APPENDIX B

Regional Method Hydrology

Regional Method Hydrology

Hydrologic Stability: Infrequent floods in Champlin Slough are substantially natural and not likely to be significantly affected by cultural activities in the basin. A private irrigation ditch may catch hillside runoff and contribute it to Champlin Slough but the magnitude of flow conveyed by the irrigation ditch is likely to be insignificant with respect to infrequent peak flows in Champlin Slough

Flood History: Overflow from the Champlin Slough channel occurs on a relatively frequent basis and results in shallow flooding.

Translation Analysis: Translation analysis consists of estimating the infrequent flood peak flows in a basin with no flood flow records by comparison with flood frequency statistics from streams or rivers having sufficient records of flood peak flows. After identification of representative basins with stream flow records, flood frequency relationships for these basins are determined by computing the normal probability Log-Pearson Type III curve fit. The curve fit is then plotted against the original data to verify the adequacy of the curve fit to represent the peak magnitude of infrequent floods. If the Log-Pearson type III curve fit reasonably represents the plotted data for the higher flows, it is considered representative of the basin having records and is used as a basis of comparison. If not, a line of best visual fit may be used as a basis of comparison.

After identifying representative flood-frequency relationships for the basins having records, candidate flood frequency relationships representing the stream or river at the proposed project site are estimated by adjusting the flood frequency relationships representing basins with flow records to account for differences in characteristics between the source basin and the project basin. These adjustments are made using the area, elevation, and precipitation exponents of the appropriate USGS regional equation.

Basin Characteristics – Characteristics of the Champlin Slough basin and of potentially representative basins having sufficient stream flow records to reasonably identify the infrequent flood peak flows are identified below.

TABLE 1
Basin Characteristics

Basin Description	USGS Gage ID	Area (sq mi)	Average Annual Precip (inches)	Elevation Index	Years of Record
Champlin Slough	n/a	4.18	23	0.35	n/a
Mill Creek	11381500	131	43	2.8	78
Deer Creek	11383500	208	47	2.8	90

Gaged basin flood frequency curves – Plotted flood frequency data and curves for the gaged basins used in this analysis are shown on the following pages.

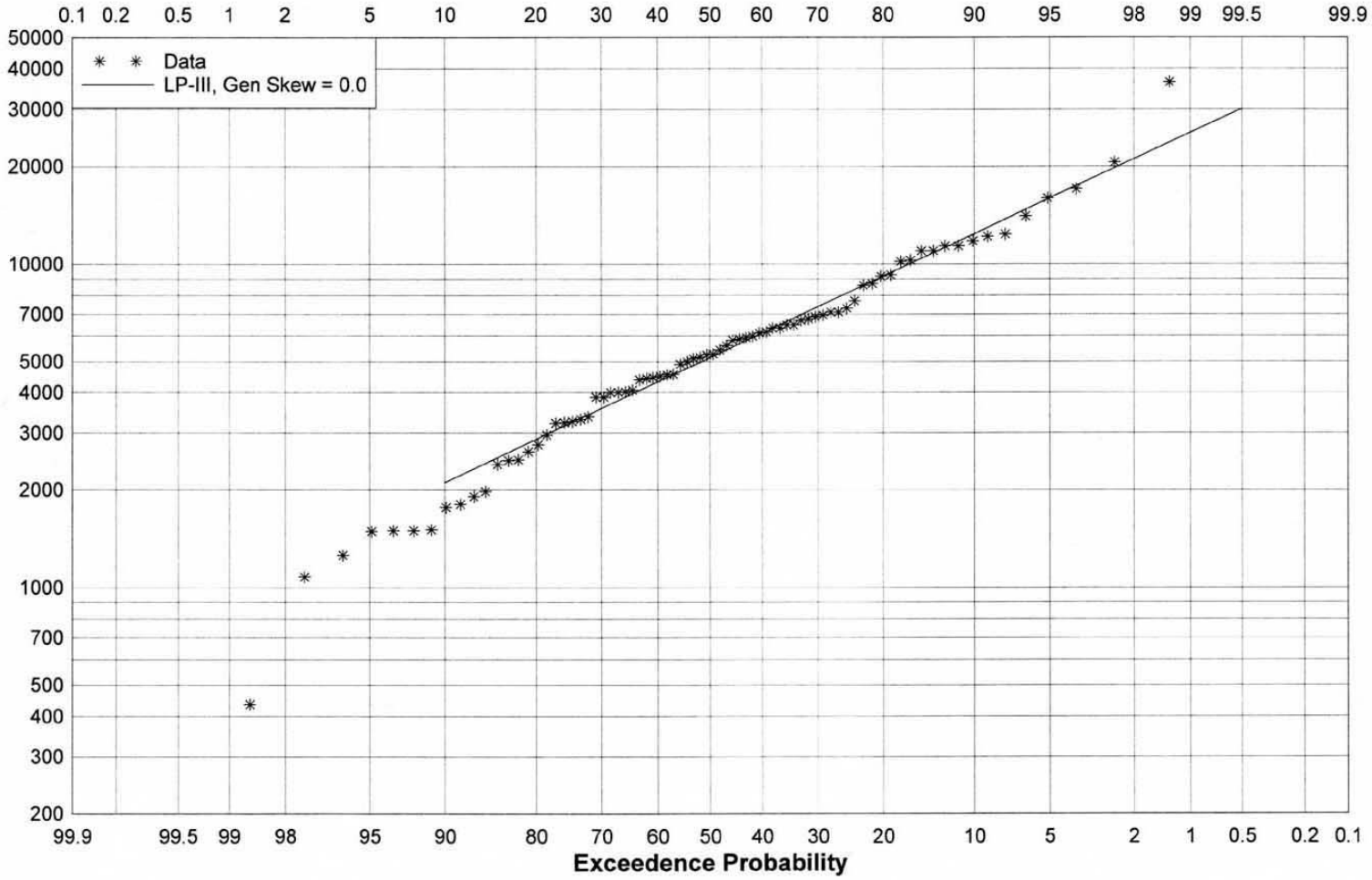
Regional Equations: Approach – The USGS has published a set of regional equations for estimating infrequent flood peak flows in natural streams and rivers not having flow records and not affected by lakes, reservoirs, substantial development or substantial reclamation projects throughout most of California. These equations are useful for planning level and rough preliminary estimates of infrequent flood peak flows and verification of flood frequency estimates using more detailed procedures. Flood peak flows estimated by these equations should only be relied upon for design if confidence in other methodologies is low and if verified by other methodologies. The empirical equations estimate flood peak flows from basin characteristics including area, elevation index and precipitation. Use of the area, elevation index and precipitation factor exponents of the regional equation for adjustment of flood characteristics from representative basins having sufficient flow records (described in Translation Analysis above) is generally considered to provide a more reliable estimate of infrequent flood peak flows for the basin without records.

