

# Water in the World

## Hawkesbury/Nepean River

*The Hawkesbury Nepean River has been a vital part of our landscape for many thousands of years. It played a key role in the lives of Indigenous Darug People living in the area, the early European Settlers, and is important to many thousands of people today. This Geographical Inquiry will focus on the environmental and human processes that influence the availability and distribution of water, with a particular focus on the Hawkesbury River at Sackville North.*

### ***Inquiry Questions:***

- How do natural and human processes influence the distribution and availability of water as a resource in the Hawkesbury Nepean River?
- What approaches can be used to sustainably manage water resources and reduce water scarcity in the Hawkesbury Nepean Catchment?



### **Health and Safety Issues**

As you are working out in the field you need to be aware that:

- Ground material is often covered in moss and can be very slippery.
- Vines and dense undergrowth can trip.
- Fallen trees can be rotten and weak.
- Some animals can deliver painful or venomous bites.
- On slopes, rocks can be easily dislodged.

### **Outcomes**

- GE4-1:** Locates and describes the diverse features and characteristics of a range of places and environments
- GE4-2:** Describes processes and influences that form and transform places and environments
- GE4-3:** Explains how interactions and connections between people, places and environments result in change
- GE4-5:** Discusses management of places and environments for their sustainability
- GE4-7:** Acquires and processes geographical information by selecting and using geographical tools for inquiry
- GE4-8:** Communicates geographical information using a variety of strategies

Student Name: \_\_\_\_\_

## Inquiry Aim:

The aim of this Geographical Inquiry is to investigate the natural and human processes influencing the Hawkesbury River Catchment at Sackville North.

## Pre-Visit Activity One

SIX Maps has been developed by the NSW Department of Land and Property. It provides access to cadastral (land and property boundaries) and topographic (hills and valleys) information, satellite data and aerial photography. Use [SIX Maps](#) to complete the following tasks.

1. On SIX Maps, type in Sackville North.
2. Click on Basemaps (top right of page) and drag the tab down until you can see the Street and Suburb names.
3. Zoom out and fly around until you find your local Suburb.
4. Click on Basemaps and move the tab back up until you can see the satellite image.
5. Zoom out to a scale around 1:600 000 (you can see this in the bottom left of screen). Follow the Hawkesbury Nepean River upstream from the ocean to Warragamba Dam.
6. By holding a piece of string to your computer screen or using six maps tools, estimate the length of the Hawkesbury Nepean River: \_\_\_\_\_
7. Look at the satellite image of the Hawkesbury Nepean river and identify 3 different broad land use patterns around the river:  
\_\_\_\_\_  
\_\_\_\_\_

8. For each land use identified in question 7, discuss how this would effect the Hawkesbury Nepean river. (Eg: Agriculture takes water out of the river for irrigation)

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_

# Definitions

What is a river catchment? (provide 3 local Sydney examples)

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What is geomorphology?

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List 3 Geomorphic Processes

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What is topography?

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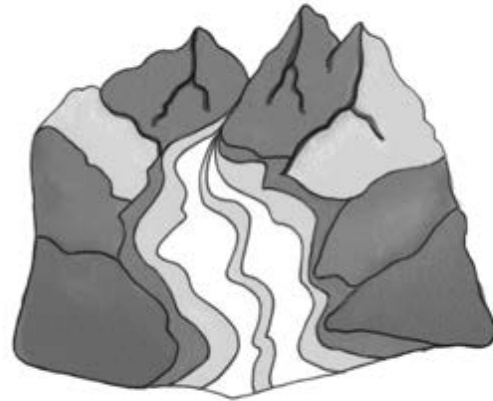
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# Geomorphic Processes

## Weathering

The breaking down or disintegration of substances such as rocks and minerals by physical, chemical, or biological processes



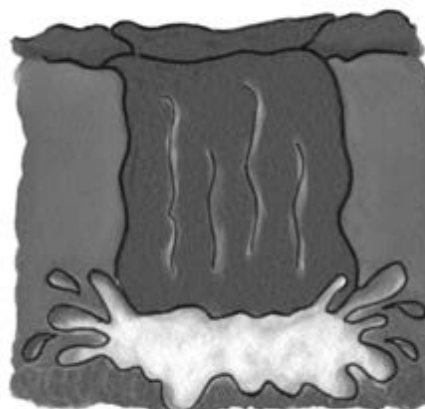
## Erosion

The movement of sediment or soil from one location to another by means of water, ice, or wind



## Deposition

When particles carried by water, ice, or wind are deposited (dropped) in another location



# Pre~Visit Lesson Two: Geographical Questions

*Geographical questions are questions which help you identify the information you need to answer the inquiry questions. Your inquiry questions are written on Page 1.*

Brainstorm: What are some geographical questions you might ask for this Inquiry?

Example: What are some human impacts on the Hawkesbury Nepean River system?

