

ASSESSMENT TWO

This assessment presents a research essay.

Image credit: Miah-Tya Gowland, 2022



ASSESSMENT TWO: RESEARCH ESSAY	
Course:	Biology T
Unit:	Unit 1: Biodiversity and Connectedness
Year Group:	11
Assessment Conditions:	You will work individually on the assignment. Some time in class will be provided to introduce the task. You will be given a collection of stimulus material to guide your reading and thinking initially. Beyond that, you are required to research for, and prepare, the essay in your own time. Consultation with the teacher librarians is highly recommended if you require assistance with the literature research. You may seek teacher feedback on your focal argument once identified, and draft essays can be submitted for preliminary feedback. Drafts and final versions must be submitted electronically via the Google Classroom page.
Prior learning:	<p>Background Information</p> <p>More than half the human population of the world live in urban settings like cities and towns. Increasingly, these people's lives are removed from the natural world that has for so long nurtured humanity, leading to a loss in appreciation and understanding of the importance of the natural world. This loss of appreciation and exposure to biodiversity is having major detrimental impacts on human health and wellbeing and is a contributing factor to the continued practise of activities that are known to damage ecosystems. At the end of the day, we are not apart from biodiversity; we a part of biodiversity, just like all the other organisms on our planet. So if we allow current trends in biodiversity loss to continue will be lost with it. Indigenous cultures around the world, especially Indigenous Australians, are often lauded for their appreciation of the interconnectedness of life, including humans, and care for the natural world around them. But is this true, or are they just as guilty of driving biodiversity to extinction? And if it is true what can modern science and cultures learn from this indigenous knowledge to help lead humanity and the rest of the natural world safely into the future?</p>
Key concepts:	Biodiversity, ecosystem management, indigenous knowledge
Key ideas:	<p>Relationship to Unit Goals To complete this task successfully, students:</p> <ul style="list-style-type: none"> • understand that ecosystem diversity and dynamics can be described and compared with reference to biotic and abiotic components and their interactions • understand how theories and models have developed based on evidence from multiple disciplines; and the uses and limitations of biological knowledge in a range of contexts • evaluate, with reference to empirical evidence, claims about relationships between and within species, diversity of and within ecosystems, and energy and matter flows • communicate biological understanding using qualitative and quantitative representations in appropriate modes and genres
Cross-curriculum priorities:	Sustainability, Aboriginal and Torres Strait Islander Histories and Cultures
General Capabilities:	Literacy, Critical and Creative Thinking, Numeracy

COVER SHEET AND RUBRIC

Task Description

Research the literature surrounding your selected topic, including information about both the science and indigenous knowledge behind the topic. You will select one topic of the following options to focus your work on:

- a. Evaluate arguments biologists have made to explain the extinction of megafauna in Australia.
- b. Evaluate arguments biologists have made as to how indigenous knowledge and modern biology compliment each other.
- c. Evaluate the extent to which indigenous cultural burning practices can mitigate the impacts of climate change

Stimulus

Viewing and reading materials for each of these topics will be provided to help you make your choice. You will then research the literature surrounding your selected topic, including information about both the science and indigenous knowledge behind the topic.

Based on this research, you will identify a specific arguments by biologists you wish to focus on, then prepare an argumentative essay in which you articulate your main argument then justify your standpoint by applying the knowledge you gained during literature research.

The completed essay should be around 1,000 words long (excluding figure captions, citations & references). Essays shorter than this are unlikely to contain the required level of detail and justification, while essays longer than this will only be assessed on the first 1,200 words.

This word limit is relatively short given the complexity of the topics, so you should focus your essay clearly and write succinctly. You may include figures if you think they help to strengthen your argument, but they are not required.

References and citations should be including using APA format. Assessment Conditions You will work individually on the assignment.

Some time in class will be provided to introduce the task. You will be given a collection of stimulus material to guide your reading and thinking initially. Beyond that, you are required to research for, and prepare, the essay in your own time. Consultation with the teacher librarians is highly recommended if you require assistance with the literature research. You may seek teacher feedback on your focal argument once identified, and draft essays can be submitted for preliminary feedback. Drafts and final versions must be submitted electronically via the Google Classroom page.

