



ADAPTATIONS AND CONSERVATION WORKSHEET

Observe 'adaptations in action' and discover how animals have increased their ability to survive in their environment. Learn more about our conservation projects and what YOU can do to help animals in the wild too!

In small groups, complete the worksheet. We recommend staggered groups to minimise congestion if multiple classes. Read the exhibit signage as well as the worksheet to discover the answers. Worksheet sections/locations can be completed in any order. Come back to a question if you can't answer it right away as you might find it on a sign later. Note that not all answers are on the signs.

Please note that Years 9-12 still require teacher/parent supervision to ride the train.

For teacher information

Australian Curriculum Elaborations

Biodiversity and the Interconnectedness of Life

Adaptations

- conduct practical investigations, individually or in teams, or use secondary sources to examine the adaptations of organisms that increase their ability to survive in their environment, including: – structural adaptations – physiological adaptations – behavioural adaptations

Keystone species and conservation

- Some biologists have advocated for keystone species to be special targets for conservation efforts and keystone species theory has informed many conservation strategies. However there are differing views about the effectiveness of single-species conservation (such as keystone species, flagship species or umbrella species) in maintaining complex ecosystem dynamics (ACSBL012)
- Human activities (for example, over-exploitation, habitat destruction, monocultures, pollution) can reduce biodiversity and can impact on the magnitude, duration and speed of ecosystem change (ACSBL028).

Conservation at Currumbin

Currumbin Wildlife Sanctuary is passionate about conservation and preserving our wildlife for future generations to enjoy. The Sanctuary participates in 16 conservation projects to help save some of these amazing species from extinction. Learn more about our conservation projects and what YOU can do to help too! Commit to making a difference to at least ONE conservation project following your visit. YOU can make a difference!

Animal feeding observations

Ensure to go to at least two animal feedings today! (If multiple classes, we recommend allocating one to two per group to minimise congestion then discussing all observations as a class back at school) Observe 'adaptations in action' and discover how animals have increased their ability to survive in their environment. Take notes!



'Adaptations in action' – Your notes

9:30am Pelican and Eel feeding O11 -

10:20am Dingoes U7 -

1pm Crocodiles Live W13 -

1:30pm Land of the Parrots S10 -

2:30pm Tasmanian Devils Q12 -

Blinky Bill's Home Tree

(Freshwater animals, nocturnal mammals and reptiles - map reference B14) -

What is a physiological adaptation? Internal and/or cellular features of an organism that enable them to survive in their environment (e.g. snakes produce poisonous venom to ward off predators and to capture prey).

1.

a) Evidence suggests that the earliest fish had gills. Find a fish that has gills but also uses something else to breath. This is a physiological adaptation.



b) What kind of environment does this enable this fish to survive? What advantage does this adaptation give this fish?

What is a structural adaptation? Physical features of an organism that enable them to survive in their environment (e.g. a penguin has blubber to protect itself from freezing temperatures).

2.

*Flying Squirrels are native to North America. They are placental mammals belonging to the order rodentia. **Natural selection** has enabled them to adapt to leaping from treetops and foraging at night hence their gliding membranes and large eyes.*

a) Find a marsupial mammal belonging to the order diprotodontia that has the same structural and behavioural adaptations. These mammals are only distantly related yet have similar adaptations. List one structural and behavioural adaptation and explain what they use them for.

b) Think of a human activity that directly impacts on this mammal and explain why.

What is a behavioural adaptation? Actions of an organism that enable them to survive in their environment (e.g. bears hibernate in winter to escape the cold temperatures and preserve energy).

3.

Did you know we don't have many Australian animals that truly 'hibernate' in Australia.

What is torpor? A physiological state that conserves energy by slowing down the heart and respiratory systems.

What is brumation? A state or condition of sluggishness, inactivity, or torpor exhibited by reptiles during winter or extended periods of low temperature.

Hibernation, torpor and brumation are examples of a physiological adaptation.

a) Find one mammal that conserves its energy via 'torpor' during the cooler months. What advantage does this give this mammal?

b) Find one reptile that conserves its energy via 'brumation' during the cooler months. What advantage does this give this reptile?

c) Think about and explain how climate change may affect animals that hibernate or migrate.



