

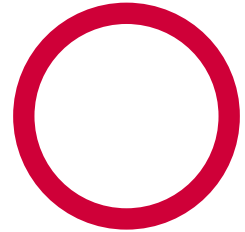
# Sustainable Schools Grants (Round 2)

## *Integrated Sustainability Project*

Wadalba Community School

8278

**Wadalba Wildlife Warriors**



Date last reviewed: 10/12/2020

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# Introduction

This Project Plan\* outlines how the *Wadalba Wildlife Warrior* project is to be conducted efficiently and safely while delivering on the broader goals of the Sustainable Schools Grants program.

The Project is being submitted for consideration under Round 2 of the Sustainable Schools Grants and will be delivered over the period of 2021 School year.

The specific goals of this project are to:

- To collect data and increase the biodiversity of native flora and fauna.
- To provide a sustainable and clean habitat for local wildlife in the Wadalba Community.
- To increase awareness of and reduce the community's ecological footprint.

\*Please refer to the additional document *WCS Sustainable School Grant Plan Detail* for further details.

# Context

We acknowledge the Dharkinjung people as traditional custodians of the land that our school is built and our children and young people learn each school day. Wadalba is proud to be a comprehensive K–12 community school. The school was established in 2000. We currently have over 250 students in our primary section and over 1200 students in our secondary. The three key areas of our strategic direction are:

1. Nurturing a learning growth mindset – Broaden horizons
2. Abundance mentality – Make a positive difference
3. Synergy – Spirit of Community

Currently Wadalba Community School has an established Enviro Group in which students on a weekly basis empty the *10c earn and return bins*. The money is then returned to the school for small sustainability projects such as signage on the bins, and removing Styrofoam cups from the canteen.

With the population increasing and the fragmentation of the local community expanding at an exponential rate, we as a school, have identified that we must have a stronger connection to sustainability. This is going to be achieved by the following 2021 initiatives:

- Enviro group
- STEaM
- Planet Earth class
- Animal Welfare class
- Year 9 traidie class
- Stage 6 Earth and Environmental, Biology and Geography

The project supports the school's wider goals by broadening students' connections to their environment, from their classrooms to their homes. The project will foster an abundance mentality through students working collaboratively, increase diversity of activities for students, and delivering something of value to the student to increase a belonging towards the school, community and nature. Lastly, this project will promote positive achievements and recognise the success of each student that contributes, as well as develop links to the community to create a shared ownership of the learning journey and prepare each individual for a successful sustainable future.

All three phases of the *Wadalba Wildlife Warriors Integrated Sustainability Project* relate directly to the syllabus as follows:

## Phase 1:

- Sc4-LW5 Science and technology contribute to finding solutions to conserving and managing sustainable ecosystems

- Sc5-LW2 - evaluate some examples in ecosystems, of strategies used to balance conserving, protecting and maintaining the quality and sustainability of the environment with human activities and needs.
- SC4-ES4D - Research how Aboriginal and Torres Strait Islander Peoples' knowledge is being used in decisions to care for country and place, e.g. terrestrial and aquatic resource management.
- SC4-LW5 - discuss how the observations and understanding of the structure, function and life cycles of native plants are used by Aboriginal and Torres Strait Islander Peoples.

**Phase 2:**

- Sc4-LW1 - There are differences within and between groups of organisms; classification helps organise this diversity
- Sc4-LW4 - Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world.

**Phase 3:**

- SC5-WS6 – undertakes first-hand investigations to collect valid and reliable data and information, individually and collaboratively
- SC5-7WS – processes, analyses and evaluates data from first-hand investigations and secondary sources to develop evidence-based arguments and conclusions
- SC5-LW2a – recall that ecosystems consist of communities of interdependent organisms and abiotic components of the environment
- SC4-CW AC – research how a knowledge of physical properties of natural materials is used by Aboriginal and Torres Strait Islander Peoples in everyday life, eg tools, weapons, utensils, shelter, housing or bush medicine
- SC4-LW5 AC – discuss how the observations and understanding of the structure, function and life cycles of native plants are used by Aboriginal and Torres Strait Islander Peoples.

These outcomes will be taught in a range of classes using a variety of teaching and learning methods, such as hand on, project-based learning and excursions.

The development of this project plan was informed by students from the STEaM and Planet Earth classes who developed the Wadalba Wildlife Warrior Grant Support document. These students took it upon themselves to research local native flora and fauna and created a booklet to support the project. This booklet will be used to inform others about what plants to plant and where/when to plant them; it informs others on what species are critically at risk and where they are located; it will also be the basis of future development of other sustainable projects.

The project has been developed in collaboration with specialist external advisors which has shaped the innovative ideas and structure of the Wadalba Wildlife Warriors. Due to the diversity of this project it was difficult to build upon other local schools, so this project is a first of its kind and will be embedded into the local community in hopes of other local schools becoming involved in the future.

This project is based on the Wadalba Wildlife Corridor established in 2006. It aims to continue and increase the parameters of the corridor with strong connections to education and the local community. Through the development of this project's teachers have liaised with the following agencies/individuals to gather key information and quotes:

- Mandy Mitchell – WL-ARC
- Michael Smith – Central Coast Council
- Christine Freeman – Rumbalara
- Office of Environment and Heritage
- Local Land Council
- Aboriginal Community Liaison officer

Other sources of information were obtained from NSW Government policies and procedures, code of practice for injured, sick and orphaned protected fauna and Wadalba Wildlife Corridor management plan.

# Project breakdown

The project involves a number of steps. These are summarised below:

Activity	Start date	End date	Responsibility
<p>Phase One:</p> <p>This phase will look to <b>collect initial data</b> of the local area and to <b>improve and regenerate local feed sources</b> for native birds such as the rainbow lorikeet and native possums such as the Yellow-bellied glider and sugar glider possum. Establishing nutrient sources for local wildlife is detrimental to the future survival of local species. Plants such as banksias, eucalypts, fruit trees and bottle brush will be established in four different locations around the school and in the community.</p> <p>This will also incorporate <b>creating a D'harwal calendar garden (see the map)</b> in Wadalba Community School, producing an educational poster with the Aboriginal seasons and how the plants react to the season.</p>	27/01/2021	12/03/2021	Ashley Fuller Dylan Magrin Joshua Cave Various Students
<p>Phase Two:</p> <p>Establishing and refurbishing possum, glider, bird and micro-bat box habitats and rope crossings in the Wadalba Wildlife corridor to complement the varying vulnerable species of marsupials, owls and birds found in the area.</p> <p>Building an animal refuge for injured or harmed native wildlife found in the local community.</p> <p>To remove and recycle soft plastic wastes from Wadalba Community School</p>	19/04/2021	17/12/2021	Ashley Fuller Dylan Magrin Joshua Cave Chiya Bowen Various Students
<p>Phase Three:</p> <p>Students propagate native plant species from the gardens around the school and local area. These are grown and developed into packs which are sold to the community. These packs will include information explaining the environmental impacts for a variety of activities and offer provides steps that can be taken to minimise the impact. The nature of each pack designed will be determined by the students.</p>	22/02/2021	17/12/2021  Possible future date of propagation of Term 1 2022	Joshua Cave Daniel Camilleri Ashley Fuller Dylan Magrin
Final report (minimum two pages with photos) on project outcomes to Sustainable Schools Grants team			Ashley Fuller Dylan Magrin Joshua Cave
Final budget acquittal to be sent to Sustainable Schools Grants team			Ashley Fuller Dylan Magrin

The identified project stakeholders include:

- Mandy Mitchell – WL-ARC
- Michael Smith – Central Coast Council
- Christine Freeman – Rumbalara
- Jason McGrath – Principle Wadalba Community School
- Denna Beecroft – Deputy Principle Wadalba Community School/ Environment and sustainability coordinator
- Dylan Magrin – Science Teacher/Enviro Group Leader
- Ashley Fuller – Science Teacher/Planet Earth Teacher
- Joshua Cave – Science Teacher/ATSI Science Leader
- Chiya Bowen – Science Teacher/Animal Welfare Coordinator/Wildlife ARC/W.I.R.E.S trained
- Wadalba Community School Students



# Project budget

The grant amount requested has been based on the following budget estimate. Project expenditure will be tracked regularly to ensure it sticks closely to these estimates. Where there is a significant deviation, due to incorrect assumptions or required changes to the projects, the advice of the Sustainable Schools Grants team will be sought prior to proceeding.

Category	Item/s	Cost (\$)
Goods	See below for specifics	
Services	Concrete Arborist Crossing installation	1000
Goods	Field study Equipment -Nest box cameras (2 x gopro)	598
	Field study Equipment -2 sticks for gopro for next box	118
	Field study Equipment -Inferred animal camera	623
	Field study Equipment -3 Weather stations	297
	Field study Equipment -kestrel Meter	490
	Seedlings e.g. Australian Wildflowers	99
	Established Shrubs e.g. Purple Lace - Melaleuca thymifolia and Birthday Candles - Banksia spinulosa	284.70
	Established Larger Shrubs e.g. Lilly Pilly Forest Flame - Acmena smithii	545
	Established Tree e.g. Trunk Size H Grass Tree - Xanthorrhoea johnsonii	800
	Soil propagation	1000
	Box rope cage fauna crossing	840
	Microbat, Glider, possum nest boxes	1425
	Animal enclosure	3500
	Animal enclosure beds, supplies and food.	500
	Material (Phase 2)	800
	Soft plastic recycling bins (Plastic Police)	389
	Recycled paper pots	<b>DIY</b>
Potting Mix (25L bag)	119.80	
Recycled cardboard boxes (10 pack)	103.50	
<b>TOTAL</b>		<b>13,332</b>

# Monitoring project outcomes

The following performance metrics are relevant to this project and will be monitored at the relevant points during the project. These will be reported back to the Sustainable Schools Grants upon completion of the project or by no later than end of Term 4, 2021.

- Improvement in biodiversity-e.g. birds, bats, bees, native frogs and mammals, insects, native plants, native aquatic animals and plants, reduction in pests, sensitive water bugs
- Number/ type/ size of trees/ bushes/ shrubs planted
- Square metres of garden planted]
- Number of participants teachers trained - online, face to face, use of experts
- Hours of employment generated by local business services used to assist your project e.g. gardeners, plumber
- Number of volunteers involved in project
- Animal rescue register

Student activities which will support the collection and analysis of project metrics include:

- Stage 6 Earth and Environment, Biology and Geography Biodiversity field study pre and post activities
- STEaM Field study analysis over the year period – including species of both flora and fauna
- Enviro Group reporting on plastics
- Animal Welfare Class to monitor and document rescue animals
- Qualitative and quantitative data collection pre and post project – with on-going data analysis for future years, school wide.

# Project communications, engagement and awareness raising

One of the goals of the Sustainable Schools Grants is to allow schools to support other schools and the wider community in their sustainability journeys by sharing relevant learnings from projects. These learnings may be to inspire others, provide data, document methodologies, share useful information about resources, and any other communication strategies which may help to overall improve the sustainability performance of the Department of Education.

This project will support these goals by employing the following communication and engagement strategies:

- Term 1 Staff Development Day 2021
- Leadership team to communicate to the school on what will be occurring
- Social media avenues including the School website and Facebook page to advertise and connect the local community to our animal sanctuary
- Phase 3 of the project (see below)

**Purpose:** To increase awareness of and reduce the Wadalba community's ecological footprint.

Students propagate native plant species from the gardens around the school and local area. These are grown and developed into packs which are sold to the community. These packs will include information explaining the environmental impacts for a variety of activities and offer provides steps that can be taken to minimise the impact.

