# Attachment 2 – Precipitation Magnitude-Frequency Estimates for SPU Rain Gauge Locations (up to 2012 data only)

This appendix contains adapted text and excerpted tables and figures from *Analysis of Precipitation-Frequency and Storm Characteristics for the City of Seattle* (MGS Engineering Consultants, Inc. for Seattle Public Utilities, January 2013). The analysis presented here is from rain gauge data ending in 2012. Updated information may be obtained from the SPU Rain Gauge Network Data Steward as it becomes available.

The results of homogeneity analyses indicate that at-site mean values for precipitation do not vary across the Seattle Metropolitan Area for durations of 3 hours and less. Accordingly, one set of intensity-duration-frequency (IDF) curves can be developed that are applicable to the Seattle Metropolitan Area. Table 1 and Figures 1 and 2 provide precipitation intensities and IDF curves representative of the Seattle Metropolitan Area for durations from 5 to 180 minutes.

**Table 1. Intensity-Duration-Frequency Values for Durations from 5-Minutes through 180-Minutes for Selected Recurrence Intervals for the Seattle Metropolitan Area.**

| DURATION (minutes) | PRECIPITATION INTENSITIES (in/hr) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | RECURRENCE INTERVAL (Years) | | | | | | | |
| | 6-Month | 2-YR | 5-YR | 10-YR | 20-YR | 25-YR | 50-YR | 100-YR |
| 5 | 1.01 | 1.60 | 2.08 | 2.45 | 2.92 | 3.08 | 3.61 | 4.20 |
| 6 | 0.92 | 1.45 | 1.87 | 2.21 | 2.62 | 2.76 | 3.23 | 3.75 |
| 8 | 0.80 | 1.24 | 1.59 | 1.87 | 2.21 | 2.32 | 2.71 | 3.13 |
| 10 | 0.71 | 1.10 | 1.40 | 1.64 | 1.93 | 2.03 | 2.36 | 2.72 |
| 12 | 0.65 | 1.00 | 1.27 | 1.48 | 1.74 | 1.82 | 2.11 | 2.43 |
| 15 | 0.58 | 0.88 | 1.12 | 1.30 | 1.52 | 1.60 | 1.84 | 2.11 |
| 20 | 0.50 | 0.75 | 0.95 | 1.10 | 1.28 | 1.34 | 1.54 | 1.76 |
| 25 | 0.45 | 0.67 | 0.84 | 0.97 | 1.12 | 1.18 | 1.35 | 1.53 |
| 30 | 0.41 | 0.61 | 0.76 | 0.87 | 1.01 | 1.05 | 1.21 | 1.37 |
| 35 | 0.38 | 0.56 | 0.69 | 0.80 | 0.92 | 0.96 | 1.10 | 1.24 |
| 40 | 0.35 | 0.52 | 0.64 | 0.74 | 0.85 | 0.89 | 1.01 | 1.14 |
| 45 | 0.33 | 0.49 | 0.60 | 0.69 | 0.79 | 0.83 | 0.94 | 1.06 |
| 50 | 0.32 | 0.46 | 0.57 | 0.65 | 0.74 | 0.78 | 0.88 | 0.99 |
| 55 | 0.30 | 0.44 | 0.54 | 0.61 | 0.70 | 0.73 | 0.83 | 0.94 |
| 60 | 0.29 | 0.42 | 0.51 | 0.58 | 0.67 | 0.70 | 0.79 | 0.89 |
| 65 | 0.28 | 0.40 | 0.49 | 0.56 | 0.64 | 0.66 | 0.75 | 0.84 |
| 70 | 0.27 | 0.38 | 0.47 | 0.53 | 0.61 | 0.64 | 0.72 | 0.80 |
| 80 | 0.25 | 0.36 | 0.43 | 0.49 | 0.56 | 0.59 | 0.66 | 0.74 |
| 90 | 0.24 | 0.33 | 0.41 | 0.46 | 0.52 | 0.55 | 0.62 | 0.69 |
| 100 | 0.22 | 0.32 | 0.38 | 0.43 | 0.49 | 0.51 | 0.58 | 0.64 |
| 120 | 0.20 | 0.29 | 0.35 | 0.39 | 0.44 | 0.46 | 0.52 | 0.57 |
| 140 | 0.19 | 0.26 | 0.32 | 0.36 | 0.40 | 0.42 | 0.47 | 0.52 |
| 160 | 0.18 | 0.24 | 0.29 | 0.33 | 0.37 | 0.39 | 0.43 | 0.48 |
| 180 | 0.17 | 0.23 | 0.27 | 0.31 | 0.35 | 0.36 | 0.40 | 0.45 |

**Table 2. Two-hour Precipitation Magnitude-Frequency Values for Selected Recurrence Intervals for the Seattle Metropolitan Area.**

| Recurrence Interval | 2-Hour Total (inches) |
|---|---|
| **6-month** | 0.40 |
| **2-yr** | 0.58 |
| **5-yr** | 0.70 |
| **10-yr** | 0.78 |
| **20-yr** | 0.88 |
| **25-yr** | 0.92 |
| **50-yr** | 1.04 |
| **100-yr** | 1.14 |