4.

a) Observe the Magnificent Green Tree Frogs. List some structural adaptations that are specific to tree frogs and their habitat.

b) Think of a behavioural adaptation that all male frogs do to attract a female.

Did you know that the only vocalisations females make are distress calls.

5.

Conservation Project #1 - Bilbies are a threatened species and Currumbin Wildlife Sanctuary is part of a National Bilby breeding program in collaboration with Save the Bilby Foundation. Currumbin Wildlife Sanctuary has had good success breeding Bilbies as part of this program and has been able to breed Bilby twins on multiple occasions.

a) How many Bilbies are estimated to be remaining in Queensland?

b) List the biggest threat to Bilby populations.

Back at school, visit <https://savethebilbyfund.com/help-bilbies> to learn how you can help Bilbies.

Forest Fringe Aviary (map reference I15) –

6.

a) Find two bird species that feed on nectar. Explain the structural adaptation these birds have to remove the sweet nectar.

b) Think about and explain how nectar feeders increase plant biodiversity and play an important role in ecosystems and plant conservation.

Tasmanian Devil (map reference Q12) –

7.

Australia has a great diversity of marsupials. Some scientists say their short gestation or pregnancy period may be a reproductive strategy or physiological adaptation used to survive Australia's largely desert environment.



a) How many joeys can Tasmanian Devils have? How many joeys will have the opportunity to secure a teat?

This reproductive strategy ensures 'survival of the fittest'! Only the fittest genes will survive and reproduce.

b) Name a structural adaptation for eating. What do they eat?

Did you know the Tasmanian Devil has the strongest jaw pressure for a mammal of its size.

Conservation Project #2 – 90% of the Tasmanian Devil population has been wiped out by the Devil Facial Tumour Disease (DFTD) making it now listed as endangered. A decision was made to move Tasmanian Devils to approved wildlife institutions on mainland of Australia. Currumbin Wildlife Sanctuary has been involved in the captive breeding program since its inception, breeding Devils and contributing to the education process to help save this species from extinction in the wild.

Kangaroos - paddock (map reference S13) -

8.

Did you know some mammals can put their pregnancy 'on pause'.

a) Briefly explain how the kangaroo can have three babies at three different stages at one time.

b) What is the benefit of this reproductive strategy or physiological adaptation?

c) Find a vulnerable species of macropod (kangaroo and wallaby family) that Currumbin Wildlife Sanctuary has previously bred and released back into the wild. How can we help this macropod?

Conservation Project #3 – Threats include hunting, predation, habitat loss and competition with other species, all of which is contributing to loss of genetic diversity. Add to this is the pressure from introduced predators such as the fox as well as competition with feral goats, sheep and rabbits.



Lost Valley (map reference V14) –

9.

a) Find a bird with a helmet.

The purpose is unknown however recent research suggests that it may help them feel vibrating sound from other males over long distances. This sense is called infrasound and was used by dinosaurs. It is also used by present-day elephants.

Conservation project #4 - This bird is now listed as secure however still considered a CWS conservation project. Major threats include the loss and fragmentation of available habitat, attacks by dogs, vehicle strikes, disease and natural catastrophic weather events. Currumbin Wildlife Sanctuary is endeavouring to have breeding success into the future.

b) Find a mammal with webbed feet! What is the advantage of these webbed feet?

c) Find a critically endangered primate.

d) What is the major threat for the endangered Ring-tailed Lemurs?

e) Currumbin Wildlife Sanctuary is involved in conservation of four mammals in the Lost Valley exhibit. These mammals range from vulnerable to critically endangered. List all four mammals.

Conservation project #5 (critically endangered) – _____

Conservation project #6 (endangered) – _____

Conservation project #7 (vulnerable) – _____

Conservation project #8 (endangered) – _____

Some of the species in the Lost Valley exhibit are affected by the illegal pet trade and poaching. As a traveller, you can help by supporting ethical wildlife tourism and avoiding wildlife exploitation. ‘Street selfies’ with exotic species are not okay. Do your research, particularly when visiting developing countries.

Saltwater Crocodiles (map reference W13)

Of all the present day reptiles, crocodiles and alligators may be the least changed proving they are perfectly adapted. Adaptations include nostrils and ear opening that can close underwater, a third clear eye lid that acts like goggles underwater, strong jaw closing pressure and dermal pressure (vibration) receptors.

