# Appendix D

## Selected Rain Gauge Index

This appendix contains hydrologic data needed for BMP design in accordance with volume-based and flow-based BMP design criteria included in many MS4 permits. For information on volume-based and flow-based BMP design criteria, refer to Section 5.5 of this handbook.

This appendix contains the following information.

## Rain Gauge Index Map

The rain gauge index map provides a visual index for selecting a rain gage closest to the site where volume-based or flow-based BMP design criteria will be applied. The index map is for quick reference only: selection of a specific gauge for use in design should be based on the rain gauge data table which provides additional information about each rain gauge, such as latitude, longitude, elevation, and rainfall statistics, which should be considered when identifying a gauge most representative of the project site.

## Rain Gauge Data Table

The rain gauge data table provides important information about the rain gauges included in this appendix. Rain gauges analyzed and included in this appendix represent a wide range of municipal stormwater permit areas, climatic areas, geography, and topography across California. Using the station location, latitude, longitude, elevation, and rainfall statistics, it should be possible to identify a gauge that is sufficiently representative of most sites in California, as there is generally less variation among sites across the State when the comparisons are made based on the frequent, small storms used for BMP design as opposed to the infrequent, large storms used for flood control design.

The rain gauge data table also tabulates estimates of mean storm depths ($P_6$). $P_6$ is used for volume design using the Urban Runoff Quality Management approach discussed in Section 5.5.1 of this handbook. The values in the table were extrapolated and approximated from the map included in the document, Urban Runoff Quality Management (WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998), pages 176). Urban Runoff Quality Management references the document, *Analysis of Storm Events, Characteristics for Selected Rain Gauges Throughout the United States* (Driscoll, E.D., et al., 1989, U.S. EPA) for the source information. A future addition to this handbook may be an analysis of the data set for the tabulated gauges to determine site-specific values of $P_6$ for inclusion in this handbook.

## Analysis of Rain Gauge Data

The rain gauge data for the stations identified in the range gauge table were analyzed to determine the basin volumes required to capture various percentages of annual runoff, and to determine various percentiles of hourly rainfall intensities. The basin-volume analysis is part of the California Stormwater BMP Handbook approach for volumetric-based design of BMPs (See

Section 5.5.1). The hourly rainfall intensities analysis is part of the California Stormwater BMP Handbook approach for flow-based design of BMPs (See Section 5.5.2)

## California Stormwater BMP Handbook Approach – Volume-Based Design

For each rain gauge, two charts (48-hour and 24-hour draw down times) contain four curves (Runoff Coefficient 0.25, 0.50, 0.75, and 1.00) each that show the Unit Basin Storage Volume required for various levels Capture of average annual runoff.

The charts are developed using a continuous simulation model, the STORM model, developed by the Hydrologic Engineering Center of the U.S. Army Corps of Engineers (COE-HEC, 1977). The version used for this study utilized the NetSTORM user interface. The Storage, Treatment, Overflow, Runoff Model (STORM) was applied to long-term hourly rainfall data at each site. STORM translates rainfall into runoff, then routes the runoff through detention storage. Key model assumptions are:

- Drainage Area = 100 acres
- Depression Storage = 0.06 inches
- Evaporation Rate = 0.15 inches/day
- Inter-event Time = 24 hours and 48 hours
- Time to Empty = 24 or 48 hrs
- Runoff Coefficients = 0.25, 0.50, 0.75, 1.00

The model results are presented on a unit basis, and are sufficient for use on most projects. Projects with drainage areas larger than 100 acres should be broken down into sub-areas and the method applied to each sub-area.

For more detail on the STORM model, use key words HEC and STORM on any major browser to locate numerous documents and publications related to the STORM model.

