GEOGRAPHY BULLETIN

STAGE 6 GEOGRAPHY

PLAN EARLY, PLAN WELL PLAN TOGETHER

The Geography Teachers Association of NSW & ACT Inc.

Volume 55 No2 2023

IN THIS ISSUE:

PROJECTS • REPORTS • RESOURCES • ARTICLES • REVIEWS

EXECUTIVE 2023

GEOGRAPHY BULLETIN

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The Geography Bulletin is a quarterly journal of The Geography Teachers' Association of NSW & ACT Inc. The 'Bulletin' embraces those natural and human phenomena which fashion the character of the Earth's surface. In addition to this it sees Geography as incorporating 'issues' which confront the discipline and its students. The Geography Bulletin is designed to serve teachers and students of Geography. The journal has a specific role in providing material to help meet the requirements of the Geography syllabuses. As an evolving journal the Geography Bulletin attempts to satisfy the requirements of a broad readership and in so doing improve its service to teachers. Those individuals wishing to contribute to the publication are directed to the 'Advice to contributors' at the back of this issue.

GEOGRAPHY BULLETIN

Volume 55, No 2, 2023
EDITOR: Lorraine Chaffer

EDITORIAL

Lorraine Chaffer

EDITORIAL

Edition 2 of the Geography Bulletin for 2023 was prepared to support the Stage 6 Geography Conference – Plan Early, Plan Well, Plan Together – for the implementation of the new NESA Geography 11–12 Syllabus released in 2022.

The contents of Bulletin 2 are separated into two main sections:

1. A Conference Journal
   - A commentary on key features of the new syllabus.
   - A brief analysis for each Content Focus Area based on the NESA syllabus document and support materials.
   - Notes on each presentation.
   - Focus questions with space to record ideas and resources.
2. Republished Articles

   Media reports relevant to some of the content areas. These reports exemplify the range of contemporary material available to support the teaching of the new syllabus.

During the conference GTA Councillors took notes from each presentation. A summary of these notes is provided in this digital edition.

APPRECIATION

As the conference convenor I want to thank the following organisations and people for their expertise and support.

MOBILE MUSTER for their generous sponsorship.

GUEST SPEAKERS

Thursday: Richard Kingsford – UNSW; Simon Kuestenmacher – The Demographics Group; Catherine Kerr – Office of Energy & Climate Change, NSW Treasury; Karen O'Connor & Rania Poullos – Minderoo Foundation.

Friday: Alex Webb – Marine Stewardship Council Australia; Karen Davids – Circular Economy Consultant, MRA Consulting Group; Alison Jose – Sustainable Textile Supply Chain / Circular Centre Pty Ltd; Andrew Toovey – UNSW; Larissa Shashkof – Lend Lease; Professor Brett Sommerell – Royal Botanic Gardens, Sydney.

THE CONFERENCE SUPPORT TEAM

Fieldwork providers, spatial technology experts and GTA Councillors (past and present). Contour Education; EEC's – Observatory Hill, Rumbalara, Field of Mars & Gibberagong; Sydney Olympic Park; Fieldwork Connections; AUSECO; Small World Journeys and NSW National Parks and Wildlife.

After eight years this will be my final edition as editor of the Geography Bulletin. Thank you to those who supported me on this journey, particularly those who provided articles and teaching resources for publication. It has been a wonderful journey but a very time consuming one and it is time for me to follow some new challenges. I will still contribute articles but it is time to turn the leadership to a new cohort of GTA NSW & ACT council members. A big thank you also to Jill Sillar at PTC NSW for her support, patience and wonderful desktop publishing.

Lorraine Chaffer

GTA NSW & ACT PRESIDENT'S REPORT

Dear Colleagues

I hope you enjoy reading through the various articles and teaching resources in Edition 2 which has a focus on the new Stage 6 Geography Syllabus.

Our program for 2023 is well underway.

Our Stage 6 Geography Conference was a success and provided an introduction to the new HSC Geography Syllabus. Approximately 230 teachers attended on the Friday and 200 on the Saturday. Each day consisted of three sessions. Each session included - an analysis of each content focus area, expert speakers, group round table discussions to share and record ideas and resources. The upcoming Stage 6 Regional Visit Program for implementation of the Stage 6 Syllabus will support regional teachers as they prepare to implement the new Syllabus. Later this year, the GTA funded Stage 6 Case Studies Text books – *Powerful Geography 1 & 2* will be released. This resource will be a welcome addition for teachers.

We continue to provide ongoing support for the current HSC course. The "Unpacking the 2022 HSC Exam" event was held in Term 1. This professional learning event included a 3 -hour NESA accredited online learning course AND two live events. Participants received details on the examination writing process, exemplar responses to all questions (essay included), lesson activities and teaching strategies, and a breakdown of the marking processes and state assessment data. Presentations were given by Senior HSC markers, GTA Councillors and NESA officials.

I would like to encourage teachers of the current HSC course to access the 2020–2022 downloadable HSC video lectures by topic. Details on how to purchase the HSC exam resource package can be found **HERE**.

GTA NSW & ACT continues to maintain a presence on social media through Facebook.

- Geography Teacher's Association of NSW & ACT
- Teachers of NSW HSC Senior Geography Group
- Primary Geography Teachers Group

The Young Geographer Award (YGA) – 2023 is the third year of the recently revamped Geography competition. The YGA aims to recognise recognise students who have excelled in geographical inquiryand also the exemplary teaching of Geography. Registration opens towards the end of Term 2.

I would like to take this opportunity to thank Lorraine Chaffer for her many years of service as Editor of the Bulletin. This will be Lorraine's final edition as Editor. Lorraine will continue to write articles for the Bulletin.

Katerina Stojanovski
President

YOUNG GEOGRAPHERS AWARD 2022 RESULTS

NESA SENIOR GEOGRAPHY PROJECT / IB INTERNAL ASSESSMENT AWARD / ACT EQUIVALENT PROJECT

First place – Eloise Baird, Year 11 Roseville College
A Study of the Process of Exurbanisation and its Impact on Small Urban Centres in NSW

Second place – Nick Jackson, Year 11 Redlands School
How will Woolworths in Mosman impact local businesses?

Third place – Brianna Loiacono, Year 11 Tara Anglican School
Effects of the March 2022 flood on the Hawkesbury River.

GEOGRAPHICAL RESEARCH AWARD

First place – Cameron Jefferies, Year 10 Hunter School of Performing Arts
The effect of the Varroa Mite and the DPI's Action Plan against it

Second place – Elise Robertson & Olivia Pisani, Year 5 St Ambrose Catholic Primary School
Flooding in NSW

Third place – Olivia Sewel, Year 7 Oxley College
*Liveability – Housing affordability in Bowra*l

GEOGRAPHY IN STEM AWARD

First place – Youran Wu, Peter Xiong and Heliang Li, Year 6, Knox Grammar Preparatory School
Hurricanes – A STEM Case study

Second place – Sara Bruce, Season Lam & Carrie Luo, Year 10 Pymble Ladies' College
Vertigrow

Third place – Hannah Kerr, Tekla Irwin & Mahli Barnes, Year 8 St Clare's College Waverley
Examining the need for affordable and accessible diabetes care in order to contribute to the UN SDG's.

Placegetters in all categories received the following prizes: First place: $500, Second place: $250 and Third place: $100

The 2023 GTA NSW & ACT Young Geographer Awards

The Young Geographer Awards invites students in NSW and the ACT to demonstrate engagement with Geography, the discipline and with the tools and skills of Geography through the creation and conduct of an inquiry-based research project. Although it is not essential, teachers are encouraged to incorporate the research and construction of the project into their teaching programs to help support students.

Unslash image by Bill Oxford @bill_oxford

Prizes for the winning entries in the Young Geographer Award, in any category are:

1st Prize $500 **2nd Prize $250** **3rd Prize $100**

Registration opens – June 2023
& closes – Friday 27 October 2023

STAGE 6 GEOGRAPHY RESOURCE

GTA NSW & ACT is publishing two books to support Stage 6 Geography. The books will be sold on a cost recovery basis. The author team are passionate about producing a quality resource to give teachers and students more options for teaching the new syllabus.

Authors: Matt Carroll, Karen Bowden, Lorraine Chaffer, Louise Swanson, Khya Brooks

POWERFUL GEOGRAPHY 1

Chapter summary*

*** Chapters 1, 4 & 8 contain GEOstories from across the world linked to Content Focus Areas**

SECTION 1: EARTH'S NATURAL SYSTEMS

Illustrating the connectedness of Earth's natural systems through the lens of one system

Chapter 2: THE CRYOSPHERE: Processes, cycles, circulations and connections. Place study – Patagonia

Chapter 3: FOREST SYSTEMS: Processes, cycles, circulations and connections. Place studies – Canada's boreal forests and Congo rainforest

SECTION 2: PEOPLE, PATTERNS and PROCESSES

Illustrating population dynamics and resource issues through place-based studies

Chapter 5: POPULATION: Japan & Uganda and Resources: Oil in Nigeria & global sand crisis

Illustrating how people transform places using human ingenuity, resilience and technology

Chapter 6: Human resilience in diverse environments VENICE: Ingenuity, Resilience and Sustainability

Chapter 7: Technological advances and the transformation of places GLOBAL SATELLITE NETWORKS: Environmental monitoring

SECTION 3: HUMAN - ENVIRONMENT INTERACTIONS

Option studies for Geographic Regions, Natural Hazards, Climate Change

Chapter 9: LAKE EYRE BASIN: A UNIQUE and VULNERABLE REGION

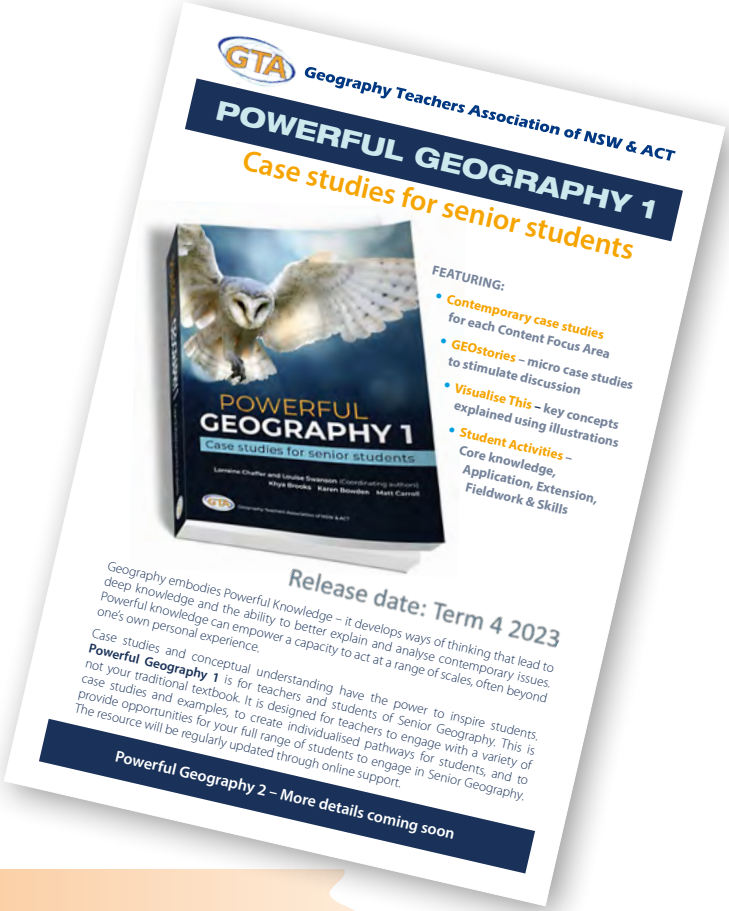
Chapter 10: THE ARCTIC: REGION ON A THRESHOLD

Chapter 11: MANAGING BUSHFIRES IN NATIONAL PARKS

Chapter 12: 2022 NORTH COAST FLOODS – FOCUS on LISMORE

Chapter 13: PACIFIC ISLAND ATOLL NATIONS: Climate change challenge

SECTION 4: Chapter 14: THE GEOGRAPHICAL INVESTIGATION



STAGE 6 GEOGRAPHY CONFERENCE

PLAN EARLY, PLAN WELL, PLAN TOGETHER

Conference Program

FRIDAY 5 MAY – GEOGRAPHY 11–12 / YEAR 11 Focus	
8.00 – 8.30	**REGISTRATION**
8.30 – 9.20	Welcome and Acknowledgement of Country – **GTA NSW & ACT President** Syllabus introduction and Year 11–12 Course overview **YEAR 11 FOCUS AREA: EARTH'S NATURAL SYSTEMS** Introductory analysis – GTA NSW & ACT
9.20 – 9.50	**EARTH'S NATURAL SYSTEMS – *Kati Thanda Lake Eyre Basin*** **Guest speaker: Richard Kingsford,** Professor of Environmental Science, Director of Centre for Ecosystem Science School of Biological, Earth & Environmental Sciences UNSW Sydney
9.50 – 10.30	Workshop & Plenary /reflect / discuss/ share/ plan Unit of Work
10.30 – 11.00	MORNING TEA
11.00 – 11.15	**FOCUS AREA: PEOPLE, PATTERNS, AND PROCESSES** Introductory analysis – GTA NSW & ACT
11.15 – 11.45	**PEOPLE, PATTERNS, AND PROCESSES – *Global population trends and insights*** **Guest speaker: Simon Kuestenmacher**, Director & Co-founder of The Demographics Group, Geographer
11.45 – 1.00	Workshop & Plenary/ reflect / discuss/ share/ plan – Unit of Work
1.00 – 2.00	LUNCH
2.00 – 2.15	**FOCUS AREA: HUMAN – ENVIRONMENT INTERACTIONS** Introductory analysis – GTA NSW & ACT
2.15 – 2.45	**HUMAN – ENVIRONMENT INTERACTIONS – *Climate Change Adaptation*** **Guest speaker**: **Catherine Kerr**, Office of Energy and Climate Change, NSW Treasury Climate Change Adaptation / Geographer)
2.45 – 3.15	**HUMAN – ENVIRONMENT INTERACTIONS – *Fire and Flood Resilience Missions*** **Guest speakers**: **Karen O'Connor,** Fire Shield Mission Lead, Minderoo Foundation **Rania Poullos**, Fire Shield Project Manager, Minderoo Foundation
3.15 – 4.00	Workshop & Plenary / reflect / discuss/ share/ plan – Unit of Work Concluding comments on Year 11 Course Q & A
SATURDAY 6 MAY – GEOGRAPHY 11–12 / YEAR 12 Focus	
8.30 – 9.00	**REGISTRATION**
9.00 – 9.15	Welcome and Acknowledgement of Country **GTA NSW & ACT President** Key points from Day 1 on 11–12 Syllabus, Assessment, HSC Exam **YEAR 12 FOCUS AREA: GLOBAL SUSTAINABILITY** Introductory analysis – GTA NSW & ACT
9.15 –10.45	**SUSTAINABILITY** **Guest speakers:** **Karen Davids**, Circular Economy Consultant MRA, Geographer. ***Circular Economy explained*** **Alison Jose**, Circular Centre, STSC Sustainable Textile Supply Chain and Adetex Circular Solutions. ***Circularity in the textiles/fashion industry*** **Alex Webb**, Marine Stewardship Council. ***Industry Certification***
10.45 –11.15	MORNING TEA

STAGE 6 GEOGRAPHY CONFERENCE

PLAN EARLY, PLAN WELL, PLAN TOGETHER

Conference Program

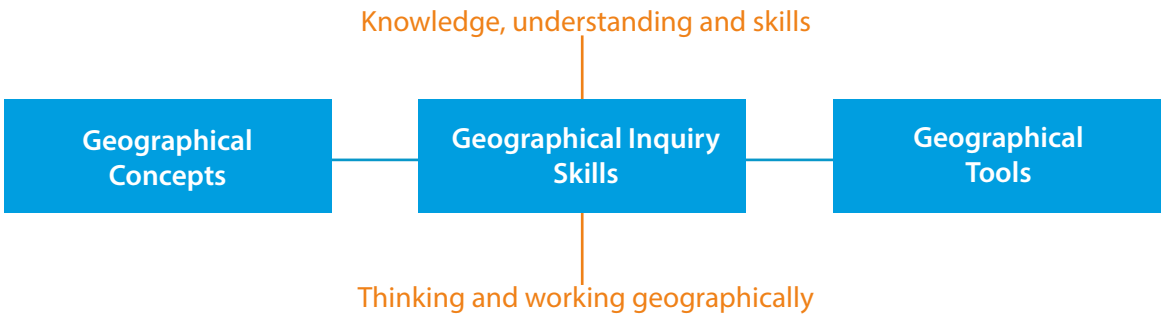
SATURDAY 6 MAY – GEOGRAPHY 11–12 / YEAR 12 Focus continued	
11.15–11.45	**Global Sustainability:** Workshop & plenary / reflect / discuss/ share
11.45 –12.00	**FOCUS AREA: RURAL AND URBAN PLACES** Introductory analysis: GTA NSW & ACT
12.00 – 1.00	**URBAN PLACES** **Guest speaker**: **Andrew Toovey**, Lecturer, UNSW School of Education. ***A place within a larger urban settlement*** **Guest speaker**: **Larissa Shashkof,** LendLease Project Stakeholder and Communications Manager, Communities. ***Fig Tree Hill***
1.00 – 1.30	Workshop & Plenary/ reflect / discuss/ share/ plan – Unit of Work
1.30 – 2.15	**LUNCH**
2.15 – 2.30	**FOCUS AREA: ECOSYSTEMS AND GLOBAL BIODIVERSITY** Introductory analysis: GTA NSW & ACT
2.30 – 3.00	**BIODIVERSITY CONSERVATION** **Guest speaker: Professor Brett Summerell,** Chief Scientist, Royal Botanic Gardens Sydney / Biodiversity conservation
3.00 – 4.00	Workshop & Plenary/ reflect / discuss/ share/ plan a Unit of Work Conclusion – assessment, and the HSC Exam Sharing of group Draft Units of Work / ideas / resources Q & A / comments / concerns / support Other PL opportunities
4.00	**CLOSE**

Over 200 teachers attended the Stage 6 Conference at the Aerial Function Centre, at UTS in Sydney. Most teachers attended both days and were supported by a team of 14 fieldwork and spatial technology providers and 12 GTA Councillors over the two days.

A program of Stage 6 Conversations based on the conference resources and expertise will be provided as after-school workshops to support regional teachers. Locations and dates to be confirmed.

INTRODUCTORY ANALYSIS

FOCUS AREAS	INDICATIVE HOURS
YEAR 11 – 2024 implementation	**120 hours**
Earth's natural systems	40
People, patterns and processes	40
Human–environment interactions	20
Geographical Investigation	20 (Note: Extended hours)
Fieldwork	*12 hours to be delivered across 3 topics – not the Geographical Investigation*
YEAR 12 2025 implementation	**120 hours**
Focus areas	Indicative hours
Global sustainability	30
Rural and urban places	45
Ecosystems and global biodiversity	45
Fieldwork	*12 hours to be delivered across 3 topics*



Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

EDITORIAL COMMENT

- It is recommended that teachers plan across Years 11 and 12 to incorporate the development of conceptual knowledge, skills and links between topic areas.
- In the digital syllabus document –

  BLUE BOXES indicate content to be included (YOU MUST DO)

  GREY BOXES are EXAMPLES ONLY. They are there to guide your choice of content but are not restricted to these examples

CONSIDERATIONS

SCOPE AND SEQUENCE

No predetermined order to Focus Area delivery HOWEVER …….
Things to consider

- Is there a 'best fit'?
- Fieldwork timing
- School restrictions
- Examination periods within the school structure

FIELDWORK

- 12 hours Year 11
- 12 hours Year 12
- Plus, the Geographical Investigation – accessible location (local or convenient) / Individual or group
- Fieldwork instruments to be integrated as appropriate.
- Compulsory HSC Fieldwork Assessment Task Activity (Weighting 20 – 30%)

Identifying fieldwork opportunities and choosing studies

1. Focus areas based on natural systems

- Earth's Natural Systems eg, a forest, sand dunes
- Changes to Earth's natural systems eg, ecological succession, deforestation
- Ecosystems and global biodiversity – two types / one in Australia / comparative management studies

2. Focus areas based on human features / change

- Population and natural resources
- Options studies – identifying unique local places transformed by human processes
- Sustainability / Global Economic activity – what can you do at a local scale?
- Rural and urban places – selecting places to allow fieldwork

OUTCOMES

- Progression from 11–12
- Focus of all learning activities

STUDIES

PLACE based studies throughout.

