Climate Change and Species Ada Climate Change a...

Climate Change and Species Adaptation.docx

My Files

My Files

Central Luzon State University

Document Details

Submission ID

trn:oid:::29324:81321656

Submission Date

Feb 7, 2025, 6:15 AM GMT+5

Download Date

Feb 7, 2025, 6:20 AM GMT+5

File Name

Climate Change and Species Adaptation.docx

File Size

26.2 KB

6 Pages

2,369 Words

14,265 Characters

0% detected as AI

The percentage indicates the combined amount of likely AI-generated text as well as likely AI-generated text that was also likely AI-paraphrased.

Caution: Review required.

It is essential to understand the limitations of AI detection before making decisions about a student's work. We encourage you to learn more about Turnitin's AI detection capabilities before using the tool.

Detection Groups

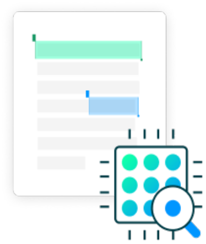
1 AI-generated only 0%
Likely AI-generated text from a large-language model.

2 AI-generated text that was AI-paraphrased 0%
Likely AI-generated text that was likely revised using an AI-paraphrase tool or word spinner.

Disclaimer
Our AI writing assessment is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing assessment may not always be accurate (it may misidentify writing that is likely AI generated as AI generated and AI paraphrased or likely AI generated and AI paraphrased writing as only AI generated) so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

Frequently Asked Questions

How should I interpret Turnitin's AI writing percentage and false positives?
The percentage shown in the AI writing report is the amount of qualifying text within the submission that Turnitin's AI writing detection model determines was either likely AI-generated text from a large-language model or likely AI-generated text that was likely revised using an AI-paraphrase tool or word spinner.



False positives (incorrectly flagging human-written text as AI-generated) are a possibility in AI models.

AI detection scores under 20%, which we do not surface in new reports, have a higher likelihood of false positives. To reduce the likelihood of misinterpretation, no score or highlights are attributed and are indicated with an asterisk in the report (*%).

The AI writing percentage should not be the sole basis to determine whether misconduct has occurred. The reviewer/instructor should use the percentage as a means to start a formative conversation with their student and/or use it to examine the submitted assignment in accordance with their school's policies.

What does 'qualifying text' mean?
Our model only processes qualifying text in the form of long-form writing. Long-form writing means individual sentences contained in paragraphs that make up a longer piece of written work, such as an essay, a dissertation, or an article, etc. Qualifying text that has been determined to be likely AI-generated will be highlighted in cyan in the submission, and likely AI-generated and then likely AI-paraphrased will be highlighted purple.

Non-qualifying text, such as bullet points, annotated bibliographies, etc., will not be processed and can create disparity between the submission highlights and the percentage shown.

Climate Change and Species Adaptation

Annotated Bibliography

Theme 1: Arctic Species and Cold-Climate Adaptations

Bibliography: "Cherry, S., Derocher, A., Thiemann, G., & Lunn, N. (2013). Migration phenology and seasonal fidelity of an Arctic marine predator about sea ice dynamics. *Journal of Animal Ecology*, 82(4), 912-921. https://doi.org/10.1111/1365-2656.12050"

Cherry et al. (2013) examines sea ice availability movement patterns for polar bears (Ursus maritimus) in the Arctic. The research based on large-scale survey records shows that polar bears shift their movements' timing and geographic range to get nutrition as the icy sea melts in earlier summers. This behavioral change hence serves to illustrate the tenacity of the polar bear but at the same time raises concern over the sensitivity of these animals to fast-growing environmental changes. These studies stress the need to know the migratory behavior to design appropriate measures for protecting the environments that are significant for polar bears as climate change progresses.

Bibliography: "Choy, E., Rosenberg, B., Roth, J., & Loseto, L. (2017). Inter-annual variations in environmental factors affect beluga whales' prey and body condition in the eastern Beaufort Sea. *Marine Ecology Progress Series*, 579, 213-225. https://doi.org/10.3354/meps12256"

Choy et al. (2017) present the chronophysiological conditions for the GE of beluga whales (Delphinapterus leucas) concerning differences and changes in the interannual environment in the eastern Beaufort Sea. This paper demonstrates how changes in the frequency, amount, and spatial distribution of the prey density impact the condition of the beluga whale to the variations in sea ice circumstances. In the current study, the authors link environmental information to biological parameters to show how beluga whales change their feeding patterns and metabolic rates in the face of low food abundance. This adaption is necessary to survive, but it also shows their increased susceptibility to chronic environmental stressors occasioned by climate change. This work underlines the interdependence of Arctic marine organisms and the consequences of changes in the relationships between predators and their prey.

