

African Elephant

WWF WILDLIFE AND CLIMATE CHANGE SERIES



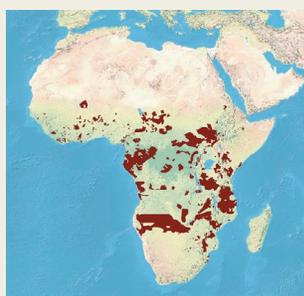
This assessment is one in a series resulting from a WWF study that assesses the vulnerability of numerous species to the effects of climate change. For each species, we also recommend climate-adaptive management strategies.

AFRICAN ELEPHANTS (*Loxodonta africana*) occur across a range of diverse habitats, are exposed to broad climate variability, and feed on a number of different foods. The flexibility inherent in these traits, along with a relatively large population size, contribute to their resilience to a changing climate.

However, a number of other traits make them vulnerable to a changing climate, including sensitivity to high temperatures and susceptibility to a variety of diseases. Additionally, an increasingly limited dispersal ability due to habitat fragmentation, coupled with a long generation time and moderate amounts of genetic variation, may limit the ability of the species to adapt to a changing climate.

But the biggest concern for elephants is their need for large amounts of fresh water, and the influence this has on their daily activities, reproduction and migration. Other threats—like poaching, habitat loss and human-elephant conflict—remain, and have the potential to increase due to the effects of climate stressors on humans and resulting changes in livelihoods.

Priorities for climate-informed African elephant conservation should include securing fresh water; maintaining and increasing suitable, connected habitat; and increasing the monitoring for disease and other causes of mortality. It is also essential to create improved conditions for people to adapt to current and future changes in climate, and to continue to reduce threats such as poaching.



African elephant range

DETERMINING SPECIES VULNERABILITY

The study identified the key vulnerabilities of a species based on four factors:

SENSITIVITY: the inability of the species to persist, as is, under changing climatic conditions. To assess sensitivity, we looked at IUCN Red List status, geographic range, population size, temperature tolerance, reliance on environmental cues (for reproduction, migration, hibernation), symbiotic interactions, diet, abundance of food sources, freshwater requirements, habitat specialization and susceptibility to disease.

ADAPTIVE CAPACITY: the ability of the species to respond to changes in climate. To assess adaptive capacity, we looked at dispersal ability, generation time, reproductive rate and genetic variation.

EXPOSURE: the extent of climatic change and variation that the species encounters and is projected to encounter.

OTHER THREATS: any other relevant threats, such as habitat destruction, poaching, human-wildlife conflict and pollution, as well as the human responses to climate change that exacerbate these threats.

CLIMATE VULNERABILITY OF THE AFRICAN ELEPHANT

Vulnerability Levels: **H** = High **M** = Medium **L** = Low **U** = Unknown



SENSITIVITY

M **IUCN Red List Status**
Vulnerable¹

L **Geographic Range**
Large. currently occur in 37 countries in sub-Saharan Africa¹

L **Population Size**
Large. 500,000+¹

M **Temperature Tolerance**
Medium. heat-sensitive animals that are susceptible to heat stress as well as sunburn²

H **Does the species rely on environmental cues for reproduction?**
Yes. Reproduction is tied to rainfall. Birth peaks coincide with rainfall peaks.³ Drought inhibits conception through impacts on vegetation that subsequently affect the female's ability to come into breeding condition.⁴

H **Does the species rely on environmental cues for migration?**
Yes. Migrates primarily to find sources of water and suitable habitat.

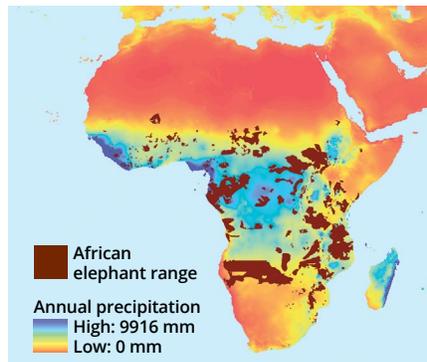
L **Does the species rely on environmental cues for hibernation?**
No. Does not hibernate.

L **Does the species have any strong or symbiotic relationships with other species?**
No. No obligate symbionts.