OPTION STUDIES – flexibility to suit cohort, resources, and geographic location.

HSC EXAMINATION SPECIFICATIONS*

Section I (15 mks) Objective response Qs
May require students to refer to the stimulus booklet and apply skills and tools.

Section II (45 mks) 4–6 short-answer Qs – 10–14 items in total.
At least one item, (5–8 marks) – integration of knowledge from more than one focus area.

Q's may require reference to the stimulus booklet and to apply skills and tools.

Section III (20 mks)
ONE structured extended-response question (RUP OR EGB). 2 or 3 parts.

May require reference to the stimulus booklet and to apply skills and tools.

Section IV (20 mks)
ONE unstructured extended-response question (RUP OR EGB).

Qs may require reference to the stimulus booklet.

* SEE THE SAMPLE EXAMINATION PAPER ON THE NESA WEBSITE – https://curriculum.nsw.edu.au/syllabuses/geography-11-12-2022?tab=teaching-and-learning

SELECTED GLOSSARY TERMS *

- **New concepts – a selection of these is shown below**
- **Option topics – some Year 12 concepts may be relevant in Year 11. See examples in RED**
  For example: A region study may provide an opportunity to introduce the concept of a hierarchy of urban places. A study of climate change would be relevant to introducing the concept of tipping points
- **Opportunities to build understanding over 2 years**

Benefit sharing – Formal and mutually agreed terms for the ongoing, equitable distribution of benefits, arising from the application or commercial utilisation of knowledge, practices and/or resources. Benefit sharing agreements with Indigenous Peoples may relate to Indigenous cultural and intellectual property (ICIP), such as knowledges and practices associated with sustainable management of land and resources.

Biocapacity – The capacity of nature/ecosystems to produce and renew the resources that people use and to absorb and filter the waste generated by human activities, within a limited period of time.

Ecological hazard – A biological hazard that has the potential to impact adversely on the wellbeing of people or the environment more generally. Examples of ecological hazards include malaria, plagues, invasive species.

Ecological disturbance – Temporary changes or events in an ecosystem that cause disturbance to its functioning, e.g., increased mortality of organisms, changes in spatial patterning. Ecosystems are typically resilient to ecological disturbance.

Ecological integrity – The ability of an ecosystem to support and naturally maintain ecological processes, species, a diverse community of organisms, and other important characteristics, with minimal or no intervention through human management.

Feedback loops – Feedback loops are reactions in response to environmental change. Positive feedback loops cause one or more components to increase overall, creating a negative impact on the ecosystem. A negative feedback loop has a positive impact on the ecosystem because it decreases the impact of change, bringing it closer to dynamic equilibrium.

Geographic region – A region exhibits shared natural or human characteristics, e.g., political, economic, social, cultural, climate, land/water cover, vegetation, that distinguishes the region from neighbouring regions. Regions can be divisions of a nation, or larger than a nation.

Land cover – The natural and artificial features and structures that cover the land's surface eg, trees, grass, crops, wetlands, water, ice, buildings, and pavement.

Overview effect – A shift in awareness reported by some astronauts who have viewed the Earth from space, including the wonder of the Earth, the thinness of its atmosphere, and the absence of national boundaries

Risk management – In the context of Geography 11–12 and Geography 11–12 Life Skills, risk management is defined in terms of preparedness, mitigation and/or prevention of a natural or ecological hazard.

Preparedness involves planning the interventions needed to prevent or mitigate the effects of a hazard.

Mitigation involves the implementation of strategies to eliminate or minimise the effects of these hazards.

Adaptation involves adjusting to the changed environmental circumstances.

Tipping points – A critical point (often called a threshold) where a series of smaller changes become significant enough, collectively, to trigger a larger-scale change. The change is often abrupt and irreversible, permanently altering the state of the original system, leading to flow-on effects that have more widespread consequences for other natural systems, and for people.

Shifting baselines – A theory that describes the way changes to an ecosystem are measured against previous reference points or baselines, which themselves may represent changes from an even earlier state of the ecosystem. Shifting baselines describes the situation where knowledge is lost about the original state of the natural world.

Urban hierarchy – The ranking of urban places in descending order, e.g., cities, determined by population size.

* SEE THE FULL GLOSSARY ON THE NESA WEBSITE – https://curriculum.nsw.edu.au/syllabuses/geography-11-12-2022?tab=glossary

EARTH'S NATURAL SYSTEMS

Overview of the uniqueness and diversity of the Earth

- Nature as a source of wonder
- People's connection to the natural world and why it can vary
- The universal value of Earth's environments

Processes, cycles, and circulations connecting natural systems

- Characteristics of Earth's natural systems and factors affecting their functioning including latitude, altitude, continentality, oceanity, seasonality.
- The processes, cycles and circulations connecting natural systems including – atmospheric systems, hydrological systems, geomorphic systems, ecological systems

Natural systems and land cover change

- The nature and extent of Earth's land cover, including water
- Natural processes, cycles and circulations that change Earth's land and water cover – including climatic and glacial cycles, the invasion and ecological succession of vegetation communities
- The natural processes, cycles and circulations that have shaped the land and/or water cover of **ONE place**

40 HOURS

OVERVIEW
Maximum 4 hours
Wonder of nature / values

MAIN CONTENT
New focus: Processes, cycles, and circulations
Interconnections

Natural change over time
Natural causes of climate change

Land cover change

Place based example

EDITORIAL COMMENT

Opportunities:

- Fieldwork – a focus on Earth systems and interconnections e.g., local forest, wetland, beach.
- Spatial technologies – give perspective from local to regional scales e.g., Null Earth
- You could teach the topic through the lens of one natural system to illustrate interconnectedness of systems through processes, cycles, and circulations e.g., forest systems

Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

GUEST SPEAKER

RICHARD KINGSFORD, Professor of Environmental Science, Director of Centre for Ecosystem Science School of Biological, Earth and Environmental Sciences UNSW Sydney.

TOPIC: Earth's Natural Systems – Lake Eyre Basin

A SUMMARY OF KEY POINTS

Professor Kingsford spoke about the unique natural systems in the Lake Eyre Basin.

He also extended his presentation to look at Human-Environment Interactions, particularly the issue of unconventional gas exploitation (including fracking).

Lake Eyre Basin: Natural systems:

- A unique arid system covering approximately one-sixth of Australia.
- Large shallow inland basin – below sea level in places, Great Artesian Basin beneath.
- Very dry – low rainfall but sometimes experiences large rain events caused largely by cyclones (north) or cold fronts (south). (Atmospheric – hydrological systems).
- Boom and bust cycles – cause changes in habitat and productivity (ecological systems).
- Wetland biodiversity – extensive floodplains upstream from Lake Eyre. Some permanent waterholes with high levels of biodiversity (aquatic and bird) e.g. pelican colonies of 30,000 – 40,000.
- Water drives ecological productivity and processes boom and bust cycles.
- Dry spells create challenges to organisms – long periods of little or no water, up to two years in Cooper Creek). Turtles size (carapace length) influenced by water availability. Permanent waterholes = bigger turtles. Threat of climate change if waterholes dry up.

Human-Environment Interactions

Extensive pastoral and tourism industries.

Major threats:

- Oil and unconventional gas (coal seam gas) – infrastructure and spills.
- Invasive species e.g., cactus, sleepy cod (native invasive species), invasive yabby.
- Floodplain developments e.g., roads, levee banks interrupt water flows.
- Dams and irrigation systems reduce water flows essential for ecological productivit.y
- Climate change.

There has been oil and gas development on floodplain – *The Conversation* https://theconversation.com/the-magnificent-lake-eyre-basin-is-threatened-by-831-oil-and-gas-wells-and-more-are-planned-is-that-what-australians-really-want-191078

Teacher idea: Use Google Earth satellite imagery to compare differences in the LEB over time.

Ramsar site – mines in the middle of a globally important ecosystem.

Impacts of developments include fragmentation of flow, alteration of flow, pollution on site and fugitive emissions- greenhouse gases, water use.

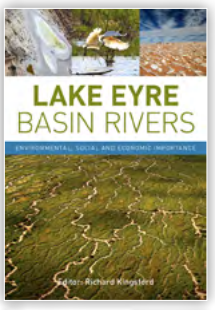
Action by states has been ineffective in enforcing protection of a unique natural system.

In summary

- Great desert river system with high cultural and environmental value.
- Some sustainable industries e.g., tourism, organic cattle farming.
- Long term impacts of oil and gas development are a major concern.
- Future depends on the actions of governments – Aust, QLD, SA.
- Remoteness leads to lack of awareness/ understanding of the unique natural system.

EDITOR BOOK RECOMMENDATION

Lake Eyre Basin Rivers
Editor: Richard Kingsford



DISCUSSION QUESTIONS

Consider the following focus questions when planning this topic

FOCUS QUESTIONS: EARTH'S NATURAL SYSTEMS

- Identify three key differences with the current syllabus.
- What did you learn about natural systems from the Lake Eyre Basin presentation? (Conference delegates)
- Are there concepts and / or content areas you not confident with?
- What would you consider for the place study?
- What opportunities are there for fieldwork and using spatial technologies?
- Suggest one effective teaching strategy that would suit the delivery of the content and skills.
- Where might you place this Focus Area in a Scope and Sequence for the Year 11 course?
- Record THREE BIG IDEAS you have for this topic

RESOURCES

BOOKS

MAGAZINES

SOCIAL MEDIA

VIDEO & PODCAST

WEBSITES

SPATIAL TECHNOLOGIES

PAST GEOGRAPHY BULLETINS

PROCESSES, CYCLES AND CIRCULATIONS

Understanding the Carbon Cycle	Volume 53, Special Edition 2021
The Carbon Cycle Game	Volume 53, Special Edition 2021
The Cryosphere	Volume 52, No 3, 2020
How I teach – Global Atmospheric Circulation Model	Volume 52, No 3, 2020
Biophysical Interactions: flipped classroom	Volume 47, No 3, 2015

PEOPLE, PATTERNS AND PROCESSES

Overview of the diversity and extent of human activity

- The diversity and extent of human activity on the Earth's surface on a global scale, including spatial patterns of settlement, infrastructure, and agricultural and industrial production
- Spatial patterns related to culture
- The increasingly integrated nature of the world including
  - economic activities and cultures, the effect of technological change on interconnections between places in relation to distance and time,
  - the role of transnational corporations (TNCs), world cities, migration and tourism in international integration

Population and resource consumption

- The characteristics, growth and distribution of the world's population - including trends, rates of change and density
- Influences that shape global population change - including demographic transition, population movements
- Challenges arising from population change – environmental, economic and social
- Population characteristics and trends in **TWO countries** – including reasons for similarities and/or differences, challenges and responses in each country, varying perspectives on population management
- Links between population characteristics and natural resources – including the global distribution and consumption of natural resources, population size, distribution and concentration, and levels of resource consumption in various places, challenges of resource consumption, including depletion of resources, impacts on Indigenous Peoples, environmental degradation, and inequalities in human wellbeing

People, patterns and processes study

Students undertake ONE of the following studies to develop an understanding of the role of people in changing places and environments, the processes involved, and various responses to change.

- Study 1: Human resilience in diverse environments
- Study 2: Local places and global economic change
- Study 3: Place and cultural change
- Study 4: Political power and contested spaces
- Study 5: Technological advances and the transformation of places

40 HOURS

OVERVIEW
Big picture
Extent of human footprint
Maximum 4 hours

Global features, trends and challenges related to population

Place based studies

EDITORIAL COMMENT:
Choose countries with very different experiences to make explanations more interesting.

EDITORIAL COMMENT:
Treat resource consumption generally backed up by examples for each link or do case studies that illustrate many challenges.

Each has a focus on one human cause of change to places
- **Human character… man vs environment**
- **Economic integration**
- **Cultural integration**
- **Political change / conflict**
- **Technological change**

Common language across all studies
- **Characteristics of places**
- **Change / transformation**
- **Impacts and / or responses to change**

Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

OPTIONS: PEOPLE, PATTERNS & PROCESSES

STUDY 1: HUMAN RESILIENCE IN DIVERSE ENVIRONMENTS

- Environments that challenge some forms of human occupation and survival
- Characteristics of environments that contribute to human occupation and endeavour
- The contribution of human ingenuity and resilience to the character of places.

ONE environment at a local or national scale that challenges human occupation and survival, including spatial patterns and characteristics of the environment, evidence of human ingenuity and resilience, impacts of, and responses to, change, opportunities to enhance environmental sustainability and/or human wellbeing.

STUDY 2: LOCAL PLACES AND GLOBAL ECONOMIC CHANGE

- Places relatively unaffected by global economic change
- Changes to places resulting from global economic integration and global flows of people, goods and ideas
- Impacts of change on the human and physical characteristics of places, including impacts on Indigenous Peoples and lands.

ONE place outside Australia shaped by international economic integration including nature of change resulting from global linkages, responses to economic integration, opportunities to enhance environmental sustainability and/or human wellbeing.

STUDY 3: PLACE AND CULTURAL CHANGE

- Culture of place
- Influences on the culture of place including the continuity of cultures in different places, the processes of diffusion, adoption and adaptation of culture, the mediums facilitating cultural change
- Evidence of cultural change in various places around the world
- Impacts of, and responses to, change.

ONE place at a local or national scale including the spatial and cultural characteristics of the place, influences on the cultural identity of the place, perceptions of, and responses to, cultural continuity and/or change, opportunities to enhance environmental sustainability and/or human wellbeing.

STUDY 4: POLITICAL POWER AND CONTESTED SPACES

Students investigate:

- The geopolitical characteristics of places from a global perspective, including nation-states and territories, political systems and ideologies, and power blocs
- Influences on political tension and conflict
- Impacts of, and responses to, political tension and conflict.

ONE contested space at a local or regional scale including spatial patterns and characteristics of the space, the influence of economic, environmental, social, cultural and/or technological factors, impacts of political tension and/or conflict on people, places and the environment, opportunities to enhance environmental sustainability and/or human wellbeing.

STUDY 5: TECHNOLOGICAL ADVANCES AND THE TRANSFORMATION OF PLACES

Students investigate:

- Technological advances that have contributed to the rise of global networks
- The spatial pattern of networks
- The role of networks in transforming places, and the implications for people and/or environments

ONE study of a network at any scale including, spatial patterns and/or characteristics of the network, the development and/or operation of the network and technological advances, impacts of, and responses to change, opportunities to enhance environmental sustainability and/or human wellbeing.

MY IDEAS

Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

GUEST SPEAKER

SIMON KUESTENMACHER, Director and Co-founder of The Demographics Group, he presents on demographic and global trends that are shaping Australia today and into the future.

TOPIC: Global population trends and insights

A SUMMARY OF KEY POINTS

The following is a brief summary of some of the insights into global population and resources Simon provided.

- Overpopulation – have we reached peak humanity? Most common population projections are from the UN – but they are revising these. In 200 – 300 years concerns will be about a very old population and low birth rates. Working age population will peak in 2060's (UN).
- For Australia, basing population growth on immigration may not work long term – it will be more expensive as countries seek compensation for exporting their people to other places.
- Urban Asian middle class continues to expand – not slum dwellers but the largest middle class in human history.
- Australia has a simple economic model – dig it up, sell it, entertain people, and teach them. This will continue in the future. China is still urbanising, demand for iron ore and other resources from Australia will continue. Impact of India will continue with increased demand.
- *Double Net Importers* vs *Double Net Exporters*. USA produces more energy and food than it uses so it exports excess. China is extremely reliant on global trade (of energy and food) as are UK, Spain, Sweden, Finland, Germany (much of Europe), Chile, Japan, Philippines, parts of Africa, and Sri Lanka..
- Double net exporters are USA, Russia, Canada, Australia, South Africa, Indonesia. China is very reliant on Australia (energy and food) – Are we the Lucky Country? Read more in Simon's article **HERE**
- Massive challenges of climate change – will lead to big population movements 'global mega trends' – massive challenges for harder to defend border countries (not Australia. Some areas including Russia will benefit from climate change e.g., increased yields. Implications for urban sprawl taking up key farming land.

In summary:

- Global population keeps growing but only for a few more decades. Peak baby has passed.
- Australia's reliance on cheap migration will only last for another decade.
- Birth rates in Sub-Saharan Africa are much higher than globally but rapidly falling. Climate data will lead to movements from this region. 'Starve or move' or 'adjust family size expectation'. Africa still fastest growing area and they will move to Europe (slowest growing area). This will increase challenges e.g., cultural integration.
- Demographics aren't everything but they are everywhere. Russia reached its population peak just before invading Ukraine. Conscription of 18–27 year-old males – this demographic is increasing. Russian population decline has started and will continue. Russia faces a small window of demographic opportunity to 'pull off' European war while it has a high % in the 18–27 years age group.

Simon is on social media – Facebook and Twitter

NOTE: SEE ARTICLES ON POPULATION and GOLD EXPLOITATION LATER IN THIS EDITION

DISCUSSION QUESTIONS

Consider the following focus questions when planning this topic

FOCUS QUESTIONS PEOPLE, PATTERNS AND PROCESSES

- Where does the content of the expert presentation sit in the new syllabus?
- What will you look for when choosing TWO countries to compare in relation to population?
- Are there content areas you are not confident with?
- What options would you consider for this topic?
- What opportunities are there for spatial technologies and fieldwork?
- Suggest one effective teaching strategy that would suit the delivery of the content and skills.
- Where might this Focus Area fit in a Scope and Sequence Plan for the Year 11 course.
- Record THREE BIG IDEAS you have for this topic.

RESOURCES

BOOKS

MAGAZINES

SOCIAL MEDIA

VIDEO & PODCAST

WEBSITES

SPATIAL TECHNOLOGIES

RESOURCES

PAST GEOGRAPHY BULLETINS

POPULATION

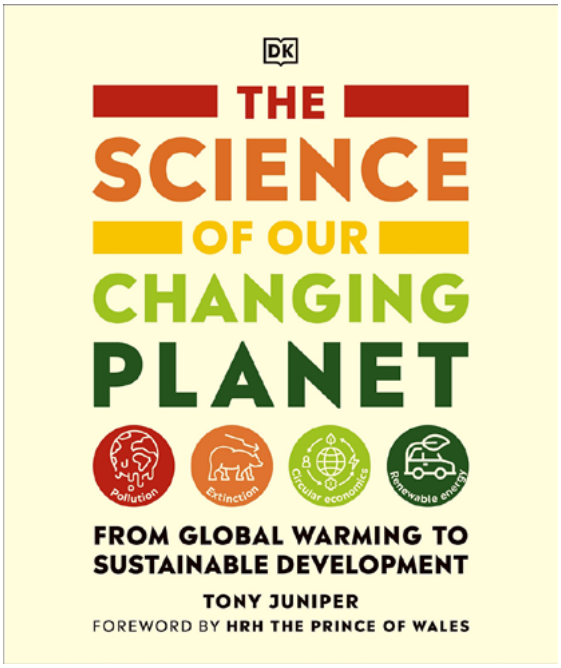
Population Boom or Bust	Volume 52, Special Edition, 2020
Population: 'World population may shrink by 2020'	Volume 52, Special Edition, 2020
Population: 'One million face displacement by 2050'	Volume 52, Special Edition, 2020
Population: 'Nearly 80- million displaced worldwide'	Volume 52, Special Edition, 2020
The problem of an ageing population	Volume 52, No 1, 2020

NATURAL RESOURCES

Case Study: Rare Earths	Volume 52, Special edition, 2020
'China may weaponise rare earths'	Volume 52, Special edition, 2020
'Environmental management in mining'	Volume 52, Special edition, 2020
Sand mafia in India	Volume, No 3, 2017
India's Blood Mica	Volume, No 3, 2017
Bangladesh leather	Volume, No 3, 2017

EDITOR BOOK RECOMMENDATION

The Science of Our Changing Planet by Tony Juniper
Dorling Kindersley Ltd.



HUMAN - ENVIRONMENT INTERACTIONS

Overview of change to Earth's natural systems over time

- Natural change compared to human-induced change
- Evidence of climate change in the contemporary world
- Evidence for the causes of climate change over time
- Land cover change at a global scale, including deforestation, desertification, melting glaciers and retreating ice sheets

Land use and land cover change

- The extent and rate of change in ONE form of land cover
  Examples of **land cover**: forests, deserts, glaciers, ice sheets

Human–environment interactions study

Students undertake ONE of the following studies to develop an understanding of natural and human elements, how they interact, and the implications of the interactions for people and the environment.