## California Stormwater BMP Handbook Approach – Flow-Based Design

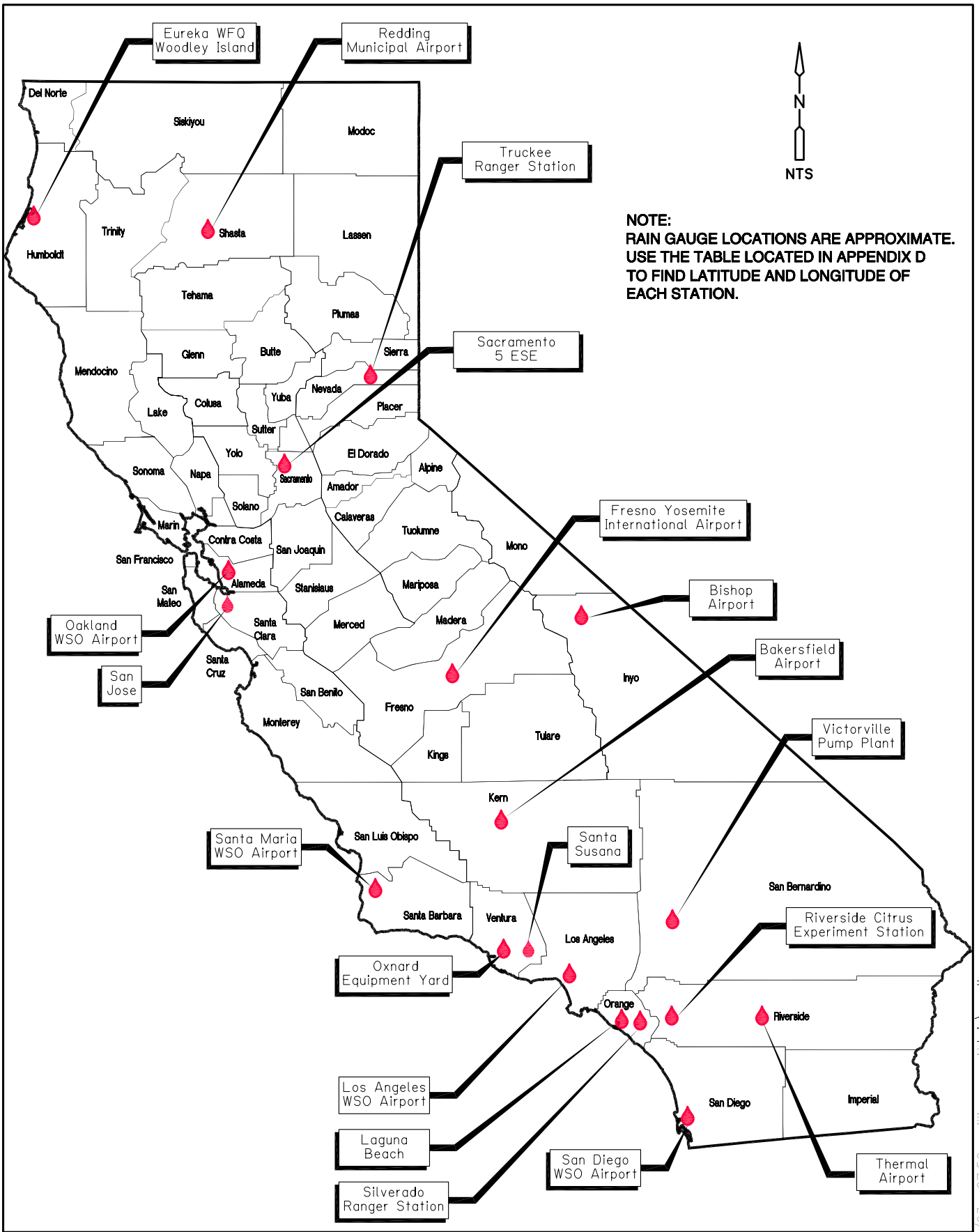
For each rain gauge, a cumulative hourly rainfall intensity chart is provided. The chart shows the percentile associated with each measured hourly rainfall intensity for the period of record. A key assumption is:

- Recorded values less than or equal to 0.01 inches per hour were not included in the analysis

A few gauges have incomplete data or data extrapolated by algorithm. No attempt was made to fill in completely missing data. Where accumulated data were available and extrapolated by algorithm, the extrapolated data were used. This situation occurs when a gauge that normally

reports hourly data is unable to report hourly data for a short period, but is able to report reliable accumulated data. A few gauges only reported rainfall in 0.1 inches per hour increments. These data were used directly without adjustment, and may result in a stair-step cumulative hourly rainfall intensity curve.

