ESP Analysis Results

Purpose:
Develop Grand Coulee April 10 elevations from two scenarios:

1. Operating to Vernita Bar flow minimum of 65 kcfs below Priest Rapids Dam
2. Operating to chum flow objective of 130 kcfs at Bonneville Dam

Model Data and Assumptions:

1. 65 kcfs minimum below Priest Rapids to meet Vernita Bar objective.
2. 130 kcfs minimum Bonneville flow to maintain chum protection level of 11.3 feet.
3. Forecast dataset from NWRFC with 70 ensemble years (1949-2018) and 5-days QPF, issued 3/3/2019.
4. Median April-August forecast volume at TDA of 76,819 KAF (88% of Normal).

Results Summary:
Median April 10 elevations at Grand Coulee are 1,265.4 feet (operating to Vernita Bar flow) and 1,264.3 feet (operating to chum flow), approx. 1-ft difference.

ESP years 1955 and 1965 contain the lowest runoff from the Snake River prior to April 10 and may be representative of 2019 given current conditions and weather forecasts. The April 10 elevations at Grand Coulee for these two traces were 1,254.0 and 1,253.8 feet (operating to Vernita Bar flow) and 1,241.1 and 1,244.0 feet (operating to chum flow), approx. 10-ft difference.

Note that the 65 kcfs Vernita Bar operation roughly equates to a daily average discharge of 108 kcfs at Bonneville (10 feet tailwater for 18 hours and 11.3 feet tailwater for 6 hours).

Table 1: Grand Coulee April 10 elevations for 65 kcfs Vernita Bar and 130 kcfs chum flow operations using 70 ESP traces (% chance of elevations equaling or exceeding).

	10%	25%	50%	75%	90%
65 kcfs Vernita Bar 10-Apr GCL Elev	**1,277.5**	**1,272.3**	**1,265.4**	**1,258.0**	**1,254.4**
130 kcfs Chum Flow 10-Apr GCL Elev	**1,280.1**	**1,271.9**	**1,264.3**	**1,256.4**	**1,251.0**

Figure 1: Grand Coulee April 10 Elevations for 65 kcfs Vernita Bar and 130 kcfs chum flow operations for each ESP trace.

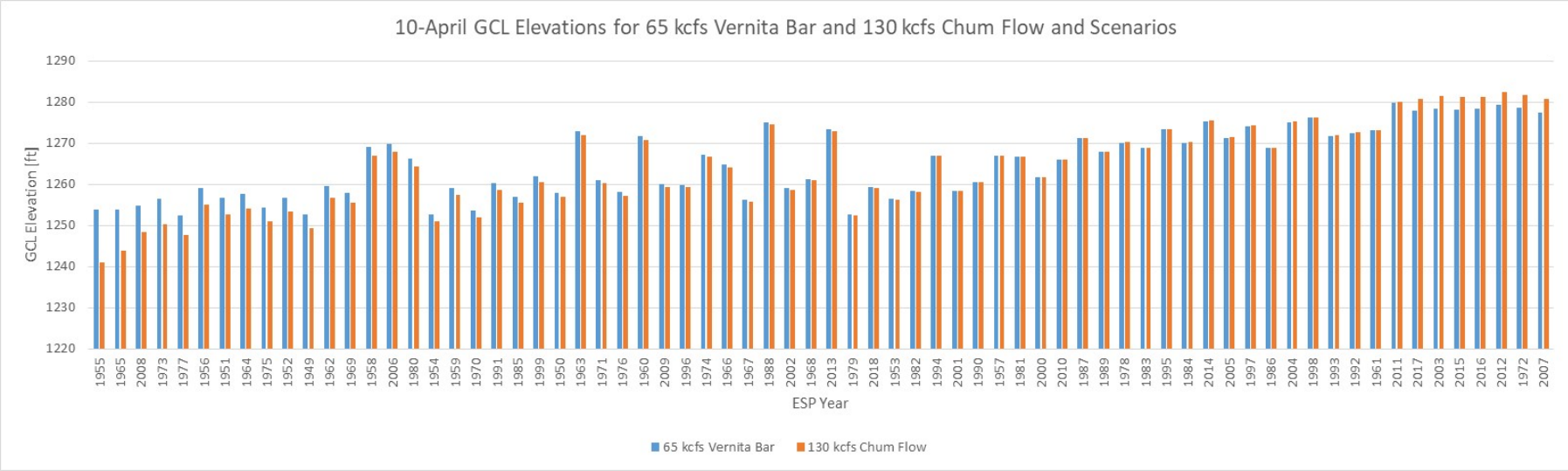

Figure 2: Grand Coulee Elevation Difference between 65 kcfs Vernita Bar and 130 kcfs chum flow operations for each ESP trace.