



Climate Change Adaptation and Mammal Diversity



Workshop on Climate Change & Biodiversity
13th-14th December 2010
Senate Room, UKM Bangi



The Story So Far

In this century, climate change is expected to be one of the greatest drivers of species extinction, particularly for those species that have already declined due to other human-caused factors such as habitat loss and utilization.

According to IPCC projections,

- *If global average temperature increase exceeds 1.5 to 2.5°C (relative to 1980-1999), approximately 20 to 30% of species assessed so far are likely to be at increased risk of extinction.*
 - *If increase is about 3.5°C, projected extinctions of about 40 to 70% of species assessed.*
 - *Up to 50% of Asia's total biodiversity is at risk due to climate change*
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The Story So Far

- Few species will be able to tolerate the effects of global warming, but some are particularly at risk such as those in polar regions, those that cannot adapt and those whose populations are already too small to cope with rapid changes.
- Based on IUCN assessments, 35% of birds, 52% of amphibians and 71% of warm water reef-building coral species are susceptible to climate change



Mammals at Risk

- Nearly one-quarter of the world's mammal species are known to be globally threatened or extinct.
- The country with the most threatened mammal species is Indonesia (184). Half of the top 20 countries for numbers of threatened species are in Asia, e.g. India (96), China (74) and Malaysia (70).





What makes a species susceptible to climate change?

- Specialized habitat and/or microhabitat requirements
 - Narrow environmental tolerances
 - Dependence on specific environmental triggers that are likely to be disrupted by climate change
 - Dependence on interspecific interactions that are likely to be disrupted by climate change
 - Poor ability to disperse to or colonise a new or more suitable range
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Effect on Species

- Changes in distribution ranges
 - Desynchronization of migration or dispersal events
 - Loss of habitat
 - Uncoupling of inter species relationships (mutualisms, predator-prey, parasite-host)
 - Changes in competitive ability
 - Changes in sex ratios
 - Increased physiological stress
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The case of the orang-utan

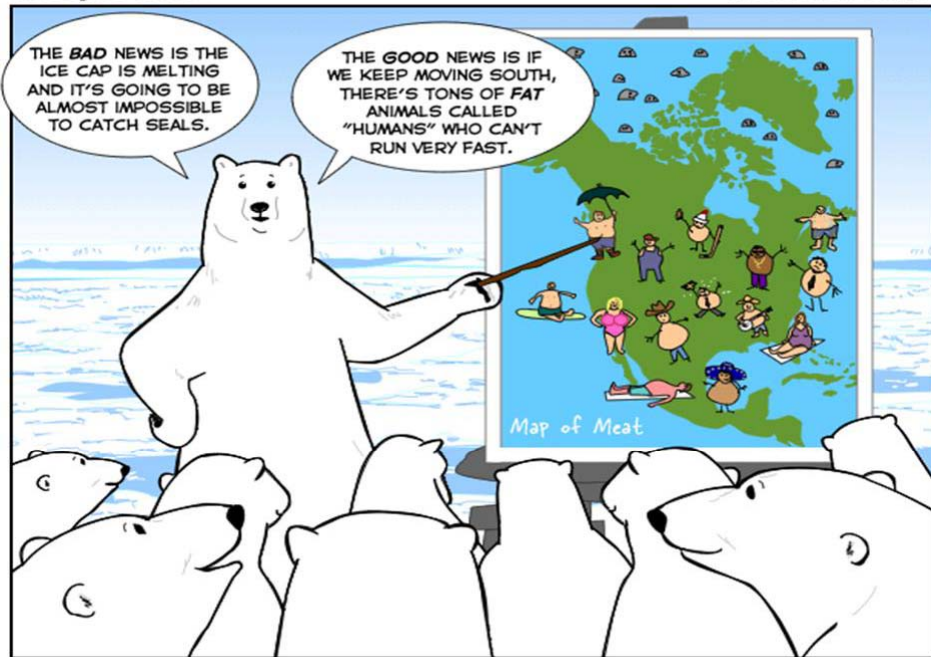
- Where orang-utans live is determined by the availability of food, good quality habitat and mates.
 - Orang-utans are mainly frugivorous (fruit-eating), but their diet also includes leaves, liana (woody vines), bark and small invertebrates.
 - Changing seasons can affect flowering and fruiting cycles of plants that the orang-utans depend on and therefore impact the food supply
 - Forest fires during prolonged and more severe droughts also directly impact the orang-utan
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How to help mammals adapt?

