Vigilance in hand-reared agile wallabies (*Macropus agilis*) after release

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Considering the impact human development continues to have on wild Australian fauna such as agile wallabies (*Macropus agilis*), it is important to not only establish wildlife rehabilitation centers, but also study the effects this different upbringing may have had on the survival of hand-reared agile wallabies once they are released into the wild. Vigilance is a vital anti-predator behavior: in order to survive in the wild, wallabies must spend a substantial amount of time looking out for possible threats in their surroundings. Specifically, the study investigated whether time spent vigilant changed progressively after release, comparing wallabies that had been raised and released in Sheoak Ridge in 2011-2013 with those released in 2014. Wallabies released in 2011-2013 allocated 23.63% of their time to vigilance whereas wallabies released in 2014 allocated 22.67% of their time to vigilance. Overall, hand-reared wallabies dedicated 22.96% of their time to vigilance. There was no significant difference in the time spent vigilant between wallabies released in 2011-2013 and those released in 2014, nor between all hand-reared wallabies and the 21% average found by Stirrat for wild wallabies during dusk [1]. Vigilance in hand-reared agile wallabies did not change progressively after release, and was similar overall to the percentage of time allotted to vigilance by wild wallabies. These results suggest that wildlife rehabilitation efforts are successfully preparing hand-reared wallabies to survive in the wild, and can serve as groundwork that we can continue to improve upon in order to alleviate our impact on their natural communities.

Introduction

Agile wallabies (*Macropus agilis*) are the most common macropod species found in northern Australia [1]. Although the International Union for Conservation of Nature (IUCN) has given agile wallabies a conservation status of “least concern,” wallaby populations are experiencing increasing stress from introduced predators such as red foxes (*Vulpes vulpes*) and dingoes (*Canis lupus dingo*) [2, 3], native predators such as wedge-tail eagles (*Aquila audax*) and salt water crocodiles (*Crocodylus porosus*) [4], as well as encroaching human development [5].

Wallabies are herbivores and feed mainly on grass. During periods of grazing or foraging, the wallaby’s attention is diverted, making it more vulnerable to predator attacks. Previous studies have shown that in order to manage the risks associated with feeding, agile wallabies travel in mobs of about 10 individuals, with alternating periods of vigilance to provide mutual protection. Vigilance is defined as a period where the wallaby is actively alert or watchful, a crucial behavior to survival. In general, animals that have predators, especially terrestrial predators, will “trade off foraging with anti-predator vigilance” [4]. A study conducted by Stirrat found that in the dry season wild agile wallabies spend about 56% of their time foraging. Vigilance represented approximately 17% of their activity budget during the daytime, 16% at night, and 21% at dusk in the dry season [1].

Australia’s increasing urban sprawl has led to an increased number of wildlife-car collisions where native animals, like wallabies, are often the victims [6]. Joeys that do not die on impact can survive up to five days inside the pouch of their dead mother. The increase in wildlife-car collisions has resulted in more orphaned joeys raised in captivity by trained wildlife caretakers [7]. While human contact is minimized, and caretakers try to emulate the circumstances the joey would experience in the wild, it is possible that developing in an artificial environment could impact the wallabies’ behavior. If development in captivity affects the wallabies’ vigilant behavior, such repercussions could be detrimental once the wallabies are released into the wild.

The wallabies used in this study were raised at Sheoak Ridge Nature Reserve in Far North Queensland. Sheoak Ridge is a reserve highly valued for its ecological diversity: its 165 acres are home to open eucalyptus woodlands, riparian rainforest, melaleuca wetlands, billabongs, and complex ecotones [8]. In Queensland, particularly in the coastal areas, such as Sheoak Ridge, the reserve is located, the number of road kill accidents increases during sugarcane harvesting season between May and November. Traffic may intensify to six trucks an hour twenty-four hours a day on the main road located 13km from Sheoak Ridge [9].