10.

a) Explain an adaptation that assists the crocodile in digesting bones of prey.



b) Which six months of the year do you think crocodiles brumate? Why do reptiles brumate?

Wombats and Koalas (map reference R8 – koalas and T8 – Wombat Den)

11.

Observe the Southern Hairy-nosed Wombats and Koalas. They share similar features as they are closely related. List structural adaptations for each and explain how they use these to survive in their different habitats.

Southern Hairy-nosed Wombats – Your notes

Adaptation	Adaptation use
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Koalas – Your notes

Adaptation	Adaptation use
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Did you know Victorian Koalas vary from their southern cousins. They are darker in colour and almost double the weight to survive the cooler climate.

Conservation project #9 – Listed as vulnerable, the Koala is under threat from habitat destruction, dog attacks and vehicle strikes. Many Koala populations are thought to have disappeared or are in serious decline. The Koala is iconic and at Currumbin Wildlife Sanctuary we have had a healthy population of Koalas for many decades and we will continue to care for and highlight the need to conserve this amazing little Aussie icon.

Koalas live in YOUR backyard/local bushland reserve. YOU can help Koalas! Plant a tree, be a responsible pet owner (desex your pets, keep your cat indoors at all times and your dog contained at night), stick to the speed limits and keep an eye out at dawn and dusk. Consider supporting our Tree to Me program – <http://cwhf.org.au/get-involved/tree-to-me/>

Become a citizen scientist and assist City of Gold Coast with Koala conservation by reporting Koala sightings – https://www.gchaveyoursay.com.au/koalas/survey_tools/reportakoala



Frog Conservation & Research Facility (map reference S5) –

12.

a) Which critically endangered frog species is Currumbin Wildlife Sanctuary looking to start breeding? Why is it critically endangered?

b) Which near threatened frog species did Currumbin Wildlife Sanctuary breed, making us the first place in the world to breed a Taudactylus species?

Conservation project #10 – The Kroombit Tinkerfrog (Taudactylus pleione) is listed as critically endangered and is currently known from only 12 small patches of rainforest totalling 596 hectares at Kroombit Tops National Park, located south-west of Gladstone in South East Queensland.

The 12 populations fall within an area of about 3000 hectares. Currumbin Wildlife Sanctuary staff have been ‘out in the field’ with Queensland Government representatives assessing habitat and locations for the Kroombit Tinkerfrog. This is such an exciting project because eggs and tadpoles have never been recorded in this species.

c) List at least two interesting breeding adaptations some frog species have developed.

d) What are the causes for frog decline in general?

1.

2.

3.

4.

5.

e) What can YOU do to help?

Hospital (map reference Q2) –

Check out the wonderful work of the Currumbin Wildlife Hospital! Consider supporting us –

<http://cwhf.org.au/get-involved/school-fundraising/>

<http://cwhf.org.au/pavers/>

The Hospital has grown to be one of the busiest wildlife hospitals in the world, admitting over 10,000 animals a year – a service that is provided free of charge to the community.

Glossy Black Cockatoo (map reference R9) –



13.

Why is the Glossy Black Cockatoo listed as vulnerable?

Conservation project #12 – Currumbin Wildlife Sanctuary breeds this species regularly and helps contribute to saving this species through education and our involvement in community days.

YOU can get involved in these community days! Become a citizen scientist and submit your sightings – http://glossyblack.org.au/Submit_sightings.html

Conservation project #13 – Eastern Bristlebird (top secret back of house area!)

Conservation project #14 – Coxen's Fig Parrot (map reference R4 – Rainforest Avairy)

Conservation project #15 and # 16 – Regent Honeyeater and Orange-bellied Parrot (map reference Q6 – Conservation Avairies)

Be a Conservation Champion! YOU can make a difference!



ADAPTATIONS AND CONSERVATION – ANSWERS

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- Some biologists have advocated for keystone species to be special targets for conservation efforts and keystone species theory has informed many conservation strategies. However there are differing views about the effectiveness of single-species conservation (such as keystone species, flagship species or umbrella species) in maintaining complex ecosystem dynamics (ACSBL012).
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'Adaptations in action' – Your notes

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10:20am	Dingoes	U7 -
1pm	Crocodiles Live	W13 -
1:30pm	Land of the Parrots	S10 -
2:30pm	Tasmanian Devils	Q12 -

Blinky Bill's Home Tree

(Freshwater animals, nocturnal mammals and reptiles - map reference B14) -

What is a physiological adaptation? Internal and/or cellular features of an organism that enable them to survive in their environment (e.g. snakes produce poisonous venom to ward off predators and to capture prey).

