

ADELAIDE
ZOO



Research at the Zoos



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Government of South Australia

Department of Education and
Children's Services

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For the Teacher

General Information

Welcome to Adelaide Zoo!

The Zoo is a great place for learning. Adelaide Zoo Education aims to support student learning by providing resources to assist classes to have educational and enjoyable experiences at the Zoo.

This booklet will provide a range of activities which may be undertaken by your students during their visit to the Zoo. A map and suggested order of activities is provided to give a logical circuit to travel during the visit.

Animal species do change from time to time, and sometimes animals are “off limits” or out of sight during visits, so a flexible approach to completion of activities is recommended.

In planning, please consider whether

- ◆ you would like your class to regroup for lunch, animal feeds, the Macaw flight or at the Entrance at the end of the visit. If so, relay the times and meeting places to students or supervisors (in writing if possible.)
- ◆ you would like to see the Pandas or use the Nocturnal House or Discovery Zone: if so, book a time when making the Zoo booking so your students are not disturbed by other school groups.
- ◆ you would like a session with a Zoo Education Officer to support your study theme. **For the Research Trail an excellent Powerpoint presentation has been prepared to complement the trail.** It is highly recommended that you book a session for your class to have this presentation. Please give as much notice as possible to allow a time to be allocated for this.

If your class is not booked in to a program involving an Education Officer, we will attempt to meet your class at the Entrance on arrival at the Zoo. At this meeting the group will be welcomed and given some information about the Zoo to assist their visit. General behaviour expectations will also be outlined.

Specific information relating to this Zoo Trail will follow for the teachers and for adult supervisors. Please ensure that supervisors have a copy of the relevant pages **before they come to the Zoo** so they can also be mentally prepared to maximise the learning for the students in their care.

RESEARCH AT THE ZOO - SECONDARY

TEACHERS INFORMATION

BACKGROUND INFORMATION ABOUT RESEARCH

Scientific Research is an important role of the Royal Zoological Society of South Australia. This trail can be supported by a presentation from an Education Officer and it is designed to enlighten students about

- ◆ The range of research projects undertaken through the RZSSA .
- ◆ The range of people involved in scientific research.
- ◆ The reasons for doing scientific research.
- ◆ Applications to which research findings are put.
- ◆ Science as a potentially exciting and satisfying career pathway.

With regard to uses of research findings, they are many and varied:

- ◆ They may provide information which leads to better animal husbandry and care **in captivity** and more successful breeding. This could be due to better knowledge of
 - Nutritional needs specific to particular types of animals – this can lead to improved health, breeding capacity and behaviour in captive animals.
 - Behavioural needs of animals : sometimes, when space is limited, behavioural needs can be met by developing a program of Behaviour and Environment Enrichment for the animals. Skills and physical and social development of the animals will improve.
 - Preferred social groupings: often these are very different in closely related species. Putting animals in an inappropriate social grouping, because they suit a similar species, can lead to poor breeding, low infant survival, fighting and high stress levels.
 - Interspecies relationships that work well for groups.

New knowledge is shared with other institutions like zoos, animal sanctuaries, food product suppliers and specialist animal societies (such as avicultural societies) leading to improved animal husbandry across the board.

- ◆ They may provide information about numbers in different **wild populations** which is vital in influencing
 - decisions such as the need to establish reserves and national parks where unique species are under threat
 - quotas of wild species allowed to be captured for human use or consumption – eg. Tuna, whiting, rock lobsters, kangaroos
 - decisions to grant leases for mining, vegetation clearing and other changes to land use
 - assigning a “Threatened Species” status to a species, which then enables decision makers to predict the influence of land use decisions which are being made.

- decisions to commence intervention programs where populations are small and severely declining.
- ◆ They can provide feedback about the success or otherwise of previous initiatives by government departments, local community groups and individuals eg. With revegetation or animal reintroduction programs.
- ◆ They can provide valuable information, which will assist reintroduction projects for threatened species.
- ◆ They may provide information which is economically valuable to the community.

