Ecological changes obvious on the Kenai Peninsula

by Ted Bailey

Many significant ecological changes are occurring on the Kenai Peninsula. Some have occurred so slowly or are so subtle that they escape notice of the casual observer confined to viewing the landscape from the ground. Those who have lived on the Kenai more than 20 years and have spent a lot of time flying over the Peninsula can readily relate to some of these changes because of their advantageous "bird's-eye" aerial view. Having met both of these criteria, I would like to share a few of the changes I have noticed since the 1970's. Most of the changes have become much more visible during the 1990's.

Some of the most obvious changes are the retreating glaciers and the shrinking Harding Icefield. These changes are most conspicuous to me because I can readily remember the different locations of the ice edges and adjacent rock or water. For example, in the late 1970's, the fronts of the two major glaciers—Skilak and Tustumena—were much farther down their valleys than they are today. An 1898 photograph of big-game hunter Dall DeWeese with the Tustumena Glacier in the background shows the front of the glacier well to the west of a prominent rocky point on the north side of the valley. No large lake can be seen at the glacier face. Aerial photographs taken 52 years (in 1950) and 78 years later (in 1976) show the face of Tustumena glacier still lying roughly one-half mile west of this point, but with a lake developing at the glacier face. That is where I remember seeing the Tustumena glacier on one of my first wildlife survey flights over the area in the late 1970's.

However, after a relatively brief period of twenty years, the face of Tustumena Glacier today has retreated well eastward of the rocky point, and a large glacial lake lies between the face and a prominent moraine formed about 1864. Detailed studies of glacial retreat on the Kenai Peninsula by Gregory Wiles from the Lamont-Doherty Earth Observatory at Columbia University confirm the retreat of Tustumena Glacier. According to Wiles, who dated the moraines with tree-rings and lichen diameters, the glacier started backing up at the end of the Little Ice Age in the mid-1850's, and its retreat appears to have been accelerated by the formation of the lake at its face.

Simultaneous with the pullback of Tustumena Glacier has been the periodic draining of a nearby meltwater lake. At least twice in the past five years, the large Arctic Lake has completely drained out underneath Tustumena Glacier, causing noticeable water level rises in Tustumena Lake and its outflowing Kasilof River.

The retreat of Skilak Glacier has been even more pronounced, especially during the last ten years. Skilak Glacier has now retreated well over one-half mile up valley, and a large glacial lake lies between the face of the glacier and its 1970's location.

Edges of the Harding Icefield have also retreated, exposing more rock and mountain slopes. This melting of ice was quantified in a recent study by Gudfinna Adalgeirsdottir from the University of Alaska-Fairbanks. Using aerial photographs she estimated the total volume of ice of the Harding Icefield has shrunk by about 8 cubic miles over a 43-year period; this translates into a loss of about 70 feet of icefield thickness since 1950. I found especially interesting her observation that the ice thickness on Skilak Glacier shrunk 10 feet between 1994 and 1996; this agrees with my "eyeball" observations that the rate of melting has accelerated over the last decade.

Significant changes have also occurred in the refuge lowlands over the past 20-30 years. Vast areas of spruce forest from Point Possession at the northern tip of the Peninsula to the Fox River Valley in the southern region of the refuge have been heavily thinned by the spruce bark beetle. In forested areas once dominated by mature white spruce trees, the canopy is now more open and the understory vegetation is changing.

Furthermore, the levels of numerous closed-basin lakes have dropped and many exposed lake shorelines are evident. The most evident shrinking lakes are in the Mystery Creek area and include Picnic, Browse, and Campsite Lakes, as well as nearby Dogteam and Upper Jean Lakes. In other shrinking lakes, new peninsulas and islands are appearing as lake levels drop. On a smaller scale, numerous small ponds once used by breeding wood frogs have dried up completely; other ponds have found their margins shrink-

ing up to 100 feet from early 1990's shorelines.

All of these ecological changes and studies support the fact that the climate is warming, especially in recent decades, and that this warming is having an impact on the refuge and the rest of the Kenai Peninsula.

What do all these changes mean for fish and wildlife? The bottom line is that we often don't know, because of the complexity of ecosystems and our lack of knowledge of how northern landscapes will continue to respond to climatic warming. However, some earlier predictions have already come true. One was the prediction that a warming climate could trigger substantial insect outbreaks in the northern boreal forest. The present round of spruce bark beetle outbreaks on the central and northern Kenai Peninsula began in the early 1970's. Analysis of past Kenai Peninsula weather data by ecologist Ed Berg on the refuge staff has revealed warming temperatures with greater evaporation and water loss by plants (transpiration), beginning with the drought of 1968-69. This has meant about 35% less water available for plant growth, stream discharge and groundwater recharge. Less available water has meant more drought-stressed trees and spruce bark beetle infestation, as well as falling lake levels and dried up ponds.

Loss of mature white spruce forest could affect populations of spruce grouse, red squirrels, and neotropical migrant birds, such as Townsend warblers, which breed on the refuge. In our annual spring breeding bird surveys we have not in the past seven years recorded any of these specialized warblers, which favor mature white spruce forest. Declining water levels could influence numbers of breeding shorebirds, waterfowl and waterbirds on the Peninsula. Fewer favored places are available for breeding wood frogs and other species that rely on small ponds for survival.

What does the future hold for us and the many forms of life that share the Kenai Peninsula? We are entering an era never before witnessed by modern humans. At best, we will continue to document the changes, but only after they have already occurred and those changes that are most obvious. Sometimes we'll attempt to predict some outcomes, and maybe we'll be right or wrong. Many of these changes will eventually affect our lives and those of our children. We will have to adapt and perhaps change our lifestyles. Water tables, trees and other vegetation, and fish and wildlife distribution and populations will likely continue to change. More subtle changes may completely escape our notice until they are later pointed out by future researchers. Some of the researchers' predictions have already come true on a local as well as a global scale. But regardless of the confirmation, accuracy or timing of the predictions, significant changes are occurring and we are all along for the ride.

Ted Bailey is a supervisory wildlife biologist and has been responsible for the Kenai National Wildlife Refuge's biological programs for over 20 years. He and his staff monitor and conduct studies of ecological conditions and wildlife on the refuge. Previous Refuge Notebook columns can be viewed on the Web at http://kenai.fws.gov.