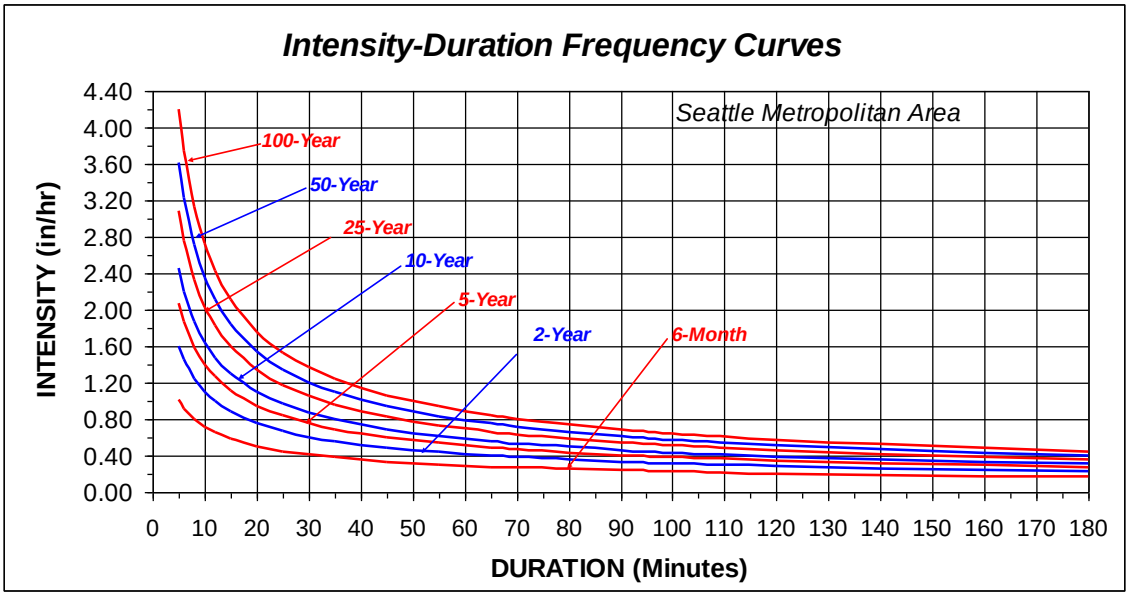


**Figure 1. Intensity-Duration-Frequency Curves for the Seattle Metropolitan Area.**

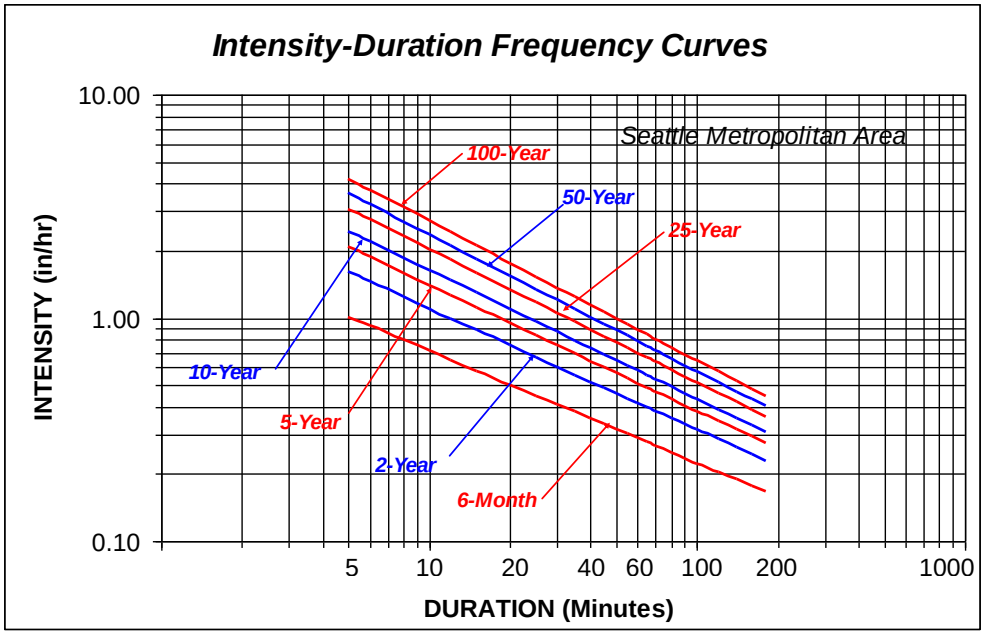


**Figure 2. Intensity-Duration-Frequency Curves for the Seattle Metropolitan Area.**

The following tables and figures contain estimates of precipitation-frequency values for durations of 6 hours, 12 hours, 24 hours, 48 hours, and 7 days for locations of SPU precipitation gauges (Table 2) in both tabular format and as magnitude-frequency curves. These precipitation values are based on estimates of the at-site mean values for the location of SPU gauges (Table 3) based on the spatial analysis of precipitation (gridded datasets) and the applicable regional growth curves obtained from the regional frequency analyses. Corrections have been applied to provide equivalent partial duration series estimates for frequently occurring events (5 times/year, 2 times/year, once/year, 2-year, and 5-year recurrence intervals).

**Table 3. Listing of City of Seattle (SPU) Precipitation Gauges.**

| Station ID | Station Name | Latitude | Longitude | Year Start | Year End | Gauge Type |
|---|---|---|---|---|---|---|
| 45-S001 | Haller Lake Shop | 47.7211 | 122.3431 | 1965 | 2003 | TB |
| 45-S002 | Magnusson Park | 47.6950 | 122.2731 | 1969 | 2003 | TB |
| 45-S003 | UW Hydraulics Lab | 47.6481 | 122.3081 | 1965 | 2003 | TB |
| 45-S004 | Maple Leaf Reservoir | 47.6900 | 122.3119 | 1965 | 2003 | TB |
| 45-S005 | Fauntleroy Ferry Dock | 47.5231 | 122.3919 | 1968 | 2003 | TB |
| 45-S007 | Whitman Middle School | 47.6961 | 122.3769 | 1965 | 2003 | TB |
| 45-S008 | Ballard Locks | 47.6650 | 122.3969 | 1965 | 2003 | TB |
| 45-S009 | Woodland Park Zoo | 47.6681 | 122.3539 | 1965 | 2003 | TB |
| 45-S010 | Rainier View Elementary | 47.5000 | 122.2600 | 1968 | 2003 | TB |
| 45-S011 | Metro-KC Denny Regulating | 47.6169 | 122.3550 | 1970 | 2003 | TB |
| 45-S012 | Catherine Blaine Elementary School | 47.6419 | 122.3969 | 1965 | 2003 | TB |
| 45-S014 | Lafayette Elementary School | 47.5781 | 122.3819 | 1965 | 2003 | TB |
| 45-S015 | Puget Sound Clean Air Monitoring Station | 47.5619 | 122.3400 | 1965 | 2003 | TB |
| 45-S016 | Metro-KC E Marginal Way | 47.5350 | 122.3139 | 1970 | 2003 | TB |
| 45-S017 | West Seattle Reservoir Treatment Shop | 47.5211 | 122.3450 | 1965 | 2003 | TB |
| 45-S018 | Aki Kurose Middle School | 47.5481 | 122.2750 | 1965 | 2003 | TB |
| 45-S020 | TT Minor Elementary | 47.6119 | 122.3069 | 1975 | 2003 | TB |
| 45-7473 | Seattle Tacoma Airport | 47.4500 | 122.3000 | 1965 | 2002 | HR |

**Table 4. Listing of At-~~S~~site Mean Values for City of Seattle (SPU) Precipitation Gauges.**

| At-Site Mean Values (in) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Station ID** | **Station Name** | **6-Hr** | **12-Hr** | **24-Hr** | **48-Hr** | **72-Hr** | **7-Day** |
| 45-S001 | Haller Lake Shop | 1.02 | 1.45 | 1.97 | 2.40 | 2.88 | 4.05 |
| 45-S002 | Magnusson Park | 1.04 | 1.50 | 2.03 | 2.48 | 2.99 | 4.21 |
| 45-S003 | UW Hydraulics Lab | 1.04 | 1.50 | 2.04 | 2.50 | 3.00 | 4.23 |
| 45-S004 | Maple Leaf Reservoir | 1.04 | 1.50 | 2.03 | 2.48 | 2.99 | 4.21 |
| 45-S005 | Fauntleroy Ferry Dock | 1.07 | 1.56 | 2.12 | 2.61 | 3.14 | 4.45 |
| 45-S007 | Whitman Middle School | 1.04 | 1.50 | 2.03 | 2.48 | 2.99 | 4.21 |
| 45-S008 | Ballard Locks | 1.05 | 1.51 | 2.05 | 2.51 | 3.02 | 4.26 |
| 45-S009 | Woodland Park Zoo | 1.04 | 1.50 | 2.04 | 2.50 | 3.00 | 4.23 |
| 45-S010 | Rainier View Elementary | 1.10 | 1.60 | 2.18 | 2.69 | 3.25 | 4.60 |
| 45-S011 | Metro-KC Denny Regulating | 1.05 | 1.52 | 2.06 | 2.52 | 3.04 | 4.29 |
| 45-S012 | Catherine Blaine Elementary School | 1.05 | 1.51 | 2.05 | 2.51 | 3.02 | 4.26 |
| 45-S014 | Lafayette Elementary School | 1.07 | 1.55 | 2.10 | 2.58 | 3.11 | 4.39 |
| 45-S015 | Puget Sound Clean Air Monitoring Station | 1.05 | 1.52 | 2.07 | 2.54 | 3.06 | 4.31 |
| 45-S016 | Metro-KC E Marginal Way | 1.06 | 1.54 | 2.09 | 2.57 | 3.09 | 4.37 |
| 45-S017 | West Seattle Reservoir Treatment Shop | 1.10 | 1.60 | 2.18 | 2.69 | 3.25 | 4.60 |
| 45-S018 | Aki Kurose Middle School | 1.06 | 1.53 | 2.08 | 2.55 | 3.07 | 4.34 |
| 45-S020 | TT Minor Elementary | 1.06 | 1.53 | 2.08 | 2.55 | 3.07 | 4.34 |
| 45-7473 | Seattle Tacoma Airport | 1.11 | 1.62 | 2.21 | 2.73 | 3.30 | 4.68 |

**Table 5. Precipitation-Magnitude-Frequency Estimates for of SPU Gauge 01.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | 0.5-Yr | | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.75 | 0.89 | 1.03 | 1.23 | 1.37 | | 1.58 | 1.74 | 1.91 | 2.31 |
| 12 | | 1.05 | 1.26 | 1.48 | 1.78 | 1.99 | | 2.32 | 2.56 | 2.81 | 3.40 |
| 24 | | 1.39 | 1.70 | 2.01 | 2.44 | 2.75 | | 3.22 | 3.58 | 3.94 | 4.83 |
| 48 | | 1.67 | 2.05 | 2.45 | 2.98 | 3.37 | | 3.96 | 4.41 | 4.86 | 5.97 |
| 72 | | 2.05 | 2.50 | 2.95 | 3.56 | 3.99 | | 4.63 | 5.11 | 5.59 | 6.72 |
| 168 | | 2.92 | 3.55 | 4.18 | 4.98 | 5.53 | | 6.32 | 6.89 | 7.44 | 8.67 |

