

# Climate change adaptation for biodiversity, in the Northern Territory

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*(with thanks to John Woinarski)*



# NT Government context

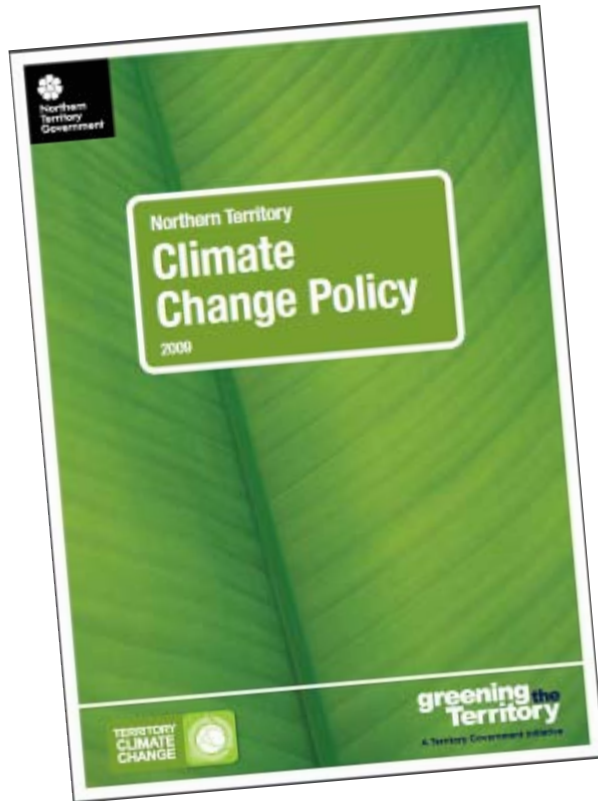


- Territory 2030

“The NT contributes to the national target for greenhouse gas reduction”

“Ensure no deterioration in the health of biodiversity in the Northern Territory”

# NT Government context



- NT Climate Change Policy  
<http://www.greeningnt.nt.gov.au/climate/policy.html>
- **Eg. Target 18** – Support landholders to use carbon offset markets to reduce the emissions from savannah burning by 500 000 tonnes per year by 2030

- NT Climate Change Adaptation Strategy (in prep)



# Climate change in the NT

- Extent and nature of climate change still very uncertain, for many parameters

*eg. By 2070 (high emission scenario)....*

*- annual warming around 1.8°C to 3.5°C*

*- annual rainfall change of -10 to +10% in the N and -40 to +15% in the S*

- NT is generally a land of sweeping plains, rather than rugged mountain ranges

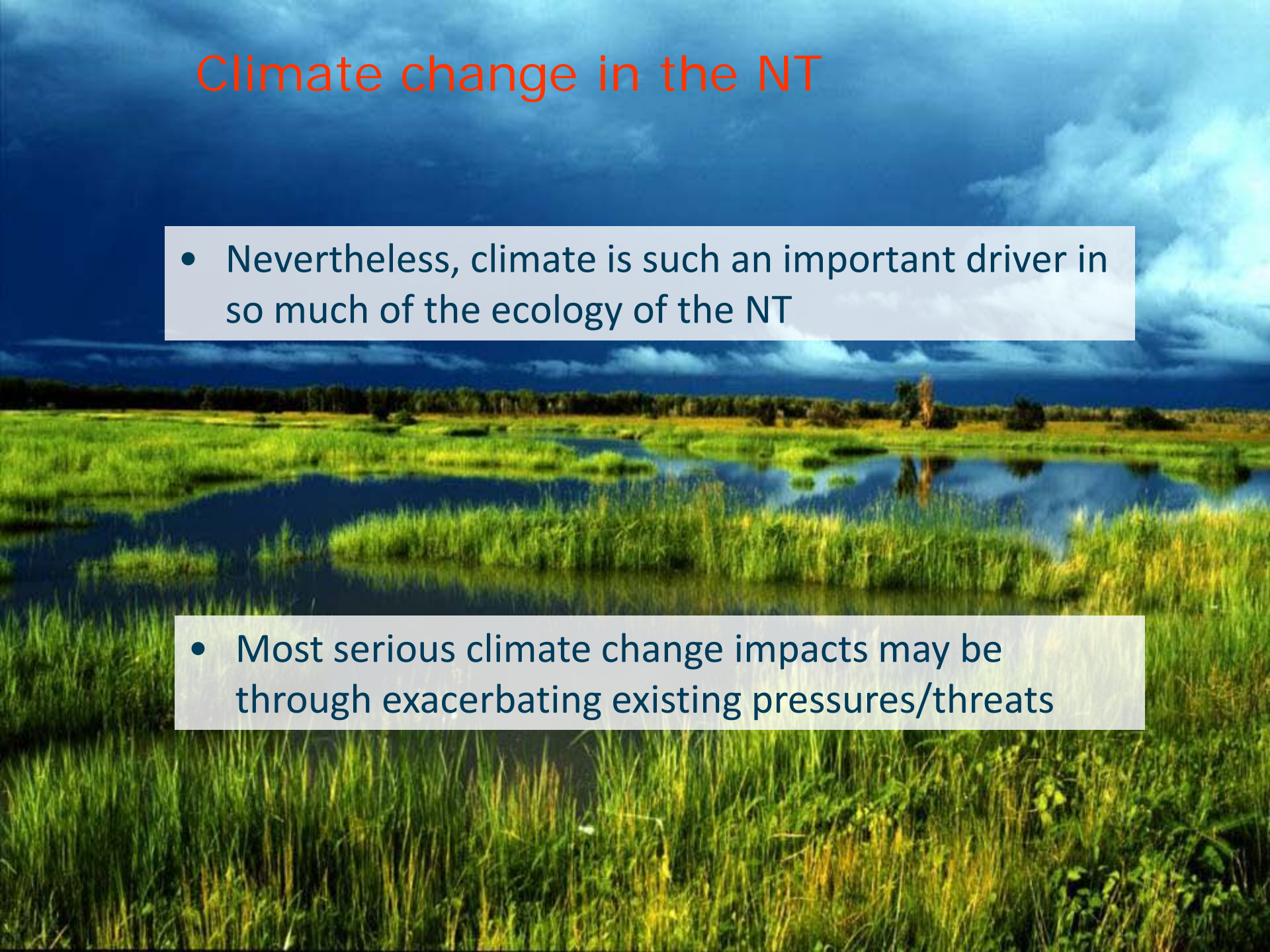
*“The Territory is somewhat lucky (in terms of climate change impacts) in not supporting terminus or baroquely structured climates”*



