

# Science for Environment Policy

## IUCN Red List criteria useful as an early warning for extinction threat

**The IUCN Red List criteria** perform well as an early warning system for short-lived species threatened by climate change, according to recent research. Using the Red List criteria, the study identified *Assa darlingtoni*, an Australian frog, as being at risk of extinction up to 85 years before a model predicted it was likely to become extinct.

The [International Union for Conservation of Nature and Natural Resources](#) (IUCN) [Red List](#) of Threatened Species<sup>1</sup> is a globally recognised directory. It provides the conservation status of [plants and animals](#) worldwide that have been evaluated using carefully chosen criteria.

The criteria categorise species according to their risk of becoming extinct. It includes three threatened categories – Critically Endangered, Endangered and Vulnerable – and any one of five criteria can be used to decide whether a species is threatened with extinction. These criteria are based on biological indicators, such as population declines or small population sizes. However, there is some concern that the small timeframe used to assess extinction risk for short-lived species may not give enough early warning for slow-acting threats, such as climate change.

This study investigated when it is possible to judge whether a species is threatened, based on the Red List criteria. As a case study, the researchers used all five Red List criteria to assess the extinction risk of *Assa darlingtoni*, a short-lived Australian frog species which was last assessed in 2004. Other studies have linked climate change to declines in amphibian populations, and frogs are considered to be particularly susceptible.

First, the researchers estimated when the frog is likely to become extinct using a model which simulated scenarios of population changes under different climate change scenarios. The model suggested that populations would be stable for a hundred years if the climate does not change.

With a warming climate, populations would remain stable until 2040–2050, and then would decline at different rates depending on the severity of the climate change. In the worst case scenario, *A. darlingtoni* would become extinct in the wild by 2095. Less severe climate change could see *A. darlingtoni* populations decline by 39% to 96% over a hundred years.

The researchers then applied the Red List criteria to see when they would categorise *A. darlingtoni* as a threatened species in advance of its predicted extinction date. In the worst case scenario, the species qualified for threatened status (Vulnerable) in 2010, 85 years before the model estimated it may become extinct. This status was based on Criterion E – quantitative estimates of extinction risk. Criterion A (population decline) categorised it as threatened in 2050, 45 years before the worst case predicted extinction.

These results imply that the Red List criteria do act efficiently as an early warning system for short-lived species at risk for extinction under a slow-acting threat, such as climate change. How much warning is needed depends on many factors, including how a species reacts to conservation actions, managing the practicalities of environmental policy, and delays caused by slow political change. The researchers suggest that at least several decades are needed from qualifying for listing to the date of estimated extinction so that appropriate conservation plans can be developed and implemented.



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1. [www.iucnredlist.org](http://www.iucnredlist.org)