The nature of each pack designed will be determined by the students. Examples of types of packs include:

- Summer pack (plants that flow in summer)
- Possum pack (plants that food sources for possums)
- Pollinator pack (a selection of plants that flower over the year to maintain consistent food sources for bees and other pollinators)
- Bush medicine (a selection of plants used for bush tucker and medicinal).

## Students involved:

- STEAM
- Selected classes from year 8 and 10
- Planet Earth Elective
- Enviro Group
- Year 9 Agriculture

## External involvement:

- Aboriginal Community Liaison officer
- Office of Environment & Heritage
- Community Households



**Plan:**

Students from the classes above will conduct research on one species of plant found in WCS or the local area. In their research students will need to identify its lifecycle, seasonal change over the year, optimal conditions for growth and development and propagation techniques. Students will then conduct a first-hand investigation to identify the most effective propagation technique for their plant, trialing different methods to produce plants that can be sold.

Students will conduct their research together, however, due to the nature of propagation, students will stagger their first-hand investigations over the year to optimise their results.

As the plants are growing students use their research and construct packs for sale to the community households. Packs will be constructed using the student's research, grouping plants together based on common themes (seasonal flowering, bush tucker, native species attraction, and pollinator attractors). Students will also have to identify space availability of typical households for the design of the packs.

Once designed the plant packs will be constructed using recycled materials from around the school. Targeted households will be given the packs as trials to develop promotional photos of the gardens designed from the packs. Once complete advertising can occur through the school Facebook and the newsletter.

**Time Frame:**

1 year – Term 4 2021 (seasonally determined for different plant species).

# Risk management

A number of potential risks have been identified and appropriate control measures to keep the risks at acceptable levels will be put in place.

Health and safety risks and environmental compliance risks are documented using the [SAFETY Risk Assessment and Management Plan](#). This must be attached to this Project Plan when completed and submitted with applications for a Grant. The Risk Assessment and Management Plan, as well as the Project Plan, should be reviewed regularly throughout the project to remain all content remains relevant and any changes are captured. Therefore, version control and dates should be considered.



## Wadalba Wildlife Warriors

### *Integrated Sustainability Project*

#### **Introduction**

We as people have had a complicated relationship with the Earth. Wadalba Community School (WCS) is seeking to grow and develop as a community while forming notions of order and beauty from the wilderness before us. However, as we reach this new age of development and progress into the contemporary technological world, we must continue to reflect on our impact and respond to the world we perceive. The Wadalba Wildlife Warriors aim **to integrate the school and local environment by increasing the sustainable practices of our local community to live symbiotically with our local area.**

#### **The Problem**

The development of Wadalba has disrupted around 4.1km<sup>2</sup> of native bush land in the Central Coast Region. This has resulted in the fragmentation and destruction of local flora and fauna. Wadalba Community School is an extremely large school that relies on a large amount of energy, water and waste management services leading to the interest of making the school, and community more sustainable.

#### **Who is involved**

Over 100 Wadalba Community School students ranging from years 8 to 12 will be directly involved with the various steps of the proposed integrated sustainability project.

- Research has already been conducted by the year 8 STEaM class on what local fauna is at risk in the local area and what food sources and habitats these animals require to have a prosperous and sustainable future within the local Wadalba Wild-Life Corridor, and other fragmented suburban areas. These students in the **year 8 STEaM class constructed the attached supporting document** for the Wadalba Wildlife Warriors.
- The Planet Earth year 9+10 class and year 9 EnviroGroup are two like-minded classes who all want to make a positive change to the local environment and have a mind geared towards sustainability. Consisting of around 30 students, these two classes will be the heart and soul of the Integrated Sustainability Project, participating in all phases of the project. Both classes will be involved with:
  - Planting food sources for local fauna in the school and community.
  - Constructing and installing fauna habitats including possum boxes and possum ladder crossings.
  - Establishing and maintaining soft plastic recycling bins.
- The Year 9 Animal Welfare class will be embroiled with the construction of the animal sanctuary in phase 3, helping with the physical construction of the sanctuary, design, furnishings and equipment needed to treat injured animals. Under the guidance of Miss Bowen, Mandy Mitchell from Wildlife-arc has already agreed to volunteer her time each term to educate the students in the care and welfare of various Australian animals.
- Year 9 TRADIE class will assist in the construction of the animal sanctuary and any other construction related aspects of the proposal.
- Year 12 Biology and Year 12 Earth and Environmental Science, along with Geography, will be involved with transecting and collecting data of the Wadalba Wildlife corridor. This will allow us to count the number of diverse flora and fauna species in the wildlife corridor and survey whether our improvements to the corridor have made a significant difference in years to come.

## The Proposal

The students have developed a dynamic plan that will see the embedding of the “**Wadalba Wildlife Warriors**” into the culture of the school and broader community. The proposal is broken into phases that will allow for the smooth integration into the planning of the school.

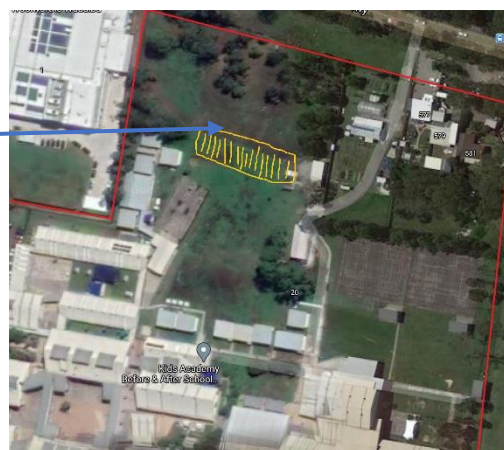
### Phase One - “Field Study”

**Purpose:** To collect data and increase the biodiversity of native flora for native wildlife.

This phase will look to **collect initial data** of the local area and to **improve and regenerate local feed sources** for native birds such as the rainbow lorikeet and native possums such as the Yellow-bellied glider and sugar glider possum. Establishing nutrient sources for local wildlife is detrimental to the future survival of local species. Plants such as banksias, eucalypts, fruit trees and bottle brush will be established in four different locations around the school and in the community.

This will also incorporate **creating a D’harwal calendar garden (see the map)** in Wadalba Community School, producing an educational poster with the Aboriginal seasons and how the plants react to the season. Plants will include Weetjellan, *Gynea lily*, Lillypilly, Burringoa, Marrai’uo, Burringoa, Boo’kerrikin, Miwa Gawaian, Kai’arrewan.

**Proposed D’harwal calendar garden**



### **NSW Syllabus Links:**

- Sc4-LW5 Science and technology contribute to finding solutions to conserving and managing sustainable ecosystems

Students:

- a. construct and interpret food chains and food webs, including examples from Australian ecosystems
- b. describe interactions between organisms in food chains and food webs, including producers, consumers and decomposers (ACSSU112)
- c. describe examples of beneficial and harmful effects that micro-organisms can have on living things and the environment
- d. predict how human activities can affect interactions in food chains and food webs, including examples from Australian land or marine ecosystems (ACSSU112)
- e. explain, using examples, how scientific evidence and/or technological developments contribute to developing solutions to manage the impact of natural events on Australian ecosystems
- f. describe how scientific knowledge has influenced the development of practices in agriculture, eg animal husbandry or crop cultivation to improve yields and sustainability, or the effect of plant-cloning techniques in horticulture

- Sc5-LW2 - evaluate some examples in ecosystems, of strategies used to balance conserving, protecting and maintaining the quality and sustainability of the environment with human activities and needs.

Students:

- a) recall that ecosystems consist of communities of interdependent organisms and abiotic components of the environment (ACSSU176)
- b) outline using examples how matter is cycled through ecosystems such as nitrogen (ACSSU176)
- c) describe how energy flows through ecosystems, including input and output through food webs (ACSSU176)
- d) analyse how changes in some biotic and abiotic components of an ecosystem affect populations and/or communities
- e) assess ways that Aboriginal and Torres Strait Islander Peoples' cultural practices and knowledge of the environment contribute to the conservation and management of sustainable ecosystems

#### ATSI Links:

- SC4-ES4D - Research how Aboriginal and Torres Strait Islander Peoples' knowledge is being used in decisions to care for country and place, e.g. terrestrial and aquatic resource management.
- SC4-LW5 - discuss how the observations and understanding of the structure, function and life cycles of native plants are used by Aboriginal and Torres Strait Islander Peoples.

#### Students involved:

- STEAM
- Planet Earth Elective
- Enviro Group
- Stage 6 Earth and Environmental Science, Biology and Geography
- Aboriginal student Leaders

#### External involvement:

- Local Land Care
- Wye nursery
- Other local nurseries if needed

#### Plan:

Students from Stage 6 Biology, Earth and Environmental and Geography classes along with STEaM will **conduct transects and quadrats to collect initial data** on native flora within Wadalba Community School and the Wildlife Corridor.

Students from the Plant Earth elective will source and mark the locations around WCS to sow native seeds and plant native species, create a timeline and watering/maintenance schedule to ensure effective establishment of native flora.

The Enviro Group will assist in the planting stage and continuous maintenance of established areas.

All students involved (STEaM, Planet Earth, Enviro Group and Stage 6 courses) will **work alongside the Aboriginal student leaders** to research and develop the D'harwal calendar garden, so that the seasonal plants are in the order of summer, autumn, winter, spring. They will develop a scope and sequence to plant, maintain and educate others.



**Time Frame:**

10 weeks (Term 1)

**Expected Costs:**

<b>Item</b>	<b>Cost</b>	<b>Total</b>
Field study Equipment -Nest box cameras (2 x gopro)	\$299 x2	\$598
Field study Equipment -2 sticks for gopro for next box	\$59 x 2	\$118
Field study Equipment -Inferred animal camera	\$89 x 7	\$623
Field study Equipment -3 Weather stations	\$99 x 3	\$297
Field study Equipment -kestrel Meter	\$490	\$490
Seedlings e.g. Australian Wildflowers	\$4.95/mix (3500 seeds) x 20	\$99
Established Shrubs e.g. Purple Lace - Melaleuca thymifolia and Birthday Candles - Banksia spinulosa	~\$10.98 - \$21.90 x 13	\$284.70
Established Larger Shrubs e.g. Lilly Pilly Forest Flame - Acmena smithii	~\$60.98 - \$109 x 5	\$545
Established Tree e.g. Trunk Size H Grass Tree - Xanthorrhoea johnsonii	~\$200 – 400 x 2	\$800
Soil propagation	~\$1400	\$1000
<b>TOTAL</b>		<b>\$4854.70</b>

## **Phase Two - “Sanctuary Preparation and Building”**

**Purpose:** To provide a sustainable and clean habitat for local wildlife in the Wadalba Community. This will be achieved by the following actions:

**Establishing and refurbishing possum, glider, bird and micro-bat box habitats** and rope crossings in the Wadalba Wildlife corridor to complement the varying vulnerable species of marsupials, owls and birds found in the area. Three possum rope crossings will be established in the area with the intention of linking up the Wadalba Wildlife corridor. Two crossings will link the corridor over the Pacific Highway, an area where many dead possums have been observed. The third will link up the Western part of the corridor over the densely populated suburbs behind the school. The animal boxes will be established throughout the current Wildlife corridor and within Wadalba Community School (see attached supporting document for more information).

Building an animal refuge for injured or harmed native wildlife found in the local community. This would act as a **drop off point** where local fauna can be stored and cared for before they can be directed to the correct services such as Wildlife-Arc or the local veterinary office. Animals found in the school and the local community will be eligible to be kept here.

