

KOGELBERG BIOSPHERE NEWS

Nature for Life

Quarterly Newsletter

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www.kogelbergbiosphere.org.za

Climate Change and the effect on the the Kogelberg Biosphere



Climate change has a significant impact on the biosphere because it alters ecosystems through changes in temperature, precipitation patterns, and ocean acidification. This in turn leads to shifts in species distribution, potential extinctions, disrupted food webs, and altered migration patterns which will ultimately affect the health and balance of life on Earth - both terrestrial and marine environments. Coral reefs and polar ecosystems are particularly vulnerable.

All living things on Earth depends on and affects climate

Life shapes climate, and climate shapes life. Every breath and every process, from tiny microbes to giant trees, influences the gasses around us, maintaining Earth's natural warmth. But, human-driven carbon emissions are throwing this balance off, trapping extra heat and changing our world.

Atmosphere: Warming intensifies due to greenhouse gases. Precipitation changes fuel droughts and floods. Extreme weather events surge.

Lithosphere: Temperature and rainfall shifts degrade soil. Extreme weather fuels erosion and landslides. Permafrost thaw accelerates greenhouse gas release.

How does climate change affect the earth's spheres?



Weather is what you experience right now—the temperature, the wind, the clouds. It's fleeting, changing within hours or days. **Climate** is the big picture, the average of weather conditions over a long period, typically 30 years or more. We measure climate using key factors like temperature, precipitation, wind, cloud cover, and even frost depth. So, while a single storm is weather, a trend of increasingly intense storms over years is a climate change indicator.

Hydrosphere: Melting ice and thermal expansion causes sea-levels to rise. Ocean acidification intensifies. Freshwater ecosystems face declining water availability and quality.



Effect of climate change on plants & animals

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Climate dictates where plants and animals can live. While they've always adapted to environmental shifts, the speed and scale of today's climate change are unprecedented. Ecosystems are struggling as species face rapid changes in temperature and rainfall. Some, like certain North American plants and animals, are migrating to cooler, higher-elevated or more northerly locations.



Approximately one million animal and plant species are threatened with extinction according to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Climate change affects at least 10,967 species on the IUCN Red List, and projections indicate that further temperature increases may cause 18% of all species on land to face the high risk of going extinct.



Rising temperatures are altering the life cycles of plants and animals. Spring arrives earlier, with plants blooming sooner and growing for longer. Hibernation and migration patterns are disrupted. Additionally, warmer climates allow invasive species to spread into new areas and survive through milder winters.

Examples of animal species threatened by climate change



There are over 250 species of bumblebees, and some are our most important pollinators. Due to climate change, rising temperatures are forcing bumblebee populations to move further north to cooler climates. These temperature changes are also causing spring flowers to bloom earlier than normal, leaving less time for the bees to pollinate them.



Whales are important for protecting our environment as they sequester large amounts of carbon that would otherwise enter our atmosphere. They rely on specific ocean temperatures for their migration, feeding, and reproduction. As temperatures rise, these habits are disrupted, and their survival becomes threatened.

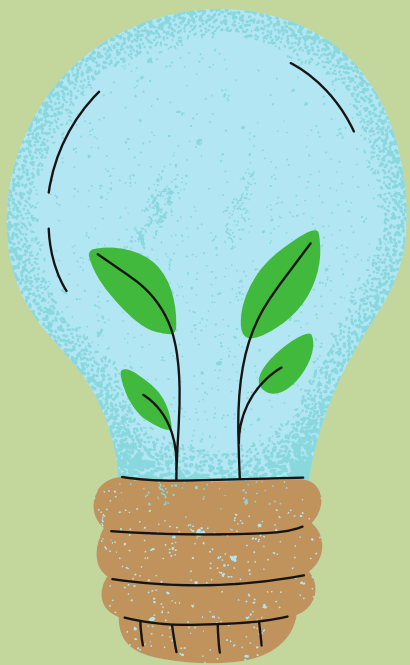
African penguins (*Spheniscus demersus*) breed at 28 locations in S.A. and Namibia, but they are sadly endangered because of food shortages, which results from shifts in prey distribution, competition with fisheries, and climate change. Climate change poses a major threat to penguins and many other animals around the world.



Examples of animal species threatened by climate change



Tortoise species found in fynbos are negatively affected by climate change. Changing temperatures and rainfall patterns, can negatively affect their growth rates and fecundity.