- Study 1: A geographic region (this may fall within a state or country or encompass a small group of neighbouring countries)
- Study 2: A contemporary hazard (ONE natural hazard OR ecological hazard)
- Study 3: Climate change.

A CONTEMPORARY HAZARD should be viewed as one that has occurred this century.

The selection of a REGION study should consider what makes the region unique and different to surrounding areas.

There are variations in the content for these options because of the nature of the content.

20 HOURS

Overview maximum 3 hours

EDITORIAL COMMENT:
Teachers may choose to do this at the end of Focus area one Natural Systems to follow natural change over time.

OPTIONS: Changing land cover
- **deforestation**
- **desertification**
- **retreating ice sheets**
- **melting glaciers**

Focus in all options on
- **human–environment interactions**
- **evidence of change**
- **challenges, opportunities, and responses**

A study of ONE place required
- **within a region**
- **managing a hazard**
- **managing a CC challenge**

Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

OPTIONS

STUDY 1: A GEOGRAPHIC REGION

- The spatial dimensions and nature of a chosen geographic region, which may be of local or regional scale
- Unique characteristics of the natural environment, including physical processes and natural cycles influencing the nature of the region
- Human–environment interactions and evidence of change, including change due to international integration, change in relation to climate
- Challenges, opportunities and responses, including changes to natural processes systems and/or environments; impacts of change on people and communities; management to minimise negative impacts; varying perspectives.

  The effectiveness of people and organisations in managing ONE challenge at a selected place, within the region.

STUDY 2: A CONTEMPORARY HAZARD

- The spatial distribution and nature of the contemporary natural hazard
- Characteristics of the natural environment, including the physical processes and cycles influencing the nature and occurrence of the hazard
- Human–environment interactions and evidence of change, including the contribution of human activities to hazard events; change in relation to climate
- Challenges, opportunities and responses, including changes to natural processes, systems and/or environments; impacts on people and communities; management at a range of scales; varying perspectives.

  The effectiveness of people and organisations in managing ONE contemporary hazard event at a selected place.

STUDY 3: CLIMATE CHANGE

- Spatial and temporal characteristics of climate change at a global scale
- Environmental and human impacts of climate change at a range of scales, including impacts on natural processes, systems and/or environments, impacts on people and communities
- Challenges, opportunities and responses, including varying perspectives; mitigation in relation to the rate and magnitude of change; minimising risk through adaptation; resilience and innovation; local, national and global action.

  The effectiveness of people and organisations in managing ONE climate change challenge at a selected place.

MY IDEAS

Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

GUEST SPEAKER

CATHERINE KERR, Office of Energy and Climate Change, NSW Treasury Climate Change Adaptation

TOPIC: Climate Change Adaptation

A SUMMARY OF KEY POINTS

The following is a brief summary of some of the insights into climate change adaptation provided by Catherine.

- Action on climate change – mitigation and adaptation focus.
- Australia warming faster than global average of 1.4 degrees since records began in 1910
- Actions have synergies – work together to overcome climate change.
- UN *Adaptation Gap Report* – the world is not doing enough / too slow.
- COP 26 adaptation agenda.

Australia

- A national strategy for just adaptation/ national climate change resilience.
- NSW working on climate change adaptation-strategy released in 2022. Four main priorities with overlap between govt departments:
  - Local govt – climate change grants – $3m for adaptation in place. Eg Cumberland Council's UV Smart Cool Playground project, Disaster and Emergency Management dashboard (Hawkesbury Local Council).
  - Community grants $615k supported 23 grants e.g. Northern Rivers – How on Earth project helping young people overcome climate anxiety, Restoring farmland in Capertee Valley.
  - Adapt NSW **website** and **teacher resources**.

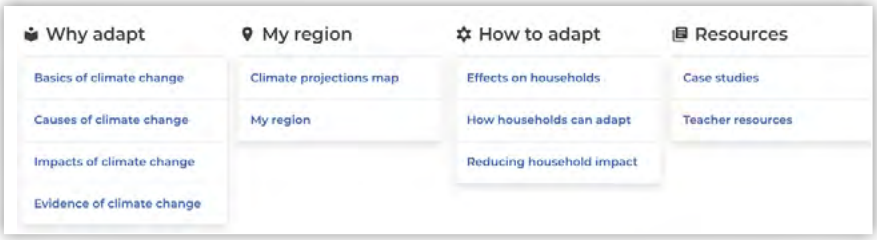
Key insights for students:

- Use Geoff Summerhayes, Bruce Mau quotes.
- Be aware of megatrends.
- Social media of **@atmos @earthrise.studio** to follow for climate change messages.
- Worldviews – becoming ecocentric.
- Increasing demand for environmental jobs – opportunities across sectors, interdisciplinary understanding essential to solve problems e.g., geo, eco, legal.
- Rise of environmental humanities, rise of customer centric design and innovation.

NOTE: SEE THE INFORMATION ON CLIMATE CHANGE ADAPTATION and ADAPT NSW LATER IN THIS EDITION

The ADAPTNSW website is full of resources for teaching about climate change in NSW.
https://www.climatechange.environment.nsw.gov.au/home

See 'Why adapt to climate change?' later in this edition.



GUEST SPEAKER

KAREN O'CONNOR, Fire Shield Mission Lead, Minderoo Foundation

TOPIC: Minderoo Fire and Flood Resilience Missions

A SUMMARY OF KEY POINTS

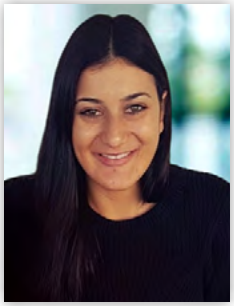
Karen O'Connor provided an overview of the work done by the **Minderoo Foundation** on the topic of natural hazards.

- Minderoo Foundation is a large philanthropic organisation, 20 years old
- Fire and flood resilience – We rise together 'lifting Australia to be the global leader in fire and flood resilience by 2025.

The Black Summer bushfires

- Long lasting health effects.
- Minderoo Foundation built temporary accommodation and worked alongside banks, fire agencies etc. to figure out the scale and scope of the problem.
- 186 million tonnes of carbon were released – which is the same amount of Australia's average annual emissions

- Conservative cost of disaster spending globally is $50b annually – much of this is after the event (97% afterwards).
- Minderoo focus on resilience and preparedness:
  - Mission Model is outcome focused, time bound, high risk - high reward, interconnected, system shift e.g., Kennedy with the moon mission – the 'Moonshot'.
  - Missions: Fire Shield, Resilient Communities, & Healthy Landscapes.
  - Underpinned by resilience



GUEST SPEAKER

RANIA POULLOS, Fire Shield Project Manager, Minderoo Foundation

TOPIC: Minderoo Fire Shield Mission

A SUMMARY OF KEY POINTS

"What if a fire never became a disaster?" https://www.minderoo.org/fire-and-flood-resilience/fire-shield/

The aims of Fire Shield are to:

- Protect and respond to fires in an hour by 2025 using satellite and AI technologies.
- Detect fires early, share information, predict what the fire will do, respond with informed decision making.
- CSIRO Spark – scalable, tailorable and updateable https://www.csiro.au/en/research/technology-space/ai/spark
- Another two 'black summers' in the next decade.
- Re-imagine how we deal with bushfires.
- Cool Australia teaching resources - links with curriculum materials/ PD modules https://www.coolaustralia.org/beyond-the-bushfires-education-resources/

DISCUSSION QUESTIONS

Consider the following focus questions when planning this topic

FOCUS QUESTIONS: HUMAN - ENVIRONMENT INTERACTIONS

- Distinguish between land cover and land use?
- What factors will influence your choice of an option study for this topic?
- Are there concepts and / or content areas you not confident with in this topic?
- What opportunities are there for fieldwork and using spatial technologies?
- Suggest one effective teaching strategy that would suit the delivery of the content and skills.
- Where might this topic fit in a Scope and Sequence for the Year 11 course.
- Record THREE BIG IDEAS you have for this topic.

RESOURCES

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RESOURCES

PAST GEOGRAPHY BULLETINS

YEAR 11: HUMAN – ENVIRONMENT INTERACTIONS

Land cover change: Deforestation	Volume 54, No2, 2022
Deforestation and Natural Cycles	Volume 53, Special Edition 2021
Creating text using infographics: Literacy skills	Volume 54, No2, 2022
The Amazon burns	Volume 51, No 4, 2019
Wild Australia: After the Fires. Documentary	Volume 53, No 1, 2021
Professional reading: How Drones are being used in Disaster Management	Volume 49, No 3, 2017
Ecological hazard / Biophysical Interactions – Malaria	Volume 48, No 2, 2016
Aboriginal Australia Series. Part 2: Aboriginal Fire Management	Volume 50, No 1, 2018
Natural Hazards: Why the volcanic eruption in Tonga was so violent, and what to expect next?	Volume 54, No1, 2022
The Tonga volcanic eruption has revealed the vulnerabilities in our global telecommunication system	Volume 54, No1, 2022
Tonga. Skills development	Volume 54, No1, 2022

THE GEOGRAPHICAL INVESTIGATION

ALLOCATED TIME: 20 Hours

There is no 'right' approach to integrating the GI into your Scope and Sequence.

Possible approaches to allocation of time could be:

- Staged over 2 terms 1 hour / week
- Staged over 1 term x 2 hours per week OR 1 full week + 1 x Hour / week + 1 full week at the end.
- A concise block of time - 5 weeks

PAST GEOGRAPHY BULLETINS

YEAR 11: GEOGRAPHICAL INVESTIGATION

Success in the SGP James Harte	Volume 54, No3, 2022
Simplifying the science. A guide to collecting fieldwork data for the Year 11 SGP	Volume 54, No1, 2022
Fieldwork Essentials: Preparing for Fieldwork	Special HSC Edition, No 1, 2018
Fieldwork Essentials: Conducting Surveys and Interviews	Special HSC Edition, No 1, 2018
Fieldwork Essentials: Basic fieldwork tools and techniques	Special HSC Edition, No 1, 2018

YEAR 12 FOCUS AREA

GLOBAL SUSTAINABILITY

Sustainability in the contemporary world

- Sustainability and sustainable development, including pillars of sustainability – social, economic, environmental, and cultural
- Principles of ecologically sustainable development – precautionary principle, intergenerational equity, conservation of biological diversity and **ecological integrity**
- Opportunities and challenges in planning for and achieving global sustainability - including
  - the role of global forums, agreements and cooperation
  - levels of action at a range of scales, from the United Nations Sustainable Development Goals to practices in local communities, including actions by governments, intergovernmental organisations (IGOs), non-government organisations (NGOs), corporations, community organisations and individuals
  - Indigenous Peoples' practices and **benefit sharing**
  - political, economic, technological, social, cultural and environmental influences

Evaluating sustainability

- The reasons for evaluating and monitoring global sustainability
- A range of criteria for evaluating the sustainability of economic activities

Investigation of a global economic activity

Students study ONE global economic activity

Students investigate:

- The nature and spatial patterns of the global economic activity
- Influences on the global economic activity including biophysical, economic, technological, political/organisational
- Current trends and future directions

For the global economic activity studied, students:

- evaluate the sustainability of the activity, using one or more criteria
- examine a range of strategies for sustainability
- critically analyse ONE strategy.

30 HOURS

There are a range of concepts in this focus area to unpack and apply where appropriate

EDITORIAL COMMENT:
This is a new area that requires some consideration and research as there are limited published metrics … but it is improving.

EDITORIAL COMMENT:
If a business, farm etc is studied during fieldwork (as an example of the economic activity) – it must be seen in the global context and represent what is also happening in other countries. Use specific examples from those other countries.

The focus is on an economic *activity* and although visiting a local enterprise, representative of the global activity can be a relevant aspect for fieldwork, the global context and nature of sustainability strategies for the economic activity should be at the forefront when planning and programming this focus area.

EDITORIAL COMMENT:
The evaluation is for the industry on a global scale. Check availability of information on criteria for evaluating sustainability and global management strategies. The critical analysis of one strategy would include evaluation.

Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

GUEST SPEAKER

KAREN DAVIDS, Circular Economy Consultant at MRA Consulting Group / High School & University Geography Tutor

TOPIC: Circular Economy Explained

A SUMMARY OF KEY POINTS

Karen provided a comprehensive overview of the concept of a circular economy and the challenges in scaling up initiatives at a range of scales.

- Production exclusively relies on virgin materials. This needs to change.
- Circular economy means keeping materials in use as long as possible – reuse / repair before recycling. Avoid re-manufacturing.

Principles:

1. Eliminate waste and pollution.
2. Circulate products and materials at their highest value.
3. Regenerate natural systems – look at opportunities such as large-scale composting/ urban farming/ permaculture.

Re- conceptualisation of waste:

1. Re-value – preserving legacies, building community and social purpose.
2. Re-articulate the semantics of waste – resource rather than waste.
3. Re engage – making waste visible – transpositional education:
   - Repair Cafe Sydney North
   - The Bower reuse and repair centre
   - Kimbriki resource recovery
   - The Green Shed – largest reuse in the Southern Hemisphere.

Barriers to scaling:

1. Funding constraints.
2. Physical infrastructure.
3. Political myopia and risk aversion.
4. Resource intensive to establish and maintain.
5. Craft knowledge and skills shortage – linked to structural change.

How do we scale up?

1. Multi stakeholder and multi sectoral approach.
2. Developing metrics.
3. More financial support.
4. Explicitly engage with the term repair and make them targets.

What is a circular economy – https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview

AUSTRALIAN CIRCULAR ECONOMY HUB

EDITOR NOTE: See the article from Australian Circular Economy Hub later in this issue. There are excellent articles and videos on the ACEH website **HERE**

GUEST SPEAKER

ALISON JOSE, Director of the Circular Centre and STSC Sustainable Textile Supply Chain & CEO of Adetex Circular Solutions,
creator of Circlolink Circular Materials Passport via RFiD Threads®

TOPIC: Circularity in the Textile/Fashion Industry

A SUMMARY OF KEY POINTS

Alison spoke on the issue of textile and fashion waste as well as solutions and challenges to addressing the issue at a range of scales. She spoke about the potential of the innovative RFiD threads in addressing the issue.

'We need to do good, not less bad' – William McDonough. *Cradle to Cradle*

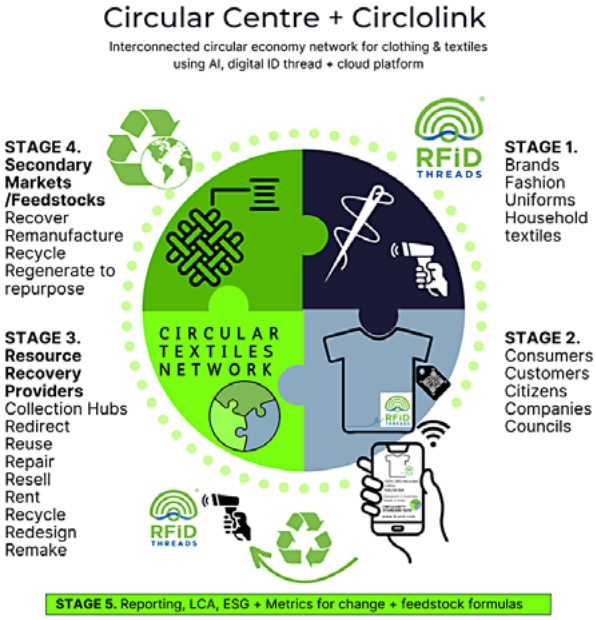
Ideas:

- Design out waste and pollution e.g., stop plastic textiles.
- Integrate first steps e.g., rent, resell.
- Regenerate nature- to generate the metrics – useful for 'criteria' to judge effectiveness of strategy.
- Minimise 'wish cycling' ABC Ghana – dead white man's clothes https://www.abc.net.au/news/2021-08-12/dead-white-mans-clothes/13495096
- Currently only 1% of textiles are recycled..
- Social issue – Rana Plaza collapse https://theconversation.com/years-after-the-rana-plaza-tragedy-bangladeshs-garment-workers-are-still-bottom-of-the-pile-159224
- Sweden – extended producer responsibility
- Needs to fall into the space of it doesn't take too much effort' to capture customers.
- Denim amnesty – General Pants.

Tracing product lifecycles:

RFiD threads – a metal scannable thread that goes onto clothing labels and can track the location of an item throughout its life cycle https://www.trimco-group.com/solutions/rfid.

- Could be used by consumers to make better purchasing choices.
- Connects various stakeholders such as brands and wholesalers and also collects data.
- Winner of global change award 'Nobel Prize for Sustainable Fashion'.
- Not about connecting to the people (it cannot track the person) – the garment is the focus.



GUEST SPEAKER

ALEX WEBB, Senior Communications and Marketing Manager, Oceania at the Marine Stewardship Council (MSC).

TOPIC: Industry Certification in Marine Fisheries

A SUMMARY OF KEY POINTS

Alex spoke about MSC industry certification as a criterion for assessing the sustainability of marine fisheries.

- Criteria for evaluating sustainability.
- Triple threat to ocean fish stocks – pollution, climate change and overfishing.

Marine Stewardship Council:

- Aims to decrease overfishing
- Fishing communities are doing the work
- Certification recognises and rewards fisheries for sustainable practices e.g. tuna.

- Geographic origin tracing relatively new.
- State of the ocean – UN FAO does a certification check every two years.
- Ocean food system - unsustainable practices will lead to further land degradation.
- SDG framework – 14 'life below oceans'.
- In Australia approximately 50% of retail fish is MSC Certified.

MSC Certification = the Blue Tick

- An outcome based standard, it recognises what you need to achieve rather than what you need to do.

  The standard is based on:
  1. Sustainability of stock.
  2. Ecosystem impact – food webs.
  3. Effective management.

- Ocean Stewardship Council fund research and provide grants and subsidies to fisheries.
- From ocean to plate – traces seafood back through the supply chain – chain of custody provided by certification.
- ACCC – recent crackdown on greenwashing.
- Consequences of mislabelled seafood – one-third globally – either for profit or by mistake.
- Building conscious consumerism.
- Building ocean literacy https://www.msc.org/en-au/for-teachers

EDITORIAL COMMENT

MONITORING / EVALUATING / ASSESSING SUSTAINABILITY

Potential criteria:

- SDG targets and indicators
- Footprints – water footprint, carbon footprint, energy footprint
- Circular economy – life cycle mapping, waste audits
- Supply chain analysis
- Labour practices – working conditions / worker health / fair pay
- Social justice and human rights record
- Economic viability
- Industry certification
- Environmental monitoring

DISCUSSION QUESTIONS

Consider the following focus questions when planning this topic.

FOCUS QUESTIONS: GLOBAL SUSTAINABILITY

- **How will changes to Year 12 assessment and HSC Examination requirements affect how you teach the year 12 course and the timing of different topics?**
- **What is the 'new' content in this Focus Area?**
- **What did you learn from the presenters and GTA analysis about measuring and assessing sustainability? (Conference delegates)**
- **Are there content areas you not confident with?**
- **Are there opportunities for fieldwork and using spatial technologies?**
- **Consider where this topic might be placed in a Scope and Sequence for the Year 12 course.**
- **Record THREE BIG IDEAS you have for this topic.**

RESOURCES

BOOKS

MAGAZINES

SOCIAL MEDIA

VIDEO & PODCAST

WEBSITES

SPATIAL TECHNOLOGIES

PAST GEOGRAPHY BULLETINS

YEAR 12: GLOBAL SUSTAINABILITY

Aquaculture,	Volume 52, Special Edition, 2020
Global Tourism update, 2020	Volume 52, No 3, 2020
Wine Industry update	Special HSC Edition, No 1, 2018
Going Bananas	Special HSC Edition, No 2, 2017
Dairy Production using BEESTOP	Special HSC Edition, No 2, 2017
Coffee Production	Special HSC Edition, No 2, 2017
Coffee Interconnections	Volume 49, No 4, 2017
Coffee Biomes	Volume 49, No 4, 2017
Chocolate (Cocoa)	Volume 49, No 1, 2017

YEAR 12 FOCUS AREA

RURAL AND URBAN PLACES

Rural and urban settlement

- The size, pattern and spatial distribution of settlements including
  - different types of settlements – remote settlement, village, suburb, regional centre, city, megacity and urban mega-region
  - settlement patterns
  - influences on size and spatial distribution – location, climate, topography, natural resources, population and economic development
- National and global urban hierarchies of settlements, based on population and urban function, and spheres of influence
- The nature of urbanisation and urban growth at a global scale including
  - challenges facing rural and urban places
  - the interdependence of rural and urban places
- Settlements in the world today that have maintained a small ecological footprint and a high level of wellbeing
- Strategies for the sustainable management of rural and urban places, including at least one successful initiative or project

Investigation of a rural and an urban place

Students study ONE place in a rural setting and ONE place within a larger urban settlement, to investigate:

- The location and character of the place
- Geographical processes, both physical and human, that have shaped the identity of the place
- Links to other places
- The nature of changes affecting the place, including social, economic and environmental
- Responses and strategies, including for sustainability

Investigation of a large city outside Australia

Students study ONE large city of 5 million people or more, outside Australia, to investigate:

- The character and spatial dimensions of the large city
- Geographical processes shaping the large city and change over time relating to demographic trends; social and economic patterns; political and economic roles; and regional and global linkages
- Challenges of living in the large city
- Responses to these challenges and opportunities for enhancing sustainability, including strategies to improve people's quality of life and reduce spatial inequality

45 HOURS

Global perspective

One successful initiative or project – sustainable management

It is recommended the rural place and the place within a larger urban settlement chosen as a study are conveniently located to facilitate fieldwork.