ORGANISING THE VISIT

To get maximum benefit from this trail,

- Book a presentation with an Education Officer on this topic at the start of your visit.
- Issue each student (or each group) with a trail to complete.

Links to SACSA framework

Science- Earth and Space

- 4.1 Identifies and investigates changes, both natural and human-induced, on the earth and suggests ideas which encourage the preservation of the natural environment for all living things.

Science - Living systems

- 5.5 Interprets and uses information about the structure and function of living systems and their relationship to survival of ecosystems.
- 4.6 Explores how living things have changed over geological time and debates the value of species diversity and the ethics of human intervention.

Society and Environment - Time, continuity and change

- 4.1 Suggests and justifies reasons why groups of people in societies, countries or civilisations have undergone changes in wealth and / or their ability to sustain natural resources.

Society and Environment - Place, space and environment

- 4.6 Identifies and describes ways that places and natural environments are valued or threatened, and discusses strategies related to ecological sustainability.

RESEARCH AT THE ZOOS - SECONDARY

BACKGROUND NOTES FOR TEACHERS, SUPERVISORS AND STUDENTS ON THE DAY.

The Research at the Zoos trail is best undertaken after students have experienced a 40 minute presentation by an Education Officer.

Each student will have a student trail. Upon arrival at the particular site, students should read the information in the Site Information Box to assist them in answering the questions. It is suggested that one student read this information out loud to the rest of the group. The students could take turns in this role.

The order in which students visit sites on the trail is not important. It will help for different groups to start their trails at different sites to avoid congestion.

The questions in the trail are ones for which there may be a variety of answers, ideas and suggestions given. Students may work better in groups where they pool ideas and produce a single group product. Ideas from each group should vary considerably. (ie. there is not a set of "correct answers" for this trail.)

Key:



Observe carefully



Discuss and share ideas with your group



Write down your thoughts



Did you know?

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

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- Q7 C14 African Wild Dog
- P8 K4 Aldabra Tortoise
- C11 M7 Baboon
- E8 Q9 Barbary Sheep
- L9 P6 Brazilian Tapir
- M7 I3 Cassowary
- G9 M13 Dusky Langur
- L3 U13 Emu
- M9 L12 Fennec Fox
- I10 S9 Giant Panda
- F7 K3 Giraffe
- E14 K7 Hippopotamus
- E10 H8 Kangaroo
- F4 H6 Koala
- Lemur

