



## Module 6: 9-10

---

Using data to manage our frogs -  
Geography



Melbourne Water Frog Census

 **Melbourne  
Water**  
Enhancing Life and Liveability



## Module 6: 9-10

Using data to manage our frogs - Geography

### Using data to manage our frogs (Years 9–10)—Geography

#### Victorian Curriculum F–10<sup>1</sup> links:

##### Geography

##### Levels 9 and 10

##### Environmental Change and Management

##### Geographical Knowledge

Different types and distribution of environmental changes and the forms it takes in different places (VCGGK144)

Environmental, economic and technological factors that influence environmental change and human responses to its management (VCGGK145)

##### Geographical Concepts and Skills

Identify, analyse and explain significant spatial distributions and patterns and identify and evaluate their implications, over time and at different scales (VCGGC128)

Select, organise and represent data and information in different forms, including by constructing special purpose maps that conform to cartographic conventions, using digital and spatial technologies as appropriate. (VCGGC131)

Analyse and evaluate data, maps and other geographical information using digital and spatial technologies and Geographical Information Systems as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology (VCGGC132)

Also see: VCGGC130  
VCGGC147

##### Digital Technologies

##### Levels 9 and 10

##### Data and Information

Analyse and visualise data to create information and address complex problems, and model processes, entities and their



<sup>1</sup> Victorian Curriculum and Assessment Authority (VCAA)  
<<http://victoriancurriculum.vcaa.vic.edu.au/>> Accessed 1 February 2017.





## Module 6: 9-10

### Using data to manage our frogs - Geography

#### Lesson plan

#### Introduction

Urban growth is a significant environmental change that has far reaching impacts on our urban areas. One negative impact of urban growth is on the biodiversity of an urban environment, specifically through habitat fragmentation.

Frogs are a class of animals in our urban habitats that are often overlooked when studying the impacts of urban growth on biodiversity.

The following activities focus on the growling grass frog (*Litoria raniformis*). This species of frog was once very common in Melbourne but due to a significant decline in numbers, is now considered endangered. This decline can be attributed to habitat fragmentation caused by urban growth, and the impacts of Chytrid fungus.

An understanding of the biology of these frogs, along with the process of urbanisation will allow students to identify future urban growth hotspots that will impact on the habitat of the growling grass frog. Students will then be able to evaluate and make decisions on the best way to manage urban growth, specifically through the use of habitat corridors.

These activities can be used individually or in sequence.

relationships using structured data  
(VCDTDI048)

#### Activity 1: How is urban growth changing Melbourne and its frogs?

Students look at nature and extent of past, current and future urban growth in Melbourne using satellite imagery—and the impact this has had on frog numbers.

#### Activity 2: Conducting a frog census in our local area—excursion or at-home activity

Students participate as citizen scientists in the Frog Census by identifying current urban growth fringe regions and recording frog data at these locations.

#### Activity 3: Where are the future of growling grass frog habitats in Melbourne?

Students use criteria to determine the location of current and future habitats of growling grass frogs in Melbourne. They then make predictions about which of these habitats would be most threatened using the *Atlas Living Australia* (ALA) and urban growth models.

#### Activity 4: Creating habitat corridors to manage future frog habitats

Students use the *Atlas of Living Australia* (ALA) and criteria to determine the location of a possible habitat corridor. Students then create an interactive map using Google My Maps to map the distribution of the growling grass frog, the location of their chosen habitat corridor and present a justification for their choice.





## Module 6: 9-10

Using data to manage our frogs - Geography

### Activity 1: How is urban growth changing Melbourne and its frogs?

Urbanisation is an increase in the proportion of people living in towns and cities. Melbourne has experienced significant urban growth in the last decade; future forecasts predict that the city, with a current population of 4.5 million, is expected to reach 10 million by 2050<sup>2</sup>.