1.

a) Evidence suggests that the earliest fish had gills. Find a fish that has gills but also uses something else to breath. This is a physiological adaptation.

Lungfish



b) What kind of environment does this enable this fish to survive? What advantage does this give this fish?

Stagnant ponds. This physiological adaptation allows this fish to survive in ponds with low oxygen.

What is a structural adaptation? Physical features of an organism that enable them to survive in their environment (e.g. a penguin has blubber to protect itself from freezing temperatures).

2.

*Flying Squirrels are native to North America. They are placental mammals belonging to the order rodentia. **Natural selection** has enabled them to adapt to leaping from treetops and foraging at night hence their gliding membranes and large eyes.*

a) Find a marsupial mammal belonging to the order diprotodontia that has the same structural and behavioural adaptations. These mammals are only distantly related yet have similar adaptations. List one structural and behavioural adaptation and explain what they use them for.

Squirrel Glider. Gliding membrane – leaping from treetops and large eyes as they are nocturnal – foraging at night.

b) Think of a human activity that directly impacts on this mammal and explain why.

Deforestation. Squirrel Gliders nest in tree hollows so loss of old growth forests results in habitat loss.

What is a behavioural adaptation? Actions of an organism that enable them to survive in their environment (e.g. bears hibernate in winter to escape the cold temperatures and preserve energy).

3.

Did you know we don't have many Australian animals that truly 'hibernate' in Australia.

What is torpor? A physiological state that conserves energy by slowing down the heart and respiratory systems.

What is brumation? A state or condition of sluggishness, inactivity, or torpor exhibited by reptiles during winter or extended periods of low temperature.

This is an example of a physiological adaptation.

a) Find one mammal that conserves its energy via 'torpor' during the cooler months. What advantage does this give this mammal?

Squirrel Glider, Yellow-bellied Glider, Feathertail Glider, Long-nosed Potoroo – Decreased physiological activity enables the animal to survive during the cooler seasons when food availability is reduced.

b) Find one reptile that conserves its energy via 'brumation' during the cooler months. What advantage does this give this reptile?

Merten's Water Monitor, Eastern Long-necked Turtle, Frilled Lizard, Freshwater Crocodile, Scrub Python, Green Tree Snake, Coastal Carpet Python Broad-headed Snake, Common Coastal Death Adder, Collet's Black Snake, Knob-tailed Gecko – Decreased physiological activity enables the reptile to survive during cooler seasons when food availability and ability to digest food is decreased.

c) Think about and explain how climate change may affect animals that hibernate or migrate.

Climate change can alter the length of climatic seasons, which affects resource availability (food, shelter, etc.) and the amount of time animals have to prepare for subsequent seasons and life stages.



4.

a) Observe the Magnificent Green Tree Frogs. List some structural adaptations that are specific to tree frogs and their habitat.

Toe and finger pads, long legs, partially webbed feet.

b) Think of a behavioural adaptation that all male frogs do to attract a female. Did you know that the only vocalisations females make are distress calls.

Croak

5.

Conservation Project #1 - Bilbies are a threatened species and Currumbin Wildlife Sanctuary is part of a National Bilby breeding program in collaboration with Save the Bilby Foundation. Currumbin Wildlife Sanctuary has had good success breeding Bilbies as part of this program and has been able to breed Bilby twins on multiple occasions.

a) How many Bilbies are estimated to be remaining in Queensland?

400-1600 Bilbies

b) List the biggest threat to Bilby populations.

Feral predators, particularly feral cats and foxes.

Back at school, visit <https://savethebilbyfund.com/help-bilbies> to learn how you can help Bilbies.

Forest Fringe Aviary (map reference I15) –

6.

a) Find two bird species that feed on nectar. Explain the structural adaptation these birds have to remove the sweet nectar.

Rainbow Lorikeet and Scaly-breasted Lorikeet – Tongue with hair-like structures.

b) Think about and explain how nectar feeders increase plant biodiversity and play an important role in ecosystems and plant conservation.

