

# GEOGRAPHY BULLETIN

## Edition 52, No 2, 2020

### STAGE 4 SKILLS Stimulus

Topics  
Landscapes and landforms  
Water in the world

Created by L Chaffer for GTANSW & ACT Edition 52, No 2, 2020

Snapshot 1: Geomorphic processes  
Snapshot 2: Landscape diversity and change  
Snapshot 3: Meandering Rivers  
Snapshot 4: Earthquakes  
Canada 1: Major landforms, geomorphic processes  
& geomorphic hazards  
Canada 2: Unique landforms & geomorphic processes  
Canada 3: Landscape values & protection  
STAGE 4: WATER IN THE WORLD  
Snapshot: Water cycle processes & connections  
Canada 4: Water resources & hazards  
Canada 5: The Bow River  
STAGE 4: Virtual Fieldwork  
STAGE 4: Skills Stimulus  
STAGE 5: Teacher Guide  
STAGE 5: SUSTAINABLE BIOMES  
Snapshot: Biomes & their productivity  
Pollinators, bees & food  
Grassland Biomes  
STAGE 5: ENVIRONMENTAL CHANGE  
Tundra Investigative Study  
Sydney Harbour Estuary  
STAGE 5: Virtual Fieldwork  
STAGE 5: Skills Stimulus  
CAREERS  
Careers in Geography



# In this task you will ...

- ♦ Use inquiry skills to analyse and interpret geographical tools including photographs, infographics, diagrams and statistical tables.
- ♦ Apply your knowledge and understanding of Landscapes and Landforms AND Water in the World to answer inquiry questions.

## **You will need**

- ♦ A hard copy of Stage 4 Skills stimulus OR this PPT
- ♦ A copy of the Student Activity worksheets



# Learning Intention

You are aiming to demonstrate:

- ♦ The use of geographical inquiry skills to
  - process geographical information (interpret and analyse)
  - communicate geographical information
- ♦ A knowledge and understanding of geomorphic processes that shape the land
- ♦ A knowledge of concepts related to water such as water resources and water scarcity.



# Success criteria

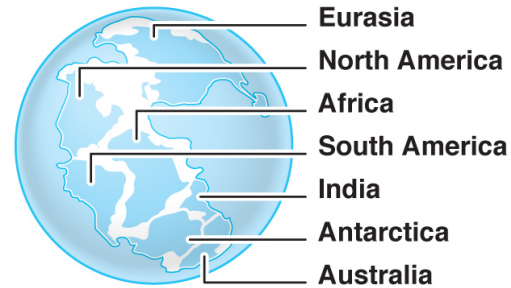
At the end of this activity you will have:

- ♦ Applied geographical inquiry skills to interpret stimulus material including diagrams, maps and photographs (interpreting, analysing, applying and communicating)
- ♦ Demonstrated a knowledge and understanding of geomorphic processes including plate tectonics, weathering, erosion and deposition.
- ♦ Demonstrated a knowledge and understanding of concepts related to the water such as water resources and water scarcity.

# How the world could look in 250m years

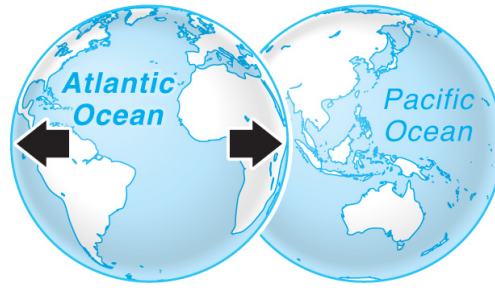
With Earth's tectonic plates constantly moving, renowned geologist *Christopher Scotese* predicts a new super-continent will emerge in around 250 million years, dubbed *Pangaea Proxima*

## PANGAEA – 200 million years ago



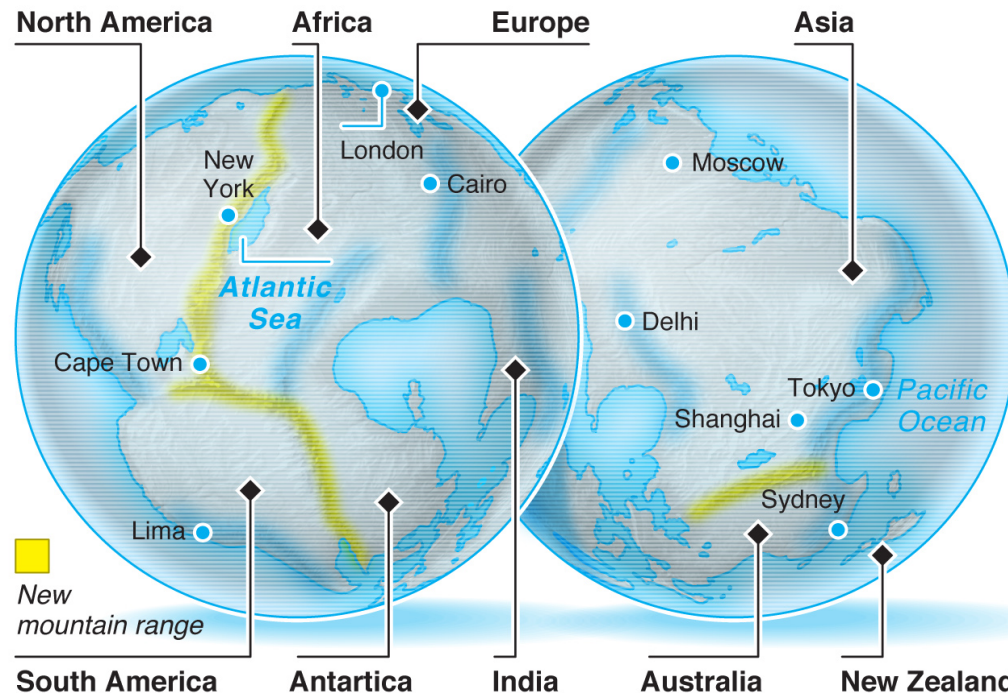
Early dinosaurs roamed last super-continent, formed from collision of older land masses

