



Climate Change Vulnerability Assessment for Species

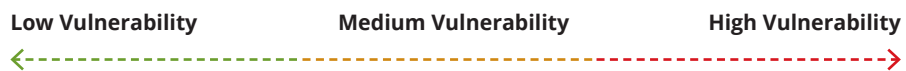
SPECIES: _____

Specify whether you are assessing the entire species or particular populations: _____

This tool assesses the vulnerability or resilience of species to climate change and is based on four factors: sensitivity, adaptive capacity, exposure and other threats. Pick a species and fill in the following table, adding details where possible.

A few notes to consider before starting:

- If a category is not applicable, indicate this in the comments section.
- Assess species traits relative to those of other similar species (e.g., African elephants relative to other large terrestrial mammals).
- Specify whether you are assessing the entire species or particular populations, as this will affect your responses.
- When assessing traits, consider any phenotypic plasticity (behavioral, physiological, morphological, phenological) or genetic variation that may exist within the species.
- While this tool can be used to assess all species, it is particularly applicable to terrestrial animals. It can, however, be applied to plants and marine species by adding these categories: for marine species, tolerance of pH, salinity and oxygen levels; for plants, C3 vs. C4 pathway, soil type and tolerance of fire.



VULNERABILITY FACTOR

SENSITIVITY: the inability of the species to persist, as is, under changing climatic conditions.

	LC	NT	VU	EN	CR	NE/DD
IUCN Red List Status find at iucnredlist.org LC: Least concern NT: Near threatened VU: Vulnerable EN: Endangered CR: Critically endangered NE/DD: Not evaluated/data deficient	Comments:					
Geographic range For example, distributed across an entire continent (large) vs. isolated in one national park (small).	Large	Medium		Small	Don't know	
	Comments:					



	Large	Medium	Small	Don't know
<p>Population size For example, among African great apes, the mountain gorilla numbers only 880 (small), compared to chimpanzees, which number 170,000–300,000 (medium).</p>	Comments:			
<p>Temperature tolerance What range of temperature can the species tolerate?</p>	Comments:			
<p>Does the species rely on environmental cues for reproduction? For example, is breeding cued by the arrival of the wet season or spring temperatures? Does temperature influence the sex of the offspring?</p>	No		Yes	Don't know
<p>Does the species rely on environmental cues for migration? For example, regional sea-surface temperature affects the upstream migration of salmon and trout.</p>	Comments:			
<p>Does the species rely on environmental cues for hibernation? For example, temperature affects the time at which ground squirrels enter and emerge from hibernation.</p>	Comments:			
<p>Does the species have any strong or symbiotic relationships with other species? This refers to significant interaction with another species. For example, obligate symbionts, competing species, predators, etc.</p>	Comments:			

Low Vulnerability Medium Vulnerability High Vulnerability


<p>Diet For example, the panda feeds only on bamboo (specialist), while the black bear feeds on roots, plants, insects, fish and other animals (generalist).</p>	<p>Generalist Specialist Don't know</p> <p>Comments:</p>
<p>Abundance of Food Source Is the diet abundant within the range of the species?</p>	<p>High Medium Low Don't know</p> <p>Comments:</p>
<p>Freshwater Requirements For example, elephants need to drink 150–300 liters of water per day (high), whereas leopards can obtain moisture from prey and go for some time without drinking (low).</p>	<p>Low Medium High Don't know</p> <p>Comments:</p>
<p>Habitat Specialization For example, pandas occur only in high altitude bamboo forest (specialists), while elephants occur in many different habitats (generalist).</p>	<p>Generalist Specialist Don't know</p> <p>Comments:</p>
<p>Susceptibility to Disease What diseases is the species exposed to? Consider in particular diseases which are projected to increase under a changing climate.</p>	<p>Low Medium High Don't know</p> <p>Comments:</p>

Low Vulnerability

Medium Vulnerability

High Vulnerability



VULNERABILITY FACTOR

ADAPTIVE CAPACITY: the ability of the species to respond to changes in climate.

	High	Medium	Low	Don't know
<p>Dispersal Ability This refers to the species' physical ability to move as well as to barriers to dispersal such as habitat connectivity and fragmentation.</p>				
<p>Generation Time The average age of the female parent at reproduction—e.g., 25 years for elephants (long), but 8 years for snow leopard (medium).</p>				
<p>Reproductive Rate The number of offspring produced and the rate at which they are produced—e.g., mature gorillas produce one infant about every four years (low), while some rodents have a number of offspring at once, multiple times in a year (high).</p>				
<p>Genetic Variation For example, cheetahs have relatively low genetic variation, as they are all descendants of a small ancestral population (genetic bottleneck).</p>				



VULNERABILITY FACTOR

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

	High	Medium	Low	Don't know
<p>What degree of climate variability is the species currently exposed to? Consider current exposure to high variability in temperature and precipitation across the species range, as well as exposure to extreme events (e.g., droughts, floods, wildfires, heat waves, hurricanes).</p>	Comments:			
<p>What level of change in temperature and precipitation is projected across the species' range? Useful resources for these data include the IPCC and World Bank.</p>	Comments:			

VULNERABILITY FACTOR

OTHER THREATS: any other relevant threats.

	Low	Medium	High	Don't know
<p>Other Threats For example, habitat destruction, poaching, human-wildlife conflict and pollution, as well as the human responses to climate change that exacerbate these threats.</p>	Comments:			

NEXT STEPS

- Review areas of medium to high vulnerability. Are these vulnerabilities addressed in your species management plan? If not, consider what climate-adaptive management strategies you might implement to address them. Examples can be found at the link below.
- Review the unknowns. Identify sources for more information, or whether further research is needed.
- Get feedback on your assessment from your peers and other species experts.

Completed assessments can be found at worldwildlife.org/wildlife-and-climate.

If you would like your vulnerability assessment to be considered for inclusion in future WWF publications, please send it to Nikhil Advani at nikhil.advani@wwfus.org.

Photos: Page 1, L to R: © Martin Harvey/WWF-Canon; © naturepl.com/Andy Rouse/WWF-Canon; © naturepl.com/Francois Savigny/WWF-Canon; © Steve Morello/WWF-Canon; © Paul Bettings/WWF-Canada; © Martin Harvey/WWF-Canon. 2015 WWF. All rights reserved by World Wildlife Fund, Inc.

References:

Foden W et al., 2013. Identifying the world's most climate change vulnerable species: A systematic trait-based assessment of all birds, amphibians and corals. PLoS ONE 8(6): e65427.
 Gill D et al., 2013. Trees and climate change. Fauna & Flora International, Cambridge, UK, 16 pp.
 The Heinz Center, 2012. Climate-change Vulnerability and Adaptation Strategies for Africa's Charismatic Megafauna. Washington, DC, 56 pp.
 Williams SE et al., 2008. Towards an Integrated Framework for Assessing the Vulnerability of Species to Climate Change. PLoS Biology 6(12): e325.

Citation: Advani, NK, 2014. Climate Change Vulnerability Assessment for Species. World Wildlife Fund, Washington, DC.