HYBRID BEARS: A Consequence of Anthropogenic Climate Change

HELLO HYBRIDS

Hybridization occurs when two different species or sub-species mate to produce offspring. The hybridization between a polar bear (Ursus maritimus) and a grizzly bear (Ursus arctos) are usually referred to as grizzly and hybrid bears (Preuß et al., 2009). The grizzly bear is produced from a male grizzly bear and a female polar bear, whereas a polar bear is produced from a male polar bear and a female grizzly bear. In all observed cases of hybridization in both captive and natural environments, the hybrids have been fertile (Preuß et al., 2009). The ecological and genetic benefits and costs of natural hybrids must be considered for conservation and management policies. Species adaptation, genetic composition, competition with parent taxa, and invasion of novel habitat are all potential effects of hybrid species (Claramund, 2007). Competition with parent taxa can increase the susceptibility to pathogens, parasites, and other environmental threats (Via et al., 2003). Hybrids also have the potential to contribute to population adaptation, rescuing of Changes in habitat, climate change, and anthropogenic factors threaten polar and brown bears populations (Derocher et al., 2013). New distribution overlaps between both species have also impacted food resources, mating, and territories of both bear species, resulting in an increased potential for hybridization (Preuß et al., 2009).

METHODS

Distributions of brown and polar bears were mapped in North America to establish the potential hybrid range. A variety of factors (biome distribution, sea surface temperature, sea ice distribution, polar bear denning sites, and oil reserves) were mapped to emphasize the effect of anthropogenic climate change in the Arctic region.

BROWN BEAR

Current North American distribution of the brown bear (Ursus arctos)

POLAR BEAR

Current North American distribution of the polar bear (Ursus maritimus)

HYBRID BEAR

Potential hybrid bear distribution was created using the overlapping range of both polar bear and brown bear ranges in North America

Biome Distribution

Current biome distribution across North America. Suitable polar bear habitat occurs only in the Arctic tundra; brown bears have a diverse range of suitable habitats with the majority including the boreal forest/taiga, conifer forests, and broadleaf/twiggy forest. The effects of climate warming intensity with increasing latitude. Arctic greening is a shift in biome type from tundra to boreal forest/taiga as a result of climate warming.

Sea Surface Temperature

Sea surface temperature change from 1996-2016. Changes in sea surface temperature reflect the overall global climate warming trend. Increases in sea surface temperature have led to an overall decline in sea ice in the Arctic region over the last several decades.

Sea Ice Distribution

Sea ice change from 2014-2017. Declines in sea ice in Hudson Bay and the Arctic Ocean have had a significant impact on food availability of polar bears. Sea ice is used by polar bears to hunt seals. Longer periods without ice has forced polar bears to hunt forage terrestrially for longer periods.

CONCLUSION

The potential ecological ramifications of hybrid bears in the Arctic region are unknown. With increasing global temperatures (Figure 2), the various impacts on the Arctic region discussed previously are expected to amplify. The increasing pressures for polar bear survival on land combined with brown bear range expansion further north will ultimately increase the likelihood of hybridization in the future. It is a possibility that hybrid bears will be better adapted to the changing climate and eventually replace the declining polar bear population. There are several research opportunities in these novel hybrid occurrences and theoretical ecological outcomes. Establishment of the current knowledge on hybrids, parent species, and climate impacts are the first steps in addressing hybrid research.