

SPATIAL CONNECT

Exploring Victoria's Biodiversity Answers

Part 1: Visualising Victoria's Biodiversity – an introduction

How can the public contribute to biodiversity recording?

1. a. What do you think is the most important function of VVB?

To record, share and inform users about biodiversity knowledge, conservation activities and build environmental values for communities

b. How might VVB be of use for scientific research?

It captures biodiversity data from a range of sources including new data collected by individuals and communities who have identified issues of concern or information they want to share about their local areas. This local knowledge and recordings can provide researchers with new scientific data that they previously did not have access to or might not be able to research themselves due to time or funding limits.

VVB also enables researchers to view data from multiple areas and multiple sources at the same time thereby increasing the chance of identifying differences between and across areas. It also enables the identification of environmental patterns and issues across areas. The fact that communities can use VVB to understand issues and to record their local environmental values helps scientific research to access information that would not otherwise be available.

c. Who is likely to use VVB?

Community groups, researchers, government departments and individuals interested in understanding the environment or adding data about their environment

Ecosystems in Victoria

What are Broad Vegetation Types (BVTs)?

2. What are the most common and least common vegetation types found in Victoria?

There are various answers to this given that students will make different assessments of what is most and least common as a number of clusters seem similar when viewed spatially. Therefore answers can include, for the most common vegetation types, Mallee Woodland, dry foothills forest and plains grassy woodland. The least common vegetation types include coastal grassy woodlands, heathy woodland, rainshadow woodland forest and valley grass forest

Complete an internet search in images to see what these vegetation types look like. Save these images in your notes.

Students to undertake an internet search for the vegetation types identified as the most and least common types and save these images as part of the exercise

3. What factors might be responsible for this variation?

Variation would be caused by climate factors such as rainfall, temperature, soil type, elevation, land management by indigenous population

4. Locate your home on the map of Victoria. What type/s of ecosystems were present around your home prior to European settlement?

The response to this question will vary dependent on where the student lives. They should identify their home area and then right click to gain description of the ecosystem around their homes pre 1750. This should be described in writing and, if possible, student should seek out images for their home ecosystem and save these in notes

5. Describe the 1987 distribution of native vegetation in Victoria. What are the main changes from pre-1750?

There has been a dramatic change in vegetation clusters since 1970. The vast majority of woodland vegetation types, including heath, coastal and valley grass forest have all but disappeared. Deforestation due to population growth and vegetation clearing has left the center of Victoria with limited native vegetation. Use of land for agriculture has resulted in clearing of three quarters of pre 1750 vegetation type and area. The main changes students might identify include:

- loss of plains grassy woodlands area
- significant reduction in vegetation along coastal regions
- reduction in moist foothill forest
- loss of herb-rich woodland
- loss of grassland areas
- major reduction in Mallee vegetation.

6. What types of ecosystems still remain? Why might this be?

There is a proportion of dry foothills forest remaining in the area between NSW and Victoria as well as some Mallee wood land and Mallee Heath in the top of Victoria, close to the South Australian border. There are some medium sized clusters of Moist Foothills Forest remaining inland, as well as some Moist Foothills Forest and Heathy Woodland along the coast line. There are miniscule pockets of Valley Grass and Box Ironbark Forest scattered across the state. While the majority of vegetation has been removed to allow for population growth these clusters have remained for a variety of reasons. These include:

- non arable land – land which is not suitable for productive agriculture so has not been altered in any way.
- as a result of conservation of sections of vegetation for parks, state forests. These are under state protection so have not altered
- for water catchment purposes
- areas for commercial forestry
- as weather protection belts for populated areas.

Part B: Comparing the biodiversity of the Mallee and the Victorian Alps

Biodiversity in Baw Baw National Park

7. What is the area of Baw Baw National Park in hectares?

12 781.42 hectares

8. List the types of vegetation types that exist within the Baw Baw National Park. Do an internet image search to record some images of these types of vegetation.

The key vegetation types that exist within Baw Baw include Moist Foothill Forest, Montane Moist Forest and Sub-Alpine woodland. Students should do an internet search for different species within this BTV which include Alpine Ash and Silver Wattle, as well as Mountain Ash. Students should save these images to notes.

9. Open the fauna folder and select each fauna type, one by one (bird, fish, invertebrate, mammal and reptile and amphibian). By clicking once on the record, an information box appears to let you know the species and when the sighting was recorded. List three species you find in each category in Baw Baw National Park.

