April 22, 2010

OBSERVATIONS ON FREEZING AND THAWING OF ICE ON KANGAROO LAKE

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INTRODUCTION

Freezing and thawing dates of Kangaroo Lake, an elongated 1,200-acre lake near the shore of Lake Michigan in Door County, have been interesting and important events for residents of the areasince early settlement times, although there are no known early records for these events.

Walter Schoof began recording freezing and thawing dates in the late 1990s, and they form the basis for this study. Continued recording of these events into the future for Kangaroo Lake will contribute to similar studiesfor other lakes in Wisconsin. One potential outcome of these studies will aid in interpreting any potential long-term cooling or warmingtrend of weather in the state and possibly even on a broader scale. Since Kangaroo Lake is on the Door County peninsula, which is affected and moderated by weather conditions of both lakes Green Bay and Michigan, the data may differ somewhat from that of lakes elsewhere in the state.

Kangaroo Lake, geologically, is an old bay of Lake Michigan and was isolated from it several thousand years ago. Peil Creek is a major source of water into the lake from the headwater about 3 miles north of the lake. This creek typically flows all winter, except in a very dry year, draining water to the lake from the large northern portion of the watershed. One phenomenon that contributes to thawing of the lake may relate to

winter flow of Peil Creek. The flow rate can be observed through four 4-foot culverts in a causeway across the northern portion of the lake. The flow rate is sufficiently rapid to melt the ice throughout the winter in the immediate area of outflow into the larger 2.5-mile length lake basin. All of the water flows under the ice for 2.5 miles to the dam at Heins Creek. Mahlberg suggests that this continual flow contributes to thinning the underside of the ice throughout the winter. As spring approaches visible thawing of the ice is initiated at the culverts as the flowing water melts long channels in the ice into the lake. These channels broaden into larger areas, which contribute to opening larger areas in the center of the lake that ultimately lead to opening of the entire lake.

PROCEDURES

The included data provide information for recording and graphically depicting the pattern for lake freezing, lake thawing and duration of ice cover for the period 1998 to 2009. One copy each of the form 3200-131 for ICE OBSERVATION REPORT-“ICE ON”, and for ICE OBSERVATION REPORT-“ICE OFF”, showing thefirst year for both ice-on and ice-off are included here. Then, on a separate sheet we list the information for succeeding years to the present time. Thus, ICE-ON and ICE-OFF each have two data sheets. In addition, the data for DURATION OF ICE COVER is provided as a separate titled sheet listing all years to the present.

Observations on lake freezing and lake thawing were made from four points around the lake: at southeast, west, north and northeast locations from the shore. Walter Schoof made these observations, and they included the widest and deepest portions of the lake. Observations were begun during the first signs of change in lake or ice appearance that were evident several days before freezing or breakup.

For ICE-ON, we considered the lake frozen when ice covered the entire lake, and the lake remained frozen thereafter.

For ICE-OFF, we considered the lake open when all ice was off the entire lake. Wind or storms typically contributed to blowing the ice to the lakeshore.

DURATION OF ICE COVER represents the number of days ice was on the lake. Days were counted from first day we report the lake frozen to the day before we report it open. These calendar days included February 29 for respective leap years.

One anomaly for ice cover occurred in 2007 when the lake thawed for a few days and froze again. We are ignoring this condition in general for this report. However, it did represent a brief warm period during the winter.

COMMENTS

The factors influencing freezing and thawing of Kangaroo Lake are undoubtedly similar to those reported in the literature for lakes in general. However, the location of Kangaroo Lake, immediately adjacent to Lake Michigan as a very large body of water, makes it unusual. Lake Michigan forms a massive reservoir of climate energy, and changes in this energy pattern occur more slowly in its immediate vicinity than distant from it. Thus, the freezing and thawing data from Kangaroo Lake may reflect the weather energy related to Lake Michigan. That is, these data may be more uniform from year to year than those of distant or inland lakes that are influenced by continental storms (weather energy) moving into the state. Perhaps it would be informative to compare the data (1998-2009) of various ‘inland’ lakes compared to those from Kangaroo Lake for possible patterns in freezing or thawing.

Ice duration on Kangaroo Lake, represented by number of ice-days, shows a progressiveincrease during the recording time, except for the last year, 2009-2010. Thus, this area of the state (the Peninsula) appears to be cooling. This cooling could be related to the lake's close proximity to Lake Michigan, if the cooling effect is localized to the Peninsula. It will be interesting to compare the cooing effect in our area with the same time period for other areas of the state and the state in general.

I am not aware of ice-on, ice-off or ice duration data for Kangaroo Lake prior to 1998. But I would expand this information if additional data become available in the future.