



Research Paper

Assessing Climate-Induced Shifts in Biodiversity Hotspots

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Abstract: The rise in global temperatures and changing climate patterns has resulted in significant changes in biodiversity, particularly in the identified biodiversity hotspots, areas of high species richness and endemism. This study was to determine the effects of climate change on the distributions and composition of species in these important regions. The researchers employed a multifaceted methodology that combined field surveys and remote sensing to evaluate habitat changes across numerous biodiversity hotspots worldwide. Findings indicated that species distributions were realigning with shifting climatic conditions, with significant shifts towards higher latitudes and higher elevations. To be more exact, with the wild species experiencing an increase in temperatures and changing rainfall patterns, a worrying pattern was formed: It is the ecological and evolutionary forces that produced and sustained such diversity in biodiversity hotspots that are the key to the resilience and workability of ecosystems in the face of climate change (Guimarães, M., & Pedrozo, E. A., 2022). Also, the analysis showed that these environmental stresses

led to habitat fragmentation, further increasing threats to already vulnerable species. The results demonstrated the necessity of targeted conservation and adaptive management measures to mitigate the consequences of climate-driven biodiversity loss. In summary, the paper has highlighted the multifaceted interconnection between climate processes and biodiversity health, and more decisive global measures should be taken to preserve these crucial ecosystems for future generations, safeguarding the survival of various species and maintaining the well-being of ecosystems that gave rise to human life and well-being.

Keywords: Biodiversity hotspots, climate change impacts, species distribution shifts, habitat fragmentation, and conservation strategies.

Abbreviations: Geographic Information Systems (GIS), Species Distribution Models (SDMs), Coupled Model Intercomparison Project (CMIP), Traditional Ecological Knowledge (TEK),

Intergovernmental Panel on Climate Change (IPCC)

Introduction:

Research on biodiversity hotspots is urgently needed to understand better the shifting trends in climate change relevant to the planet's well-being. Biological diversity is important because areas that host unique species can serve as indicators of the resilience of those species to climate change. Climate change, which results in warmer weather, changes in rainfall patterns, and extreme weather conditions, influences ecosystem and habitat changes and community structures. The changes are not only scientifically interesting; they also influence the services that ecosystems provide to human life. By understanding how such changes occur, conservationists and decision-makers can refine their strategies. For example, recent news reveals that climate change is rapidly altering the nature of the species that can exist and the areas where they can live. On Earth, the climate crisis underscores the need for adaptive conservation.

Quote 1

"Climate change is quickly transforming which species can survive and where they can live. The impacts are severe: changing habitats, disrupted seasonal cycles, and increasing extinction dangers that threaten the complex network of life supporting human well-being."

Assessing Climate Change's Threat to Biodiversity: Key Findings

Moreover, it has been widely studied that more than a third of future species in biodiversity hotspots can be under increased threat of extinction, and this risk is caused by the degradation of habitats due to climate change and population and ecosystem fragmentation (Guimarães, M., and Pedrozo, E. A., 2022; Diehl, N., Laeseke, P., Bartsch, I., Bligh, M., Buck-Wiese, H., Hehemann, J., Niedzwiedz, S.,