Task Specific Assessment Criteria / Rubric

Attached along with the Declaration of Original Work Supporting Information Stimulus materials provided on our Google Classroom page.

Argumentative essays explained:

https://owl.purdue.edu/owl/general_writing/academic_writing/essay_writing/argumentative_essays.html

Referencing guidelines:

<https://tclibrary.com/referencing/referencing-web-assistance-and-online-tutorials/>

Assignment verbs:

<https://tclibrary.com/research-and-writing/assignment-verbs>

Assessment Rubric

	A: Exemplary	B: Proficient	C: Capable	D: Developing	E: Emerging
Concepts, Models & Applications	<i>critically analyses</i> different lines of evidence for models/theories 5	<i>analyses</i> different lines of evidence for models/theories 4	<i>explains</i> different lines of evidence for models/theories 3	<i>describes</i> different lines of evidence for models/theories 2	<i>identifies</i> different lines of evidence for models/theories 1
	<i>evaluates</i> models/theories and <i>develops</i> evidence-based conclusions 5	<i>analyses</i> models/theories and <i>develops</i> evidence-based conclusions 4	<i>explains</i> models/theories and <i>develops</i> conclusions with reference to evidence 3	<i>describes</i> models/theories and <i>develops</i> conclusions with some reference to evidence 2	<i>identifies</i> models/theories and <i>develops</i> conclusions with little reference to evidence 1
Contexts	<i>critically analyses</i> the influence of social & economic problems, and ethical & cultural considerations on modern science 5	<i>analyses</i> the influence of social & economic problems, and ethical & cultural considerations on modern science 4	<i>explains</i> the influence of social & economic problems, and ethical & cultural considerations on modern science 3	<i>describes</i> the influence of social & economic problems, and ethical & cultural considerations on modern science 2	<i>identifies</i> the influence of social & economic problems, and ethical & cultural considerations on modern science 1
Inquiry Skills	<i>communicates</i> argument with clear, concise thesis statement, and logically organised and connected paragraph structure 5	<i>communicates</i> argument with clear thesis statement, and logically organised paragraph structure 4	<i>communicates</i> argument with accurate thesis statement, and mostly logically organised paragraph structure 3	<i>communicates</i> argument with a thesis statement, and clear paragraph structure 2	argument ineffectively <i>communicated</i> , with inaccurate thesis statement and lacking paragraph structure 1
	<i>communicates</i> concisely, effectively, and accurately in writing, demonstrating scientific literacy 5	<i>communicates</i> clearly and accurately in writing, demonstrating scientific literacy 4	<i>communicates</i> accurately in writing, demonstrating scientific literacy 3	<i>communicates</i> in writing, demonstrating some scientific literacy 2	<i>communicates</i> in writing, demonstrating limited scientific literacy 1
	effectively and accurately <i>draws on</i> relevant and authoritative sources and <i>includes</i> accurate referencing 5	accurately <i>draws on</i> relevant and authoritative sources and <i>includes</i> accurate referencing 4	<i>draws on</i> relevant and authoritative sources and <i>includes</i> mostly consistent referencing 3	<i>identifies</i> relevant and authoritative sources and <i>includes</i> inconsistent referencing 2	<i>identifies</i> relevant sources and <i>includes</i> inconsistent and inaccurate referencing 1
Overall Grade:				Total Mark:	/ 30

ASSESSMENT TWO: ANALYSIS OF THE TASK USING QUALITY ASSESSMENT GUIDELINES

Outstanding	Coverage of BSSS Accredited Courses	Outstanding	Reliability
High	Bias Awareness	High	Levels of Thinking
Outstanding	Student Engagement	Outstanding	Academic Integrity

1. COVERAGE OF BSSS ACCREDITED COURSES: OUTSTANDING

Outstanding Coverage of BSSS Accredited Courses – Assessment tasks are strategically planned for alignment with Achievement Standards, unit goals and content descriptors. Assessments are not too big: assessing irrelevant content or criteria; nor too small: missing important content or criteria

COMMENTS

The task is a disciplinary appropriate task that engages with a key element of the course and required material. It requires students to assess research and draw conclusions about material related to the key concepts of the course and apply them to a particular problem.

