

Level 2 Flood Frequency Analysis – Simplified Stochastic Extreme Flood Model (SSEFM)



Purpose of Method

- Create synthetic extended record for projects with short gage records
- Create continuous frequency distribution
- Allow for reasonable results with a moderate effort.
 - Use widely available data.
 - Site specific rainfall not required.
 - AEP neutral values for hydrometeorological inputs

Step 1A – Identify Regional Storm Types

MLC (Extratropical Cyclone) storm events are synoptic scale low pressure systems that may be fed by atmospheric rivers and may include fronts. Occur predominantly in the fall, winter and early spring months in the continental U.S.

TSR (Tropical Moisture) includes hurricanes, tropical storms and tropical depressions. Near-coastal areas adjacent to the Atlantic Ocean and Gulf of Mexico.

MEC (Large thunderstorm or cluster of thunderstorm cells) is a general category of mesoscale storms which includes Mesoscale Convective Complexes. Warm season events typically early April through October primarily affecting areas east of the continental divide.

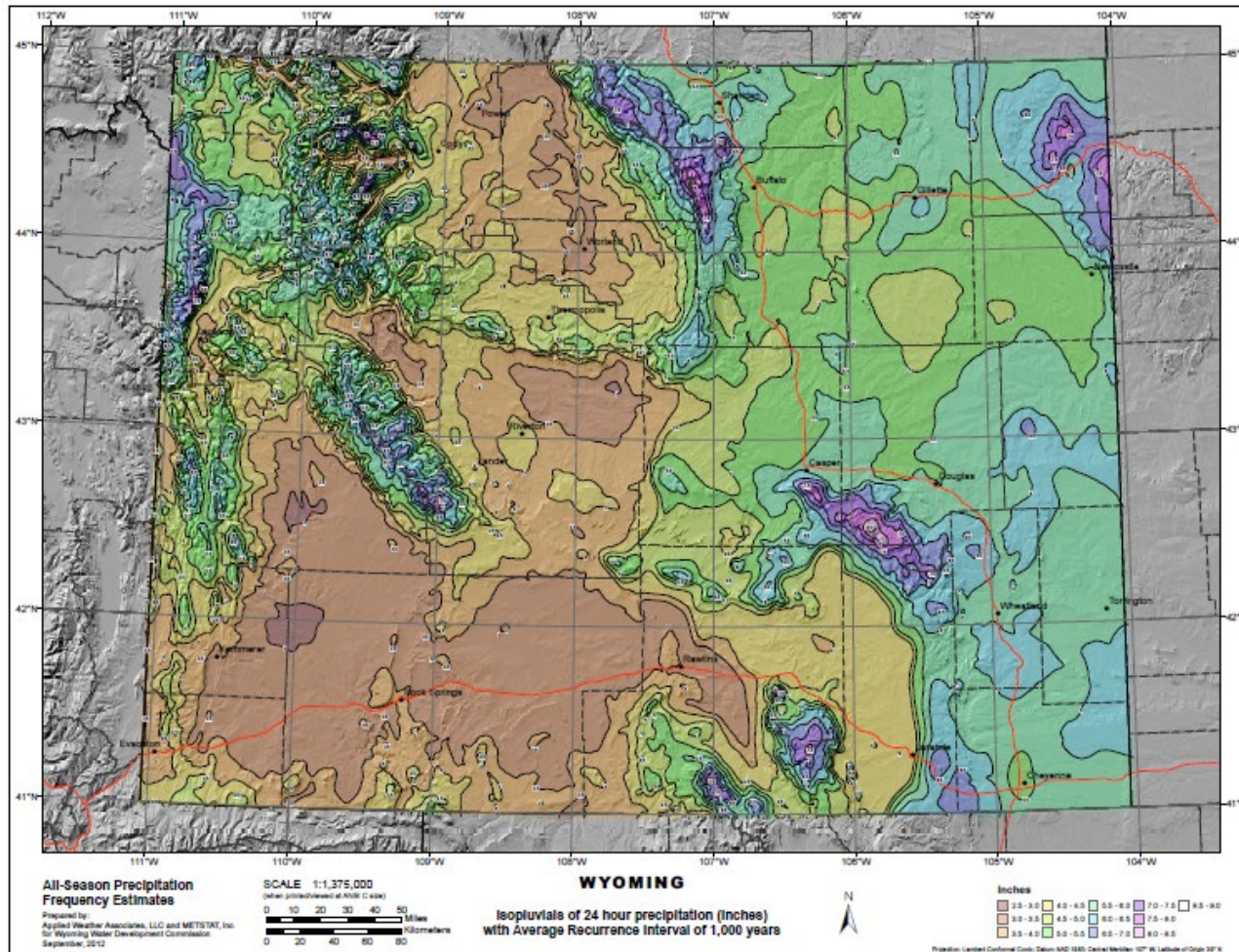
LS (Small local storm) storm types are a general category of convective events (thunderstorms) which can also produce short-duration high-intensity precipitation and generate flash floods. These are storms of interest for smaller watersheds in the inter-mountain west, west of the continental divide. Local Storms typically occur in the warm season from May through September.