Given the number of years of record, the quality of data used overall is considered to be of sufficient quality for stormwater quality design.




CASQA California Stormwater Quality Association

California Stormwater BMP Handbook

## Selected Rain Gauge Index

Appendix D

**RAIN GAGE DATA TABLE**

| GENERAL INFORMATION | | | LOCATION INFORMATION | | | |
|---|---|---|---|---|---|---|
| STATION NAME | NAME USED IN HANDBOOK | STATION ID | COUNTY | LAT | LONG | ELEV FT MSL |
| EUREKA WFO WOODLEY IS | EUREKA WFO WOODLEY ISLAND | 2910 | HUMBOLDT | 40:48:00 | 124:09:00 | 20 |
| REDDING MUNICIPAL AP | REDDING MUNICIPAL AIRPORT | 7304 | SHASTA | 40:30:00 | 122:17:00 | 497 |
| OAKLAND WSO AP | OAKLAND WSO AIRPORT | 6335 | ALAMEDA | 37:44:00 | 122:12:00 | 6 |
| SAN JOSE | SAN JOSE | 7821 | SANTA CLARA | 37:21:00 | 121:54:00 | 67 |
| SACRAMENTO 5 ESE | SACRAMENTO 5 ESE | 7633 | SACRAMENTO | 38:33:00 | 121:25:00 | 38 |
| TRUCKEE RS | TRUCKEE RANGER STATION | 9043 | NEVADA | 39:19:00 | 120:11:00 | 6,020 |
| FRESNO YOSEMITE INTL | FRESNO YOSEMITE INTERNATIONAL AIRPORT | 3257 | FRESNO | 36:46:00 | 119:43:00 | 333 |
| BAKERSFIELD AP | BAKERSFIELD AIRPORT | 442 | KERN | 35:26:00 | 119:03:00 | 489 |
| BISHOP AP | BISHOP AIRPORT | 822 | INYO | 37:22:00 | 118:21:00 | 4,102 |
| SANTA MARIA WSO ARPT | SANTA MARIA WSO AIRPORT | 7946 | SANTA BARBARA | 34:54:00 | 120:27:00 | 254 |
| LOS ANGELES WSO ARPT | LOS ANGELES WSO AIRPORT | 5114 | LOS ANGELES | 33:56:00 | 118:24:00 | 100 |
| LAGUNA BEACH 2 | LAGUNA BEACH | 4650 | ORANGE | 33:33:00 | 117:48:00 | 210 |
| SILVERADO RANGER STN | SILVERADO RANGER STATION | 8243 | ORANGE | 33:44:00 | 117:39:00 | 1,095 |
| RIVERSIDE CITRUS EXP ST | RIVERSIDE CITRUS EXPERIMENT STATION | 7473 | RIVERSIDE | 33:58:00 | 117:21:00 | 986 |
| VICTORVILLE PUMP PLANT | VICTORVILLE PUMP PLANT | 9325 | SAN BERNARDINO | 34:32:00 | 117:18:00 | 2,858 |
| SAN DIEGO WSO AIRPORT | SAN DIEGO WSO AIRPORT | 7740 | SAN DIEGO | 32:44:00 | 117:10:00 | 15 |
| THERMAL AIRPORT | THERMAL AIRPORT | 48892 | RIVERSIDE | 33:38:N | 116:10:W | -112 |
| OXNARD EQUIPMENT YARD | OXNARD EQUIPMENT YARD | 168 | VENTURA | 34:12.0 | 119:12.1 | 35 |
| SANTA SUSANA | SANTA SUSANA | 193 | VENTURA | | | |

