Wind River glacier discoveries: melting, grasshoppers, climate, and chemistry

Charles M. Love and Craig D. Thompson
Western Wyoming Community College
Rock Springs, Wyoming 82902-0428

Abstract

During nine years of investigation of Knife Point glacier, the terminus has retreated 360 ft and the main trunk has thinned from 43 to 60 ft. Retreat since aerial photographs were taken in 1963 is approximately 1100 ft, with thinning approximating 140 ft. Historic photographs taken in 1922 show both Knife Point and Bull Lake Creek glaciers united. Today's photographs from precisely the same location show no visible ice from either glacier, and they are no longer joined. Should the rate of melting continue and be applicable to other major glaciers of the Wind River Range, today's glacier contribution of flow to the Wind River during the months of August, September, and October will be negligible in less than 100 years.

Annual summer melt lines preserved in these basal slip glaciers reveal climatic data much like those retrieved from dendrochonologies, but with more problems. From aerial photography, various glaciers have similar sequences of summer melt lines. In Knife Point glacier, the oldest carbon date made on locusts trapped within a major summer melt line is 450 years and suggests that in 1985, as much as 700 years of ice remained. Out of a floating sequence of 286 summer melt lines, 33 contained frozen locust swarms. This suggests an 8.6-year minimum average interval between prehistoric locust swarms.

Climatic data from Pinedale since 1914, and from Lander since 1896, show several periodically oscillating snow-bearing storm tracks. The most recent change in these probably occurred in 1939, and since that time, snow accumulation on various Wind River glaciers has been consistently to the west or southwest compared with accumulations prior to that time. Several prehistoric but major changes in direction of snow-bearing storms can be seen in the stratigraphy of the summer melt lines. Current rates of glacier retreat are quickly consuming the prehistoric data base for these types of climatic records.

A high source area for Bull Lake Creek glacier was cored and sampled to determine if these glaciers could be repositories for modern pollutants. Chemical analysis reveals little evidence that local power plants or trona industries have much influence on atmospheric deposition on the sampled glacier. Trace metal concentrations ranged from 0.1 μg/l to 200 μg/l. Our data indicate copper, zinc, and lead enrichment in only the most recent years.