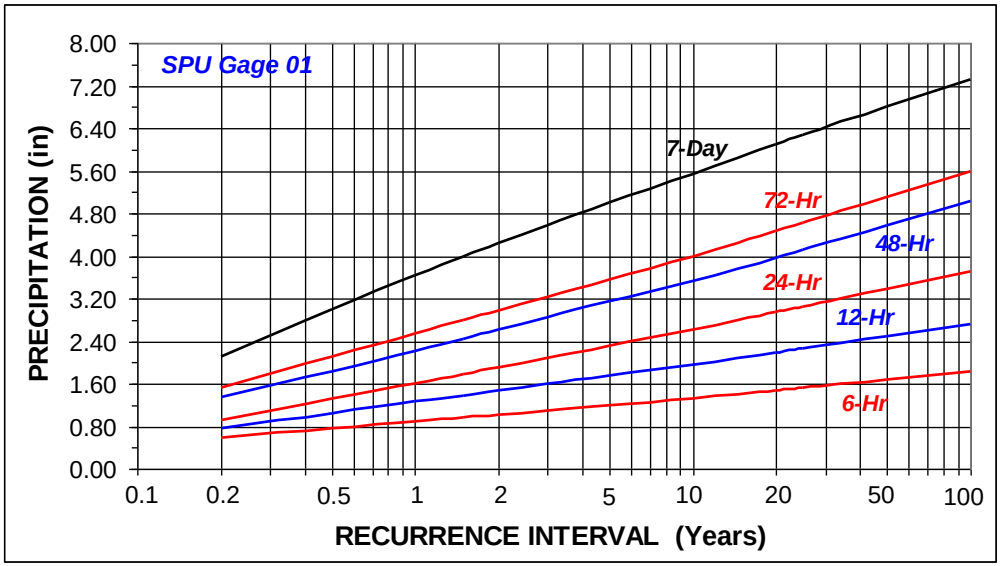


**Figure 3. Precipitation-Magnitude-Frequency Estimates for of SPU Gauge 01.**

**Table 6. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 02.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.77 | 0.91 | 1.06 | 1.26 | 1.40 | | 1.62 | 1.78 | 1.95 | 2.36 |
| 12 | | 1.08 | 1.30 | 1.53 | 1.83 | 2.05 | | 2.38 | 2.64 | 2.89 | 3.50 |
| 24 | | 1.44 | 1.75 | 2.07 | 2.51 | 2.83 | | 3.31 | 3.68 | 4.06 | 4.97 |
| 48 | | 1.73 | 2.12 | 2.53 | 3.08 | 3.49 | | 4.09 | 4.56 | 5.03 | 6.18 |
| 72 | | 2.13 | 2.59 | 3.06 | 3.69 | 4.13 | | 4.80 | 5.30 | 5.79 | 6.97 |
| 168 | | 3.03 | 3.69 | 4.34 | 5.17 | 5.75 | | 6.57 | 7.16 | 7.74 | 9.01 |

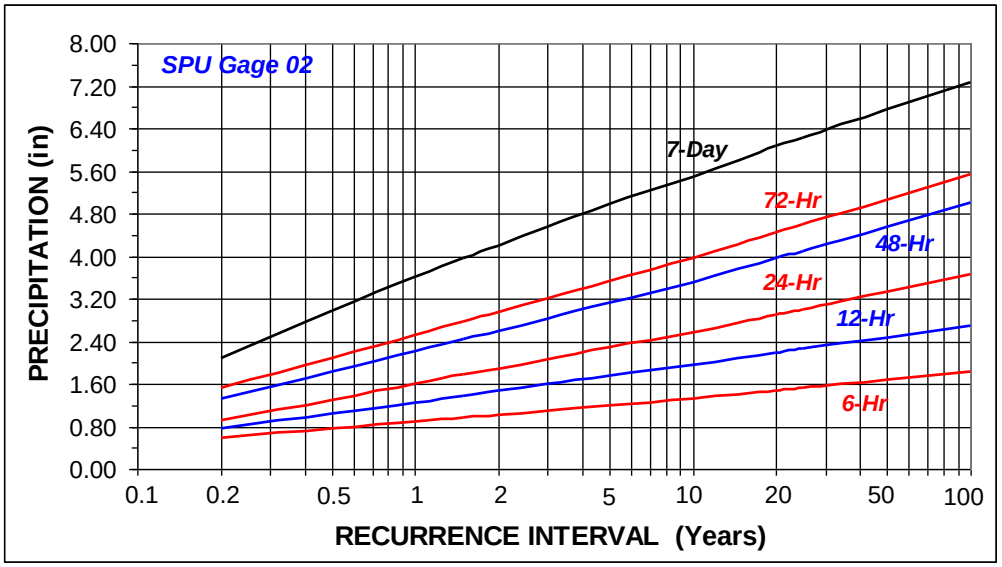


**Figure 4. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 02.**

**Table 7. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 03.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.77 | 0.91 | 1.06 | 1.26 | 1.41 | | 1.62 | 1.79 | 1.96 | 2.37 |
| 12 | | 1.09 | 1.31 | 1.53 | 1.84 | 2.06 | | 2.39 | 2.65 | 2.90 | 3.52 |
| 24 | | 1.44 | 1.75 | 2.08 | 2.52 | 2.84 | | 3.33 | 3.70 | 4.08 | 4.99 |
| 48 | | 1.74 | 2.14 | 2.55 | 3.10 | 3.51 | | 4.12 | 4.59 | 5.06 | 6.22 |
| 72 | | 2.14 | 2.60 | 3.08 | 3.71 | 4.16 | | 4.83 | 5.33 | 5.83 | 7.01 |
| 168 | | 3.05 | 3.71 | 4.37 | 5.21 | 5.79 | | 6.61 | 7.21 | 7.78 | 9.07 |

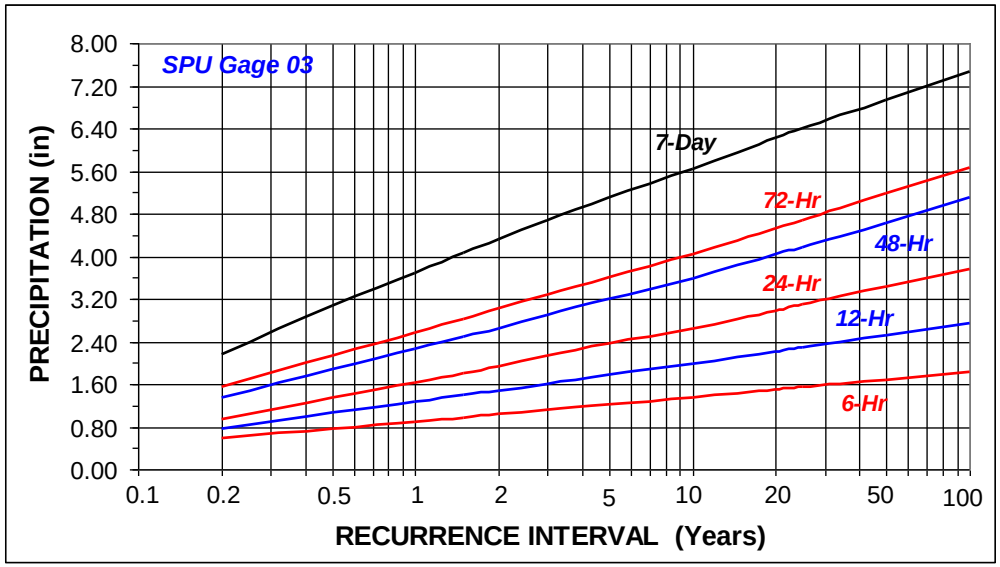


**Figure 5. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 03.**

**Table 8. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 04.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.77 | 0.91 | 1.06 | 1.26 | 1.40 | | 1.62 | 1.78 | 1.95 | 2.36 |
| 12 | | 1.08 | 1.30 | 1.53 | 1.83 | 2.05 | | 2.38 | 2.64 | 2.89 | 3.50 |
| 24 | | 1.44 | 1.75 | 2.07 | 2.51 | 2.83 | | 3.31 | 3.68 | 4.06 | 4.97 |
| 48 | | 1.73 | 2.12 | 2.53 | 3.08 | 3.49 | | 4.09 | 4.56 | 5.03 | 6.18 |
| 72 | | 2.13 | 2.59 | 3.06 | 3.69 | 4.13 | | 4.80 | 5.30 | 5.79 | 6.97 |
| 168 | | 3.03 | 3.69 | 4.34 | 5.17 | 5.75 | | 6.57 | 7.16 | 7.74 | 9.01 |