Agile wallabies are considered ready to be released into the wild when they reach a weight between 6-7 kilograms, as long as their caretakers see no patterns or behaviors that would excessively endanger the animal, such as if a wallaby is considered to be too comfortable around humans, or if the animal is apathetic. At Sheoak Ridge wallabies go through a “staged pen release” where they live in pens of increasing size with decreasing amounts of human contact. The staged release allows the wallabies to familiarize themselves with other wallabies and with the predator sounds that would be natural in the wild. Finally, the wallabies are
released under “soft release.” The doors to the pen are opened, allowing the wallabies to leave to go into the wild, but they can return at any time to their pen for additional support, such as supplementary feeding. This leads to a much less stressful release than “hard release,” where wallabies are released into the wild with no support system. Hard release is known to have a much higher mortality rate [9].

This study aims to compare the general activity budget of recently released wallabies with those that have already lived in the wild between 1-3 years. In particular, we investigate the percentage of time spent vigilant between recently released and wallabies released 1 to 3 years ago. While previous studies have focused on activity budget allocation in wild wallabies [1,10] and the activity budget and vigilance in captive wallabies as compared to wild wallabies [11,12], there are no studies that assess how or whether vigilance in released, hand-reared wallabies changes progressively after release. Most research concerning captive wallabies studies their physiology and biology. In fact, there are no studies that focus exclusively on the behavior of captive agile wallabies, and there exists even less information about the behavior of rehabilitated and released wallabies. Most of the information on released wallabies is anecdotal because placing tracking devices on released animals is both invasive and expensive [9].

While it may be difficult to accurately measure if the time that wallabies spend in human care has any repercussions on their general behavior after release, this study aims to provide a first approach at assessing the impact that time spent in care may have in the anti-predator behavior of released hand-reared agile wallabies.

**METHODS**

This study uses behavioral observations of wallabies taken into care as early as 2010 and released back into the wild as recently as September, 2014. Observations quantifying the general behavior of the animals yielded data on 17 different wallabies, 10 of who were released in 2014 and 7 who were released between 2011 and 2013.

Observations were taken on October 8th and 9th, 2014, towards the end of the dry season. For the purpose of this study, wallabies released before 2014 are considered to have spent more time in the wild, and those released in 2014 are considered recent releases. These observations were carried out at Sheoak Ridge, in North Queensland, Australia.

**Observation Sessions**

Observations were conducted between 6-8am in the morning and between 4-6pm in the afternoon. Observers sat on a couch facing an open lawn where the wallabies may come get supplemental food twice a day. The lawn is surrounded by rainforest on two sides, woodland on another, and a house behind the observers. There

![Figures 1 and 2.](image1.png) Sheoak Ridge – These are photos of the lawn where released wallabies may come back twice a day for supplementary feed.

<table>
<thead>
<tr>
<th>Behavioral Category</th>
<th>Description</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foraging</strong></td>
<td>Anytime the wallaby was observed eating or searching for food. Regurgitation was classified under foraging while standing (F2).</td>
<td>(F1) = Crouching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(F2) = Standing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(F3) = Propped up</td>
</tr>
<tr>
<td><strong>Vigilance</strong></td>
<td>Anytime the wallaby was acting alert, whether the wallaby looked up from feeding, scanned his surroundings, or focused on a specific object or location.</td>
<td>(V1) = Crouching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(V2) = Standing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(V3) = Propped up</td>
</tr>
<tr>
<td><strong>Locomotion</strong></td>
<td>Anytime the wallaby moved from one place to another.</td>
<td>(LW) = Walking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(LH) = Hopping</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Any behavior that did not fit the descriptions for the previous categories. Times when the animal exhibited alertness or foraged while lying down, or times when the wallaby did not engage in any particular activity, were considered as resting (OR).</td>
<td>(OS) = Socializing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(OG) = Grooming</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(OR) = Resting</td>
</tr>
</tbody>
</table>

**Table 1.** Categories of Behavior – Description and characterization of the four categories used to classify the wallabies’ behavior.
were 16 plates dispersed throughout the area for supplementary feeding at dusk and dawn. The primary wildlife caretaker at the site sat near the observers to provide the names and histories of the wallabies present.

Upon arrival at the property, a waiting period of 10 minutes was allotted before observations were taken in order to minimize disturbance from the vehicle’s arrival and allow the wallabies to grow accustomed to human presence. The wallabies were then observed individually, in random order, for a period of five minutes each.