2. RELIABILITY: OUTSTANDING

Outstanding Reliability - Assessment tasks and marking are strategically designed to remove all sources of non-relevant variation in measurements.

COMMENTS

The rubric clearly engages with the achievement standards. The open-ended nature of the task allows measurement of student performance at different levels of ability. The questions are clear, focus student work, and the instructions are answerable within the parameters of the task.

3. BIAS AWARENESS: HIGH

High Bias Awareness - The suite of assessment tasks is designed that promote the diverse needs of gender, socio-economic status, disabilities and/or cultures, and that do not marginalise or favour a student or group of students, or advantage or disadvantage certain background knowledge or ways of thinking.

COMMENTS

Bias is determined across the suite of tasks in a portfolio; hence no individual task will be rated outstanding. This task is within the discipline and covers material and skills developed in class. The open-ended nature of the task which allow for a wide range of views and perspectives provide for a wide range of students.

4. LEVELS OF THINKING: HIGH

High Levels of Thinking – Clear assessment tasks are designed that allow students to engage at progressively higher cognitive demands. The suite of assessments demonstrates that there are expectations for all learners at all levels of learning and opportunities for extending all learners are planned for. Assessment tasks are flexible and varied, covering a range of assessment modes.

COMMENTS

The open ended nature of task, which raises complex problems that engage in key disciplinary debates and contemporary research, allows for higher order thinking and critical analysis while also supporting lower ability to student to show their understanding.

5. STUDENT ENGAGEMENT: OUTSTANDING

Outstanding Student Engagement – Assessment tasks are strategically planned to engage students. Assessment tasks are explicitly and purposefully connected to contemporary issues or student lived experiences, interests, or prior knowledge. The suite of assessment tasks clearly supports student ownership.

COMMENTS

Student engagement and agency has clearly been thoughtfully planned throughout this task. There are range of interesting questions that engage with contemporary issues currently at question in the discipline and with impact on the wider community.

6. ACADEMIC INTEGRITY: OUTSTANDING

Outstanding Academic Integrity - Students are required to engage in genuine deep learning at a level of challenge appropriate to the student and tasks make provision for sense making or knowledge construction. Assessment is designed to ensure authenticity from students and requires individualised responses.

COMMENTS

The design of the task supports academic integrity. The questions require argumentation and analysis of research material which require students to engage in writing their own ideas. Further, the task requires elements that engage the students in academic integrity.

Biology Assignment. Fighting Fire with Fire.**Indigenous fire practices are essential to protect not only the environment but also our way of life.**

With an increased prevalence of mega-fires as a result of climate change and rising temperatures (Dunne 2020), it is more important than ever to adapt and utilise Indigenous knowledge and practices to prevent mass ecological destruction (Morrison, 2021). The impacts from increasingly prevalent mega-fires would result in environmental, economic and societal collapse. Knowledge of effective fire prevention practices has been utilised by the Indigenous Australian population for over 50,000 years (Gilles 2017), but since halted during the European colonial era. Not only do Indigenous fire prevention practices reduce the risk of bushfires and other natural disasters, they reduce long-term greenhouse gas emissions, protect biodiversity, and promote and encourage new growth within the immediate environment (Morrison 2021). Indigenous fire prevention practices reduce the possibility of mega-fires and aid action against climate change. Through analysing the environmental, economic, and societal impacts of the 2019-2020 Australian bushfires, it is clear to see that working with, and learning from, the Indigenous Australian population is vital for the Australian environment and its people to survive and thrive.

Concisely and effectively communicates main argument as a thesis statement (IS5).

Uses in-text citations to provide a reference for stated information following a formatting convention (IS5).