Step 1B – Identify Key

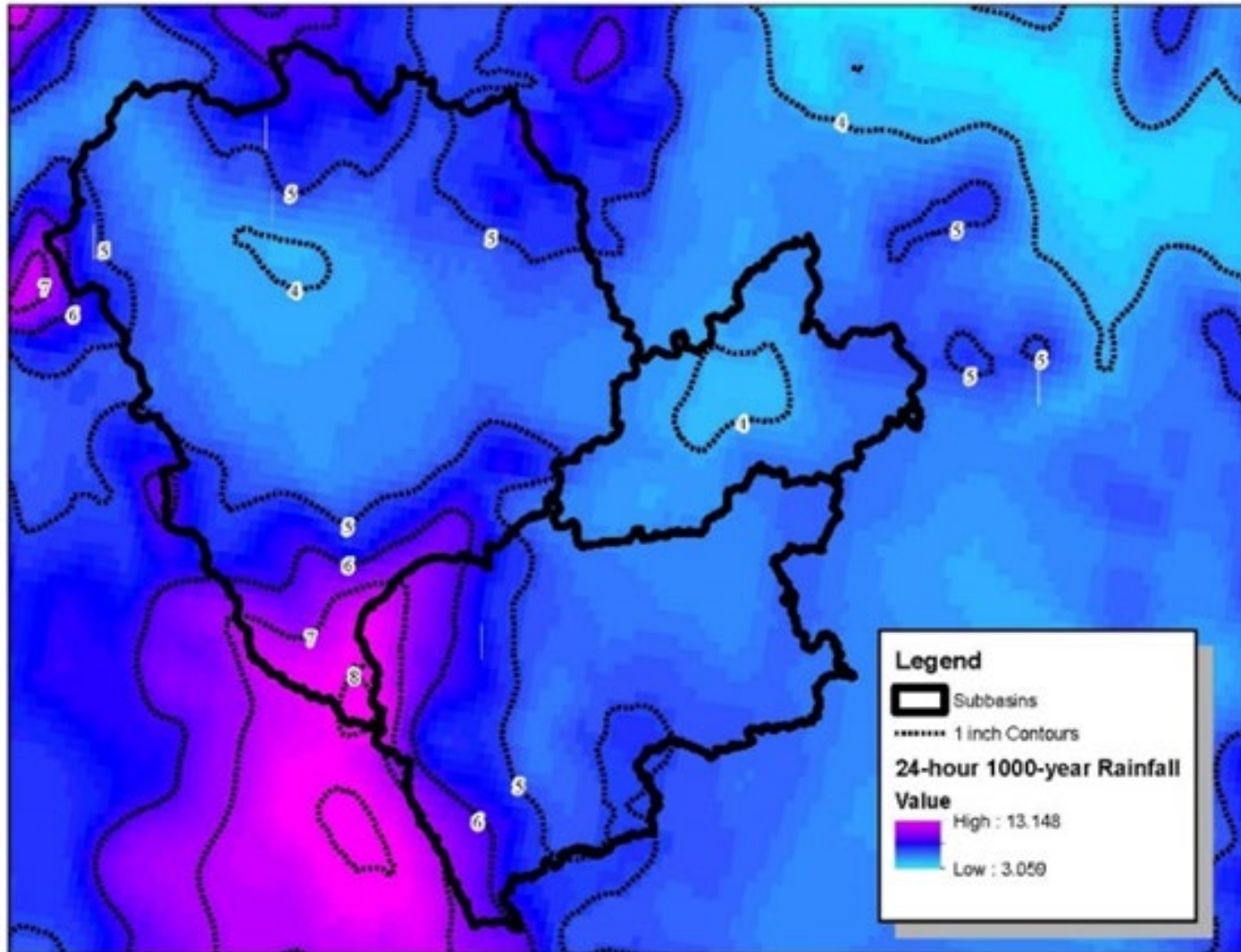
STORM TYPE	KEY DURATION (Hours)	ALTERNATE KEY DURATION (Hours)
Local Storm	2	1
Mesoscale Storm with Embedded Convection	6	6
Mid-Latitude Cyclone	48	24
Tropical Storm Remnant	48	24

