Potential Impacts of Climate Change on the Surf Coast Region

By Ryan Jopp

Victoria is the smallest mainland state in area but the most densely populated and urbanised. It is the second most populous Australian state after New South Wales, with an estimated population of around 5.2 million as of June 2007 (Australian Government, 2009). Victoria contains many diverse tourism destinations, from temperate rainforest areas of Gippsland, coastal areas such as the Great Ocean Road, and snow-covered alpine areas.

Climate change presents various challenges to tourism across the state, with impacts likely to affect tourism infrastructure, the environment, and communities. Whether a net gain or loss results from such changes will partly depend on the ability of the tourism industry to predict and manage these impacts. Destinations and tourism businesses need to adapt to changes in the pattern of demand and in the type of tourism they offer.

The Surf Coast region has been selected for this case study, as it is a major tourist destination, and because it is vulnerable to a range of climate change impacts. The Surf Coast like many Australian tourism destinations has a coastal orientation. Australian tourism surveys (Henrick et al, 2000) indicate that, of the ten most popular attractions to international visitors to Australia, eight are within a coastal zone, including the Great Ocean Road. Coastal destinations are especially vulnerable to climate change related impacts such as storm surge inundation and erosion (Voice et al, 2006).

Surf Coast Tourism is also very vulnerable to bushfires, which are forecast to become more frequent and intense as a result of climate change (Cioccio et al, 2007; DeLacy and Jago, 2007). Many of the Surf Coast’s major coastal destinations are bound by highly bushfire susceptible forests on their northern border.

The Surf Coast, which includes much of the famous Great Ocean Road, offers a spectacular coastline, scenic rainforests and magnificent beaches, and is one of the major tourist draw cards of Australia (Surf Coast Shire). The natural physiography of the region is a core attractor for tourists, with a drive along the Great Ocean Road being on most visitors “must do list” when visiting Victoria. The natural environment and landscape of the region forms the essence of its appeal, and it is vital to the long term competitiveness of the Surf Coast as a destination that appropriate resource stewardship exists to protect such valuable tourism assets.

The Surf Coast region has a relatively high dependence on tourism, and is susceptible to a range of different climate change impacts. Below is a summary of the key climate change impacts that are likely to influence Surf Coast Tourism.

Rainfall- Dependent on the rate of emissions average annual rainfall is expected to reduce by 4% to 12%, with the greatest reductions likely to occur during Spring (DSE, 2008). Fewer rainy days are expected, with more droughts, however the intensity of heavy daily rainfall is likely to rise impacting on soil erosion (ibid).
**Temperature**- Victoria is expected to become warmer with more hot days and less cold nights (Australian Government, 2009). This will likely lead to more extreme heat days and fewer frosts. By 2030 average annual temperatures for the Surf Coast region will be approximately 0.8 degrees warmer (DSE, 2008). By 2070, temperatures are expected to rise by between 1.3 degrees and 2.4 degrees (*ibid*). As the number of very hot days (over 35 degrees) increase, this will likely lead to increases in deaths and illness due to heat stress. Warmer conditions may also lead to the spread of vector-borne, water-borne and food-borne disease, putting increased pressure on medical services (Australian Government, 2009).

**Sea-Level Rise**- Global sea levels are predicted to rise 0.18 to 0.59 metres by 2095 (DSE, 2008). Increasing sea levels, and more frequent severe storms, will impact on both environmental assets, and coastal infrastructure. The Victorian coastline is likely to see an increase in erosion of beaches and sand dunes, and inundation of fresh water systems. This situation will be worsened when conditions occur inline with a high or king tide (DSE, 2008).

**Storm Surge**- The frequency and intensity of storms and storm surges are predicted to increase (DSE, 2008) Increasing sea levels, combined with more frequent severe storms, are likely to impact on both environmental assets, and coastal infrastructure. By 2070, a 1-in-100 year storm surge is likely to happen every 1 to 4 years (Australian Government, 2009).

**Bushfire**- Climate change predictions by the CSIRO suggest that the Surf Coast region will become hotter and drier, creating perfect conditions for more frequent and intense fire storms (DSE, 2008). The Surf Coast region incorporates many highly bushfire susceptible areas, creating further risk. The recent “Black Saturday” fires, of February 2009, have also brought to the fore the increased risk of bushfires throughout tourism destinations in Victoria, with the likelihood of ‘extreme’ fire danger days predicted to increase by 12-38% by 2020 (Australian Government, 2009).