There are a range of responses that students can provide for this question as there are many varieties of each fauna type within Baw Baw. Students should be able to explore the site and make their own choices of fauna to include, however the final result of their work should look like the following:

Example	Bird	Fish	Invertebrate	Mammal	Reptile and Amphibian
One	Southern Boobook (<i>Ninox novaeseelandiae</i>) Not listed as having endangered status	River Blackfish (<i>Gadopsis marmoratus</i>) Not listed as having endangered status	Common Freshwater Shrimp (<i>Paratya australiensis</i>) Not listed as having endangered status	Gould's Wattled Bat <i>Chalinolobus gouldii</i> Not listed as having endangered status	Victorian Smooth Froglet (<i>Geocrinia Victoriana</i>) Not listed as having endangered status
Two	Eastern Yellow Robin (<i>Eopsaltria australis</i>) Not listed as having endangered status	Southern Shortfin Eel (<i>Anguilla australis</i>) Not listed as having endangered status	Burrowing Crayfish (fam. <i>Parastacidae</i> gen. <i>Engaeus</i>) Not listed as having endangered status	Southern Myotis (<i>Myotis macropus</i>) Near threatened status	Lace Monitor (<i>Varanus varius</i>) Listed as endangered
Three	Australian Owlet Nightjar (<i>Aegotheles cristatus</i>) Not listed as having endangered status	Shorthead Lamprey (<i>Mordacia mordax</i>) Not listed as having endangered status	Gippsland Spiny Crayfish (<i>Euastacus kershawi</i>) Not listed as having endangered status	Greater Glider (<i>Petauroides Volans</i>) Listed as vulnerable status	Lowland Copperhead (<i>Austrelaps superbus</i>) Not listed as having endangered status

10. Locate and name one endangered mammal that has been sighted in the park. Conduct some research and write one paragraph about this mammal.

The most likely endangered species (critically endangered) that students are likely to identify within Baw Baw is *Gymnobelideus leadbeateri* – Leadbeater's Possum. Students could explore the different years it has been sighted and then conduct an internet search to explore information relating to this mammal. The one paragraph summary by students could include information such as:

- the type of habitat they can be found in
- history
- threats
- conservation efforts.

For activities 11, 12 and 13 students will have different results based on which area of the national park they choose to generate a Natural Values Report. All students should choose a drawing tool (polygons are often more user friendly) and then request that a Natural Values report be generated.

Based on the 5 km area chosen for this answer booklet for this national park, the following answers are provided.

How to generate a Natural Values Report

Creating a natural values report of a sample within the Baw Baw National Park

11. How many occurrences of flora and fauna have been recorded in your sample? What are the total occurrences in the Atlas of Living Australia?

79 flora observations

104 fauna observations

783 occurrences in the Atlas of Living Australia

Explore the diversity of flora and fauna by clicking on the Atlas of Living Australia (ALA) records.

In the area that was chosen for this example, the Atlas of living Australia (ALA) records show that there were:

- 92 types of mammals
- 558 types of birds
- 36 types of reptiles
- 6 types of amphibians
- 4 types of fish
- 1 type of arthropod
- 1 type of bryophytes
- 19 types of ferns and allies
- 66 types of angiosperms.

It is valuable for students to go through and make up a list such as this by going through the sub sets contained within the Natural Values report to see the bio diversity that exists in a small 5 km area and to see how different fauna and flora cluster.

12. List the most common animals and plants found in your selected survey area. Find pictures on the internet to accompany these species names.

Students should draw out the top three occurrences of flora or fauna within their ALA report and list these when responding to this question. In some cases there may not be more than three examples and so, in those cases select what is available up to three examples. The three most commonly occurring of each type for the area that was tested for Baw Baw for this answer booklet were:

- mammals: the Agile and Dusky Antechinus and the Bush Rat,
- birds: Brown Thornbill, Gang-gang cockatoo and the grey shrike-thrush
- reptiles: Highland copperhead, Southern Forest Cool skink and tiger snake
- amphibians: River eel, river blackfish and brown trout
- arthropods: Euastacus kershai (only one type identified)
- bryophytes: Breutelia affinis (only one type identified)
- ferns and Allies: Cyathea Australia, common maidenhair and Austral bracken
- angiosperms: Mimosa, Red bidibid and Messmate stringybark.

Students should search for these species on the internet and match as many names as they can to images. These should be stored in their notes.

13. Did your sample discover any rare or threatened species? (Hint: Click on the Fauna link of Natural Values Report)

In the example used for Baw Baw National Park for this Answer Booklet, by going to the fauna section of the Natural Values Report one (1) vulnerable, two (2) endangered and one (1) near threatened species were found.

