

## CHANGING PLACES

### LEVEL

Year 11

Geography Unit 2 Tourism: Issues and Challenges

### ACTIVITY DESCRIPTION

Until the launch of earth orbiting satellites, we were not able to view our planet from above. Since the early 1970's, however, we have been collecting imagery of the entire world and, as satellite and sensor technology advances, we can capture much greater detail to learn how our world is changing. Given the vast amount of digital imagery we have accumulated over the past 40+ years, Google wanted to make the imagery more useful. Rather than looking at each tile as a small area of the earth's surface, Google created seamless images of the entire world for 18 consecutive years: 1984 to 2012, and now to 2020. The results provide an extraordinary opportunity to look at any part of the world and observe changes over time.

Students will explore how to use the Timelapse website to view areas of interest around the world, including Puffing Billy Railway and the Dandenong Ranges. Students will research and discuss how the Dandenong Ranges has been affected in the past 20 years.

### THEME

Area of Study 1 – Characteristics of Tourism

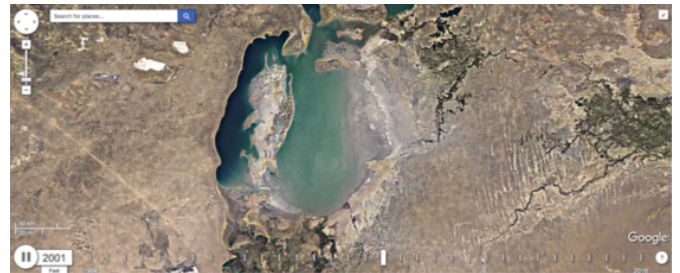
Area of Study 2 – Impact or tourism: issues and challenges

### MATERIALS REQUIRED

- “Changing Places” workbook
- Electronic devices with access to the internet
- Access to Google Earth Timelapse
- Pen/Pencil

### INSTRUCTIONS

1. Using the background information provided, as a class discuss the use of satellite imagery and Google Earth to view change over time.



2. As a whole group activity visit the timelapse website and notice the different controls found in the timelapse interface. On the top left, there is the zoom tool; along the bottom is the time slider; and on the top right is the overview map. Each of these tools will help students to navigate the world and zoom in on specific locations.

<https://earthengine.google.com/timelapse/>

3. As a group follow the step-by-step instructions for navigating the website below.
  - Click on the tiles below the time slider to view different areas of interest. Notice how each tile highlights the changes that have occurred over time.

- Look at the Aral Sea tile (you may have to scroll to the far right). What changes do you notice in the thirty-year sequence? Scientists often think in terms of cause and effect.
  - What are some possible causes for such a drastic change in this area? Discuss and share ideas.
  - The Aral Sea is a well-documented human impact area. To find out what provoked this change and its major effects on people in the region, click here: [https://earthobservatory.nasa.gov/world-of-change/aral\\_sea.php](https://earthobservatory.nasa.gov/world-of-change/aral_sea.php)

*Discuss if there is any hope to reclaim the Aral Sea?*

- Many other well documented areas around the world have been impacted by humans. Click on the Dubai tile and watch the timelapse sequence. You can slow the sequence down by clicking on the “Fast” tab, located just below the year on the time slider.
  - What did you notice after watching the 30-year sequence? Can students identify any of the structures appearing in the timelapse? What potential impacts (positive or negative) could these structures have on the surrounding environment?
4. Teachers to discuss with students how many areas around the world have changed over the past 30 years. “Some of them may be close to your home, some may be home to your favourite species, and some you may have read or heard about on the news. The sites you explored previously were curated by the Google Geo Team and are well documented”.

Now it’s the students turn!

5. Students are to collect their devices and use the ‘Changing Places’ worksheet below to find Puffing Billy Railway and notice any change to the Railway over time. Students are to complete the short answer questions on the worksheet. Group discussion is encouraged. Can students develop any ideas to keep the natural area healthy and safe for the future?