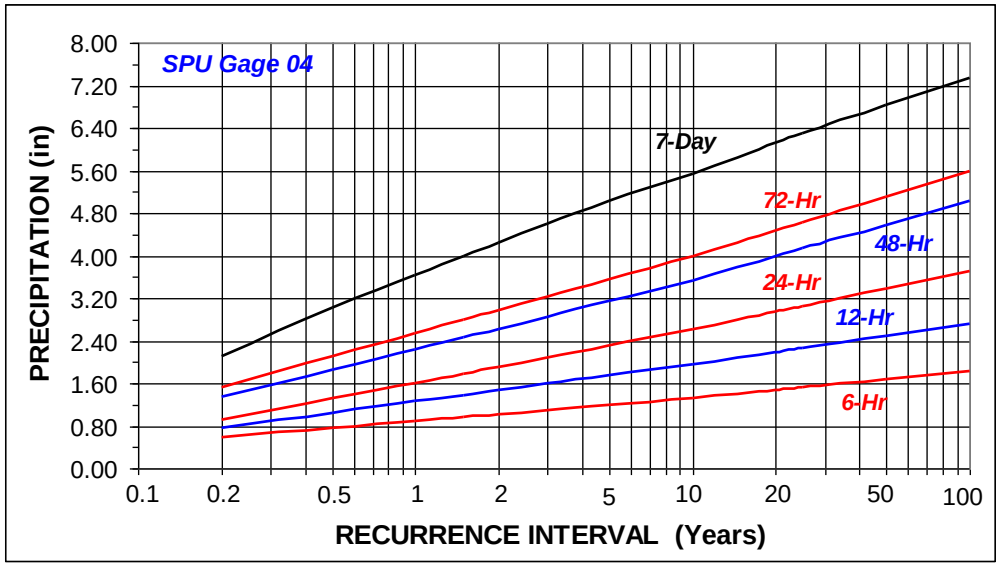


**Figure 6. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 04.**

**Table 9. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 05.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.80 | 0.94 | 1.09 | 1.30 | 1.45 | | 1.67 | 1.85 | 2.02 | 2.44 |
| 12 | | 1.13 | 1.36 | 1.59 | 1.91 | 2.14 | | 2.48 | 2.75 | 3.01 | 3.65 |
| 24 | | 1.50 | 1.82 | 2.16 | 2.62 | 2.95 | | 3.45 | 3.84 | 4.23 | 5.18 |
| 48 | | 1.82 | 2.23 | 2.66 | 3.24 | 3.66 | | 4.30 | 4.79 | 5.29 | 6.50 |
| 72 | | 2.24 | 2.72 | 3.22 | 3.88 | 4.35 | | 5.05 | 5.58 | 6.10 | 7.33 |
| 168 | | 3.20 | 3.90 | 4.59 | 5.47 | 6.08 | | 6.94 | 7.57 | 8.17 | 9.52 |

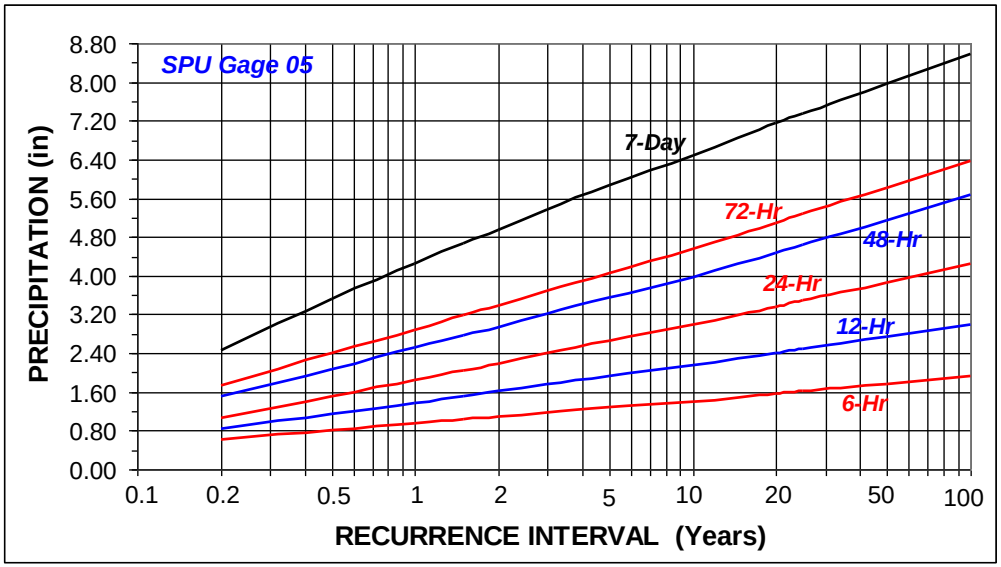


**Figure 7. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 05.**

**Table 10. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 07.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.77 | 0.91 | 1.06 | 1.26 | 1.40 | | 1.62 | 1.78 | 1.95 | 2.36 |
| 12 | | 1.08 | 1.30 | 1.53 | 1.83 | 2.05 | | 2.38 | 2.64 | 2.89 | 3.50 |
| 24 | | 1.44 | 1.75 | 2.07 | 2.51 | 2.83 | | 3.31 | 3.68 | 4.06 | 4.97 |
| 48 | | 1.73 | 2.12 | 2.53 | 3.08 | 3.49 | | 4.09 | 4.56 | 5.03 | 6.18 |
| 72 | | 2.13 | 2.59 | 3.06 | 3.69 | 4.13 | | 4.80 | 5.30 | 5.79 | 6.97 |
| 168 | | 3.03 | 3.69 | 4.34 | 5.17 | 5.75 | | 6.57 | 7.16 | 7.74 | 9.01 |

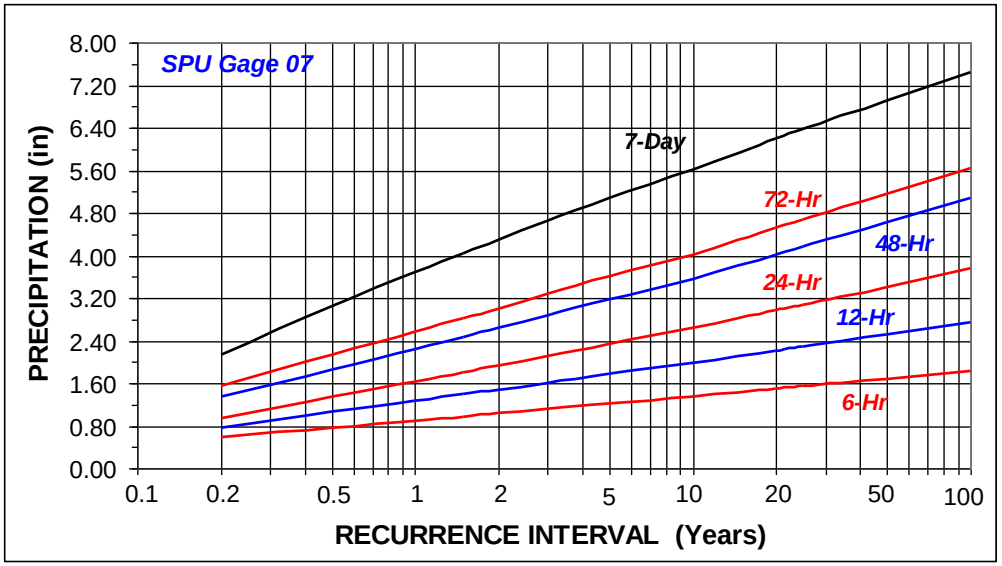


**Figure 8. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 07.**

**Table 11. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 08.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.78 | 0.92 | 1.07 | 1.27 | 1.41 | | 1.63 | 1.80 | 1.97 | 2.38 |
| 12 | | 1.09 | 1.31 | 1.54 | 1.85 | 2.07 | | 2.41 | 2.66 | 2.92 | 3.53 |
| 24 | | 1.45 | 1.76 | 2.09 | 2.53 | 2.86 | | 3.34 | 3.72 | 4.10 | 5.01 |
| 48 | | 1.75 | 2.15 | 2.56 | 3.12 | 3.53 | | 4.14 | 4.61 | 5.09 | 6.25 |
| 72 | | 2.15 | 2.62 | 3.09 | 3.73 | 4.18 | | 4.85 | 5.36 | 5.86 | 7.05 |
| 168 | | 3.07 | 3.74 | 4.40 | 5.24 | 5.82 | | 6.65 | 7.25 | 7.83 | 9.12 |