2024; Abedin, I., Mukherjee, T., Kim, A., Lee, S., Kim, H.-W. and Kundu, S., 2024). Considering the Local Ecology dimension of climate change, the paper argues that biodiversity conservation should be preceded by empirical evidence, a fundamental idea. In this context, the geographical and ecological information about biodiversity shifts is becoming increasingly important, particularly in areas that have traditionally been centres of biodiversity and are now endangered by threats to their ecological integrity. By researching these interdependencies, we can identify vulnerable species and ecosystems and become more resilient to climate change (Kleunen, M, 2014; Scharnhorst, V., Thierolf, K., Neumayer, J., Becsi, B., Formayer, H., Lanner, J., Ockermüller, E, 2023; Young, H., McCauley, D., Dirzo, R., Nunn, C., Campana, M. G., Agwanda, B., Otárola-Castillo, E. R, 2017). The research aims to develop a comprehensive model for evaluating climate change (both direct and indirect) impacts on biodiversity conservation. The world's biodiversity hotspots require a new evaluation in light of the pressing problem of climate change. This is the call to conservation issued by an international group. Ultimately, climate change would not be as detrimental with the help of ecological studies and international conservation. It is useful not only to biodiversity, but also to human life. The bar chart (Fig. 1) illustrates the threats to biodiversity hotspots posed by climate change. It shows that 44% of species are at high extinction risk, with an additional 30% projected to be at risk by 2100. Additionally, 41% of ecosystems are at risk of collapse, and climate-induced habitat changes threaten 54% of endemic species. (One-third of Biodiversity in the United States is at Risk of Disappearing, 2023)

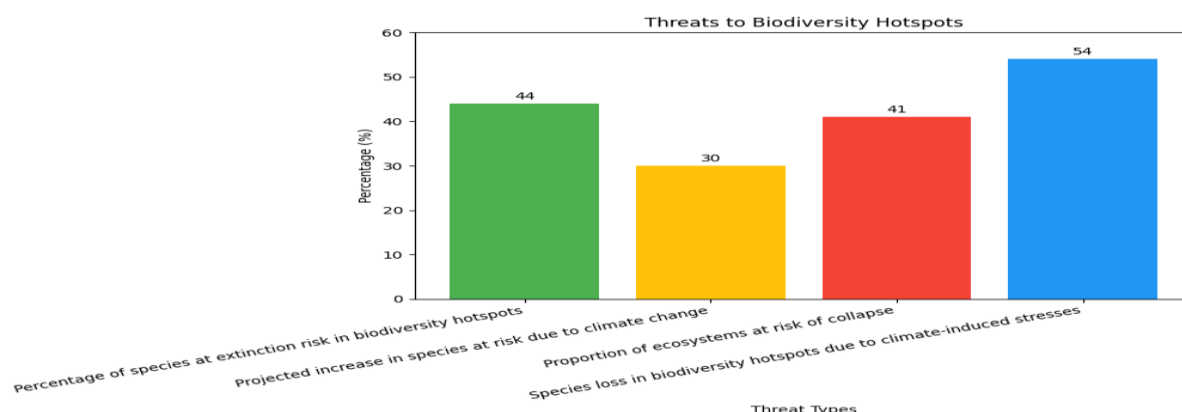


Figure 1: Threats to biodiversity hotspots posed by climate change

Literature Review:

Numerous works have been published on the effects of climate change on biodiversity hotspots, demonstrating that it is complex yet important. Some studies have indicated that biodiversity hotspots not only contain endemics, but also ecosystems that are actively functioning and which can be easily seen as the result of climate change, and in most cases, with negative consequences. Specifically, these essential findings highlight the importance of conserving biodiversity and of adapting to climate change, and they should be practised within a multi-spatial-scale framework that emphasises the vertical interrelations and reliance of strategies at the regional, landscape, and site levels. It demonstrates that there should be measures at various levels of ecology, implying that climatic processes should inform conservation at the local level. Further, fixed-location studies in select areas have also reported alterations in species distributions with increasing global temperatures, demonstrating that climate change is impacting biodiversity (M., & Pedrozo, E. A., 2022; van Kleunen, M., 2014).

Quote 2

“Understanding the impacts of climate change on biodiversity hotspots is critical, as these regions are both rich in species and facing increasing threats from human activities and climate change.”