There was a distance of about 3-4m between the lawn and the observers so that, once the wallabies became accustomed to our presence, the interactions were minimal. Those wallabies that approached the human observers and their caretaker were not evaluated for the time that the interaction lasted.

<table>
<thead>
<tr>
<th>Name</th>
<th>Sex</th>
<th>Stage of life when wallaby came into care</th>
<th>Date of arrival at Sheoak Ridge**</th>
<th>Date of release</th>
<th>Time since release</th>
<th>Weight at release</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harley</td>
<td>Male</td>
<td>Velvet</td>
<td>Oct. 18, 2010</td>
<td>Aug. 17, 2011</td>
<td>38 months</td>
<td>6kg</td>
</tr>
<tr>
<td>Wee Willy</td>
<td>Male</td>
<td>Velvet</td>
<td>Nov. 13, 2011</td>
<td>Jan. 27, 2012</td>
<td>34 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Lara</td>
<td>Female</td>
<td>Pinkie</td>
<td>Dec. 1, 2011</td>
<td>Apr. 3, 2012</td>
<td>30 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Barry</td>
<td>Male</td>
<td>Furred</td>
<td>Jan. 1, 2012</td>
<td>May 9, 2012</td>
<td>29 months</td>
<td>6kg</td>
</tr>
<tr>
<td>Tiffany</td>
<td>Female</td>
<td>Velvet</td>
<td>June 7, 2012</td>
<td>Sept. 9, 2012</td>
<td>25 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Holly</td>
<td>Female</td>
<td>Velvet</td>
<td>Feb. 15, 2013</td>
<td>Jul. 16, 2013</td>
<td>15 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Jojo</td>
<td>Female</td>
<td>Pinkie</td>
<td>Feb. 21, 2013</td>
<td>Jul. 16, 2013</td>
<td>15 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Poppy</td>
<td>Female</td>
<td>Pinkie</td>
<td>Jan. 9, 2014</td>
<td>May 25, 2014</td>
<td>5 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Archie</td>
<td>Male</td>
<td>Furred</td>
<td>Jan. 21, 2014</td>
<td>May 25, 2014</td>
<td>5 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Meika</td>
<td>Female</td>
<td>Furred</td>
<td>Jan. 21, 2014</td>
<td>May 25, 2014</td>
<td>5 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Jacob</td>
<td>Male</td>
<td>Furred</td>
<td>Feb. 7, 2014</td>
<td>Aug. 9, 2014</td>
<td>2 months</td>
<td>~6kg</td>
</tr>
<tr>
<td>Laura</td>
<td>Female</td>
<td>Velvet</td>
<td>May 15, 2014</td>
<td>Aug. 9, 2014</td>
<td>2 months</td>
<td>5kg</td>
</tr>
<tr>
<td>Joseph</td>
<td>Male</td>
<td>Pinkie</td>
<td>Apr. 27, 2014</td>
<td>Sept. 23, 2014</td>
<td>&lt;1 month</td>
<td>4.7kg</td>
</tr>
<tr>
<td>Josephine</td>
<td>Female</td>
<td>Pinkie</td>
<td>Apr. 27, 2014</td>
<td>Sept. 23, 2014</td>
<td>&lt;1 month</td>
<td>5kg</td>
</tr>
<tr>
<td>Midget</td>
<td>Female</td>
<td>Pinkie</td>
<td>Apr. 27, 2014</td>
<td>Sept. 23, 2014</td>
<td>&lt;1 month</td>
<td>5.5kg</td>
</tr>
<tr>
<td>Oscar</td>
<td>Male</td>
<td>Velvet</td>
<td>Jul. 27, 2014</td>
<td>Sept. 23, 2014</td>
<td>&lt;1 month</td>
<td>5kg</td>
</tr>
<tr>
<td>Texas</td>
<td>Male</td>
<td>Furred</td>
<td>Jul. 27, 2014</td>
<td>Sept. 23, 2014</td>
<td>&lt;1 month</td>
<td>4.5kg</td>
</tr>
</tbody>
</table>

Table 2. Individual histories for the 17 observed wallabies. **The date of arrival at Sheoak Ridge is not necessarily the date the wallabies came into care. The wallabies may have spent time at a veterinary clinic.