Indigenous fire practices mitigate the effects of mega-fires as it reduces the amount of fuel needed to start such fires (Bennet 2021). Indigenous Australians utilise low-intensity, 'cool' fires to clear debris off the bush floor (Kroff 2021). These cool fires help change the vegetation structure by reducing the density of plants like Bracken Fern or Casuarina which lead to extreme fuel loads (Kroff 2021). But hot fires, like mega-fires, encourage their regrowth (Eriksen & Hankins 2014). Fires are intentionally set during favourable conditions during the cooler months of April and July (Kroff 2021). The cool

Introduces and explains evidence relevant and necessary to subsequent analysis (CMA3).

fires are low-temperature slow-burning fires that produce a limited amount of CO₂ (Carbon Dioxide) into the earth's atmosphere compared to hot mega-fires. Such fire practices ultimately reduce the amount of CO₂ as it mitigates the probability of future mega-fires occurring. During the 2019-2020 Australian bushfires 715 teragrams of CO₂ were released into the earth's atmosphere (Van Der Velde *et al.* 2021). To put that into perspective a single-car produces 4.6 tonnes of CO₂ in a year, so these mega-fires were equivalent to having more than one hundred fifty million more cars on the road for that year. Thus, mega-fires are not only a result of climate change, but they also contribute to it (Tyson 2020) so by utilising Indigenous fire prevention techniques that reduce the chances of mega-fires we can prevent immediate climate catastrophe and environmental destruction.

Uses numerical data sourced from external references to effectively communicate an idea (IS5).

Analyses the multiple lines of evidence introduced to draw a logical, evidence-based conclusion (CMA3).

The application of Indigenous knowledge of fire prevention practices are not only beneficial as they clear debris needed to initiate mega-fires, but they also prove to protect and promote biodiversity. As the prevalence of mega-fires continues to increase, it has led to a severe decrease in biodiversity across all of Earth's biomes (Hoffman *et al.* 2021). Preventing mega-fires protects earth ecosystems and the species within, as it mitigates the likelihood of biodiversity loss on a mass scale. For example, during the 2019-2020 Australian mega-fires, an estimated 3 billion animals were killed (Vernick 2020) and an estimated 13 million hectares of native flora was burnt (Granwall 2020); biodiversity loss on an unprecedented scale here in Australia. Unlike mega-fires, as cool burns are low-temperature slow-moving fires, it allows animals to flee or burrow into the surrounding environment, which ensures the continuation of many species. Controlled cool burns further ensure that seeds, nutrients and roots are intact, and soil moisture is increased (Kroff 2021). Additionally, utilising cool burns prevents the growth of invasive plants and encourages the growth of native species (Kroff 2021). Thus, by utilizing and implementing Indigenous fire knowledge we can not only protect the earth's ecosystems from ecological destruction but promote and encourage biodiversity.

Introduces and explains a specific example used to later draw a logical conclusion (CMA3).

Analyses evidence explained previous and develops a logical, evidence-based conclusion (CMA3).

Uses a rhetorical question to effectively engage with, and communicate to, the audience (IS5).

So Indigenous cultural burning practices can protect native flora and fauna from extinction, but could they also protect human communities too? As the prevalence of

mega-fires continues to increase, not only are native animals displaced, humans too find themselves in unsafe, life-threatening situations as a result of mega-fires. During the 2019-2020 Australian bushfires 34 people lost their lives as a result of fire exposure and a further 400 deaths occurred as a result of smoke inhalation (Coates 2020). It is appropriate to blame the deaths of over 400 individuals on our inability to prepare and utilise fire prevention knowledge at our disposal. If we utilised Indigenous fire prevention practices like cool burning in areas with an increased risk to mega-fires, over 400 people would still be with us today. And that's not to mention the economic impacts brought forwards as a result of such damage. It is estimated that \$10.5 billion in damages occurred, mainly consisting of damage to agricultural land (Wittwer & Waschick 2021). Furthermore, the short-term effects of mega-fires are often overshadowed by the long-term issue at hand. With atmospheric levels of CO₂ (Carbon Dioxide) at an all-time high (Nunez 2019), it appears climate catastrophe is inevitable, leading to huge health and economic impacts on human communities. The leading cause of climate change is the release of greenhouse gasses like CO₂ (Carbon Dioxide) into the earth atmosphere and mega-fires are partly to blame. If action is not taken now, we are risking the lives of billions of people. Therefore, by implementing Indigenous fire knowledge we can prevent the occurrence of mass casualties as a result of possible mega-fires, and reduce the social and economic impacts of fire on Australian communities.

