

12. Pike Lake

Pike Lake is located within the City of New Brighton in Ramsey County. It has a surface area of approximately 36 acres and an ordinary high water level of 867.77 (MSL 1912), 866.77 (NGVD 29) or 866.95 (NAVD 88). The lake discharges to the main trunk of Ramsey County Ditch 2, and the water levels are controlled by a 20-foot long weir at 866.52 (NGVD 29), or 866.70 (NAVD 88), leading to two lines of 5-foot by 10-foot RC box culverts.

The DNR Lake Finder website provided lake level data for a period of record from 1968-2021 (see **Figure 12a**). This data is recorded by Ramsey County in MSL 1912 datum. The County recommends subtracting 1.0 feet from MSL 1912 to convert elevation data to NGVD 29, and subtracting 0.82 feet to convert elevation data to NAVD 88.¹ This is consistent with adding 0.18 feet to lake levels in NGVD 29 datum to obtain levels in NAVD 88, as specified from VERTCON.²

The maximum annual series, consisting of 54 years, was plotted on probability paper. A polynomial line was fit to the data to determine the elevations for the various recurrence intervals (see **Figure 12b**). The estimated flood elevations are shown in **Table 12a**. The 100-year flood elevation was estimated using the polynomial equation. Insufficient lake level data and information on potential overflow elevations are available to provide a reliable estimate of the 500-year flood elevation. The water surface elevation for the 100-year recurrence interval reported in the 2010 Ramsey County FIS is 871.8 (NAVD 88), as compared to 869.7 estimated in this study. The 2010 FIS elevation was adopted from a 1978 New Brighton FIS report,³ which, due to lack of historical lake level data, was determined with using HEC-1 rainfall runoff computations using the Snyder method. Because this current study is based on statistical analysis of 54 years of historic lake level data of from the Minnesota DNR,⁴ the results are considered reliable.

An additional component of this study consists of creating a non-exceedance frequency graph based on all daily measurements available (see **Figure 12c**). For Pike Lake, the period of record consists of the data found on the MnDNR Lake Finder website, which consists of 1,520 days of measurements, from 1968 to 2021, as shown on **Figure 12a**. The results are presented in **Table 12b**.

¹ Email from Al Rupnow, Environmental Resource Specialist, Ramsey County Public Works, May19, 2011.

² <http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html>

³ Federal Insurance Administration, Flood Insurance Study, City of New Brighton, Ramsey County, Minnesota. Flood Insurance Study Report, March 1, 1978.

⁴ Minnesota DNR Lake Finder website (<http://www.dnr.state.mn.us/lakefind/index.html>).

Table 12a: Estimated Flood Elevations for Pike Lake

Return Period	Lake Level Data Source		
	1981 FIS (n = 56)	DNR (used in this study) (n = 99)	
	(NGVD 29)	(NGVD 29)	(NAVD 88)*
2	--	867.3	867.5
5	--	867.8	867.9
10	--	868.1	868.3
50	--	869.1	869.2
100	--	869.5	869.7
500	--	--	--

*0.18 feet is added to NGVD 29 datum to convert to NAVD 88 datum

Table 12b: Daily Non-Exceedance Frequency of Lake Levels for Pike Lake

Non-Exceedance Frequency	Lake Level	
	(NGVD 1929)	(NAVD 1988)
2.5%	865.2	865.4
10%	865.8	865.9
25%	866.1	866.3
50%	866.5	866.7
75%	866.7	866.9
90%	867.0	867.1
99.5%	867.8	868.0

