

Introduction

This report was prepared by Northwest Carbon in April 2013 for Rangelands NRM WA as part of the update of the Regional Plan. The purpose of the report is to provide information and advice regarding predicted climate change that may occur between now and 2050 that may have implications for Natural Resource Management in the Desert subregion.

Predicted climate change

The Desert subregion experiences a dry and arid climate with typically high levels of moisture and growth in the warm season and low levels in the cool season.

The predicted impacts of climate change for the Desert subregion region are:

- **Average annual increase in temperature in the range of 1 – 2.5 °C by 2050**
 - Summer: 1 - 2.5 °C
 - Autumn: 1 - 2 °C
 - Winter: 1 - 2 °C
 - Spring: 1 - 2.5 °C

- **Average annual rainfall to decrease between 2 – 10% by 2050**
 - Summer: decrease of 2 – 5%
 - Autumn: decrease of 2 – 10%
 - Winter: decrease of 5 – 10%
 - Spring: decrease of 5 – 10%

- **Average annual relative humidity to decrease by -0.1 - 2% by 2050**
 - Summer: decrease of 0.5 – 1%
 - Autumn: decrease of 0.5 – 1%
 - Winter: decrease of 1 – 2%
 - Spring: decrease of 1 – 2%

- **Annual average wind speed to remain constant through to a 2% increase in the south by 2050**

- Summer: 2% decrease to 2% increase (remaining constant or decreasing across the north and middle of the region with a potential increase to the south)
 - Autumn: 2% decrease to 2% increase
 - Winter: 10% decrease to 5% increase (The north of the region remains unchanged with the central belt seeing a 5% increase and the southern section now seeing up to a 10% decrease)
 - Spring: unchanged or increase by up to 5%
- **Annual average potential evapotranspiration will remain unchanged or increase by up to 4% by 2050**
 - Summer: no change or increase by up to 4%
 - Autumn: increase of 2 – 4%
 - Winter: increase of 2 – 4%
 - Spring: no change or increase by up to 4%

In summary, annual temperatures are forecast to increase, whilst annual rainfall and humidity is predicted to decrease.

Impacts of climate change for natural resource management (NRM)

Addressing the predicted impacts of climate change will require NRM projects that will reduce the risk of further impacts, or which will attempt to mitigate impacts that have already occurred.

The potential impacts of climate change in the Desert in the context of future management of the region's natural resources are summarised below:

1. Overgrazing by feral herbivores (camels and rabbits)

A reduction in average rainfall could lead to overgrazing of native vegetation by feral animals such as camels and rabbits. Overgrazing pressure could lead to a significant degradation of vegetation and diversity of species. This would be in addition to any negative impacts that reduced rainfall and increased temperatures may have on the biology of the region.

2. Impacts from feral animals (predation by cats and foxes)

Changed patterns of rainfall and/or an increase in temperatures may lead to the loss of critical habitats and havens for some animals, exposing to them greater risk of predation from feral cats and foxes.

3. Impacts caused by human management

The impacts of predicted climate change on potential NRM projects will be influenced by many complex interactions between the climate, changes to land use, human management responses, and broader ecosystem and species level responses to changes in environmental conditions.

In the future, more detailed examination of the sensitivity of biodiversity to climate change will need to be undertaken to allow for a broader consideration of climate change and how it will impact NRM planning. It is likely that future ecosystems will look and function differently than those we are managing today, according to the CSIRO (2013) (available at <http://www.csiro.au/nationalreservesystem>).

4. Fire

The likelihood of unmanaged wild fires is expected to increase as a result of climate change. This may also create potential risks for environmental assets not currently identified as at risk from fire.

NRM projects may need to be altered to cope with potential changes in fire seasonality.

5. Weeds (buffel grass)

Less rain and drier land as a result of climate change could lead to a more disturbed environment. Disturbed habitats may be more easily colonised by pest weeds, for example after a drought or fire. Land managers may need to adjust the timing of their weed control strategies, or may need to adapt to invasions of new weed species.

6. Overgrazing by stock animals

Healthy paddocks need rain to grow. A reduction in average annual rainfall and an increase in temperature could lead to a decrease in the quantity of food available for livestock. Likewise, an increase in the frequency of wild fires may also reduce the availability of healthy grazing land for stock to graze on.

The potential for climate change to impact on overgrazing is complex and is highly dependent on the human response to changes in natural resource condition and adaptation. There is a clear need to develop and implement effective strategies for sustainable grazing, and reduce the incidence and severity of unplanned fires in order to improve the resilience of the landscape.