# Project: Summarizing and Analyzing Research Papers

## Submission Template

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**Topic**: Impact of climate change on the biodiversity

**Research Paper**: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9058818/

### Initial Prompt

**Description (50 words max)**: Please summarize the below article in 100 words: Topic:: Impact of climate change on biodiversity [Article of 6 page pasted in the prompt]

**Generated Summary (100 words max)**: Climate change, driven by human activities since the industrial revolution, poses a significant threat to biodiversity and human well-being. The Intergovernmental Panel on Climate Change emphasizes that current changes are unprecedented in the last 2,000 years. Climate change has led to shifts in species distribution and phenological events, risking extinction for many species unable to adapt. Notably, marine corals are suffering from increased ocean temperature and acidity, resulting in widespread bleaching. Additionally, rising sea levels threaten biodiversity hotspots, particularly on islands. Urgent global mitigation measures are necessary to protect ecosystems and biodiversity against these escalating impacts.

### Iteration 1

**Description (50 words max)**: Elaborate on the impact of rising sea levels in 100 words.

**Generated Summary (100 words max)**: Rising sea levels, driven by climate change, pose a grave threat to both biodiversity and human communities. As sea levels increase, coastal ecosystems, including critical biodiversity hotspots like coral reefs and island habitats, face destruction. Species that rely on these areas are at heightened risk of extinction, unable to adapt quickly enough to the changing conditions. Human populations in coastal regions are also vulnerable, with millions at risk of displacement due to flooding. The loss of these ecosystems also undermines natural barriers against storms and erosion, exacerbating the impact on both the environment and human infrastructure. Urgent action is needed to mitigate these effects.

### Iteration 2

**Description (50 words max)**: Please elaborate more species distribution in 100 words.

**Generated Summary (100 words max)**: Climate change significantly disrupts species distribution, forcing many to migrate to new habitats as their current environments become inhospitable. Warming temperatures, altered precipitation patterns, and changing seasons push species toward higher altitudes and latitudes in search of suitable conditions. This shift can lead to mismatches in ecosystems, where species interactions, such as predator-prey relationships or pollination, are disrupted. Additionally, some species, especially those with limited mobility or specific habitat requirements, may face extinction if they cannot relocate. These changes threaten biodiversity, as ecosystems are destabilized and species that once thrived together are scattered or lost entirely.

### Final Prompt

**Description (50 words max)**: Please provide a revised summary in 100 words. Keep the contexts discussed above as the main theme.

**Generated Summary (100 words max)**: Climate change, driven by human activities, poses a severe threat to biodiversity and human well-being, with rising sea levels and disrupted species distribution as key impacts. Coastal and island ecosystems, including vital biodiversity hotspots like coral reefs, are at risk from increasing sea levels, leading to habitat loss and species extinction. Additionally, species are being forced to migrate to new habitats as their current environments become unsuitable, causing ecosystem imbalances and further threats to biodiversity. Urgent global mitigation efforts are needed to protect both ecosystems and human communities from these escalating climate-driven challenges.

### Insights and Applications

**Key Insights (150 words max)**:  Biodiversity **Loss:** Climate change exacerbates the loss of biodiversity, contributing to the sixth mass extinction. Human-induced factors like habitat loss, overexploitation, and invasive species interact with climate change, worsening its impact.

 Species **Distribution:** As temperatures rise, species shift to higher altitudes or toward poles, threatening their survival, especially for those unable to relocate or adapt.

 Phenological **Shifts:** Climate change disrupts the timing of seasonal events, causing mismatches between species, such as plants and their pollinators, affecting reproduction and survival.

 Marine **Ecosystems:** Rising ocean temperatures and acidity cause coral bleaching, leading to widespread coral death and threatening marine biodiversity.

 Endangered **Species:** Melting Arctic ice and rising sea levels endanger native species and coastal biodiversity hotspots, potentially submerging islands and threatening endemic species with extinction.

 Global **Call to Action:** Urgent global mitigation measures are required to protect terrestrial and marine ecosystems from the escalating effects of climate change.

**Potential Applications (150 words max)**:  Habitat **Loss:** Rising sea levels and climate change lead to the destruction of critical ecosystems, particularly in coastal and island regions, threatening biodiversity hotspots like coral reefs.

 Species **Extinction:** Species unable to adapt to changing environments or relocate are at a heightened risk of extinction, leading to a loss of biodiversity.

 Ecosystem **Disruption:** Shifts in species distribution disrupt established ecological relationships, such as predator-prey dynamics and pollination, destabilizing ecosystems.

 Human **Displacement:** Coastal communities face increased risks of flooding and displacement as sea levels rise, leading to potential humanitarian crises.

 Economic **Impact:** The loss of natural barriers like reefs and mangroves increases vulnerability to storms and erosion, leading to costly damage to infrastructure and economies.

 Global **Urgency:** The cascading effects of these environmental changes highlight the need for immediate global action to mitigate climate change and protect both ecosystems and human populations.

Evaluation

**Clarity (50 words max)**: Final summary is a conclusive paragraph showcasing the impact of climate change on biodiversity touching on the species distribution, forced migration and threats from the rising sea level as suggested to the ChatGPT through controlled prompts. Key insights provide a bulleted responses broadening the impacts and call for actions

**Accuracy (50 words max)**: The final summary and key insights obtained from the ChatGPT are accurate responses and fits in line with the article content in a summative perspective.

**Relevance (50 words max)**: Key insights and implications highlight the urgent need to address climate change to protect biodiversity and ecosystems. Rising temperatures, shifting species distributions, and phenological disruptions threaten global biodiversity, while the loss of marine ecosystems like coral reefs underscores the broader ecological and economic consequences. Immediate global action is crucial.

### Reflection

**(250 words max)**: The Generative AI course was a transformative learning experience, expanding my understanding of artificial intelligence and its creative potential. I delved into the mechanics of generative models, particularly GANs and VAEs, which allowed me to appreciate the intricacies of how machines can generate new data that mirrors the complexities of human-created content. The hands-on projects were especially enlightening, providing practical applications of theoretical concepts, such as training models to create realistic images and text.

In addition to the technical aspects, I had the opportunity to use ChatGPT to write a summary of an article on the "Impact of climate change on biodiversity." This experience highlighted the practical utility of generative AI in simplifying complex topics and enhancing productivity.

Despite the challenges, I gained valuable insights. I learned the importance of iterative learning—both for models and myself. Each failure or unexpected outcome was an opportunity to refine my approach and deepen my understanding. Additionally, the ethical implications of generative AI became clear, emphasizing the need for responsible development and use of these technologies.

Overall, this course not only equipped me with technical skills but also encouraged a more thoughtful approach to AI, balancing innovation with ethical considerations.