

7. Long Lake

Long Lake is a 178-acre lake lying within the City of New Brighton. Rice Creek enters the lake on the northeast and exits on the lake's northwest corner. The discharge from the lake to the creek is controlled by the channel elevation of 863.1 (NGVD 29), 863.28 (NAVD 88)¹. The ordinary high water level, as recorded by the Minnesota DNR, is 864.93 feet (NGVD 29).

The DNR Lake Finder website provided lake level data for a spotty period of record from 1906-2018 (see **Figure 7a**). Because only one lake level measurement exists for the years 1906 and 1910, and the uncertainty that these measurements are the annual maximum levels, these two years were excluded from the analysis. The data found in the DNR Lake Finder website is from Ramsey County, and it recorded in MSL 1912 datum. Ramsey County has investigated the conversion and recommends adding 0.17 feet to MSL 1912 to convert elevation to NGVD 29 datum, and to add 0.44 to convert MSL 1912 to convert elevation to NAVD 88 datum.² The conversion from MSL 1912 to NGVD 29 has been adopted for this study, but to be consistent with the other lakes, the VERTCON³ conversion from NGVD 29 to NAVD 88 datum is used (0.18 feet).

The maximum annual series, consisting of 95 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 7b**). The estimated flood elevations are shown in **Table 7a**. 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.

Table 7a: Estimated Flood Elevations for Long Lake

Return Period	Lake Level Data Source		
	1981 FIS	DNR (used in this study) (n = 95)	
	(NGVD 29)	(NGVD 29)	(NAVD 88)*
2	--	866.3	866.4
5	--	866.9	867.1
10	--	867.3	867.5
50	--	868.0	868.2
100	--	868.3	868.4
500	--	--	--

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

¹ Memorandum to RCWD from Montgomery Watson, "RCWD HydroCAD Model Calibration," February 25, 1998.

² Telephone conversation with Al Rupnow, lake biologist with Ramsey County, December 7, 2010.

³ <http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html>

An additional component of this study consists of creating a non-exceedance frequency graph based on all daily measurements available (see **Figure 7c**). For Long Lake, the period of record consists of the data found on the MnDNR Lake Finder website, which consists of 3,188 days of measurements, from 1906 to 2018 (see **Figure 7a**). The results are presented in **Table 7b**.

Table 7b: Daily Non-Exceedance Frequency of Lake Levels for Long Lake

Non-Exceedance Frequency	Lake Level	
	(NGVD 1929)	(NAVD 1988)
2.5%	864.2	864.4
10%	864.6	864.7
25%	864.8	864.9
50%	865.2	865.3
75%	865.6	865.8
90%	866.1	866.2
99.5%	867.6	867.8