FOR EACH PLACE:
- **Integration of natural and human influences**
- **Interconnections**
- **Change**
- **Reponses and strategies**
- **Sustainability**

EDITORIAL COMMENT:
Similar wording – greater depth for the city

Outside Australia
Integration of natural and human influences
Interconnections
Change
Challenges & opportunities
Responses and strategies
Sustainability, QOL, Inequality

The studies selected for the rural place, urban place and large city must not overlap.

RURAL – regional centre, rural town, village, remote settlement
URBAN – suburb, urban precinct, urban corridor

If selecting a regional centre as the rural place it is ideal that its location has a rural context.
For example, Newcastle and Wollongong are not generally considered to be rural regional centres.

Source: NESA Geography 11–12 Syllabus – https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=aim

GUEST SPEAKER

ANDREW TOOVEY, Lecturer, UNSW School of Education.

TOPIC: A place within a larger urban settlement

A SUMMARY OF KEY POINTS

Andrew provided very comprehensive investigation into Campbelltown as an urban place within a larger urban place. Andrew included ideas for fieldwork, the use of spatial technologies and the sources of the data he used to support this investigation.

How to use an existing case study with new syllabus:

1. Tips for developing a new case study.
2. Ideas for integrating fieldwork with assessment in Year 12.
3. Integrating spatial technologies with fieldwork.
4. Walk through of a case study.

- Place geography opportunities – refer to scale – council, LGA, Macarthur region, Greater Sydney.
- Appropriate to understand scale and the size and diversity of SW Sydney.
- Google My Maps is an easy to use and access spatial technology tool.
- Physical processes operating at Campbelltown – watersheds, rain shadow, climate variations, Dharawal season calendar, fires plus smoke from nearby regions:
  - Look at the catchment – use Sydney Water for rainfall variability.
  - Use synoptic charts to understand specific weather events.
- Human processes – suburbanisation, urban decay and renewal, spatial exclusion, spatial inequality, urban villages:
  - Suburbanisation – rapid Sydney growth, improvement in transport tech- commuting, growth over time – use ABS data.
  - Housing commission – Claymore, Minto, Airds, Macquarie Fields – failed urban planning; urban decay – state government renewal – consolidation, increased density e.g., Macarthur Station/ Edmondson Park.
  - Spatial exclusion – Macquarie Links vs Macquarie Fields
  - Urban village – Park Central

Links to other places

- Road and rail e.g., East Hills Link
- 'Tap on' data show it is a commuter town … employment links
- Connection between Campbelltown and Port Botany – manufacturing links

Nature of Changes affecting the place

- Infrastructure hasn't kept up with growth e.g., hospital wait times,
- Death of the high street, loss of heritage and urban decay – changed Campbelltown from a country town to a satellite city of Sydney.
- Economic character – Positive e.g., jobs and housing availability. Negative – wait times/ pressure on infrastructure, car parking chaos.
- Social – lack of walkability and long commute times. See Jeff Speck's book *Walkable City*.
- The problem of the last mile – ABC/ UTS study.

Assessment

- Create a photo essay using Google y Maps for fieldwork – pinned to maps

GUEST SPEAKER

LARISSA SHASHKOF, Lend Lease Project Stakeholder and Communications Manager, Communities

TOPIC: Creating sustainable places – Fig Tree Hill

A SUMMARY OF KEY POINTS

Larissa provided very comprehensive investigation into the development of Fig Tree Hill (near Campbelltown) as a sustainable urban suburb.

Overview of location:

- SW Sydney, close to Appin on Appin Rd – Campbelltown area.
- Close links to Campbelltown.
- Land between Nepean and Georges River.
- Character – heritage listed (Mount Gilead Homestead).
- Greenfield site – wheat in 1800's, then dairying until rezoning.

Development:

- Fig Tree Hill will have 1700 homes – low density single dwelling, retail, community and school infrastructure (TB approved).
- Gilead will have 3300 new homes.
- 70% woodland had been removed for agriculture – conserving and replanting needed.
- Lend lease responsible for infrastructure upgrades e.g., new/ bigger roads.
- Hours of testing across site to check for first nations artifacts – point of trade – artifacts from all over Australia identified. Sacred sites protected.
- View lines protected.
- Electric – no gas connection. Incentives to use solar e.g., rebates. 'Looking at' battery storage – community scale. EV charging stations, bike paths connecting through bike paths.
- Landscaping important to reduce urban heat islands, re. wetlands.
- Habitat restoration includes changing the chemical composition of the soil – from pasture to woodland. Removing livestock through fencing helps regeneration. Removal of invasive species, restoring natural watercourses.
- Connections USYD, WSU – insects and regeneration, platypus surveys.
- Biodiversity corridors determined by NSW government.
- Use of technology to track animal movements e.g., dogs getting into conservation areas.

DISCUSSION QUESTIONS

Consider the following Focus questions when planning this topic.

FOCUS QUESTIONS: RURAL AND URBAN PLACES

- What information will you look for when choosing places to study?
- Can you adapt current studies to the new syllabus requirements?
- Where could you embed fieldwork and spatial technologies?
- Consider where this topic will fit in a Scope and Sequence for the Year 12 course.
- Suggest one effective teaching strategy that would suit the delivery of the content and skills for this focus area.
- Record THREE BIG IDEAS you have for this topic

RESOURCES

BOOKS

MAGAZINES

SOCIAL MEDIA

VIDEO & PODCAST

WEBSITES

SPATIAL TECHNOLOGIES

PAST GEOGRAPHY BULLETINS

YEAR 12: RURAL AND URBAN PLACES

Busting the bands: Mega cities	Volume 52, No 3, 2020
Stage 6 Skills: Dharavi	Volume 52, No 3, 2020
Sydney's Darling Harbour	Volume 51, No 2, 2019
Central Maitland	Volume 51, No 2, 2019
Sydney Olympic Park, Newington, Rhodes and The Waterfront	Volume 52, Special Edition, 2020
Sydney's Green Square	Volume 51, No 2, 2019

ECOSYSTEMS & GLOBAL BIODIVERSITY

Ecosystems and biodiversity

- The nature and complexity of ecosystem functioning and global biodiversity
  Including:
  - energy flows and nutrient cycles
  - **dynamic equilibrium** and **feedback loops**
  - relationships between natural systems
- The value of ecosystems and biodiversity
- The relationship between ecological and human stresses, and the **vulnerability** and **resilience** of ecosystems, including **ecological integrity** and **biocapacity**
- The global state of ecosystems and biodiversity
  Including:
  - current and future trends, and reasons for the trends
  - **shifting baselines** and **tipping points**
  - strategies for the sustainable management of ecosystems at a range of scales, including at least one successful conservation program
  - the role played by Indigenous Peoples in contemporary management practices

Investigation: Ecosystems

- The characteristics of the ecosystem, including its spatial pattern and the nature of its biodiversity
- The dynamics of ecosystem functioning, including vulnerability, resilience and ecological disturbance
- Human-induced modifications to the ecosystem
- Responses and strategies, including for maintaining ecosystem functioning and actions for sustainability
- Differences in ecosystem management, compared with at least one other location, due to economic, political and sociocultural factors
  - Level of development
  - Culture
  - Indigenous practices
  - Ideology
  - Nature of the economy
  - Land ownership
  - Business interests
  - Government policy
- The role of contemporary research and innovation in the sustainable management of the ecosystem

45 HOURS

EDITORIAL COMMENT:
There are a range of concepts in this focus area.
It is important to unpack each concept and apply it where appropriate including the ecosystems being studied.

EDITORIAL COMMENT:
FOR EACH ECOSYSTEM INVESTIGATED BELOW, try to link to this section

TWO DIFFERENT TYPES OF ECOSYSTEMS:
- **One in Australia**
- **One Overseas**

FOR EACH ECOSYSTEM SELECT A COMPARATIVE MANAGEMENT STUDY and make sure any DIFFERENCES CAN BE EXPLAINED.

EDITORIAL COMMENT:
These comparative management studies could be in Australia or overseas.

EDITORIAL COMMENT:
When selecting two ecosystems to study, take into account the availability of contemporary information on research and innovation.

GUEST SPEAKER

PROFESSOR BRETT SUMMERELL,
Chief Scientist & Director Science, Education and Conservation, Royal Botanic Garden Sydney / Australian Institute of Botanical Science.

TOPIC: Biodiversity Conservation

A SUMMARY OF KEY POINTS

Professor Summerell provided an overview of the challenges facing biodiversity globally and in Australia.

Biodiversity Conservation:

- Problems with biodiversity conservation are a challenge globally.

  Australia
  - Biodiversity hotspots.
  - 85% endemism – a product of Gondwana.
  - Tree diversity significantly higher than in USA.
  - Tropical rainforest significantly impacted by human use – less than 5% remaining however contributes to overall biodiversity in Australia.
- Main biodiversity conservation issues in Australia:
  1. Land clearing – agriculture, mining, and urbanisation.
  2. Invasive species – feral animals, weeds, exotic pests, and disease invasion e.g., horses, cats, weeds, African olive, lantana.
  3. Climate change, temperature extremes, wildfires.
  4. Fragmentation.

Australia:

- Sorry tale of extinction of every level of species – plants, mammals, bird, reptiles, invertebrates, fungi, fish.
- Impacts of large natural hazards e.g., bushfires – Gondwanan rainforest world heritage – 7 billion plants impacted, 367 threatened species impacted.
- Invasive species – *myrtle rust* from Brazil in 2010. Started west of Gosford – now all over the country in just 13 years. 16 species on extinction trajectory as a result.

The future:

- Great time to be a scientist/ geographer – excellent tools e.g., germ plasma/ gene banks/ Mount Annan PlantBank / seed banking. Lots of detailed work is going into collection and storage of biological material.
- DNA and genomic tools are very useful for understanding genetics for cross breeding including finding the best changes that can allow plants to withstand changes in environment
- Plant blindness – important to consider whole ecosystem interdependence 'no plants no future'.

EDITOR'S NOTE

See the information later in this bulletin for links to resources provided by the Sydney Royal Botanic Garden AND Australian Institute of Botanical Science. I highly recommend the Branch Out **podcasts**.

Potential cross topic fieldwork could include visits to Campbelltown and Fig Tree Hill for Urban and Mt Annan Botanic Gardens for Global Biodiversity.

DISCUSSION QUESTIONS

Consider the following focus questions when planning this topic.

FOCUS QUESTIONS: ECOSYSTEMS AND GLOBAL BIODIVERSITY

- What ideas about biodiversity were provided by the expert presenter? (Conference delegates)
- What ecosystems do you currently study and how do the syllabus changes affect your ability to continue with these? (One in Australia, One overseas)
- What factors will guide your choice of a comparative management strategy for each type of Ecosystem?
- How will you embed fieldwork and spatial technologies into the topic?
- Suggest one effective teaching strategy that would suit the delivery of content and skills.
- Where will you look to find information on the role of contemporary research and innovation for each type of ecosystem?
- Record THREE BIG IDEAS you have for this topic.

RESOURCES

BOOKS

MAGAZINES

SOCIAL MEDIA

VIDEO & PODCAST

WEBSITES

SPATIAL TECHNOLOGIES

PAST GEOGRAPHY BULLETINS

YEAR 12: ECOSYSTEMS AND GLOBAL BIODIVERSITY

Biggest threats to Earth's biodiversity	Volume 53, No1, 2021
Great Southern Reef Case Study	Volume 53, No 4, 2021
Google Site	https://sites.google.com/view/gtanswactgreatsouthernreef/home
Tropical Rainforest Heritage of Sumatra	Vol 53, Special Edition 2021
Kakadu Wetlands	Vol 53, Special Edition 2021
Ningaloo Reef	Volume 52, Special Edition, 2020
Oregon Dunes	Volume 52, Special Edition, 2020

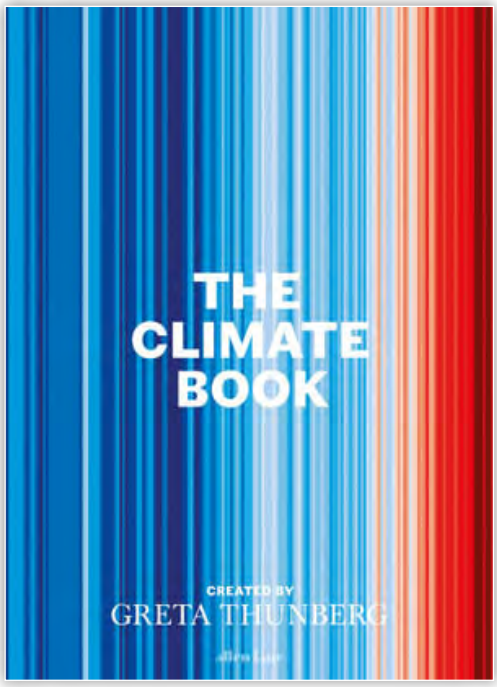
MEDIA REPORTS AND WEBSITES

The following articles represent a small proportion of the media reports available on topics for the new Geography 11–12 Syllabus (2022).

- **Population:**
  The world's most populous countries
- **Population:**
  The twenty countries with the fastest declining populations
- **Resources:**
  Gold mining is one of the world's most destructive and unnecessary industries – Here's how to end it
- **Hazards:**
  200 Experts Dissected the Black Summer Bushfires in Unprecedented Detail.
  Here Are Six Lessons to Heed.
- **Hazards:**
  Floods Play a Vital Role in Ecosystems – It's Time to Get Out of Their Way
  What Australia learned from recent devastating floods
  Floods can be a disaster from humans – but for nature it's a boom
- **Hazards:**
  Indigenous Expertise Is Reducing Bushfires in Northern Australia. It's Time to Consider Similar Approaches for Other Disasters
- **Climate Change Adaptation**. ADAPT NSW
- **Sustainability:**
  Three Core Principles of the Circular Economy
- **Biodiversity Conservation:**
  Royal Botanic Gardens and The Australian Institute of Botanical Science

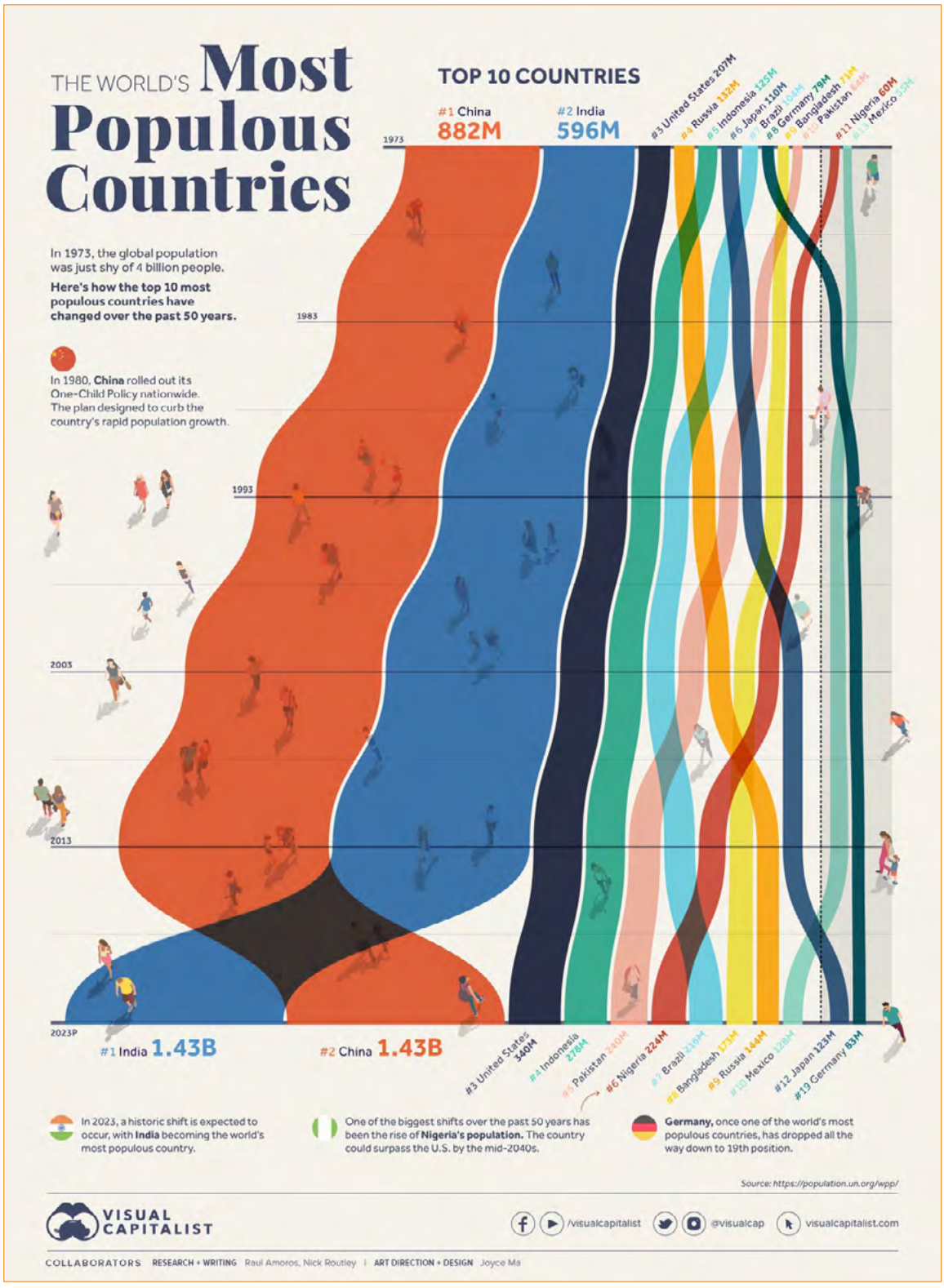
EDITOR BOOK RECOMMENDATION

The Climate Book
Greta Thunberg (E-Book and printed books available)



CHARTED: THE WORLD'S MOST POPULOUS COUNTRIES (1973–2023)

Visual Capitalist



Source: https://www.visualcapitalist.com/most-populous-countries-over-50-years/

The World's Most Populous Countries (1973–2023)

Humankind is now double the size it was in 1973

Of course, that growth has been far from uniform, and the ranking of the world's most populous countries continues to evolve.

Using the latest data available from the United Nations, we've looked at which countries have the largest share of the planet's eight billion people.

Country	Population (1973)	Population (2023)	Change (1973-2023)
China	881,652,084	1,425,671,353	544,019,269
India	596,107,487	1,428,627,666	832,520,179
United States	207,314,772	339,996,567	132,681,795
Russia	132,191,636	144,444,360	12,252,724
Indonesia	124,709,060	277,534,118	152,825,058
Japan	109,679,473	123,294,516	13,615,043
Brazil	103,666,906	216,422,450	112,755,544
Germany	78,667,473	83,294,634	4,627,161
Bangladesh	71,144,816	172,954,325	101,809,509
Pakistan	64,285,630	240,485,666	176,200,036
Nigeria	59,605,450	223,804,636	164,199,186
Mexico	55,228,202	128,455,563	73,227,361

The Top 10 Most Populous Countries

Here are the countries shown above, including how much they've grown over the past 50 years:

The numbers above highlight the extreme variance in growth for these world's most populous countries. While Germany has grown by just 6% over the past 50 years, Pakistan and Nigeria have nearly quadrupled their populations.