## PRESENT DAY



Atlantic widens by 2.5cm every year. Scotese predicts this will reverse and ocean will shrink dramatically

## PANGAEA PROXIMA – 250 million years from now



Sources: Christopher Scotese (Paleomap Project), The Economist, National Geographic © GRAPHIC NEWS

# GEOMORPHIC PROCESSES

## TECTONIC PLATES

Bulletin SOURCE A page 58  
Activity worksheet SOURCE A page 42

# Volatile boundaries of Earth's tectonic plates

Around 500,000 detectable earthquakes occur each year, of which 100,000 can be felt, around 100 cause damage, but only 18 are greater than 7.0 magnitude. The majority of tremors and volcanic eruptions take place along the boundaries between the shifting tectonic plates which form the earth's crust

## SIGNIFICANT 2010 QUAKES

<b>1</b> Jan 11, Haiti: Magnitude: 7.0, depth: 13km, fatalities: 222,500	<b>4</b> Feb 26, Ryukyu Islands, Japan Magnitude: 7.0, depth: 22km	<b>6</b> Mar 5, offshore Bio-Bio, Chile Magnitude: 6.6, depth: 35km
<b>2</b> Feb 4, offshore California Magnitude: 5.9, depth: 23.6km	<b>5</b> Feb 27, Maule, Chile: Magnitude: 8.8, depth: 35km, fatalities: 800 <i>Entire city of Concepcion moved at least 3 metres to west</i>	<b>7</b> Mar 5, Sumatra, Indonesia Magnitude: 6.5, depth: 22km
<b>3</b> Feb 18, China-Russia-N. Korea: Magnitude: 6.9, depth: 573.8km		<b>8</b> Mar 8, Turkey: Magnitude: 6.0, depth: 12km, fatalities: at least 51



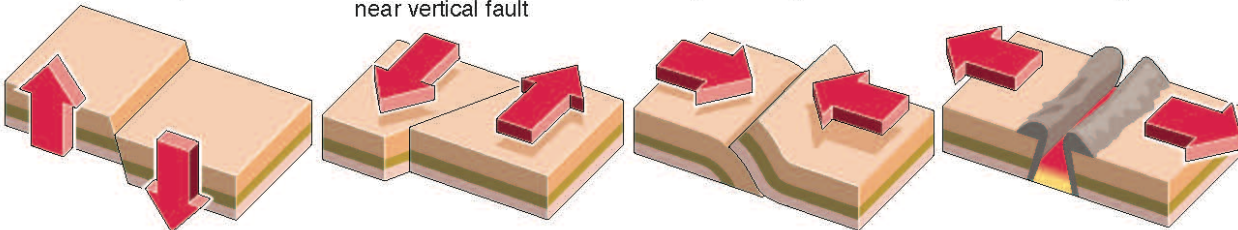
➤ Direction of movement of tectonic plates

■ **Normal/thrust faults:** Plates shift vertically – either dropping down or thrust upwards

■ **Strike-slip fault:** Plates shift horizontally either side of vertical or near vertical fault

■ **Convergence fault:** One plate pushed under another as they move together

■ **Divergence fault:** Plates pull apart, forming rift valleys or mid-oceanic ridges