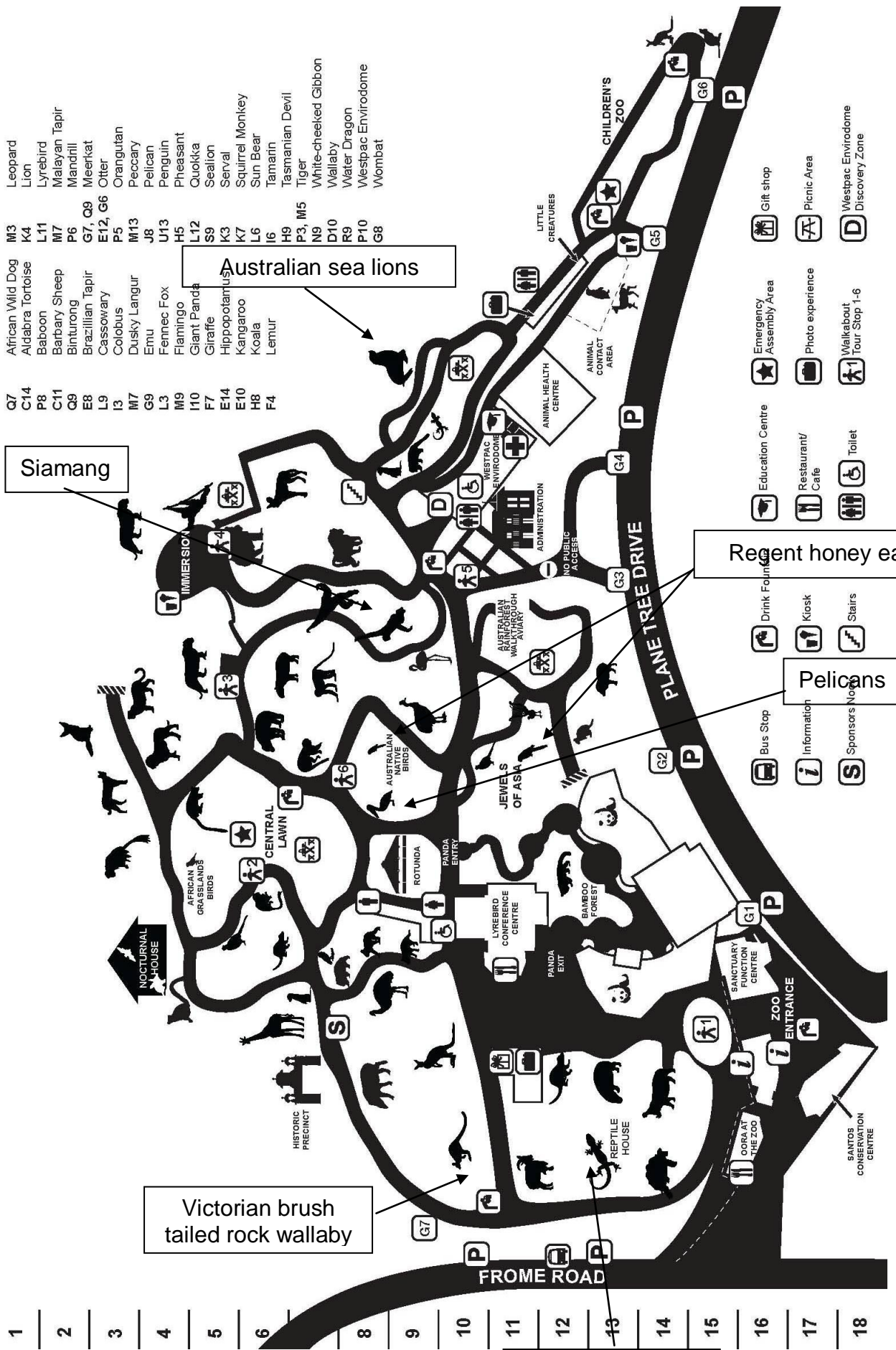
- M3 Leopard
- L11 Lion
- M7 Lyrebird
- P6 Malaysian Tapir
- G7, Q9 Mandrill
- E12, G6 Meerkat
- M13 Otter
- J8 Orangutan
- U13 Peccary
- H5 Pelican
- L12 Pheasant
- S9 Quokka
- K3 Sealion
- K7 Serval
- L6 Squirrel Monkey
- I6 Sun Bear
- H9 Tamarin
- P3, M5 Tasmanian Devil
- N9 Tiger
- D10 White-cheeked Gibbon
- R9 Wallaby
- P10 Water Dragon
- G8 Westpac Envirodome
- Wombat