**EXTENSION:** The site below gives students an opportunity to develop their own timelapse. There is also a tutorial that explains how to use the Timelapse tour editor linked below.

TimeMachine Editor: <http://timemachine.cmucreatelab.org/wiki/EarthEngineTourEditor>

Timelapse Tutorial: <http://wiki.gigapan.org/creatingtimemachines/toureditorgoogleearthtimelapse>

## ✓ **SUGGESTIONS FOR ASSESSMENT**

Ability to navigate the online interface and successful completion of the “Changing Places” worksheet.

## **BACKGROUND INFORMATION**

### **TIMELAPSE IN GOOGLE EARTH**

You can use Timelapse in Google Earth to tour the world and see how our planet has changed over time through a global time-lapse video of the planet from 1984 to today. You can navigate and explore timelapse in Google Earth, using it to investigate change in certain areas.

<https://earthengine.google.com/timelapse/>

Use this tutorial to learn how to navigate Timelapse:

Timelapse Tutorial: <http://wiki.gigapan.org/creatingtimemachines/toureditorgoogleearthtimelapse>

### **HABITAT OF THE DANDENONG RANGES**

Dandenong Ranges National Park is part of an Aboriginal cultural landscape in the traditional Country of the Wurundjeri People.

The ranges consist mostly of rolling hills, steep weathered valleys and gullies covered in thick temperate rainforest, predominantly of tall mountain ash trees and dense ferny undergrowth. The Yarra Ranges natural environment is made up of the landforms and ecological services that provide the air we breathe, the water we drink, the soils that grow our food, and the habitats that are home to indigenous wildlife, such as Lyrebirds, and make up our scenic landscapes. The Yarra Ranges contain some of the most environmentally important areas in Victoria. These precious areas include the Mountain Ash forests of the Dandenong Ranges and Central Victorian Highlands. Remnant native vegetation is home to iconic species such as the Powerful Owl, the Helmeted Honeyeater and Leadbeater's Possum. The upper half of the Yarra River and its tributaries support a diverse range of plants and animals including significant populations of platypus, frogs and fish. These waterways and key dams and reservoirs such as O'Shannassy, Upper Yarra, Maroondah and Silvan provide about 70% of Melbourne's drinking water.

### **CHANGE OVER TIME IN THE DANDENONG RANGES**

Some of Yarra Ranges environmental assets lie within areas modified by humans, such as areas converted to agriculture, urban and rural settlements, transport infrastructure, parks, gardens and sports fields. Agriculture is a significant component of the Yarra Ranges landscape and the richness of the municipality's agriculture has made it an important food production area for Victoria. This natural environment has always attracted people, many of whom have chosen to live there, enticed by the diverse and attractive scenery offered by the rural valleys and forested mountains. This scenery continues to attract tourists, including day trippers from Melbourne, and our landscapes have become embedded in the cultural history of residents and Melburnians alike.

Tourism is an important industry for Yarra Valley and Dandenong Ranges. The region received approximately 3.2 million domestic (overnight and daytrip) visitors, who spent an estimated \$431 million in the year ending September 2021.

Human settlement has always had an impact on the natural environment. That pressure continues today through urban development, pollution, introduction of weeds and pest animals, bushfires, and climate change. Urban development and land use changes, which have supported the development of vibrant local communities and productive agricultural sector, have had significant environmental impacts across the municipality. Since European settlement, 70% of the original vegetation has been lost from privately owned land. The remaining vegetation is threatened by incremental reduction in extent and quality, primarily due to urban development, weed invasion and management practices that degrade the land. Tree hollows are a critical component of habitat that is being lost from ecosystems, and the hardest to replace. Hollows in large old trees provide the homes needed by 21% of local birds and mammals.

Urban development also presents specific threats to water resources. The hard surfaces created by buildings, roads and footpaths cause rainwater to flow quickly over the landscape rather than soaking naturally into the soil and being absorbed by plants. This causes unnaturally high flows of water when it rains, eroding stream banks and channels and damaging fish and platypus habitat. Stormwater runoff also carries pollution in the form of oil, heavy metals, bacteria, sediment, and chemicals into streams and rivers, significantly lowering the water quality.