Step 2 – Retrieve Gridded Rainfall Data

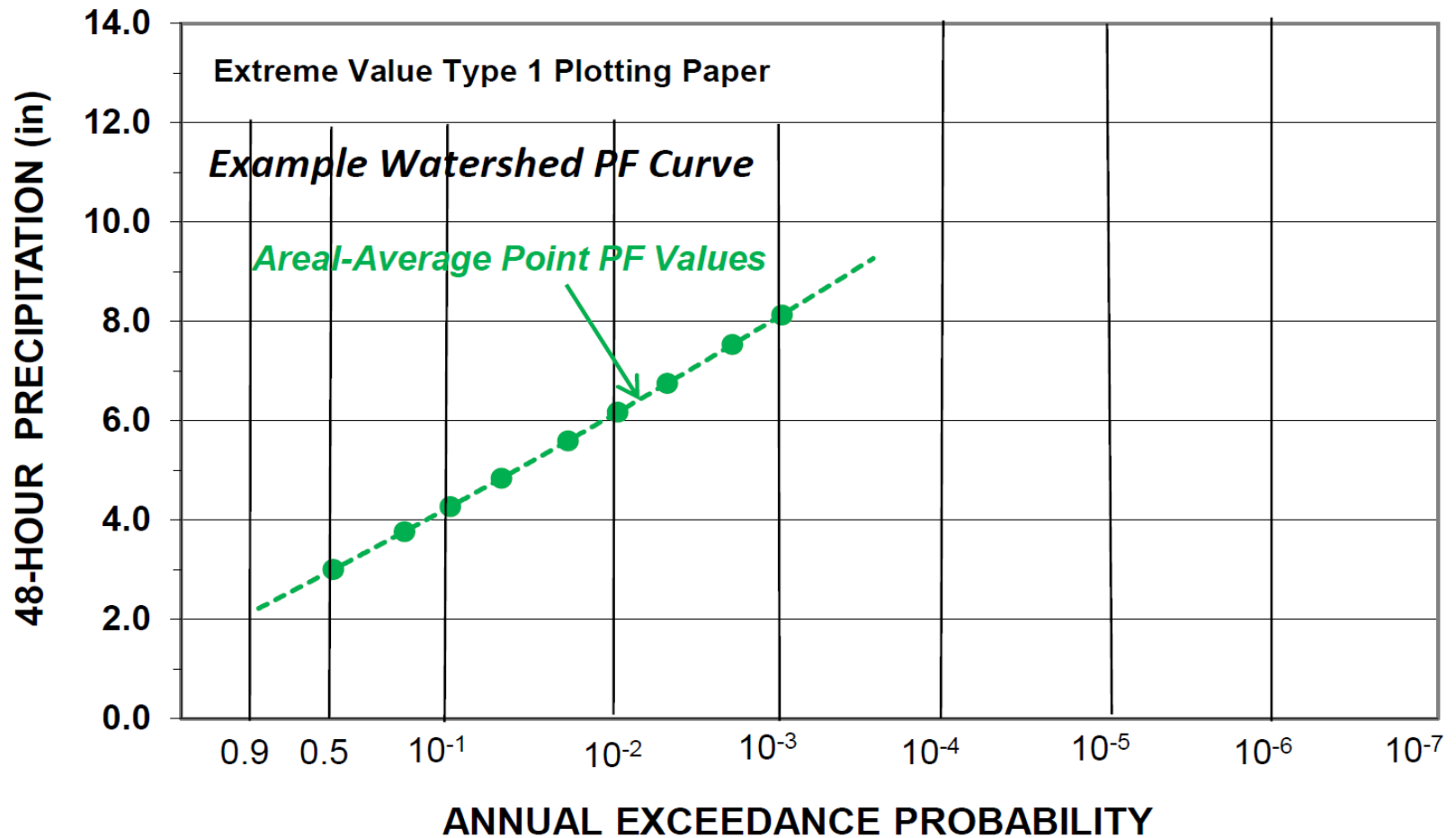
- NOAA Atlas 14 or Similar (EPRI)