To **remove and recycle soft plastic wastes** from Wadalba Community School. This will encompass placing soft plastic recycling bins around the school to accompany our new metal bins that consist of landfill waste, general recycling and organics. Soft plastics are prevalent in our targeted areas of rehabilitation, our survey indicated that most soft plastics originate in the school and are transported by wind and rain through to the Wadalba Wildlife corridor.

### **NSW Syllabus Links:**

- Early Stage 1 – Science and Technology K–6
  - Students recognise that living things have different features and basic needs which can be met. They recognise that plants and animals can be used for food, clothing and shelter.
  - Students compare living things and identify the life cycles which support the survival of plant and animal species.
- Sc4-LW1 - There are differences within and between groups of organisms; classification helps organise this diversity  
Students:
  - a) identify reasons for classifying living things
  - b) classify a variety of living things based on similarities and differences in structural features
  - c) use simple keys to identify a range of plants and animals
  - d) outline the structural features used to group living things, including plants, animals, fungi and bacteria
  - e) explain how the features of some Australian plants and animals are adaptations for survival and reproduction in their environment.
- Sc4-LW4 - Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world.

### **Students involved:**

- Animal Welfare Elective
- STEAM
- Planet Earth Elective
- Enviro Group
- Year 9 Tradie Class
- Stage 6 Earth and Environmental Science, Biology and Geography

## External involvement

- WildLife-Arc – Mandy Mitchell
- Central Coast Council – Michael Smith

Wadalba Community School has **partnered with WildLife-Arc** to educate and oversee the construction and maintenance of the proposed animal sanctuary. Miss Bowen, a licensed keeper and animal welfare teacher, is a member of WildLife-Arc and WIRES who is actively involved in animal rescues and animal welfare in the local community. Miss Bowen has already established a relationship with Education Officer Mandy Mitchell from WildLife-Arc. Mandy will be visiting the school in term 1, 2021, where she will be bringing in commonly injured animals found in the community and educating the students on the appropriate responses and needs to treat these animals.

## Plan

Possum, bird and microbat boxes will be constructed in selected areas around the school and community (see attached Wadalba Wildlife Warriors supporting document). The boxes will be constructed by the Year 9 tradie class, planet Earth class, and year 9+10 EnviroGroup.

Two aviaries will be constructed up at the agriculture farm alongside the fence near the Pacific Highway. This will allow for easy access for community drop offs without compromising the safety of the school. The aviaries will consist of an open bird section and a closed off dark section for any nocturnal animals. The aviaries will be built to minimum enclosure size guidelines listed by the Office of Environment and Heritage (EOH). The location of the aviaries has been specially selected to maximise the welfare of the animals and prevent external stimulation from the bulk of the school cohort.

Soft plastic recycling bins will be established to accompany our new sectioned off school bins. This initiative coincides with the knowledge we are gathering from the Wiping Out Waste program. The money will also be used to establish a bulk skip bin at the school. The bins will be maintained by the Year 9 + 10 EnviroGroup.

## Proposed aviary for animal sanctuary

Two of the below animal enclosures with open and closed sections. Both will be placed on a concrete slab built by the Year 9 Tradie Class. All enclosures adhere to the Office of Environment and Heritage animal welfare guidelines.

length, width, height

Bird enclosure 5 x 2 x 2.

Possum enclosure 5 x 4 x 2



**Time Frame:**

1 year – Term 4 2021

**Expected Costs:**

<b>Item</b>	<b>Cost</b>	<b>Total</b>
Box rope cage fauna crossing	~\$280 x 3	\$840
Microbat, Glider, possum nest boxes	~\$95 x 5 of each type	\$1425
Animal enclosure	~ \$1700 x 2	\$3500
Animal enclosure beds, supplies and food.	~\$500	\$500
Concrete truck and material	~\$800	\$800
Soft plastic recycling bins (Plastic Police)	~\$389	\$389
<b>TOTAL</b>		<b>\$7454</b>

## **Phase Three - “Regenerating Wadalba”**

**Purpose:** To increase awareness of and reduce the Wadalba community’s ecological footprint.

Students **propagate native plant species** from the gardens around the school and local area. These are grown and developed into packs which are sold to the community. These packs will include **information explaining the environmental impacts** for a variety of activities and offer provides steps that can be taken to minimise the impact.

The nature of each pack designed will be determined by the students. Examples of types of packs include:

- Summer pack (plants that flow in summer)
- Possum pack (plants that food sources for possums)
- Pollinator pack (a selection of plants that flower over the year to maintain consistent food sources for bees and other pollinators)
- Bush medicine (a selection of plants used for bush tucker and medicinal.



**Sample plant pack**

### **NSW Syllabus Links:**

- SC5-WS6 – undertakes first-hand investigations to collect valid and reliable data and information, individually and collaboratively.
- SC5-7WS – processes, analyses and evaluates data from first-hand investigations and secondary sources to develop evidence-based arguments and conclusions.
- SC5-LW2a – recall that ecosystems consist of communities of interdependent organisms and abiotic components of the environment.

### **ATSI Links:**

- SC4-CW AC – research how a knowledge of physical properties of natural materials is used by Aboriginal and Torres Strait Islander Peoples in everyday life, eg tools, weapons, utensils, shelter, housing or bush medicine.
- SC4-LW5 AC – discuss how the observations and understanding of the structure, function and life cycles of native plants are used by Aboriginal and Torres Strait Islander Peoples.

### **Students involved:**

- STEAM
- Selected classes from year 8 and 10
- Planet Earth Elective
- Enviro Group
- Year 9 Agriculture

### **External involvement:**

- Aboriginal Community Liaison officer
- Office of Environment & Heritage
- Community Households

**Plan:**

Students from the classes above will **conducted research on one species** of plant found in WCS or the local area. In their research students will need to identify its lifecycle, seasonal change over the year, optimal conditions for growth and development and propagation techniques. Students will then conduct a first-hand investigation to identify the most effective propagation technique for their plant, trialing different methods to produce plants that can be sold.

Students will conduct their research together, however, due to the nature of propagation, students will stagger their **first-hand investigations** over the year to optimise their results.

As the plants are growing students use their research and construct packs for sale to the community households. Packs will be constructed using the student's research, grouping plants together based on common themes (seasonal flowering, bush tucker, native species attraction, and pollinator attractors). Student will also have to identify space availability of typical households for the design of the packs. Each pack will come with educational pamphlets that identify the significance of each plant including; the carbon emissions offset by the pack and the organisms that rely on this species.

Once designed the plant packs will be **constructed using recycled materials** from around the school. Targeted households will be given the packs as trials to develop promotional photos of the gardens designed from the packs. Once complete advertising can occur through the school Facebook and the newsletter.

**Time Frame:**

1 year – Term 4 2021 (seasonally determined for different plant species).

**Expected Costs:**

Item	Cost	Total
Recycled paper pots	(to be constructed from recycled paper from school)	
Potting Mix (25L bag)	\$11.98 x 10	\$119.80
Recycled cardboard boxes (10 pack)	\$34.50 x 3	\$103.50
<b>TOTAL</b>		<b>\$223.30</b>

# WADALBA WILDLIFE WARRIORS



*By the Students of Wadalba Community School*  
NSW DEPARTMENT OF EDUCATION



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## Overview

**Area of investigation** – Wadalba Community school and local surroundings.

**Purpose of this document** – Information on the local environment including flora and fauna that will contribute to sustainability and regeneration of the Wadalba community.

**Specific Location** – The wildlife corridor, owned by Central Coast Council, is located on the NSW Central Coast. The corridor is a patch of retained native vegetation and fauna habitat that functions as a wildlife movement corridor and provides connectivity between Porters Creek Wetlands and Tacoma Wetlands. To date, limited studies have been undertaken to look at the fauna assemblages using the corridor and determine if it is functioning as expected.

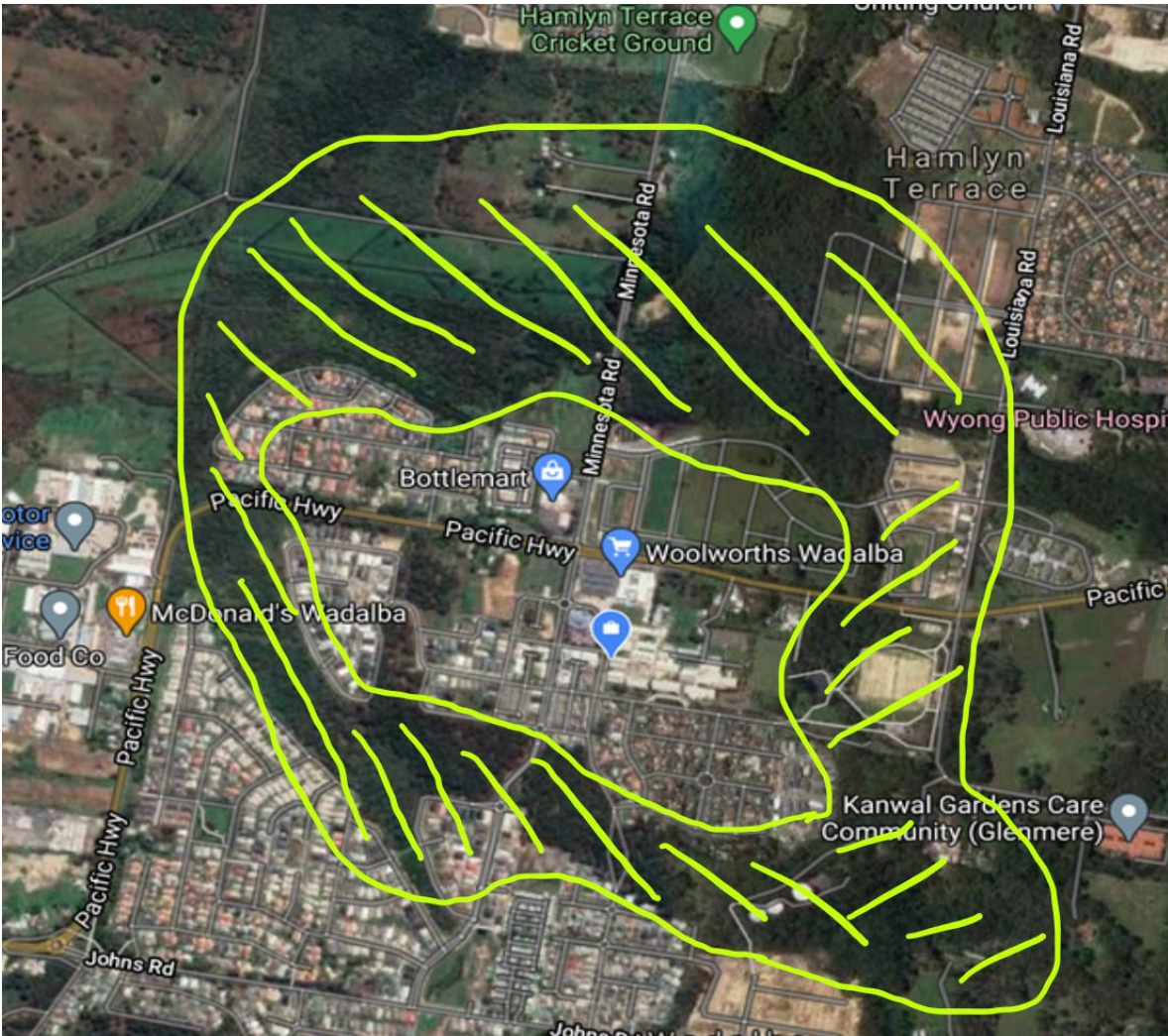
### **Problems identified –**

- Fragmentation of species due to development
- Habitat loss
- Reduction in Biodiversity – both flora and fauna
- No upkeep of the corridor
- Lack of education about local area
- Limited native species
- Weed Control