Classification of Behavior

The wallabies’ behavior was measured from the moment a behavior started to the moment that it stopped, and was classified into one of the four categories described in Table 1 [1, 5, 11, 12].

Analysis

The data was analyzed for the four main behavioral categories listed above, and was then used to calculate the percentage of time the wallabies spent on each of the four main categories per day, both individually and as a group according to their date of release (2011-2013 or 2014). All data is reported as each behavior’s averages ± standard error. After analyzing the data using a two-tailed t-test, differences are considered significant when the p-value is less than 0.05.

The statistics found for hand-reared wallabies in this study were compared with the values found in Stirrat’s 2004 study on wild wallabies’ behavior activity budgets during the dry season. The comparable value for vigilance between the two studies was
Developmental Stages When Wallabies Came into Care

Joys that are rescued from a dead or injured mother’s pouch may be found at various stages of development [7]. These can be classified as the following:

Pinkie: The stage lasts up to when the joey is 3 – 3 ½ months old of age. Joys rescued at this stage are often found still fused to the teat. They do not have fur and cannot thermo-regulate [9].

Velvet: This stage lasts until the joey is between 4-5 months old. The joey’s skin gets darker as the beginnings of fur start to show. Joys begin to poke their heads out of the pouch [9].

Furred: Agile joys become properly furred at about 5 months of age. At this stage they will also start to come out of the pouch for short periods of time. Usually, at 6 months old they will spend most of the time outside the pouch, and at about 7-9 months of age, depending on the individual wallaby and the mother, they will be completely out of the pouch [9].

RESULTS

Individual History

There were 17 wallabies observed during the two-day observation period. The developmental stage when the wallaby entered care, date of arrival and release at Sheoak Ridge, time since release, and weight at release were recorded for each wallaby (Table 2). The wallabies released in September of 2014 had not yet reached the ideal weight for release (6-7kg), but were let out earlier due to research activities happening in October at Sheoak Ridge.

Vigilance Related to the Overall Behavior Budget

Vigilance was the second most frequent behavior following foraging in the wallabies released in 2011-2013 and those released in 2014 (Figure 3). The overall mean percentage of time spent vigilant for wallabies that have already spent some time in the wild (2011-2013) was 23.6%±3.2% whereas the mean percentage was 22.7%±2.0% for wallabies released in 2014. The t-test yielded a p-value of 0.59, making the difference not statistically significant. The overall average percentage of time spent foraging was 57.6%±7.4% for wallabies released in 2011-2013 and 65.4%±3.4% for wallabies released in 2014. While the percentage of time spent foraging was greater for recently released wallabies, the difference was found to be statistically insignificant (p=0.15).

Both groups of wallabies spent similar amounts of time in locomotion. Wallabies released in 2011-2013 spent on average 6.8%±2.1% of their time moving while those released in 2014 spent 5.6%±1.0% of their time moving on average. Wallabies released in 2011-2013 spent 12%±4.8% of their time grooming, socializing, or resting, while wallabies released in 2014 spent 6.4%±1.4% doing the same.

Vigilance Related to Stage of Life When the Wallabies Came into Care

Wallabies that were released in 2011-2013 and came into care furred, the last stage of a joey’s development, appear to have spent a higher percentage of time being vigilant than wallabies that were released the same year but came into care as pinkies or velvets (Figure 4). Nonetheless, for this measurement only one individual was assessed and was found to spend 50.7% of his time being vigilant. Wallabies that came in as pinkies and were released in 2011-2013 exhibited a mean vigilance time of 19.9%±3.6%, and those that came in as velvets exhibited a mean of 22.4%±3.7%. The difference between these last two groups was not statistically significant (p=0.15).

Among the wallabies released in 2014, those that came in as velvets spent the most time being vigilant (Figure 5). The average percentage of time spent vigilant for wallabies that came into care as velvets was 24.3%±4.7%, while those that came in as pinkies spent 23.7%±2.6% of their time being vigilant, and those that came in furred allocated 19.8%±3.5% of their time to the same behavior. None of these differences were found to be statistically significant.