Plants benefit from animals feeding upon their nectar and pollen because they assist with fertilisation of plants when it sticks to their feathers and they move from plant to plant.

Tasmanian Devil (map reference Q12) –

7.

Australia has a great diversity of marsupials. Some scientists say their short gestation or pregnancy period may be a reproductive strategy or physiological adaptation used to survive Australia's largely desert environment.

a) How many joeys can Tasmanian Devils have? How many joeys will have the opportunity to secure a teat?

As many as 40 joeys. Only four joeys will have the opportunity to secure a teat.

This reproductive strategy ensures 'survival of the fittest'! Only the fittest genes will survive and reproduce.



b) Name a structural adaptation for eating. What do they eat?

Canine teeth

Did you know the Tasmanian Devil has the strongest jaw pressure for a mammal of its size.

Conservation Project #2 – 90% of the Tasmanian Devil population has been wiped out by the Devil Facial Tumour Disease (DFTD) making it now listed as endangered. A decision was made to move Tasmanian Devils to approved wildlife institutions on mainland of Australia. Currumbin Wildlife Sanctuary has been involved in the captive breeding program since its inception, breeding Devils and contributing to the education process to help save this species from extinction in the wild.

Kangaroos - paddock (map reference S13) -

8.

Did you know some mammals can put their pregnancy 'on embryonic diapause'.

a) Briefly explain how the kangaroo can have three babies at three different stages at one time.

One joey out of the pouch, one in the pouch and one suspended in development. Kangaroos have a reproductive adaptation called delayed implantation. This is when the fertilised egg can cease development and wait.

b) What is the benefit of this reproductive strategy or physiological adaptation?

So they can wait until the mother is ready and conditions are right.

c) Find a vulnerable species of macropod (kangaroo and wallaby family) that Currumbin Wildlife Sanctuary has previously bred and released back into the wild. How can we help this macropod?

Brush-tailed Rock Wallaby

Conservation Project #3 – Threats include hunting, predation, habitat loss and competition with other species, all of which is contributing to loss of genetic diversity. Add to this is the pressure from introduced predators such as the fox as well as competition with feral goats, sheep and rabbits.

Lost Valley (map reference V14) –

9.

a) Find a bird with a helmet.

Southern Cassowary

The purpose is unknown however recent research suggests that it may help them feel vibrating sound from other males over long distances. This sense is called infrasound and was used by dinosaurs. It is also used by present-day elephants.

Conservation project #4 - This bird is now listed as secure however still considered a CWS conservation project. Major threats include the loss and fragmentation of available habitat, attacks by dogs, vehicle strikes, disease and natural catastrophic weather events. Currumbin Wildlife Sanctuary is endeavouring to have breeding success into the future.

b) Find a mammal with webbed feet! What is the advantage of these webbed feet?

Cabybara



c) Find a critically endangered primate.

Cotton-top Tamarin

d) What is the major threat for the endangered ring-tailed lemurs?

Deforestation

e) Currumbin Wildlife Sanctuary is involved in conservation of four mammals in the Lost Valley exhibit. These mammals range from vulnerable to critically endangered. List all four mammals.

Conservation project #5 (critically endangered) – Cotton-top Tamarin

Conservation project #6 (endangered) – Ring-tailed Lemur

Conservation project #7 (vulnerable) – Red Panda

Conservation project #8 (endangered) – Goodfellow's Tree Kangaroo

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Saltwater Crocodiles (map reference W13)

Of all the present day reptiles, crocodiles and alligators may be the least changed proving they are perfectly adapted. Adaptations include nostrils and ear opening that can close underwater, a third clear eye lid that acts like goggles underwater, strong jaw closing pressure and dermal pressure (vibration) receptors.

10.

a) Explain an adaptation that assists the crocodile in digesting bones of prey.

The stomach is the most acidic known to man and is capable of digesting even the large bones of prey which have been broken by the crocodile's jaw pressure that exceeds 3500 psi.

b) Which six months of the year do you think crocodiles brumate? Why do reptiles brumate?

Winter. Reptiles brumate or decrease their physiological activity to enables them to survive during cooler seasons when food availability and ability to digest food is decreased

Wombats and koalas (map reference R8 – koalas and T8 – Wombat Den)

11.