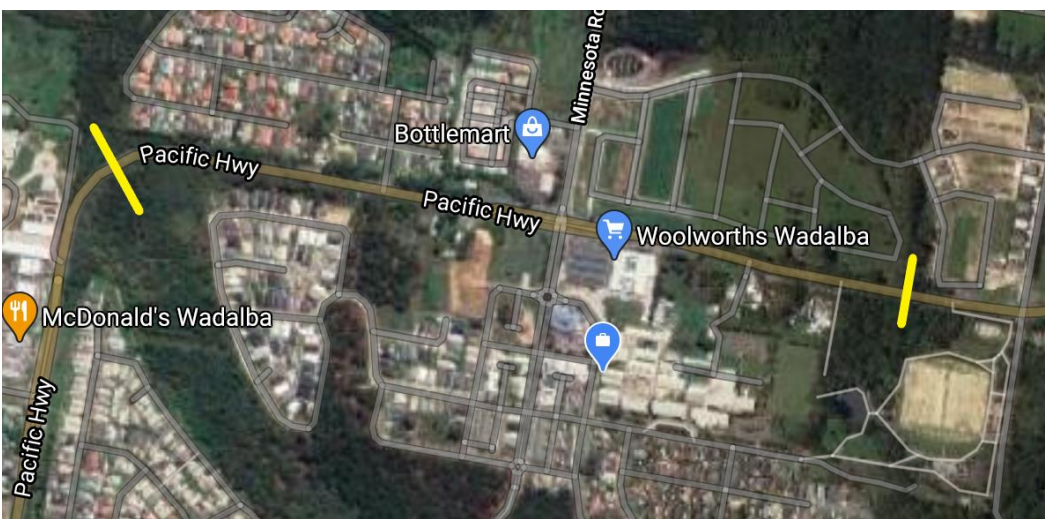
### **Proposed solutions to increase biodiversity and sustainability –**

- Increasing native flora for local wildlife
- Build a sanctuary for injury wildlife for the school and local community, refuge for injured animals
- Establish connection with local services
- Involve students from Wadalba in the conservation of the local area
- Educate the local community on sustainability practices

**Map – Wildlife Corridor**



**Map – Proposed areas for wildlife crossings**

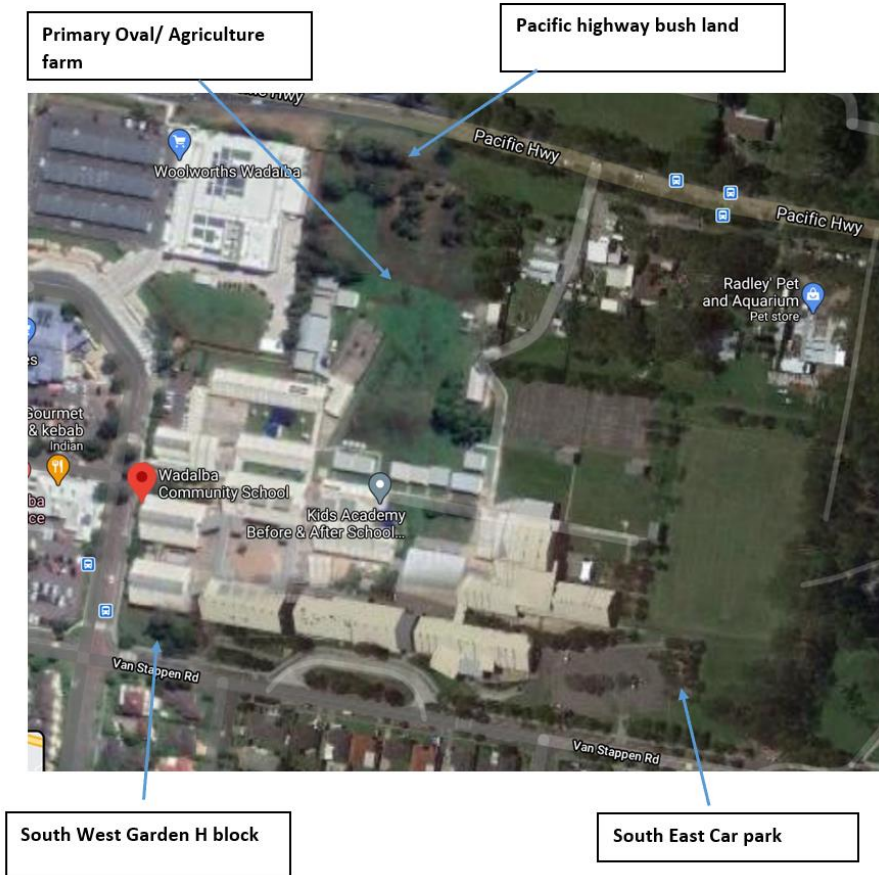




**Map – School (green= proposed possum huts; orange= native flora regeneration)**



**Targeted areas of rehabilitation of flora and fauna**



## **THE PROJECT OUTLINE**

Together, with the teachers, we have created the following:

**Phase 1: Creating Nutrient sources:** This phase will look to improve and regenerate local feed sources for native birds such as the rainbow lorikeet and native possums such as the pigmy and sugar glider possum. Establishing nutrient sources for local wildlife is detrimental to the future survival of local species. Plants such as banksias, eucalypts, fruit trees and bottle brush will be established in four different locations around the school and in the community (see map below).

### **Target plant species**

- **Banksias**
- **Eucalypts**
- **Fruit trees**
- **Bottle brush**

### **Target animal species**

- **Brush tailed possum**
- **Feather tailed glider**
- **Pigmy possum**
- **Sugar glider**
- **Yellow belly glider**
- **Rainbow lorikeet**
- **Black cockatoo**
- **Sulphur-crested cockatoo**
- **Yellow-tufted honeyeater**

### **Phase 2: Establishing a sanctuary:**

**Possums boxes:** This will look at constructing possum boxes in designated areas to create a safe and sustainable habitat for local possums.

**Animal refuge:** Animal refuge for injured wildlife found at the school or in the community.

**Animal crossings:** Connecting the Wildlife corridor to the wider community, establish connects across the Pacific Highway.

**Soft plastics:** Establishing a clean environment

### **Phase 3: Regenerating Wadalba:**

**Education:** This will entail an educational pack developed by students to be distributed amongst the local community. The pack will include sustainably produced paper leaflet with information on what is being done at the school and the local area, what to watch out for in terms of flora and fauna, and how to grow native plants and how to reduce waste and live sustainability.

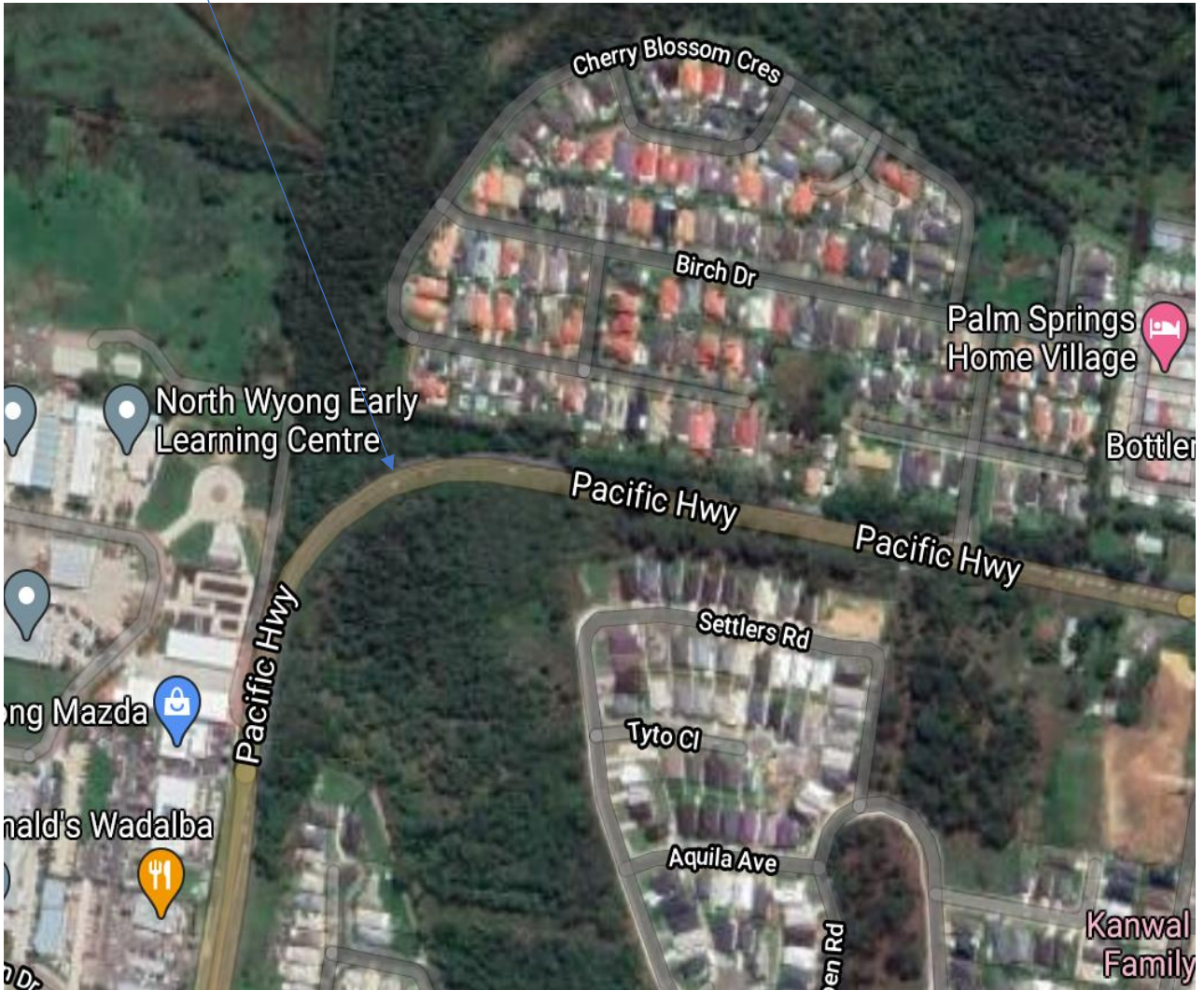
Proposed animal crossing to link Wadalba Wildlife Corridor over the Pacific Highway