Each student should have a different list, dependent on the area in which they explored. Students should be encouraged to undertake an internet search on any rare, vulnerable, near threatened or endangered species they find in their search area to build an understanding of the characteristics of the specified which has been identified as rare or at risk.

Choose a species from each list in the Atlas of Living Australia to learn more about it. For each one, describe each species physical description, habitat, feeding habits, and distribution within Victoria.

The response to this question will vary dependent on the species they have chosen to explore. Students should provide detail on physical description, habitat, feeding habits and distribution within Victoria. Students should make an assessment of the vulnerability status of their chosen species as part of this process.

Biodiversity in Murray-Sunset National Park

14. What is the area of Murray-Sunset National Park in hectares? How does it compare with the size of Baw Baw National Park?

The Murray-Sunset National Park is 53 0722.9 hectares. This means that Murray-Sunset National Park is 41.5 times bigger than Baw Baw National Park, with a difference of 517 941.48 hectares

15. List the types of vegetation types that exist within Murray-Sunset National Park. Do an internet image search to record some images of these types of vegetation.

The key vegetation types that exist within Murray-Sunset are Mallee and Mallee Woodland. Students should do an internet search for different species within this BTV which include Native Cypress Pine and Silvery Emu Bush, as well as the Blue Leaf Mallee. Students should save these images to notes.

16. Open the fauna folder and select mammals and reptile and amphibian. By clicking once on the record, an information box appears to let you know the species and when the sighting was recorded. List three species you find in each category in different parts of Murray-Sunset National Park.

There are a range of responses that students can provide for this question as there is a variety of fauna type within Murray-Sunset. They should be able to explore the site and make their own choices of fauna to include, however the final result of their work should look like the following:

Example	Mammal	Reptile and Amphibian
One	Common Dunnart (<i>Sminthopsis murina murina</i>) Listed as being Vulnerable	Bandy Bandy (<i>Vermicella annulata</i>) Listed as being Vulnerable
Two	Little Pygmy-possum (<i>Cercartetus lepidus</i>) Listed as Near threatened status	Barking Marsh Frog (<i>Limnodynastes fletcheri</i>) Not listed as having endangered status
Three	Lesser long eared bat (<i>Nyctophilus geoffroyi</i>) Not listed as having endangered status	Peron's Tree Frog (<i>Litoria peroni</i>) Not listed as having endangered status

17. Locate and name one endangered mammal or reptile/amphibian that has been sighted in the park. Conduct some research and write one paragraph about this mammal or reptile/amphibian.

There are a range of endangered mammal and reptile and amphibian endangered species that students might identify in their search. One of this might be the narrow-nosed planigale (*Planigale tenuirostris*) which a species of very small marsupial carnivore. Students could explore the different years it has been sighted and then conduct an internet search to explore information relating to this mammal. The one paragraph summary provided by students should include information such as:

- the type of habitat they can be found in
- history
- threats
- conservation efforts.

For activities 18, 19 and 20 students will have different results based on which area of the national park they choose to generate a Natural Values Report. All students should choose a drawing tool (polygons are often more user friendly) and then request that a Natural Values report be generated.

Creating a natural values report of a sample within the Murray-Sunset National Park

18. How many occurrences of flora and fauna have been recorded in your sample? What are the total occurrences in the Atlas of Living Australia?

Based on the 5 km area chosen for this answer booklet for this National Park (Murray-Sunset), the following answers are provided

- 53 Flora observations
- 36 Fauna observations
- 3 observations of native vegetation
- 156 occurrences in the Atlas of Living Australia.

Explore the diversity of flora and fauna by clicking on the Atlas of Living Australia (ALA) records.

In the area that was chosen for this example, the Atlas of living Australia (ALA) records show that there were:

- 6 types of mammals
- 83 types of birds
- 7 types of reptiles
- 60 types of angiosperms.

It is valuable for students to go through and make up a list such as this by going through the sub sets contained within the Natural values report to see the bio diversity that exists in a small 5 km area and to see how different fauna and flora cluster.

19. List the most common animals and plants found in your selected survey area. Find pictures on the internet to accompany these species names.

Students should draw out the top two occurrences of flora or fauna within their ALA report and list these when responding to this question. In some cases there may not be more than one or two examples and so, in those cases select what is available up to two examples. The two most commonly occurring of each type for the area that was tested for this national park for this answer booklet were:

- mammals: Gould's Wattle Bat and Western Grey Kangaroo
- birds: White eared honey eater and the Galah
- reptiles: Central Bearded Dragon and wood gecko
- angiosperms: Flax-Leaf Alyssum and the Australian carrot.

Students should search for these species on the internet and match as many names as they can to images. These should be stored in their notes.