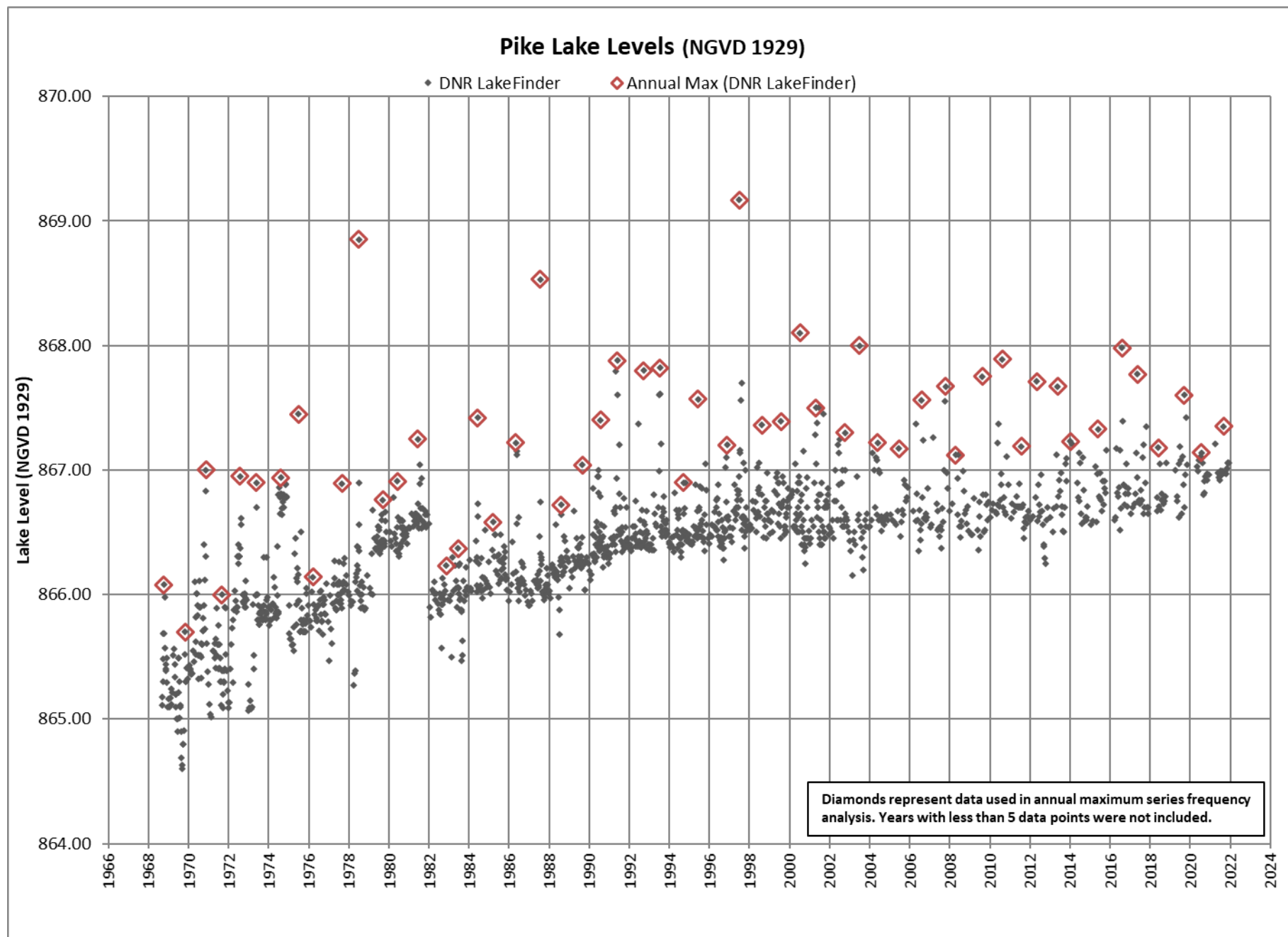