Geographical Question 1: \_\_\_\_\_  
\_\_\_\_\_

Geographical Question 2: \_\_\_\_\_  
\_\_\_\_\_

Geographical Question 3: \_\_\_\_\_  
\_\_\_\_\_

Geographical Question 4: \_\_\_\_\_  
\_\_\_\_\_

Geographical Question 5: \_\_\_\_\_  
\_\_\_\_\_

# Pre-Visit Lesson Three: Planning Your Inquiry

Answer the following questions for each of the Geographical Questions you came up with last lesson:

1. What information is needed to answer this geographical question and where can you find that information?

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2. What are the geographical tools you need to access the information?

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3. Develop a system for recording the information you get.

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# Fieldwork Activity One: Water Quality of the Hawkesbury River

Site Location: \_\_\_\_\_ Date of Water Tests: \_\_\_\_\_

### Physical Parameters

Descriptor	Result	Units	Rating <i>(Use Rating Chart provided and score out of 10)</i>
Water Temperature		°C	
River width		m	
Turbidity		NTU	
Tide: Ebb (flowing to low) or Flood (Flowing to high)			

### Chemical Parameters

Descriptor	Result	Units	Rating <i>(Use Rating Chart provided and score out of 10)</i>
Salinity		ppm	
pH (acidity)			
Oxygen		ppm	

What natural and human factors could influence results for the following?

Measurement	Natural factors	Human factors
Water Temperature		
River Width		
turbidity		
Salinity		
pH		
Oxygen		

## Fieldwork Activity Two: Vegetation

In your **10 metre quadrat**:

Parameter	Units	Equipment	Result
Average Plant Height (Measure 5 random trees in the quadrat then work out the average height)	Metres	HowHighFar iPad App OR Clinometer (Use calculators to get average)	
Tree abundance	Number of trees (more than 5m)		
Groundcover	% cover	Eyes	
Canopy Cover	% cover	Blank iPad screens & Canopy Cover Charts	
Aspect (direction slope faces)	Degrees	Compass	
Slope	Degrees	Clinometer	

1. Did you see any evidence of erosion at this site? If so, describe what you saw. (Hint: use page 4 to refresh your memory about erosion)

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2. Describe the links between the forest vegetation and water quality in the river.

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## Fieldwork Activity Three: Topography

You will walk from Sackville Ferry Road to the Hawkesbury River.

1. How many examples of stormwater erosion did you see? (Hint: use page 4 to refresh your memory about erosion)

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2. Describe some examples of stormwater erosion you saw. Take photos if possible.

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3. Were the examples of stormwater erosion mostly along the track or were they in the bush?

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4. Discuss the links between slope (topography) and water. How might water shape landforms?

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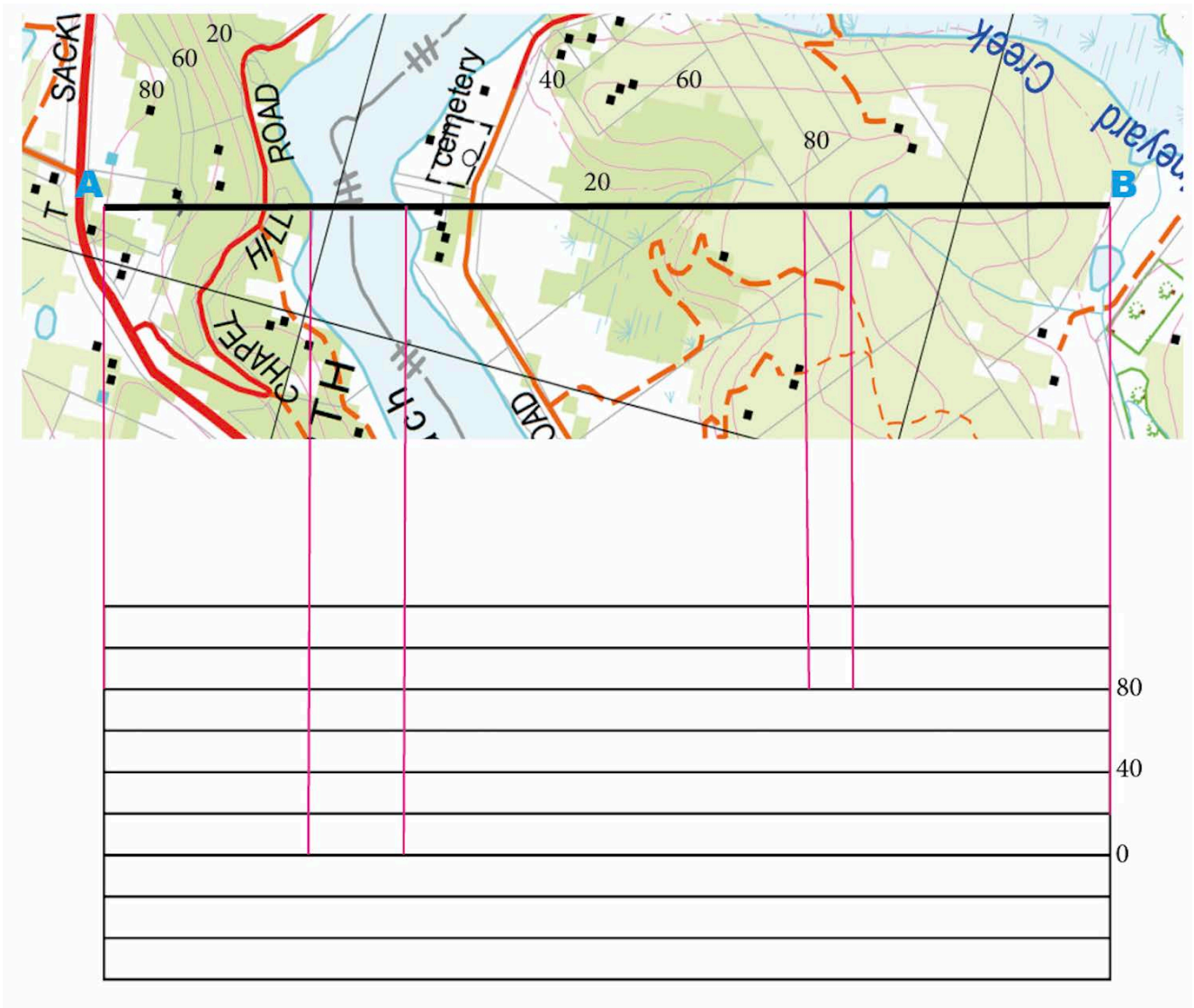
5. Use the map below and a GPS (or iPad App) to record your elevation at the following points along your walk.