Source: USGS

© GRAPHIC NEWS

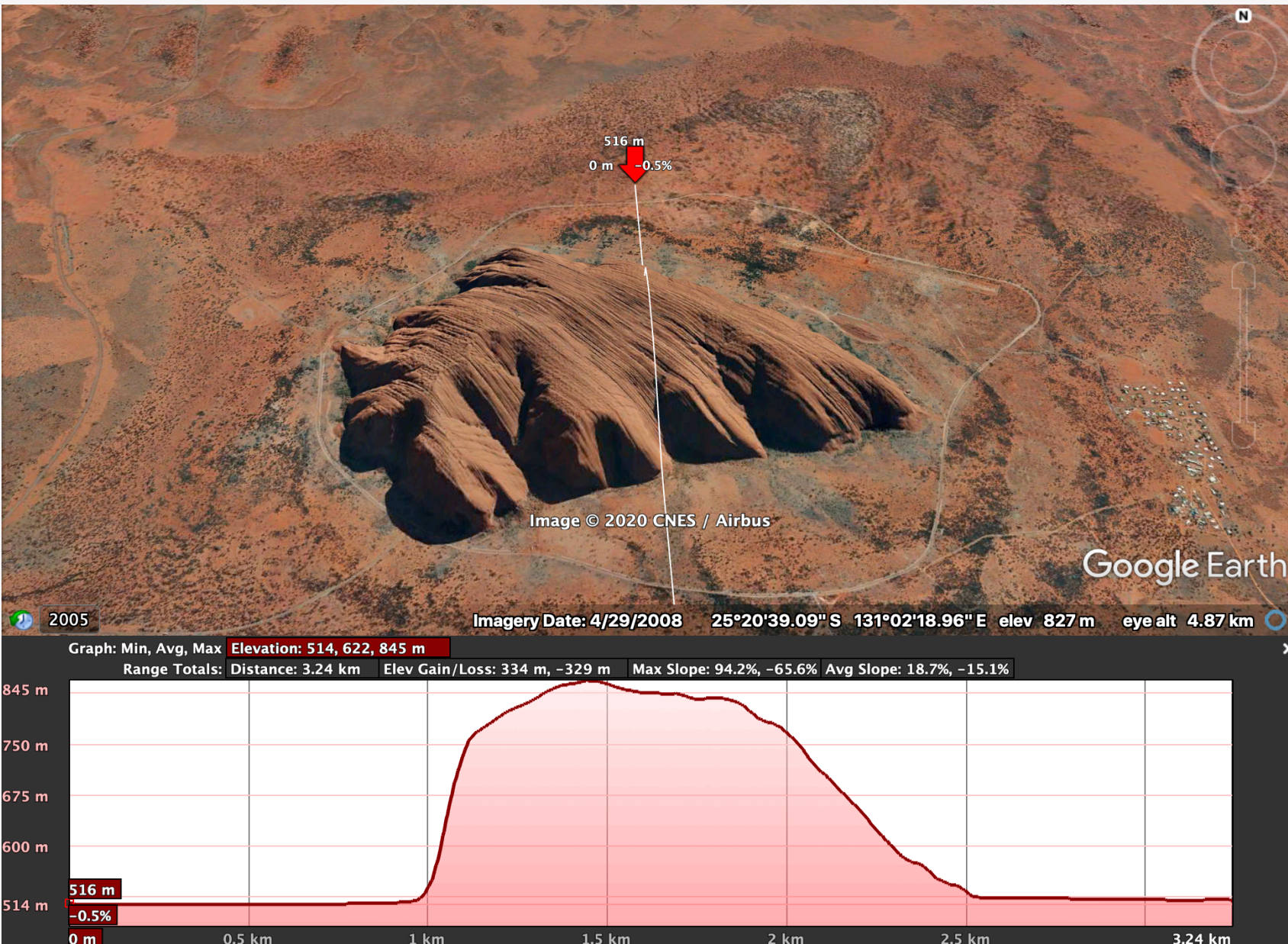
# GEOMORPHIC PROCESSES TECTONIC PLATES

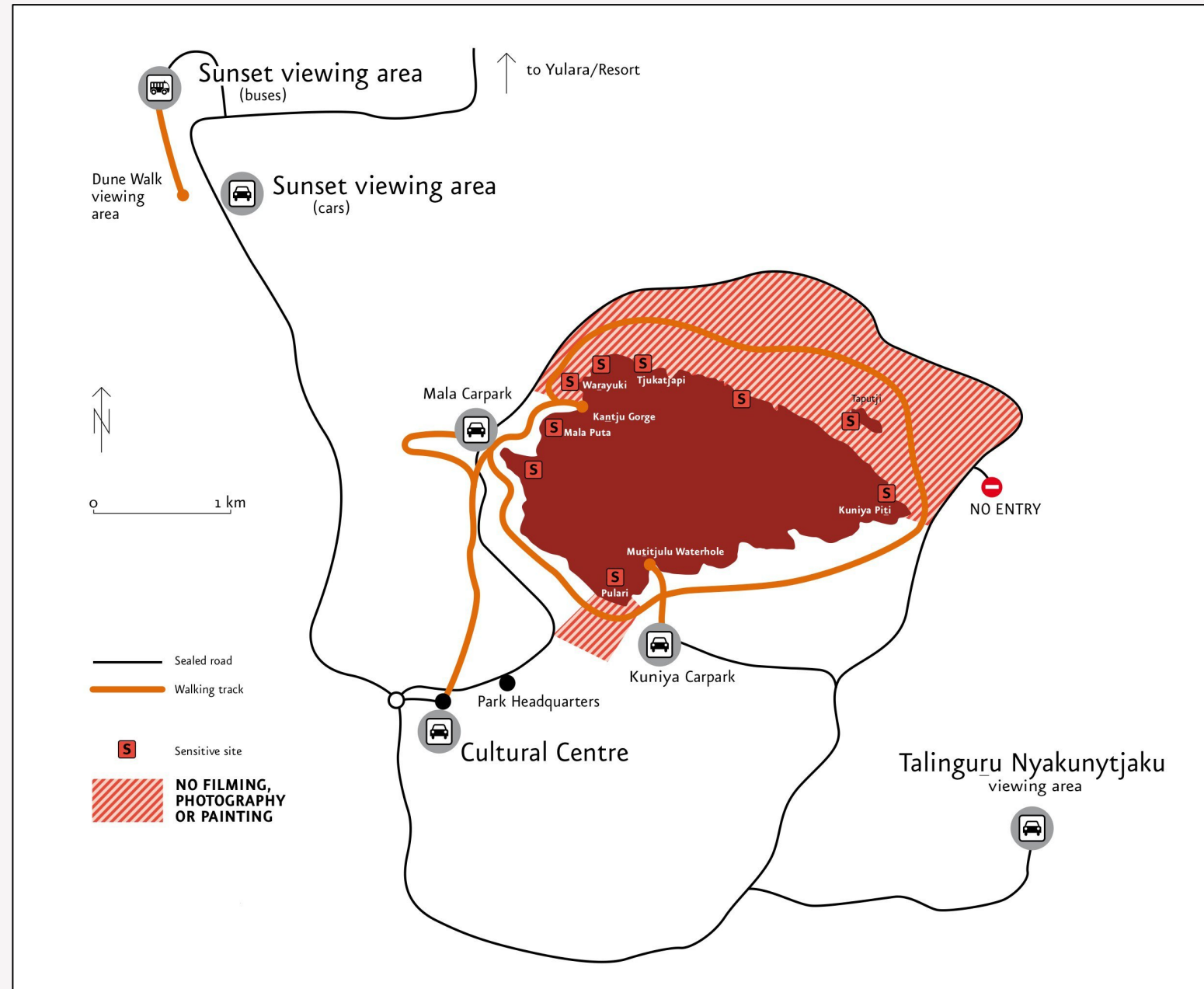
Bulletin SOURCE B page 58

Activity worksheet SOURCE B page 42

# ULURU : GEOMORPHIC PROCESSES

Bulletin SOURCE C, D & E page 58  
Activity worksheet page 43





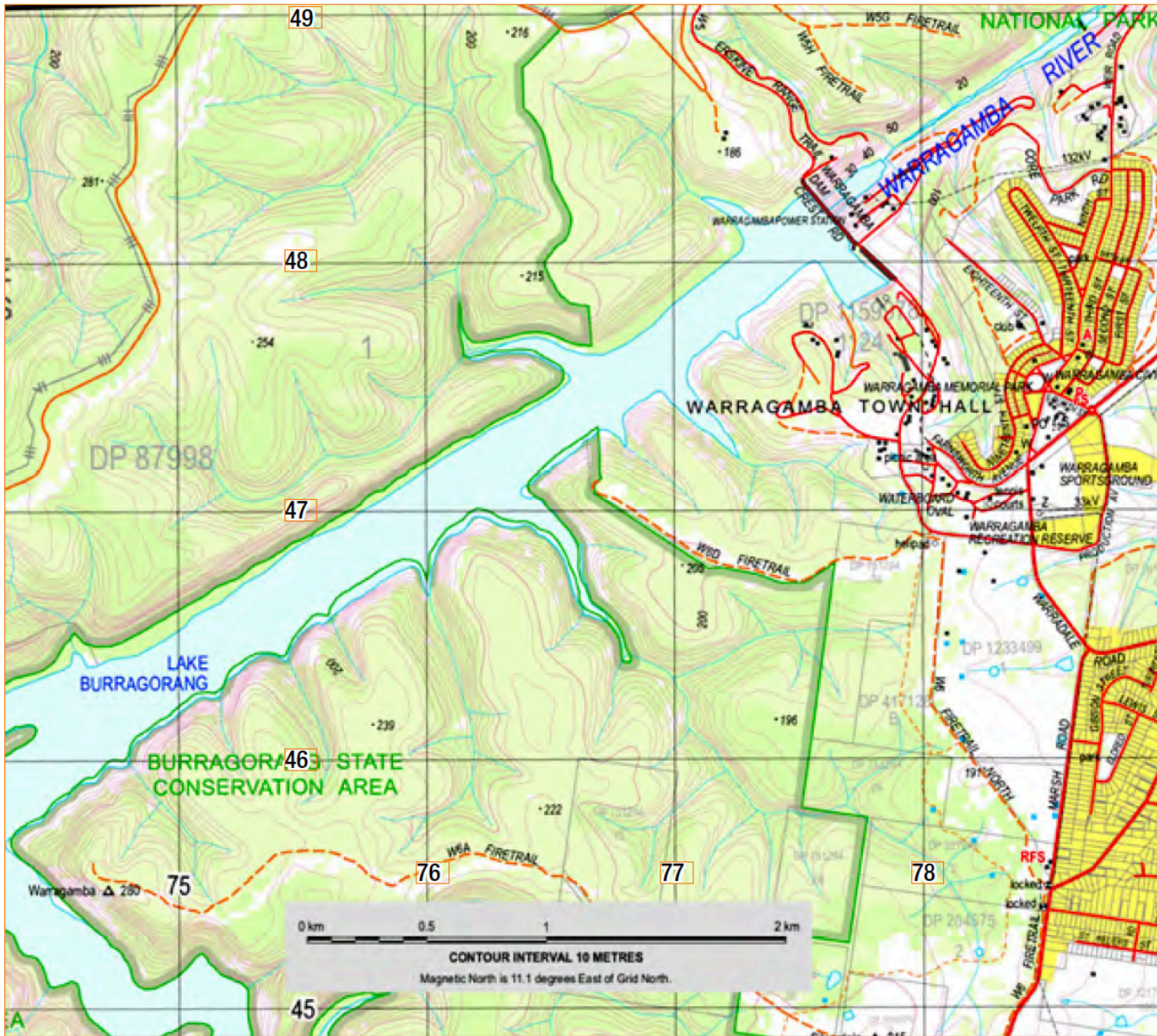
# ULURU : GEOMORPHIC PROCESSES

Bulletin SOURCE D page 58  