L **Diet**
Generalist. Feeds on as many as 173 plant species, including a wide variety of grasses, leaves, fruits, bark and roots.⁵

L **Abundance of Food Source**
High. Food is widely available in their habitat.

H **Freshwater Requirements**
High. Require 150-300 liters of water per day for drinking, in addition to bathing and play.^{2,3} Occasional droughts can affect populations immediately by increasing mortality or by reducing conception rates.⁶⁻⁸



African elephants are highly dependent on fresh water. This map shows the overlap between the range of the African elephant and areas of high annual precipitation for the years 1961-1990.

L **Habitat Specialization**
Generalist. Found in dense tropical rain forest, open and closed savanna, grassland, and arid desert (Namibia and Mali). Found over wide altitudinal and latitudinal ranges—from mountain slopes to oceanic beaches, and from the northern tropics to the southern temperate zone.¹

M **Susceptibility to Disease**
Medium. Sensitive to a number of diseases including endotheliotropic herpes, anthrax, tuberculosis, foot and mouth disease, and rinderpest.⁹

ADAPTIVE CAPACITY

M **Dispersal Ability**
Medium. Capable of dispersing over long distances in a single day; however, their habitat is becoming increasingly fragmented.

H **Generation Time**
Long. 25 years¹

M **Reproductive Rate**
Medium. A 22-month gestation period, 4 to 6 years between calves. Over a lifetime, a female can produce as many as 7 offspring.¹⁰

M **Genetic Variation**
Medium. Potentially 3 distinct lineages.¹¹ Recent population isolation and restricted gene flow.¹² Significantly lower genetic diversity than forest elephants, possibly reflecting a founder effect.¹² Lower genetic diversity in populations that have experienced a bottleneck (e.g., Kruger and Addo national parks in South Africa).¹³

EXPOSURE

L **What degree of climate variability is the species currently exposed to?**
High. Occurs across a wide range of habitats (savanna, forest and desert) and is consequently exposed to a wide variation of temperature and precipitation regimes.

H **What level of change in temperature and precipitation is projected across the species' range?**
High. Sub-Saharan Africa is projected to get warmer, with summer warming evenly distributed throughout the region, and unusual and unprecedented heat extremes projected to occur with greater frequency during summer months.¹⁴ Most projections indicate an increase in rainfall for eastern Africa, while southern and western Africa may see a decrease. There is significant uncertainty in rainfall projections, particularly for the east and west. If rainfall does increase, it is likely to be erratic, rather than evenly distributed.¹⁴

OTHER THREATS

H **Other Threats**
High. Poaching for ivory and meat.¹ Habitat loss and fragmentation.¹ 70% of the species range is in unprotected land.¹ Habitat encroachment. Human-elephant conflict for space and water.



RECOMMENDED CLIMATE-ADAPTIVE MANAGEMENT STRATEGIES



Based on the vulnerability assessment, we recommend these climate-adaptive management strategies for African elephants:

1. Secure fresh water in areas that are experiencing drought, or are projected to experience drought. This might include providing separate and additional water sources for wildlife, people and livestock, to reduce conflict over water.
2. Monitor disease, particularly pathogens to which elephants may not have had previous exposure.
3. Increase monitoring of population range shifts, changes in phenology, changes in population abundance, changes in behavior and the correlation of any of these with changes in weather and climate.
4. Increase the extent of protected areas to include stepping stones, movement corridors and climate refugia; improve management and restoration of existing protected areas to facilitate resilience.¹⁵
5. Outside protected areas, provide and restore movement corridors (including across country borders) and adequate space for elephants to roam.
6. Reduce pressures from other threats, many of which are likely to be exacerbated by climate change, through increasing the capacity of humans to manage the effects of climate change. Examples include
 - Promote changes in farming practices that will reduce human-elephant conflict. For example, support eco-friendly agriculture and better crop selection for the projected climate. This could result in increased yields on less land, and thus less encroachment into elephant habitat.
 - Minimize habitat loss and fragmentation caused by poor land use, development, etc., on unprotected land.
 - Monitor trends (such as an increase in poaching) that might indicate that communities facing increased hardships are turning to methods of earning income that adversely affect elephants and other wildlife.
 - Help people adapt to the changing climate by promoting alternative livelihoods that conserve ecosystem services and do not negatively impact elephants.

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