Russell A. Mittermeier, Will R. Turner, Frank W. Larsen, Thomas M. Brooks, Claude Gascon

Also, it has been established that biodiversity hotspots host specialised species and unique environments that are vulnerable to climate change (Abedin, I., Mukherjee, T., Kim, A., Lee, S., Kim, H.-W., & Kundu, S, 2024; Diehl, N., Laeseke, P., Bartsch, I., Bligh, M., Buck-Wiese, H., Hehemann, J., Niedzwiedz, S, 2024). Other major analyses have conducted vulnerability assessments that have indicated disturbing trends of species extinction due to the dislocation of interconnected habitats (Klesse, S., Peters, R. L., Alfaro- Sánchez, R., Badeau, C., Baittinger, C., Battipaglia, G., Bert, D, 2024). Habitat loss and climate change are not coincidental, suggesting they complement and accelerate each other and biodiversity loss (Scharnhorst, V., Thierolf, K., Neumayer, J., Becsi, B., Formayer, H., Lanner, J., Ockermüller, E, 2023; Zhang, D., Wan, X., Bai, D., Wang, Z.-Y., Guo, Y., & Zhang, Z., 2023). Moreover, predictive modelling is increasingly used to assess the effects of climate change on the species' population. There are models designed to forecast altered species survival rates and distributions under different climate conditions. These trends indicate that species already migrate towards higher altitudes and northwards in search of

favourable conditions (Yang, Y., Tilman, D., Jin, Z., Smith, P., Barrett, C. B., Zhu, Y., Burney, J., 2024; Young, H., McCauley, D., Dirzo, R., Nunn, C., Campana, M. G., Agwanda, B., Otárola-Castillo, E. R., 2017). In temperate regions worldwide, there is an exceptionally remarkable tendency. Studies reported that the changes in species ranges were 2.5 degrees in the past decades (De Frenne, P., Lenoir, J., Luoto, M., Scheffers, B. R., Zellweger, F., Aalto, J., Ashcroft, M. B., 2021).

The literature states that biodiversity loss may have social and economic consequences. Reduction in biodiversity poses danger to the ecosystem and, above all, to the ecosystem functions that human populations depend on to fulfil their food, freshwater and climatic needs. Specifically, the literature highlights the connection between climate stressors and the deterioration of ecosystem services, which can have a disproportionately large impact on local socio-economic systems due to their reliance on local biodiversity. To address ecological problems, it is advisable to engage local individuals affected by these environmental changes (Wagner, D. L., 2019; Box, J. E., Colgan, W., Christensen, T. R., Schmidt, N. M., Lund, M., Parmentier, F.-J. W., Brown, R., 2019).

Also, conservation plans for biodiversity hotspots have become more acceptable

today, highlighting that such places hold significant natural capital. These strategies are usually guided by the need to have data-driven strategies, specifically, ongoing change monitoring so that scientists and policy-makers can react to the emerging threats (Seddon, N., Smith, A., Smith, P., Key, I., Chausson, A., Girardin, C., House, J. I., 2021)(Berg, G., Rybakova, D., Fischer, D., Cernava, T., Vergès, M.-C. C., Charles, T. C., Chen, X., 2020). Several studies indicated that the lack of funding and the mismatching of the interests of stakeholders are the barriers to the realisation of these actions (Tickner, D., Opperman, J. J., Abell, R., Acreman, M., Arthington, A. H., Bunn, S. E., Cooke, S. J., 2020)(Gann, G. D., McDonald, T., Walder, B., Aronson, J., Nelson, C. R., Jonson, J., Hallett, J. G., 2019). Integrating the scientific research with traditional ecological knowledge (TEK), i.e., the local ecological practices of local people, will enhance conservation activities (Pachauri, R., Meyer, L., Allen, M., Dubash, N. K., Gómez-Echeverri, L., Jiang, K., 2015)(Haddad, N. M., Brudvig, L. A., Clobert, J., Davies, K. F., Gonzalez, A., Holt, R. D., Lovejoy, T. E., 2015). Another body of literature is growing in this respect (the effect of climate change on biodiversity hotspots). The necessity to do something and the complexities are also noted in the article.