Proposed animal crossing 1

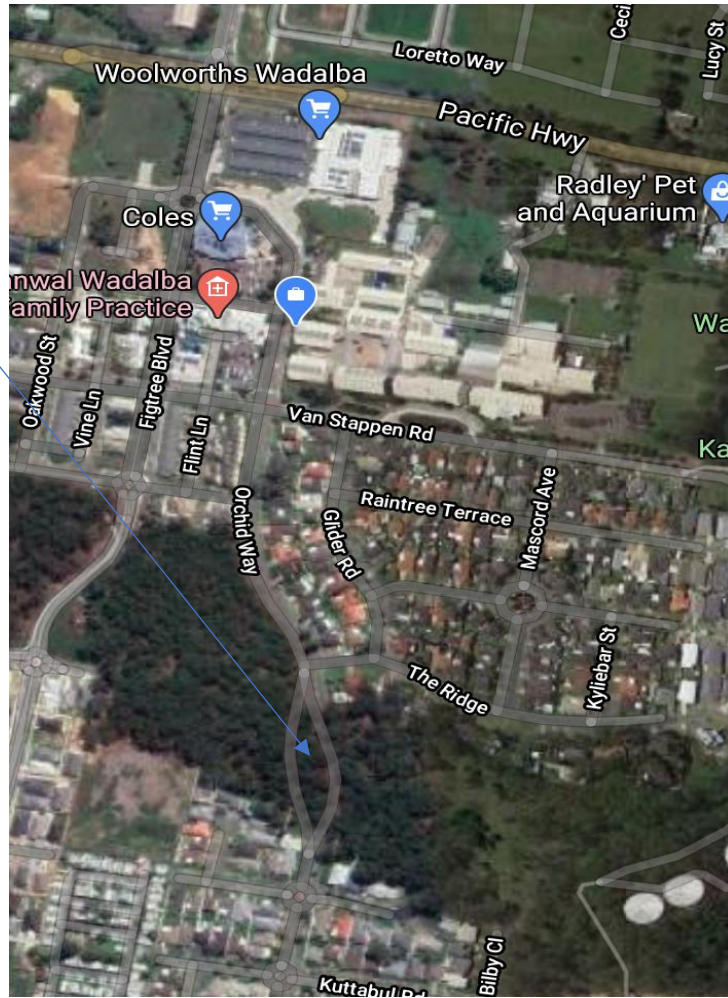




Proposed animal crossing 2



Proposed animal crossing 3



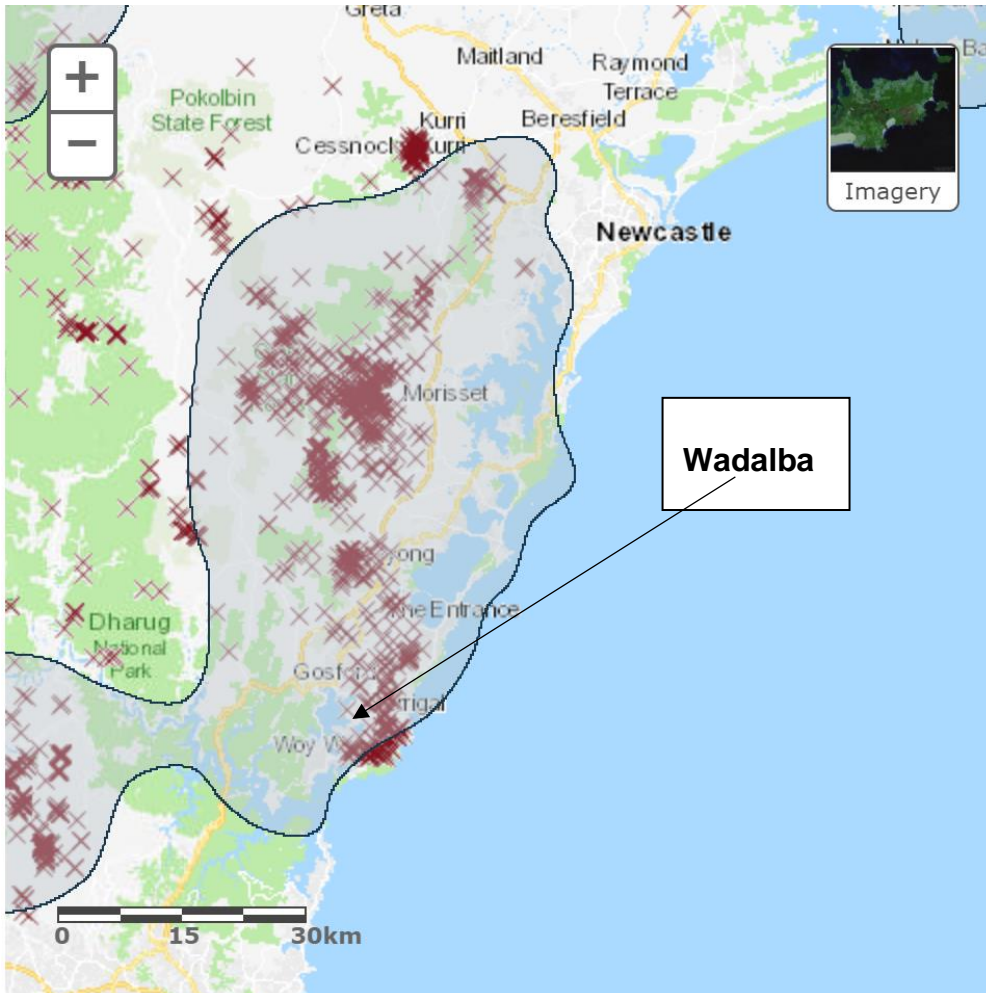


## SPECIES UNDER THREAT

### Yellow-bellied Glider (*Petaurus Australis*)

#### Conservation status –

Status in NSW:	Vulnerable
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Distribution on Central Coast

#### Critical actions for this species –

The key threats to the viability of landscape-managed species are loss, fragmentation and degradation of habitat, and widespread pervasive factors such as impacts of climate change and disease. Many of these threats are addressed by NSW planning, native vegetation, and biodiversity legislation, policy and programs including the offsets program (Biobanking, NSW Biodiversity Offsets Policy for Major Projects), Biodiversity Certification, management of environmental water and reservation under the *National Parks and Wildlife Act 1974*.

#### Key Actions:

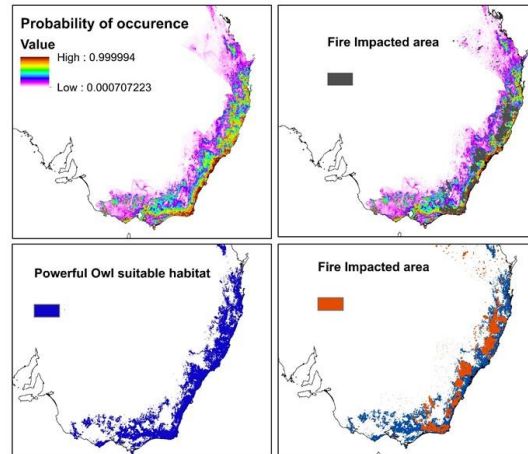
- Protect and maintain areas of high-quality habitat
- Undertake revegetation, using a mix of locally appropriate native species
- Improve and maintain connectivity between patches of suitable habitat



## Powerful Owl (*Ninox strenua*)

**Numbers left in the wild:** 2200-2800 – under threat

30% of Powerful Owl suitable habitat impacted by fires in 2019 / 2020



Suitable Habitat estimated by maximizing training sensitivity plus specificity of Maxent derived probabilities, Maxent model AUC = 0.86

**Habitat:** The Powerful Owl is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. Needs old growth trees to nest.

**Threats:** Historical loss and fragmentation of suitable forest and woodland habitat from land clearing for residential and agricultural development. This loss also affects the populations of arboreal prey species, particularly the Greater Glider which reduces food availability for the Powerful Owl.

**Diet:** The Powerful Owl is a carnivore, eating mainly medium to large tree-dwelling mammals, particularly the Common Ringtail Possum, *Pseudocheirus peregrinus*, and the Great Glider. It will also take roosting birds and sometimes small ground-dwelling mammals such as rabbits or small marsupials. It forages mainly in trees, swooping down on prey and taking prey with its feet.

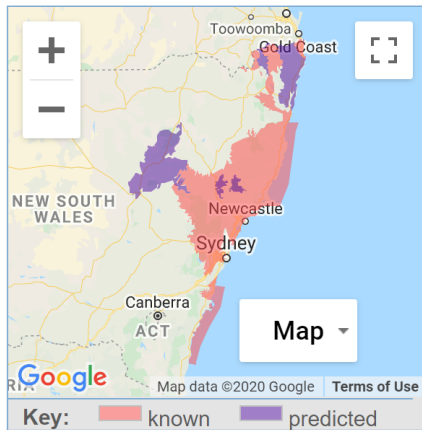
**Height:** Adults reach 60 cm in length, have a wingspan of up to 140 cm

**Weight:** 1.45 kilograms

**Description:** The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with large yellow eyes and no facial-disc. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. Juvenile Powerful Owls have a white crown and underparts that contrasts with its small, dark streaks and dark eye patches.

## White-flowered Wax Plant (*Cynanchum elegans*)

Conservation status: Endangered



**Habitat:** The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Flowering occurs between August and May, with a peak in November. Flower abundance on individual plants varies from sparse to prolific.

**Threats:** Loss and fragmentation of habitat as a result of clearing for agriculture. Loss and fragmentation of habitat as a result of residential development.



**BIRDS**



## Galah

**Scientific Name:** *Eolophus roseicapilla*

**Habitat:** The Galah lives in most parts of Australia, including some offshore islands, and it has been introduced to Tasmania. It occupies a range of habitats, including woodlands, grasslands and shrublands. It also adapts well in urban areas, pastures, parks and agricultural land, though it avoids dense forest.

**Threats:** The major threats to galahs are feral cats, birds of prey, goannas and snakes.

**Numbers left in the wild:** There are plenty of Galahs left in the wild.

**Diet:** They eat various types of seeds, leaf buds, roots, nuts, fruit and some insects. Galah's aren't fussy eaters but they particularly love wattle seeds such as *Acacia fimbriata* and macadamia nut trees (*macadamia tetraphylla*), so if you can plant one or two you, you will be great to help them.

**Reproduction:** The Galah's will line the nest with eucalyptus leaves. Galah usually lay between 2 to 5 eggs. Both the male and the female bird will take turns incubating (sitting on the eggs). The juvenile Galah's will then join a flock of other juvenile birds until they reach breeding maturity (about 4 years).

**Height:** 35cm

**Weight:** 300grams

**Description:** The Galah can be easily identified by its rose-pink head, neck and underparts, with a paler pink crown, and grey-back, wings and undertail. Birds from the west of Australia have comparatively paler plumage. The galah is found in large flocks in a variety of timbered habitats, usually near water.



## **Rainbow Lorikeet**

**Scientific Name:** Trichoglossus moluccanus

**Habitat:** The Rainbow Lorikeet is found in a wide range of treed habitats including rainforest and woodlands, as well as in well-treed urban areas.

**Threats:** These Goshawks have the ability of blending in with the environment, making them a massive threat to the Rainbow Lorikeet. Environmental threats include deforestation, climate change, disturbance of breeding and environmental flows.

**Numbers left in the wild:** The population now numbers an estimated 8,400 birds and is expanding in range at a rate of 0.7 km per year.

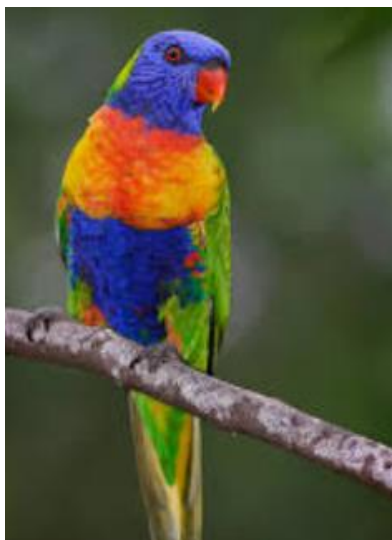
**Diet:** their favourite foods are nectar and pollen from native flowers. Nectar gives them energy, and pollen provides protein for healthy feathers.

**Reproduction:** The breeding season varies widely between regions, depending on climate and resource availability, but generally occurs from August to January in southern Australia.