Half a century ago, there were only six countries with populations of over 100 million. Today, there are 15 countries past that mark, with Vietnam positioned to hit that milestone next.

The Top 20 Most Populous Countries

Things get even more interesting when we examine the top 20 most populous countries over the same time period.

Looking back 50 years ago, **Nigeria** was the lone African nation in the top 20. Today, it is joined by **Ethiopia**, **Egypt**, and the **Democratic Republic of the Congo** – all of which have experienced staggering population growth.

African nations are expected to lead population growth over the next few decades. By 2100, one quarter of the world's people are expected to be African.

Europe is the flip side of this equation. Back in 1973, there were six European countries in this top list. Today, only **Russia** and **Germany** remain, with the latter country soon to fall out of the top 20 ranking.

Ukraine, which was shrinking, is expected to fall to at least 41st place due to the turmoil surrounding the Russian invasion of the country. Since the invasion began in February 2022, nearly 14 million border crossings have been recorded from Ukraine to other countries.

Country	Population (1973)	Rank (1973)	Population (2023)	Rank (2023)
China	881,652,084	1	1,425,671,353	2
India	596,107,487	2	1,428,627,666	1
United States	207,314,772	3	339,996,567	3
Russia	132,191,636	4	144,444,360	9
Indonesia	124,709,060	5	277,534,118	4
Japan	109,679,473	6	123,294,516	12
Brazil	103,666,906	7	216,422,450	7
Germany	78,667,473	8	83,294,634	19
Bangladesh	71,144,816	9	172,954,325	8
Pakistan	64,285,630	10	240,485,666	5
Nigeria	59,605,450	11	223,804,636	6
United Kingdom	56,166,630	12	67,736,798	21
Mexico	55,228,202	13	128,455,563	10
Italy	54,379,587	14	58,870,763	25
France	51,814,077	15	64,756,586	23
Ukraine	48,301,548	16	36,744,635	41
Vietnam	44,891,286	17	98,858,947	16
Philippines	40,406,232	18	117,337,366	13
Thailand	38,873,065	19	71,801,281	20
Turkey	38,028,236	20	85,816,192	18
Egypt	37,120,778	21	112,716,599	14
Iran	30,981,903	25	89,172,768	17
Ethiopia	30,694,321	26	126,527,064	11
DRC	21,853,908	32	102,262,812	15

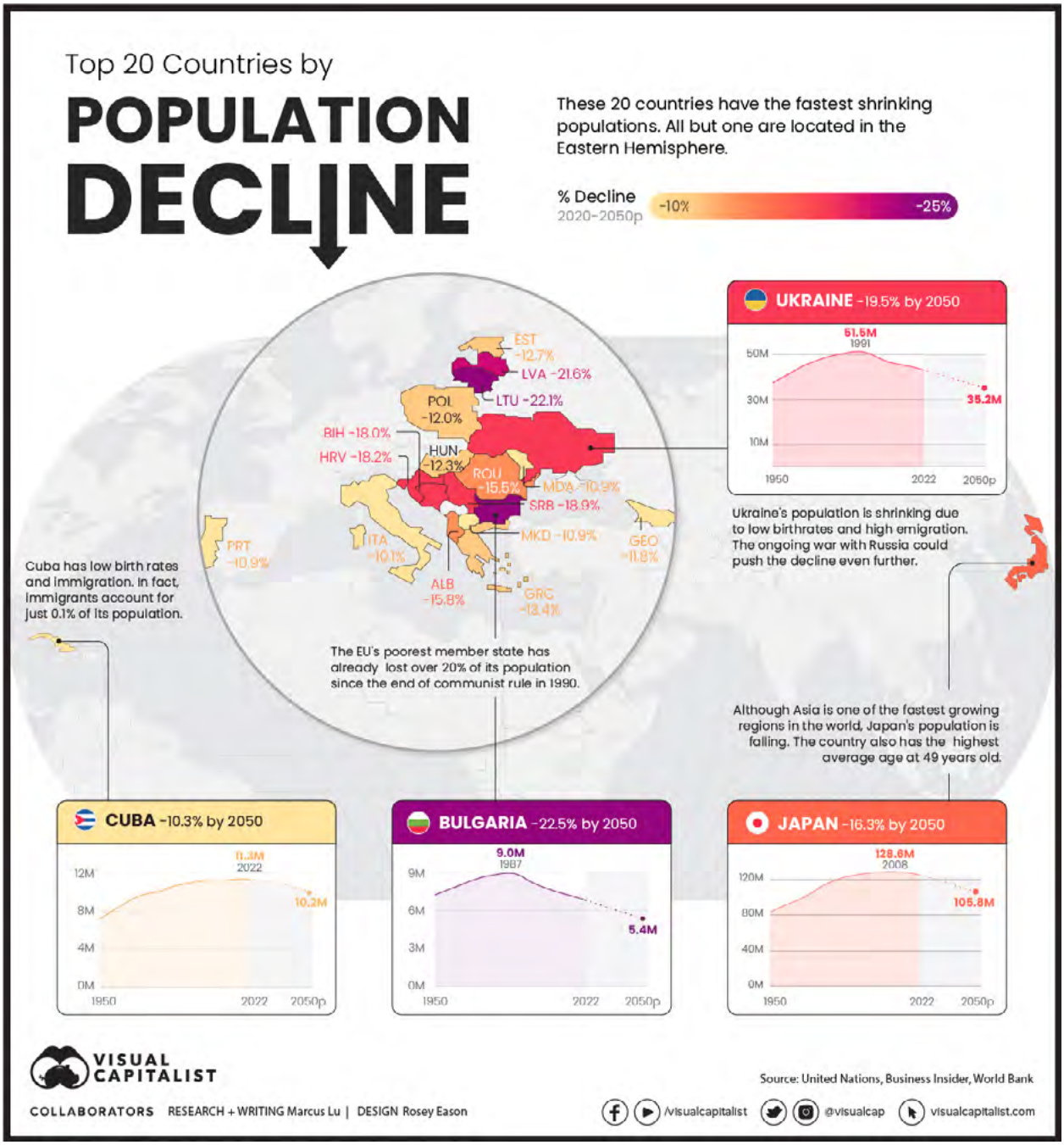
How Big Will Populations Get?

Once **India** becomes the world's largest country, it will likely remain so for many decades in the future, peaking in the 2060s (unless there are substantial changes in projected growth rates). India's peak population will stand at around 1.7 billion people.

The world's population is expected to peak later, around the 2080s. Humanity's peak population is expected to be about 10.5 billion.

RANKED: THE 20 COUNTRIES WITH THE FASTEST DECLINING POPULATIONS

Visual capitalist



Visualising Population Decline by Country

Since the mid-1900s, the global population has followed a steep upwards trajectory.

While much of this growth has been concentrated in China and India, researchers expect the next wave of growth to occur in Africa. As of 2019, for example, the average woman in Niger is having over six children in her lifetime.

At the opposite end of this spectrum are a number of countries that appear to be **shrinking** from a population perspective. To shed some light on this somewhat surprising trend, we've visualised the top 20 countries by population decline.

The Top 20

The following table ranks countries by their rate of population decline, based on projected rate of change between 2020 and 2050 and using data from the United Nations.

Rank	Country	Decline 2020-2050
1	Bulgaria	22.5%
2	Lithuania	22.1%
3	Latvia	21.6%
4	Ukraine	19.5%
5	Serbia	18.9%
6	Bosnia and Herzegovina	18.2%
7	Croatia	18.0%
8	Moldova	16.7%
9	Japan	16.3%
10	Albania	15.8%

Many of these countries are located in or near Eastern Europe, for reasons we'll discuss below.

The first issue is **birth rates**, which according to the Peterson Institute for International Economics (PIIE), have fallen since the collapse of the Soviet Union. Across the region, the average number of children per woman fell from 2.1 in 1988 to 1.2 by 1998.

Birth rates have recovered slightly since then, but are not enough to offset deaths and **emigration**, which refers to citizens leaving their country to live elsewhere.

Eastern Europe saw several waves of emigration following the European Union's (EU) border expansions in 2004 and 2007. The PIIE reports that by 2016, **6.3 million** Eastern Europeans resided in other EU states.

The Outliers

There are two geographical outliers in this dataset which sit on either side of Europe.

Japan

The first is Japan, where birth rates have fallen continuously since 1970. It wasn't until 2010, however, that the country's overall population began to shrink.

By the numbers, the situation appears dire. In 2021, **811,604** babies were born in Japan, while **1.44 million** people died. As a result of its low birth rates, the island nation also has the world's highest average age at 49 years old.

The Japanese government has introduced various social programs to make having kids more appealing, but these don't appear to be getting to the root of the problem. For deeper insight into Japan's low birthrates, it's worth reading this article by *The Atlantic*.

Cuba

The second country is Cuba, and it's the only one not located within the Eastern Hemisphere. Cuba's fertility rate of 1.7 children per woman is the lowest in the Latin American region. It can be compared to countries like Mexico (2.2), Paraguay (2.5), and Guatemala (3.0).

Cuba's immigration is also incredibly low compared to its neighboring countries. According to the International Organization for Migration, immigrants account for just **0.1%** of its total population.

Visual capitalist– https://www.visualcapitalist.com/ranked-the-20-countries-with-the-fastest-declining-populations/

EDITOR WEBSITE RECOMMENDATION

Our World in Data
https://ourworldindata.org

GOLD MINING IS ONE OF THE WORLD'S MOST DESTRUCTIVE AND UNNECESSARY INDUSTRIES – HERE'S HOW TO END IT

The Conversation

Stephen Lezak, University of Oxford

The 16th-century King Ferdinand of Spain sent his subjects abroad with the command: "Get gold, humanely if possible, but at all hazards, get gold." His statement rings true today. Gold remains one of the world's most expensive substances, but mining it is one of the most environmentally and socially destructive processes on the planet.

Around 7% of the gold purchased globally each year is used for industry, technology or medicine. The rest winds up in bank vaults and jewellery shops.

Beautiful objects and stable investments are worthwhile things to create and own, and often have significant cultural value. But neither can justify gold mining's staggering human and ecological toll. In a recent study, my colleagues and I showed how it might be possible to end mining and instead rely entirely on recycled gold.

Despite improvements in gold mining practices over the past century and new regulations designed to limit mining's impacts, this industry continues to wreak havoc upon landscapes across every continent except Antarctica.

In a given year, gold mines emit more greenhouse gases than all passenger flights between European nations combined. Gold mining also accounts for 38% of annual global mercury emissions, which cause millions of small-scale miners to suffer from chronic mercury poisoning, which can cause debilitating illness, especially in children.

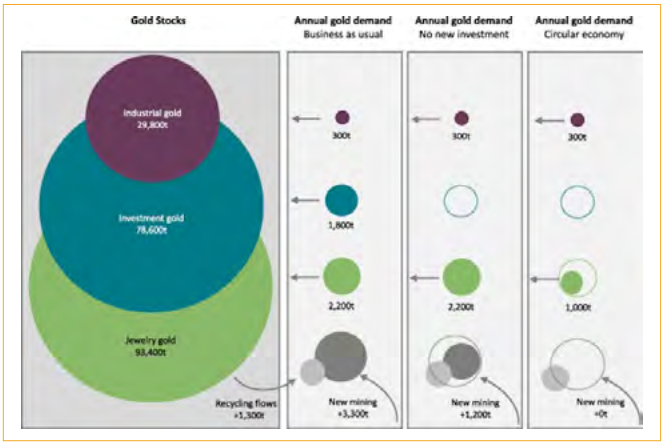
Our research involved modelling hypothetical scenarios in which gold consumption could decline to more sustainable levels. Using current recycling rates, we examined a fully circular gold economy in which the world's entire supply of gold came from recycled sources.

Even today, nearly one-quarter of annual gold demand is supplied through recycling, making it one of the world's most recycled materials. The recycling process uses no mercury and has less than 1% of the water and carbon footprint of mined gold.

We found that a global decline in gold mining would not necessarily derail any of gold's three central functions in jewellery, technology or as an investment.

Two trucks transport gold ore from Barrick Cowal Gold Mine in New South Wales, Australia. Image: Jason Benz Bennee/Shutterstock

Towards circularity



Gold stocks and three scenarios of gold flows. Lezak et al. (2022), CC BY-NC-ND

Our model showed that the gold used for industrial purposes (mainly in dentistry and smartphones) could be supplied for centuries even if all gold mining stopped tomorrow.

We also found that jewellery could still be produced with recycled gold in a fully circular gold industry. There would just be about 55% less to go around, which would still leave more than enough for essential uses.

In order to make this future a reality, investors would have to limit their trading to existing reserves, without adding newly mined gold to their coffers.

A world with a shrinking supply of gold would likely mean that consumers would pay more for the same 24-karat pure gold ring. But more likely, jewellery purchases would shift to cheaper (and more durable) alloys of gold that are already popular. And in the future, demand for gold may decline as consumers become more concerned with making sustainable choices.

The role that invested gold plays in the global economy would likely continue to function regardless of extraction. Like Renaissance art, gold is valuable precisely because it is scarce. Ending gold mining would not put an end to the buying and selling of gold for bank vaults. Instead, it would make existing stocks of gold more valuable.

Irrespective of whether the world needs gold, our research suggests that the world does not need gold mining.

Private investors and central banks may balk at this idea. The US government, for example, is the world's single largest owner of gold, holding US$11 (9.1) billion in reserves. But transitions to sustainability are always hard-won and the gold industry is no exception.

Inspired by other transitions

Like gold, the extraction of fossil fuels is also environmentally damaging. But unlike gold, fossil fuels provide warmth and electricity to homes and businesses, power to vehicles and fertiliser to farms. Transitioning away from this resource required decades of research and investment into clean energy technologies.

By contrast, finding substitutes for gold does not require any research. Jewellery can be made more sustainable by blending gold with other metals. Investors can rely on existing gold stocks and diversify to other stable assets. And technology can continue to use recycled gold when appropriate.

Closing gold mines is the first step. But many regions have grown dependent on gold mining, and artisanal mining alone supports as many as 19 million miners and their families worldwide, mostly in developing economies.

These miners deserve a just transition that ensures they do not become collateral damage in the shift to sustainability. Governments must provide a robust safety net for former gold miners and their families. That includes offering low-cost training and reskilling to ensure that miners can find employment in more sustainable industries.

Steps toward sustainability

Responsibly drawing down gold extraction will take time. But several measures are available to begin the transition today.

On the demand side of the industry, major jewellery brands, including Pandora, have already committed to using only recycled gold by 2025. Global technology firm Apple has also recently set a goal to use exclusively recycled materials by 2030.

On the supply side, mining companies should begin retiring mines that extract only gold. Many copper mines produce gold as a byproduct, which will likely continue into the future.

Meanwhile, institutional investors should stop investing in new gold mines. That includes groups like the World Bank, which has invested US$800 (£660) million in gold mines in Africa, Asia, South America and the Pacific Islands since 2010.

Justice-minded fund managers, such as those overseeing endowments, should add gold mining firms alongside coal producers to their divestment lists. And central banks should redirect their future investments toward other stable stores of value, or at least source exclusively recycled gold.

The world is filled with difficult sustainability trade-offs. Gold mining is not one of them. Drawing down this industry stands out as a relatively easy way to reduce humanity's footprint on a fragile planet.

Artisanal gold mining near Kouremale, northern Guinea.
Image: Tommy E Trenchard/Alamy Stock Photo

Related articles

Artisanal gold mining in South Africa is out of control. Mistakes that got it here. Published: August 3, 2022 9.25pm AEST https://theconversation.com/artisanal-gold-mining-in-south-africa-is-out-of-control-mistakes-that-got-it-here-188038

Gold mining leaves deforested Amazon land barren for years, find scientists https://theconversation.com/gold-mining-leaves-deforested-amazon-land-barren-for-years-find-scientists-141639

Pictures from outer space reveal the extent of illegal gold mining in Peru https://theconversation.com/pictures-from-outer-space-reveal-the-extent-of-illegal-gold-mining-in-peru-159416

200 EXPERTS DISSECTED THE BLACK SUMMER BUSHFIRES IN UNPRECEDENTED DETAIL. HERE ARE SIX LESSONS TO HEED

The Conversation 2023

The Black Summer bushfires of 2019–20 were cataclysmic: a landmark in Australia's environmental history. They burnt more than 10 million hectares, mostly forests in southeast Australia. Many of our most distinctive, ancient and vulnerable species were worst affected.

A new book released today, titled Australia's Megafires, synthesises the extent of the losses. The work involved contributions from more than 200 scientists and experts. It provides the most comprehensive assessment yet of how the fires affected biodiversity and Indigenous cultural values, and how nature has recovered.

The work reveals a picture of almost unfathomable destruction. More than 1,600 native species had at least half their range burnt. And hundreds of species and ecosystems became nationally threatened for the first time, or were pushed closer to extinction.

We must use Black Summer as an opportunity to learn – and make fundamental changes. Here, we outline six lessons to heed.

1. Natural systems are already stressed

Problem: Even before Black Summer, most Australian ecosystems were already struggling due to multiple threats.

The threatened alpine bog communities in the Australian Capital Territory, for example, were already being damaged by climate change, weeds and feral animals. Then the Black Summer fires came through and burnt 86% of known sites.

Put all these threats together, and recovery for these ecosystems – which are slow to develop – will not be easy. They may be lost altogether, along with threatened animals that call the bogs home, such as the broad-toothed rat.

Solution: Managing crises such as fires is not enough on its own. Our natural systems must be made more resilient. More effective legislation and management is needed to control all threats that degrade nature. And in some cases, threatened species may need to be relocated to put them out of harm's way.

2. We don't know what, or where, all species are

Problem: Thousands of Australian species are not (or barely) known to science. It's very hard to protect a species if we don't know it exists, where it lives or how it responds to fire.

For example, it's likely that the Black Summer fires sent many invertebrate species – such as insects and spiders – to extinction. But we'll never know because they were never described by Western science, and their distributions were never traced.

Only about 30% of Australia's estimated 320,000 invertebrate species have been described by taxonomists. Of those that are described, most are known from only one or two records, which provides only limited insight. Information is similarly poor for fungi.

Solution: We need to gather more information about how species and environments respond to fires, and to what extent conservation efforts after fires are working. This is especially true for poorly known species groups. And the data should be made accessible to all who seek it.

RIGHT: Loss of alpine bogs threatens the survival of the native broad-toothed rat. AAP Image/Supplied by Museums Victoria, Heath Warwick

3. Emergency responders don't have enough information

Problem: Emergency responders told us that during the fires, they didn't have the information to prioritise the most important areas for conservation.

We found across 13 agencies, just two threatened species were covered by a specific and accessible emergency plan: the Wollemi pine and the eastern bristlebird. These plans told emergency responders what rescue action was needed.

For example, a plan was in place to protect the only known natural stand of Wollemi pines, in New South Wales. This prompted an extraordinary firefighting effort during the Black Summer fires. The effort was successful.

Solution: More than 1,800 of Australia's plant and animal species are at risk of extinction. We must identify which are a priority, where they are, and how to protect them from bushfires. This information must be communicated to emergency responders and incorporated into regional fire management plans.

4. Biodiversity usually comes last

Problem: Traditionally, the hierarchy of what to protect in disasters goes like this: first human life, then infrastructure, and finally biodiversity. If this hierarchy continues, some of our most significant species and natural environments will be lost.

In one example recounted to the book's researchers, fire authorities decided to prioritise saving a few farm sheds over 5,000 hectares of national park.

Solution: There are cases, such as avoiding extinctions, where protecting nature is more important than saving infrastructure. Community priorities should be surveyed, and the information used to inform planning and policy.

Legal obligations to protect biodiversity in fires are few. The current re-working of federal environment laws provides an opportunity to change this.

5. Conservation funding is grossly insufficient

Problem: Decades of sustained management effort is needed to recover many species and environments affected by fire. Unfortunately, funding for the task is short-term and inadequate.

For example, both state and federal governments invested heavily in controlling feral herbivores, such as deer, in the months after the fires. This was done to protect unburnt and regenerating vegetation. Yet, eventually the funding dries up and feral populations rebound.

Extra funding for some short-term recovery projects flowed in the wake of the Black Summer fires – from governments, the private sector and the community. But for many species, recovery will be a long-term proposition – if it happens at all.