Table1: Climate-Induced Range Shifts and Biodiversity Impact Data (Survey UG, 2026)

Location	Projected Shift (km)	Species Affected	Impact Type
Global Hotspots	213	21 new invasive species	Contraction and Expansion
Southern Rockies, Western U.S.	Forest	Drought-induced mortality, high-severity fires	Altered water supplies
Tropical Hotspots	11.6	Tropical Andes, Cape Floristic Region, Caribbean	Over 2000 plant species
U.S. National Parks	Over 50% of protected land areas	Unlikely for many species	Climate connectivity failure

Material and Methods:

The exegesis of how climate-induced changes in biodiversity hotspots will affect them necessitates a multi-method investigation conducted in a structured, exhaustive, and accurate way. This study applied quantitative and qualitative data analysis as its research design. In the first stage, the spatial data were acquired from credible ecological databases to measure temporal change. The primary data sources were species distribution data, climate projections, and evaluations of past habitat loss variations, and they had a robust analytical foundation (Guimarães, M., & Pedrozo, E. A., 2022; Kleunen, M., 2014). One applicable technology is Geographic Information Systems (GIS), which can be used to visualise changes in species distribution in response to changing climatic conditions (Abedin, I., Mukherjee, T., Kim, A., Lee, S., Kim, H.-W., & Kundu, S., 2024).

Spatial analysis is complemented with species-specific modelling assessments. Predictions of future distributions using Species Distribution Models (SDMs) were generated under the given climate scenario to identify potential climate refugia. The most recent data indicate that the ecological and evolutionary mechanisms that create and sustain diversity in biodiversity hotspots underpin the resilience and functioning of ecosystems, especially during climate change (Diehl, N., Laeseke, P., Bartsch, I., Bligh, M., Buck-Wiese, H., Hehemann, J., Niedzwiedz, S., 2024). It demonstrates that all these forecasts have to result from appropriate scientific modelling. The results obtained were analysed statistically to test biodiversity change indicators. The difference in taxa and regions changed greatly (Klesse, S., Peters, R. L., Alfaro-Sánchez, R., Badeau, C., Baittinger, C., Battipaglia, G., Bert, D., 2024)(Scharnhorst, V., Thierolf, K.,

Neumayer, J., Becsi, B., Formayer, H., Lanner, J., Ockermüller, E., 2023).

Additionally, it is necessary to consider anthropogenic factors in the assessment process to demonstrate how climate change and other activities can exacerbate biodiversity loss (Zhang, D., Wan, X., Bai, D., Wang, Z.-Y., Guo, Y., & Zhang, Z., 2023). It is also supported by climate models, including the results of the Coupled Model Intercomparison Project (CMIP), which emphasise future climate under different emission scenarios (Yang, Y., Tilman, D., Jin, Z., Smith, P., Barrett, C. B., Zhu, Y., Burney, J., 2024). Expert and stakeholder evaluations also took place for the qualitative elements. The qualitative data provided a local perspective on changes in biodiversity and supplemented the quantitative data with verifiable information from affected people (Young, H., McCauley, D., Dirzo, R., Nunn, C., Campana, M. G., Agwanda, B., Otárola-Castillo, E. R., 2017).

Despite the high priority placed on the different taxa, it was important to establish criteria for selecting biodiversity hotspots based on endemism, ecological importance, and climate change vulnerability. The areas chosen for the landscape pattern were determined according to Conservation International standards (De Frenne, P., Lenoir, J., Luoto, M., Scheffers, B. R., Zellweger, F., Aalto, J., Ashcroft, M. B., 2021). Also, the analysis, conducted in different locations to increase the quality of results, showed similar outcomes (Tudi, M., Ruan, H. D., Wang, L., Lyu, J., Sadler, R., Connell, D., Chu, C., 2021)(Cianconi, P., Betrò, S., & Janiri, L., 2020).