**Height:** The rainbow lorikeet is a medium-sized parrot, with the length ranging from 25 to 30 cm including the tail.

**Weight:** Adult rainbow lorikeets weigh around 120g

**Description:** Both sexes look alike, with a blue (mauve) head and belly, green wings, tail and back, and an orange/yellow breast.



## **Kookaburra**

**Scientific Name:** Dacelo

**Habitat:** Laughing kookaburras are native to woodlands and open forests in Australia, where they perch in large trees and nest in cavities of tree trunks and branches.

**Threats:** Deforestation of trees with hollows which they need to nest in. Poisoning from pesticides.

**Numbers left in the wild:** The kookaburra population is estimated to be around 65 million birds. They are not considered an endangered species, but as with all Australian native animals, they are protected by strict laws.

**Diet:** Laughing kookaburras eat more insects, reptiles, frogs, and rodents than fish.

**Reproduction:** Their nesting season starts in September and finishes in January. The bird's nest in a large cavity in a tree trunk or in a hole made in a tree-dwelling termite mound. The female usually lays three white eggs 1-2 days apart.

**Height:** 27-43cm

**Weight:** 300g

**Description:** Kookaburras have a compact body, short neck, rather long and pointed bill and short legs, the upper parts dark brown, the wings spotted grey-blue.





## **Far Eastern Curlew**

**Scientific Name:** Numenius madagascariensis.

**Habitat:** This bird is found on intertidal mudflats and sandflats-often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.

**Threats:** Coastal developments in non-breeding range, bycatch in fishing nets, disturbance of nest sites and degradation of coastal mudflats.

**Numbers left in the wild:** 38,000 individuals- Endangered

**Diet:** They mainly eat small crabs and molluscs.

**Reproduction:** These birds breed in the Northern Hemisphere on swampy moors and boggy marshes. The nest is a shallow depression lined with grass.

**Height:** 55-61 cm

**Weight:** 900g

**Description:** The Far Eastern Curlew is a large wader. They have a very long down-curved black bill which is pink at the base. They are streaked dark brown and buff above the chin and throat are whitish and there is a white eye-ring.



## **Red Tailed Black Cockatoo**

**Scientific Name:** Calyptorhynchus Banksii

**Habitat:** The Red-tailed Black-Cockatoo is found in a range of environments, but it is found mostly in Eucalyptus forests or woodlands and often in adjacent areas of woodlands or shrublands, especially if they have experienced fire recently. It can also be found in grasslands and farmlands.

**Threats:** The major reason for the decline of the red-tailed black-cockatoo is loss of habitat, through clearing for agriculture.

**Numbers left in the wild:** estimated population of about 1500 birds.

**Diet:** They mainly eat seeds but also fruit, berries, nectar, flowers and sometimes insects and larvae. Seeds especially favoured are those of eucalypts, casuarinas, acacias and banksias.

**Reproduction:** Red-tailed Black Cockatoos general mating season is from May through to September,

**Height:** Up to 63cm in length.

**Weight:** An Adult can weigh up to 720g

**Description:** The male is glossy black with bright red panels in its tail. The female has generally duller plumage and has yellow spots on head, neck and wings.





## Eastern Yellow Robin

**Scientific Name:** Eopsaltria australis

**Habitat:** These birds are found in a wide range of habitats, from dry woodlands to rainforests. They are commonly found in parks and gardens.

**Threats:** Snakes, squirrels and other birds have been known to eat robin eggs and chicks. Threats to adult robins include hawks, snakes and cats.

**Numbers left in the wild:** There is no exact number of how many there are left in the wild but there are plenty- Least Concern.

**Diet:** They feed on insects, spiders and other arthropods.

**Reproduction:** Breeding season is from July-January. The females build a nest consisting of sticks and leaves. Both parents and sometimes helpers care for the young.

**Height:** 13-17 cm

**Weight:** 20g

**Description:** The Eastern Yellow Robin is a medium sized robin. It has a grey back and head, and olive-yellow underparts.



## Seagulls

**Scientific name:** *Larus argentatus*

**Habitat:** Seagulls are found along coastal areas all around the world.

**Threats:** Plunging fish stocks.

**Numbers left in the wild:** 15,000-20,000.

**Diet:** Insects and earthworms, rodents, eggs, carrion, offal, reptiles, amphibians, plant items such as seeds and fruit, and hot chips.

**Reproduction:** Females lay 2-6 eggs. The eggs are normally laid in the beginning of May.

**Height:** 29-76 cm

**Weight:** 120g-1.75kg

**Description:** They are typically medium to large birds, usually grey or white, often with black markings on the head or wings. They typically have harsh wailing or squawking calls; stout, longish bills; and webbed feet.



## **Red Wattlebird**

**Scientific name:** Anthochaera carunculata

**Habitat:** The Red Wattlebird occurs in forests, woodlands and gardens, where it aggressively

**Threats:** Red wattlebirds are adversely impacted by land and undergrowth clearing, and have vanished from some habitats thus altered.

**Numbers left in the wild:** They are classified as Least Concern on the IUCN Red List, as they occur over a wide range, have a large population, and the population decline is not rapid.

**Diet:** The Red Wattlebird feeds on nectar, which it obtains by probing flowers with its thin curved bill. Some insects are also eaten, taken either from foliage or caught in mid-air. Berries and the honeydew produced by some insects add to the bird's diet.

**Reproduction:** Breeding season is July to December.

**Height:** The sexes of the red wattlebird are similar in size and plumage, the length of the adult male ranging from 33 to 37cm and the adult female from 34 to 37cm.

**Weight:** They have an average weight of 130g.

**Description:** The Red Wattlebird is a large grey-brown honeyeater with red eyes, distinctive red wattles either side of the neck and white streaks on the chest and belly, which reveals a bright yellow patch towards the tail. Juveniles are generally less flamboyant, with less prominent wattles and browner eyes.



## **Magpie**

**Scientific Name:** Pica pica

**Habitat:** Australian Magpies are found wherever there is a combination of trees and adjacent open areas, including parks and playing fields. They are absent only from the densest forests and arid deserts.

**Threats:** In some parts of the world magpie populations are in decline due to habitat loss, animal agriculture, pollution, pesticides and changes in climate

**Numbers left in the wild:** Their numbers have increased by 112% over the last 30 years.

**Diet:** Magpies feed on small insects and animals that live on, or just under, the surface of the ground. A favourite is the scarab beetle, which is a major pest of garden lawns. Magpies will also eat frogs, small lizards, meat scraps and grain

**Reproduction:** The female Australian Magpie lays between 1 - 5 eggs, which she keeps warm for around 3 weeks. Once the eggs hatch the young remain in the nest for about 4 weeks whilst being fed by the mother. During this time the nest is defended by the male.

**Height:** The adult magpie ranges from 37 to 43 cm in length, with a 65-85 cm wingspan.

**Weight:** 210-270g

**Description:** Many different species are black and white, usually with white chests and sides.



## **Masked Lapwing**

**Scientific Name:** Vanellus miles

**Habitat:** They commonly inhabit large grassy areas, particularly those areas cleared for pasture or parkland.

**Threats:** Humans – recreational beach users, horse riders, vehicles, events, boot camps, paragliders, hang gliders. Dogs – unsupervised dogs, dogs off leash (even if under effective control), and dogs on leash in situations where disturbance keeps Hoodies away from their nest.

**Numbers left in the wild:** There are about three dozen species of plovers.

**Diet:** Worms and insects, they also like to forage along shorelines and riverbanks during low tide for small invertebrates. Seeds, which they eat during dry or cold weather.

**Reproduction:** Plovers usually lay their eggs after local rains. They lay up to four eggs on the ground in a small depression in open areas so they can see their predators.

**Height:** It measures from 30 to 37 cm and has a wingspan of 75–85 cm.

**Weight:** 390g

**Description:** Masked Lapwings are large, ground-dwelling birds that are closely related to the waders. The Masked Lapwing is mainly white below, with brown wings and back and a black crown. Birds have large yellow wattles covering the face, and are equipped with a thorny spur that projects from the wrist on each wing.



## **Green Catbird**

**Scientific name:** *Ailuroedus crassirostris*

**Habitat:** The Green Catbird is found along the east coast of Australia, from south-eastern Queensland to southern New South Wales. The Green Catbird is found in temperate and subtropical rainforest and paperbarks, and sometimes adjacent eucalypt forest.

**Threats:** ongoing clearing of rainforest and paperbark swamps for development is likely to continue to threaten the green catbird in the future.

**Numbers left in the wild:** Population unknown but decreasing.

**Diet:** The Green Catbird eats fruit, notably figs, flowers, and other plant material. It will also kill baby birds to feed its own young during breeding season and will eat small reptiles too.

**Reproduction:** Green catbirds are monogamous breeders. Once a female accepts a male they will mate for life.

**Height:** Length 24-33cm

**Weight:** 210g

**Description:** The Green Catbird is a large, stout green bird, spotted white, with a dusky crown, nape and face and a white bill. The eye is red. Juveniles are duller in colour.





POSSUMS



## **Brushtail Possum**

**Scientific name:** Trichosurus vulpecula (from the Greek for "furry tailed" and the Latin for "little fox")

**Habitat:** Forests and Woodlands- East Coast, Tree-lined rivers and creeks- Inland

**Threats:** Dingoes, Foxes, Cats and Dogs.

**Numbers left in the wild:** 60-70 million

**Diet:** Eucalyptus Leaves, flowers, fruits, nuts, veggies, small rodents, insects, frogs and birds.

: Flowers- Roses, Gardenias, Fuchsias.

: Fruits- Passion Fruits, Berries.

: Veggies- Corn, Lettuce, Tomatoes, Cucumbers and broccoli.

**Reproduction:** Females give birth to single young (March-May) and carries in pouch for up to 5 months. When young are too big (usually 9 months), it rides on the mothers back.

**Weight:** 1.2-4.5 kg.

**Height:** Head and Body= 35-55 cm

: Tail= 25-40 cm

**Description:** Grey fur on head, back and sides. Black fur is seen around the eyes, nose and sometimes along the centre of forehead. Belly is pale grey to yellowish or white. They have black oval shaped ears with white tips. Their tail is black and bushy.

### **Fun Facts:**

- Brushtail Possums are nocturnal, which means they sleep all day and party all night.
- In New Zealand the Brushtail Possums are considered a pest.





## **Pygmy Possums**

**Scientific Name:** Burramyidae

**Habitat:** Dense rainforests, wet and dry sclerophyll forests, woodlands, mallee scrub and coastal heathlands.

**Threats:** Foxes and Feral Cats. Habitat has also been threatened by snow, removal of boulders, development of noisy ski fields, villages, car parks and roads. The surviving colonies are at threat of global warming.

**Numbers left in the wild:** Fewer than 2,000 remain- Critically Endangered

**Diet:** During the night they eat nectar and pollen from eucalypts, banksias and bottlebrushes. They're important pollinators of these plants. When flowers are scarce they also eat fruit, seeds and insects.

**Reproduction:** A female pygmy possum usually has around 3 to 4 offspring and the young remain in the pouch for around 3 weeks after which they remain in the nest for a further 3 to 4 weeks.

**Weight:** The 5 different sub-species of pygmy possum and their weights range from around 8g (tasmanian pygmy possum) to 44g (mountain pygmy possum)

**Height:** Males- 110mm

: Females- 111mm

**Description:** Mainly grey-brown with paler grey/brown to cream underneath. Its fur is dense to keep the possum warm in freezing temperatures.