Blue cranes (*Anthropoides paradiseus*) are found in South Africa and Namibia and are classed as vulnerable. Climate change is also impacting agriculture, leading to practices that may cause further harm to the cranes. In addition, collisions with powerlines, entanglement in fences, illegal capture of fledglings, predation by domestic dogs, and chicks becoming stuck in water troughs all pose threats to blue cranes.



Examples of plant species threatened by climate change

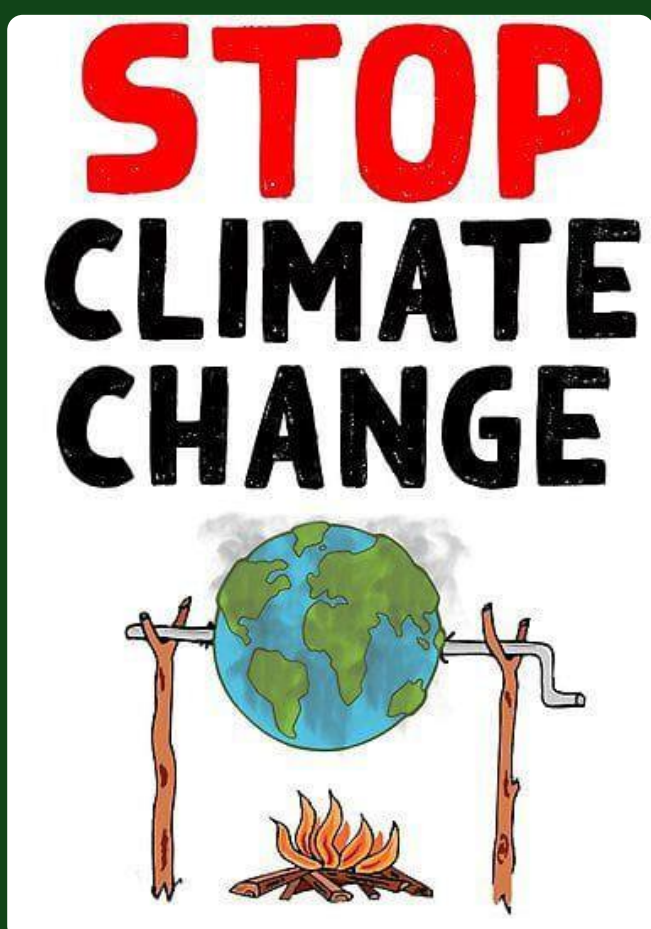


Specialized species in South Africa's mountain ranges, including the Cape Fold Mountains, are highly vulnerable to climate change. Because they rely on specific microhabitats their distribution areas become increasingly restricted as they move to higher altitudes.

As mountain species are forced upward by climate change, they risk extinction when suitable habitats disappear. Higher elevations also warm faster, compounding the threat. Protea species like *Protea stokoei*, (found in the Biosphere) are specifically vulnerable to these impacts.



South Africa's fire-dependent ecosystems, like fynbos, face a heightened risk of more frequent and intense fires due to climate change. While fire is essential for these ecosystems, crossing a critical threshold can hinder recovery. Post-fire droughts pose a significant threat to seedling survival, impacting long-term resilience.



TEST YOUR KNOWLEDGE



1. What is the main difference between "weather" and "climate"?
2. What is the primary cause of the current rapid climate change?
3. Name one greenhouse gas that contributes to climate change.
4. How does increased CO₂ in the atmosphere affect the oceans?
5. What happens to sea levels as a result of global warming?
6. Name one South African biome that is particularly vulnerable to increased fire frequency due to climate change.
7. What happens to plant blooming times when temperatures rise?
8. What is the impact of climate change on mountain species?
9. Name one Protea species that is threatened by climate change.
10. What is one action individuals can take to help reduce the effects of climate change?



Answers:

1. Weather is short-term atmospheric conditions (days/hours), while climate is long-term patterns (decades).
2. Increased greenhouse gas emissions from human activities (burning fossil fuels).
3. Carbon dioxide (CO₂), methane (CH₄), or nitrous oxide (N₂O).
4. It causes ocean acidification.
5. Sea levels rise.
6. Fynbos.
7. Plants bloom earlier.
8. Their habitats shrink as they move to higher altitudes, increasing extinction risk.
9. *Protea stokoei*.
10. Reduce energy consumption, use public transport, eat less meat, recycle, plant trees, etc.

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