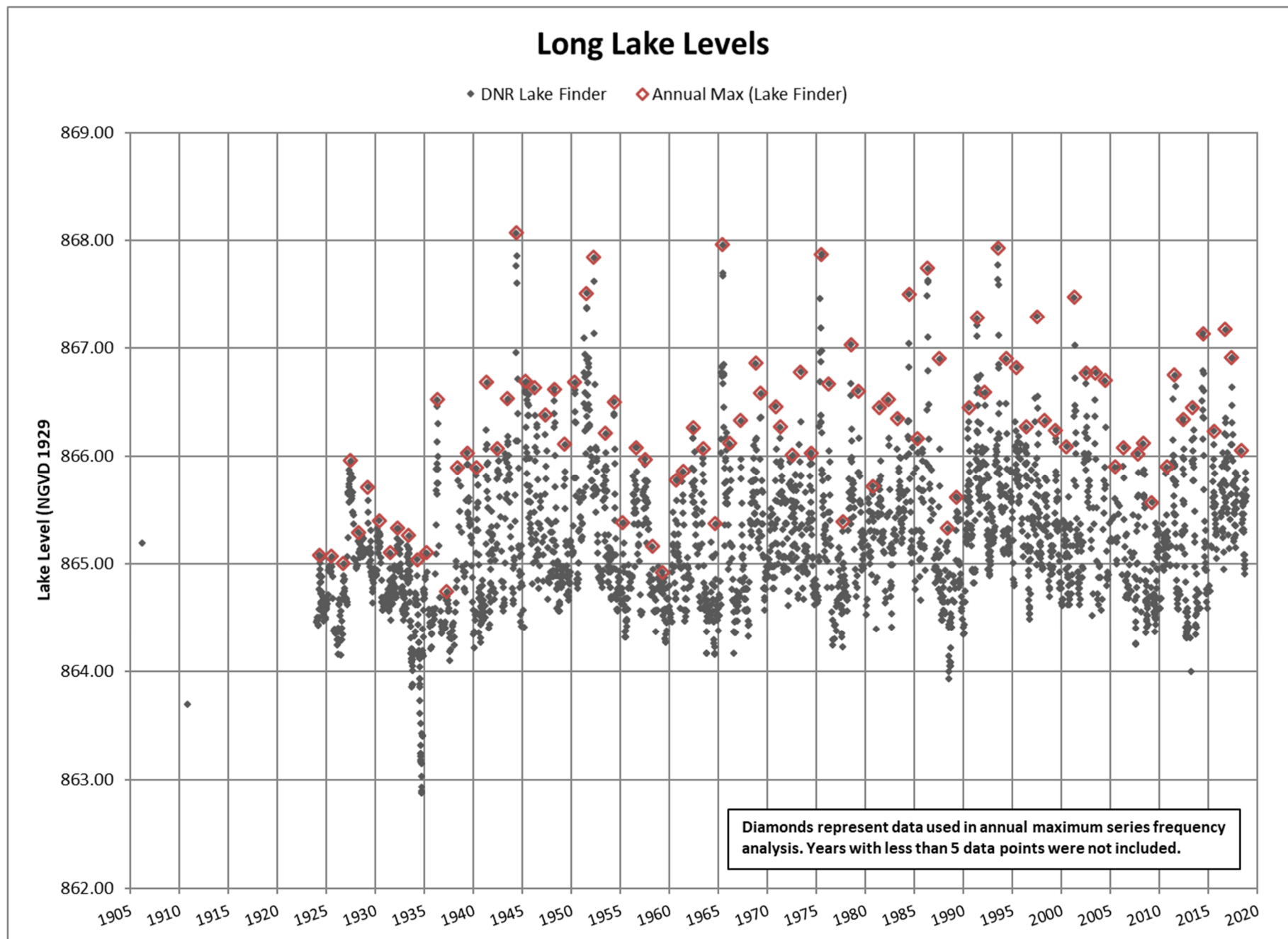
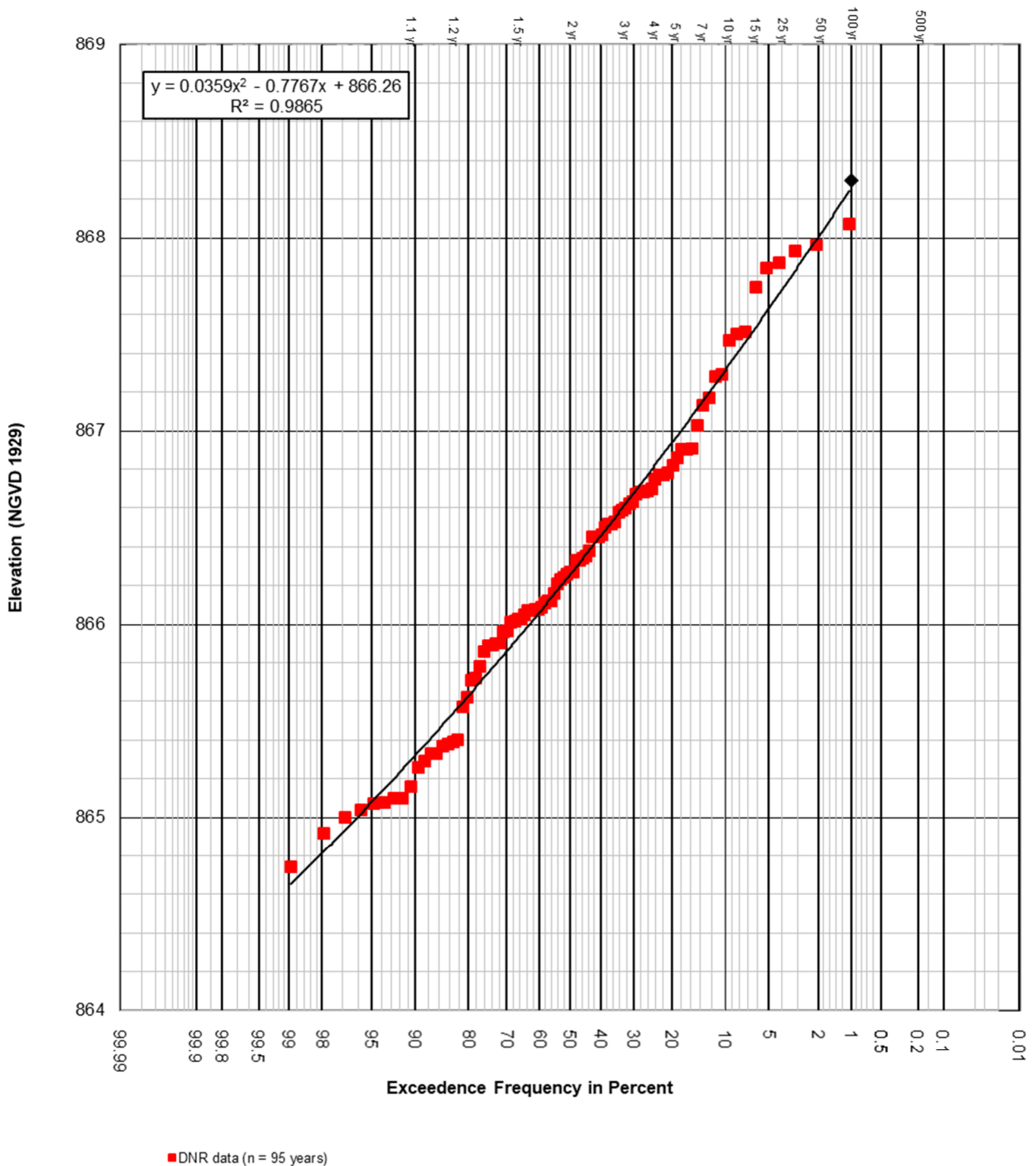