Step 3a – Compute Basin Weighted Average



Step 3b – Assemble Rainfall Frequency Curve



Step 4 and 5 – Apply Areal Reduction Factors from HMRs

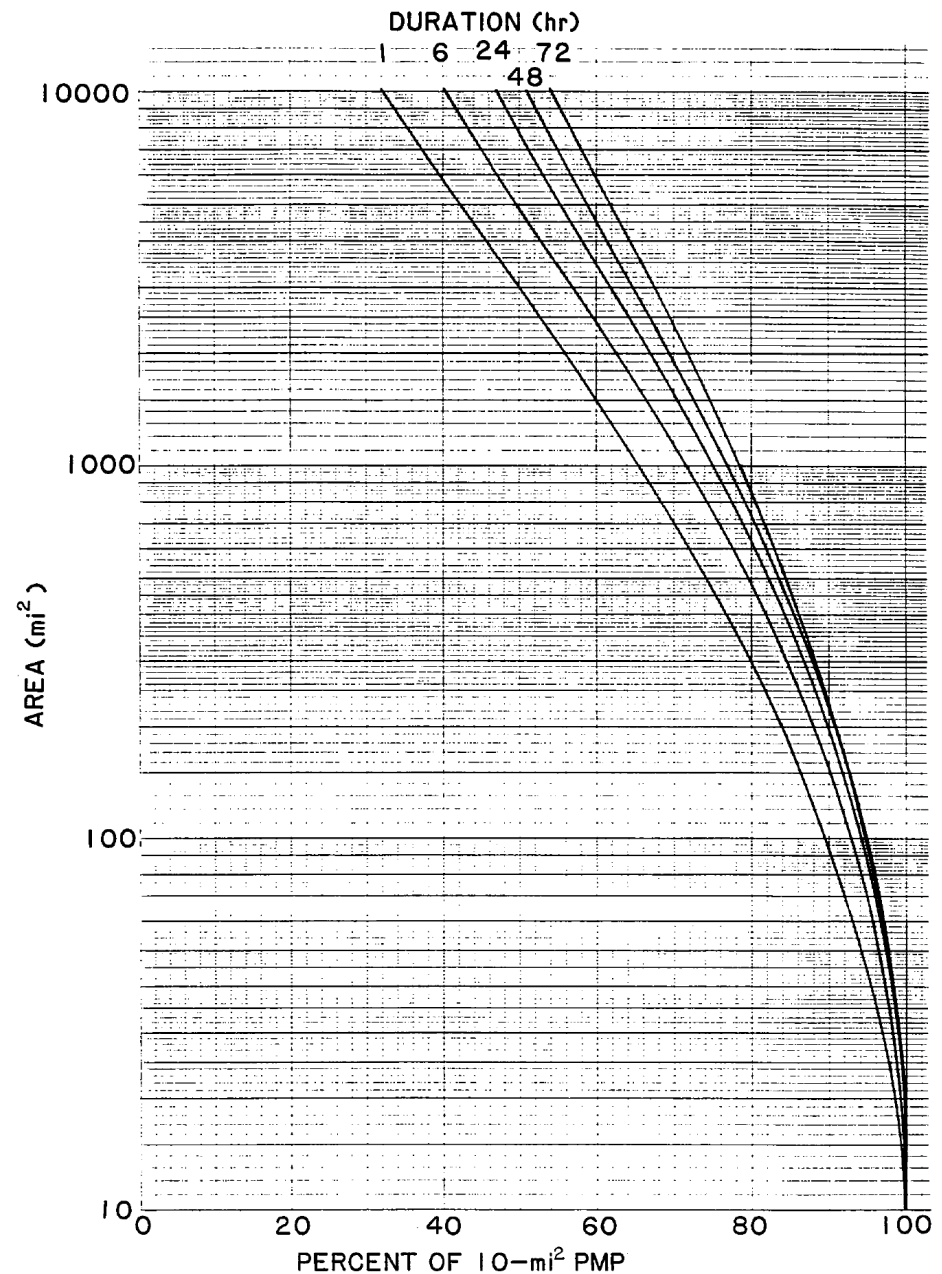
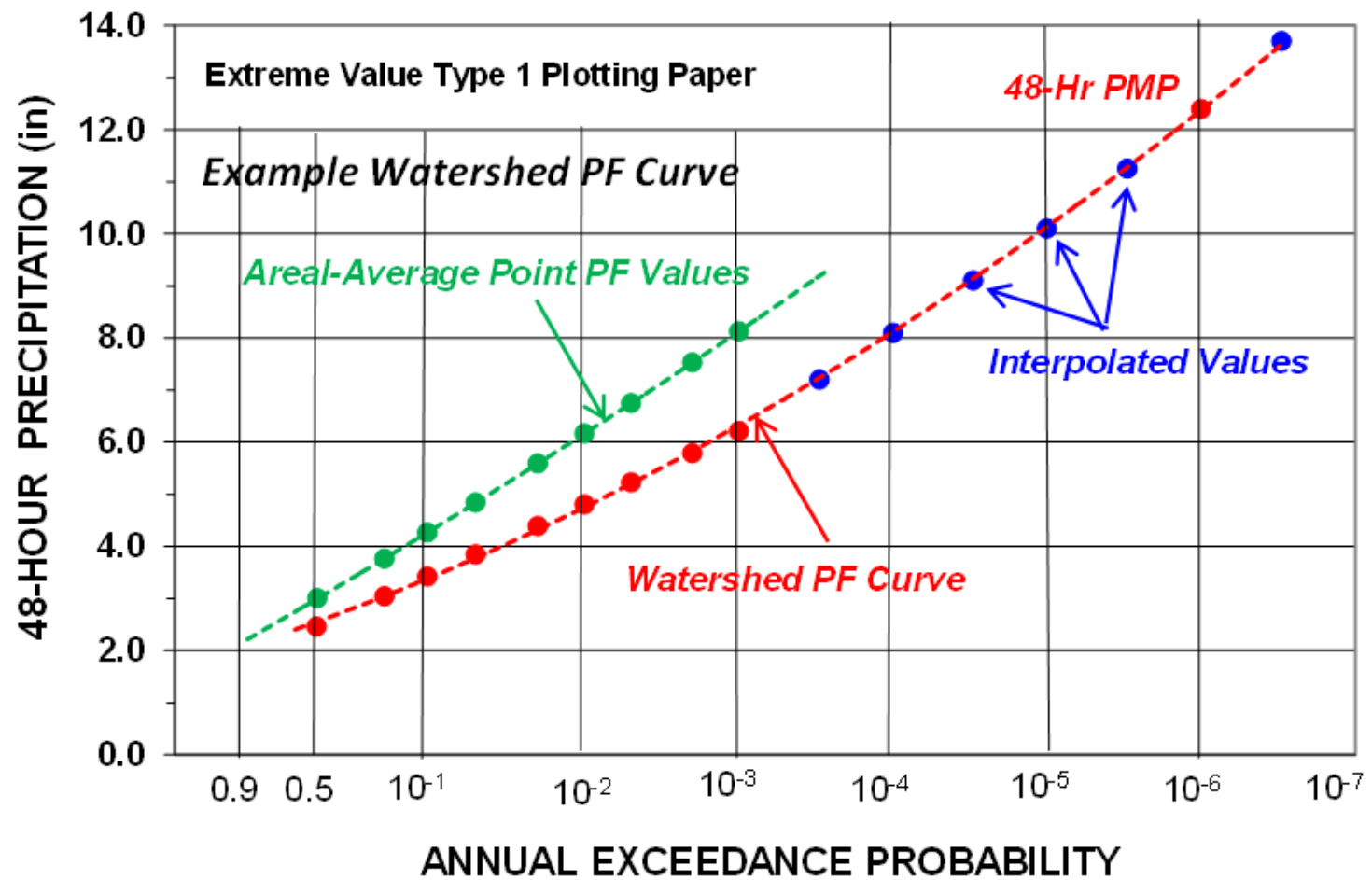


