

Drivers of Biodiversity Loss:

CLIMATE CHANGE



Over the past 50 years, the natural world has experienced unprecedented rates of change with devastating implications.¹ Today, approximately one million species are at risk of extinction globally and integrally linked ecosystem services— from disease buffering to pollination— are at risk of loss. The direct drivers of biodiversity loss with the largest global impact are: changes in land and sea use; direct exploitation of organisms; climate change; pollution; and invasion of nonnative species. These drivers are largely a result of underlying societal values and behaviors; if left unaddressed, they are predicted to continue or increase their detrimental impact. Transformative action is needed to alleviate these threats and the species declines that they contribute to.

Climate change is altering our environment by shifts in mean and extreme temperatures and precipitation. It also amplifies the impact of other drivers: species affected by other drivers are less resilient to climate change and therefore have a heightened risk of extinction. The average annual temperature in the contiguous U.S. has risen 1.2 – 1.8 °C since the beginning of the 20th century, causing changes in species distributions and interactions.¹

Key Facts

- Fossil fuel combustion is the primary source of anthropogenic greenhouse gas emissions and increases in global temperatures. The Earth's average temperature has increased by 1.9° Fahrenheit (1.1° Celsius) since 1880.²
- Climate change is projected to become the fastest growing driver of biodiversity loss by 2050; 40% of species native to the Americas are likely to become extinct. The synergies between climate change and other drivers of biodiversity loss are still understudied but expected to contribute significantly to species declines in both terrestrial and aquatic ecosystems.¹
- In North America, species are already experiencing local extinctions due to shifts in temperature and precipitation.³ Species with small ranges are particularly vulnerable. Species redistributions will impact ecosystem services – like pollination - affecting agricultural production and food security.¹

Possible Solutions

- *Reduce greenhouse gas emissions.* The United States must drastically reduce its greenhouse gas emissions and carbon footprint. Ambitious national goals to reduce greenhouse gas emissions in half by 2030 and achieve net-zero by 2050 are important first steps.⁴
- *Maintain current protected areas and create strategically placed new ones.* Maintenance or restoration of healthy, natural habitats and corridors that connect them is critical to promote adaptation to changing conditions. ^{1,5} Ensuring that the protected areas network is representative of diverse landscapes and climes makes it more likely that protected areas will continue to encompass current habitat types. Climate refugia often occur in areas with complex, high elevation topography and steep elevational gradients (e.g., mountainous, alpine landscapes), while lower climate change velocities have been detected inside terrestrial and freshwater biodiversity hotspots.⁵ It will be important to plan for

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Limiting global warming ensures a habitable climate for biodiversity.

Shifts in temperature and precipitation are already affecting species distributions and ecosystem services.

Future-minded focus on conservation is critical for mitigating climate impacts on biodiversity.



without the same official protections. These areas, if allowed to persist in their current state, can play an important part in alleviating climate change.⁵

- *Address exacerbating factors.* To maximize the opportunity for wild organisms and ecosystems to adapt to and survive climate change, non-climate stressors such as habitat loss, invasive species, pollution, disease, and over-exploitation must be minimized.⁷ See related factsheets for possible solutions related to other drivers of biodiversity loss.

References

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shifts in priority areas as the climate changes since the current protected areas network does not encompass many areas that will be important for biodiversity in the future.⁶

- *Incentivize nature-based solutions.* Nature-based climate solutions such as reforestation, wetland restoration, and restorative agricultural practices should be actively sought and implemented in planning and disaster risk reduction. Incentivizing sustainability through local, regional, and national policies and programs can help facilitate nature-based solutions.⁵

- *Restore key areas for climate adaptation.* Restoration planning provides an opportunity to incorporate adaptation measures, such as in selecting plant species adapted to higher temperatures, accommodating species range shifts with improved connectivity, and securing benefits to people. In the context of climate change, it is important that restoration targets are appropriate to future conditions.⁵

- *Other Effective area-based Conservation Measures (OECMs).* While fully protected areas are key to conserving biodiversity and mitigating climate change, there are many other areas (e.g. many lands managed by Indigenous communities) that contribute to long-term conservation goals