

SPECIES SUSCEPTIBILITY TO CLIMATE CHANGE IMPACTS



Emperor Penguin Aptenodytes forsteri and man meet in front of Mount Discovery (McMurdo Sound, Antarctica). © Colin Harris

There is growing evidence that climate change will become one of the major drivers of species extinctions in the 21st century. But how do we know which species are most at risk? IUCN is developing assessment tools to identify the species that are most susceptible to climate change and the areas in which they occur.

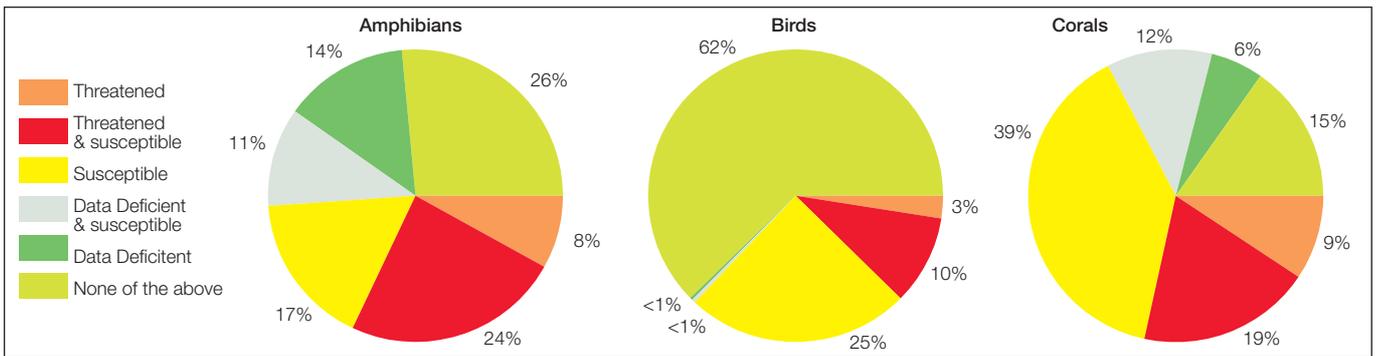
Why are some species more at risk from climate change than others?

Some species are much more susceptible to climate change impacts than others due to their life history, and their ecological, behavioural, physiological and genetic traits. The risk of extinction increases markedly when species experience both high susceptibility to climate change and large climatic changes.

What are the biological traits that make species most susceptible to climate change?

IUCN has identified five groups of traits that are believed to be linked to increased susceptibility to climate change; these are:

- Specialized habitat and/or microhabitat requirements
- Narrow environmental tolerances or thresholds that are likely to be exceeded due to climate change at any stage in the life cycle.
- Dependence on specific environmental triggers or cues that are likely to be disrupted by climate change.
- Dependence on interspecific interactions that are likely to be disrupted by climate change.
- Poor ability to disperse to or colonize a new or more suitable range.



The proportion of birds, amphibians and warm-water reef-building corals assessed as combinations of threatened (according to The 2008 IUCN Red List), "climate-change-susceptible", and Data Deficient.

IUCN has collected information relating to these groups of traits for the world's birds (9,856 species), amphibians (6,222 species) and warm-water reef-building corals (799 species).

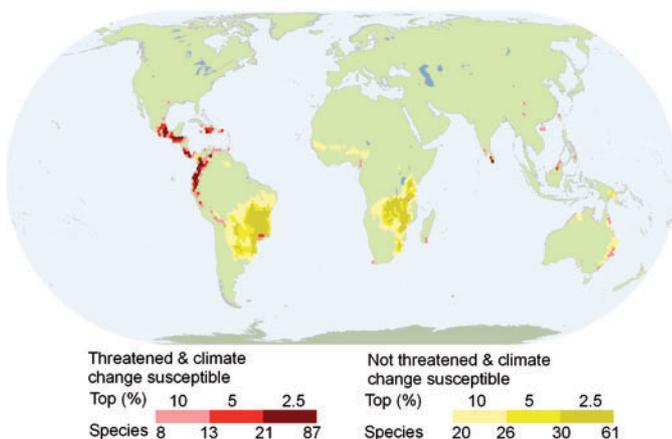
How common are these traits in the amphibians, birds and corals?

Where species possess one or more traits associated with negative climate change impacts, we treat them as "climate-change-susceptible". Through compiling scores for birds, amphibians and warm-water reef-building coral species, initial results suggest that up to 35%, 52% and 71% of these groups respectively could be susceptible to climate change.

Are the "climate-change-susceptible" species the same as those already identified as threatened on The IUCN Red List?

Not entirely. IUCN's work shows that 70-80% of birds, amphibians and corals that are already threatened are also "climate-change-susceptible". Given exposure to large climatic changes, these species which also have least resilience to further threat, face the greatest risk of extinction. Of those that are not considered threatened, 28-71% are "climate-change-susceptible". We recommend that these species, and the areas of their greatest concentrations, are given high conservation priority.

Areas of highest concentration (top 10%, 5% and 2.5% globally) of amphibian species assessed as threatened and "climate-change-susceptible" (reds), and not threatened but "climate-change-susceptible" (yellows).



Which areas have the highest concentrations of "climate-change-susceptible" species?

For amphibians and corals, we have identified where the greatest numbers and proportions of threatened and "climate-change-susceptible" and non-threatened but "climate-change-susceptible" species occur.

For amphibians, the largest of such areas for threatened and "climate-change-susceptible" species spans Mesoamerica and northwestern South America, while for non-threatened but "climate-change-susceptible" species, southern Brazil and its neighbouring countries, and a large region from east to central and southern Africa are identified as priorities.

For corals, high concentration areas occur mainly in the species-rich 'Coral Triangle' (Indonesia, Philippines to the Solomon Island), although various other areas with lower species richness have high proportions of "climate-change-susceptible" species.

How will IUCN use "climate-change-susceptibility" assessments?

In combination with spatial projections of future climate from General Circulation Models, assessments of "climate-change-susceptibility" complement IUCN Red List assessments of extinction risk and serve as a 'warning flag' highlighting the need for intensive monitoring and potentially conservation action for the affected species.

Already considered Vulnerable, Venezuelan forest species *Cochranella antisthenesi* has been assessed as "climate-change-susceptible".