Figure 15.10.--Adopted depth-area relations for orographic subregions (Section 10.2.1).

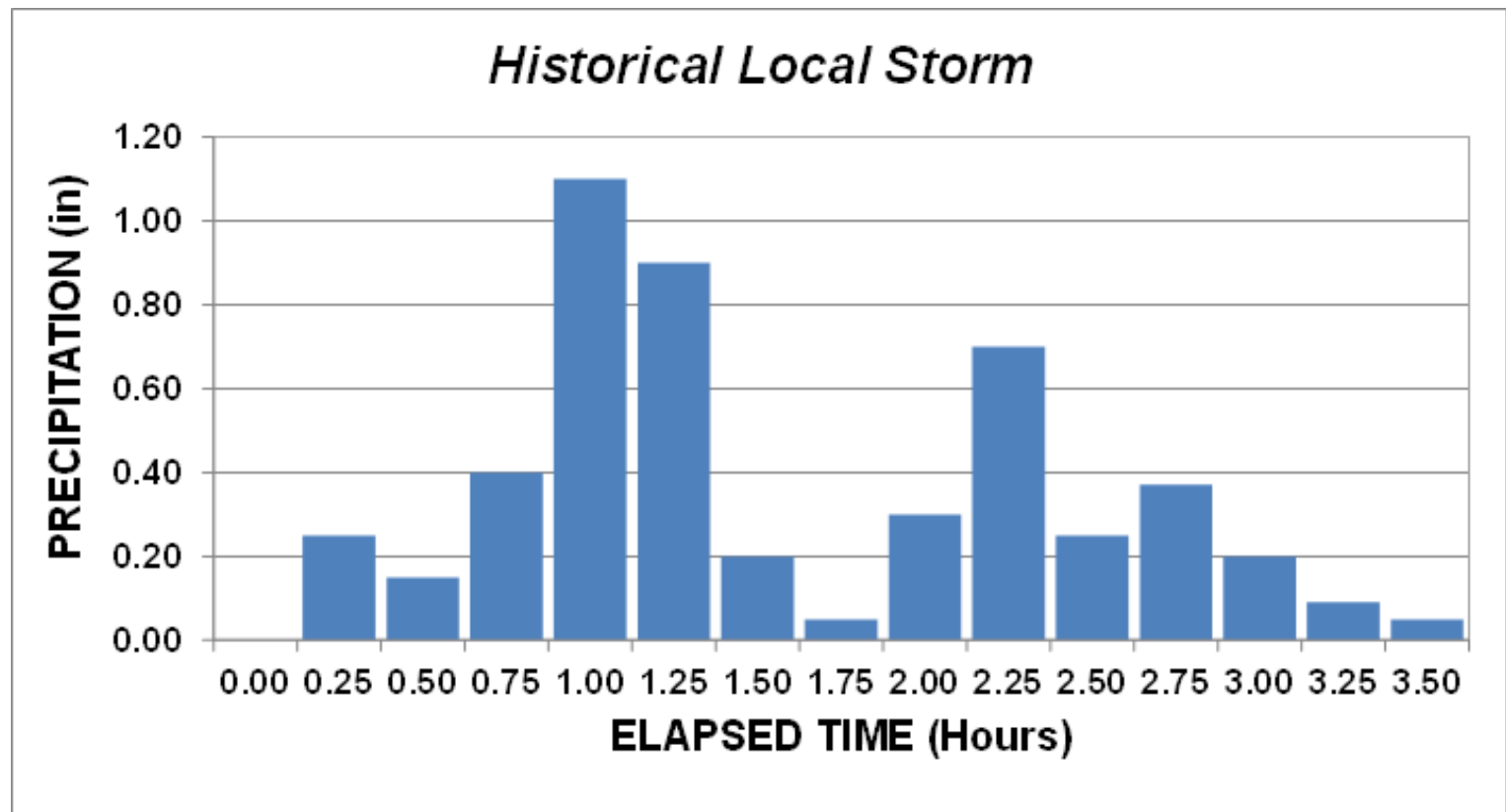
Step 6 – Choose recurrence for PMP

PHYSIOGRAPHIC PROVINCE	ANNUAL EXCEEDANCE PROBABILITY
Coastal Areas East of Continental Divide	$10^{-5.5}$
Non-Coastal Areas East of Continental Divide	$10^{-6.0}$
Areas West of Crest of Cascade Mountains in Washington	$10^{-6.0}$
Areas West of Crest of Cascade Mountains in Oregon	$10^{-5.5}$
Areas West of Crest of Sierra Mountains in California	$10^{-4.5}$
Intermountain Areas in Western US	$10^{-6.5}$