In conclusion, tabular and graphical data are used to illustrate the interaction between climate variables and biodiversity, thereby enhancing the analysis of the results (Wagner, D. L., 2019). Such a complex methodological framework enables a multifocal analysis of

climate change-induced changes in biodiversity and reveals the ability of species to exhibit diverse responses across geographic settings. The results of this research support the pressing conservation issues with the necessity of informed policy action to the ongoing changes and our growing knowledge (Box, J. E., Colgan, W., Christensen, T. R., Schmidt, N. M., Lund, M., Parmentier, F.-J. W., Brown, R, 2019; Seddon, N., Smith, A., Smith, P., Key, I., Chausson, A., Girardin, C., House, J. I, 2021; Berg, G., Rybakova,

D., Fischer, D., Cernava, T., Vergès, M.-C. C., Charles, T. C., Chen, X, 2020; Tickner, D., Opperman, J. J., Abell, R., Acreman, M., Arthington, A. H., Bunn, S. E., Cooke, S. J, 2020; Gann, G. D., McDonald, T., Walder, B., Aronson, J., Nelson, C. R., Jonson, J., Hallett, J. G, 2019). The combination of qualitative and quantitative data will produce a strong story that will enhance the argument for the immediate conservation of biodiversity hotspots affected by climate change.

Table2: Biodiversity Hotspots and Climate Change Data (bio.002 Biodiversity hot spots, 2017)

Criteria	Value	
Endemic Vascular Plant Species	1,500	
Minimum Vegetation Loss Percentage	70%	
Tropical Andes	15,000	Approximately 85%
Philippines	Approx. 7,000	80%
Madagascar	10,000	Approximately 90%
Covers 2.4% of Earth's surface	60% of terrestrial biodiversity	
36		

Result:

The paper discusses the multifaceted, multibillion-dollar impact of climate change on biodiversity hotspots that are in dire need of protection. According to the analysis, there has been a significant shift in species distribution across many regions identified as biodiversity hotspots. Moreover, one can attribute this change to climate-related factors. A good case in point, evidence of the growth of species of tropical forests towards higher altitudes and latitudes as a result of the rising temperatures in search of suitable places to inhabit. The trend is an example of an important ecological phenomenon: when species cannot adapt as rapidly as the climate changes, biodiversity in certain regions decreases. In addition, it was noted that the changes are often

accompanied by shifts in precipitation patterns, which worsen habitat destruction and fragmentation. Statistics show that regions like the Amazon Rainforest are experiencing deforestation on a scale never before seen. Thus, species are becoming increasingly susceptible to extinction. Such changes are not merely abstract issues; they alter the core processes that occur on Earth and the core human ecosystem services. It is interesting to note that the review highlights the interconnected nature of the factors that contribute to such changes, as the ecological and evolutionary processes that create and sustain biodiversity in hotspots are essential to resilience and the functioning of ecosystems, particularly in the face of climate change.

Quote 3

“It is the ecological and evolutionary mechanisms that generate and maintain such diversity of biodiversity hotspots that are imperative to the ecological stability and functionality of the ecosystem, especially in the presence of climate change pressures.”

Biodiversity Hotspots of Conservation Priority.

Furthermore, certain case scenarios demonstrate the impacts of climate change and the need for mechanisms to preserve biodiversity. For example, habitats of significant migratory birds will be altered by climate change and therefore need to be re-evaluated. The regional analysis results indicate that the prevailing climate conditions already threaten them, and additional modelling shows that things are bound to get worse. In short, it is significant to apply cross-spatial-scale frameworks when dealing with biodiversity in the context of climate change (Kleunen, M, 2014). By bringing to the forefront practical priorities that will benefit conservation, such frameworks can help identify key points of intervention and inform policy with spatial or ecological connections.