Solution: Governments must stop seeing spending on the environment as optional. It's as fundamental to our society and well-being as health and education – and funding levels should reflect this.

An endangered Rosenberg's monitor at Kangaroo Island, after the Black Summer fires. For many species, recovery is a long road. Image: David Mariuz

6. First Nations knowledge has been sidelined

Problem: First Nations people have used fire to manage forested landscapes for millenia. Yet their knowledge and perspectives have not been incorporated into forest fire management and recovery.

So how has this come about? Barriers identified in the book include inadequate employment and training opportunities for First Nations people to undertake cultural burning activities. Also, First Nations people are frequently denied access to Country to rekindle and develop their land management skills, and lack the legal authority to undertake cultural burning.

And as the book shows, cross-cultural challenges mean non-Indigenous fire officers can have limited appreciation or knowledge of Indigenous cultural burning protocols.

Solution: Indigenous people should be supported to rekindlecultural fire practices in forests. And non-Indigenous fire managers should, with consent from First Nations people, incorporate these practices into policies governing fire management and recovery.

What's more, species and sites that are culturally important to First Nations people should be prioritised for protection and recovery.

Harnessing our grief

The Black Summer fires showed people care. The disaster triggered an outpouring of grief from Australia and around the world. We understood one thing clearly: we were losing what enriches our lives.

But protecting our precious natural assets requires a fundamental reset of Australia's fire management.

More broadly, the Black Summer fires kickstarted a huge collaborative recovery effort from governments, conservation and research organisations, and First Nations groups. If we're to be better prepared for future megafires, this impetus must continue.

Libby Rumpff ,University of Melbourne
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Sarah Legge, Australian National University
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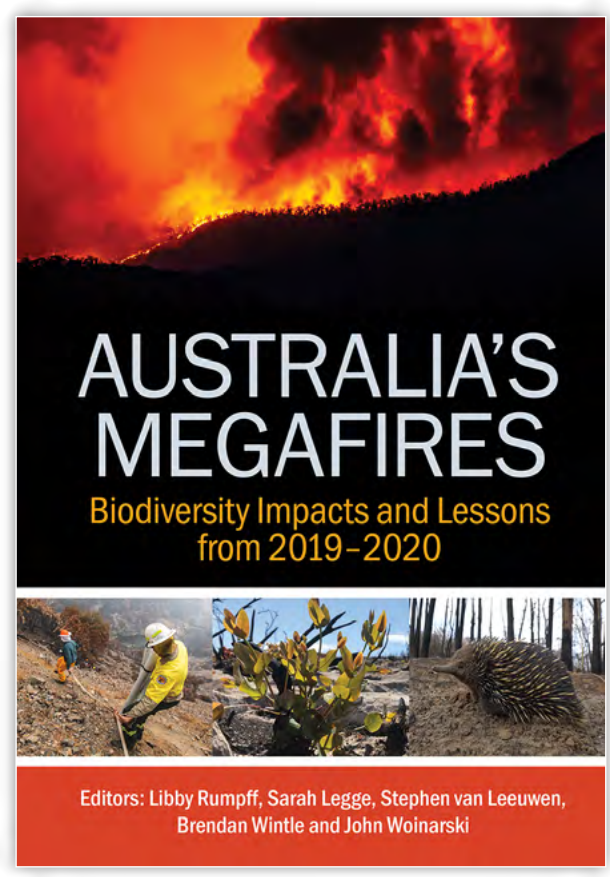
First Nations fire knowledge has been sidelined. Pictured: a workshop on Indigenous fire practices in Bungendore, NSW, in 2020. Image: Kydpl Kyodo

https://theconversation.com/200-experts-dissected-the-black-summer-bushfires-in-unprecedented-detail-here-are-6-lessons-to-heed-198989

EDITOR BOOK RECOMMENDATION

Australia's Megafires.
Biodiversity Impacts and Lessons from 2019 – 2020.
CSIRO PUBLISHING https://www.publish.csiro.au/book/8085/



WHAT AUSTRALIA LEARNED FROM RECENT DEVASTATING FLOODS

The Conversation 2023

Iftekhar Ahmed Associate Professor, University of Newcastle

Australia and New Zealand have both faced a series of devastating floods triggered by climate change and the return of the La Niña weather pattern. So it makes sense that Australia has now sent disaster crews to help with the aftermath of Cyclone Gabrielle.

With five serious floods in the space of 19 months in 2021–2022, Australia's experiences – and how people responded – offer New Zealand a guide for recovering and rebuilding after an extreme weather event.

The flooding events in both countries share two key common elements. First, the floods broke previous records and were the largest in recent history. Second, there were also repeat flood events.

In Auckland, there were two massive floods within five days, while Cyclone Gabrielle became the Coromandel's fifth severe weather event for 2023 and devastated other parts of the North Island.

The other common factor is urbanisation. Auckland's population has been growing, resulting in the increasing development of the built environment. Intensifying urban development places pressure on existing drainage systems – parts of which are no longer fit for purpose.

Extensive built-up and paved areas with hard, impermeable surfaces can also cause rapid run-off during heavy rain, with the water unable to be absorbed into the ground as it would be in soft, vegetated areas.

LEFT: Disruption by floods to the road connection to Aberdeen, Hunter Valley. Image: NSW Surf Lifesaving, author provided

Working with the community

Our **recent research** in the Hunter Valley in Australia – one of the areas affected by those five successive floods – identified similar factors contributing to the flooding events, including a rapidly growing regional population.

Two of our research sites – the Cessnock and Singleton local government areas – had growing urban centres that reflected a similar development trajectory to Auckland, albeit in a smaller scale.

Our research in the Hunter Valley established the importance of identifying existing community resilience and gaps. We also observed the need to involve the community at all levels. This included having early warning systems and evacuation protocols in place to improve community access to information and warnings.

The State Emergency Services (SES) is the main agency in New South Wales responsible for flood response and management. Supported by community volunteers, the SES has a clear focus at the local level.

This community focus is evident with its "door-knocking kit", which is based on a community-level vulnerability assessment. The SES has a list of those in the community who are most at risk, such as the elderly and people with disabilities. When a flood risk becomes evident, SES volunteers go knocking on doors to check their preparedness and provide evacuation support.

The equivalent of SES in New Zealand, Auckland Emergency Management, could learn from this community-based approach and include it within its Community Group Support initiative, so that future disaster responses can be more closely tailored to the community.

In the recent floods in Auckland, communication was an issue. Relaying directives and information through multiple institutional layers led to confusion, which could have been avoided through a closer community-based approach.

Building a volunteer army

Another key factor in Australia is the large cadre of SES volunteers – around 9,000 in New South Wales, a state with a population of just over eight million. This is a significant form of social capital, without which the current approach to flood response and management would not be possible.

While there are initiatives in New Zealand to attract and engage volunteers, more needs to be done. Civil defence needs to conduct a structural review of the existing volunteer organisations that work in the disaster and emergency response field to identify ways to improve the recruitment and retention.

We also found evidence of volunteer "burn-out", meaning there's a need to support volunteers emotionally and financially during extended periods of disaster response and recovery.

While there is a large number of SES volunteers in Australia, more are needed as climate change drives more frequent, extensive and intense disasters. Given the similar nature of repeat climate-related disaster events in New Zealand, provisions for a large cadre of well-supported and well-trained volunteers is necessary.

A review of existing volunteer agencies and community organisations should be undertaken to identify ways they can be harmonised to avoid competing pressures for resources. As well, there's a need to nurture collaboration between agencies to help with sharing skills, training, data and resource management.

The need for resilience

Perhaps the key lesson for New Zealand, and also Australia, is the need to think beyond emergency management to building long-term resilience within agencies and communities.

As climate-related disasters become more common, we need to think about how our cities grow and how we can incorporate flood resilience by retaining green areas and vegetation, improved drainage and transportation links.

But both countries also need to focus on being ready for a disaster, instead of managing it after it happens. In doing so, the pressures of managing the disaster when it arrives would be less – and so would the long-term impacts on people and the economy.

State Emergency Services played an important role in working with the community during and after the Hunter Valley floods. Image: NSW Surf Lifesaving, author provided

FLOODS CAN BE A DISASTER FOR HUMANS – BUT FOR NATURE, IT'S BOOM TIME

The Conversation 2022

Paul Humphries Associate professor in ecology, Charles Sturt University
Keller Kopf Lecturer, Charles Darwin University

Humans, as a rule, do not like floods. And three years of La Niña rains have meant Australians have had more than enough of floods.

But Australia's plants and animals have evolved alongside periodic floods, as they have for fire. For them, floods are a boon. These pulses of water are vital to the health of most river floodplain ecosystems. For some native fish, floods create new habitat as the waters fill floodplains, wetlands and creeks. Many trees like river red gums need periodic flooding too.

Floods trigger a huge spike in growth. Nutrient-rich sediment is washed downstream and out on to floodplains. This is a boon to algae and aquatic plants at first, and, once the water evaporates, to grasses, shrubs and trees. Herbivores such as wallabies and wombats feast on the new growth.

Most of the time, rivers stay in their main channels and floodplains are dry. But in years like this one, so much rain falls that water spills over the banks and fills floodplains. This is a life-giving process which nourishes and replenishes. Without floods, rivers would not be rivers – they'd just be drains, unfit for all but the very hardiest of animals and plants.

Herbivores like wallabies flock to the new growth after floods. Image: Shutterstock

Why does nature need floods?

It's not all good news for nature. Flooding is a disturbance for wildlife and plants, moving things around and shaking things up. Some animals may drown, high flows may rip out plants and even undermine and topple trees. Low-oxygen blackwater events and fish kills – heartbreaking for many – often follow floods, as they have recently on the Murray. But after the damage comes the boom.

Once the initial pulse of water subsides, it often takes much longer for the water to evaporate or drain from the floodplains. Plants killed by the water will add to the organic matter load, which may later be used by other plants.

The pulse of nutrients that goes with flooding is wonderful for freshwater phytoplankton (miniscule aquatic plants), as well as zooplankton which feed on them, such as tiny rotifers, known as wheel animals, and crustaceans. Some fish leave the main channel of the river and swim onto their new temporary habitat, feeding on the zooplankton. Waterbirds follow them.

Should the timing be right, native fish like golden and silver perch may breed in floodplain wetlands. Their larvae are poor swimmers, and these still, food-rich water bodies are ideal nurseries.

South Australia's Kati Thanda-Lake Eyre has only filled a handful of times over the last century. But the unprecedented rains this year have partly filled the lake. When water covers the arid land, brine shrimp eggs hatch in their millions and start feeding and breeding. It's a brief boom for fish, but as the water evaporates, the lake gets saltier and eventually kills the fish. Pelicans, cormorants, terns and gulls head inland to feast on shrimp and dying or dead fish.

In northern Australia, many rivers are not dammed, and widespread natural flooding occurs most years. Indigenous people here are accustomed to living alongside flooding and have been making use of the riches of floodplain productivity for more than 50,000 years. Tropical floodplains offer food and habitat

to everything from aquatic plants and barramundi to saltwater crocodiles and magpie geese.

In Australia's south-east, floodwaters generally don't linger quite as long as they do in the tropical north. But they do rise rapidly – sometimes several metres over only a couple of days. Much of the water will never return to the main channel of the river but will evaporate slowly. Deeper remnants like billabongs, lagoons or oxbow lakes – actually old river channels – linger longest.

The giant of Australia's rivers, the Murray, takes longer to flood because Australia is mostly flat. Pulses of water move slowly down its tributaries to the main channel. It can take weeks to months for rain that falls on the Great Dividing Range to make it to the Murray's mouth at Goolwa in South Australia.

These lingering floodwaters are perfect for freshwater mussels, as well as frogs, lizards, platypus and snakes. Bottlebrushes, wattles, reeds, rushes and aquatic plants do well out of floods too.

Of course, introduced species often thrive too. Common carp populations typically boom after floods. And willow trees and other invasive aquatic plants that spread through pieces breaking off, do well on the back of floods.

Our uneasy relationship with rivers

Nature needs floods. But while you might not believe it, we need them too. Most of the world's major cities were founded next to rivers, which gave their inhabitants water, fish, transport, and fertile farmland. But for all river cities, there are times when the river surges and can destroy houses and livelihoods.

Many cities have tried to tame floods with levees and dams. But as we're finding now, you can reduce the impact of smaller floods – but the big ones are all but unstoppable.

Floodplain fertility can be seen with the naked eye, as in this image of the Murray River flowing through the Riverina in New South Wales. Image: Shutterstock

Because we have farmed and settled so many floodplains, farmers are particularly vulnerable to floods. Floodwaters hitting bush will be slowed by trees and plants. But farms are often cleared, which can see more erosion take place. Whole farms can be devastated by flooding, leading to **food prices spiking**.

With climate change, Australia is expected to experience bigger and more frequent floods. This may be a good thing for nature but means people will no longer be able to live safely in some places. It will also mean iconic ecosystems like Kakadu **will be at risk**, with sea level rise predicted to push saltwater into almost half of its famous wetlands by 2070.

While floods bring pain in the short term, over the longer term both humans and nature need the benefits they bring.

The Conversation 2022 – https://theconversation.com/floods-can-be-a-disaster-for-humans-but-for-nature-its-boom-time-192837

Birds like red-necked avocets flock to ephemeral lakes like Kati Thanda–Lake Eyre. Graham Winterflood/Flickr, CC BY

FLOODS PLAY A VITAL ROLE IN ECOSYSTEMS – IT'S TIME TO GET OUT OF THEIR WAY

The Conversation 2016

Floods are often seen as a force of destruction. From photographs of crops under water and houses being swamped by swollen rivers, to stories of road, business and public amenity closures, the news during flooding understandably emphasises human loss.

But as river ecologists, we find it hard not to see the positive side of flooding. Why? Because although floods cause destruction, they are also creators, of which we are all beneficiaries.

Floods as destroyers

Rivers have played pivotal roles in most civilisations throughout human history due to the universal need for drinking water and other resources like food. Rivers feature in the mythology, religion, philosophy and culture of so many societies and also play political roles, acting as borders between tribes, states and nations.

Virtually all of the world's major cities were founded on soils made fertile by flooding. In fact, floods – and the fertility that they bring - have been one of the most important reasons why human societies exist where they do today.

But despite their benefits to humans, rivers also bring death and destruction. In terms of lives lost, the top two worst natural disasters on record are floods.

The worst was in 1931, when at least 4 million people died and almost 30 million people were affected by floods in China.

In the United States, the Great Mississippi Flood of 1927 affected about 630,000 people and covered an area of almost 70,000 square kilometres. That flood's destructive power was exacerbated by the failure of levees, as has commonly happened elsewhere.

By contrast, death tolls from Australian floods have been comparatively light. Purportedly the most lethal flood in Australia's history was the 1852 Gundagai flood, which claimed almost 90 lives. Many drowned because the town was previously built on the lowland flood plain of the Murrumbidgee River.

Deaths and destruction occur to the extent they do because of our desire to live in the very areas that are most prone to flooding. But with living on flood plains comes risk, and sooner or later, a big flood will come.

Floods as creators

Generally, rivers flood every one to two years. It is just what they do. The reason is because of the interaction of geology, geomorphology and climate.

When rivers flood, water moves out onto the flood plain. But so does sediment and a lot of organic matter, nitrogen and phosphorus – the energy and materials that fuel river ecosystems and productive farm land. There is in fact mutual exchange of these rich materials between rivers and flood plains, which is why river flats are valued so much by farmers, and often why these areas became permanent settlements.

Some fish and other animals move backwards and forwards between the main channel and flood plain too, but all benefit from the rich materials transported by flooding.

Nature over nurture

In our ambition, we think that we can live on and exploit flood plains through controlling flooding. But this has been shown time and time again to be deluded.

Since the industrial revolution, vastly ambitious and expensive engineering projects around the world have sought to separate rivers from their flood plains, to reclaim land on which to build houses or to farm, and to prevent flooding. In most cases, levees have been built to effectively raise the level of riverbanks.

Levees have been constructed to separate rivers from their flood plains. Bidgee/Wikimedia, CC BY-SA

While these reduce the incidence of minor floods in some areas, they mostly fail to stop the major ones, and generally make flooding much worse in areas downstream.

Flood damage in the European Union from 2000-12, for example, cost an average US$6.8 billion a year, despite the extensive networks of levees designed to prevent flooding. Similar networks of dams and levees are ineffective at preventing large-scale flooding in Australia. Climate change is set to make the costs even higher.

Going with the flow

If we've learned anything from floods, it is that trying to prevent flooding, especially the big ones, is enormously expensive, rarely works and causes ecological and socio-economic damage. There are, however, ways in which people can live and enjoy the benefits of rivers without causing damage.

For example, the Yolo Bypass in Sacramento, California is a clever way of harnessing the floodplain's capacity to buffer the effects of flooding, rather than trying to prevent flooding in the first place. The bypass, built in the 1930s, transports a large percentage of high flows away from the city, and into a reconnected flood plain. The flood plain is, during non-flood periods, used for agriculture and other activities.

Researchers argue that there are many human uses consistent with periodic flooding, such as the growing of pasture and timber, but building infrastructure on flood plains is not one of them.

Solutions such as these are far less costly than trying to prevent flooding and mopping up after inevitable failure. But of course, this requires a transformation in thinking when planning the design of towns and in developing flexible agricultural practices.

Floods are reminders that nature can be both creator and destroyer. Herodotus referred to Egypt as "the gift of the Nile". It would be wise of us to view our own flood plains in the same way: that they are the gift of our rivers.

We should learn to accept that there will be times when the landscape on which we live, farm or play is reclaimed by the river that created it. On the flipside, we can rejoice when the river spends its time confined to its banks, and make hay while the sun shines.

Paul Humphries Senior lecturer in Ecology, Charles Sturt University

Nicole McCasker Postdoctoral researcher, Charles Sturt University

R. Keller Kopf Postdoctoral research fellow, Charles Sturt University

The Conversation 2016 – https://theconversation.com/floods-play-a-vital-role-in-ecosystems-its-time-to-get-out-of-their-way-66676

The Yolo Bypass is CalifoRrnia is one way of harnessing floodwater for good. Source: Mwehman/Wikimedia, CC BY-SA

INDIGENOUS EXPERTISE IS REDUCING BUSHFIRES IN NORTHERN AUSTRALIA. IT'S TIME TO CONSIDER SIMILAR APPROACHES FOR OTHER DISASTERS

The Conversation

Northern Australia is by far the most fire-prone region of Australia, with enormous bushfires occurring annually across thousands of square kilometres. Many of these vast, flammable landscapes have precious few barriers to slow down a fire. Infrastructure and resources are limited, and people are widely dispersed across the region.

Fire risk reduction in the recent past included very local prescribed burning operations. The overall effect was small, with huge greenhouse gas emissions from out-of-control savanna wildfires.

So, what might a better approach look like?

Our team at the Charles Darwin University's Darwin Centre for Bushfire Research has been working with Indigenous land managers, conservation, research and government organisations in northern Australia for the last 25 years to find more effective ways to manage wildfires.

These collaborations have led to a new approach, blending modern scientific knowledge with traditional Indigenous land management practices to reduce bushfire risk.

How? By reducing fuel load through a patchy mosaic of small, low intensity, burns early in the fire season that cut the risk of late dry season fires when greenhouse gas emissions are much greater.

Reducing fuel load through a patchy mosaic of small, low intensity, burns early in the fire season cuts the risk of late dry season fires when greenhouse gas emissions are much greater. Waanyi Garawa Rangers (Jimmy Morrison), Author provided

By collaborating with Indigenous ranger groups, this experience shows Australia can develop economically sustainable long-term solutions to manage bushfire risks — and shows what might be possible for other natural hazards such as cyclones and floods.

Such collaborations deliver benefits such as:

- reducing the risk of wildfires and other natural hazards
- engaging widely with dispersed remote communities
- building community resilience to bushfires and other natural hazards
- reducing greenhouse gas emissions (which soar when savanna fires get out of control)
- saving government costs
- protecting biodiversity and
- conserving water.

When done well, a collaborative approach to emergency management can create opportunities on country, enhance cultural and learning opportunities for Indigenous peoples and deliver environmental benefits for everyone.

Making fire management economically sustainable: a case study

Indigenous fire management skills and traditions have long been practised in Australia but part of the challenge, as one study put it, is "finding the economic means to reinstate this type of prescribed strategic management." In other words, how do we pay for it?