Explains evidence relevant to subsequent analysis (CMA3).

Evaluates the influence of social and economic factors on the application of scientific knowledge (C2).

Despite the abovementioned benefits, there are considerable limitations and challenges associated with the implementation of Indigenous Australian fire management strategies in modern Australia. Prior to European invasion of Australia, Indigenous Australian communities were widespread across the Australian landscape, with small communities of people living on and interacting with their local environment intimately (Gammage 2013). Thus, when these communities practiced their cultural burning practices, it was done on a very small scale, by people who lived in that area (Gammage 2013). But nowadays, Indigenous Australian communities have been displaced from most of the Australian landscape and are concentrated with other Australians in large urban centres (ABS 2021) away from natural bushland environments. This means that, not only do we not have many Indigenous or non-Indigenous Australians living in the environments that need better fire management,

Analyses limitations and draws evidence-based conclusions (CMA3).

the location-specific knowledge required for effective cultural burning may no longer exist. Furthermore, the small-scale nature of Indigenous fire management would likely make it much more costly to implement than large-scale strategies like large-area hazard reduction burning. Nonetheless, with appropriate funding and community support, it would be possible to setup a network of fire-managers who live and work on country at a local scale and use what Indigenous knowledge is left to inform general guidelines of best-practice for these fire-managers. Furthermore, by emphasising the value in Indigenous knowledge to contemporary Australian communities, we may be able to help provide Indigenous Australians with meaningful and gainful employment opportunities and help justify the re-establishment of Indigenous Communities across areas of Australia from which they have been displaced.

Evaluates the influence of ethical and cultural factors on science (C2).

Overall, as our climate changes, mega-fires are occurring more frequently at greater intensity, and these megafires accelerate future climate change. To break this cycle we urgently need to learn from, and implement, the fire prevention practices of Indigenous Australians. If we fail to do so, we are risking the progressive loss of diverse ecosystems, flora and fauna, and of humanity and society as we know it. Utilizing Indigenous fire prevention practices we can prevent ecological and societal destruction as a result of mega-fires and potentially help promote reconciliation across Australia.

Summarises overall argument concisely and effectively (IS5).

References:

Australian Bureau of Statistics (2021) Aboriginal and Torres Strait Islander people: Census, from <https://www.abs.gov.au/statistics/people/aboriginal-and-torres-strait-islander-peoples/aboriginal-and-torres-strait-islander-people-census/2021>

Bennet, A. (2021) Cultural Burning Practices in Australia. Retrieved 28 October 2021, from <https://naturaldisaster.royalcommission.gov.au/system/files/2020-06/Cultural%20burning%20practices%20in%20Australia%20-%20Background%20Paper.pdf>

Coates, L. (2020) Bushfire deaths in Australia, 2010-2020. (2020). Retrieved 4 November 2021, from <https://www.preventionweb.net/news/bushfire-deaths-australia-2010-2020>

Dunne, D. (2020) How Climate Change Is Affecting Wildfires Around The World. Retrieved 22 October 2021, From: <HTTPS://WWW.CARBONBRIEF.ORG/EXPLAINER-HOW-CLIMATE-CHANGE-IS-AFFECTING-WILDFIRES-AROUND-THE-WORLD>

Compiles a list of references following a convention (IS5).

Eriksen, C., & Hankins, D. L. (2014). The retention, revival, and subjugation of Indigenous fire knowledge through agency fire fighting in eastern Australia and California. *Society & Natural Resources*, 27(12), 1288-1303. Accessed 22/10/2021 From; <https://ro.uow.edu.au/cgi/viewcontent.cgi?article=2275&context=sspapers>

Gammage, B. (2013) *The Biggest Estate On Earth*. Allen & Unwin, Sydney, Aus.