Results: A figure showing the flood frequency relationships from the regional methods follows.

Mill Creek nr Los Molinos

USGS Streamgage 11381500: 78-years, 131 sq-mi, MAP=43-in, EI=2.8

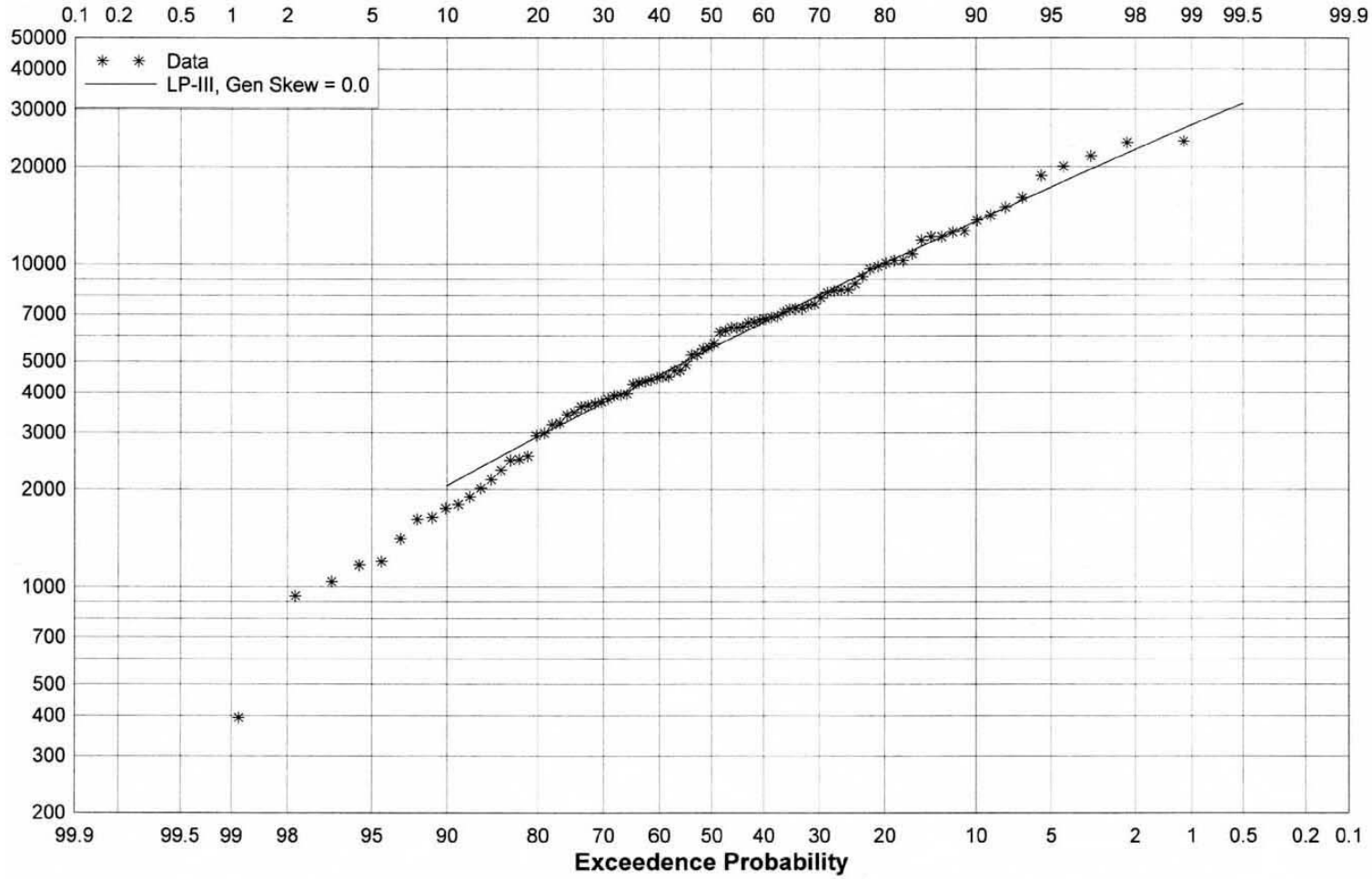
Active

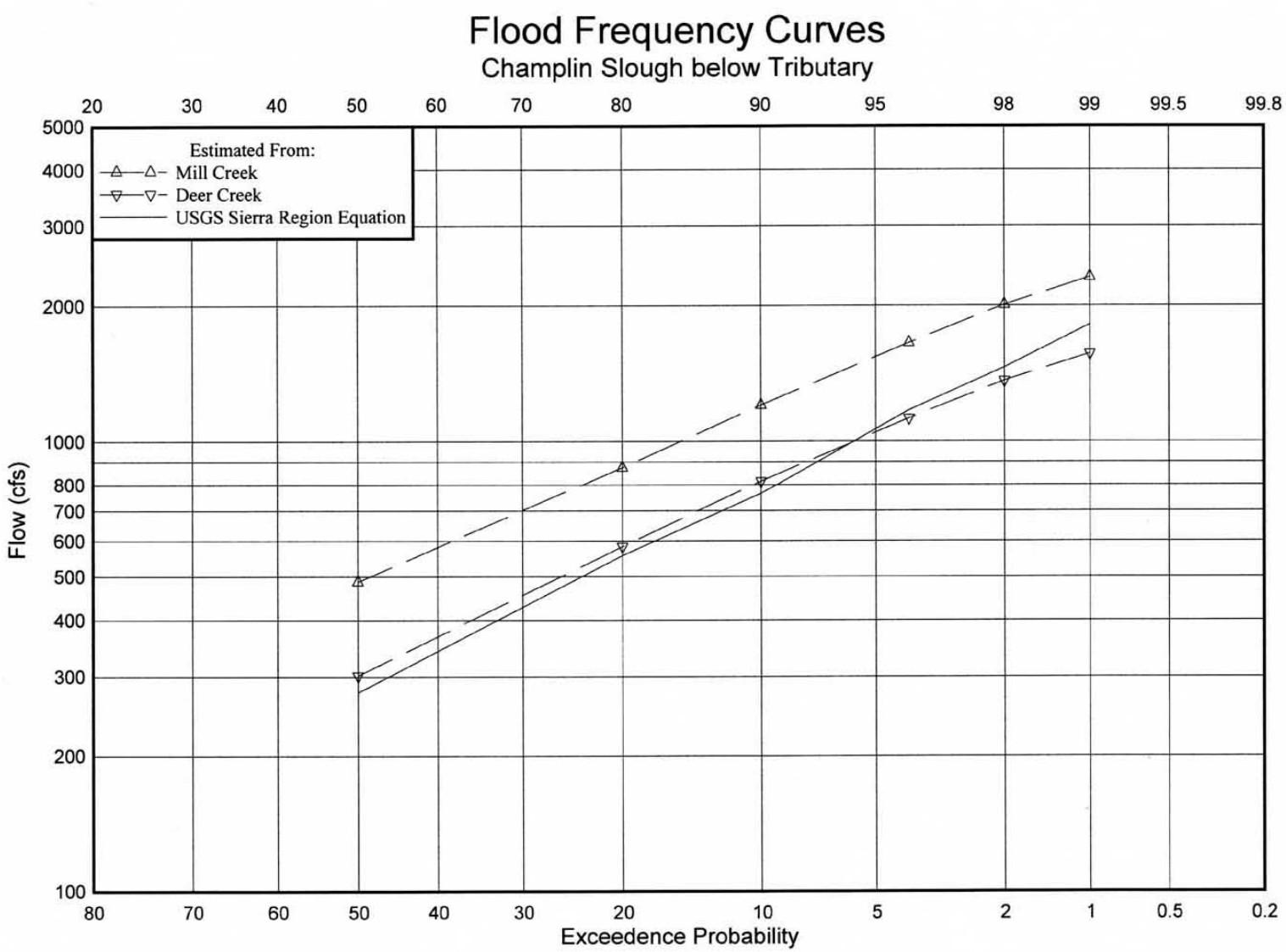


Deer Creek nr Vina

USGS Streamgage 11383500: 90-years, 208 sq-mi, MAP=47-in, El=2.8

Active




Flood Frequency Curves
Champlin Slough below Tributary
Estimated From:
Mill Creek
Deer Creek
USGS Sierra Region Equation
Flow (cfs)
5000
4000
3000
2000
1000
800
700
600
500
400
300
200
100
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
Exceedence Probability

APPENDIX C

References

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