In this activity, students will use interactive maps and satellite imagery to analyse the change in Melbourne's urban boundary. They will then use historical data to look at the decline in the number of frogs in the Melbourne region. The students will also identify urban growth hotspots that will impact on the habitats of native species, such as frogs.

#### Equipment

Computer or digital device with a digital projector or interactive whiteboard for whole class discussions

Whiteboard

Computers or devices for student use, either individually or in pairs

#### Activity steps

##### Melbourne urban growth

1. Ask students to share their knowledge and understanding of the process of urbanisation. Prompting questions could include:
  - What is urbanisation?
  - Why does it occur?
  - Do more people live in urban areas than in rural areas in the world today?
  - Which regions of the world experience high levels of urbanisation?
  - Why do most people in Australia live in cities? How has this changed over time and why?
  - What impact would urbanisation have on the environment?
2. Move the discussion to the growth of Melbourne as a city. Discuss changes to Melbourne that the students have seen in their lifetime. Include in the discussion terminology such as urban growth boundary, urban sprawl and the role of the car in the growth of cities.
3. Use the following map from Plan Melbourne to look at the changes to Melbourne's urban growth boundary since 1883—Melbourne's Urban Growth  
<[http://www.planmelbourne.vic.gov.au/\\_data/assets/pdf\\_file/0003/376653/Map-1-Melbournes-urban-growth.pdf](http://www.planmelbourne.vic.gov.au/_data/assets/pdf_file/0003/376653/Map-1-Melbournes-urban-growth.pdf)>
4. Students open Google Earth and use the historical imagery tool to look at satellite imagery of Melbourne and how it has changed.

For a help guide on how to open this tool in Google Earth, go to 'View a map over time' <<https://support.google.com/earth/answer/148094?hl=en>>.

<sup>2</sup> The State of Victoria Department of Environment, Land, Water and Planning 2017, Plan Melbourne 2017–2050,  
<[http://www.planmelbourne.vic.gov.au/\\_data/assets/pdf\\_file/0009/377127/Plan\\_Melbourne\\_2017-2050\\_Summary.pdf](http://www.planmelbourne.vic.gov.au/_data/assets/pdf_file/0009/377127/Plan_Melbourne_2017-2050_Summary.pdf)>, accessed 20 March 2017.





## Module 6: 9-10

### Using data to manage our frogs - Geography

1. Discuss the changes to Melbourne's urban growth boundary and why this may have occurred. Discuss how this urban growth has impacted on environments. Ask students specific questions regarding habitat loss and loss of biodiversity.

#### Impact of growth in Melbourne on frogs

5. Open the *Atlas of Living Australia* (ALA) <<http://www.ala.org.au/>>. Go to the 'Species by location' and select 'Browse locations'. Select the 'Browse by region' option. Students select 'Victoria' and then select 'Amphibians' and then 'Australian Ground Frogs'. Students then use the zoom-in tool to navigate to Melbourne and surrounding areas.

For more information on how to open this map, go to Finding the species recorded in your region—ALA Teacher Guide 10 at <<http://www.ala.org.au/wp-content/uploads/2015/06/G10-SpeciesByRegion.pdf>>.

6. Using the scroll bar at the top of the map, students should select the following dates (as shown in the Plan Melbourne map):
  - a) 1883
  - b) 1927
  - c) 1954
  - d) 1971
  - e) 2001
  - f) 2015
7. Using the *Atlas of Living Australia* (ALA) map, students answer the following question:

How has the spatial distribution of Australian Ground Frogs changed over time? When did the most rapid change occur?

Is there a pattern evident between urban growth in Melbourne and a change in Australian Ground Frog populations? Suggest reasons as to why this pattern may occur?
8. Explain the concept of habitat fragmentation—the process by which habitat loss results in the division of large, continuous habitats into a greater number of relatively smaller isolated patches of habitat. This process has an impact on the genetic diversity of the species.
9. Discuss how urban growth leads to habitat fragmentation of Australian ground frog populations i.e. the impact of urban development including roads, footpaths and other barriers that would inhibit frogs from moving from one habitat to another.
10. To finish, review the key ideas covered in the lesson.

