

16. Silver Lake

Silver Lake is a 71-acre lake located within the cities of St. Anthony and Columbia Heights in Ramsey County. The lake has no designated ordinary high-water level. The lake discharges to the Ramsey County Ditch 3. The lake levels are controlled by the downstream storm sewer at elevation 931.82 (NGVD 29), or 932.00 (NAVD 88).

The DNR Lake Finder website provided lake level data for a period of record from 1933-2021 (see **Figure 16a**). 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 88¹. This is consistent with adding 0.18 feet to lake levels in NGVD 29 datum to obtain levels in NAVD 88, as specified from VERTCON².

Through the 1960's, the Silver Lake outlet, which is also the beginning of Ramsey County Ditch (RCD) 3, flowed east below Silver Lake Road via a 15-inch clay pipe, which extended all the way to Poplar Lake. A major flood event affecting Silver Lake and surrounding areas occurred in the spring of 1965, which prompted Ramsey County, in conjunction with the Village of St. Anthony, to conduct a drainage study of the RCD-3 ditch system to assess alternatives to lessen the flooding events occurring along the public system. In 1967, a study was conducted, and plans prepared to modify the Silver Lake outlet to follow a 66-inch storm sewer pipe from the southeast corner of the lake south to a manhole structure constructed at the intersection of Silver Lane and Silver Lake Rd. This manhole became the control elevation for Silver Lake at an elevation of 931.82 (NGVD 29) or 932.0 (NAVD 88). It is unknown exactly when the construction took place, but the historic lake level data on **Figure 16a** suggest that the new outlet control elevation took effect in 1969. Therefore, the period of record used for this lake level frequency analysis was selected to be 1969-2021.

The maximum annual series, consisting of 53 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 16b**). The estimated flood elevations are shown in **Table 16a**. 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.

An additional component of this study consists of creating a non-exceedance frequency graph based on all daily measurements available (see **Figure 16c**). For Silver Lake, the period of record consists of the data found on the MnDNR Lake Finder website, which consists of 1,643 days of measurements, from 1969 to 2021, as shown on **Figure 16a**. The results are presented in **Table 16b**.

¹ Email from Al Rupnow, Environmental Resource Specialist, Ramsey County Public Works, May 19, 2011.

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

Table 16a: Estimated Flood Elevations for Silver Lake

Return Period	Lake Level Data Source		
	1981 FIS	DNR (used in this study) (n = 53)	
	(NGVD 29)	(NGVD 29)	(NAVD 88)*
2	--	933.3	933.5
5	--	933.7	933.8
10	--	933.9	934.1
50	--	934.3	934.5
100	--	934.5	934.7
500	--	--	--

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

Table 16b: Daily Non-Exceedance Frequency of Lake Levels for Silver Lake

Non-Exceedance Frequency	Lake Level	
	(NGVD 1929)	(NAVD 1988)
2.5%	931.7	931.9
10%	932.1	932.3
25%	932.4	932.6
50%	932.6	932.8
75%	932.8	933.0
90%	933.1	933.3
99.5%	933.8	934.0