Activity worksheet page 43

A large, reddish-brown rock formation (Uluru) dominates the background. Several thin, white waterfalls are visible cascading down its face. The foreground is filled with green, scrubby vegetation. The sky is a pale, overcast blue.

# ULURU : GEOMORPHIC PROCESSES

Bulletin SOURCE E page 58  
Activity worksheet page 43

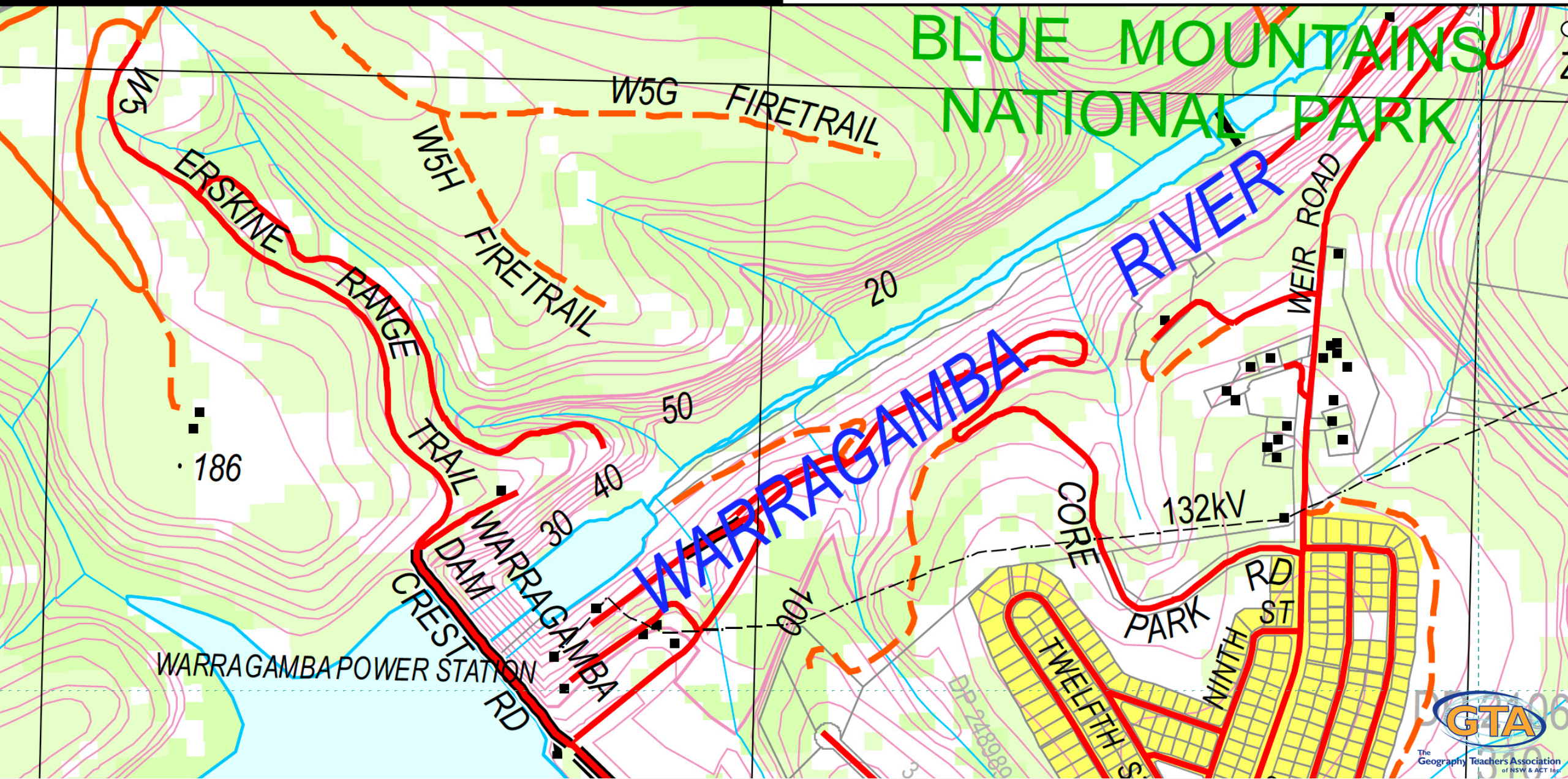


# Warragamba Dam

Bulletin SOURCE F page 59  
Activity worksheet page 44

Next slide  
Bulletin SOURCE G page 59  
Activity worksheet page 44

Source: Six Maps  
<https://maps.six.nsw.gov.au>





# Warragamba Dam

Bulletin page 60

Activity worksheet page 44

Images sourced from

[https://www.thefifthstate.com.au/articles/nsw-can-](https://www.thefifthstate.com.au/articles/nsw-can-have-water-or-fossil-fuels-but-not-both/)

