* (1978).

Vegetation

The study area in OPNP had been largely denuded of vegetation by 1972 and the land was very degraded, with 90% covered by 24 species of noxious weeds, dominated by African Boxthorn *Lycium ferocissimum*, Spanish Artichoke *Cynara cardunculus* and Horehound *Marrubium vulgare*. It was infested by rabbits, foxes and other vermin, and became severely eroded (Edwards 1974). Few native plants or animals survived except where some protection was provided by rock crevices or creek banks.

By 1989 the revegetation project at OPNP had been an outstanding success as indicated by the diversity of indigenous species found in the Park. Woodlands of trees and shrubs now provide excellent habitat for native animals. Natural regeneration of trees and shrubs is now occurring where the rabbit population has been controlled (Kemp and Irvine 1993). It has been planted with a forest of River Red Gum *Eucalyptus camaldulensis* and Manna Gum *Eucalyptus viminalis*, Blackwood *Acacia melanoxylon*, Silver Wattle *A. dealbata*, Black Wattle *A. mearnsii* with dense growth of Woolly Tea Tree *Leptospermum lanigerum* and River Bottle-brush *Callistemon sieberi* at the water's edge.

The area known locally as Middle Flat (Fig. 3) is part of the Red Gum zone of the original planting plan (Kemp and Irvine 1993). By 1989, there were Yellow Box *Eucalyptus melliodora*, Yellow Gum *Eucalyptus leucoxylon*, River Red Gum and Manna Gum which have grown to a height of 20 m. There was also a mixture of Wattles , including Black Wattle, Silver Wattle, Wirilda *A. retinodes* and Golden Wattle *A. pycnantha* which had reached 10 m in height. The principal understorey plants are grasses, Tree Violet *Hymenanthera dentata*, River Bottlebrush, Sweet Bursaria *Bursaria spinosa*, Lightwood *Acacia implexa* and Silver Banksia *Banksia marginata*.

Fauna

A general fauna survey conducted in February 1988 by Arthur Rylah Institute (Department of Conservation and Natural Resources – DCNR, now DNRE) recorded no Sugar Gliders (Brereton and Schulz 1988). It was accepted that the Sugar Gliders were unlikely to recolonise the park, as the nearest forest population was too far away and there was no suitable habitat in between through which they could migrate to the park. Bird surveys showed a steady increase in species using the area, and a fauna survey in 1988 showed the presence of some possum species using the creekside trees for food and nesting.

Artificial hollows

In 1972 there were few old trees with nesting hollows in the park, but a vigorous planting program since then has filled the alluvial flats with young trees. By 1989 all were still under 20 years old, so none had natural nesting hollows. Because young regenerating forest is usually an unsuitable habitat for arboreal mammals, particularly forest-dependent species (Suckling and Macfarlane 1983), the release proposal involved building artificial nesting hollows, constructed by Friends Of Organ Pipes (FOOP), to be attached to trees along the creek (Fig. 4) to make the area more habitable by Sugar Gliders.

In January 1989 two types of artificial hollows were constructed: box and log. Each hollow had a circular side entrance near the top, and a hinged lid that could be opened for inspection and cleaning out of unwanted materials such as bird nests, rats or bees. Later, in an unrelated project in the same area to provide roosting sites for bats, 10 bat roosting boxes (Fig. 4) were installed. These had smaller internal dimensions than the glider boxes, and each had a 30 mm entrance slit in the base rather than a circular side entrance. In November 1990, 20 months after the initial glider release, FOOP constructed and installed an additional 21 boxes designed for birds (but similar in design to the glider boxes), and these were installed further west in the park, upstream of the Tessellated Pavement and along Column Gully (Fig. 3).

Inspection of these in 1991 revealed that released Sugar Gliders had extended their range and were also using the additional boxes (FOOP April 1991). To further encourage the northern expansion of the Sugar Gliders range, another ten boxes (nos 60–70) were installed along Jackson's Creek in 'Burns paddock' in 1992.