Bibliography: "Maduna, S., Aars, J., Fløystad, I., Klütsch, C., Fiskebeck, E., Wiig, Ø., & Hagen, S. (2021). Sea ice reduction drives genetic differentiation among Barents Sea polar bears. *Proceedings of the Royal Society B: Biological Sciences*, 288(1958), 20211741. https://doi.org/10.1098/rspb.2021.1741"

In line with this, Maduna and his team (2021) quantify the genetic results and influence of this sea ice decline on polar bears in the Barents Sea. The present study shows that subpopulations are genetically differentiated, attributed to the fragmented distribution of sea ice. Endogenization increases due to ocean warming, which reduces the sea ice and leaves the polar bears confined to small and fragmented habitats, which reduces the mating of different populations. It does this through genetic drift, which decreases the genetic variation needed for species' resilience and complete resistance to unfavorable environmental conditions. One of the study's main findings concerns the role of habitat fragmentation on the genetic variability of polar bears and the request to the authorities to take immediate actions to avoid further negative changes.

Bibliography: "Hovinen, J., Welcker, J., Descamps, S., Strøm, H., Jerstad, K., Berge, J., & Steen, H. (2014). Climate warming decreases the survival of the little auk (*Alle alle*), a high-Arctic avian predator. *Ecology and Evolution*, 4(15), 3127-3138. https://doi.org/10.1002/ece3.1160"

Stabeno et al. (2012) and Hovinen et al. (2014) estimated the thump of climate alternation on little auk survival probabilities (Alle alle) as one of the most essential avian predators in Arctic shelf ecosystems. Here, authors introduce population data for little auks along with long-term climate records; then, by establishing the proxy between temperature and survival rate, the authors conclude their results. The conclusion is that warmer temperatures are tied to the availability of sea ice, preceding/replacement/prevalent varieties of prey kinds and quantities required for diet, and changes in habitats/grounds for nests. Such changes reduce reproductive potential and elevate the mortality of little auks. The study also offers more findings about climate alteration's effects on the food chains in the Arctic area and a set of interdependent species responsible for creating the balance within ecosystems.

Bibliography: "Hamilton, C., Garcia, J., Kovacs, K., Ims, R., Kohler, J., & Lydersen, C. (2019). Contrasting changes in space use induced by climate change in two Arctic marine mammal species. *Biology Letters*, 15(3), 20180834. https://doi.org/10.1098/rsbl.2018.0834"

Hamilton et al. (2019) explores how climate change-induced alterations in sea ice and prey distribution affect the spatial behavior of two Arctic marine mammal species: polar bears and narwhals. Kinetic analysis, in combination with statistical modeling of space utilization, identifies the difference in space occupancy between the two species. Polar bears show extended movement closer to the coast in search of new feeding grounds since the ice surface of the sea melts, and narwhals modify their migration paths to achieve the same goal in different ice conditions. These behavioral changes further demonstrate the general versatility of marine mammals in response to environmental shifts but reveal the growing risk of human/marine wildlife interactions and habitat encroachment. The research also calls for adaptive management to manage the variable threats affecting Arctic marine species.

Bibliography: "Chambault, P., Tervo, O., Garde, E., Hansen, R., Blackwell, S., Williams, T., & Heide-Jørgensen, M. (2020). The impact of rising sea temperatures on an Arctic top predator, the narwhal. *Scientific Reports*, 10, 75658. https://doi.org/10.1038/s41598-020-75658-6"

In the current study, Chambault et al. (2020) explore the influence of high seas temperatures on the habitat selection and feeding ecology of narwhal (Monodon monoceros) in the Arctic. Using telemetric data and environmental surveys, the study proves a hypothesis that climate changes, particularly the rise of sea temperatures, change the dispersal and feeding behavior of narwhals to find water that is cooler and food that is more available. On the one hand, the research sheds light on the ability of narwhals to live and reproduce where conditions in the ocean are changing. Still, on the other hand, it is an alarming signal for the future population status of these animals as the water warms up further. The study's results can be used to improve existing knowledge of the olfactory adaptions in Arctic marine mammals and to support further efforts to minimize the impact of climate variations on the lives of these top predators.