- Siamang
- Australian sea lions

- Victorian brush tailed rock wallaby
- Woma python

- Regent honey eater
- Pelicans

- Children's Zoo



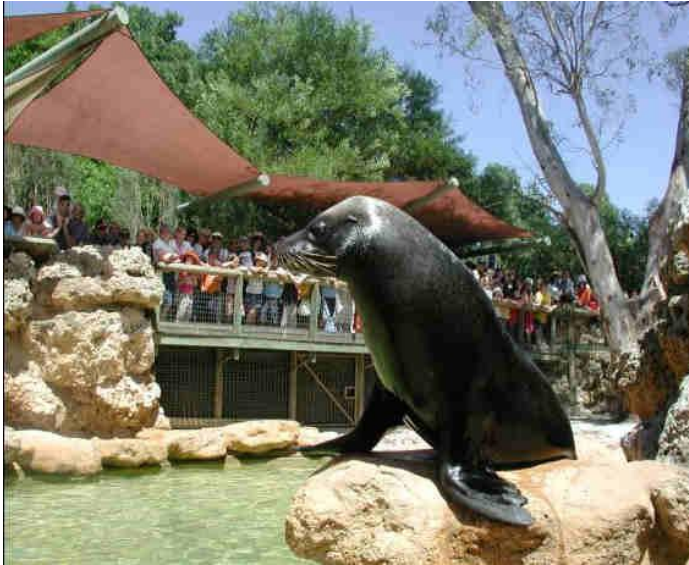
AUSTRALIAN SEALIONS – FEEDING AND BEHAVIOUR



Observe the sealion enclosure carefully. Try to work out where the night quarters are, and how individuals can be separated from each other when necessary.



Site Information Box



Australian Sealion (*Neophoca cinerea*)

Adelaide Zoo displays and breeds the Australian Sealion. This species is classed as Endangered by the IUCN (International Union for the Conservation of Nature).

Sealion keepers train the male sealions to lift their flippers and open their mouths wide on request.

They also train the sealions to go into their off-limit area at night, so the keepers can clean the pool area and filter the water overnight.

The sealions seem to enjoy the training and it is considered to be good “behaviour enrichment” for them.

In the past, keepers have kept monthly records of the mass and level of

cooperation of the male sealions. They have found that as his mass increases over 200kg, their level of cooperation decreases.

Cooperation from the sealions is vital to get the pool cleaned each night and for the keepers to be able to work safely with this species.

?

In the Australian sea lion enclosures at Adelaide Zoo what are some of the problems which would occur if keepers do not have the male sea lion’s cooperation?



What do you understand by the term “behaviour enrichment” and why is it so important in a Zoo situation?



SIAMANGS' SELF IMAGE

 Observe the Siamangs in their enclosure, and the enclosure itself.



Site Information Box



Siamangs (*Hylobates syndactylus*)

Students from the Comparative Cognition Laboratory, University of Queensland, are studying how apes, such as Orangutans, Chimpanzees and Siamangs, think.

Along with Gorillas and Bonobos, these species are the closest relations to humans in the modern world.

When you are brushing your teeth, how do you know that it is your reflection in the mirror? Many birds fight with their reflection, or try to feed it, thinking it is a different bird.

Studies in the past on all ape species, except gibbons, (Siamangs are a gibbon species), have found that they

can recognise themselves in the mirror.

This study is testing to see if in fact Adelaide Zoo's Siamangs can also recognise themselves in the mirror. This is tested by secretly putting a mark on their heads and seeing if they wipe this mark off when they are in front of a mirror.

The students are also testing to see whether apes understand imitation, object movements and the feelings of others.

If the researchers do find that the Siamangs can recognise themselves in the mirror,

a) what does this tell us about this species?