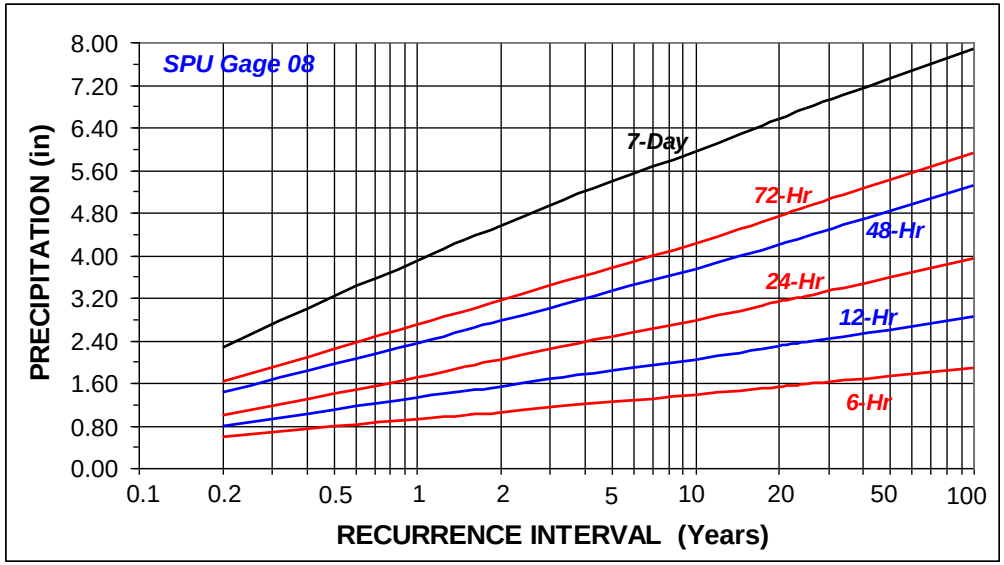


**Figure 9. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 08.**

**Table 12. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 09.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.77 | 0.91 | 1.06 | 1.26 | 1.41 | | 1.62 | 1.79 | 1.96 | 2.37 |
| 12 | | 1.09 | 1.31 | 1.53 | 1.84 | 2.06 | | 2.39 | 2.65 | 2.90 | 3.52 |
| 24 | | 1.44 | 1.75 | 2.08 | 2.52 | 2.84 | | 3.33 | 3.70 | 4.08 | 4.99 |
| 48 | | 1.74 | 2.14 | 2.55 | 3.10 | 3.51 | | 4.12 | 4.59 | 5.06 | 6.22 |
| 72 | | 2.14 | 2.60 | 3.08 | 3.71 | 4.16 | | 4.83 | 5.33 | 5.83 | 7.01 |
| 168 | | 3.05 | 3.71 | 4.37 | 5.21 | 5.79 | | 6.61 | 7.21 | 7.78 | 9.07 |

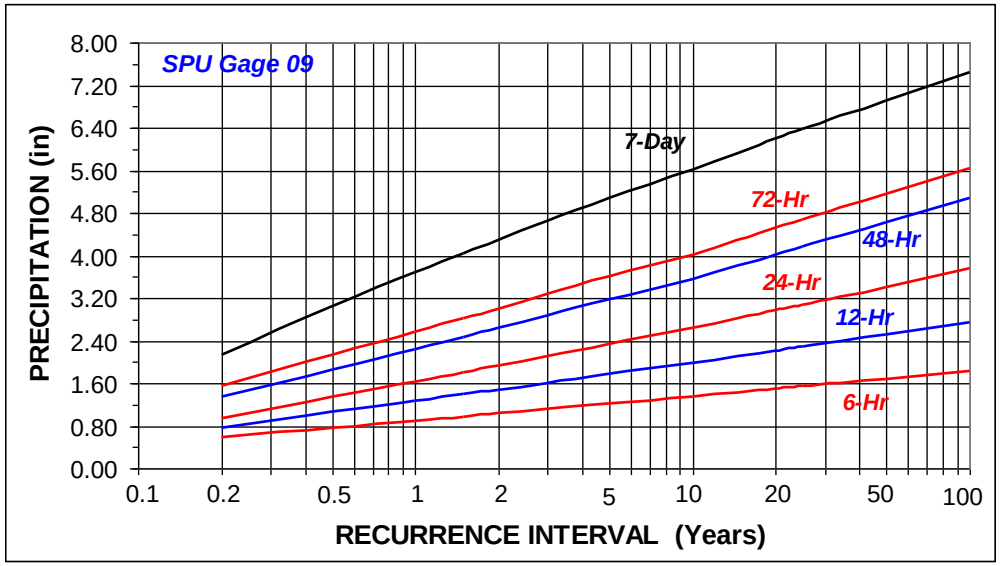


**Figure 10. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 09.**

**Table 13. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 10.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.81 | 0.96 | 1.12 | 1.33 | 1.48 | | 1.71 | 1.89 | 2.07 | 2.50 |
| 12 | | 1.16 | 1.39 | 1.63 | 1.96 | 2.20 | | 2.55 | 2.82 | 3.09 | 3.74 |
| 24 | | 1.54 | 1.87 | 2.22 | 2.69 | 3.04 | | 3.55 | 3.95 | 4.36 | 5.33 |
| 48 | | 1.88 | 2.30 | 2.75 | 3.35 | 3.78 | | 4.44 | 4.95 | 5.46 | 6.71 |
| 72 | | 2.31 | 2.81 | 3.33 | 4.01 | 4.50 | | 5.22 | 5.76 | 6.30 | 7.58 |
| 168 | | 3.32 | 4.04 | 4.75 | 5.66 | 6.29 | | 7.19 | 7.84 | 8.46 | 9.86 |

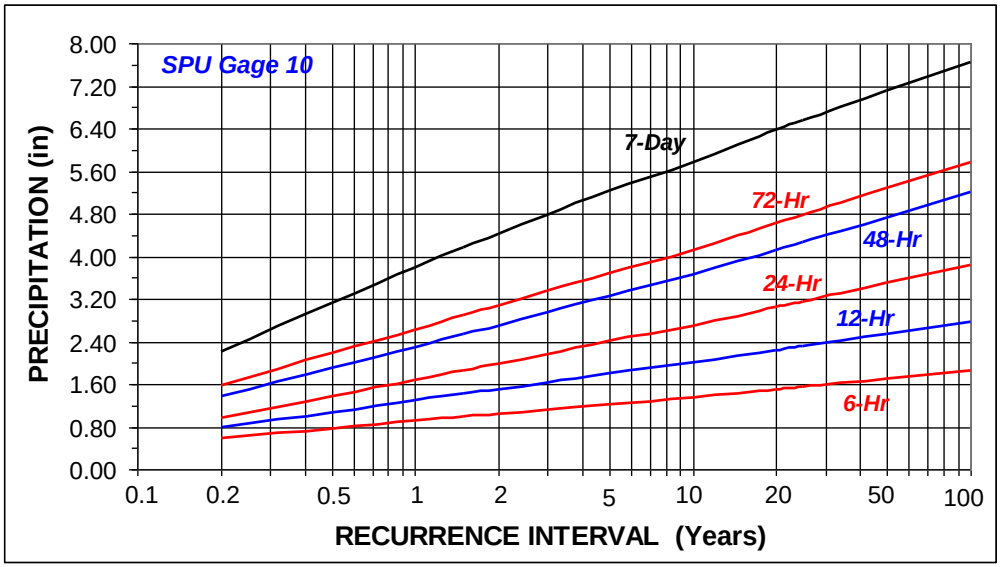


**Figure 11. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 10.**

**Table 14. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 11.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.78 | 0.92 | 1.07 | 1.27 | 1.42 | | 1.64 | 1.80 | 1.98 | 2.39 |
| 12 | | 1.10 | 1.32 | 1.55 | 1.86 | 2.08 | | 2.42 | 2.67 | 2.93 | 3.55 |
| 24 | | 1.46 | 1.77 | 2.10 | 2.55 | 2.87 | | 3.36 | 3.73 | 4.12 | 5.04 |
| 48 | | 1.76 | 2.16 | 2.57 | 3.14 | 3.55 | | 4.16 | 4.64 | 5.12 | 6.29 |
| 72 | | 2.16 | 2.63 | 3.11 | 3.75 | 4.21 | | 4.88 | 5.39 | 5.90 | 7.09 |
| 168 | | 3.09 | 3.76 | 4.42 | 5.27 | 5.86 | | 6.70 | 7.30 | 7.88 | 9.18 |