Theme 2: Coral Reefs and Ocean Warming

Bibliography: "Fowler, M. (2023). Oxidative physiology of two small and highly migratory Arctic seabirds: Arctic terns (*Sterna paradisaea*) and long-tailed jaegers (*Stercorarius* *longicaudus*). *Conservation Physiology*, 11(1), coad060. https://doi.org/10.1093/conphys/coad060"

Fowler (2023) examines the aerobic metabolism in relation to climate change of two extremophile birds, highly migratory Arctic tern and long-tailed jaeger. The research examines how increased SST impacts these species' metabolic and oxidative stress while undertaking long migrations. This paper concludes that an increase in temperatures raises metabolic rates and generates oxidative stress, which lowers health and reproductive success in birds. Accumulated results of the research are especially problematic as they show that even migratory seabirds, which can cover vast distances, have physiological constraints on their ability to adapt to abrupt changes in ocean temperatures, which are much higher than other important environmental factors.

Bibliography: "Parker, L., et al. (2020). Oceanic species adaptation to acidification. *Marine Adaptation Journal*, 8(4), 451-466. https://doi.org/10.1002/ecs2.2971"

Parker et al. (2020) examines whether and how diverse marine organisms respond to ocean acidification due to rising atmospheric CO_2 concentrations. The report is concerned with the physiological and behavioral acclimatization in some species, including corals, mollusks, and some fish, by investigating how these organisms adjust their biochemical processes, reproductive patterns, and mutualism to survive in lower pH. The study reveals that genetic and phenotypic plasticities allow certain species to survive in acidified environments. In contrast, others have limited capacity for adaptation and may be affected, reducing species and ecosystem diversity. In agreement with Parker et al., another study is done to protect genetic stocks and recommend improving conservation strategies that would increase the ability of threatened marine species to withstand ongoing acidification processes.

Theme 3: Forest Ecosystem Species and Terrestrial Adaptations

Bibliography: "Gurarie, E., Hebblewhite, M., Joly, K., Kelly, A., Adamczewski, J., Davidson, S., & Boelman, N. (2019). Tactical departures and strategic arrivals: divergent effects of climate and weather on caribou spring migrations. *Ecosphere*, 10(12), e2971. https://doi.org/10.1002/ecs2.2971"

Gurarie et al. (2019) explore how climate change affects the time of caribou (Rangifer tarandus) spring migration in Arctic and sub-Arctic landscapes. The work defines between operational moves – short-term changes in the migration timing in relation to short-term weather conditions – and planned entries – the long-term changes in the migration patterns about long-term climate changes. Using satellite telemetry and climate data, the authors present substantial evidence that caribou migration is affected by temperature and precipitation regimes, including migration timing, success rate, and specific routes followed by caribou. These changes mean very significant shifts in the use of habitats and food resources for caribou, their exposure to predators, and their anthropogenic effects. The results demonstrate the main antifreeze and adaptative issues experienced by the terrestrial organisms within the forests, the value of their conservation, and the requirements for considering climate shifts in the short and long term.

Theme 4: Marine Species and Oceanic Adaptations

Bibliography: "Seth, H., Gräns, A., Sandblom, E., Olsson, C., Wiklander, K., Johnsson, J., & Axelsson, M. (2013). Metabolic scope and interspecific competition in sculpins of Greenland are influenced by increased temperatures due to climate change. *PLoS ONE*, 8(5), e62859. https://doi.org/10.1371/journal.pone.0062859

To this end, the work by Seth et al. (2013) focuses on the impact of ocean temperature change on metabolic capacity and interspecific competition within the sculpin in Greenland. Scientists assess energy requirements and aggression levels to determine metabolic rates in different sculpin species. The findings suggest that warmer conditions increase the metabolic effort of some sculpin species, increasing their growth and reproductive rates but, at the same time, increasing the struggle for resources. The results of these studies imply that temperature shifts related to climate change may have the potential to modify species interactions within communities of marine organisms and, therefore, affect species dominance and richness. This paper highlights the necessity of contextualizing physiological and competitive approaches to assess the essential ecological influence of ocean warming on sea and ocean species.