Gilles, C. (2017) Traditional Aboriginal Burning In Modern-Day Land Management - Landcare Australia. Retrieved 22 October 2021, From <https://Landcareaustralia.Org.Au/Project/Traditional-Aboriginal-Burning-Modern-Day-Land-Management/>

Granwall, L. (2020) Australia - total area burned by bush fires by state 2020 | Statista. Retrieved 4 November 2021, from: <https://www.statista.com/statistics/1089996/australia-total-area-burned-by-bushfires-by-state/>

Hoffman, K., Davis, E., Wickham, S., Schang, K., Johnson, A., & Larking, T. et al. (2021). Conservation of Earth's biodiversity is embedded in Indigenous fire stewardship. *Proceedings Of The National Academy Of Sciences*, 118(32), e2105073118. DOI: 10.1073/pnas.2105073118

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Nunez, C. (2019) Carbon dioxide in the atmosphere is at a record high. Here's what you need to know. (2021). Retrieved 4 November 2021, from: <https://www.nationalgeographic.com/environment/article/greenhouse-gases>

Tyson, B. (2020). Mediafire. National Geographic. Retrieved 31 October 2021, From: <https://www.nationalgeographic.org/encyclo>

Van der Velde, I.R., van der Werf, G.R., Houweling, S. et al. (2021) Vast CO₂ release from Australian fires in 2019–2020 constrained by satellite. *Nature* 597, 366–369. <https://doi.org/10.1038/s41586-021-03712-y>

Vernick, D. (2020) 3 billion animals harmed by Australia's fires. (2021). Retrieved 4 November 2021, from <https://www.worldwildlife.org/stories/3-billion-animals-harmed-by-australia-s-fires>

Wittwer, G., & Waschik, R. (2021). Estimating The Economic Impacts Of The 2017–2019 Drought And 2019–2020 Bushfires On Regional NSW And The Rest Of Australia. *Australian Journal Of Agricultural And Resource Economics*. Doi: 10.1111/1467-8489.12441

ANNOTATED STUDENT WORK: C GRADE

How Indigenous burning practises can save us from climate change and megafires.

The Australian bushfires of 2019-2020 was a devastating event which led to the destruction of plants, animals, towns, livelihoods and families. The aftermath of these megafires started conversations regarding burn offs, how they can be used to limit the impact of future fires and ultimately climate change. Looking back thousands of years into Australia's history, there is evidence to suggest that Indigenous Australians knew how to manage the ecosystem therefore knowing how to minimise the impact of bushfires. Therefore, by learning the cultural burning practises of Indigenous Australians, then applying in a modern setting, can help reduce the impact of climate change and megafires in Australia.

Clearly and accurately communicates main argument as a thesis statement (IS5).

Australia has always suffered from bushfires; a combination of high summer temperatures and low rainfall creating a dry bushland and climate. The summer bushfires from 2019-2020, consuming more than 20 percent of Australia's temperate forest floor (Boer, M, Resco de Dios, V, 2020), demonstrated that these fires can be extremely deadly. When a fire begins through either natural means or being deliberately lit, old leaves, grass, fallen branches and trees aid in the spreading of the fires. Firefighters often take part in back-burning, or burn offs, which aim to reduce the fuel load for fires in a controlled manner. For a number of years leading to the 2019-2020 fire season, many years of drought in NSW combined with years of inadequate burn off activities throughout the state, the resulting mega fires that season demonstrated that the country's modern back burning policies were not working.

Uses in-text citations to provide a reference for stated information partly following a formatting convention (IS5).

Develops an evidence-based conclusion (CMA3).

Victor Steffensen, an Indigenous cultural burning expert tells the story of how he was taught how to perform these cultural burnings through the elders of his people. Victor stated: "*Hazard reduction burning is not good for the country. Mainly in the return of food for animals. When you burn at the wrong time, you get 6 months of no food. When you burn at the right time, you have food in 6 days.*" Adding onto this statement Victor gave some understanding of why these cultural burnings are different to hazard reduction burns. "*The elders talked about applying fire in a way that is in sync with the seasons and in sync with the breeding times of the animals. The old men would look at indicators in the landscape, to see if it was time to burn a certain ecosystem.*" Victor showed evidence of how cultural burning helped the environment by detailing the grass population's improvement throughout the last 3 years of cultural burning (Nelson, G, 2020). This evidence provided by Victor demonstrates the cultural significance of Indigenous burnings, specifically their timing, influencing the ecosystem and lowering the risk of megafires to occur, as well as their impact.