Sugar Glider release program

In January 1989, young non-breeding animals were captured in the Pyrete Range, Toolern Vale, (37° 35' S, 144° 32' E) (Fig. 3). This area was chosen as suitable because the Sugar Glider population was large enough to have extra animals removed. Traps were attached to Eucalypt and Wattle trees at heights ranging from 2–5 m above the ground. A mixture of honey and oats was used as bait and, as an additional attractant, a trail of dilute honey was laid from a trap to the main stem of the tree. Initially Sugar Gliders, were selected by age (a range of 2+ years to 4 months) (Table 1) and breeding condition. They were transferred to enclosures in two compounds at Arthur Rylah Institute (ARI) for 10 days to familiarise them with their new nest boxes, to allow group interrelationships to be formed and to ensure the animals were healthy. All animals were weighed, sexed and had metal ear tags attached, male Sugar Gliders on the right ear, females on the left ear. They were transported in their nest boxes to OPNP where 'family' groups of *P breviceps* were placed in three of the 24 boxes that were attached to trees along the creek.

The first Sugar Gliders were released at

Red Gum Flat and the northern end of Main Flat in February 1989 (FOOP Feb 1989). For the first few weeks, supplementary food (baby food, egg and honey) was set out atop the glider nesting boxes. Most of this food was consumed overnight. Artificial feeding was discontinued ten days after release to encourage the young *P. breviceps* to establish their own feeding patterns.

Another trapping was conducted at Toolern Vale in February 1990 and after a week at the ARI to settle down, the Sugar Gliders were released into the park on 9 March 1990 (FOOP April 1990).

Methods

Nest box inspections

All artificial hollows (nest boxes) were inspected in daylight on a monthly basis from 1989 to 1992, and intermittently after that period., Inspection was by raising the hinged lid and looking inside the interior. Any gliders found inside were not removed from the boxes, but the number of occupants was estimated. Presence of a spherical nest of Eucalypt leaves was seen as an indicator of box use by gliders (Triggs 1989).

Spotlighting

Spotlighting sessions were conducted, by park staff and the Friends group, at about one month intervals to gauge activity of gliders throughout the park. A hand-held, 100-watt lamp was used, and the movements and number of gliders seen were recorded for each session.

Trapping

A three-day trapping program was conducted every two years, in winter, 1989,

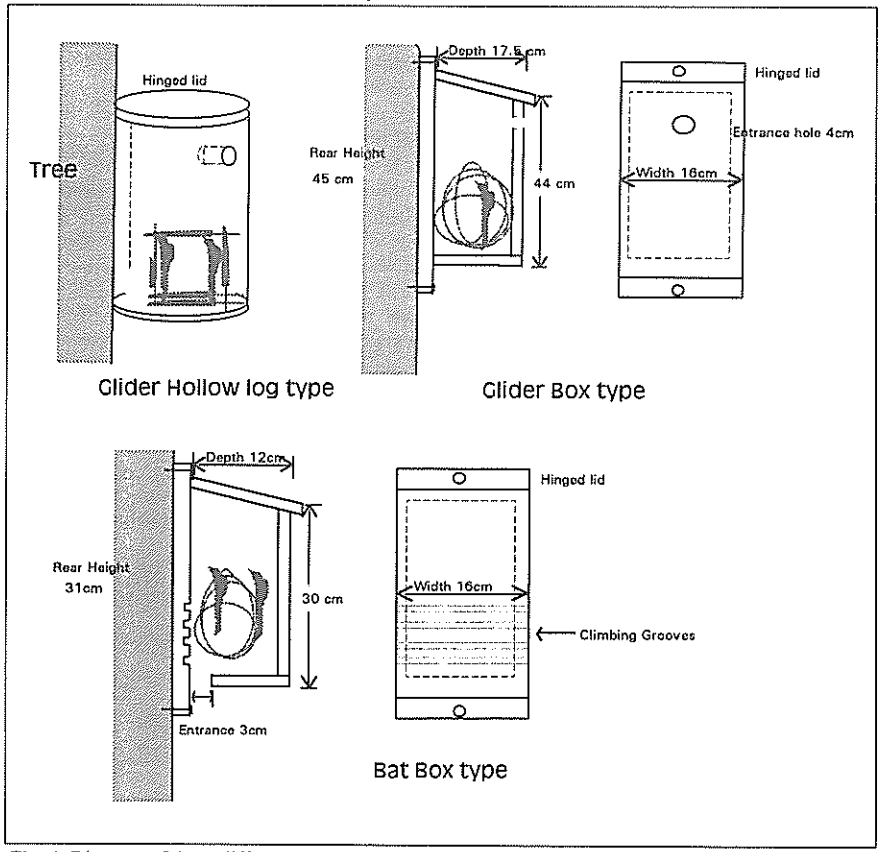

Fig. 4. Diagram of three different types of artificial hollows established at Organ Pipes National Park.

Table 1. First and second release of Sugar Gliders into OPNP.

