Rangelands NRM
Western Australia

Pilbara subregion – Predicted Climate Change Report

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 Pilbara subregion.

Predicted climate change

The Pilbara region experiences a dry climate with low levels of moisture and growth throughout the year.

The predicted impacts of climate change for the Pilbara region are:

- **Average annual increase in temperature in the range of 1 – 4 ^{O}C by 2050**
  - Summer: increase of 1 – 4 ^{O}C
  - Autumn: increase of 1 – 3 ^{O}C
  - Winter: increase of 1 – 2.5 ^{O}C
  - Spring: increase of 1.5 – 4 ^{O}C

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

- **Average annual relative humidity to generally decrease by 0.5 – 3% by 2050**
  - Summer: decrease of 0.5 – 2%
  - Autumn: decrease of 0.5 – 2%
  - Winter: decrease of 1 – 3%
  - Spring: decrease of 0.5 – 2%

- **Annual average wind speed to remain approximately constant by 2050**
  - Summer: increase of 2 – 5%
  - Autumn: decrease of 5 – 10%
  - Winter: decrease of 2% to increase of 5%

- Spring: decrease of 2% to increase of 10%

- **Annual average potential evapotranspiration to increase between 2 – 4% by 2050**
  - Summer: increase of 2 – 8%
  - Autumn: increase of 2 – 8%
  - Winter: increase of 2 – 8%
  - Spring: decrease of 2% to increase of 8%

In summary, annual temperatures and loss of water from the soil and plants are forecast to increase, whilst annual rainfall 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 Pilbara in the context of future management of the region's natural resources are summarised below:

1. **Overgrazing by stock animals**

Healthy paddocks need rain to grow. A reduction in the 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

2. **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.

3. Weeds (buffel grass, mesquite)

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.

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. **Over abstraction of groundwater**

Mining projects that remove too much groundwater can threaten levels of surface water and the natural resources that rely on surface water, which would have a big impact on agriculture.

Reduced ground and surface water will affect the quality of vegetation and habitat in groundwater dependent ecosystems which provide refuge for native flora and fauna.

A reduction in surface water could further exacerbate the effects of a predicted warmer and drier climate.

6. Development of linear infrastructure impacting connectivity and water flow

The development of linear infrastructure such as rail, road or highway projects may change the flow of water. This will threaten marshes or other natural resources that depend on a regular flow of water across the catchment area. The development may also result in a further channelling of water flow that has the potential to cause soil erosion.

Further reductions in the flow of surface water or water availability as a result of forecast climate change may exacerbate the impacts of climate change.

7. Human impacts (pollution, recreational tracks, litter)

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).