### **Fun Facts:**

- Mountain Pygmy-possums were thought to be extinct until they were rediscovered at Mt Hotham in the 1960s



## Sugar Glider

**Scientific name:** Petaurus breviceps

**Habitat:** Sugar gliders are native to tropical, cool temperate forests in Australia, Indonesia and Papua New Guinea.

**Threats:** The major environmental threats are the clearing of forests by humans. Predators include kookaburras, owls, goannas, snakes, quolls and feral cats.

**Number left in wild:** The amount of Sugar gliders in the wild is unknown

**Diet:** Sugar gliders adapt seasonally to the food source. In the summer they feed on insects (insectivorous) and in the winter they become exudativorous which means that they feed on excreted fluids from organisms from pores and wounds like tree sap.

**Reproduction:** Sugar gliders nest in tree hollows with up to 10 other adults. In addition to forests, they've also been found in plantations and rural gardens. Females have one or two young, called joeys, at least once a year. The young stay with their mothers until they're seven to 10 months old.

**Weight:** 114to 171 grams

**Height:** The length from their nose to the tip of their tail is around 24-30cm long.

**Description:** the sugar glider has a soft, thick mink-like, grey fur that covers its body and tail. A black stripe runs the full length of the body in line with the spine and crown of the head. The tip of the tail is black.

**Fun Facts:** These marsupials are able to glide up to 45 meters and can leap and catch moths in the air.



## **Squirrel Glider**

**Scientific name:** *Petaurus norfolcensis*

**Habitat:** The Squirrel Glider prefers wet and dry sclerophyll forest and woodlands. While they are often found in drier forest areas, in some areas of Queensland they prefer wetter forest areas bordering on rainforests.

**Threats:** Feral predators such as dogs, cats and foxes. Habit clearing and fragmentation. Barbed wire fences, trapping the animal by its gliding membrane unless assisted.

**Number left in wild:** Around 10,000 individual mature Gliders.

**Diet:** Squirrel Gliders are omnivores who feed at night. Their diet is mainly of insects such as caterpillars, beetles and tick insects. Plant exudates such as sap or resin from wattle and eucalypt trees are important for their diet.

**Reproduction:** The ability to breed is usually sound 12 months of age. Breeding takes place from August with each female producing 2 young.

**Weight:** An adult Squirrel glider weighs around 320g.

**Height:** Adult Squirrel Gliders have a head and body length of about 20 cm and a tail averaging about 27 cm in length.

**Description:** They have blue-grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy.



## **Yellow belly Glider**

**Scientific name:** Petaurus Australis

**Habitat:** inhabits forests and woodlands in eastern Australia and is found at a range of altitudes from sea levels to 1400 meters.

**Threats:** Loss of fragmentation of habitat, loss of hollow- bearing trees, loss of feed trees.

**Number left in wild:** 6000

**Diet:** Insect, pollen, exudate

**Reproduction:** A yellow- bellied glider will pair up with another glider, usually a monogamous relationship, and live in a single-family group, although polygamous groups (in which one male mates with multiple females) also occur. Mating is from August to December in Victoria, while in Queensland it is throughout the year.

**Weight:** 570g

**Height:** 450-700g

**Description:** Large, active, sociable and vocal glider. Adults weigh 450-700grams, have a head and body length of about 30cm and a large bushy tail that is about 45cm long. It has grey to brown fur above with a cream to yellow belly, which is paler in young animals.

**Fun Facts:** The yellow-bellied glider's scientific name 'Petaraus Australis' has a meaning 'southern rope-dancer'. Yellow- bellied gliders are able to glide for up to 114 meters. The distinctive growing call these animals make can be heard as far away as 500m.



## Feathertail Glider

**Scientific Name:** *Acrobates pygmaeus*

**Habitat:** They are found throughout eastern Australia from South Australia through to far north Queensland. These gliders will build their nests in anything from abandoned bird's nests to banana bags and line the nest with leaves, feathers and shredded bark.

**Threats:** Habitat loss and fragmentation. Feral predators such as cats, dogs, and foxes

**Numbers left in the wild:** Feathertail gliders have a home range of 0.4-2.1 hectares and usually have a population density of 0.01-0.4 individuals per hectare.

**Diet:** The Feathertail Gliders diet consists of insects, plant exudates, pollen, honeydew, nectar and seeds.

**Reproduction:** Feathertail Gliders commonly give birth between July and January; however, northern populations can breed any time of the year. Litter size is between 2-4 young, and they will have up to 2 litters per year.

**Height:** Tail length is between 70-80mm, body length is 65-80mm.

**Weight:** 10-15g

**Description:** Has a mouse sized body with grey-brown fur on the back and a white underside.





**FROGS**



## Corroboree Frog

**Scientific Name:** Pseudophryne corroboree

**Habitat:** Corroboree frogs use a variety of habitat types for breeding including pools and seepages in sphagnum bogs, wet tussock, grasslands, fens and wet heath. They also feed and shelter in Montane forest, sub alpine woodland and tall heath near breeding areas.

**Threats:** The main threats to the Southern Corroboree Frog is the disease Chytridiomycosis, caused by infection with Amphibian Chytrid Fungus. This is a big cause of frog deaths worldwide. Another issue is climate change, which is having an effect on the frog's alpine home environment.

**Numbers left in the wild:** 50 Southern Corroboree frogs remain in their alpine habitat.

**Diet:** The typical diet of a mature corroboree frog includes beetles, mites, ants and insect larvae. However, as tadpoles they also tend to eat algae and other small pieces of organic materials found in their pools.

**Reproduction:** Adult males move into breeding areas early to late summer. The males make small chambers or nests in moss or other soft vegetation and soil at the edges of the breeding pools. Males have a special courtship call to attract the females to their nests to mate and lay their eggs.

**Height:** 2.5-3cm long

**Weight:** 3 grams

**Description:** The southern corroboree frog has bright yellow longitudinal stripes alternating with black stripes on its back, and has black, yellow and white blotches underneath. Adults reach a length of 2.5-3cm. The call is a short 'squelch'



## **Green tree frog**

**Scientific Name:** Litoria caerulea

**Habitat:** They prefer cool and dark places. Green tree frogs live in urban areas, forests, woodlands, wetlands and heath. They have a habit of taking up residence in and around suburban houses, in drain pipes, water tanks, letterboxes and even toilet bowls.

**Threats:** The main danger to the Green Tree Frog is the destruction of its habitat through wetland clearance and drainage, as well as chemical use. Frogs are nocturnal and they are often found around lit areas that attract various types of bugs and insects to them.

**Numbers left in the wild:** There are over 2500 species of frogs throughout the world.

**Diet:** Insects and spiders make up the majority of their diet, as well as crickets, lizards and other frogs and cockroaches and, when in captivity, they will even eat small mice.

**Reproduction:** In Spring and Summer you will hear male frogs calling. This is the best time to mate and for females to make their eggs in any water they can find; pools, puddles, swamps. They will even breed in water troughs and buckets filled with rainwater.

**Height:** 11.5cm

**Weight:** Adults weigh 50-90grams.

**Description:** Their average size is 10cm. Their upper surface is dark olive to bright green; sometimes they have scattering of white spots or flecks. Their under surface is white. They have tiny sticky pads on their toes which help them climb smooth surfaces, they also cling with their belly skin.





## **Green and golden bell frog**

**Scientific Name:** *Ranoidea aurea*

**Habitat:** The green and golden bell frog inhabits all along the east coast of NSW and likes to spend its time in infrequent disturbance areas such as golf courses, disused industrial land, brick pits, and landfill areas.

**Threats:** The species is most threatened by the destruction of its habitat and predators include snakes, birds, foxes and tortoises.

**Number left in the wild:** The number left in the wild has gone down by about 30% in the last 10 years making it an endangered species.

**Diet:** Adult green and golden bell frogs have a broad diet which includes insects such as crickets, larvae, mosquito wrigglers, dragonflies, earthworms, cockroaches, flies, and grasshoppers.

**Reproduction:** The green and golden bell frog breeds in the warmer months from October to March. When looking for a mate, the male releases a sound similar to that of a motorcycle changing gears and when heard other males will call in union.

**Weight:** Metamorphs weigh about 2 g, while the largest adults can reach 50 g. Individual frogs can vary substantially in body weight due to changes in the amount of stored fat, recent eating, and egg formation.

**Height:** An adult green and golden bell frog can be around 4.5 - 11cm

**Description:** The frog is as the name suggests and is green with golden patterns on it and is one of Australia's largest frogs.

**Fun Facts:** The frog's scientific name "aurea" means golden in Latin



## Traditional Aboriginal Bush tucker And Medicine

### Eucalyptus

**Uses:** Eucalyptus was infused to relieve pains, fevers and chills. Today it is used commercially as cough medicine and mouthwash.

**Location:** Eucalyptus are found all across Australia the most common of which is a gum tree or stringy bark tree.

**Description:** Eucalyptus is a genus of over 700 species of flowering trees, shrubs or mallees in the myrtle family, Myrtaceae.

**Fun Facts:** Eucalyptus tree leaves are poisonous to humans but is the favourite food for koalas as they get all their water and nutrients from the leaves and are able to digest it.



### Witchetty Grubs

**Uses:** Not only was it a food for the aboriginal people it was also used for burn relief cream by crushing it into a paste and applying it to the burnt area and wrapping with a bandage to soothe the pain.

**Location:** Witchetty grubs are found all around Australia.

**Description:** Witchetty grubs are white grubs that live underground in Australian soil.



**Fun Facts:** Witchetty grubs turn into ghost moths who then lay their eggs in the witchetty bush.

### Ipomoea pes-caprae

(Also known as Goat's Foot/Bay-Hops)

**Uses:** Goat's foot in Australia was commonly used to treat stingray stings and stonefish stings.



**Location:** Ipomoea pes-caprae is common on the sand dunes of Australia's upper north coast of New South Wales, and can also be found along the entire Queensland coastline.

**Description:** Ipomoea pes-caprae is a prostrate perennial, often covering large areas; stems long-trailing often several metres in length, rooting at the nodes, glabrous. It has pink petals with a darker centre.

## **Canavalia rosea**

(Also known as Beach bean)

**Uses:** A carefully prepared extract from the roots could be rubbed on the skin to relieve various aches and pains.

**Location:** It is commonly found on beaches, dunes and open areas.

**Description:** Coastal jack-bean is a trailing, herbaceous vine that forms mats of foliage. Stems reach a length of more than 6m and 2.5 cm in thickness. Each compound leaf is made up of three leaflets 5.1–7.6 cm in diameter, which will fold themselves when exposed to hot sunlight. The flowers are purplish pink and 5.1 cm long.

**Fun Facts:** The *Canavalia rosea* is a part of the bean family



## **Lemon grass**

**Uses:** The Aboriginal people used Lemongrass to treat flu symptoms, chest infections and skin sores.

**Location:** This plant is found widely throughout Australia except in the cool temperate regions.

**Description:** Native Lemongrass is an aromatic grass, with a strong citrus odour, the stalks and leaves may be used in tea or as a fragrant flavouring ingredient in soups, curries, sauces, marinades and cakes.

**Fun Facts:** Their essential oils may be found in a variety of skincare and beauty products like shampoos, soaps, scrubs and moisturisers.



## **Mud, sand, and termite dirt**

**Uses:** Aboriginal people were known to directly apply specific types of soil onto their fresh wounds. Mud, or, more accurately, sediment, was carefully selected from the cooler proximity of a waterhole to relieve and act as a physical barrier to retard infection on open wounds.