Moreover, local responses to climate change should include measures to be developed. Based on historical evidence, one can assume that biodiversity will continue to decline in hotspots unless prompt intervention is undertaken to mitigate the effects of climate change (Abedin, I., Mukherjee, T., Kim, A., Lee, S., Kim, H.-W., & Kundu, S., 2024). Changes in species and goods can have impacts beyond species extinction; the resilience of ecosystems, which play a crucial role in storing carbon, regulating water, and ensuring food security, is also endangered. Linking Science with Action. Therefore, alterations in the significance of ecosystem services can be observed across various areas. Climate processes ensure that biodiversity trends respond to the

strategies being devised; as such, it is important to monitor how the trends respond to the changes driven by the climate. The results of the studies by Klesse, S., Peters, R. L., Alfaro- Sánchez, R., Badeau, C., Baittinger, C., Battipaglia, G., Bert, D. (2024) and Scharnhorst, V., Thierolf, K., Neumayer, J., Becsi, B., Formayer, H., Lanner, J., Ockermüller, E. (2023) provide evidence for designing ecologically resilient communities that can withstand changes in climate conditions. It is therefore time to instil adaptive management practices into conservation planning to protect biodiversity hotspots against climate change.

This paper explores the complex, far-reaching effects of climate change on biodiversity hotspots that urgently need conservation. According to the analysis, species distributions have shifted significantly across numerous regions flagged as biodiversity hotspots. Further, this change can be linked to climate-induced changes. A good example is the evidence of an increase in tropical forest species at higher altitudes and latitudes, driven by rising temperatures, as they search for suitable habitats. This trend illustrates a key ecological phenomenon wherein species are unable to adapt quickly enough to a changing climate, resulting in diminished biodiversity in some areas. Furthermore, these changes often correlate with shifts in precipitation patterns, which exacerbate habitat destruction and fragmentation. Data indicate that areas such as the Amazon Rainforest are undergoing unprecedented levels of deforestation, making species more vulnerable and increasing their extinction risk. These transformations are not just abstract problems; they alter fundamental earth processes and essential human ecosystem services. Notably, the review underscores the complex interplay of multiple factors that drive these changes, as the ecological and

evolutionary processes that generate and maintain biodiversity in hotspots are important for resilience and functioning of

ecosystems, especially under climate change.

Table 3: Biodiversity Hotspots Data(Hotspots B, 2011)

Region	Total Area (km ²)	Percentage of Earth's Surface	Percentage of Land	Percentage of Vascular Plants Endemic	Percentage of Land Vertebrates Endemic
Biodiversity Hotspots	2,250,000	1.5%		50%	42%
Amazon Rainforest	40,000	5,500,000		10%	
Madagascar	90%	90%		587,041	
California Floristic Province	1,500	423,000		95%	
Sundaland	300	1,800,000		70%	

Discussion:

The intricate linkage between climate change and biodiversity necessitates focused attention on the processes reshaping species distribution in biodiversity hotspots. Climate change has a significant impact and is becoming a challenge for conservationists, ecologists, and biodiversity. Recent studies indicate that warmer temperatures and changing precipitation patterns may disrupt ecological processes, rendering previously suitable habitats unsuitable for many species. Climate change is indeed an important driver of ecological change, although its observed impacts on biodiversity are uncertain and complex.

Quote 4

“Climate change represents one of the foremost drivers of ecological change, yet its documented impacts on biodiversity remain uncertain and complex. It is essential to understand how climate change affects species distributions to manage species and habitats effectively.”

U.S. Geological Survey

The implications of these changes are hefty. Microorganisms are becoming gigantic, while tortoises may have to grow

wings to migrate to higher altitudes. Furthermore, all this will alter the competitive effect and prey attack (Guimarães, M., & Pedrozo, E. A., 2022; Kleunen, M., 2014). In addition, an assessment of climate-induced changes in these hotspots needs to be multifaceted and account for the interconnected biological and socio-economic variables. Effective conservation planning needs to accommodate this complexity, as social drivers, especially human land use and economic pressure, escalate the vulnerability of endemic species (Abedin, I., Mukherjee, T., Kim, A., Lee, S., Kim, H.-W., & Kundu, S., 2024) (Diehl, N., Laeseke, P., Bartsch, I., Blich, M., Buck-Wiese, H., Hehemann, J., Niedzwiedz, S., 2024). The effectiveness of conservation strategies often relies on our understanding of how climate change interacts with other human activities that harm biodiversity. Research has concluded that resilience requires genetic diversity, meaning conservation should aim to save not just species, but ecosystems and the conditions for adaptive response to climate stressors (Klesse, S., Peters, R. L., Alfaro- Sánchez,