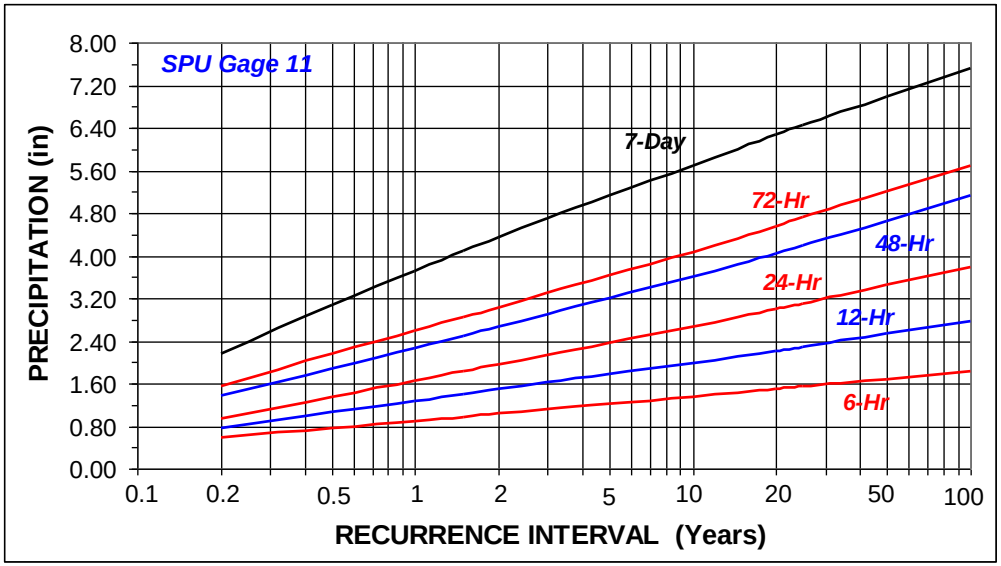


**Figure 12. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 11.**

**Table 15. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 12.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.78 | 0.92 | 1.07 | 1.27 | 1.41 | | 1.63 | 1.80 | 1.97 | 2.38 |
| 12 | | 1.09 | 1.31 | 1.54 | 1.85 | 2.07 | | 2.41 | 2.66 | 2.92 | 3.53 |
| 24 | | 1.45 | 1.76 | 2.09 | 2.53 | 2.86 | | 3.34 | 3.72 | 4.10 | 5.01 |
| 48 | | 1.75 | 2.15 | 2.56 | 3.12 | 3.53 | | 4.14 | 4.61 | 5.09 | 6.25 |
| 72 | | 2.15 | 2.62 | 3.09 | 3.73 | 4.18 | | 4.85 | 5.36 | 5.86 | 7.05 |
| 168 | | 3.07 | 3.74 | 4.40 | 5.24 | 5.82 | | 6.65 | 7.25 | 7.83 | 9.12 |

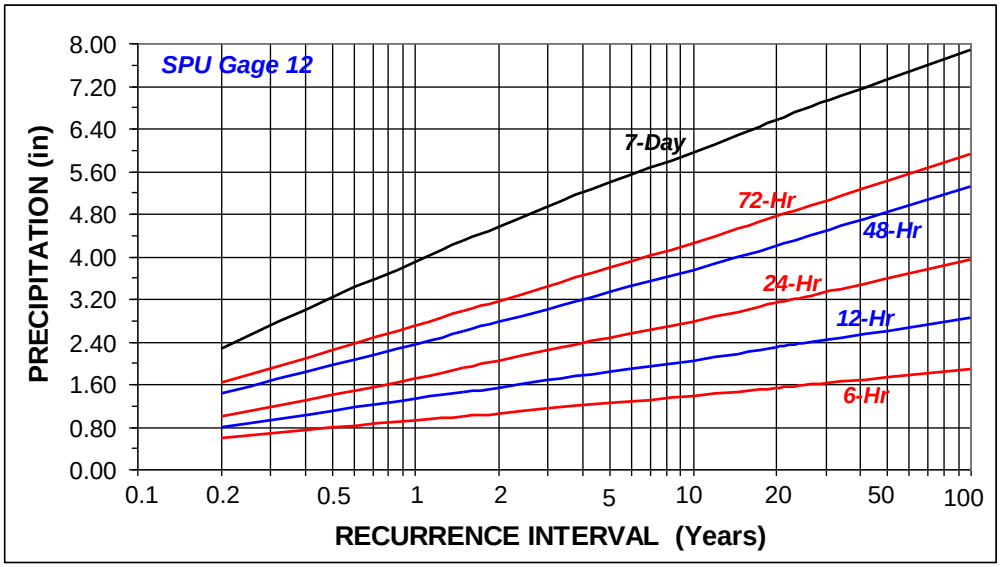


**Figure 13. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 12.**

**Table 16. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 14.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.79 | 0.93 | 1.09 | 1.29 | 1.44 | | 1.66 | 1.83 | 2.01 | 2.43 |
| 12 | | 1.12 | 1.34 | 1.58 | 1.89 | 2.12 | | 2.46 | 2.72 | 2.99 | 3.61 |
| 24 | | 1.49 | 1.81 | 2.14 | 2.60 | 2.93 | | 3.43 | 3.81 | 4.20 | 5.14 |
| 48 | | 1.80 | 2.21 | 2.63 | 3.21 | 3.62 | | 4.26 | 4.74 | 5.23 | 6.43 |
| 72 | | 2.21 | 2.69 | 3.18 | 3.84 | 4.30 | | 4.99 | 5.51 | 6.03 | 7.25 |
| 168 | | 3.17 | 3.85 | 4.53 | 5.40 | 6.00 | | 6.86 | 7.48 | 8.08 | 9.41 |

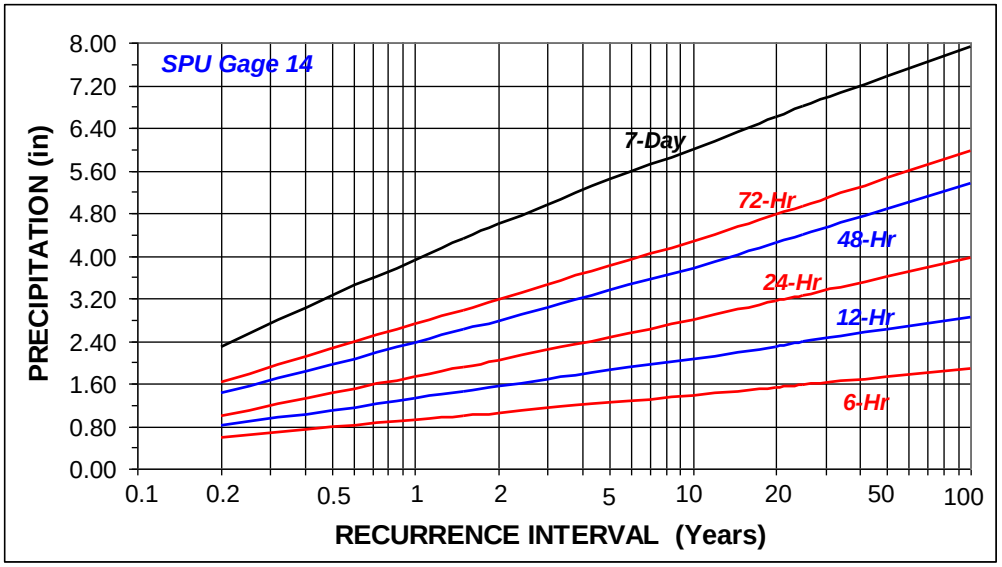


**Figure 14. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 14.**

**Table 17. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 15.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.78 | 0.92 | 1.07 | 1.28 | 1.42 | | 1.64 | 1.81 | 1.98 | 2.40 |
| 12 | | 1.10 | 1.32 | 1.56 | 1.87 | 2.09 | | 2.43 | 2.69 | 2.95 | 3.56 |
| 24 | | 1.46 | 1.78 | 2.11 | 2.56 | 2.88 | | 3.38 | 3.75 | 4.14 | 5.06 |
| 48 | | 1.77 | 2.17 | 2.59 | 3.15 | 3.57 | | 4.19 | 4.66 | 5.15 | 6.32 |
| 72 | | 2.18 | 2.65 | 3.13 | 3.77 | 4.23 | | 4.91 | 5.42 | 5.93 | 7.13 |
| 168 | | 3.11 | 3.78 | 4.45 | 5.30 | 5.90 | | 6.74 | 7.34 | 7.93 | 9.24 |