#### Extension activity

The following article could be used as a follow-up activity to consolidate understanding about the relationship between urban growth, habitat loss and habitat fragmentation.





## Module 6: 9-10

Using data to manage our frogs - Geography

Milman, O, 2015, Melbourne's urban sprawl: Just how big can the city get, *The Guardian*, <<https://www.theguardian.com/australia-news/2015/sep/03/melbournes-urban-sprawl-just-how-big-can-the-city-get>>



Melbourne Water Frog Census





## Module 6: 9-10

Using data to manage our frogs - Geography

### Activity 2: Conducting a frog census in our local area—excursion or at-home activity

Giving students the opportunity to explore their local environment provides benefits on many levels. There is an increasing volume of literature which suggests that interaction with the natural environment—even impacted urban environments—leads to improved well-being and both cognitive and behavioural function and development<sup>3</sup>.

In this activity, students and their families have the opportunity to be citizen scientists: collecting meaningful and useful data for the Frog Census, an initiative managed by Melbourne Water.

Melbourne Water is responsible for the management of 8400 kilometres of rivers and creeks as well as important wetland habitats in the greater Melbourne region. Our management activities include on-ground works, stormwater management, managing environmental flows, advocacy, enforcement and planning. The management decisions we make need to be based on accurate information.

Conducting an evening Frog Census excursion to a local frog habitat site is a great way to interact with your local environment. While the frogs themselves may be difficult to find, in breeding season they are easily heard.

Using the Frog Census app or another recording device, students record frog calls and identify the frogs and gain an appreciation of the ecology of their habitat. They gain first-hand experience of the impacts of humans on urban wetlands.

If possible, take students to a wetland area that is in an urban growth corridor in Melbourne. The students can then collect Frog Census data at this site prior to rapid urban development. If you would like to create your own map, collect location data (latitude and longitude) for each siting. There are hard copy frog data collection sheets available on the Melbourne Water website -

<[https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Documents/Frog\\_Census\\_Flyer\\_Datasheet\\_2016.pdf](https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Documents/Frog_Census_Flyer_Datasheet_2016.pdf)> The data should be transferred to an excel spreadsheet and saved as a CSV file. This data could then be used in addition with other data added to the Google Earth Map outlined in Activity 3.

Ensure you follow all school excursion and health and safety guidelines.

Alternatively, students could also monitor frogs with their parents as an at-home activity.

Information about how and when to conduct a frog survey, organise a school monitoring program, prevent the spread of frog disease and stay safe are included in the *Frog Census Handbook for Schools* available from

<sup>3</sup> This paper is just one of many available online:

De Young, R et.al. 2017, Some psychological benefits of urban nature: Mental vitality from time spent in nearby nature. In Columbus, AM (Ed) *Advances in Psychology Research* 116, Chapter 4, Nova Science Publishers, Hauppauge, NY, pp. 93–120. Available from <<https://deepblue.lib.umich.edu/handle/2027.42/136087>>





## Module 6: 9-10

Using data to manage our frogs - Geography

<<https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Pages/Frog-Census.aspx>>

The Frog Census app, developed by Melbourne Water, makes frog monitoring easy and provides a great opportunity for Melbourne students to contribute to this important citizen science project

(<<https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Pages/Frog-Census.aspx>>). The app can be used on both Apple and Android devices.

Alternatively, you can download resources from the Melbourne Water Frog Census web page above. Students can record frog calls and send the Frog Census datasheet and sound files to Melbourne Water as per the instructions on the web page.

For more information about how to prepare students for this excursion, go to *Activity 2: Identifying our frogs—excursion or at-home activity* in the Years 7–8 Frog Census Module.