	Sex	Estimate of age (years)	Weight (grams)
1	F	<1	78
2	F	<1	72
3	F	1+	97
4	F	1+	93
5	F	1 to 2	102
6	F	1 to 2	112
7	M	4 months	89
8	M	<1	90
9	M	<1	88
10	M	1	86
11	M	1 +	93
12	M	1 to 2	113
13	M	2 +	93
1	F	2	132
2	F	<2	115
3	F	2	137
4	M	1	88
5	M	1	74
6	M	2 +	142

1991, 1993 and 1995. Nine months after the initial release an assessment trapping was made at OPNP during Nov 15-17 1989 to determine the status of the population of wild-caught Sugar Gliders released in February. A total of 68 Elliot traps, 30x10x10 cm (Elliott Scientific Co., Upwey, Melbourne) and 8 wire traps was set over 3 nights, giving a total of 228 trap-nights. (Table 2). In June 1993, 150 aluminium Elliott traps were set up in a variety of *Eucalyptus* and *Acacia* trees along the creek. Over two weeks they were baited with a sweet food, and inspected twice a day for captured gliders. Those captured were taken to the park's Visitor Centre for data collection, including weight, sex, fur colour, condition, age (assessed by tooth wear), and ear tattoo (FOOP July 1993).

In the May 1995 trapping, 200 Elliott traps were set, covered with plastic in case of rain, and baited with a mixture of rolled oats, honey and dried apple. Socks were placed in the traps, to keep any trapped gliders warm. By this time many of the gliders had been micro-chipped and could be identified merely by passing an electronic wand over the chipped area.

Results

Number of Sugar Gliders

In February 1989 thirteen Sugar Gliders, seven male and six female (Table 1), were released and a monitoring program was commenced immediately. By August 1989, daytime box inspections and follow-up night-time spotlighting monitoring of those boxes known to have gliders in them regularly yielded no more than two sightings (FOOP July 1989, Sept 1989).

Table 2. Mean weights of Sugar gliders captured at OPNP 1989- 1995 compared to Tower Hill, Pyrete Range and Willung (Suckling 83). Key: A, OPNP body weight (g); B, Pyrete Range body weight (g); C, Willung body weight (g); D, Tower Hill body weight (g).

Sex	Age (y)	A	B	C	D
Male	<1	92	89	<115	127
	1-2	97	95	100-150	140
	>2	125	117	120-160	154
Female	<1	89	78	<100	111
	1-2	120	107	90-130	121
	>2	130	128	100-140	137

The November 1989 trapping yielded six animals, two of which were pregnant females. Four had metal ear tags, but two were untagged, which suggested that predation by Owls (Geoff Pitt *pers. comm.*) and other predators was being offset by at least some of the gliders breeding. Sugar Gliders have a number of native predators (Brunner *et al.* 1975; Henry *et al.* 1984) that were known to be present in the park ,as well as possible introduced predators. It was therefore expected that predation by owls would mean further releases of captive gliders were needed to maintain the breeding population until a balance was achieved. On one spotlighting evening, an owl was seen swooping down to pounce on a glider and carry it off (FOOP Feb 1990). DCNR Wildlife Division was satisfied that a sufficient number of animals had survived and agreed to relocate more animals.

In 1990, another 18 gliders were trapped and subsequently released into the park in April 1990. As with the earlier releases, they were provided with an artificial food supply, daily at first and then every second day, until the frequency was reduced to fortnightly and eventually discontinued (FOOP July 1990). At this stage, a total of 37 Sugar Gliders had been released into the National Park.

The box inspection records and the May 1991 trapping suggest that the colony had split into three separate family groupings.

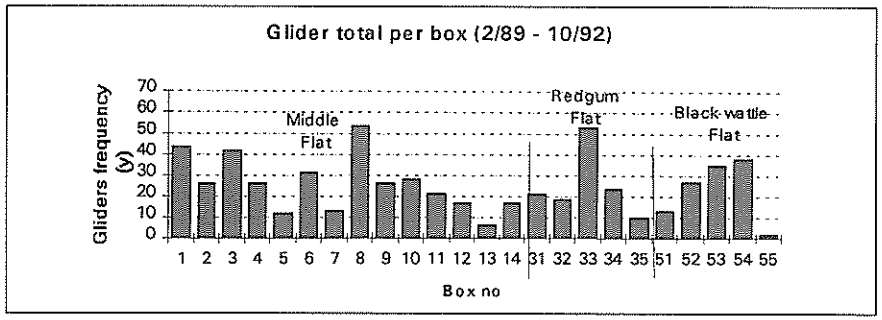

Fig. 5. Sugar Glider usage of artificial nest hollows at Organ Pipes National Park February 1989 to October 1992 (y) indicates the number of times gliders were seen in the box during the 46 monthly inspections.