20. Did your sample discover any rare or threatened species? (Hint: Click on the Fauna link of Natural Values Report)

In the example used for this Murray-Sunset National Park and for this Answer Booklet, by going to the fauna section of the Natural Values Report two (2) vulnerable, one (1) endangered and one (1) near threatened species were found. Each student should have a different list, dependent on the area in which they explored. Students should be encouraged to undertake an internet search on any rare, vulnerable, near threatened or endangered species they find in their search area to build an understanding of the characteristics of the specified which has been identified as rare or at risk.

Choose a species from each list in the Atlas of Living Australia to learn more about it. For each one, describe each species physical description, habitat, feeding habits, and distribution within Victoria.

The response to this question will vary dependent on the species they have chosen to explore. Students should provide detail on physical description, habitat, feeding habits and distribution within Victoria. Students should make an assessment of the vulnerability status of their chosen species as part of this process.

Comparing biodiversity

The following activities ask you to compare the biodiversity between Baw Baw and Murray-Sunset National Parks. It would be beneficial for students to work in groups and compare the total observations made when generating reports for each national park.

21. Write a summary paragraph comparing the numbers and types of animals and plants inhabiting the Baw Baw National Park compared to the Murray-Sunset National Park? What similarities and differences can you observe?

This is a group activity and each student will bring their own knowledge base to group discussions (knowledge they have developed as they explored different parts of each national park). There are, however, some commonalities that groups should identify as characteristic of the different national parks. These include:

- the greater level of biodiversity at Baw Baw and the greater number and types of flora and fauna found at Baw Baw
- the types of vegetation at Baw Baw and the fact that there is more diversity in vegetation than in the more arid environment of Murray-Sunset
- the geographical location of the two parks and what these differences might mean
- the size difference between the two national parks
- the fact that both locations have threatened species
- the lack of fish at Murray-Sunset.

22. Did you observe any species that occur in both habitats? (Hint: look at bird lists). What might this suggest about the adaptability of these species to their environment?

The responses to this question will vary dependent on which areas students have examined while completing the unit however there are similarities in the bird types across both locations and student should identify and catalogue these. It would be valuable for students to explore information on the site around bird species characteristics (available through ALA) or to visit Birdlife Australia <http://www.birdlife.org.au/> to explore species adaptability across locations.

23. Did you notice a difference in the number of mammals and amphibian species in both regions? Why are there more/ fewer mammals and/or amphibians in Baw Baw National Park?

Students will have begun to explore this question in their responses to the activity (Q. 21) in this section. It would be valuable for student to explore weather patterns, soil health issues and Parks Victoria information relating to each of the locations.

24. What environmental factors are responsible for the distribution and diversity of the flora and fauna of these regions? You may like to visit the Bureau of Meteorology website (<http://www.bom.gov.au/climate/data/>) and look at the climate for each location.

This is an extension of the activity undertaken by the group for question 23. Differences should be recorded and students should discuss how weather and climate differences might impact on flora and fauna in each location.

25. How useful is spatial technology (the use of GIS maps) to understand biodiversity?

Students should identify and list the knowledge and insights they were able to gain using spatial technology, particularly those that would not have been available without access to spatial technology. They should explore how spatial technology can be used to flag biodiversity threats and challenges, as well as tracking improvement over time. There should be some consideration of the benefits of the ability to visually (and immediately) undertake comparison over time (e.g. BTV 1750–BTV 1987) and discussion of how they might use technology to better understand and track changes within their own local environment.

As part of this activity students should be encouraged to spend some time, as a group, exploring the range of tools available with VVB that they did not use while completing the activities contained in this unit. Consideration of how these might be used for managing and comparing biodiversity would be beneficial.

26. How can these maps and data be used to help monitor changes to environments and environmental change? How can they be used to help manage an environment e.g. developing a vegetation corridor?

As above.

Extension activity

1. Investigate and compare the biodiversity of other national parks of interest to you.

Students own answer.

2. The Visualising Victoria's Biodiversity web portal can be used for scientific research and also as a tool used by environmental managers. Is there something that you would like to know about Victoria's biodiversity?

Students own answer.

Work in groups to develop some hypotheses about Victoria's biodiversity. Use the web portal to test these hypotheses. Examples could include:

- communities of coastal bird species will be different in urban versus rural areas
- nationally-significant wetlands (Ramsar wetland sites) will contain more threatened species than non-Ramsar wetlands.

Students own answer/activity.

3. Alternatively, investigate whether a wildlife corridor should be established at [insert a location of interest to you]?

Students own answer/activity.