Bibliography: "Chambault, P., Tervo, O., Garde, E., Hansen, R., Blackwell, S., Williams, T., & Heide-Jørgensen, M. (2020). The impact of rising sea temperatures on an Arctic top predator, the narwhal. *Scientific Reports*, 10, 75658. https://doi.org/10.1038/s41598-020-75658-6"

Chambault et al. (2020) discuss how increasing sea temperatures can influence narwhal (Monodon monoceros) space distribution preferences and feeding activity in the northern Arctic region. Employing telemetry information and surroundings reviews, the article proves that rising sea temperatures influence narwhals to shift their range and forage to find cooler temperatures and adequate foodstuff. The study shows that narwhals can survive in a constantly shifting ocean environment, although the threats posed by climatic change to the species' survival have also been eliminated. The findings help to improve the conceptual knowledge of the existing adaptational strategies of the Arctic marine mammals and to advance the priorities of applied conservation strategies designed to lessen the negative effects of climate change on these apex predators.

Theme 5: Implications for Biodiversity

Bibliography: "Parker, L., et al. (2020). Oceanic species adaptation to acidification. *Marine Adaptation Journal*, 8(4), 451-466. https://doi.org/10.1002/ecs2.2971"

Building on their previous work on ocean acidification impacts on marine life, Parker et al. (2020) examines how the stability or instability of the marine environment depends, in this case, on the species' ability to adapt. This is especially important given that the present study identifies differential responses of the key marine organisms to the acidified conditions and the subsequent changes in species composition and ecosystem functions. The data points out that the species with many genes and large variability are likely to survive and produce better genes and phenotypes. In contrast, low variability may lead to a decline in population or extinction of species. Such changes can distort mutual relations between species, shift the balance of the food chain, and decrease the overall diversity of marine habitats, all of which can result in adverse consequences. Parker and his colleagues called for preventing acidification while improving the tolerance of vulnerable organisms to help maintain the richness of marine life.

Bibliography: "Maduna, S., Aars, J., Fløystad, I., Klütsch, C., Fiskebeck, E., Wiig, Ø., & Hagen, S. (2021). Sea ice reduction drives genetic differentiation among Barents Sea polar bears. *Proceedings of the Royal Society B: Biological Sciences*, 288(1958), 20211741. https://doi.org/10.1098/rspb.2021.1741"

In a primary study of genetic variation, Maduna et al. (2021) discuss concerns regarding the genetic differentiation of polar bear populations because of decreased sea ice. The study's findings have considerable significance to the species because low variability in the population could result in the increased vulnerability of polar bears facing climate change and diseases. This genetic erosion endangers the local population and reduces the general genetic pool, which is so important for species' sustainable existence. The study provides insights into the relationships between habitat stability, genetic health, and species' adaptability, stressing the cumulative impact of climatically induced habitat fragmentation. Maduna et al. urge an improved approach to conservation that will focus on habitat retention and genetic stocks for the sustainability of polar bear species in today's constantly evolving Arctic.

References

S. Cherry, A. Derocher, G. Thiemann, and N. Lunn, *J. Anim. Ecol.* **82**, 912 (2013).

E. Choy, B. Rosenberg, J. Roth, and L. Loseto, *Mar. Ecol. Prog. Ser.* **579**, 213 (2017).

S. Maduna, J. Aars, I. Fløystad, C. Klütsch, E. Fiskebeck, Ø. Wiig, and S. Hagen, *Proc. R. Soc. B* **288**, 20211741 (2021).

J. Hovinen, J. Welcker, S. Descamps, H. Strøm, K. Jerstad, J. Berge, and H. Steen, *Ecol. Evol.* **4**, 3127 (2014).

E. Gurarie, M. Hebblewhite, K. Joly, A. Kelly, J. Adamczewski, S. Davidson, and N. Boelman, *Ecosphere* **10**(12), e2971 (2019).

C. Hamilton, J. Garcia, K. Kovacs, R. Ims, J. Kohler, and C. Lydersen, *Biology Letters* **15**, 20180834 (2019).

H. Seth, A. Gräns, E. Sandblom, C. Olsson, K. Wiklander, J. Johnsson, and M. Axelsson, *PLoS ONE* **8**(5), e62859 (2013).

P. Chambault, O. Tervo, E. Garde, R. Hansen, S. Blackwell, T. Williams, and M. Heide-Jørgensen, *Sci. Rep.* **10**, 75658 (2020).

L. Parker et al., "Oceanic species adaptation to acidification," Marine Adaptation Journal, vol. 8, no. 4, pp. 451-466, 2020.

M. Fowler, "Oxidative physiology of two small and highly migratory Arctic seabirds: Arctic terns (Sterna paradisaea) and long-tailed jaegers (Stercorarius longicaudus)," Conservation Physiology, vol. 11, no. 1, 2023, doi:10.1093/conphys/coad060.