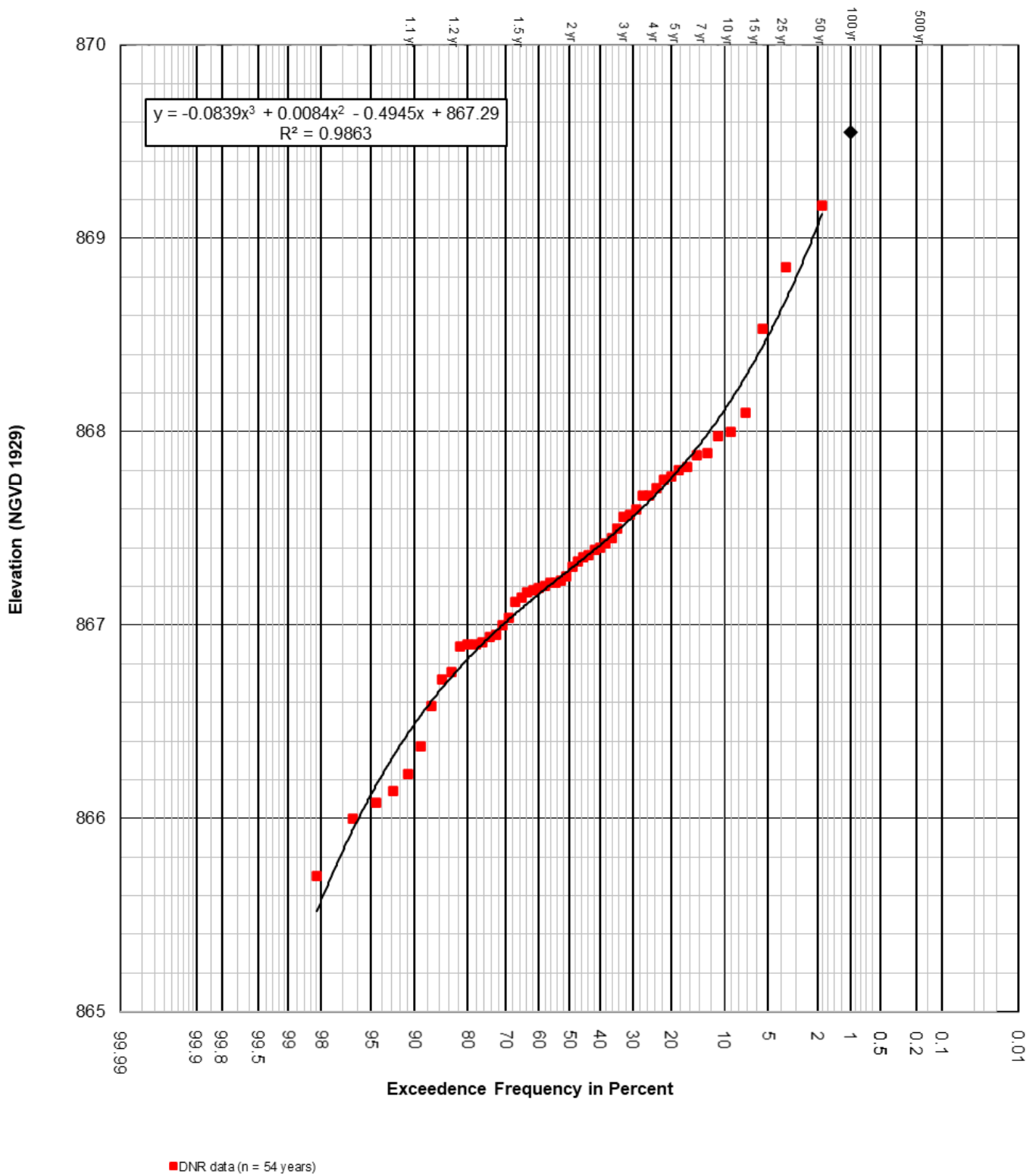