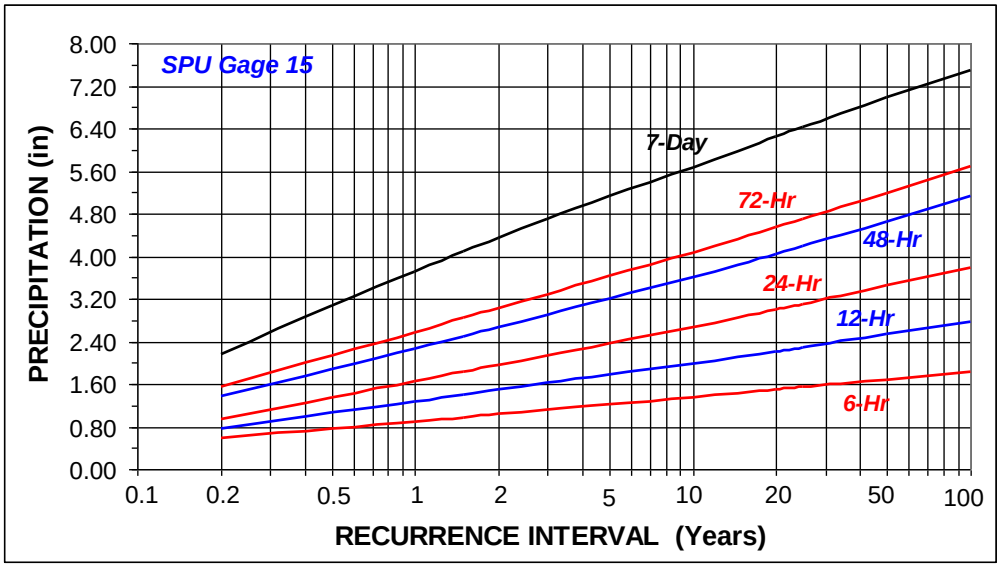


**Figure 15. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 15.**

**Table 18. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 16.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.79 | 0.93 | 1.08 | 1.29 | 1.43 | | 1.65 | 1.82 | 2.00 | 2.42 |
| 12 | | 1.11 | 1.34 | 1.57 | 1.88 | 2.11 | | 2.45 | 2.71 | 2.97 | 3.60 |
| 24 | | 1.48 | 1.80 | 2.13 | 2.59 | 2.91 | | 3.41 | 3.79 | 4.18 | 5.12 |
| 48 | | 1.79 | 2.20 | 2.62 | 3.19 | 3.60 | | 4.23 | 4.72 | 5.21 | 6.39 |
| 72 | | 2.20 | 2.68 | 3.17 | 3.82 | 4.28 | | 4.97 | 5.48 | 6.00 | 7.21 |
| 168 | | 3.15 | 3.83 | 4.51 | 5.37 | 5.97 | | 6.82 | 7.43 | 8.03 | 9.35 |

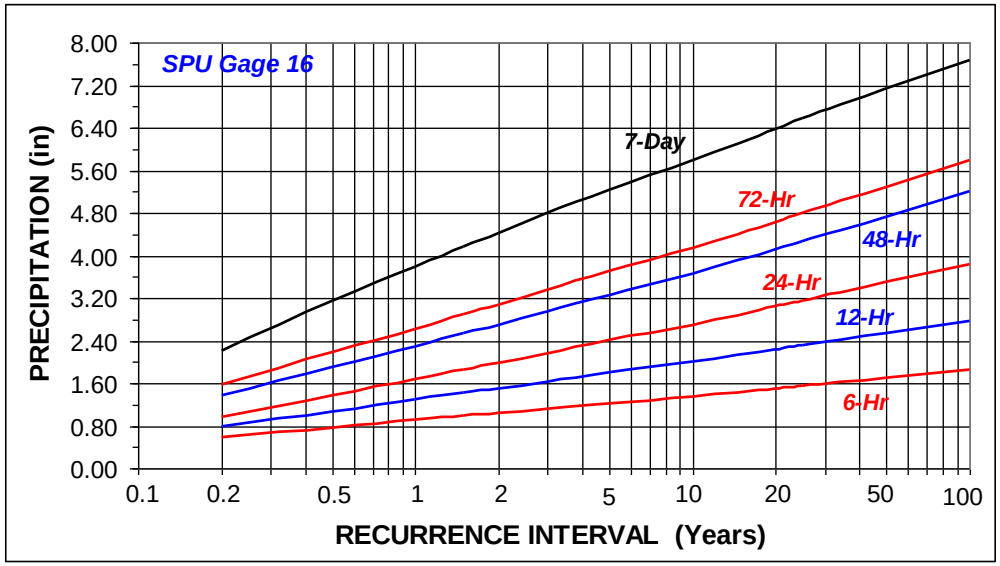


**Figure 16. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 16.**

**Table 19. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 17.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.81 | 0.96 | 1.12 | 1.33 | 1.48 | | 1.71 | 1.89 | 2.07 | 2.50 |
| 12 | | 1.16 | 1.39 | 1.63 | 1.96 | 2.20 | | 2.55 | 2.82 | 3.09 | 3.74 |
| 24 | | 1.54 | 1.87 | 2.22 | 2.69 | 3.04 | | 3.55 | 3.95 | 4.36 | 5.33 |
| 48 | | 1.88 | 2.30 | 2.75 | 3.35 | 3.78 | | 4.44 | 4.95 | 5.46 | 6.71 |
| 72 | | 2.31 | 2.81 | 3.33 | 4.01 | 4.50 | | 5.22 | 5.76 | 6.30 | 7.58 |
| 168 | | 3.32 | 4.04 | 4.75 | 5.66 | 6.29 | | 7.19 | 7.84 | 8.46 | 9.86 |

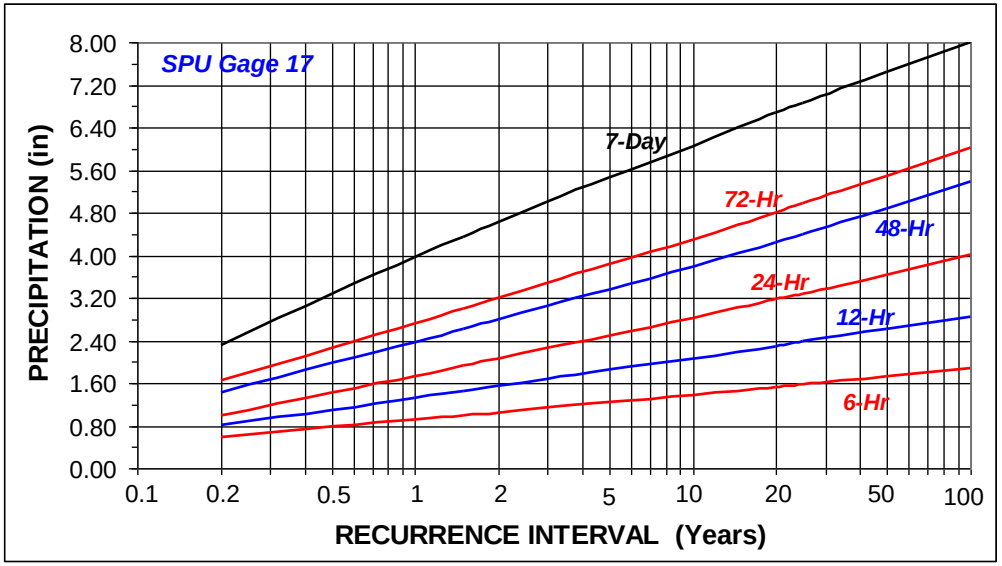


**Figure 17. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 17.**

**Table 20. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 18.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.79 | 0.93 | 1.08 | 1.28 | 1.43 | | 1.65 | 1.82 | 1.99 | 2.41 |
| 12 | | 1.11 | 1.33 | 1.56 | 1.87 | 2.10 | | 2.44 | 2.70 | 2.96 | 3.58 |
| 24 | | 1.47 | 1.79 | 2.12 | 2.57 | 2.90 | | 3.39 | 3.77 | 4.16 | 5.09 |
| 48 | | 1.78 | 2.18 | 2.60 | 3.17 | 3.59 | | 4.21 | 4.69 | 5.18 | 6.36 |
| 72 | | 2.19 | 2.66 | 3.15 | 3.79 | 4.26 | | 4.94 | 5.45 | 5.96 | 7.17 |
| 168 | | 3.13 | 3.81 | 4.48 | 5.34 | 5.93 | | 6.78 | 7.39 | 7.98 | 9.29 |

