

# Mountain Gorilla

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.*

**MOUNTAIN GORILLAS** (*Gorilla beringei beringei*) possess a number of traits that contribute to their resilience to a changing climate: they are tolerant of a wide range of temperatures, are exposed to fairly high climate variability, have low freshwater requirements, and feed on a variety of abundant food.

However, a number of other traits make them vulnerable to a changing climate. Their population is very small and their range highly restricted. A limited dispersal ability (due to human settlements), coupled with a long generation time, a low reproductive rate, and low amounts of genetic variation, will limit the ability of the species to adapt to a changing climate.

Of high concern is the susceptibility of gorillas to disease. Diseases can be passed from humans to gorillas, and pose a high threat due to the widening distribution of disease under a changing climate, the frequent interaction between humans and gorillas, and the clustered distribution of the species. Other threats like habitat destruction, poaching, socio-political instability, commercial activities, and growing human population pressure, remain high and have the potential to increase due to the effects of climate stressors on humans and resulting changes in livelihoods.

Priorities for climate-informed conservation of mountain gorillas should include monitoring disease and maintaining and possibly increasing suitable habitat. 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 instability in the east/central African region.



Mountain gorilla 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 MOUNTAIN GORILLA

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



## SENSITIVITY

**H IUCN Red List Status**  
Critically endangered<sup>1</sup>

**H Geographic Range**  
**Small.** found only in Uganda, Rwanda and the Democratic Republic of the Congo, at 1,100-4,500 m,<sup>2,3</sup> occupying 260 km<sup>2</sup> in Bwindi<sup>4</sup> and 375 km<sup>2</sup> in Virunga<sup>5</sup>

**H Population Size**  
**Small.** 400 in Bwindi Impenetrable National Park and 480 in the Virunga Massif

**L Temperature Tolerance**  
**High.** tolerant of a wide range of temperatures<sup>4</sup>

**U Does the species rely on environmental cues for reproduction?**  
**Don't know.** There is no statistical evidence of birth seasonality.<sup>6</sup>

**L Does the species rely on environmental cues for migration?**  
**No.** Does not migrate.

**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.**

**L Diet**  
**Generalist.** Herbivorous; feeds on up to 140 different species, including leaves, shoots and stems, bark, roots, flowers, fruit (up to 36 species) and occasionally ants.<sup>2,3,7,8</sup> Not much seasonality in food availability (except for fruits and highly prized bamboo shoots).

**L Abundance of Food Source**  
**High.** Feeds on a variety of herbaceous species which are widely available.

**L Freshwater Requirements**  
**Low.** Does not typically drink from free-standing water sources, but rather obtains water from food sources.

**M Habitat Specialization**  
**Specialist.** The range of altitude for both populations covers different habitat types, from mixed forest to subalpine zones.<sup>1</sup> Virunga has a higher elevation, cooler temperatures and a lower diversity of tree species. Bwindi has a higher diversity of tree species, and the gorillas there build tree nests more often and eat more species of fruit.<sup>4</sup>

**H Susceptibility to Disease**  
**High.** Pathogens can be transferred from humans,<sup>1</sup> particularly due to exposure to high numbers of tourists, researchers, trackers and rebels. Several human-induced outbreaks have occurred over the years. Additionally, disease is easily communicated within the species because of their clustered distribution, extremely limited range, and frequent transfer of individuals between groups.<sup>4</sup>

## ADAPTIVE CAPACITY

**M Dispersal Ability**  
**Medium.** An annual home range of 4-40 km<sup>2</sup>, determined mostly by food and social factors.<sup>2,3,4</sup> Highly mobile and not tied to permanent nesting sites, with a mean daily journey length of 500-1000 m.<sup>4</sup> However, they are confined to small protected areas, and surrounded by a fairly high human population density in the areas immediately outside the parks.<sup>4</sup>

**H Generation Time**  
**Long.** approximately 20 years<sup>1</sup>

**H Reproductive Rate**  
**Low.** Beginning after age 10, females give birth to an average of one infant every four years.<sup>4</sup> Adult females produce an average of 3-4 surviving offspring during their lifetime.<sup>9</sup>

**H Genetic Variation**  
**Low.** A very small population size is coupled with low levels of genetic variation within the species.<sup>10</sup> However, there has been no recent population bottleneck.<sup>11</sup>

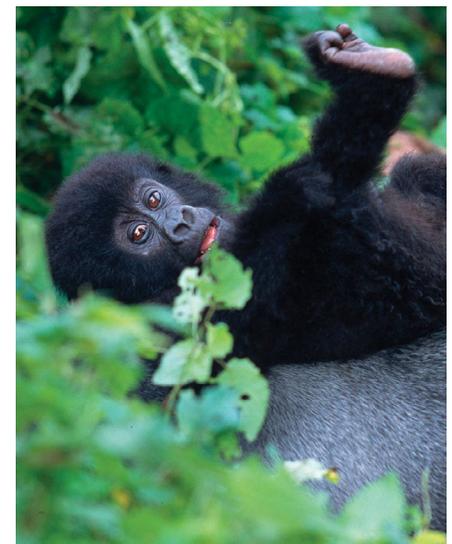
## EXPOSURE

**L What degree of climate variability is the species currently exposed to?**  
**High.** Travel patterns occur across a wide altitudinal range, where temperatures can fluctuate significantly, from fairly intense heat in the low altitude areas to severe cold at the snow-capped volcanoes.

**M What level of change in temperature and precipitation is projected across the species' range?**  
**Medium.** 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.<sup>12</sup> Most projections indicate an increase in rainfall for eastern Africa, though there is significant uncertainty. If rainfall does increase, it is likely to be erratic, rather than evenly distributed over time.<sup>12</sup>

## OTHER THREATS

**H Other Threats**  
**High.** Habitat destruction (illegal grazing, fuelwood consumption, expansion of farming/pastoralism), poaching (including snares for other species), socio-political instability (rebels and military in the gorilla habitat), commercial activities (oil drilling, road construction, tourist infrastructure, geothermal energy projects), and rapid human population growth in the region.<sup>1,13</sup>



## RECOMMENDED CLIMATE-ADAPTIVE MANAGEMENT STRATEGIES



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

1. Monitor disease, particularly pathogens to which mountain gorillas may not have had previous exposure.
  2. 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.
  3. 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.<sup>14</sup> Ensure appropriate policy/enforcement/collaboration for protected area management.
  4. 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
    - Mitigate increasing risks posed by infrastructure development and exploitation of resources.
    - Minimize habitat loss and fragmentation caused by poor land use, development, etc., on unprotected land.
  5. If mountain gorillas are faced with an increased risk of extinction, drastic measures such as translocation of subpopulations may need to be considered.
- Monitor trends (such as gorilla habitat encroachment) that might indicate that communities facing increased hardships are turning to methods of earning income that adversely affect mountain gorillas and other wildlife.
  - Help people adapt to the changing climate by promoting alternative livelihoods that conserve ecosystem services and do not negatively impact mountain gorillas.
  - Facilitate cross-border dialogue and improved harmonization of best practices for tourism.
  - Increase monitoring by rangers.

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For this and other species assessments, visit [worldwildlife.org/wildlife-and-climate](http://worldwildlife.org/wildlife-and-climate)

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