### Useful links

#### Waterbug Census—Melbourne Water

Waterbugs (macroinvertebrates) are also useful biological indicators and students can be citizen scientists by monitoring waterbugs for Melbourne Water's Waterbug Census. This data is important for ongoing research and water management. For more information about the Waterbug Census go to

<https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Pages/Waterbug-Census.aspx>

#### ***Macroinvertebrates as biological indicators activity (Year 9–10)—Melbourne Water Story***

This activity outlines how students can collect, identify macroinvertebrates and analyse the data to determine the health of the waterway. It can be found on the Melbourne Water Story website at <<http://waterstory.melbournewater.com.au/educate/year-9-10>> (click on 'teacher resources').

#### Platypus Census—Melbourne Water

Melbourne Water also runs a Platypus Census program with its own platypusSPOT app. For more information go to

<<https://www.melbournewater.com.au/getinvolved/protecttheenvironment/Pages/Platypus-Census.aspx>>







## Module 6: 9-10

Using data to manage our frogs - Geography

### Activity 3: What is the future of growling grass frog habitats in Melbourne?

Current Growling grass frog populations are under threat, particularly in urban areas such as Melbourne. Melbourne is undergoing significant growth and the city has identified four urban growth corridors. These corridors are expected to accommodate close to half of Melbourne's new housing and much of the city's future supply of industrial land. This future growth will continue to have negative impacts on the growling grass frog populations.

In this activity, students identify criteria to determine current and future habitats for the growling grass frog. They identify the location of the four urban growth corridors and use Google Earth Pro to map current and possible future growling grass habitat locations in these corridors.

#### Equipment

Computer or digital device with a digital projector or interactive whiteboard for whole class discussions

Whiteboard

For each group or individual student:

one computer for student use, either individually or in pairs

one copy of the *Growling grass frogs in urban Melbourne* (Worksheet 1) for each student or for groups

#### Preparation

Download Google Earth Pro to computers. Note: This activity will not work on a tablet or iPad.

If internet speed is an issue, the teacher should also download all KML and CSV files from relevant sites for students to access.

#### Activity steps

1. Discuss the term habitat as a class. Use resources to develop a definition.
2. Develop a set of criteria to determine the ideal habitat for the growling grass frog. Use the information provided in Worksheet 1 to develop these criteria. The students could develop the criteria individually or in groups. As a class, decide on the final list. Criteria could include types of urban waterbodies, existence of specific types of vegetation and water quality.
3. Discuss what an urban growth corridor is.
4. Students use the following resources to map the location of the four urban growth corridors in Melbourne.

A Google Earth (KML file) of the urban growth corridors can be downloaded from the Victoria Planning Authority Open Data Site <[http://data-planvic.opendata.arcgis.com/datasets/b70f3919609e4713b6c61b0447f3e8a3\\_0](http://data-planvic.opendata.arcgis.com/datasets/b70f3919609e4713b6c61b0447f3e8a3_0)>. This file can be opened directly into Google Earth by opening the KML file from your computer.





## Module 6: 9-10

### Using data to manage our frogs - Geography

Downloading additional layers will add further information to the map. The Open Data site includes other layers regarding urban growth corridors including:

- Land Use <[http://data-planvic.opendata.arcgis.com/datasets/b70f3919609e4713b6c61b0447f3e8a3\\_0](http://data-planvic.opendata.arcgis.com/datasets/b70f3919609e4713b6c61b0447f3e8a3_0)>
  - Open Space Data <[http://data-planvic.opendata.arcgis.com/datasets/da1c06e3ab6948fcb56de4bb3c722449\\_0](http://data-planvic.opendata.arcgis.com/datasets/da1c06e3ab6948fcb56de4bb3c722449_0)>
5. Select one of the four urban growth areas. You will now be adding frog location data to the Google Earth map. Use the *Atlas of Living Australia* (ALA) to locate any current growling grass frog populations in this corridor. To find this data,
    - a. go to the ALA <<http://www.ala.org.au/>>
    - b. select the option to 'Browse locations'
    - c. select 'Browse by location'
    - d. search using the name of one of the suburbs located in the growth corridor e.g. Craigieburn
    - e. select to display records in a 10km radius
    - f. select Amphibians and then select the species name *Litoria raniformis*. The data can then be downloaded as a CSV file.
  6. Add this data to the Google Earth map. Before adding the CSV file, it must be tidied by filtering out and deleting all other species data for this location and the columns that are not relevant to the task. To do this, you can filter *Litoria raniformis* and delete all other data from the spreadsheet. Instructions on how to do this can be found at Microsoft Office Support – Filter Data in a Range or Table - <<https://support.office.com/en-us/article/Filter-data-in-a-range-or-table-01832226-31b5-4568-8806-38c37dcc180e>>