Figure 12a

Pike Lake Levels (NGVD 1929) **Maximum Annual Series Frequency Curve** **(Weibull Plotting Positions)**



Outlet:

20-foot Long Weir @ 866.52 (NGVD 29) or 866.70 (NAVD 88)

Figure 12b

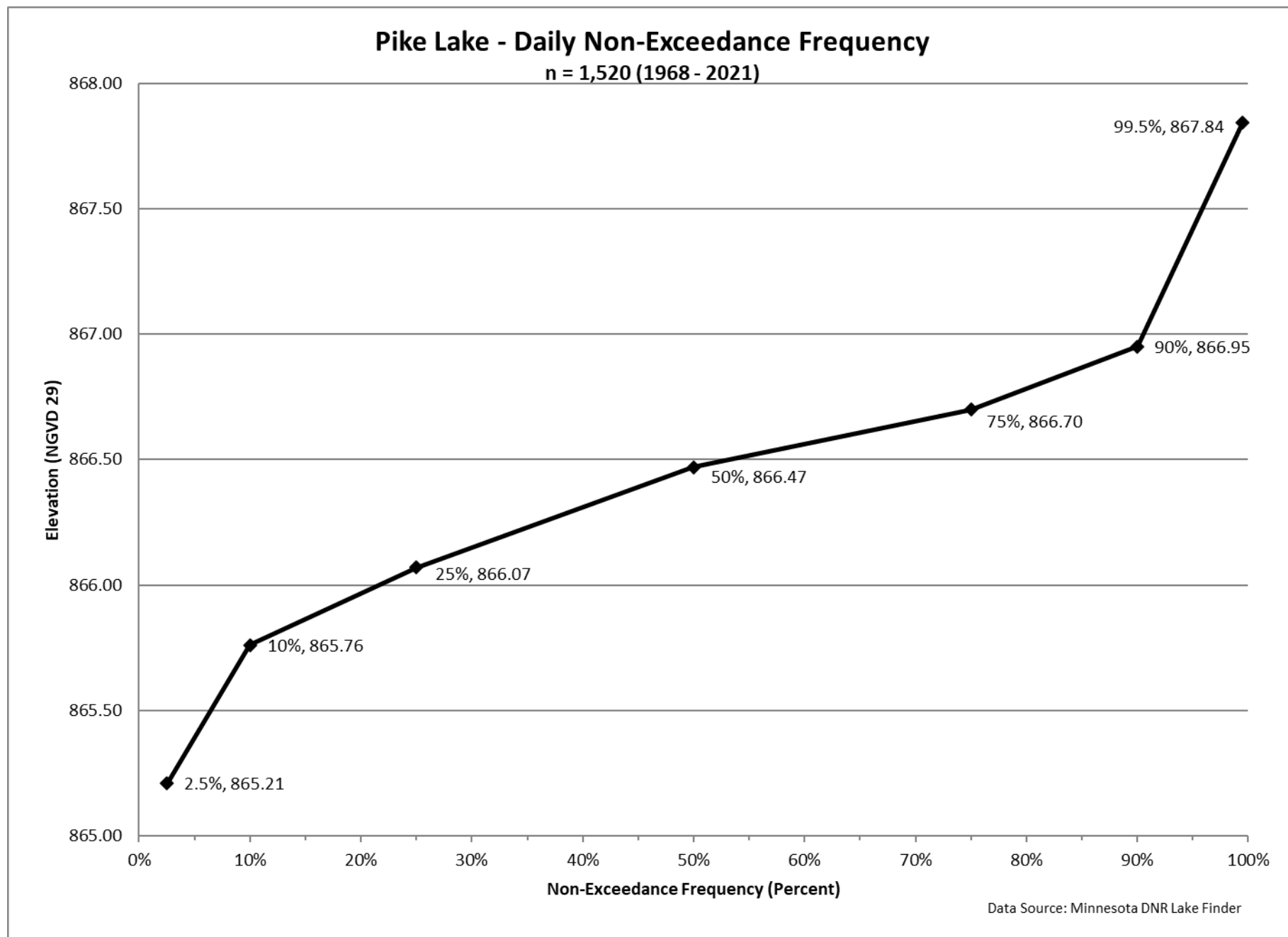


Figure 12c