Threats from climate change are increasing for Natural World Heritage Sites

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Abstract (500 words)

Many Natural World Heritage Sites (Grand Canyon National Park, Yellowstone National Park, Dolomites) are important tourist attractions but, like all other open landscapes, are threatened by climate change with a negative impact on biodiversity and changes in species. Studies show that Natural World Heritage sites and ecosystems are threatened by sea level rise (Reinmann et al., 2018), erosion and shoreline change (Sabour et al., 2020), glacier retreat (Bosson et al., 2019), fires (Hemp, 2005), climate change (Perry, 2011) as well as other natural and geological threats (Valagussa et al., 2020). Climate change has already become the most prevalent threat to Natural WHS, as stated in the latest International Union for Conservation of Nature (IUCN) World Heritage Outlook (Osipova et al., 2020).

The aim of the paper is to investigate the incidence and intensity of climate change threats to Natural World Heritage Sites as assessed by the IUCN experts. The data originates from the Conservation Outlook Assessment database covering 250 sites for three time periods (2014, 2017 and 2020). The threat of climate change is broadly defined and includes temperature extremes, rapidly disappearing glaciers, coral bleaching, droughts, desertification, rising temperatures and rising sea levels. Simultaneous probit and ordered models with individual site effects are used to analyse the occurrence and intensity of both a perceived current and potential threat.

The results show that the percentage of sites currently threatened by climate change increased from 10 percent to 31 percent between 2014 and 2020. Similarly, the percentage of sites identified as potentially threatened by climate change increased from 20 to 32 percent during the same period. Of the sites identified as having a current climate
change threat, 31 per cent fall into the very high threat category, which is also increasing over time.

The estimations reveal that both the incidence of a current climate threat and its intensity are significantly increasing over time when site characteristics are controlled for. In 2020, the current climate change threat probability is 15 percentage points higher than in 2014. The likelihood of a very high climate change threat increases by between 12 and 15 percentage points in the same time period. An important finding of the study is that the likelihood of a climate change threat is not only increasing over time but also depends on type and site characteristics. Marine and coastal sites have the highest probability of a current climate threat, while deserts have the lowest. The probability of a current climate threat is significantly lower for locations in Africa, while the probability of a potential climate change threat is highest in Latin America.

However, even in 2020, the latest year available, almost half of the locations are not recognised as having either an actual or potential threat from climate change. This suggests that even experts may have difficulty recognising climate risks. One indication of this is that the IUCN experts have identified a lack of data to determine climate risks for 10 per cent of the sites.

Keywords: Climate Change, threats, expert assessment, marine and coastal sites, Natural World Heritage sites, Probit and ordered probit model.