The CSV file can then be added to the Google Earth map. Instructions on how to do this can be found at Google Earth Help—Import and change map data <<https://support.google.com/earth/answer/176685?hl=en>>
  7. Use the satellite imagery function on Google Earth to find current wetlands in the selected growth corridor. Look through the criteria established by the class to determine if there are wetlands in the growth corridor that would be appropriate for future frog habitats.

If these locations were part of a previous excursion, students could also add in photo data collected in the field. Highlight these on the map by creating a point or polygon on the Google Earth Map. Instructions for this can be found at Google Earth Help—Create travel routes or areas of Interest <<https://support.google.com/earth/answer/148072?hl=en>>
  8. Students have now created a map of current and future habitats of the growling grass frog populations that will be threatened by urban growth.
  9. Students save their Google Earth map for future use. Instructions on how to do this can be found at Google Earth Help—Save and share place info <<https://support.google.com/earth/answer/148150?hl=en>>





## Module 6: 9-10

### Using data to manage our frogs - Geography

10. Discuss the term 'habitat fragmentation' and consider how this would impact on the biodiversity of the growling grass frog.

11. Read the 'Ecology' section of Worksheet 1. Discuss the following questions:

What characteristics of the Growling Grass Frog relate to mobility?

How would urban development impact on the ecology of the Growling Grass Frog? What specific types of development and infrastructure would have the most impact?

## Useful links

### Creating a tour using Google Earth

Google Earth Help—Create travel routes or areas of interest

<<https://support.google.com/earth/answer/148072?hl=en>>

If Google Earth Pro is not available as a tool to create this map, there are other options available. These include:

- Google Tour Builder - The following link provides an overview on how to create a map using Google Tour Builder  
<<https://www.google.com.au/earth/outreach/tutorials/tourbuilder.html>>
- Google My Maps – The following links provide an overview on how to create a map using Google My Maps, and how to add CSV files.
  - Google My Maps Help – Create a map -  
<https://support.google.com/mymaps/answer/3024454?hl=en>
  - Google My Maps Help – Import map features from a file -  
<https://support.google.com/mymaps/answer/3024836?hl=en>

### Melbourne's Urban Growth Corridors—Victoria Planning Authority

The following links provide detailed information from the website on Melbourne's Urban Growth Corridors <<https://vpa.vic.gov.au/greenfield/growth-corridor-plans/>>. The most useful resource is the Growth Corridor Plans: Managing Melbourne's growth <[https://vpa-web.s3.amazonaws.com/wp-content/uploads/2016/10/Growth\\_Corridor\\_Plan\\_Managing\\_Melbournes\\_Growth.pdf](https://vpa-web.s3.amazonaws.com/wp-content/uploads/2016/10/Growth_Corridor_Plan_Managing_Melbournes_Growth.pdf)>

### Frogs and roads don't mix—Kirsten Parris

These blogs provide useful background information about the threats that road barriers pose to frog populations, particularly in urban areas.