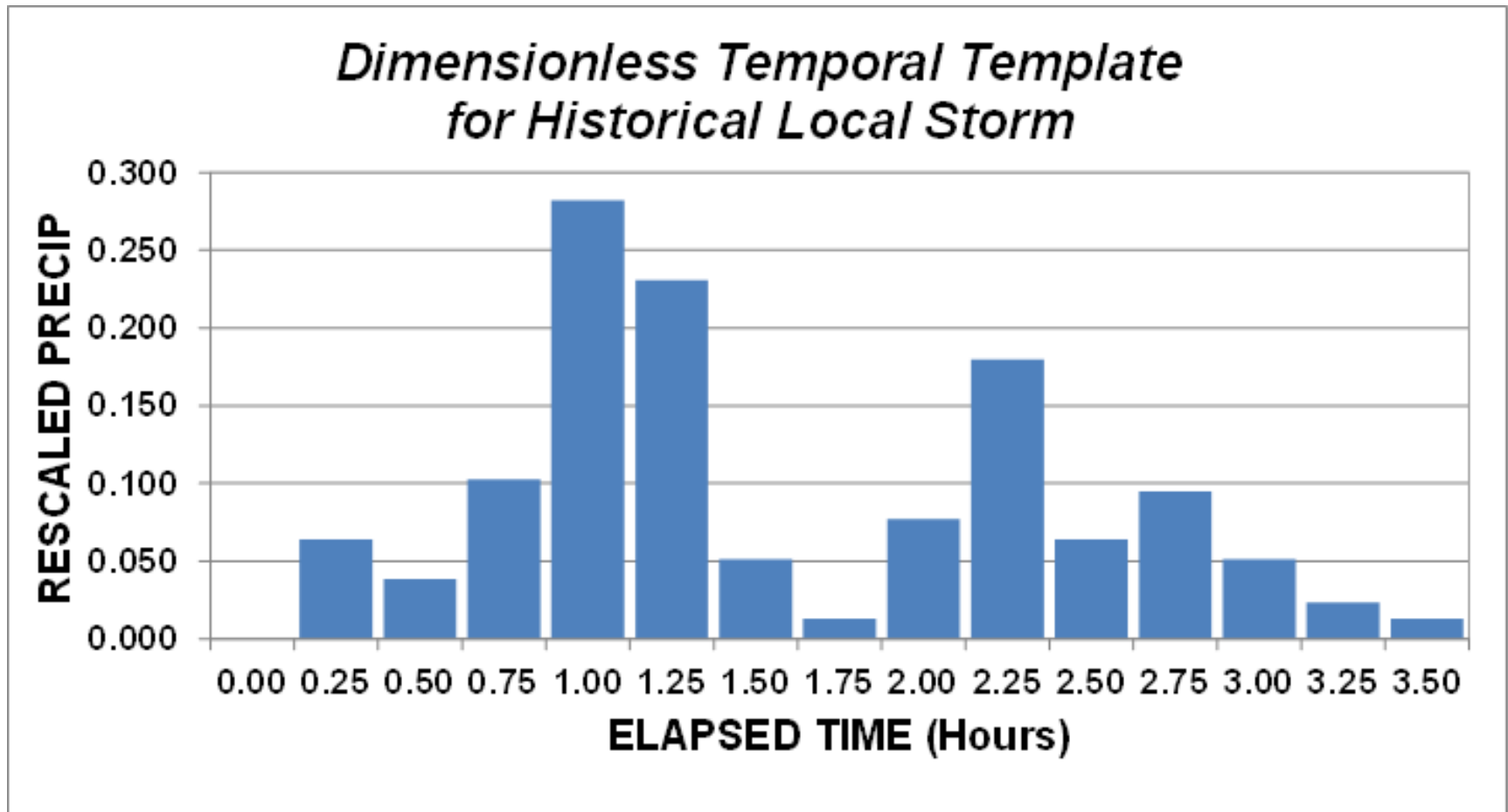
Precip-Frequency



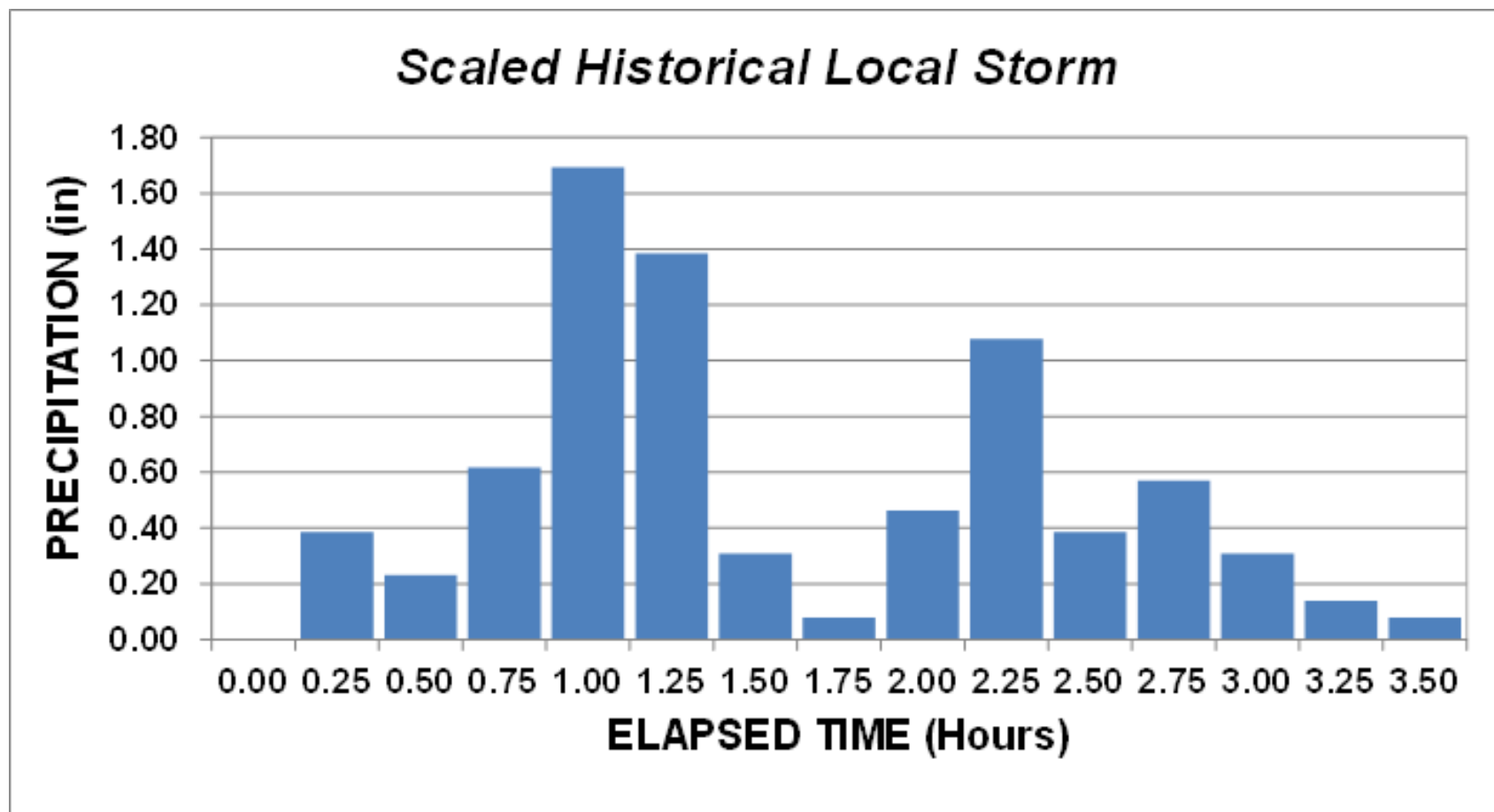
Step 7 – Choose historic storms



Step 8 – Compute Dimensionless Storms



Step 9 – Scale storms



Step 10 – Run storms in hydrologic model

HEC-HMS 4.2.1 [C:\Users\ejgpj12\Desktop\Spirit Level 2\SpiritHMS\SpiritHMS.hms]

File Edit View Components Parameters Compute Results Tools Help

--None Selected-- --None Selected--

SpiritHMS

- Basin Models
 - Basin 1

Components Compute Results

Basin Model

Name: Basin 1

Description:

Grid Cell File:

Local Flow: No

Flow Ratios: No

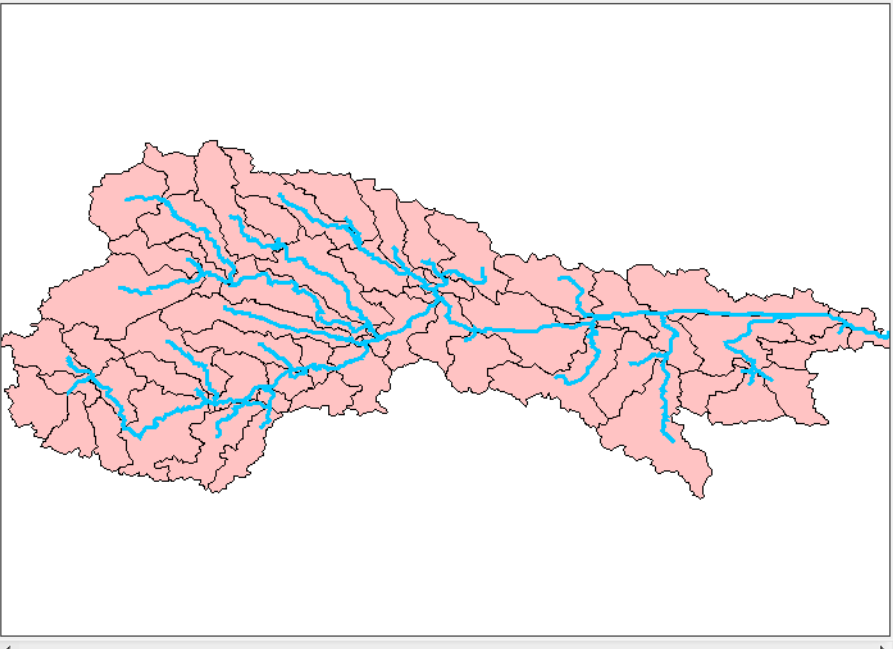
Replace Missing: No

Unit System: U.S. Customary

Sediment: No

Water Quality: No

Basin Model [Basin 1]



NOTE 10008: Begin opening project "SpiritHMS" in directory "C:\Users\ejgpj12\Desktop\Spirit Level 2\SpiritHMS" at time 27Sep2017, 07:45:32.
NOTE 10019: Finished opening project "SpiritHMS" in directory "C:\Users\ejgpj12\Desktop\Spirit Level 2\SpiritHMS" at time 27Sep2017, 07:45:32.
WARNING 10020: Begin updating "SpiritHMS" from Version 3.5 to Version 4.2.1 at time 27Sep2017, 07:45:32.
WARNING 10021: Project "SpiritHMS" was updated from Version 3.5 to Version 4.2.1 at time 27Sep2017, 07:45:32.