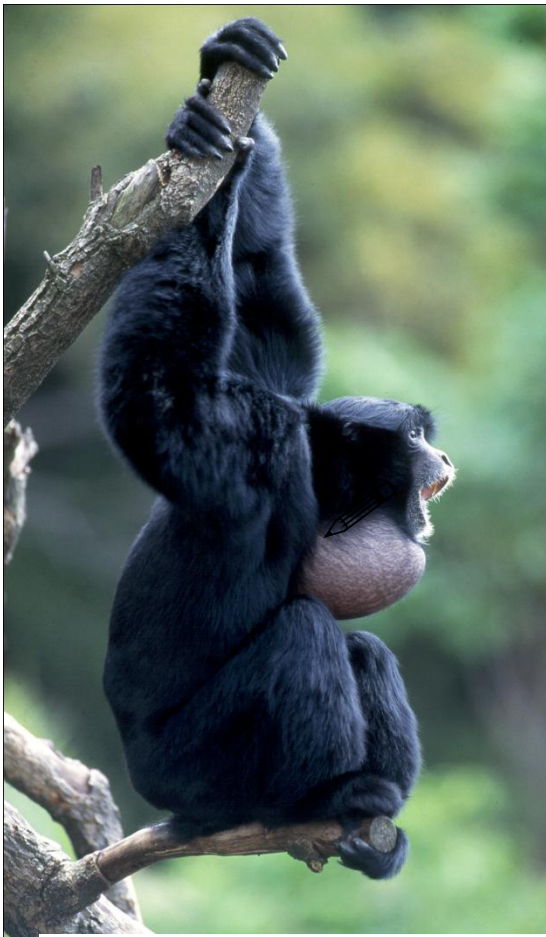


b) are there any implications for the way that Zoos manage Siamangs?



This study involves interstate travel, a lot of time commitment by keepers and some expensive recording equipment.

How can these researchers justify the costs of their research projects to the organisation which is funding it?



Siamangs (*Hylobates syndactylus*)

PELICAN BREEDING - HATCHING ASYNCHRONY



Observe the pelicans in their enclosure. This is the largest breeding group of Australian pelicans in captivity in Australia



Site Information Box



Australian Pelican
(*Pelecanus conspicillatus*)

Scientists at the RZSSA, have been studying the breeding of Australian Pelicans in a wild population near Port Adelaide for more than 18 years.

They have found that Australian Pelicans lay 2 eggs per nest, several days apart. The first chick to hatch is quite large by the time the second hatches and tends to out-compete the smaller one for food.

Often, the first-born hatchling kills the smaller sibling so that only one young pelican is normally raised to adulthood. A similar situation is known to occur in some other bird species such as Yellow-tailed Black Cockatoos.

The scientists also studied the characteristics of the second hatchlings: for critically endangered species with this egg-laying behaviour, a possible solution to increasing numbers is to remove the second egg from the nest, incubate them and hand-raise the young.

But will this action alter the sex ratio, the behaviour profile or other features of a population which are important to survival of individuals and populations?

Have you seen the movie (or read the book) “Storm Boy” by Colin Thiele? If so, what big change would Colin Thiele have made if he was researching and writing the book now?



If Pelicans became a threatened species, then in theory their numbers could be built up, without the wild population, by taking the second laid eggs, incubating them and hand raising them for possible release back into the wild.

Can you see any problems that might result from this process, which might even be bad for the population?



If nearly all the second laid chicks are killed, why do you think the females waste the energy needed to lay a second egg at all?



REGENT HONEYEATERS



You may have to watch quietly and patiently to observe these birds in the aviary.



Site Information Box



Regent honey eater
(*Xanthomyza phrygia*)

Regent Honeyeaters are a threatened species, and an Australasian regional plan is in place to breed these animals.

In the wild, their feathers are black and bright yellow, but many of the captive animals in Australia are black and white.

A food scientist associated with animal food products has been studying the effects of various food combinations, containing different “carotenoids”, coloured compounds, in the diets of these birds at Adelaide Zoo.

Specific carotenoids are needed for good health in birds, and excess amounts are put into the birds’ feathers: so a brightly coloured bird is getting plenty of this food requirement.

As a result of this research, the Adelaide Zoo birds are known amongst zoo bird departments in Australia for the bright yellow in the feathers of the Regent Honeyeaters.

More importantly, the food production industry is building on its knowledge about the best diet for these birds in the captive situation, and is improving the quality of food products on the market to bird owners.

Many female birds are attracted to the male birds which have the most brightly coloured feathers. How could this be an advantage to her and her chicks?



This bird is an endangered species. Taking individuals from the wild is not desirable as the wild populations are already struggling to maintain numbers.