Parris, K, 2013, *Frogs and roads don't mix Parts 1, 2 and 3*,

<<https://kirstenparris.com/2013/03/26/frogs-and-roads-dont-mix-part-1/>>,

<<https://kirstenparris.com/2014/07/29/frogs-and-roads-dont-mix-part-2/>>

<<https://kirstenparris.com/2015/08/30/frogs-and-roads-dont-mix-part-3/>>





## Module 6: 9-10

Using data to manage our frogs - Geography

### Worksheet 1

#### Growling grass frogs in urban Melbourne

##### *Fact sheet*

Despite the impact of development, Melbourne still retains significant habitat for many species—including frogs. More than 14 species of frog have been found in the Greater Melbourne area. The largest of these is the growling grass frog (*Litoria raniformis*): a large green frog with a warty back that is active during the day as well as at night.

##### **Threats**

This frog was once common and widespread throughout south-east Australia including Tasmania. However, populations of the growling grass frog have suffered significant declines since 1990 because of factors such as habitat disruption, long-term drought, fire and the spread of infection by the chytrid fungus. The chytrid fungal disease has caused rapid declines in frog species globally and is thought to play a key role in the decline of growling grass frogs.

Much of the growling grass frog habitat has been lost to residential and industrial development and existing habitats have been fragmented or degraded resulting in the extinction of many local frog populations. Many of the populations that remain are found in areas still under threat from future development.

Frog eggs and tadpoles are eaten by introduced fish such as mosquitofish, trout and carp. Predation by the introduced mosquitofish may be a factor in the decline of growling grass frog populations, especially when they faced with other environmental stresses such as unhealthy habitats. Both the red fox and cats are efficient predators of frogs.

Frogs have a special semi-permeable skin; this means certain substances like water and oxygen can pass through it. So they are particularly vulnerable to the presence of toxic pesticides and other pollutants from sources such as stormwater runoff. Also, because growling grass frogs bask in the sun, their skin may be damaged by higher ultra-violet radiation levels linked to climate change.

##### **Habitat**

Growling grass frogs are found in a wide variety of waterbodies, both permanent and semi-permanent. Research into growling grass frog habitats around Melbourne indicates that populations of frogs are more likely to occupy sites that are wetland systems with a range of still or slow-moving waterbodies such as lakes, ponds, dams, disused quarries and wetlands.

These wetland systems should include at least one large, deep permanent waterbody with good aquatic vegetation (water plant) cover and a number of close semi-permanent waterbodies to allow frogs to migrate. The semi-permanent ponds would need to retain water long enough in the breeding season for tadpoles to develop into frogs.

Growling grass frogs require three types of aquatic vegetation: floating, submerged and emergent. Adult males call from 'rafts' of floating water plants during the breeding season and the plants also provide cover for the tadpoles. Similarly submerged water plants protect tadpoles from predators. The tall emergent vegetation is found around the edge of the wetlands and provides protection and food for adult frogs.





## Module 6: 9-10

Using data to manage our frogs - Geography

Rocks, logs and dense vegetation at ground level—such as reeds and grasses around wetlands—provide cover, food and overwintering sites for growling grass frogs. The frogs also use patches of bare ground and rocks for foraging over land.

Growling grass frogs require habitat with good water quality with low levels of nutrients (nitrates and phosphates), low salinity levels and low turbidity (clear water).

### Ecology

Growling grass frogs feed and move around at night during the warmer months. The species has been recorded migrating between wetlands so that if a population disappears from one wetland, individuals can recolonise an adjacent wetland—if it is a suitable habitat.

In the breeding season, the frogs tend to breed in some ponds and use other ponds for feeding. The survival of a population of frogs may be dependent on the movement of adult frogs between waterbodies—breeding and non-breeding. Barriers to movement such as fences, roads and development may adversely affect the viability of the population. Also, the construction of roads across a wetland system not only disrupts frog migrations, it can lead to road kills.

Growling grass frogs migrate between wetlands using habitat corridors to allow them to move safely. They shelter in the reeds around the edge of the ponds and under logs, debris and rocks in the area around the wetlands.