[have-water-or-fossil-fuels-but-not-both/](https://www.thefifthstate.com.au/articles/nsw-can-have-water-or-fossil-fuels-but-not-both/)

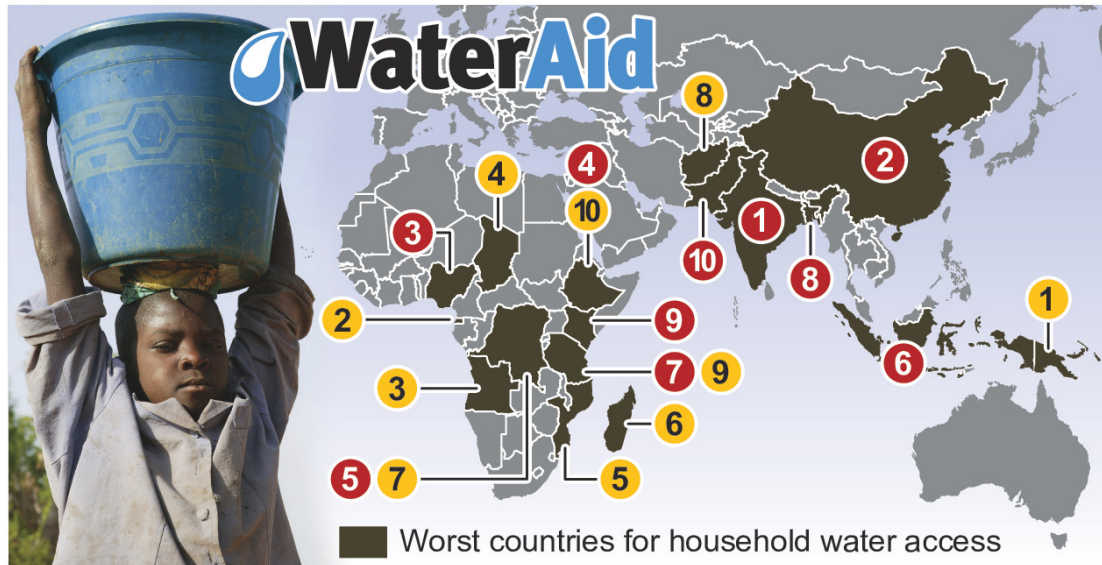
<https://sydneyuncovered.com/warragamba-dam-and-lakeburragoranglookout/>



The  
Geography Teachers Association  
of NSW & ACT Inc.

# One in 10 people without safe water

Over 650 million people, equal to almost one in 10 of the world's population, are living without access to safe drinking water, putting them at risk of ill-health or premature death, according to international charity WaterAid



■ Top 10 countries with greatest percentage of people living without access to safe water

Rank / country	Percentage
1 Papua New Guinea	60
2 Equatorial Guinea	52
3 Angola	51
4 Chad	49
5 Mozambique	49
6 Madagascar	48
7 Democratic Rep. of Congo	47
8 Afghanistan	45
9 Tanzania	44
10 Ethiopia	43

■ Top 10 countries with greatest numbers of people living without access to safe water

Rank / country	Numbers (millions)
1 India	75.8
2 China	63.2
3 Nigeria	57.8
4 Ethiopia	42.3
5 Democratic Rep. of Congo	33.9
6 Indonesia	32.3
7 Tanzania	23.2
8 Bangladesh	21.1
9 Kenya	17.2
10 Pakistan	16.1