Observe the wombats and koalas. They share similar features as they are closely related. List structural adaptations for each and explain how they use these to survive in their different habitats.

Wombats – Your notes

Adaptation

Adaptation use

Sharp claws

Digging

Large nose and ears

To smell and hear predators as they have small eyes and are nocturnal

Backwards facing pouch

To prevent dirt entering when burrowing

Hard bony bottom

To prevent predators entering burrow



Koalas – Your notes

Adaptation

Sharp claws
Large nose and ears
Backwards facing pouch
Hard bony bottom

Adaptation use

Digging
To smell and hear predators as they have small eyes and are nocturnal
To prevent dirt entering when burrowing
To prevent predators entering burrow

Did you know Victorian Koalas vary from their southern cousins. They are darker in colour and almost double the weight to survive the cooler climate.

Conservation project #9 – Listed as vulnerable, the Koala is under threat from habitat destruction, dog attacks and vehicle strikes. Many Koala populations are thought to have disappeared or are in serious decline. The Koala is iconic and at Currumbin Wildlife Sanctuary we have had a healthy population of Koalas for many decades and we will continue to care for and highlight the need to conserve this amazing little Aussie icon.

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Become a citizen scientist and assist City of Gold Coast with Koala conservation by reporting Koala sightings – https://www.qchaveyoursay.com.au/koalas/survey_tools/reportakoala

Frog Conservation & Research Facility (map reference S5) –

12.

a) Which critically endangered frog species is Currumbin Wildlife Sanctuary looking to start breeding? Why is it critically endangered?

Kroombit Tinkerfrog. Threats include climate change, chytrid fungus, cattle grazing (trampling and faeces in water), predation and trampling by pigs, fire and invasive weeds.

b) Which near threatened frog species did Currumbin Wildlife Sanctuary breed, making us the first place in the world to breed a Taudactylus species?

Leim's Tinkerfrog

Conservation project #10 – The Kroombit Tinkerfrog (Taudactylus pleione) is listed as critically endangered and is currently known from only 12 small patches of rainforest totalling 596 hectares at Kroombit Tops National Park, located south-west of Gladstone in South East Queensland.

The 12 populations fall within an area of about 3000 hectares. Currumbin Wildlife Sanctuary staff have been 'out in the field' with Queensland Government representatives assessing habitat and locations for the Kroombit Tinkerfrog. This is such an exciting project because eggs and tadpoles have never been recorded in this species.

c) List at least two interesting breeding adaptations some frog species have developed.

Pouched Frog – male has pouch to raise tadpoles to frog, Tusked Frog – male has tusks to fight other males for territory, Holy Cross Toad – male excretes sticky secretion to secure a female when mating, Gastric Brooding Frogs (now extinct) – female swallowed her fertilised eggs to incubate her young.



d) What are the causes for frog decline in general?

1. Habitat loss and degradation
2. Introduced feral animals
3. Global warming
4. Pollution
5. Chytrid fungus

e) What can YOU do to help?

Preserve and create frog friendly habitat, be a responsible pet owner, don't pollute by putting chemical downs drains etc and minimise spread of the fatal chytrid fungus.

Hospital (map reference Q2) –

Check out the wonderful work of the Currumbin Wildlife Hospital! Consider supporting us –

<http://cwhf.org.au/get-involved/school-fundraising/>

<http://cwhf.org.au/pavers/>

The Hospital has grown to be one of the busiest wildlife hospitals in the world, admitting over 10,000 animals a year – a service that is provided free of charge to the community.

Glossy Black Cockatoo (map reference R9) –

13.

Why is the Glossy Black Cockatoo listed as vulnerable?

Loss of casuarina food trees and old growth trees/nesting hollows.

Conservation project #12 – Currumbin Wildlife Sanctuary breeds this species regularly and helps contribute to saving this species through education and our involvement in community days. YOU can get involved in these community days! Become a citizen scientist and submit your sightings – http://glossyblack.org.au/Submit_sightings.html

Conservation project #13 – Eastern Bristlebird (top secret back of house area!)

Conservation project #14 – Coxen's Fig Parrot (map reference R4 – Rainforest Avairy)

Conservation project #15 and # 16 – Regent Honeyeater and Orange-bellied Parrot (map reference Q6 – Conservation Avairies)

YOU can make a difference!