

# **CLIMATE CHANGE AUDIT EXAMPLE**

## **ADVENTURE GREEN ALASKA**

This is an example of a climate change audit for a hypothetical small cruise company based in Juneau. This make-believe company specializes in sights-seeing trips in Favorite Channel, Lynn Canal, Saginaw Channel, and Stephens Passage, and at the Mendenhall Glacier. Its customers enjoy viewing orcas, humpback whales, seals, Steller sea lions, seabirds, and other wildlife. To conduct the climate change audit, we contacted several local authorities on climate change and relied in particular on the 2007 report by the City and Borough of Juneau Scientific Panel on Climate Change, Climate Change: Predicted Impacts on Juneau.

The climate change audit does not describe every possible effect that climate change will have on southeast Alaska. Instead, it briefly addresses some of the impacts that are most important to nature-based cruise boats in the region such as rising temperatures, sea level changes, and glacial recession. This example also reflects the fact that global climate change is an unprecedented phenomenon and that the science surrounding its impacts is evolving and may be subject to different interpretations. Remember, in most cases the results of a climate change audit can be recorded informally in an internal document. This sample audit contains editorial comments and would probably not be posted publicly.

According to Climate Change: Predicted Impacts on Juneau, most of the glaciers in southeast Alaska are melting at an unprecedented rate. Although glaciers, especially tidewater glaciers, have their own cycles that are independent of climate change, rising temperatures are triggering extreme melting events. Southeast Alaska glaciers are now thinning more than 10 feet per year at low elevations, and this rate has increased in recent decades. The rate at which glaciers are melting is attributed by scientists to human induced climate changes and quickly melting glaciers are contributing to a global rise in sea levels. Additionally, the loss of glaciers means the loss of critical habitat for wildlife species such as the tidewater glacier-dependent Kittlitz's murrelet.

Interestingly, Climate Change: Predicted Impacts on Juneau does not anticipate a rise in sea level in southeast Alaska. According to the report, the Juneau area will experience a sea level drop, counter to the sea level rise predicted for most of the globe. Receding glaciers will release an enormous amount of pressure on the land, causing the land surface to rebound. As of 2007, the land was uplifting faster than the sea level was rising, resulting in a predicted net decrease in sea level of 1.0 to 3.6 feet during the next century. Increases in the elevation of the land surface can cause entire plant communities to shift. Even relatively minor changes can have widespread ecosystem effects such as loss of wildlife habitat, decreases in the water table and flow levels in salmon streams, and reduced periodic flooding of streams and rivers.

This conclusion is not, however, universally shared. According to the federal meteorologist at the National Weather Service Forecast Office in Juneau, glaciers are melting, water is expanding, and the sea level may be rising in southeast Alaska more quickly than previously predicted. If true, the resulting effects may reduce or negate the effects of uplift resulting in a net sea level rise. This difference in opinion—among experts--underscores the difficulty in predicting and responding to global climate change. Reducing carbon emissions remains the best strategy for confronting climate change.

Experts generally do agree that climate change will likely affect the life cycle of every species of salmon in southeast Alaska. Altering the cycles of just one species or population of salmon could have far-reaching consequences that span ecosystems. According to *Climate Change: Predicted Impacts on Juneau*, salmon survival and fitness will be threatened in many ways. For instance, higher temperatures “hasten emergence and the onset of migration” into the marine environment of both pink and chum salmon. Early in the season, food may become unavailable for salmon fry, drastically decreasing survival and fitness. Higher temperatures in some habitats such as beaver ponds may exceed the lethal limit for coho salmon. Lower seasonal flow rates will lower water levels, increase pool temperatures, and decrease coho salmon food supply.

The marine environment will also be impacted by climate change. The May-July 2007 Alaska Fisheries Science Center quarterly report, published by the National Marine Fisheries Service, stated that the fitness of pteropods, tiny marine snails that are a major food source for salmon, herring, and cod, are threatened by higher ocean temperatures and acidification. A major die-off of pteropods could lead to a collapse of fish populations and cause a chain reaction resulting in the decline of marine mammals such as whales, seals, and sea lions. *Climate Change: Predicted Impacts on Juneau* also anticipates that Southeast Alaska will see changes in marine mammal migratory patterns due to warmer temperatures and changing ocean currents, increased frequency and intensity of coastal storms, and plankton shifts in productivity.