Male frogs call at night to attract mates from August to March but breeding usually only occurs between November and March, depending on the weather conditions. The males call while floating in the water. The females lay their eggs in a loose mass amongst floating and submerged water plants.

Growling grass frog tadpoles live amongst the submerged water plants, feeding on strands of floating algae and on the algae that grow on the plants.

The frogs overwinter beneath thick vegetation, logs, rocks and other debris.

Growling grass frogs eat a variety of terrestrial (dry land) insects such as cockroaches, beetles and moths. They also eat small lizards, fish and even other frogs. In turn, growling grass frog tadpoles are eaten by fish and insects such as water boatmen. The adult frogs are prey for snakes, and introduced foxes and feral cats.





## Module 6: 9-10

Using data to manage our frogs - Geography

### Activity 4: Creating habitat corridors to manage future frog populations

The Victorian Government has developed a Biodiversity Conservation Strategy to manage the biodiversity in Melbourne's future growth corridors. This conservation strategy has specific reference to the Growling Grass Frog. In this activity, students will use the data collected in Activity 3 to determine the location of a habitat corridor in one of these urban growth areas, and justify its location using their knowledge of the growling grass frog, as well as the process of urbanisation in urban growth areas.

#### Equipment

Computer or digital device with a digital projector or interactive whiteboard for whole class discussions

Computers or devices for student use, either individually or in pairs

Google Earth Pro downloaded on the computer or device (Note: This activity will not work on a tablet or iPad)

#### Activity steps

1. Introduce and discuss the concept of a management strategy. What is a management strategy? How are they used to manage future growth sustainably?
2. Use the links below to research and develop a summary of the current management strategy put in place in urban growth corridors for the Growling Grass Frog. The Biodiversity Conservation Act includes the creation of conservation areas and the creation of buffer zones on wetland areas.

Victorian State Government, Department of Environment, Land, Water and Planning, *Conservation Strategies* <<http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/melbourne-strategic-assessment/conservation-strategies#A2.2>>

3. Evaluate the effectiveness of these current strategy using criteria. These criteria should be developed from the considerations of the ecology of the growling grass frogs developed in Activity 3. Are these strategies effective in reducing habitat fragmentation?
4. Introduce the concept of habitat corridors. Discuss with the class. Distinguish clearly between habitat corridors and the construction of road underpasses and overpasses for animal migration. Further information on this can be found in the article by Kirsten Parris, *Frogs and roads don't mix Part 2*, <<https://kirstenparris.com/2014/07/29/frogs-and-roads-dont-mix-part-2/>>. Discuss the importance of planning for habitat corridors in urban growth areas where development is yet to occur.
5. Introduce the hypothetical situation below:

You are an environmental scientist, employed by the Victorian Planning Authority to develop a new strategy as part of the Biodiversity Conservation Strategy for Melbourne's Growth Corridors. The specific strategy you are required to develop will focus on habitat corridors. In one of the four growth corridors in Melbourne, you need to:





## Module 6: 9-10

### Using data to manage our frogs - Geography

- locate a habitat corridor that connects at least two wetlands for the growling grass frog. The wetlands do not need to be a current habitat for the frog.
  - map this habitat corridor on a Google Earth Map
  - justify the location of this map to the Victorian Planning Authority.
6. Students present the chosen location for the habitat corridor on the Google Earth Map they created in Activity 3. The following guide will provide information on how to add a point of interest to the map:

Google Earth Help—Create travel routes or areas of interest

<https://support.google.com/earth/answer/148072?hl=en>

7. Students then justify the location of the habitat corridor using the existing data on the map or new data they find and add. This justification could be presented as a separate paragraph, text on the Google Earth Map, or a voice-over added to a Google Earth Tour. Instructions on how to create this tour can be found at Google Earth Outreach—Creating a narrated tour in Google Earth
- <https://www.google.com.au/earth/outreach/tutorials/kmltours.html>