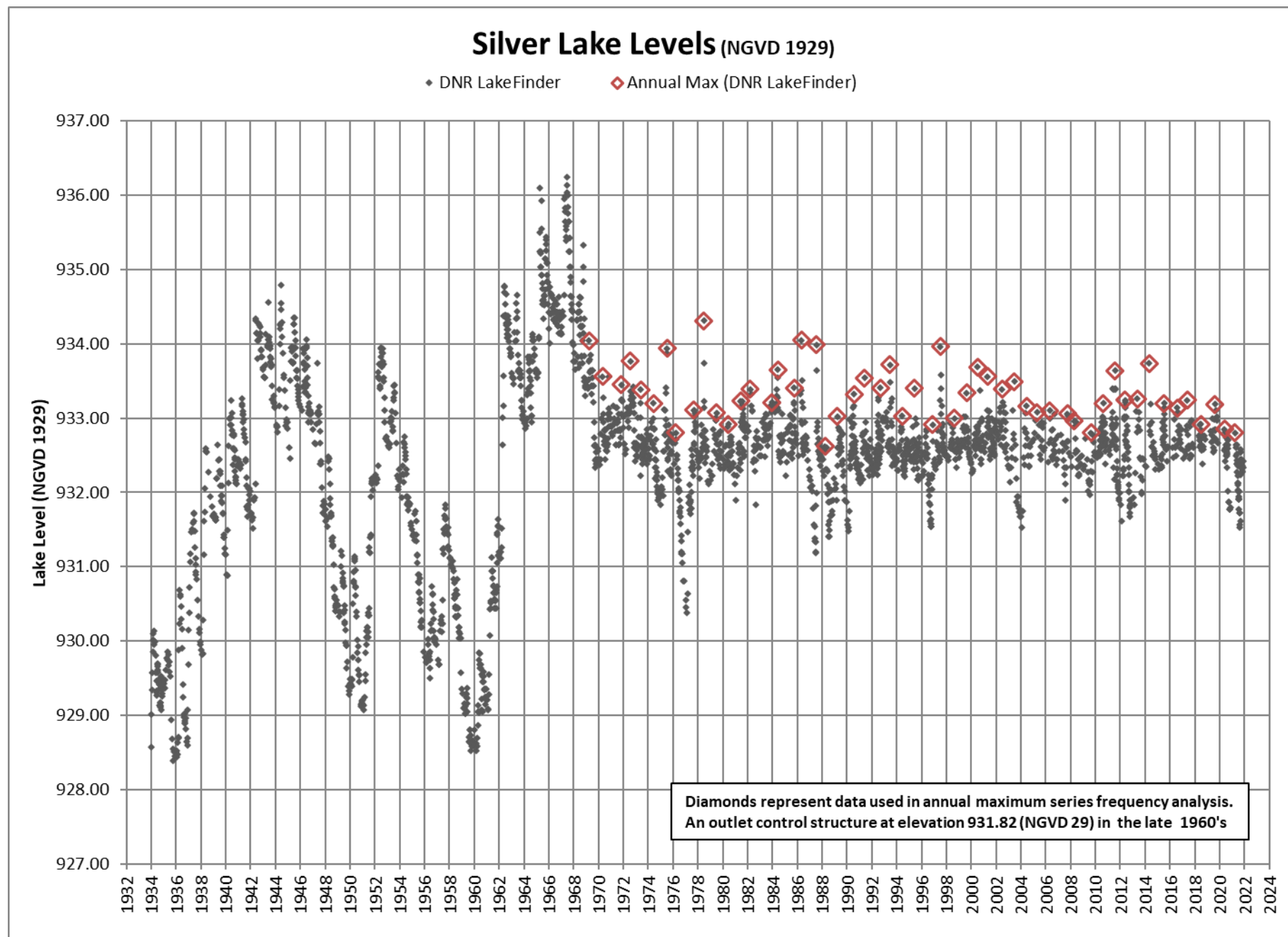
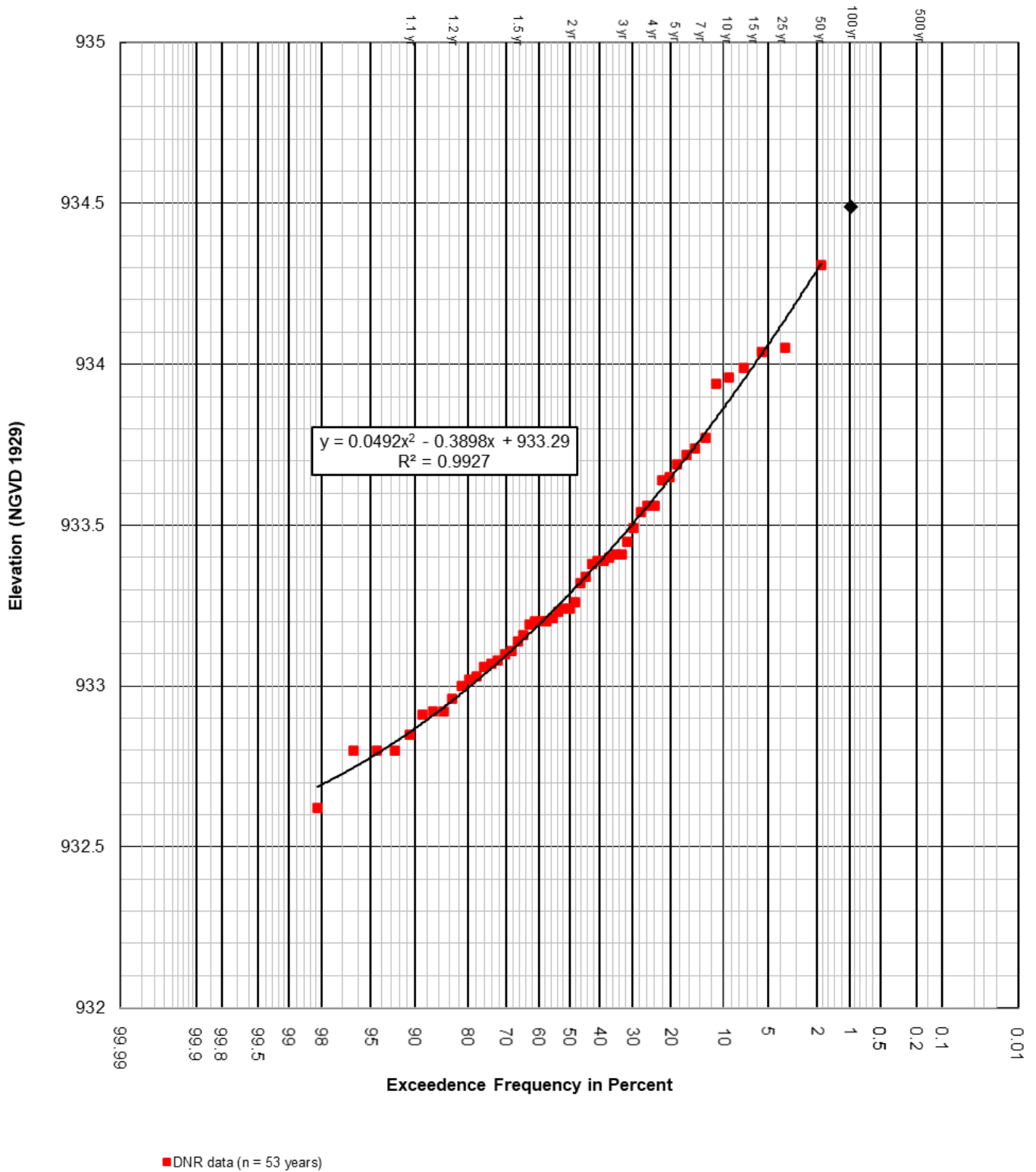


