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URBANA

Illinois State Water Survey
LAKE EVAPORATION IN
ILLINOIS : TECHNICAL
SWS0955 LETTER 5

Subject: Technical Letter No. 5
Lake Evaporation in Illinois

Because most lakes in Illinois are shallow, evaporation from them constitutes an important loss. The State Water Survey has been operating evaporation stations at Carbondale and Urbana since 1947 and near Rockford since 1950. These stations have standard Weather Bureau Class A pans which are ten inches deep and forty-eight inches in diameter. Year-round measurements have been obtained at the three Water Survey stations by use of evaporimeters in winter time. The evaporimeters use the mechanisms of recording rain gages to show graphically water losses from pans two inches deep and thirty inches in diameter. The U. S. Weather Bureau has operated a station in the Springfield area since 1941 but these data are not included in this letter because the non-standard installation causes nonrepresentative evaporation.

Use is also made of a comprehensive experiment conducted by several government agencies at Lake Hefner, Oklahoma for a 17-month period in 1950 and 1951. One of the objects of that study was to obtain reliable indices of lake evaporation from pan records. Monthly and seasonal pan-to-lake coefficients were developed which related pan evaporation to Lake Hefner water losses as determined by the water budget, thermal energy budget, and mass transfer methods.

Coefficients developed through the Lake Hefner study have been used with reasonable agreement on water-budget studies at lakes near Ramsey and Mattoon, Illinois. They have now been applied to the average monthly records for the Illinois pan evaporation stations. The data are shown in Table 1.

For further information on this subject you are referred to the following publications:

Roberts, W. J., "Recording Evaporation Gage Provides Year-Round Record," Civil Engineering, October 1954, Vol. 24, No. 10, p. 64.

Roberts, W. J., Evaporation Records in Illinois, Circular No. 43, State Water Survey, Urbana, Illinois 1954.

Table 1

ILLINOIS PAN AND LAKE EVAPORATION

AVERAGES IN INCHES

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann.
Coefficient, Pan to Lake	.61	.61	.61	.61	.70	.77	.77	.77	.77	.70	.61	.61	
Rockford													
Class A Pan Data	1.00	1.00	2.00	3.89	5.49	4.84	5.51	4.46	3.56	3.41	1.11	0.90	37.17
Adjusted Values	0.61	0.61	1.22	2.37	3.84	3.73	4.24	3.43	2.74	2.39	0.68	0.55	26.41
Urbana													
Class A Pan Data	0.77	1.02	2.14	3.96	5.54	6.25	6.52	5.98	4.57	3.23	1.70	0.98	42.66
Adjusted Values	0.47	0.62	1.30	2.42	3.88	4.81	5.02	4.60	3.52	2.26	1.04	0.60	30.54
Carbondale													
Class A Pan Data	0.94	1.32	3.27	5.01	5.97	6.53	6.92	6.34	5.09	3.32	2.98	0.99	48.68
Adjusted Values	0.57	0.81	1.99	3.06	4.18	5.03	5.33	4.89	3.92	2.32	1.82	0.60	34.52

Water-Loss Investigations: Lake Hefner Studies, Technical Report, Geological Survey Professional Paper 268, Washington, D, C, 1954.

Research Paper No. 38, Kohler, M. A., Nordenson, T. X. and Pox, W. E., United States Weather Bureau, Washington, D. C, 1955.

Hudson, H. E., Jr. and Roberts, W. J., 1952-1955 Illinois Drought with Special Reference to Impounding Reservoir Design, Bulletin No. 43, State Water Survey, Urbana, Illinois, 1955. Out of print, copies available on loan.

Meyer, Adolph P., Evaporation from Lakes and Reservoirs, Minnesota Resources Commission, St. Paul, Minnesota, June 1942.

Very truly yours,

William C. Ackermann