Implications of Climate Change for Tourism in North America

Sarah Nicholls, Ph.D.
Depts. of Community, Agriculture, Recreation & Resource Studies (CARRS) and Geography, Michigan State University
NET 2009

Outline
• Key terms
• Global figures
• Regional figures
• Implications for NA tourism

Some Key Terms
Climate Change
• A change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period (decades or longer)

Climate Projections
• Projections of the response of the climate system to GHG emissions scenarios
  - Are not predictions or forecasts, are plausible future states
  - Based on assumptions of future development that may or may not be realized
  - Are subject to uncertainty

Climate Change, ctd.
• May be due to natural internal processes or external forcings
• External forcings may be natural or anthropogenic
Vulnerability

• The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change

Adaptation

• Adjustment in natural or human systems in response to actual or expected climate change, which moderates harm or exploits beneficial opportunities

Mitigation

• A human intervention to reduce the anthropogenic forcing of the climate system
• Via the reduction of sources or enhancement of sinks of GHGs

Global Climate Change

Observed Change
Relative Change in Precipitation

Relative Change in Precipitation

• Very likely that heat waves and heavy precipitation events will continue to become more frequent
• Likely that hurricanes will become more intense
• High confidence that semi-arid areas will suffer decreases in water resources

Other Changes

Regional Climate Change

Observed Change
Temperature

• Annual mean warming *likely* to exceed global increases in most areas
• Warming *likely to be greatest* ...
  - ... in winter in northern regions
  - ... in summer in the southwest

Precipitation

• Very *likely to increase* in Canada and the northeast USA
• *Likely to decrease* in the southwest

• Snow season length and snow depth are very *likely to decrease* across most of NA

Implications for Tourism

“Understanding and responding to climate change represents one of the more important, complex and challenging issues facing the contemporary tourism and recreation industries”

Higham and Hall, 2005
Types of Potential Impact

• Direct
  - Changes in key climate variables that directly impact the visitor experience

• Indirect
  - Changes in climate patterns that indirectly impact the visitor experience via their effects on the natural environment

More Indirect Impacts

• Upward + northward shift in habitat zones

• Potential shifts in migration patterns + breeding grounds
• Changing distribution of cold v. warm-water fish
• Potential increase in disease, insects + other pests
• Increased risk of fire

More Indirect Impacts

• Water resources
  - quantity, quality
  - competition
• Wetland loss
  - marine: inundation, saltwater intrusion, erosion
  - inland: declining water levels

Categorization of Research

• By type of impact
  - Direct or indirect
• By approach
  - Supply or demand

The Tourism Climatic Index
The Tourism Climatic Index (TCI)

- Daytime comfort
  - max daily temp, min daily relative humidity
- Daily comfort
  - mean daily temp, mean daily relative humidity
- Precipitation
- Sunshine
- Wind

---

<table>
<thead>
<tr>
<th>Index</th>
<th>Comfort level</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 - 100</td>
<td>Ideal</td>
</tr>
<tr>
<td>80 - 89</td>
<td>Excellent</td>
</tr>
<tr>
<td>70 - 79</td>
<td>Very good</td>
</tr>
<tr>
<td>60 - 69</td>
<td>Good</td>
</tr>
<tr>
<td>50 - 59</td>
<td>Acceptable</td>
</tr>
<tr>
<td>40 - 49</td>
<td>Marginal</td>
</tr>
<tr>
<td>30 - 39</td>
<td>Unfavourable</td>
</tr>
<tr>
<td>20 - 29</td>
<td>Very unfavourable</td>
</tr>
<tr>
<td>10 - 19</td>
<td>Extremely unfavourable</td>
</tr>
<tr>
<td>Below 9</td>
<td>Impossible</td>
</tr>
</tbody>
</table>

---

Jan, 1970s

Jan, 2050s

Jan, 2080s

July, 1970s
Implications of TCI Results

- Flows of tourists (in/out/domestic)
  - Volumes, directions, timing
  - Occupancy rates
- Timing, duration + # of peak seasons
- Need for new infrastructure and amenities
- Note: winter tourism NOT considered

Winners and Losers …

Adaptation
Adaptation in North America

“Traditions and institutions in North America have encouraged a decentralized response framework where adaptation tends to be reactive, unevenly distributed, and focused on coping with rather than preventing problems. ‘Mainstreaming’ climate change issues into decision making is a key prerequisite for sustainability.”

(IPCC, 2007)

Adaptive Capacity

• Varies among actors:
  - Tourists: have high adaptive capacities – can shift destination or travel timeframe, last-minute bookings
  - Tour operators: also quite high – low location-specific investment, can switch easily
  - Tourist facilities: existing facilities susceptible due to long-term commitment to location (‘spatial fixity’); potential for new opportunities
  - Infrastructure developers and managers: least flexible; long-term projections of demand very important

Adaptation Strategies (supply)

• Technological innovation
  - e.g., improved snowmaking
• Diversification
  - locations, seasons, activities

Source: Bürki, Elsasser & Abegg

Adaptation Strategies (demand)

• R&T preferences and behaviors
  - New and/or different activities, locations, timing, frequencies, etc.
  - Hard to predict

“...It is vital for tourism destinations [...] to anticipate the coming changes and to draw their consequences, starting now. [Adaptation] is a long-term project that must be anticipated and carefully prepared beforehand; it is not easy to see this through successfully, because it entails, all at the same time, modifying economic circuits, introducing new technologies, carrying out intensive training, investing in the creation of new products, [...] changing the minds of public authorities, entrepreneurs, host communities and tourists.”

Francesco Frangialli, UNWTO Secretary-General (2007)
Mitigation Activities - Suppliers

- Replacing boilers or furnaces with more energy-efficient models
- Using biofuels (e.g., biodiesel) in generators and other stationary devices
- Installing energy efficient lighting
- Reducing electricity and on-site fossil fuel consumption
- Producing or purchasing renewable electricity

Mitigation Activities - Suppliers, ctd.

- Encouraging reuse of linens + towels
- Increasing recycling + composting
- Reducing/reusing waste/gray water
- Purchasing supplies from local vendors

Mitigation Activities - Consumers

- Carbon offsetting
  - http://www.carbonfund.org/
  - http://co2offsets.sustainabletravelinternational.org/us/offsets

Questions?

Sarah Nicholls, Associate Professor
Michigan State University
(517) 432 0319
nicho210@msu.edu