**Water**- Lower rainfalls and higher temperatures may also reduce water quality and accessibility. Victoria is expected to become warmer with more hot days and less cold nights, resulting in increased evaporation rates. This will mean less water for rivers and dams, agriculture, and human needs. Less rainfall and lower river flows may also create more favourable environments for potentially harmful algal blooms (DSE, 2008).

**Bio-diversity**- Climate change will effect bio-diversity on many levels, from individuals to ecosystems (DSE, 2008). Species may alter in terms of breeding, migration, and distribution. The most susceptible will be those with restricted or specialised habitat requirements, poor dispersal abilities, and small populations (DSE, 2008). Existing threats such as habitat loss, invasive species, and water shortages are likely to be exacerbated by circumstances brought about by climate change.

For example the World Wildlife Fund (WWF, 2008) states that in Australia, at least 90 species have been identified as being at risk including iconic Australian animals such as koalas, wombats and some species of kangaroo. Marine ecosystems are
vulnerable also, with an increase in sea temperature of just 1-2 degrees, leading to the possible extinction of up to 14% of marine micro invertebrates that are limited to the cool temperate waters of South East Australia (Australian Government, 2009).

**Settlements**- The aforementioned impacts will have numerous direct and indirect impacts on human settlements throughout the Surf Coast region. Impacts may include damage to infrastructure such as roads, lifeline infrastructure such as water and power, and beachside dwellings. Coastal and marine ecosystems, and harbours and ports are also at risk. For example, the Australian Government (2009) suggests that the area of land subject to inundation due to sea-level rise and storm surge is likely to increase by 4-15% by 2030. This has the potential to affect over 1000 dwellings on Victoria’s coast valued in excess of A$780 million (Australian Government, 2009).

**Forests**- Climate change is already stressing forests through higher mean annual temperatures, altered precipitation patterns and more frequent and extreme weather events, such as bushfires and storms.

**Destination Appeal**- Favourable climatic conditions at tourist destinations are key to their appeal, particularly at beach destinations, which are still the dominating form of tourism. Indeed ‘natural beauty and climate’ have been found to be of universal importance in defining destination attractiveness (Hamilton et al., 2005). Generally, the types of tourism activities that exist at a destination are dependent on the appropriate weather and climate. Changing climatic conditions can affect the appeal of a destination in either a positive or negative manner, as improved or deteriorated conditions affect seasonal demand. For example increasing average temperatures could lengthen summer seasons at beach locations across the Surf Coast, reducing seasonality issues. However, the increased threat of extreme weather events, such as bushfires, could negatively impact demand.

**Consumer Behaviour**- Increased public awareness and understanding of tourism’s link with climate change may bring about significant changes in tourist motivations and behaviour. Tourism, and in particular transportation’s, link with green house gas emissions has received increasing media coverage over past decades. The level of green house gas emissions from long-haul flights may deter some tourists from traditional markets such as the United Kingdom and Europe, from visiting Australia. Indeed, many airlines are now realising that environmental issues, more than economic slowdowns or airspace congestion, may be the greatest threat to the future growth of air travel (McCartney, 2008). Furthermore, road transportation, which is vital for intraregional travel, and touring the Great Ocean Road, may also be impacted by tourist’s desires to reduce their carbon footprint.

**Business Tourism**- Business tourism, in particular the incentives market, may also be impacted by increased concern over emissions. Concerns over climate change, and/or concerns regarding corporate image, may influence some businesses in their choices regarding travel. Destination choice for incentive travel may be based to some degree on emissions, and in more extreme cases, organisations may move away from incentive travel altogether. The Surf Coast region is one of the most popular incentive travel destinations in Victoria. There are also major conference centres in Lorne and Torquay, as well as smaller venues throughout the region.
Policy Response- Changes to national and international policy in regards to a carbon tax, and carbon trading, are likely to impact on the cost of air travel. A carbon tax on aviation fuel would particularly affect long-haul flights to Australia due to the high level of emissions. Although the impact of a carbon tax on consumer demand is unknown, the result is likely to be a decrease in international visitors. If a fuel tax is introduced this may not only induce behavioural change in consumers, but also bring about technical and business management adaptation by airlines.

References

DSE (2008) Climate Change in the Corangamite Region. Melbourne, Department of Sustainability and Environment.