Rural areas are significantly impacted by weeds and pest animals. On agricultural land, weeds and pest animals can compete with production and contaminate produce. Weeds can also poison livestock. In bushland settings, weeds and pest animals compete with native plants and animals and degrade their habitat. Fire is a natural part of the Australian environment and is necessary for the renewal of many ecosystems. However patterns of fires that occur outside of the normal frequencies, intensity, seasons and scales of what our plants and animals can tolerate are a considerable risk. The Yarra Ranges landscape is prone to fire and medium to long-term impacts of climate change which will include temperatures rising and a reduction in rainfall.

## **CURRICULUM LINKS**

### **Geography Skills**

#### **Images**

- Use satellite images and oblique and vertical aerial photographs to interpret and draw conclusions from observed features and to describe relative locations of features and general spatial patterns.
- Use combinations of remote sensing images and topographic maps to explain change over time.

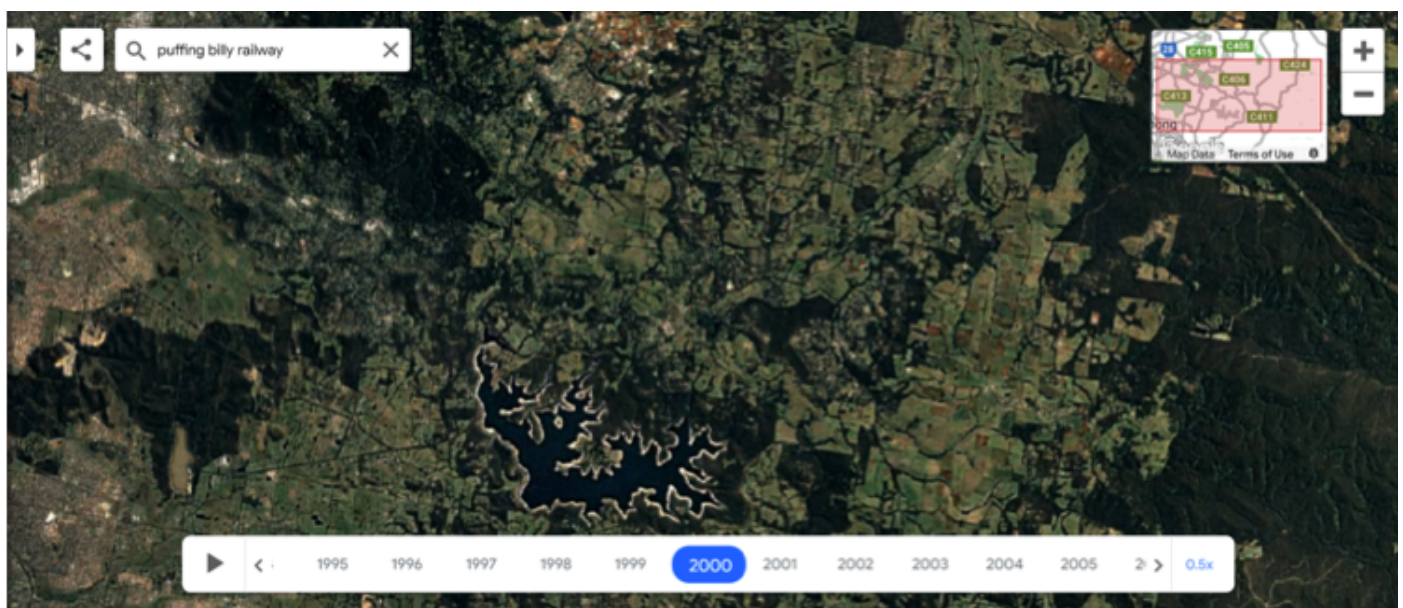


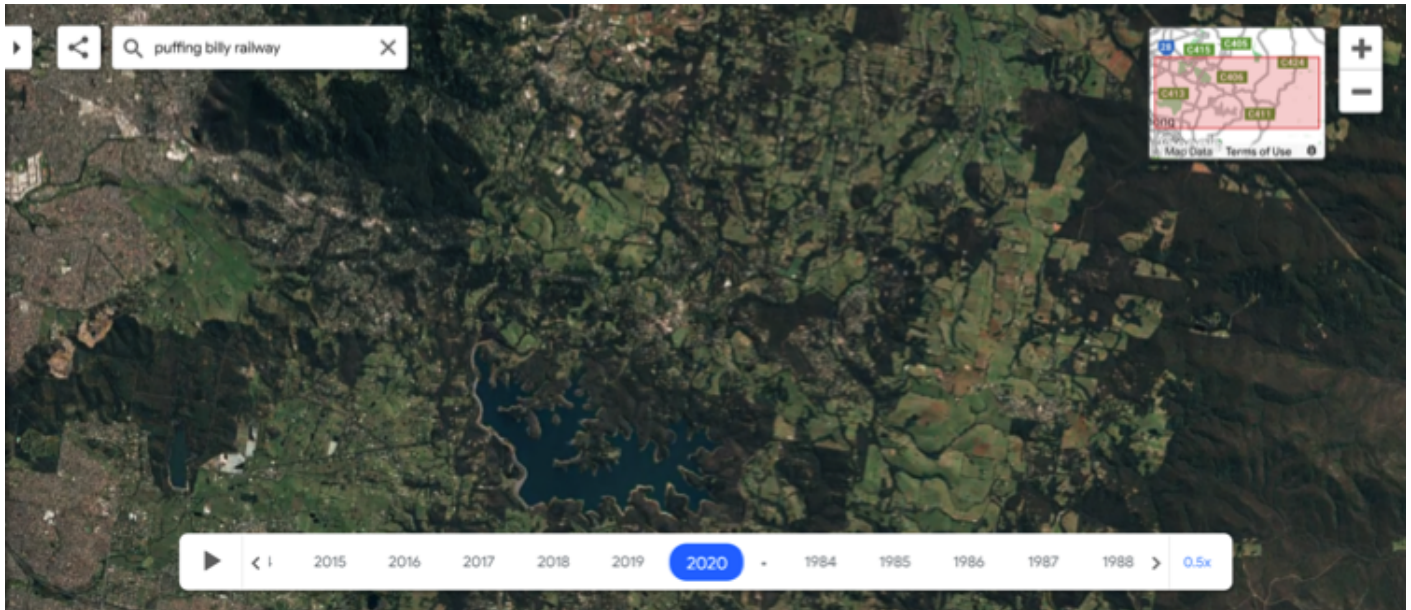
## WORKSHEET – CHANGING PLACES

Visit the website listed below. Notice the different controls found in the Timelapse interface. Each of these tools can help you navigate around the world and zoom in on specific locations.

<https://earthengine.google.com/timelapse/>

Type in 'Puffing Billy Railway' into the search area and view the change over time along the railway from 1984 to 2020. You may wish to zoom in or move along the Railway. You can also use the below images.





Puffing Billy Railway. [Puffing Billy Railway Google Earth Engine Map].  
Retrieved September, 2021, from <https://earthengine.google.com/timelapse/>

Using the images above or Timelapse interface, answer the below.

1. What type of habitat does Puffing Billy Railway move through in the Dandenong Ranges.  
Are their multiple types?

2. Describe what you see in the satellite image for the specific years below.

1984	2000	2020

3. Can you identify any differences in the area across this 26-year period. Are there any common trends or patterns across the years at this location?

4. Is there any evidence of human impact at Puffing Billy Railway? Is it positive or negative to the surrounding environment?

5. What could the local Councils introduce or do to mitigate this impact in the Dandenong Ranges?

6. What could Puffing Billy Railway introduce or do to mitigate its impact in the Dandenong Ranges?