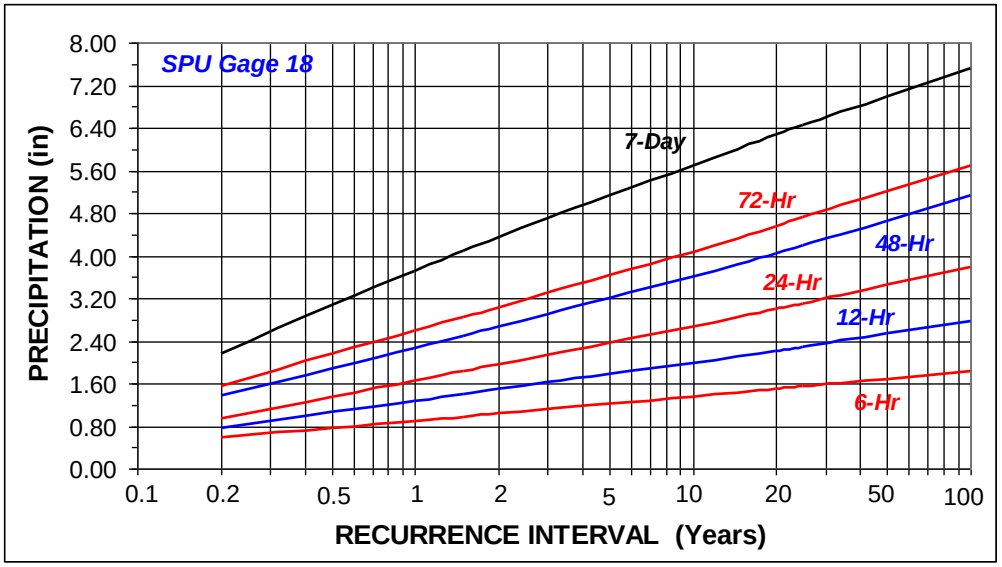


**Figure 18. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 18.**

**Table 21. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 25.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.79 | 0.93 | 1.08 | 1.28 | 1.43 | | 1.65 | 1.82 | 1.99 | 2.41 |
| 12 | | 1.11 | 1.33 | 1.56 | 1.87 | 2.10 | | 2.44 | 2.70 | 2.96 | 3.58 |
| 24 | | 1.47 | 1.79 | 2.12 | 2.57 | 2.90 | | 3.39 | 3.77 | 4.16 | 5.09 |
| 48 | | 1.78 | 2.18 | 2.60 | 3.17 | 3.59 | | 4.21 | 4.69 | 5.18 | 6.36 |
| 72 | | 2.19 | 2.66 | 3.15 | 3.79 | 4.26 | | 4.94 | 5.45 | 5.96 | 7.17 |
| 168 | | 3.13 | 3.81 | 4.48 | 5.34 | 5.93 | | 6.78 | 7.39 | 7.98 | 9.29 |

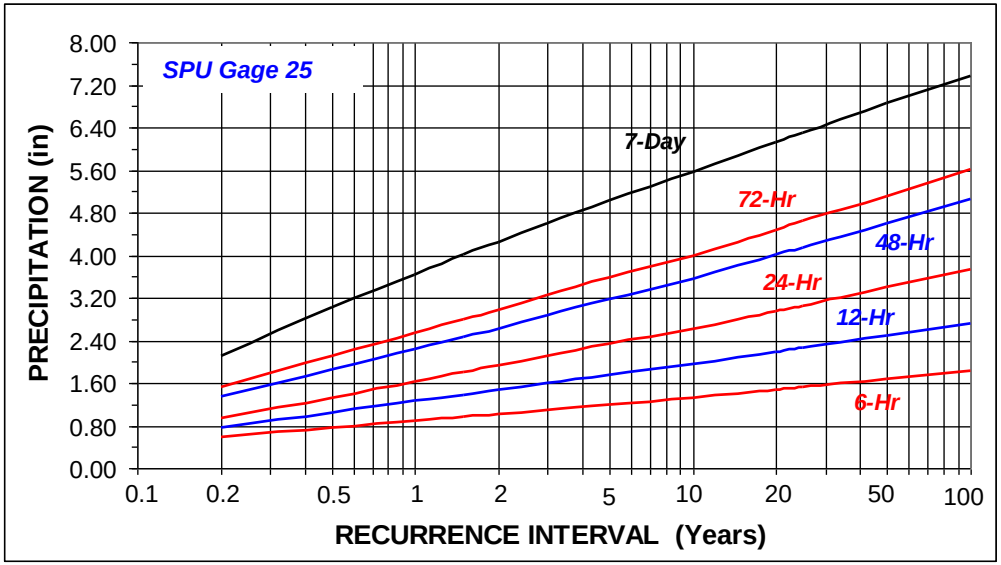


**Figure 19. Precipitation-Magnitude-Frequency Estimates for SPU Gauge 25.**

**Table 22. Precipitation-Magnitude-Frequency Estimates for SeaTac.**

| Duration (hr) | Precipitation (in) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recurrence Interval (years) | | | | | | | | | | |
| | | 0.5-Yr | 1-Yr | 2-Yr | 5-Yr | 10-Yr | | 25-Yr | 50-Yr | 100-Yr | 500-yr |
| 6 | | 0.82 | 0.97 | 1.13 | 1.34 | 1.50 | | 1.73 | 1.91 | 2.09 | 2.52 |
| 12 | | 1.17 | 1.41 | 1.65 | 1.98 | 2.22 | | 2.58 | 2.85 | 3.13 | 3.79 |
| 24 | | 1.56 | 1.90 | 2.25 | 2.73 | 3.08 | | 3.60 | 4.01 | 4.42 | 5.41 |
| 48 | | 1.91 | 2.34 | 2.78 | 3.39 | 3.84 | | 4.50 | 5.02 | 5.54 | 6.80 |
| 72 | | 2.35 | 2.86 | 3.38 | 4.07 | 4.57 | | 5.30 | 5.85 | 6.40 | 7.70 |
| 168 | | 3.37 | 4.10 | 4.83 | 5.76 | 6.40 | | 7.31 | 7.97 | 8.61 | 10.02 |

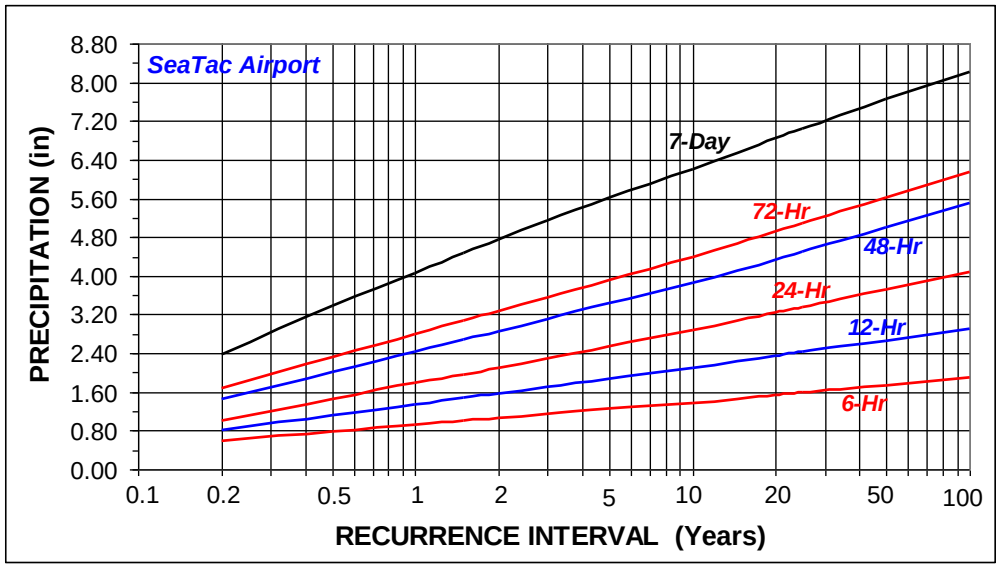


**Figure 20. Precipitation-Magnitude-Frequency Estimates for SeaTac.**