**Location:** Everywhere

**Description:** Its mud, sand, and termite dirt

## **Umbrella sedge**

**Description:** Perennial, tall clumping sedge, up to 1.5 m tall, with large spreading bracts giving it an umbrella-like appearance. Leaves are inconspicuous, reduced to sheaths wrapped around the stems. Stems are rigid and erect, 3–5 mm wide, smooth and hairless, with longitudinal ridges. Flower head (inflorescence) consists of numerous unequal length stalks 50–100 mm long, branching into secondary stalks 10–20 mm long. Flowers (spikelets) are arranged into dense clusters 20 mm wide, reddish-brown at maturity. The inflorescence is surrounded by a spiralling ring of 12–22 leafy bracts (involucral bracts) 100–300 mm long, 10–15 mm wide. Fruit is a yellowish-brown nut, 0.6 mm long.

**Habitat:** Generally, occurs in seasonal (ephemeral) swamps and seasonally dry creek beds, particularly those with sandy creek beds. Often grows as a weed in irrigation and drainage channels, in water up to 0.4 m deep.

**Seasons:** Fruiting - January to July

Flowering - January to July



### **Value in wetlands:**

- a valuable fast-growing pioneer species for bare, disturbed sand, loam or clay wetland margins, including areas subject to occasional tidal influence
- dense cover provides good habitat for frogs and invertebrates
- dense colonisation of disturbed areas reduces the rate of weed invasion by competitive exclusion.

### **Plant use:**

- used as a filtering plant in constructed wetlands including swales, buffer strips and batters, creating better fauna habitat than turf species
- recommend for investigation as a direct seeding dense cover for bare wetland margins
- leaves used for weaving mats and baskets
- indicator of disturbance



### Melaleuca Quinquenervia

**Uses:** new leaves were chewed for treatment of head colds and a decoction brewed for headaches, colds and general sickness.

**Location:** Melaleuca Quinquenervia grows on the east coast of Australia and grows in swamps, on floodplains and near rivers and estuaries, often on silty soil.

**Description:** is a small - to medium-sized tree of the myrtle family, Myrtaceae. It grows as a spreading tree up to 20 m tall, with its trunk covered by a white, beige and grey thick papery bark. The grey-green leaves are egg-shaped, and cream or white bottlebrush-like flowers appear from late spring to autumn.



**Fun Facts:** It has become naturalised in the Everglades in Florida, where it is considered a serious weed by the USDA.

### Vigna vexillate

**Uses:** Aborigines ate the roots to treat constipation.

**Location:** Vigna vexillata thrives in a wide range of conditions, mostly in grasslands and in disturbed areas, as well as a weed. In Australia, it grows in the north where monsoons with 1,250–1,500 mm of rainfall and a long dry season are common, growing on acidic soils rich in aluminium.



**Description:** Vigna vexillata is a variable, perennial climbing plant that is pantropical, found in regions such as Ethiopia, Nigeria, and Venezuela.

**Fun Facts:** The plant is a very important food crop in several areas, such as Namibia, where it is commonly harvested from the wild for local use.

### Solanum aviculare

**Uses:** Solanum aviculare is good for treating achy joints and wounds, as well as encourages skin rejuvenation on scarring, pigmentation and aging.

**Location:** Solanum aviculare grows in rainforests, wet forests and rainforest margins on clay soils.

**Description:** Solanum aviculare is an upright shrub that can grow up to 4 m tall. The leaves are, 8–30 cm long, lobed or entire, with any lobes being 1–10 cm long.



**Fun Facts:** Bees are thought to pollinate the flowers.

### What is seasonal?



**Native frangipani** - *Hymenosperum flavum*: 3-8 meters. Fast growing. Cream scented flowers in spring. Native frangipani likes a position in full sun to dappled shade, with protection from strong wind. This tree performs very well in alkaline soils.

**Willow bottlebrush** - *Callistemon salignus*: 3-5 meters. Attractive pink new growth, papery bark. Bottle brush needs a very mild climate. They will flower best when grown in full sun in moist but well drained soil in a sheltered position away from cold wind. Flower in spring.

**Coast wattle** - *Acacia sophorae*: 3 meters. Dense foliage. Good in sandy soil near the sea. They grow in any sunny to semi-shaded spot. They have good tolerance to extremes of both heat and cold. Soil needs to be free draining. They flower in winter to the middle of spring.

**Grey myrtle** - *Backhousia myrtifolia*: 2-4 meters. Ornamented specimen tree. Long lasting pale green bracts after flowering. Plant in a full sun to a partly shaded position in the garden. Plant in a free draining soil rich in organic matter. Tolerates most soil types and light frost. Flowers in summer.

**NSW Christmas bush** - *Ceratopetalum gummiferum*: 5 meters. Spectacular ornamental trees. Pink-red bracts after flowering in mid-summer. Christmas bush will grow in sun or semi-shade, although flowering is best if planted in full sun. likes a well-drained spot with reliable moisture. Flower in summer.

**Hairpin Banksia** - *Banksia spinulosa*: 2 meters. Spectacular banksia brushes with black styles. Full of birds attracting nectar. Grows well in soils ranging from light through to moderately heavy with good moisture and drainage. Grows in sun to part shade. Flowers in autumn and winter.

**Mint bush** - *prostanthera ovalifolia*: 1 meter. Dark green fragrant foliage and flowers in spring. They like well-drained moist soils but they don't like wet soils. They are at their best in light shade such as in the dappled light of eucalypts. They also flower in spring and summer.

**Native rosella** - *Hibiscus heterophyllus*: 2 meters. Grows large white or yellow hibiscus flowers. They like warm temperatures but can survive in cooler climates. The rosella prefers full sun or light shade. They tend to flower in the summer. They are also rich in nectar.

**Grevillea banksii** - spider flower. 6-7 meters: It is a hardy plant for warm climates where it likes well drained soils in full sun. They flower most of the year, but mainly in winter and spring, and the grevillea also produces pollen.

**Grevillea johnsonii** - spider flower: grows between 2 to 4.5 meters. Their flowers appear between august and November. The grevilleas should be planted in a position with full sun, they will survive in a partly shady spot but won't do as well.

**Gum tree** - *Eucalyptus*: 10-60 meters tall. Requires full sun, they also adapt well to a wide range of soils, from hot, dry sites to slightly wet as long as the area is well draining. The trees grow all year round and the leaves are great for possum and other animals

#### **Other seasonal Plants -**



## **Sesbania pea**

**Description:** The Sesbania pea, A.K.A. yellow pea bush, is an annual woody shrub to 3.5 m tall, developing a woody trunk up to 100 mm diameter. Long compound leaves are alternately arranged on stems, 50–250 mm long. Flower head (inflorescence) consists of 1–8 yellow pea flowers 10–16 mm wide hanging on a stem 20–60 mm long. The fruit is a brown pod 120–200 mm long, containing around 25–35 hard seeds.

**Habitat:** It Usually grows along the margins of swamps and watercourses, or in seasonally waterlogged areas of grassland and open woodland, particularly low, wet depressions. Tolerates a broad range of soil types, including relatively saline soils, but prefers heavy, cracking clays.

**Seasons:** It flowers from December-July and fruits from December-August.

**Wetland uses:** It rapidly grows and has a seed bank that can remain dormant for years under swards of introduced grasses. Seed germination is stimulated by fire or direct sun after weed removal. It grows in infertile soils and can fix nitrogen meaning it's useful for soil improvement and bank stabilisation. It also provides roosting habitat for many small bird species, attracting many insects, including bees.

**Plant uses:** It's used in revegetation sites as a windbreak, erosion control and habitat for birds. It's tolerant of heavy metal toxicity and has potential for use in phytoremediation of mercury contaminated soil. The flowers are edible and are used as a vegetable in India. There are various plant parts that are used medicinally to treat dysentery, fevers, headaches, smallpox, sores, sore throat, and inflammation or infection of the mouth and lips. Eating leaves as a vegetable is reported to improve eyesight. The straight stems used by Aboriginals to make light spear shafts for hunting fish and small animals. The seeds contain a water-soluble gum with broad applications as a food additive, textiles, paper products and various industrial uses. The stems contain fibre similar in quality to jute. The fast-growing habit provides reliable fuel wood in developing countries, used as pulpwood. It's widely used in Asia as a green manure crop to increase yields of rice, wheat, and maize. The young plants are grazed by stock and have high protein but generally unpalatable. It may be a weed of cotton, and other irrigated crops on heavy soils.



## **Azolla pinnata**

**Description:** *Azolla pinnata* is a Free-floating perennial fern which is generally triangular-shaped with feathery roots. It has scaly lobes 1 mm long in alternating rows. It's initially green but changes colour to reddish when exposed to direct sunlight. The upper rows of leaves contain photosynthetic blue-green algae. It can reproduce either vegetatively from broken fragments or by two types of spores. Microspores are produced in conical structures under the plant surface, while megaspores are produced in the lower lobe of the leaves.

**Habitat:** It grows primarily in still or slow flowing rivers, creeks, channels, ponds, swamps and dams. Often grows as scattered plants caught up in vegetation along the sides of creeks but, in the presence of high nutrient levels, especially phosphorus, it can double every seven days and eventually completely cover water bodies.

**Value in wetlands:** through its association with blue-green algae, *Azolla* fixes atmospheric nitrogen and rapidly takes up nutrients in the water, thereby limiting the growth of introduced weeds such as salvinia and water hyacinth and, by reducing light penetration, reduces blooms of blue-green algae. It provides a high protein food source and habitat for water birds, fish, insects, snails and crustaceans. High nutrient loads may cause *Azolla* to become over-abundant, potentially blocking pumps and water inlets, and reducing stock access to water; however, spraying herbicide on *Azolla* will cause de-oxygenation of the water, potentially causing fish-kills. If *Azolla* is removed from high nutrient wetlands, toxic algal blooms may result.

**Plant uses:** It's valuable as a biological indicator of nutrient levels in wetlands. It's also valuable in constructed wetlands for reducing nutrient loads and limiting algal growth. Mats of *Azolla* can be used as a form of biological mosquito control by preventing mosquito larvae surfacing for air (sometimes called 'Mosquito fern'). Excess *Azolla* can be harvested, and has been used for compost or as a chicken feed supplement. It's grown as a companion plant in rice paddies, for it fixes nitrogen and suppresses weeds. It's an attractive plant easily grown in dams, garden ponds and aquaria. It is of botanical interest as a living fossil— *Azolla* fossils extend back at least 80 million years.



***Persicaria attenuata***

**Description:** Perennial erect herb, growing to 1 m tall on wetland margins or sprawling and floating in water with stems to 3 m long. It's densely covered in short white hairs especially on veins and leaf margins. Leaf stems may be absent or up to 30 mm long. A basal leaf membrane is generally hairless, striated and may or may not be ringed with small stiff hairs. It's densely covered in white/greenish white flowers 3–5mm long with 5 petals. The fruit is a shiny lens-shaped nut 2.5–3 mm long.

**Habitat:** Usually occurs along the margins of flood plains, swamps, lagoons, billabongs, dams and rivers, in both seasonal (ephemeral) and permanent freshwater. Often forms thick dominant stands, spreading out over the water, developing partially floating thickets along wetland margins.

**Seasons:** It flowers from February December and fruits from February-November.

**Value in Wetland:** It is thick, dense, pure stands provides a valuable food source and habitat for birds, frogs and other wildlife. It's one of the best native plants for withstanding wetland degradation and weed invasion. Can be used to replace and displace para grass but has not been investigated for allelopathic chemicals. It has an over-abundance as dense floating mats can lead to reduced diversity of aquatic macroinvertebrates.



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