

## Climate Change Winners and Losers: Contrasting Responses of Two Aphanioops Species in Oman

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**Abstract :** This study investigates the potential effects of climate change on the habitat suitability of two Aphanioops species (Teleostei: Aphanioopsidae) found in the Oman Mountains and the Southwestern Arabian Coast. *Aphanioops kruppi*, an endemic species, is found in various water bodies such as wadis, springs, aflaj, spring-fed streams, and some coastal backwaters. *Aphanioops stoliczkanus*, on the other hand, inhabits brackish and freshwater habitats, particularly in the lower parts of wadies and aflaj, and exhibits euryhaline characteristics. Using Maximum Entropy Modeling (MaxEnt) in conjunction with ArcGIS (10.8.2) and CHELSA bioclimatic variables, topographic indices, and other pertinent environmental factors, the study modeled the potential impacts of climate change based on three Representative Concentration Pathways (RCPs 2.6, 7.0, 8.5) for the periods 2011-2040, 2041-2070, and 2071-2100. The model demonstrated exceptional predictive accuracy, achieving AUC values of 0.992 for *A. kruppi* and 0.983 for *A. stoliczkanus*. For *A. kruppi*, the most influential variables were the mean monthly climate moisture index (Cmi\_m), the mean diurnal range (Bio2), and the sediment transport index (STI), accounting for 39.9%, 18.3%, and 8.4%, respectively. As for *A. stoliczkanus*, the key variables were the sediment transport index (STI), stream power index (SPI), and precipitation of the coldest quarter (Bio19), contributing 31%, 20.2%, and 13.3%, respectively. *A. kruppi* showed an increase in habitat suitability, especially in low and medium suitability areas. By 2071-2100, high suitability areas increased slightly by 0.05% under RCP 2.6, but declined by -0.02% and -0.04% under RCP 7.0 and 8.5, respectively. *A. stoliczkanus* exhibited a broader range of responses. Under RCP 2.6, all suitability categories increased by 2071-2100, with high suitability areas increasing by 0.01%. However, low and medium suitability areas showed mixed trends under RCP 7.0 and 8.5, with declines of -0.17% and -0.16%, respectively. The study highlights that climatic and topographical factors significantly influence the habitat suitability of Aphanioops species in Oman. Therefore, species-specific conservation strategies are crucial to address the impacts of climate change.

**Keywords :** *Aphanioops kruppi*, *Aphanioops stoliczkanus*, Climate change, Habitat suitability, MaxEnt

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