MOST PROTECTED AREAS OF
THE KAVANGO-ZAMBEZI (KAZA) LANDSCAPE
ARE VULNERABLE TO CLIMATE CHANGE

BACKGROUND

The Kavango-Zambezi (KAZA) landscape or trans-frontier conservation area (TFCA) is the largest TFCA in the world covering almost 520,000 km² and encompassing parts of Angola (17%), Botswana (30%), Zambia (25%), Zimbabwe (14%) and Namibia (14%). Of this area, 371,394 km² are under some form of conservation, including 20 national parks, 85 forest reserves, 22 conservancies, 11 sanctuaries, 103 wildlife management areas, and 11 game management area. The area hosts the largest elephant population in the world (Karidozo et al., 2016) and about 25% of the global wild dog population (KAZA TFCA, 2014).

The KAZA TFCA was established primarily to manage shared natural and cultural heritage resources and biodiversity to support healthy and viable populations of wildlife species, including migratory species, and to facilitate tourism across international borders.

Global climate change impacts are among the most significant drivers threatening the sustainability of the food system and the conservation of natural capital in the landscape.

For these reasons, WWF's Africa Climate Change Adaptation Initiative (AAI) in partnership with Anchor Environmental consultants, have conducted a climate change vulnerability and adaptation assessment for twenty-seven (27) protected areas of the KAZA landscape.
EXPECTED CHANGES IN CLIMATE

In this study, future climate conditions were estimated for 2050 using the IPCC’s representative concentration pathway (RCP) 8.5 scenario, which is the one that corresponds best to observed trends.

Total annual precipitation averaged over the whole of KAZA is expected to decrease by 4.6% by 2050, relative to historical (1960-1990) precipitation.

The hot dry season (August to October) is expected to get drier by 33%, the hot wet season (November to April) is expected to get drier by 3.3%, and the cool dry season (May to July) is expected to get drier by 22%.

Mean annual temperature averaged over the whole of KAZA is expected to increase by 3°C (14%), with mean monthly temperatures reaching dangerously high levels (close to 30°C) for October and November.

POTENTIAL CLIMATE IMPACTS

Impacts were assessed in terms of **habitat change** (how different is the future biome representation of each protected area compared to current), **species loss** (what proportion of species will no longer find the protected area suitable in the future) and **resource pressure** (in which direction is resource pressure by local communities likely to move given community vulnerability to extreme climate events).

The overall potential impact scores ranged from 21.1% for Nxai Pan National Park in Botswana to 50.0% for Chizarira National Park in Zimbabwe.

**Habitat change:** For ten of the protected areas, predictions were for no habitat change, while only Chizarira National Park in Zimbabwe is predicted to have a change in habitat of more than 30%.

**Species loss:** The species impact scores ranged from 19.8% for Kariba Recreation Park in Zimbabwe to 44.7% for Makgadikgadi Pans National Park in Botswana.

**Current resource pressure:** Current resource pressure scores ranged from 21.0% for Nxai Pan National Park in Botswana to 77.0% for Zambezi National Park in Zimbabwe.

ADAPTIVE CAPACITY

The adaptive capacity of parks is strongly affected by their level of financing in relation to management requirements. The potential change in protected area finances was coupled with the ability of protected areas to expand (in order to accommodate species range shifts) to yield each protected area’s adaptive capacity score.

The resulting adaptive capacity scores ranged from a low of 46.2% for Mahango Game Park in Namibia to a high of 96.1% for Nxai Pan National Park in Botswana. The vast majority of protected areas assessed had an adaptive capacity score of above 60%.
**Tourism demand:** Estimated decline in tourism demand is fairly low for all protected areas considered, ranging from no predicted change in demand for two protected areas to 13.3% for Makgadikgadi Pans National Park in Botswana.

**Infrastructure at risk of river flooding:** Varied substantially across KAZA, with seven protected areas having no infrastructure at risk, while three protected areas had more than 80% of their infrastructure at risk.

**Possibility of expansion:** High for all protected areas apart from Bibilili Game Management Area in Zambia and Chirisa Safari Area and Chizarira National Park in Zimbabwe.

The climate change vulnerability assessment was done for twenty-seven (27) protected areas, each of which were attributed vulnerability scores. The vulnerability score indicates KAZA’s potential overall loss of biodiversity, taking both the potential impacts and the capacity to adapt into account. It was used for both ranking the conservation areas in terms of vulnerability and to classify each conservation area in terms of severity of vulnerability.

Thus, vulnerability scores ranging from 20-100% were considered “highly vulnerable”, those ranging from 10-20% were considered as “vulnerable”, and those ranging from 0-10” were considered to be “resilient”.

Of the 27 protected areas assessed, 10 were considered to be ‘highly vulnerable’ and 17 were considered as ‘vulnerable’. None of the protected areas were considered to be ‘resilient’.

**PROTECTED AREAS ASSESSED AND VULNERABILITY ASSESSMENT RANKING**

The vulnerability scores ranged from a low of 11.0% for Nxai Pan National Park in Botswana to a high of 29.7% for Chizarira National Park in Zimbabwe.

(Source: WWF, Coldrey et al)
RECOMMENDED ADAPTATION MEASURES

I. SHORT-TERM

- The first priority for KAZA should be to remove fencing and restore the land by either improving land management (for those areas not too severely degraded) or actively rehabilitating and clearing the land (for those areas that are severely degraded) in order to build ecosystem resilience to climate change.
- Comprehensive monitoring of biodiversity and climate should be established across KAZA to help identify which species’ populations are under pressure as the climate changes, as well as identify how different species’ distributions are changing.

II. MEDIUM-TERM

- Efforts should be made to assist communities with either diversifying into additional climate-compatible, nature-based livelihood activities or build climate resilience into existing livelihoods.
- Floodplains in KAZA are extremely important for both wildlife and communities and efforts to secure environmental flows in the face of climate change are required.