Zoos and other breeders need to be able to breed animals successfully to supply the captive population with new animals.

Why is nutritional research so important to species like the Regent Honeyeater?



Feathers from other Zoos (top) and Adelaide Zoo (bottom)



Regent honey eater (*Xanthomyza phrygia*)

WOMA PYTHON



Observe the Woma python in its exhibit in the Reptile House.



Site Information Box



Woma python
(*Aspidites ramsayi*)

The Woma python is a native Australian snake species which comes from the arid lands. It is now a threatened species, which is no longer found in 1/3 of its former habitat.

Adelaide Zoo has successfully bred Woma Pythons and reintroduced 9 offspring to the wild in 2007.

The site of reintroduction was the Arid Recovery Project located near Roxby Downs. This area contains over 100 km² of fenced fox and cat free habitat into which species such as Bilby,

Burrowing Bettong, Stick Nest Rat and Western Barred Bandicoot have been released.

One reason for reintroducing Womas here is that as the ecosystem is being reestablished in this area, it should contain natural predators, like the Woma, to keep the other populations under control.

The snakes were 4 years old when reintroduced and unfortunately all, but one, were eaten by venomous Mulga Snakes within 4 months of their release.

However, valuable knowledge and lessons have been gained through this project, and it has been a pilot for the release back into the wild of this and other threatened boas around the world. Researchers are confident they will be more successful next time.

?

The Arid Recovery Project partnership includes BHP Billiton (which owns and runs the mines at Roxby Downs) as one of the partners. Much of the cost of establishing the fencing and paying for the programs has come from this company.

What are some reasons for a mining company, like BHP Billiton, to fund projects like this one?



The Arid Recovery Project area is fenced to keep feral cats and foxes out. A number of native herbivores and insectivores have been released into the area already. If no predators are added to the community, what would you predict about the size of the other populations in the short, medium and longer term?



Why do you think Woma Pythons have become a threatened species?



Baby Woma Python hatching



Woma eating mouse

BRUSH-TAILED ROCK-WALLABY



At the Yellow-footed Rock-wallaby enclosure, locate the signage about the Brush-tailed Rock-wallaby surrogacy project.

Site Information Box



Victorian Brush-tailed Rock-Wallaby
(*Petrogale penicillata penicillata*)

The Victorian BTRW is critically endangered: less than 50 remain (in the wild & in captivity). The reasons for the decline of this once common species include

- habitat destruction,
- hunting for the fur trade in the past and
- introduced predators such as the Red fox.

To increase the breeding rate of the remaining population scientists at the Adelaide Zoo has researched and developed surrogacy techniques (cross-fostering) which are now being used at Adelaide Zoo, Healesville Sanctuary and other zoos across Australia.

Tiny new-born joeys are taken from the pouch of the BTRW mother and put into the pouch of a Yellow-footed Rock-walle raises the joeys as their own and once the surrogate mother, it is moved to join a population

This program has been operating with considerable success for several years. Potentially a female BTRW can produce 5 or 6 joeys per year by this method, instead of one the natural way. The increased numbers of the remaining population gives the species a much better chance of avoiding extinction.

Can you see any Brush-tail Rock-wallaby joeys with surrogate mothers in the Yellow-footed Rock-wallaby enclosures?

This project is very costly in terms of veterinary and keeper time and interstate travel and transport costs.

How do you think these workers are involved in this project, between the time a female Brush-tailed Rock-wallaby gives birth to a new joey and the time when an independent Brush-tailed Rock-wallaby (which has been fostered by a Yellow-footed Rock-wallaby) is released into a semi-wild population in Victoria?

Native Animals Keeper

Veterinary Nurse



Veterinarian

Transfers Officer

Driver

This project involves a lot of intervention into natural reproductive processes.

Zoos try to avoid this under normal circumstances. Why do you think it is necessary with this species?



Victorian Brush-tailed Rock-Wallaby (*Petrogale penicillata penicillata*)