Three males, an older one and two younger ones, had at first formed a single colony (on Main Flat), but later the two younger males had moved off to form their own groups, one upstream in the bird boxes on Rubble Flat, the other further downstream on Black Wattle Flat. Twenty untagged animals were captured (FOOP April 1991).

In June 1993 a trapping yielded 43 Sugar Gliders, so the population had considerably increased from the group released two years earlier (FOOP Sept 1993). During this survey period, the cumulative total of successful trappings was 966 animals, many being trapped repeatedly. All the artificial hollows were occupied at some time by gliders, in addition to some boxes which contained Eucalyptus leaves woven into a ball about 25 cm in diameter, a common sign of nest-hollow use by gliders (Triggs 1989). This is consistent with the fact that a number of gliders use a several different hollows, particularly during the breeding season (Golding 1979; Suckling 1980, 1984).

In May 1995, thirty-one animals were trapped over four nights, including six which were previously unrecorded young.

Glider density

Data for glider occupation were measured using the area enclosed by boxes 1–55 for the period 2/89 to 10/92. Accurate changes in the density of Sugar Gliders can be calculated where 0 represents the density before the first release (Shulz *et al.* 1989). During the program at known times and locations certain recorded numbers of gliders were released. From then on, densities could be calculated using a combination of box inspection results and trapping results over known areas of boxes (10 ha) and traps (Fig. 5). By July 1991 CF and L (now DNRE) reported that the glider population was increasing faster than expected and seemed to be a success (FOOP Sept 1991). Data were recorded by the use of the 'know to be alive' technique, i.e.using individual records of animals over a long time period, and if missing or not observed during one or two sessions but recorded in a later session, they were regarded as known to be alive throughout the period (Fig. 6).

Health and condition of animals

All of the original Sugar Gliders trapped at Pyrete Range were in good health, the individual weights are shown in Table 1. Comparison of later trappings at Organ Pipes National Park are shown in Table 2. The animals at OPNP had, on average, lower weights than animals at Wilung and Tower Hill. (Suckling 1983).

Discussion

The results of this release program are comparable to the similar program at Tower Hill (Suckling *et al.* 1983, 1989). The apparent lack of success at Blackburn Lake (Juzva and Peeters 1992) and of the early attempts at Tower Hill make the success of the release program at the Organ Pipes National Park very significant. Although the OPNP is, in the main, an artificially regenerated forest surrounded by cleared farmland, it does have something of a flora corridor along Jackson's creek. Assessing the survival success of the colony and the number of gliders in the area is difficult as all traps have been set within the National Park and some Sugar Gliders may have moved in and out of the

park study area in search of further food sources or nesting hollows, while some may have been forced out of the area by competing family groups. The Blackburn Lake project (Juzva *et al.* 1992) may have failed due to predation of gliders by foxes, feral cats and other introduced predators, common in urban areas. To avoid repetition of this experience, regular carnivore baiting and trapping was carried out at OPNP during the study period. It was agreed that a control program of known glider predators, foxes *Vulpes vulpes*, and cats *Felis cattus* (Brunner *et al.* 1991), had to be intensified preparatory to the proposed release, which might otherwise just be providing free food for the feral carnivores (FOOP July 1988).

By June 1991 results suggested that the glider reproduction rate was adequate to maintain the population against owl predation (FOOP June 1991). Seasonal variations in numbers of Sugar Gliders in boxes is known to be partly due to dispersal of sub-adults from parental groups, and to the formation of larger aggregations during winter perhaps to huddle together to keep warm (Menkhorst 1984).

As all those gliders released into the park had metal ear tags (Salt Lake Stamp Co., U.S.A) or had been tattooed (later micro chipped), it was possible to determine the numbers of wild-bred animals in the population. However, measurement of survival rate has problems as it is possible for gliders to move out of the park along the Jacksons Creek corridor where there are sufficient mature trees existing to provide tree hollows. So more may survive than are shown by trapping results within the park.