A	m	B	m
C	m	D	m
E	m	F	m



## Fieldwork Activity Four: Topography of the Hawkesbury River

1. Complete the cross-section by drawing lines from the contour interval to the corresponding graph line.
2. Use the word bank below to label the geomorphic features of the landscape into the cross-section
3. Use a GPS to determine the height of the contour lines \_\_\_\_\_ m



Brewongle Ridge  
Lagoon  
Floodplain  
Gully Cemetery  
River Road

# Post-Visit Lesson One: Fieldwork Summary

*How does water influence geomorphology and what role does topography play in this interaction?*

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*Describe a human process that has changed the availability of water in the Hawkesbury River.*

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*What role does vegetation play in the health of a river system?*

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## Post-Visit Lesson Two & Three: Processing the Data

Below is a list of Geographical Tools used to collate, review and evaluate data and information. Choose at least 5 of these tools to analyse and present your data in a Word Document.

The information you create here will be used in your documentary assessment task.

- Using ICT software, use a **topographic map** or **satellite image** as a base map, locate the Hawkesbury River at Brewongle and identify surrounding natural and human features.
- Collate data from your in-depth study into a **table** to summarise your findings.
- Create **flowcharts** to demonstrate your understanding of the ways the environment influences people and places.
- Assemble and annotate **photographs** to provide a visual representation of the site. Analyse and label interconnections.
- Develop **consequences charts** to explain human impacts (positive and negative). Show the impacts on [Google Tour Builder](#). Use photos taken on the day to match parts of the tracks we walked.
- Use a **T-chart** to represent data on advantages and disadvantages of population increases in the Hawkesbury Nepean River Catchment.
- Create a **mind map** summarising how different groups of people (stakeholders) value the area you studied. Include Traditional Owners, National Parks Rangers, Local Residents, Local Farmers, and any others you can think of.
- Construct a **flow chart** or **concept map** to explain the role of government, and other major stakeholders in sustainably managing the Hawkesbury Nepean River Catchment.
- Research floods of the Hawkesbury Nepean River and create a **poster** to educate local residents about flood mitigation.

## Assessment Task:

# Communicating Geographical Information

Work in small groups to develop a 5-6 minute documentary on the environmental and human processes that form and transform water availability for the Hawkesbury Nepean River, using Sackville North as a field study. Your documentary should include:

- A clear description of the various land uses, geomorphology and other landscape features around Brewongle;
- An evaluation on how these features above are influenced by people, and how people can reduce negative impacts;
- Tools to support your information, such as maps, satellite images, graphs, statistics, flowcharts, labelled photographs, diagrams, illustrations/sketches and other labelled visual representations;
- Information on the traditional use of the place by Darug people;
- Information on the types of land use by early European settlers;
- A description of the role of government in organising or managing the river sustainably as well as the perspectives of other stakeholders, for example developers, conservationists, recreationists and local residents;
- An evaluation of the potential impact of flood on the local area;
- A description and justification of a course of action to decrease the impact of changes to the natural environment around Brewongle EEC.