# Climate change in the NT

- Nevertheless, climate is such an important driver in so much of the ecology of the NT

- Most serious climate change impacts may be through exacerbating existing pressures/threats





# Likely climate change impacts

## BIODIVERSITY AND ENVIRONMENTAL IMPACTS DUE TO TEMPERATURE CHANGES

- Increased incidence (and impacts) of fires
- Reduction or loss of coral reefs, through bleaching
- Decline through altered sex ratios for reptile species with temperature-driven sex determination
- Increased direct mortality for species currently close to thermodynamic thresholds
- Decline or loss of relictual montane species in central Australia



# Likely climate change impacts

## BIODIVERSITY AND ENVIRONMENTAL IMPACTS DUE TO RAINFALL CHANGES

- Increased incidence (and impacts) of fires
- Increased stress on Top End species over the dry season
- Reduced continuity and persistence in water courses
- Increased degradation of rivers and riparian systems
- Sediment deposition on sea grass meadows
- Decline of water sources in central Australia, and the many species that are dependent upon them

# Likely climate change impacts

## BIODIVERSITY AND ENVIRONMENTAL IMPACTS DUE TO SEA LEVEL RISE

- Decline or loss of floodplain environments, and their iconic biota
- Diminution or loss of islands, and their associated conservation values
- Decline or loss of sandy beaches and dunes, and their associated values as nesting sites for threatened marine turtles and seabirds
- Decline or loss of coral reefs



# Likely climate change impacts

## BIODIVERSITY AND ENVIRONMENTAL IMPACTS DUE TO CHANGE IN CYCLONE ACTIVITY, AND CO<sub>2</sub> LEVELS

- Degradation of coastal and near-coastal mangrove and eucalypt forest communities
- Decline or loss of coral reefs
- Changes in plant species composition (mostly at the expense of “C4” plant species)
- Increase in some vegetation communities (including rainforest)

# Major risks to biodiversity

(high likelihood + high severity)

- increased impact from increased frequency, intensity and extent of fire (particularly on fire-sensitive species and environments)
  - invasion of “new” pest, weed and disease species; or increased incidence, range and impacts of existing such species
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- decline or loss of water-dependent species and ecosystems in central Australia
  - decline or loss of continuity and persistence in river systems (including riparian vegetation) and other water sources
  - decline or loss of coastal floodplain environments
  - decline or loss of relictual montane species in central Australia
  - reduction or loss of coral reefs, and their associated diverse communities



# Adaptation strategies

- Prepare for climate change by maximising environmental resilience, particularly at key sites of conservation significance.
  - Reduce existing threats + biosecurity
  - Prioritised management actions
  - Large-scale linkages
  - Maintain environmental flows



# Adaptation strategies

- Increase knowledge that allows for improved consideration of biodiversity responses to climate change, and assessment of cost-effectiveness of adaptation options
  - Identify the most climate-change susceptible species and environments
  - Assess translocation and ex situ options for highly susceptible species
  - Identify natural dispersal routes
  - Make use of Indigenous knowledge linking biodiversity and climate features
  - Model climatic suitability for potentially invading weed, pest and disease species



# Adaptation strategies

- establish targeted and surveillance monitoring programs
- NT's role in a global context?
- adaptive management model for climate change adaptation action planning
- maximise community involvement