In April 1992, FOOP established a set of bat roosting boxes in the same general area as the glider boxes, but on different trees (Irvine and Bender 1995). The boxes had a very different design, but inspection of the bat boxes showed that several were regularly used by gliders. This was clear from the discovery that either gliders were in residence when the boxes were inspected (all ten boxes have been used by gliders at some stage), or there were leaf-nests inside the bat roost boxes, and the borders of the entrance slits on some boxes showed signs of gnawing, presumably by gliders attempting to widen the narrow entrances to make entry and exit easier (FOOP Aug 1994, Dec 1994, Feb 1995, April 1995).

Feral honeybees in the artificial hollows

Soon after installation of the artificial tree hollows, bees established nests in two boxes, while others were regularly used by Common Brushtail Possums *Trichosurus vulpecula*, Ringtail possums *Pseudocheirus peregrinus* and Black Rats *Rattus rattus* (FOOP May 1989).

During the study, many boxes needed maintenance in the form of repair or replacement following infestation of bees, which was a problem each swarming season. Eventually a solution was found to keep bees out, which involved fitting a small pest strip under the lid of all hollows. Bees still occupied these hollows but inspections revealed heaps of dead bees which are easily removed. In comparison to the problem at Tower Hill at which bees were found in 51% of hollows (Suckling and Goldstraw 1989) OPNP was less affected. As bees were generally removed promptly, it should not have had a significant effect on the number of hollows available for use by gliders. However, at swarming season, some hollows have been occupied by aggressive bee swarms which may have caused some glider mortality due to gliders being driven out of their boxes and exposed to attack by predators (Laila Sadler *pers. comm.*).

Population size and density

Box inspections at OPNP found a maximum of four gliders per box (cf. Suckling 1984 who found a 'normal' group size of seven). This suggests that box counts could have under-estimated the number of gliders in each box. During OPNP box inspections gliders were not actually removed from boxes, but an estimate of the number of occupants was made visually. As gliders often sleep stacked one on top of another, it can be difficult to estimate accurately the number of animals in a crowded box. However, if this was the case it could be argued the Sugar Glider population is actually an underestimate and any inaccuracy should be corrected during the trapping program every two years.

It is clear from the box inspection results that all boxes were used, but that there was one box in each area that was used most

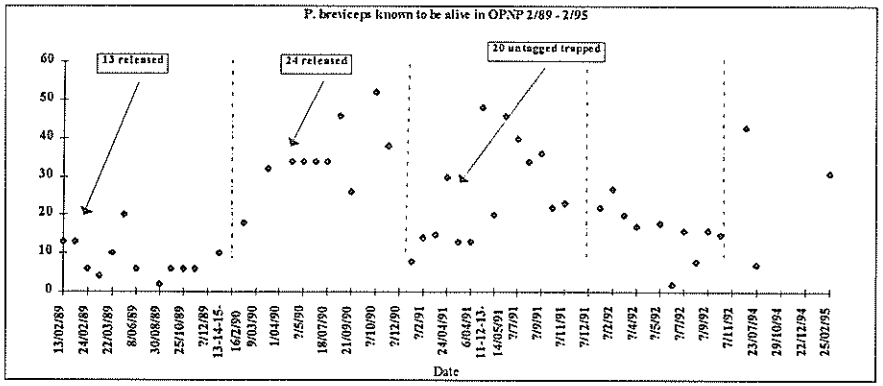

Fig. 6. Number of Sugar Gliders known to be alive at Organ Pipes National Park. Data from a combination of nest box inspections and trapping (labelled).

frequently, i.e. Box 8 in Middle Flat, Box 33 in Redgum Flat and Box 54 in Black Wattle Flat (Fig. 5). This may indicate a separate family group on each Flat.

The glider population at the park seems to have decreased after the initial release, possibly as a result of predation by owls, but after the 1990 releases appears to have increased significantly over the following three years, with a maximum park population of around 43, reached in 1993. Since then, there has been some decline, to around 30. This may be the result of multiple causes, with some animals moving along the creek beyond the park boundaries and so beyond the reach of the trapping program. It may indicate something about the carrying capacity of this area, with dispersing young having to seek territories outside the National Park. Other causes might be the senescence of the Black Wattles which are all of about the same age, and reaching the end of their normal life span of around 20–25 years. Breeding seems to be continuing successfully, since new untagged animals have been found at each trapping. These replace losses due to death of ageing animals, and predation by owls, foxes and feral cats.