The Joy of Tech™

by Nitrozac & Snaggy



Adaptation

- Simple definition: Actions taken to reduce vulnerability to actual or expected changes in climate
- IPCC's definition: Adaptation is an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities



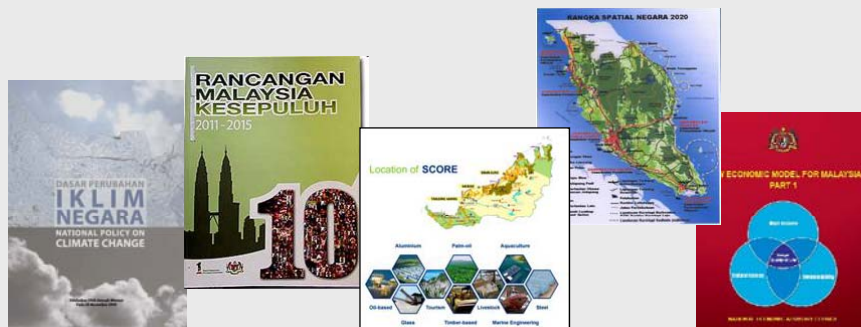
Resilience building

- Building resilience helps ensure that ecosystems and communities can return to a normal state of wellbeing following an extreme event or other climate-related disturbance.
- Many traditional conservation activities help build resilience to a changing climate. However, in many places where an increased frequency and severity of extreme events is anticipated, more proactive adaptation measures that go beyond traditional conservation will be needed to ensure the wellbeing of ecosystems and communities



Plan ahead for climate change

- It is crucial to incorporate climate change considerations into national and subnational level policies and spatial plans associated with biodiversity conservation





Reduce/eliminate other stressors

- For species that are highly threatened due to over-exploitation by humans and habitat loss, climate change threatens to put the final nail in the coffin.



- Steps must be taken to increase the resilience of ecosystems and species by reducing habitat loss and over-exploitation. This include habitat restoration and better enforcement of laws controlling hunting.



Improve knowledge of species vulnerability

- Different species would react differently to the effects of climate change. There is a need to increase understanding of how mammals are impacted before we can adequately design the appropriate adaptation strategy





Protected Areas (PAs)

- Early establishment of new and diverse PAs is vital in reducing the threat of climate change on biodiversity. Current PAs may no longer meet the original conservation objectives as the geographic distribution of wildlife and plants start to shift due to changing climate.



Contiguous Habitats

- Habitat fragmentation and degradation present significant barriers to species. Successful migration requires viable source populations and habitats, destination refugia, and large scale connectivity in the form of migration corridors.





Conclusion

- A changing climate will change the geographic distribution and in some cases, biology of certain species.
 - Current measures put in place to conserve species may no longer be sufficient. E.g. higher temperatures may force some species to move outside of current PAs to seek more suitable habitat.
 - Climate considerations need to be reflected in national policies, landscape planning and conservation strategies.
 - Climatic effects can act synergistically with other non-climatic stressors to compound the impacts of climate change. E.g. sea level rise, increased competition for land for food and fuel crops, increased competition for resources for a growing population may change human behaviours and human settlements and thereby placing greater pressures on ecosystem services and species
 - Steps must be taken to increase resilience to climate change by reducing all other threats to species, allowing them to adapt to the changes in their environment
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Thank You