Those wallabies that came into care as pinkies and velvets spent similar amounts of time vigilant across the group released in 2011-2013 and the group released in 2014. There was a
Hand-reared wallabies released in 2011-2013 and those released in 2014 displayed a similar overall activity budget, including the percentage of time allocated to vigilance. Contrary to what may be expected, recently released wallabies do not devote more time to anti-predator behavior than wallabies that have already spent some time in the wild. In both groups, wallabies spent the greatest percentage of their time foraging. Allocating a considerably larger percentage of time to foraging rather than to vigilance may be due to the fact that wallabies are less vigilant in the dry season, when food availability decreases, than in the wet season [10]. Foraging comprises 56% of the activity budget of wild wallabies in the dry season and 42% in the wet season [1]. Wallabies in this study spent 57.6% (2011-2013 releases) and 65.4% (2014 releases) of their time foraging, which is higher in both cases than the percentage we could expect to see in the wet season.

Although the difference was not significant, wallabies that had been released recently spent a greater percentage of time foraging than those released in 2011-2013. Five of the wallabies had been released very recently, less than three weeks before this study was carried out, and they had not yet reached the ideal weight for release of 6-7kg. Wallabies released in 2014 in general, and the aforementioned five in particular, are younger than those released in 2011-2013, and therefore still growing, so it would be presumed that they require larger quantities and more nutritious food [10].

Conversely, although the difference was not statistically significant, wallabies released in 2011-2013 spent more time engaging in behavior classified as “Other” than wallabies released in 2014, suggesting that wallabies that have already spent some time in the wild spend more time grooming, resting, and socializing. The difference is not unusual, for wallabies that were released earlier are older, and are becoming or have already become sexually mature. They are more likely to engage in interactive social behavior. Much like the younger wallabies need to spend more time foraging due to the demands of their developmental stage, sexual maturity can cause older wallabies to allocate time differently in their activity budget [9].

The stage of development at which the wallabies came into care (pinkies, velvets, and furred joeys) did not greatly influence the percentage of time allocated to vigilance. For the group of wallabies released in 2011-2013, Barry, the only individual observed that came in furred, spent 50.7% of the time being vigilant, while wallabies that came in as pinkies and velvets allocated 19.9% and 22.4% to vigilance, respectively. Barry is a mature male and had been observed persistently courting females prior to, as well as during, this study [9]. This makes him more likely to be alert, looking around in order to be aware of any potential mates in his surroundings; which explains the much greater portion of time dedicated to vigilance. There was no difference between the wallabies that came into care as pinkies and velvets and were released in 2011-2013.

Although the wallabies that came into care as velvets had similar activity budgets across both release groups, there was a small significant difference in the time spent vigilant between the wallabies that came in as pinkies. This suggests that recently released wallabies that came in as pinkies spend a greater percentage of time being vigilant (23.67%) than those released in 2011-2013 (19.9%). This difference in vigilance may be due to the fact that the recently released wallabies are younger. In addition, some of the wallabies released in 2014 that came in as pinkies were released shortly before this study was conducted. The recently released wallabies may be more attentive towards human presence, which could erroneously inflate the amount of time they spend vigilant. The last wallaby released in 2011-2013 that came into care as pinkies was released more than a year before the last wallaby that came in as a pinkie was released in 2014.

Wallabies that came into care furred and were released in 2014 spent significantly less time being vigilant (19.8%) than the individual released in 2011-2013 (50.7%). Once again, this was probably greatly influenced by Barry’s inclination to be, as a sexually mature male, particularly alert towards the other wallabies in the group, rather than by the life stage at which the wallabies came into care.

In general, aside from the category of the wallabies that came in furred and were released in 2011-2013, all other groups show similar levels of vigilance. This result is not surprising, considering that the wallabies went through the same type of care and release regardless of the life stage at which they were brought into care.

A previous study found that wild wallabies forage for an average of 56% of their total activity budget in the dry season [1], while hand-reared wallabies in this study foraged for an average of 63%±3.3% of their time. Nonetheless, this increase in time
spent foraging could be due to the supplementary feeding offered at the observation site that wallabies would not have access to in the wild. It is natural, especially in the dry season, for wallabies to broaden their diet “to include alternative, higher-quality foods in order to supplement their relatively nutrient-poor herbage diet” [1]. They are therefore more likely to take advantage of the supplementary feeding that is conveniently laid out for them.