Northern Australia is by far the most fire-prone region of Australia, with enormous bushfires occurring annually in some places. AAP Image/Dave Hunt

After Australia ratified the Kyoto Protocol in 2007, there was renewed focus on reducing wildfires in Australia's tropical savannas due to their significant role in creating greenhouse gas emissions.

In collaboration with Indigenous land managers and others, our collective efforts helped to develop what's known as the savanna burning methodology. This system incentivises management of fire in the north.

Under this method, Indigenous land managers in tropical savannas can earn income for managing fire on their land to reduce greenhouse gas emissions. This is done through a tightly controlled system in which their emissions savings are measured in terms of carbon credit units.

Global and local benefits

This approach has allowed a new carbon economy to bloom in remote northern Australia. As one **study** put it:

> *Since the development of the first savanna-burning methodology determination in 2012, 25% of the entire 1.2 million km2 eligible northern savannas region is now under formally registered savanna-burning projects, currently **generating** [more than] A$30m per year.*

These self-acquired funds go far to support Indigenous rangers to develop and improve skills so they can continue improving fire management across the north.

As Dean Yibarbuk, fire ecologist and senior traditional owner in West Arnhem Land has **said**:

> *This fire management program has been successful on so many levels: culturally, economically and environmentally. Through reinstating traditional burning practices, new generations of landowners have been trained in traditional and western fire management, hundreds of thousands of tonnes of greenhouse gas have been abated, and the landscape is being managed in the right way.*

A consistent and reliable flow of funds from carbon contracts, as well as other government and philanthropic sources, further offers many other socio-economic benefits. It has been instrumental in allowing art centres, weed and feral animal control businesses, rock art conservation projects, and bi-cultural schools to flourish.

Investing money to save money

This system shows what's possible with the right engagement and policy levers. Perhaps one day a similar approach could help reduce risk from other kinds of natural disasters, all while building community resilience.

In the future, could we have similar systems where flood mitigation projects or cyclone risk reduction projects are made economically viable for local communities?

This would reduce reliance on emergency services. It also makes it less likely cultural protocols are breached when non-local emergency personnel are sent in. For example, tree removal is a common cyclone risk reduction practice but it's important to know which trees are culturally significant in a community, and why you need to leave them alone.

For these approaches to work, **genuine and ongoing engagement**with Indigenous peoples and dispersed remote communities is **essential.**

As a start to this engagement, we brought together Indigenous leaders, government representatives, and emergency management agency personnel from across the north for a meeting at Charles Darwin University late last year, supported by the Bushfire and Natural Hazards Cooperative Research Centre.

Many of the key personnel in these groups were meeting for the very first time, despite having worked for years on trying to address the same problems.

Self-acquired funds from the system go far to support Indigenous rangers to develop and improve skills so they can continue improving fire management across the north. Waanyi Garawa Rangers (Jimmy Morrison), Author provided

With appropriate funding, we could make such gatherings regular events so it's easier for these stakeholders to work together. Long term collaborations can reduce disaster risk for northern Australian communities who live there permanently, build their resilience, and cut significant costs for Australian governments.

Resources to cover training, transport, and logistics are crucial to implement such an integrated approach.

Long term solutions cost money. But by drawing on local Indigenous knowledge and expertise on disaster risk reduction, we can make huge savings in the long term.

Kamaljit K Sangha, Senior Ecological Economist, Charles Darwin University

Andrew Edwards, Research Fellow Bushfires, Charles Darwin University

Willie Rioli, Sr Fire Coordinator for the Tiwi Islands, Indigenous Knowledge

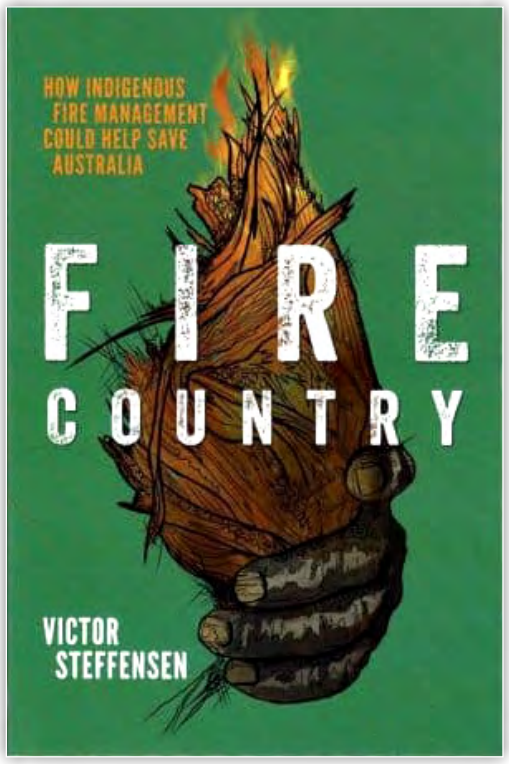
The Conversation 2021 – https://theconversation.com/indigenous-expertise-is-reducing-bushfires-in-northern-australia-its-time-to-consider-similar-approaches-for-other-disasters-155361

Indigenous land managers in certain areas can earn income for managing fire on their land to reduce greenhouse gas emissions. AAP Image/Dave Hunt

EDITOR BOOK RECOMMENDATION

FIRE COUNTRY

Victor Steffensen



WHY ADAPT TO CLIMATE CHANGE?

Source: Adapt NSW https://www.climatechange.environment.nsw.gov.au/why-adapt

What is adaptation?

Adaptation means making adjustments to decisions and activities, in consideration of climate change, in order to manage risks and harness potential opportunities.

The goal of climate change adaptation for NSW is to increase the ability of our environmental, social and economic systems to not only cope with a changing climate but thrive. It involves becoming climate-resilient, which is about reducing greenhouse gas emissions, and learning how to live with the impacts we can't avoid.

Why is NSW adapting to climate change?

The climate of NSW is changing. Average temperatures have been steadily rising since the 1960s. The decade from 2010 to 2019 was the hottest on record, while 2019 was the hottest year in NSW.

Climate change is already affecting the natural, social and economic welfare of NSW and will increasingly affect the environment and our quality of life in every part of the state.

Responding to climate change involves two key actions:

1. **Mitigation**: reducing emissions and stabilising the levels of heat-trapping greenhouse gases in the atmosphere; and
2. **Adaptation**: adapting to the changes we have already caused due to climate change, and the changes we anticipate in the future.

Mitigation vs Adaptation

Mitigation is about taking action to limit further changes in climate. These actions involve both reducing the greenhouse gases emitted into the atmosphere and enhancing the natural systems that store greenhouse gases such as oceans, forests, and soil (the sinks).

This is an ongoing mission that the NSW Government is committed to - but as our climate continues to change, we need to be able to adapt.

The goal of adaptation is to reduce our vulnerability to the harmful effects of climate change – such as sea-level rise or more intense extreme weather patterns. It is fundamental that the people of NSW are empowered to adapt, so we can, together, make a difference now and for future generations.

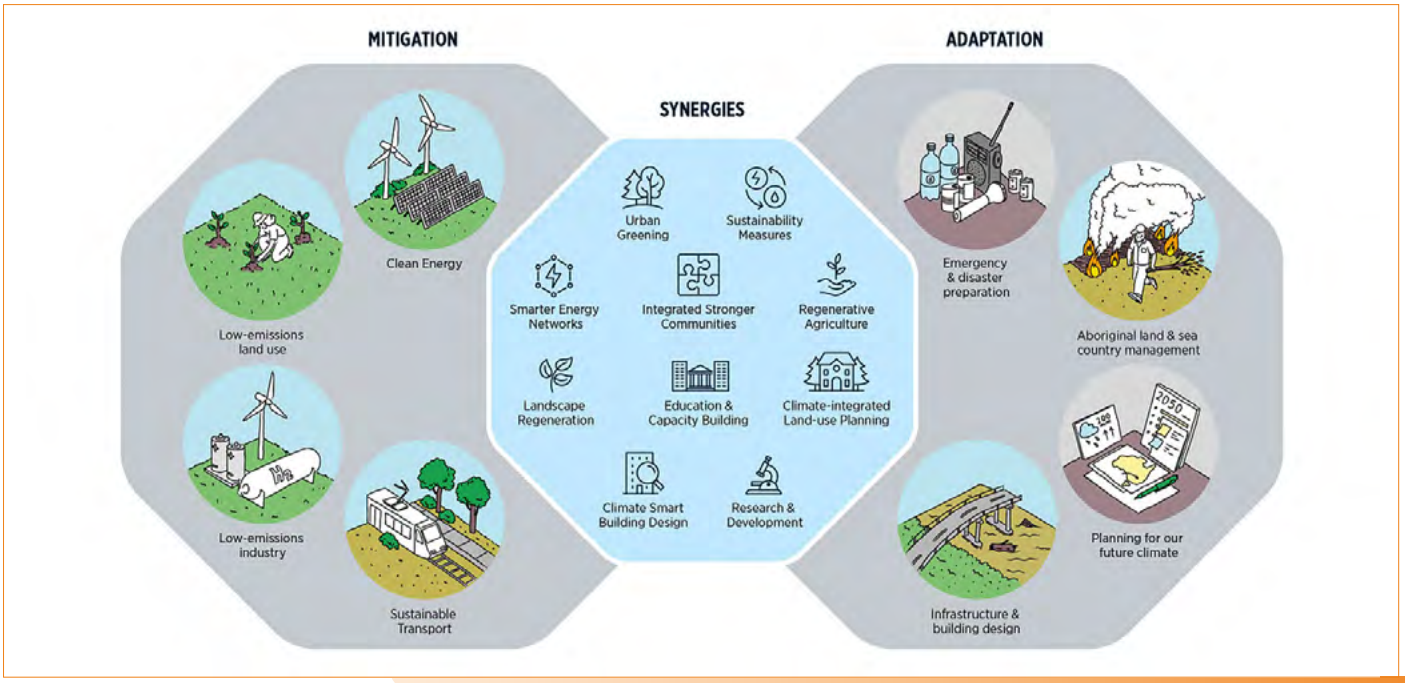
Who should adapt to climate change?

The NSW Government's objective is for the NSW community to work together to be more resilient to a changing climate.

The most effective climate change adaptation occurs at a local level through the actions of individuals, businesses and communities in response to location-specific climate change impacts.

The NSW Government will help NSW adjust to a changing climate by:

- Supporting local adaptation actions.



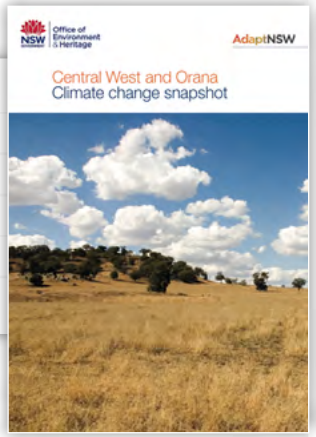
CLIMATE CHANGE ADAPTION

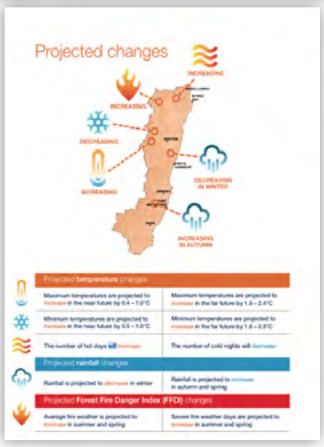
- Managing climate change risks to its own assets and services.
- Removing market, regulatory and governance barriers to the private sector and local government adapting effectively.
- Reducing climate change impacts on health and wellbeing.
- Managing impacts on natural resources, ecosystems and communities.
- Through our collective actions we can make NSW more resilient to a changing climate.

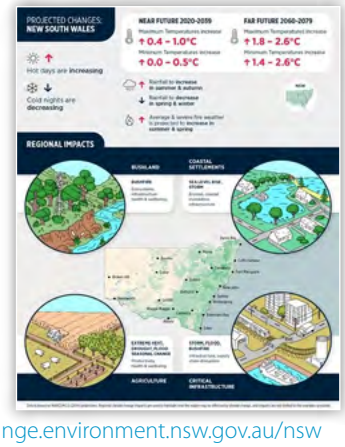
Source: https://www.climatechange.environment.nsw.gov.au/macksvilles-symbol-sustainability

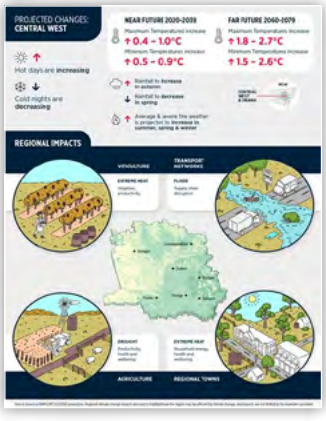
ADAPT NSW WEBSITE – A COMPREHENSIVE TEACHING RESOURCE

REGIONAL PROFILES and INTERACTIVE MAP









Explore the ADAPT NSW website – https://www.climatechange.environment.nsw.gov.au/why-adapt

Learn more about Climate Adaptation in NSW – https://www.climatechange.environment.nsw.gov.au/nsw

SYDNEY ROYAL BOTANIC GARDENS AND AUSTRALIAN INSTITUTE OF BOTANICAL SCIENCE

The Australian Institute of Botanical Science will advance fundamental knowledge of flora and drive effective conservation solutions to ensure the survival of plants and all life that depends on them.

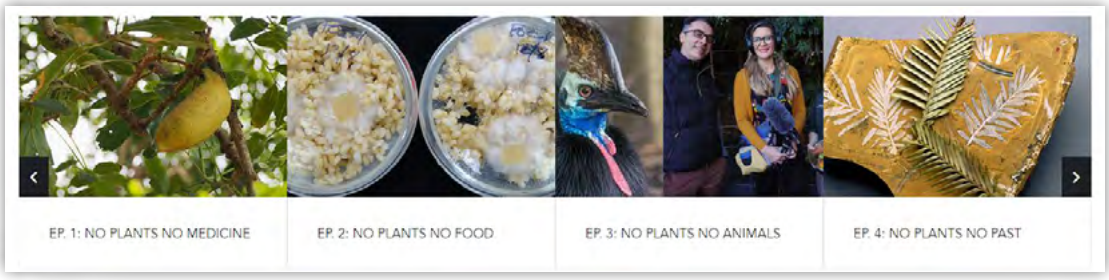
Download the Australian Institute of Botanical Science prospectus for a detailed look at the vital science work we undertake. https://www.rbgsyd.nsw.gov.au/science/australian-institute-of-botanical-science

Explore the Australian Institute of Botanical Science

Our world leading research and collections advance fundamental knowledge of plants and drive effective conservation. You can explore how we do this by taking a look at the elements that make up the Australian Institute of Botanical Science.

Did you know about the Royal Botanic Garden podcasts?

These interesting podcasts cover many topics in the Geography7–12 curriculum. Here are some to try. https://www.rbgsyd.nsw.gov.au/science/branch-out.



Discover the surprising world of plants in our award-winning Branch Out podcast.

THREE CORE PRINCIPLES OF THE CIRCULAR ECONOMY

Liam Taylor, Australian Circular Economy Hub

The linear economy is poorly positioned to handle the challenges presented by a rapidly growing human population on a planet with finite resources. But moving towards a circular economy will require a firm understanding of its three core tenets.

The linear economy is failing us in a big way. The "take, make, dispose" model has resulted in inefficient use of our natural resources, a culture of consumerism and a predisposition towards waste. On a planet with finite resources, this has to change.

There is a growing global movement aimed at transforming this linear model to a circular economy, but what does this really mean? How do we take that linear model and turn it on its head?

Defining the Circular Economy

Looking beyond the linear take-make-dispose extractive industrial model, the primary aim of a circular economy is to redefine what is meant by growth, focusing on positive society-wide benefits rather than narrower and purely economic metrics.

Essentially, a circular economy requires us to completely rethink what we understand as progress and, in the process, redesign our economic model. It entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural and social capital.

Graphic by the Ellen MacArthur Foundation.

There are three primary principles associated with this transition to a circular economy according to the Ellen MacArthur Foundation:

1. Design out waste and pollution
2. Keep products and materials in use
3. Regenerate natural systems

Only by integrating all three in a concerted approach can a fully circular economy be achieved.

Designing out waste and pollution

For too long our linear economic model has caused our waste management approaches to focus on end-of-life scenarios. A product reaches its use-by date or is replaced by a newer model and we are left asking how to dispose of the resultant "waste". But what if instead of building our products to reach obsolescence, we constructed them so the resources and materials used could be recovered and returned to the material cycle?

The first principle of the circular economy is about understanding that waste and pollution are largely a result of the way we design things and finding new and innovative ways to design out those negative impacts. Around 80 per cent of environmental impacts are determined at the design stage, meaning transitioning this area towards greater circularity can have amplified impacts throughout material cycles. By changing our mindset to view waste as a design flaw and harnessing new materials and technologies, we can ensure that waste and pollution are not created in the first place.

A prominent example of this kind of circular thinking can be seen in the turn towards reusable alternatives to single-use items such as coffee cups, water bottles and plastic straws and cutlery. By designing easily transportable, reusable alternatives we reduce our reliance on single-use products, a huge contributor to waste in a linear economy.

Keeping products and materials in use

The second principle of a circular economy is based on a simple premise: we can't keep wasting resources. On a planet with finite resources the products and materials we construct from those we extract must be kept in the economy for as long as possible. We can design some products and components so they can be reused, repaired, and remanufactured.

But making things last longer is only part of the solution, we also need to be able to get the resources used to create them back in the system so they don't end up in landfill. This is particularly pertinent for materials and resources with short lifespans such as food and packaging, which can cause huge amounts of waste without appropriate resource recovery processes.

Australia is no stranger to resource recovery, with recycling rates increasing from just 7 per cent of all waste in 1996 to 58 per cent in 2016/17. That still leaves around 40 per cent of all waste materials being disposed to landfill, that's equivalent to 21.7 megatonnes (millions of tonnes) of waste in 2016/17 according to the latest National Waste Report. To reduce this, we need to ensure we have appropriate collection systems for our various waste streams.

One example of this can be seen in container deposit schemes, an example of product stewardship legislation where the beverage industry is obliged to take greater responsibility for its packaging after it has been sold. Beverage suppliers must ensure that a system is in place for the recovery and recycling of their empty containers.

Regenerating natural systems

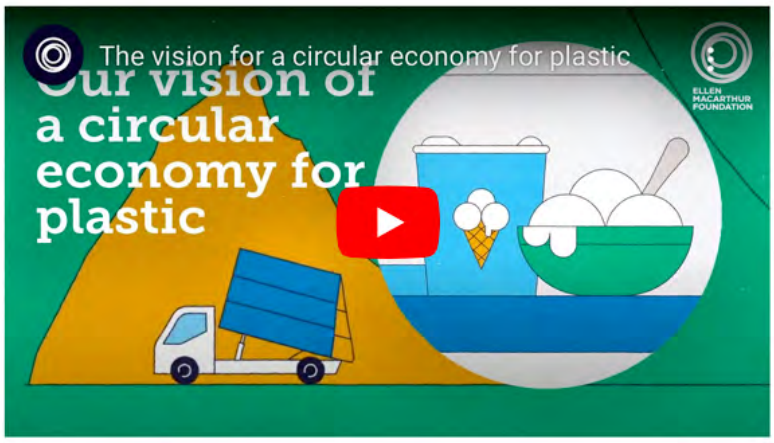
Perhaps the most transformative principle of a circular economy is in its emphasis on providing feedback loops that actively improve our natural environment. In the linear economy, environmentalism is predicated on trying to do *less harm*. Whilst this is an important guideline to follow in and of itself, the circular economy takes this to the logical next step by aiming to *do good* for the environment.

In nature, there is no concept of waste; everything is cyclical. All the great natural cycles – carbon, oxygen, nitrogen, water etc. – work in closed loops with little to no loss of resources through their cycle. The circular economy aims to mimic these natural cycles, creating an economic model that protects, supports and actively improves our environment.

This is particularly applicable to organic materials, which for too long in our linear economy have been treated as waste and disposed to landfill. This not only wastes the water and energy used to make the products in the first place but can also create negative environmental impacts as organic materials break down. When organic matter begins to rot in anaerobic environments like landfill, methane (a greenhouse gas with a warming effect around 25x stronger than carbon dioxide) is produced as a by-product. By returning valuable nutrients to the soil and other ecosystems instead of sending it to landfill, we can enhance our natural resources.