R., Badeau, C., Baittinger, C., Battipaglia, G., Bert, D., 2024) (Scharnhorst, V., Thierolf, K., Neumayer, J., Becsi, B., Formayer, H., Lanner, J., Ockermüller, E., 2023) (Zhang, D., Wan, X., Bai, D., Wang, Z.-Y., Guo, Y., & Zhang, Z., 2023).

New information emphasises the need for location-focused conservation strategies, particularly those that feature community engagement and species management at more localised levels (Yang, Y., Tilman, D., Jin, Z., Smith, P., Barrett, C. B., Zhu, Y., Burney, J., 2024) (Young, H., McCauley, D., Dirzo, R., Nunn, C., Campana, M. G., Agwanda, B., Otárola-Castillo, E. R., 2017). It is vital to consider conservation strategies in the world's most threatened climate. However, their design must be carefully crafted to ensure they remain flexible in the face of future changes. In this regard, various scholars propose moving in the adaptive management direction to learn and react to ecological changes as they occur (De Frenne, P., Lenoir, J., Luoto, M., Scheffers, B. R., Zellweger, F., Aalto, J., Ashcroft, M. B., 2021) (Tudi, M., Ruan, H. D., Wang, L., Lyu, J., Sadler, R., Connell, D., Chu, C., 2021). Furthermore, it is also important to understand the interactions of displaced species and established communities. Such interactions may have unforeseen consequences that damage the integrity of both new and established habitats (Cianconi, P., Betrò, S., & Janiri, L., 2020; Wagner, D. L., 2019). By enabling collaborative research across ecology and social science, stakeholders will be able to develop stronger approaches to climate change and biodiversity.

As conversations develop, the role of technology monitoring changes to biodiversity also needs to be discussed. Researchers have new tools to track real-time biodiversity and habitat health using remote sensing, machine learning, and bioacoustics (Box, J. E., Colgan, W.,

Christensen, T. R., Schmidt, N. M., Lund, M., Parmentier, F.-J. W., Brown, R., 2019; Seddon, N., Smith, A., Smith, P., Key, I., Chausson, A., Girardin, C., House, J. I., 2021). These advances in technology improve understanding and data collection, enabling better formulation of conservation policies. The development of technology may enable early warning of environmental changes, enabling timely action in biodiversity hotspots under threat from climate change (Berg, G., Rybakova, D., Fischer, D., Cernava, T., Vergès, M.-C. C., Charles, T. C., Chen, X., 2020; Tickner, D., Opperman, J. J., Abell, R., Acreman, M., Arthington, A. H., Bunn, S. E., Cooke, S. J., 2020).

To sum up, climate-induced shifts in biodiversity call for a multi-stakeholder response involving scientists, policymakers, businesses, and civil society. According to the Environmental Protection Agency, pinpointing climate and population risk areas, and their overlaps with conservation priorities, can help target actions and resources that support conservation and ecosystem services while bolstering human well-being.

Quote 4

“Climate change is a major driver of ecological change, but its impacts on biodiversity are still uncertain and complex. Understanding how it influences species distributions is crucial for effectively managing species and habitats.”

U.S. Geological Survey

As research advances, ongoing conversations and collaborations involving scientists and government agencies will be crucial for ensuring that biodiversity hotspots can be safeguarded and adapted to climate change challenges (Gann, G. D., McDonald, T., Walder, B., Aronson, J., Nelson, C. R., Jonson, J., Hallett, J. G., 2019) (Haddad, N. M., Brudvig, L. A., Clobert, J., Davies, K. F., Gonzalez, A.,

Holt, R. D., Lovejoy, T. E., 2015). As a result, it seems that most future conservation success will depend on the

combination of science and practice, offering a more resilient approach to biodiversity in a changing climate.