In the dry season, vigilance represent approximately 21% of the wild wallabies’ activity budget at dusk [1], the time of day that compares best to the time at which observations for this study were taken [9]. Meanwhile, released hand-reared wallabies observed in this study allocated 22.9%±1.7% to vigilance overall. Furthermore, in a concurrent study carried out on a population of wild wallabies at Trinity Beach, in Far North Queensland, vigilance represented 23.7% of the wallabies’ total activity budget (Yates L, unpublished Targeted Research Project, 2014). The difference between the results found in this study and the results found by Yates was statistically insignificant, and our values were very close to those established by Stirrat.

The lack of a significant difference in the percentage of time allotted to vigilance or anti-predator behavior between wild and hand-reared wallabies speaks well for the wildlife rehabilitation strategies implemented to date. Without awareness for potential threats, their survival in the wild could be compromised. This study aimed to assess the anti-predator behavior of released hand-reared wallabies, as well as if and how this behavior changes progressively after release: in spite of being raised by humans, hand-reared wallabies develop the same, natural perspicacity towards their surroundings as wild wallabies do.

There are, nonetheless, some limiting factors to this study. Due to the fact that the observations could only be recorded over a period of two days, the main concern is lack of data on all the wallabies living at Sheoak Ridge, which limits the generalizability of these results. Conducting the study over a longer period of time would likely allow for greater data collection, and may yield more reliable results. Repeating the study in the wet season, as well as at different times during the day, may similarly yield different results.

Furthermore, there was only data for one wallaby that came into care furred and were released in 2011-2013. This could have potentially skewed the results, making it appear that individuals that came in furred and were released in 2011-2013 spent more time being vigilant than those released in 2014. While we gathered data on 10 wallabies released in 2014, we gathered data on only 7 wallabies released in 2011-2013. Given that the observation site is also where wallabies may come twice a day for supplementary feeding, and therefore involves more exposure to humans, this may actually prove to be a good sign: wallabies released in 2011-2013 may be less present because they are more used to being in the wild and have developed a natural apprehension towards humans.

Moreover, audible noise from the sugar cane trucks and other activity in the neighboring plantation as well as occasional disturbance from other research studies being conducted at the property at the time may have affected the overall amount of time the wallabies spent alert. The familiarity of the observation site may have made the wallabies feel safer and less likely to be as vigilant as they normally are in the wild. They may have felt particularly comfortable around their caretaker: the wallabies were more likely to approach the primary wildlife caretaker than the observers, but these interactions happened at most twice per observation session. Finally, it is also possible the results would vary if the gender of the wallabies was factored in, as well as if wallabies raised by different caretakers and under different circumstances were taken into account.

**CONCLUSION**

This is the first study that looked at how hand-reared wallabies’ activity budgets change progressively after release, particularly the percentage of time allotted to vigilance and anti-predator behavior. The similarity in vigilance between released hand-reared wallabies and the wild-reared wallabies in Stirrat’s 2004 study suggests that the anti-predator awareness in hand-reared wallabies is not impacted. The percentage of time that wallabies released in 2011-2013 spent vigilant (23.6%) did not differ significantly from the percentage of time that wallabies released in 2014 spent doing the same (22.7%), suggesting that the care provided in wildlife rehabilitation appropriately prepares hand-reared wallabies for the wild.

This study aims to contribute to the research being done on captive agile wallabies and rehabilitated wallabies, particularly after their release into the wild. The results provide an initial assessment on the effectiveness of rescue care and rehabilitation in agile wallabies, but it is crucial to continue studying these animals to ensure that the potential negative human impact humans may have on their population has feasible, healthy solutions. While tracking devices may be too intrusive for the animals, the sample size under observation can be expanded to include multiple wildlife rehabilitation facilities. Further studies are needed to assess whether differences in the type of care and release into the wild impact wallaby survival and quality of life once they are released back into the wild. Increasing our knowledge on the wallabies’ progress after release enables us to improve the management and care of captive agile wallabies. Further research will allow us to know whether we can, at least, suitably mitigate our negative impact on wildlife, and even sometimes redress it.

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**REFERENCES**


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