Sampling difficulties

Long-term identification of individual animals has proved difficult as the coloured metal ear-tags used on first release were soon torn off, perhaps in aggressive male interactions, so a program of ear tattooing was begun. This was not started until some ear-tags had already been lost and tracing an identified ear-tagged animal to a later tattooed animal is not possible for some gliders. The tattoos also proved a problem, as they faded and were torn. The third attempt at secure identification has been by placement of microchips beneath the skin, but again, tracing tattooed individuals to later micro-chipped animals has proved difficult for most of the gliders. So there is limited continuity in the data and extracting life histories of survival and movement is frustrated by these gaps in the data. Population sampling during this study has been highly variable, with box inspections being carried out monthly from February 1989 to October 1992, and then only biannual trapping in 1993 and 1995.

Survival and status of Sugar Glider population at OPNP.

During one of the trapping programs in 1990 some of the trapped gliders were released at the south-eastern extremity of the OPNP. The gliders did not travel upstream towards the artificial nesting boxes but instead moved away from the park possibly towards a natural tree hollow in one of the many original River Redgums (Richard Leppitt *pers. comm.*). Dispersing individuals are known to go as far as 1.9 km (Suckling 1984) and so have the potential to move well outside artificial hollow and trapping locations in OPNP.

The age structure, population size (Fig. 6), reproductive success, survival and condition (Table 2) of OPNP gliders substantiate the conclusion that the species has been

successfully established as a self-regenerating population in the National Park. The population of Sugar Gliders has now persisted at OPNP for seven years. In the study period the size of habitat has expanded as young tree seedlings have matured to offer new territory for gliders, and the planted trees which were a maximum of 17 years old in 1989 are now seven years older and more capable of sustaining a glider colony. As the rainfall at Organ Pipes National Park is lower than Tower Hill or Willung the growth rate of these trees may be slower and not provide as much food. The most recent survey indicates that there are about the same number of gliders in the park as were released in 1989-90. From these findings, reports, that the minimal viable size required for a glider program was 2000 ha, (Juzva and Peeters 1992) now appear to be an over-estimate.

Future management implications

The data gathered during this project are relevant to the future management of Sugar Gliders at Organ Pipes National Park and to management of regenerating forest areas elsewhere in the state for the conservation of Sugar Gliders.

To ensure this survival there must be a planned provision of natural food sources. In the OPNP, these sources are *E. viminalis* in spring-summer and in winter are likely to be *Acacia* species (Suckling 1980; Suckling and MacFarlane 1983). The continued survival of Sugar Gliders at OPNP suggests there were adequate natural food resources during the study. The presence of Acacias capable of producing gum seems to be of great importance, at least to southern populations. Seven such trees are enough to sustain one Sugar Glider (Henry *et al.* 1989). The OPNP has a strict planting policy of using only local gene-stock. Self-seeding has been significantly affected by rabbits that are still a major problem, so the senescent mature Black Wattles, which are a major food tree, have not been replaced by maturing younger trees, and the food source is contracting. Senescence of wattles is very high and most trees are about 20 years old. This means a major regeneration program is needed to keep Sugar Gliders alive in the long term. Whether it is possible to replace the currently dying older trees with younger trees in time to be used as a food source and thus ensure the survival of the current glider population remains to be seen.

Sugar gliders reduce their energy requirements in winter by huddling together in nest groups, so to survive in OPNP Sugar gliders need adequate shelter. Shelter sites must be provided in all areas where trees have reached 5–6 m in height, which will allow dispersing animals to find shelter in, and colonise all, areas of habitat that provide sufficient food.

Comparison of density of artificial hollows at Organ Pipes National Park (2.4–1.0 nos per ha) are comparable with densities recorded by Suckling (1984) at Willung (0.5–3.0 ha) and Tower Hill (3.0– 5.0 ha). The erection of more hollows at suitable sites should allow more *P. breviceps* to survive in the park. Recommended box density is 3–5 nest hollows per hectare, preferably clumped into groups (e.g. within a radius of 100 m).

Until such time as the planted trees at OPNP form hollows, it will be necessary to ensure that nest sites are provided and maintained in useable condition. Experience has shown that boxes need to be constructed soundly from a resilient type of wood to survive for many years out in the weather.

This study been shown that Sugar Gliders will use boxes designed for bats with the slit at the bottom of the box (Fig. 4) this has the advantage that bees do not swarm into these boxes. Recent studies also have indicated that fitting loose carpet to the roof of artificial hollows may stop bee infestation, but studies are only at the preliminary stage.

Further research is needed to document more accurately population variation of the Sugar Gliders at Organ Pipes National Park. Some studies are currently underway and those results should be published soon.

Acknowledgments

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