Figure 16a

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



Outlet:

Storm sewer

Invert: 931.82 (NGVD 29)

Figure 16b

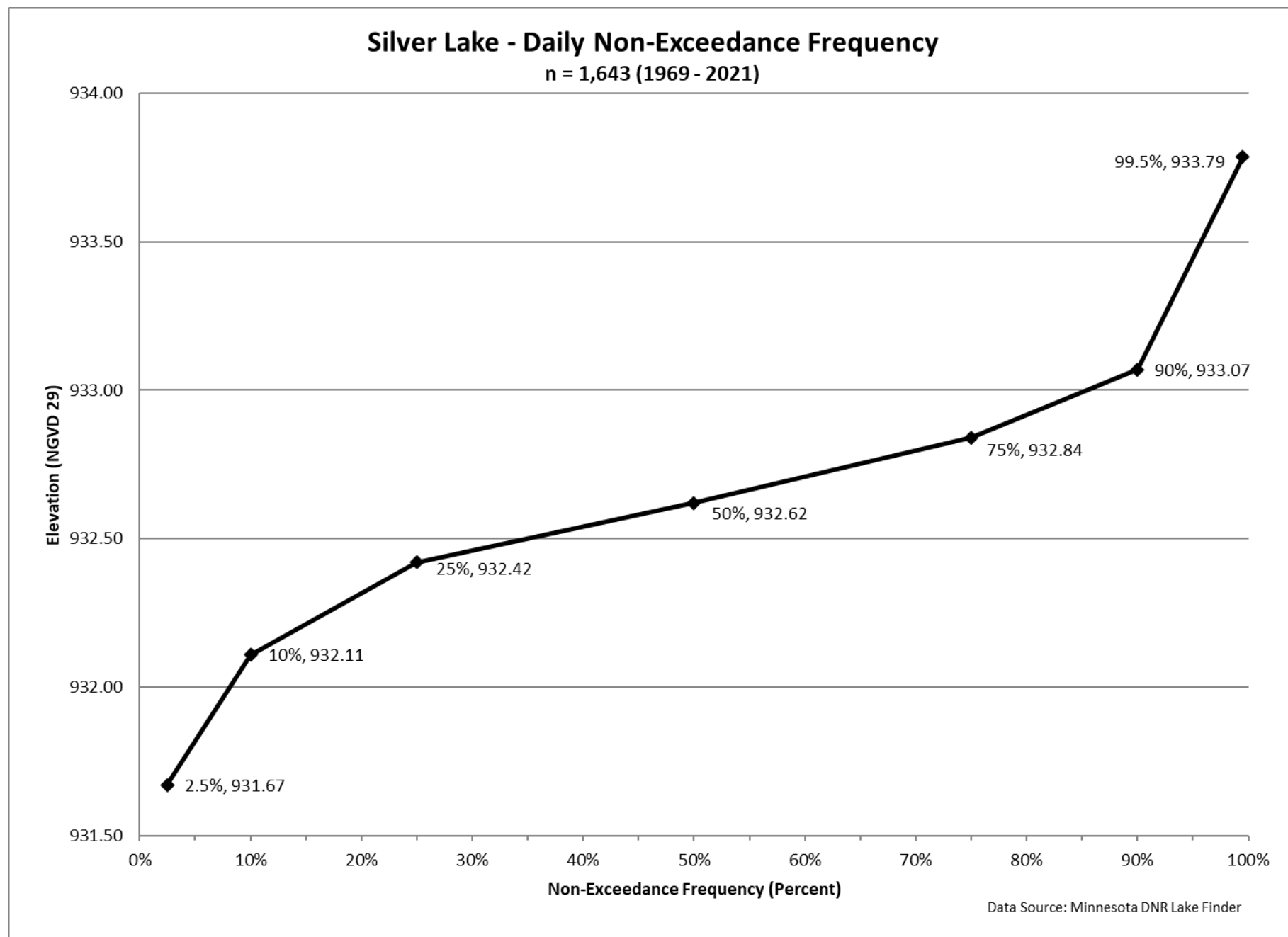


Figure 16c