Source: WaterAid

Picture: Newscom

© GRAPHIC NEWS

## WATER IN THE WORLD

### Access to water

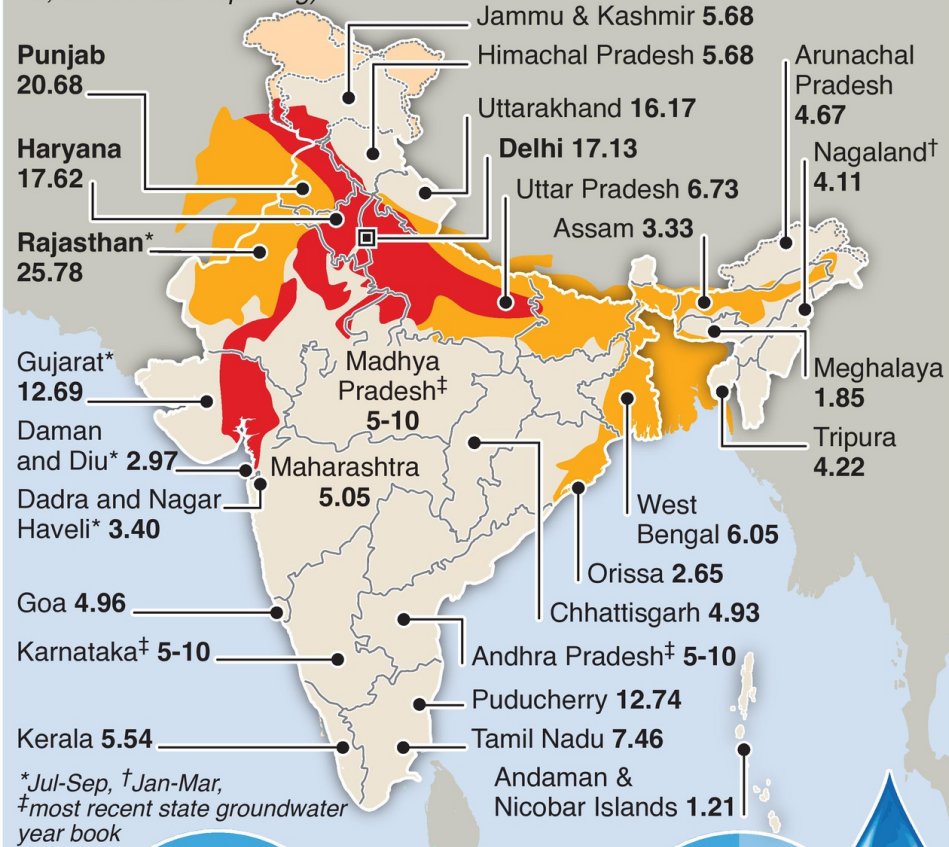
Bulletin SOURCE H page 61  
Activity worksheet page 46

## India's water scarcity challenge

India, the world's largest groundwater user, is seeing levels declining across the country with farmers in Punjab, Haryana and Rajasthan facing the prospect of having no groundwater left for irrigation by 2025

**Groundwater decline** ● Medium-high 2-8cm/year ● Extreme >8cm/year

**Depth of groundwater level** (metres below ground level, Oct-Dec 2018, 10,800 stations reporting)



**230 billion cubic metres**

Groundwater used for irrigation each year

**90%**

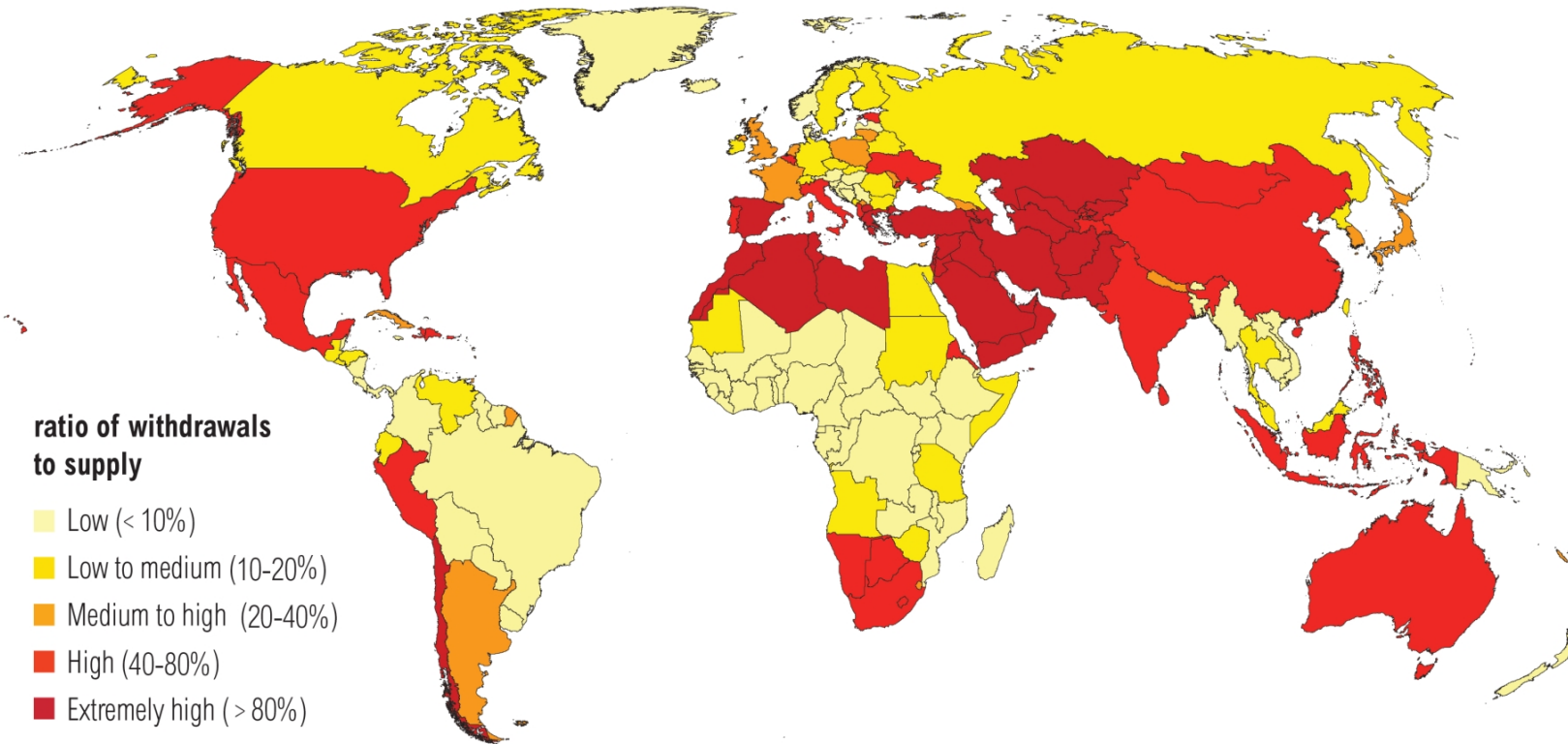
Rice-wheat areas irrigated using groundwater