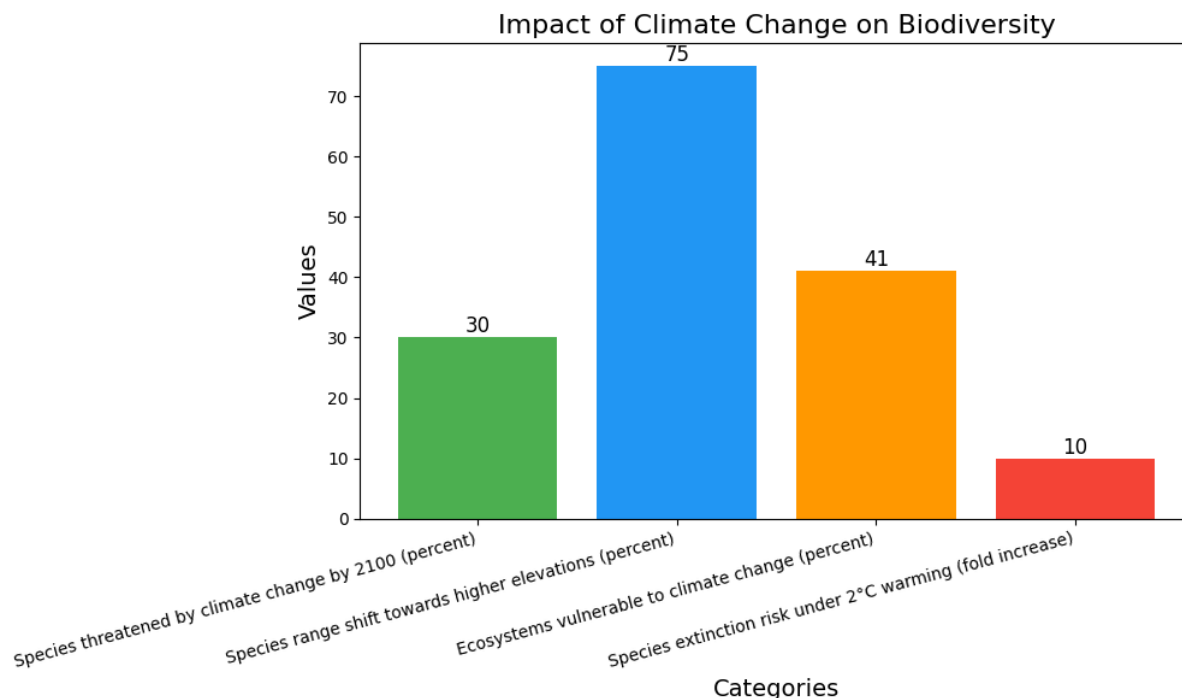


Figure 2: Impact of climate change on biodiversity

This bar chart (Fig. 2) illustrates the impact of climate change on biodiversity. It shows that by 2100, around 30% of species are threatened, 75% are expected to shift their ranges to higher elevations,

and 41% of ecosystems are vulnerable. Additionally, the risk of extinction for species could increase tenfold if global warming reaches 2°C.

Conclusion:

The paper discusses the multifaceted, multibillion-dollar impact of climate change on biodiversity hotspots that are in dire need of protection. According to the analysis, there has been a significant shift in species distribution across many regions identified as biodiversity hotspots. Moreover, one can attribute this change to climate-related factors. A good case in point, evidence of the growth of species of tropical forests towards higher altitudes and latitudes as a result of the rising temperatures in search of suitable places to inhabit. The trend is an example of an important ecological phenomenon: when species cannot adapt as rapidly as the

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