Draws in information from a reference without providing an in-text citation (IS5).

Describes the influence of cultural factors on science (C2).

Climate change is an ever-changing issue which is proving to be one of the most dangerous events to ever occur in human history (United Nations, 2021). The megafires of 2019-2020 affected climate change greatly, in a negative way. On the 3rd of February 2020, multiple smoke plumes made their way into the stratosphere. These plumes of smoke were recorded as some of the most poisonous in the world (NASA, 2020). The wind pushed the smoke across the Southern Hemisphere with countries in South America such as Bolivia and Chile beginning to suffer the effects of Australia's dangerous smoke (NASA, 2020). Furthermore, a study on the 3rd of January 2020 stated that Canberra, Australia had the worst air quality of anywhere in the world at that time, outranking cities like Delhi, India and Lahore, Pakistan (Remeikis, A, 2020). The air quality readings of Canberra reached 5109 ppm of pollutants, which is well past the danger zone of 2000 ppm.

Describes evidence relevant to topic, without progressing to an evidence-based analysis (CMA3).

Researchers at Charles Darwin University have been studying Indigenous burning practises for some time. A number of key findings have been that cultural burnings are crucial in reducing the impacts of climate change in Australia (Edwards, A., Rioli Sr, W., & Sangha, K, 2021). Cultural burnings were shown to reduce greenhouse gas emissions by reducing the fuel load using small, low intensity burns early in the fire season, in turn reducing the risk of significant fire events later in the fire season and thereby reducing greenhouse gas emissions (Edwards, A., Rioli Sr, W., & Sangha, K, 2021). The Northern Territory has been one of the most fire prone regions in Australia for some time due to it's warm climate combined with the dry landscape (Edwards, A., Rioli Sr, W., & Sangha, K, 2021). Due to this fact the state government has enlisted the help of Indigenous Australians to start a fire management program. Using the information uncovered by the research program in Charles Darwin University, the NT fire management program has been successful in many ways in respect to cultural, economic and environmental impacts (Edwards, A., Rioli Sr, W., & Sangha, K, 2021). By adopting the traditional fire burning practises in the NT, hundreds of thousands tonnes of greenhouse gases have been abated (Edwards, A., Rioli Sr, W., & Sangha, K, 2021) and the landscape is arguably managed in a safer, more effective manner.

Explains evidence relevant to subsequent conclusion (CMA3).

Australia is one of the most ecologically diverse countries in the world (WWF 2020). The 2019-2020 summer bushfires, in combination with breaking of the drought in NSW through heavy rainfalls of early 2020, attributed to significant levels of erosion across the state (Taylor, A 2020). The megafires also affected Australia's wildlife with ecologist Chris Dickman estimating that more than a billion animals died from the 2019-2020 bushfire season around the country (Cox, L, 2020), resulting in an estimated 500 distinct species removed from the country's ecosystem (Pickrell, J 2021). Some of these animals include Koalas, the Regent Honeyeater, the Brush-Tailed Rock-Wallaby and the Quokka. Indigenous cultural burnings are carefully performed in the Australian ecosystem with Indigenous Australians applying a deep knowledge and understanding of the immediate landscape: the vegetation, native animal species and climate. Cultural burning aims to burn at the right times and in the right manner to encourage native vegetation in each micro-region to grow, which ultimately prove far less flammable during bushfires than invasive or introduced

Develops an evidence-based conclusion that, while sound, is not an obvious result of the above explanation (CMA3).

Describes evidence relevant to topic, but jumps between subtopics without explaining links sufficiently to inform an analysis (CMA3).

species (Betigeri, A, 2020). This indirectly relates to the welfare of native animals; burnings lead to native vegetation growth and fire resiliency, and ultimately animal population sustainability.

To conclude, Indigenous knowledge of the landscape is key to avoiding a massive climate crisis in Australia. By following and practising Indigenous techniques Australian ecosystems will benefit immensely. Overall using Indigenous knowledge will help us navigate into a safer, healthier and brighter future.

Summarises overall argument clearly and accurately (IS5).

References

Compiles a list of references mostly consistently following a convention (IS5).

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