Figure 7a

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



Outlet:

Natural Channel @ 863.10 (NGVD 29), 863.28 (NAVD 88)

(Source: Memo to RCWD from Montgomery Watson, "RCWD HydroCAD Model Calibration," Feb. 25, 1998)

Figure 7b

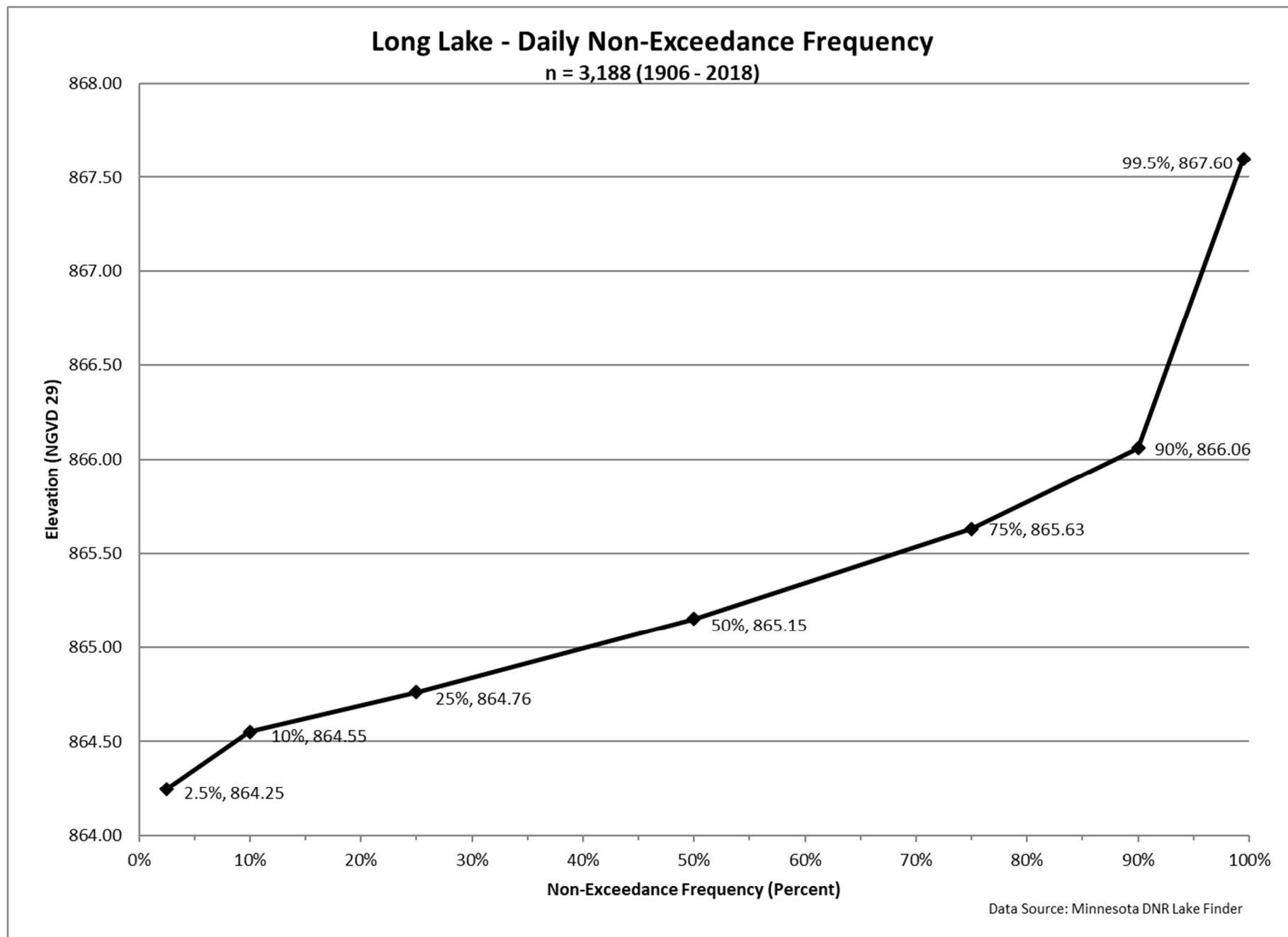


Figure 7c