# WATER IN THE WORLD

## Water scarcity

Bulletin SOURCE I page 61  
Activity worksheet page 46 -47

## Water Stress by Country: 2040



**NOTE:** Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

For more: [ow.ly/RiWop](https://ow.ly/RiWop)



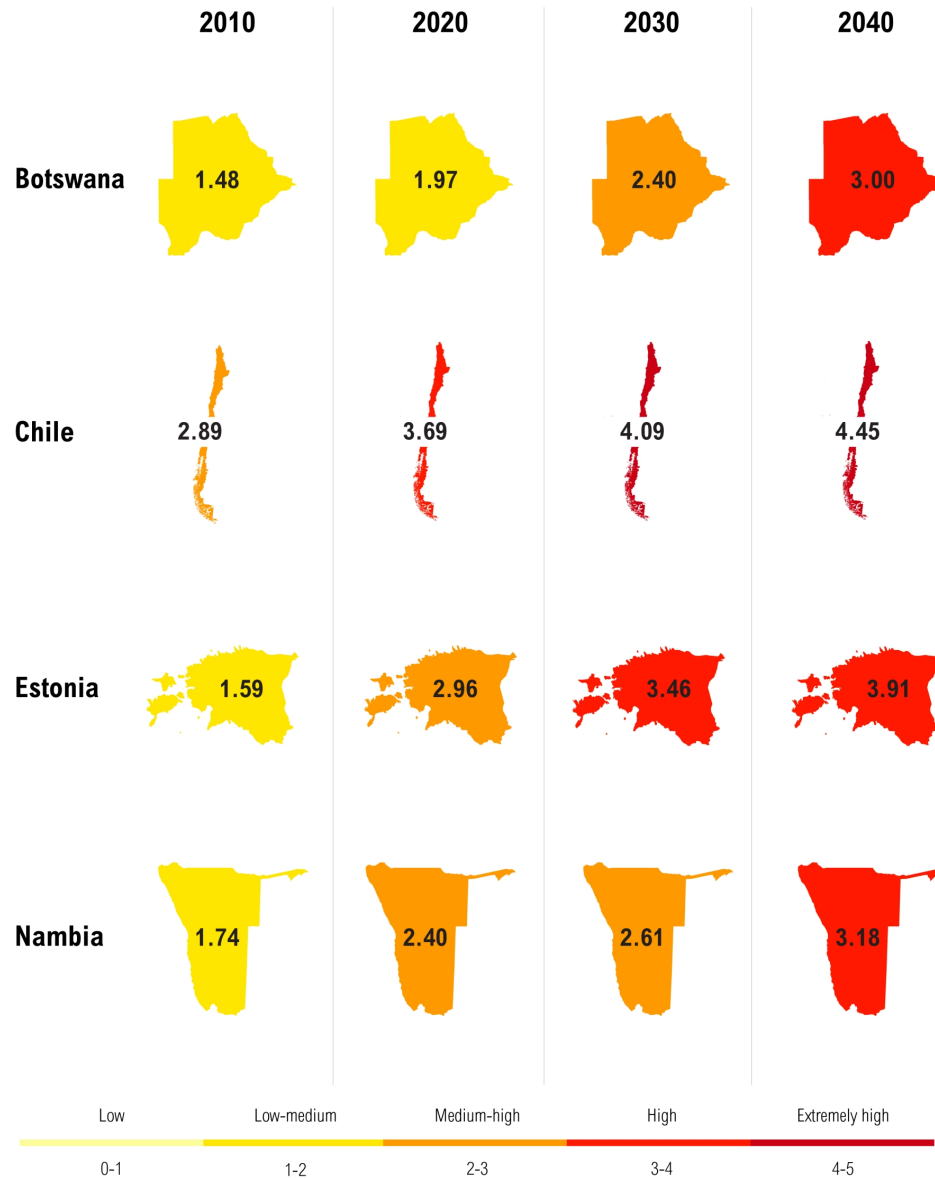
WORLD RESOURCES INSTITUTE

# WATER IN THE WORLD

## Water stress

Bulletin SOURCE J page 61  
Activity worksheet page 47

## Water Stress from 2010 to 2040



**NOTE:** Baseline water stress measures competition for surface water, calculated as the ratio of local water withdrawals over renewable supply. Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

Read more: [ow.ly/RiWop](http://ow.ly/RiWop)

# WATER IN THE WORLD

## Water stress

Bulletin SOURCE H page 61  
Activity worksheet page 47

World Resources Institute blog

<https://www.wri.org/blog/2015/08/ranking-world-s-most-water-stressedcountries-2040>