A rapidly growing movement exemplifying this principle is that of regenerative agriculture, which involves farming principles and practices that have positive impacts on the surrounding environment. This can involve projects such as increasing biodiversity levels, enriching soils, improving watersheds or enhancing ecosystem services, but ultimately, it's about doing good for the world around us.

- CIRCULAR ECONOMY
- AUSTRALIAN CIRCULAR ECONOMY HUB



POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS

The Geography Teachers' Association of NSW & ACT

GEOGRAPHY POSTERS FOR SALE

GTA NSW & ACT has printed a number of infographic posters for classroom use.

Posters are linked to topics studied in Geography K–12 for the Australian Curriculum and NSW Syllabuses.

- A **bank of questions** for individual and groupwork will be accessible via Google Drive to all schools /teachers purchasing posters.
- Posters can be purchased in **pre-packaged sets** or as **individual posters**.
- **New posters** will be added to the website throughout the year.

SOURCES AND PRICING

Posters have been sourced from organisations including the Geological Society (UK), Visual Capitalist and Graphic News. GTA NSW & ACT has also commissioned some posters. Posters are being sold in sets of 4 or 5 to make postage viable. Affordability was a key consideration when determining pricing.

Administration, printing and distribution, licensing and design costs where relevant are incorporated into the cost of each pack. Postage includes the cost of cylinders. A maximum of 5 posters will be packaged in any postage cylinder.

PACK 1: THE CARBON CYCLE – $70 includes p/h

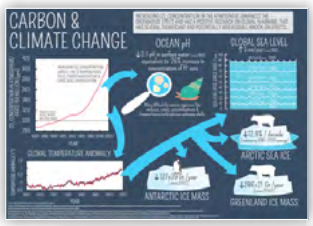
Click here to order Pack 1

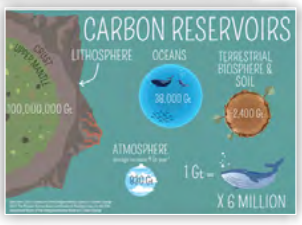
Contents:

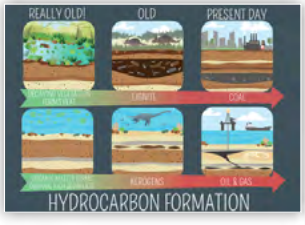
1 x A1 poster: **The Carbon Cycle**

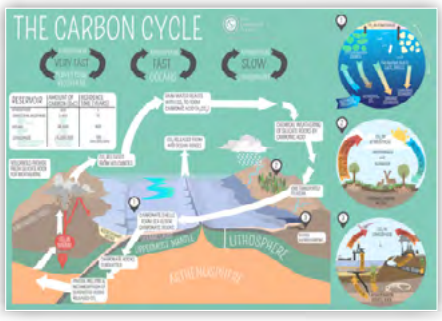
4 x A2 posters: **Carbon Set**

- **Carbon & the Greenhouse Effect**
- **Carbon Reservoirs**
- **Hydrocarbon Formation**
- **Carbon & Climate Change**









POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS

The Geography Teachers' Association of NSW & ACT

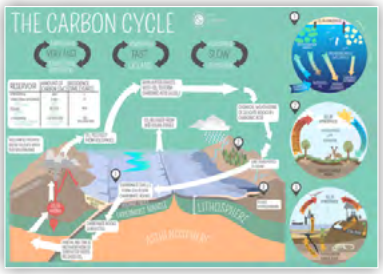
GEOGRAPHY POSTERS FOR SALE

PACK 2: GEOGRAPHY CONTENT – $81 includes p/h

Click here to order Pack 2

Contents: 4 x A1 posters

- **Plate tectonics**
- **Minerals in a smartphone**
- **The Carbon Cycle**
- **On the Brink: The biggest threats to Earth's biodiversity**



PACK 3: A1 CAREERS poster – 3 for $50 includes p/h

Where will GEOGRAPHY take you?

New Pack 3 coming Term 2

Also sold individually, see below...

About the poster sizes –
A1 = 594mm X 841mm
A2 = 420mm X 594mm
A3 = 297mm x 420mm

INDIVIDUAL SELECTION: A1 sized posters @ $15 per poster (one type per order)

Up to 5 posters $15 postage (1 cylinder)
6 to 10 posters $30 postage (2 cylinders) etc

Choose from posters:

- **Plate tectonics**
- **Minerals in a smartphone**
- **The Carbon Cycle**
- **On the Brink: The biggest threats to Earth's biodiversity**
- **Where will GEOGRAPHY take you?**

www.gtansw.org.au • gta.admin@ptc.nsw.edu.au • 02 9716 0378

POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS POSTERS

The Geography Teachers' Association of NSW & ACT

GEOGRAPHY POSTERS FOR SALE

INDIVIDUAL SELECTION: A1 & 60cm square posters @ $15 per poster (one type per order)

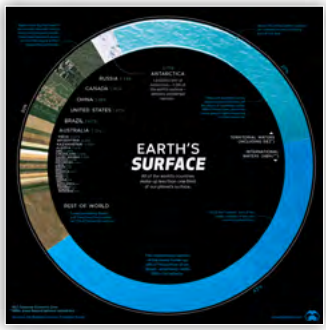
Up to 5 posters $15 postage (1 cylinder)
5 to 10 posters $30 postage (2 cylinders)

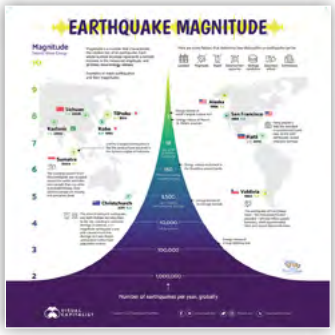
Choose from posters:

- **Biomes and Ecosystems** (A1 size)
- **Earth's surface**
- **Earthquakes**
- **UN sustainable development goals**

PACK 4: Three square posters – $55 includes p/h

Click here to order Pack 4

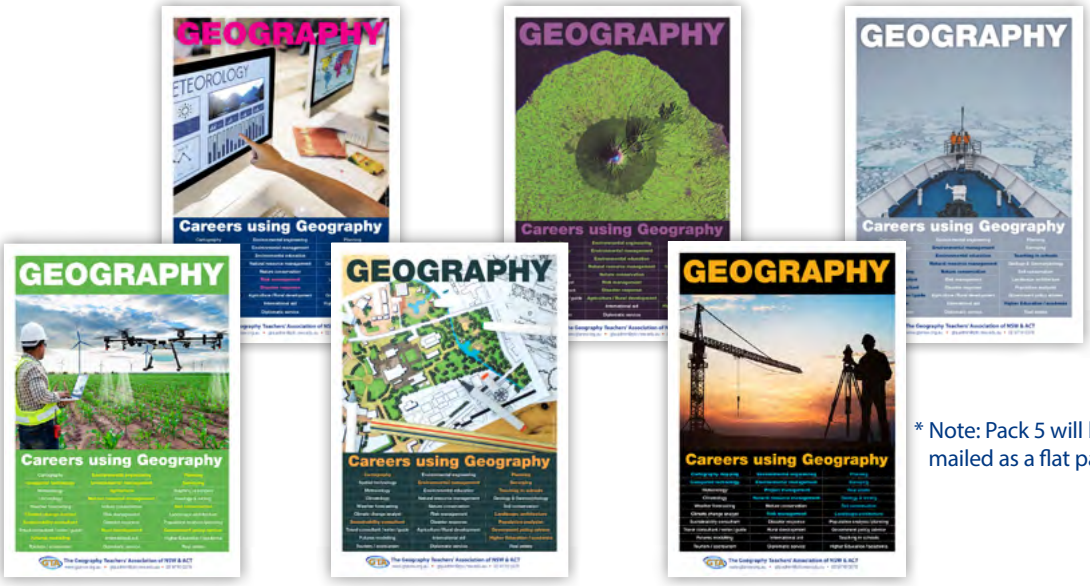




PACK 5: GEOGRAPHY CAREERS – $35 includes p/h*

A set of 6 x A3 **Careers Using Geography** flyers

Click here to order Pack 5



* Note: Pack 5 will be mailed as a flat pack

For more details and to order go to: www.gtansw.org.au/order-resources/

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Geography fieldwork

Stage 4 - 6

Conduct premium geographical fieldwork with NSW DoE qualified teachers.

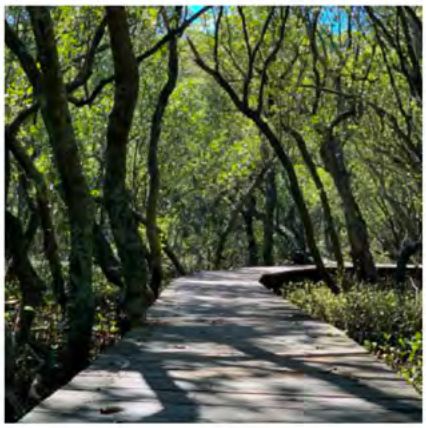
Students engage in fieldwork techniques to gather primary data within natural and human environments. They use environmental assessment equipment and sampling methodology to sample biophysical data. Geographical tools such as mapping and spatial technology are used to investigate human processes.

Stage 4 - Landscapes and landforms; Place and liveability

Stage 5 - Environmental change and management

New Stage 6 syllabus (Year 11) - Earth's natural systems with a focus on the processes, cycles and circulations within the Lane Cove River catchment; People, patterns and processes focusing on your local area; Human–environment interactions with a focus on climate change.

Maximum 10 classes. Experience, engage, enable, enjoy.



FIELDOFMARS
ENVIRONMENTAL EDUCATION CENTRE
EXPERIENCE ENGAGE ENABLE

NSW GOVERNMENT

RUMBALARA ENVIRONMENTAL EDUCATION CENTRE

Central Coast

BIOPHYSICAL INTERACTIONS: STAGE 6

NOTE: This program is being adapted for the new Stage 6 Focus Area: Earth's Natural Systems.

Program overview

Students will investigate the four components of the biophysical environment at Rumbalara Reserve. They will use their data collected to consider the environmental impacts of an increasing central coast population on Rumbalara Reserve and other reserves within the Coastal Open Space System (COSS).

Before visiting Rumbalara students will have access to population statistics, maps and past fauna survey information to understand the location of current development in the area and the importance of wildlife corridors.

Activities include:

- comparing two different vegetation communities using a variety of instruments to measure abiotic factors including anemometers, light meters, clinometers and soil testing instruments
- using water testing equipment to measure the quality of the water at Rumbalara Reserve and explain how the hydrosphere effects the rest of the biophysical environment.
- assessing human impact at Rumbalara Reserve

Download our **Stage 6 Biophysical Environments**

Avoca Lagoon

ECOSYSTEMS AT RISK: STAGE 6

NOTE: This program is being adapted for the new Stage 6 Focus Area: Ecosystems and Global Biodiversity.

Program overview

At Avoca Lagoon students will investigate the endangered Green and Gold Bell Frog, urban impacts on water quality, and conduct a kayak based survey of impacts and endangered ecological communities.

Activities include:

- using water testing equipment to measure the quality of the water at Avoca Lagoon and discussion how this impacts ecosystems
- using field work instruments to assess the habitat of the Green and Gold Bell Frog, includes pH, salinity and water temperature
- kayak survey to assess human impact along the riparian zone of Avoca Lagoon and view an endangered Grey Headed Flying Fox colony

Porters Creek Wetland

At Porters Creek Wetland students will study the management and impacts of stormwater runoff from a rapidly expanding urban area. Students investigate stormwater treatment devices, wetland ecosystems and measure water quality and the impact of changed hydrology on plants.

- using water testing equipment to measure the quality of the water at Porters Creek and discussion how this impacts ecosystems
- using field work instruments to measure abiotic factors including anemometers, light meters, clinometers and soil testing instrument
- bushwalk through Porters Creek Wetland and vegetation quadrat of endangered Woolly Butt Trees
- site visit to residential area in Watanobbi to view the effects of excess stormwater runoff on ecosystems.

Observatory Hill Environmental Education Centre is a specialist DoE school staffed by experienced DoE geography teachers. It offers a range of low-cost fieldwork options for S6 geography. Fieldwork options are currently available for Urban Places, People and Economic Activity, and Ecosystems at Risk. All fieldwork options include extensive support websites with introductory activities to familiarise students with the topics being covered, and resource materials for further study and/or assessment tasks. Book early to ensure your fieldwork coincides with your programming schedule. Non-DoE schools can also be catered for. Current fieldwork options include:


Barangaroo

Urban Dynamics at Green Square, Barangaroo or Pyrmont

These fieldwork options focus on the urban dynamics of renewal and consolidation. Students investigate the impact of the urban dynamic on each suburb and assess the sustainability and liveability of each case study using 'best practice' planning principles, in order to answer a fieldwork question. Some fieldwork activities include:

- undertaking a guided tour with specialist geography teachers
- collecting evidence of urban dynamics, including their economic, social and environmental outcomes
- mapping skills
- assessing liveability and sustainability using a rating index

People and Economic Activity at Taronga Zoo and Sydney Harbour Youth Hostel in The Rocks

These fieldwork options focus on a case study of an economic enterprise within the global tourism industry. Students listen to a presentation on the enterprise by Taronga Zoo educators, and observe and record aspects of its operations in the field.

Ecosystems at Risk – Kelp forests of SE Australia at Chowder Bay Sydney Harbour

Through an investigation of kelp forests in Chowder Bay, students learn about:

- how kelp forest ecosystems function
- where kelp forests are located
- how kelp forest ecosystems are changing
- the nature and rate of change affecting kelp forest ecosystems
- the human impacts on kelp forests
- current and future management strategies.

Students undertake fieldwork skills and methodologies that can be used to investigate kelp forest ecosystems including snorkelling and undertaking a transect to identify factors affecting kelp ecosystems.

Revised S6 Geography Syllabus– Proposed fieldwork options

Observatory Hill EEC is developing a range of fieldwork options to support the revised S6 geography syllabus. These include:

Year 11: People, Patterns and Processes (Millers Point)

Syllabus link: Study 3, Place and Cultural Change – one place at a local scale

A case study highlighting place and cultural change at a local level using geographical skills and tools.

Students will:

- Investigate Millers Point highlighting the spatial and cultural characteristics of the suburb and the influences on its cultural identity.
- Observe and interpret perceptions of, and responses to cultural continuity and change.
- Students identify opportunities to enhance environmental sustainability and human well-being.

Year 12: Rural and Urban Places (Either Barangaroo, Green Square or Pyrmont)

Syllabus link: Investigation: Rural and an Urban Place.

A case study of an urban place highlighting:

- The location and character of the place
- Geographical processes, both physical and human, that have shaped the identity of the place
- Cultural, economic and political links to other places
- The nature and changes affecting the place, including social economic, and environmental.

Responses and strategies, including for sustainability.

Year 12: Ecosystems and Global Biodiversity (Kelp Forests)

Syllabus link: Investigation – Ecosystems

A case study of an ecosystem – Kelp forests of south eastern Australia, through a fieldwork investigation of one place within the ecosystem – Chowder Bay, Sydney Harbour. The program will highlight:

- The character of the ecosystem, including its spatial patterns and nature of its biodiversity
- The dynamics of ecosystem functioning including vulnerability, resilience and ecological disturbance
- Human induced modification to the ecosystem
- Responses and strategies including for maintaining ecosystem functioning and actions for sustainability
- Ecosystem management including research and innovation in sustainable management of the ecosystem.

Year 12: Global Sustainability – Tourism

Syllabus link: Global sustainability outcome – A student evaluates responses and management strategies at a local scale, for sustainability

A case study of a range of strategies for sustainability at a local scale, through an examination of a local tourism case study – Taronga Zoo Sydney. This tourism organisation demonstrates a variety of sustainable management practices within the tourism industry at a local scale.

The program will highlight:

- An overview of the global economic activity of Tourism, focussed on sustainability
- A range of strategies for sustainability within a local tourism case study ie Taronga Zoo, and other Zoo's globally. This organisation exemplifies sustainable management practices including conservation of biological diversity and ecological integrity.

Find out more about how Observatory Hill EEC can support your class by visiting the website at: https://observatoryhilleec.schools.nsw.gov.au

AUSECO

Specialists in Environmental Education

Year 11: Earth's Natural Systems

- Choose from a variety of locations in which to collect primary data about atmospheric, hydrological, geomorphic and ecological systems and their functioning. (Long Reef / Dee Why Lagoon, Cronulla, Botany Bay, Bantry Bay, Mt Keira, Camp Coutts)

Year 11: People, patterns and processes

- Study 2: Investigate the impacts of global economic change at Barangaroo, comparing pre-European environmental conditions with those of the modern urban jungle.
- Study 3: Investigate cultural change in central Sydney with a case study of an area that has shed its traditional roots and emerged as a vibrant and diverse modern community.

Year 11: Human-environment Interactions

- Study 1: The Sydney Basin geographical region – investigate responses to the challenge of urban runoff where residential and bushland areas meet. (Bantry Bay, Forestville and Lime Kiln Wetlands, Peakhurst Heights)
- Study 2: Landslip hazard on the Illawarra Escarpment – identify characteristics of the natural environment that predispose the area to landslip, and assess the human and ecological impacts of landslip events. (Mt Keira, Wollongong)

Year 12: Global Sustainability PLUS Ecosystems and Global Biodiversity

- Study fishing as an example of a global economic activity, and evaluate the sustainability of oyster farming in Botany Bay.
- Investigate characteristics and functioning of wetland ecosystems (mangroves and seagrass) and study human modifications and actions for their sustainability.

Year 12: Rural and urban places

- Explore a rural and urban location in the Sydney region, by investigating the geographical processes that have shaped the identity of each, and observing first-hand some changes, human responses and strategies for sustainability.

https://www.auseco.com.au
https://www.facebook.com/ausecoeducation/

Illawarra Escarpment from Stanwell Park lookout

ADVICE TO CONTRIBUTORS

Geography Bulletin guidelines

1. *Objective:* The Geography Bulletin is the quarterly journal of The Geography Teachers' Association of NSW & ACT Inc. The role of the Geography Bulletin is to disseminate up-to-date geographical information and to widen access to new geographic teaching ideas, methods and content. Articles of interest to teachers and students of geography in both secondary and tertiary institutions are invited, and contributions of factually correct, informed analyses, and case studies suitable for use in secondary schools are particularly welcomed.

2. *Content:* Articles, not normally exceeding 5000 words, should be submitted to the GTA NSW & ACT Office by email gta.admin@ptc.nsw.edu.au

   Articles are welcomed from tertiary and secondary teachers, students, business and government representatives. Articles may also be solicited from time to time. Articles submitted will be evaluated according to their ability to meet the objectives outlined above.

3. *Format:* Digital submission in Word format.
   - Tables should be on separate pages, one per page, and figures should be clearly drawn, one per page, in black on opaque coloured background, suitable for reproduction.
   - Photographs should be in high resolution digital format. An indication should be given in the text of approximate location of tables, figures and photographs.
   - Every illustration needs a caption.
   - Photographs, tables and illustrations sourced from the internet must acknowledge the source and have a URL link to the original context.

Note: Please try to limit the number of images per page to facilitate ease of reproduction by teachers.

Diagrams created using templates should be saved as an image for ease of incorporation into the bulletin.

All assessment or skills tasks should have an introduction explaining links to syllabus content and outcomes. A Marking Guideline for this type of article is encouraged.

4. *Title:* The title should be short, yet clear and descriptive. The author's name should appear in full, together with a full title of position held and location of employment.

5. *Covering Letter:* As email with submitted articles. If the manuscript has been submitted to another journal, this should be stated clearly.

6. *Photo of Contributor:* Contributors may enclose a passport-type photograph and a brief biographical statement as part of their article.

7. *References:* References should follow the conventional author-date format:

   Abbott, B. K. (1980) *The Historical and Geographical Development of Muswellbrook* Newcastle: Hunter Valley Press.

   Harrison, T. L. (1973a) *Railway to Jugiong* Adelaide: The Rosebud Press. ***(2nd Ed.)***

8. ***Spelling*** should follow the Macquarie Dictionary, and Australian place names should follow the Geographical Place Names Board for the appropriate state.

Refereeing

All suitable manuscripts submitted to the Geography Bulletin are subject to the process of review. The authors and contributors alone are responsible for the opinions expressed in their articles and while reasonable checks are made to ensure the accuracy of all statements, neither the editor nor the Geography Teachers' Association of NSW & ACT Inc accepts responsibility for statements or opinions expressed herein.

Books for review should be sent to:

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Lidcombe NSW 1825

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