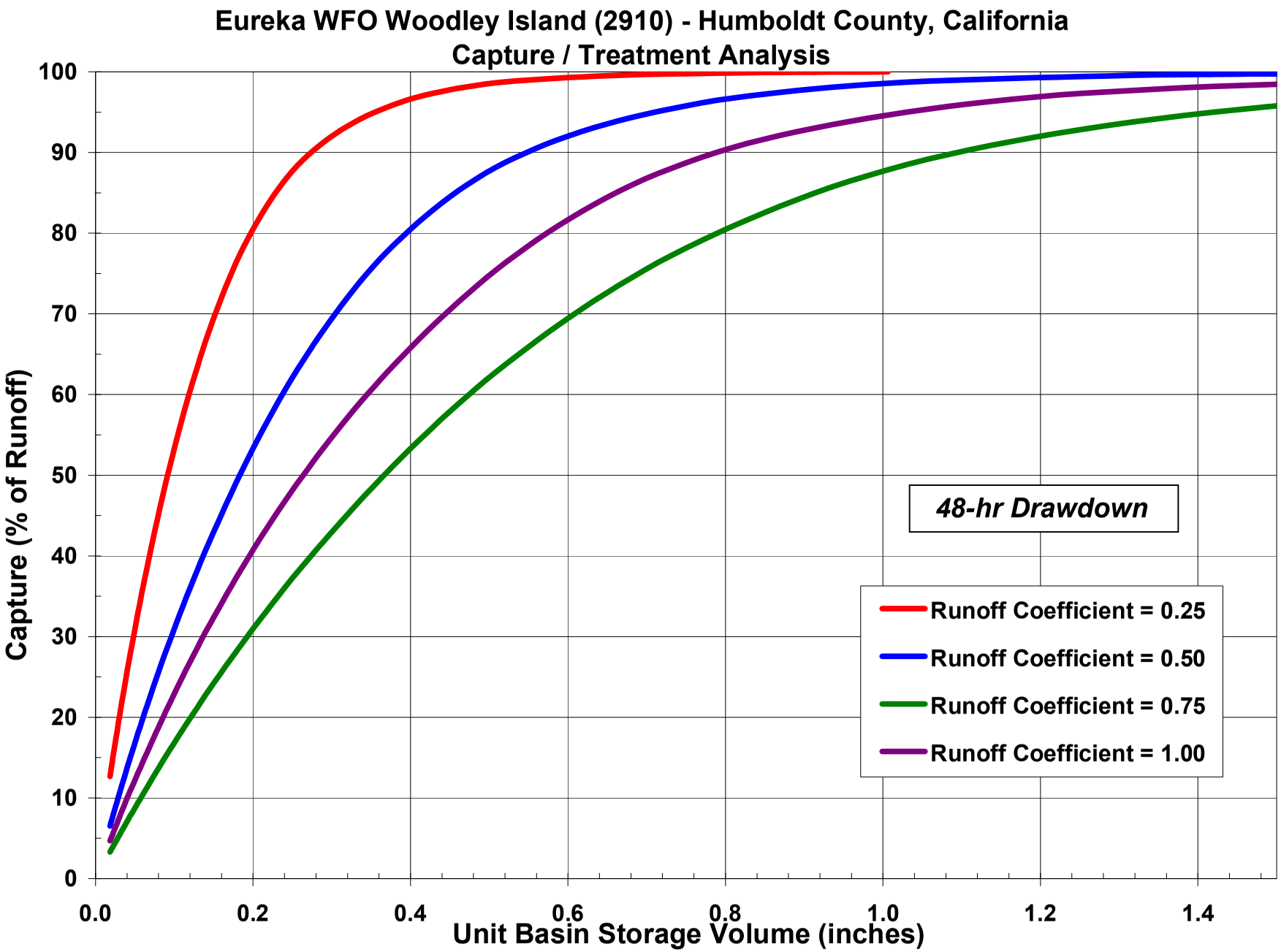
**RAIN GAGE DATA TABLE**

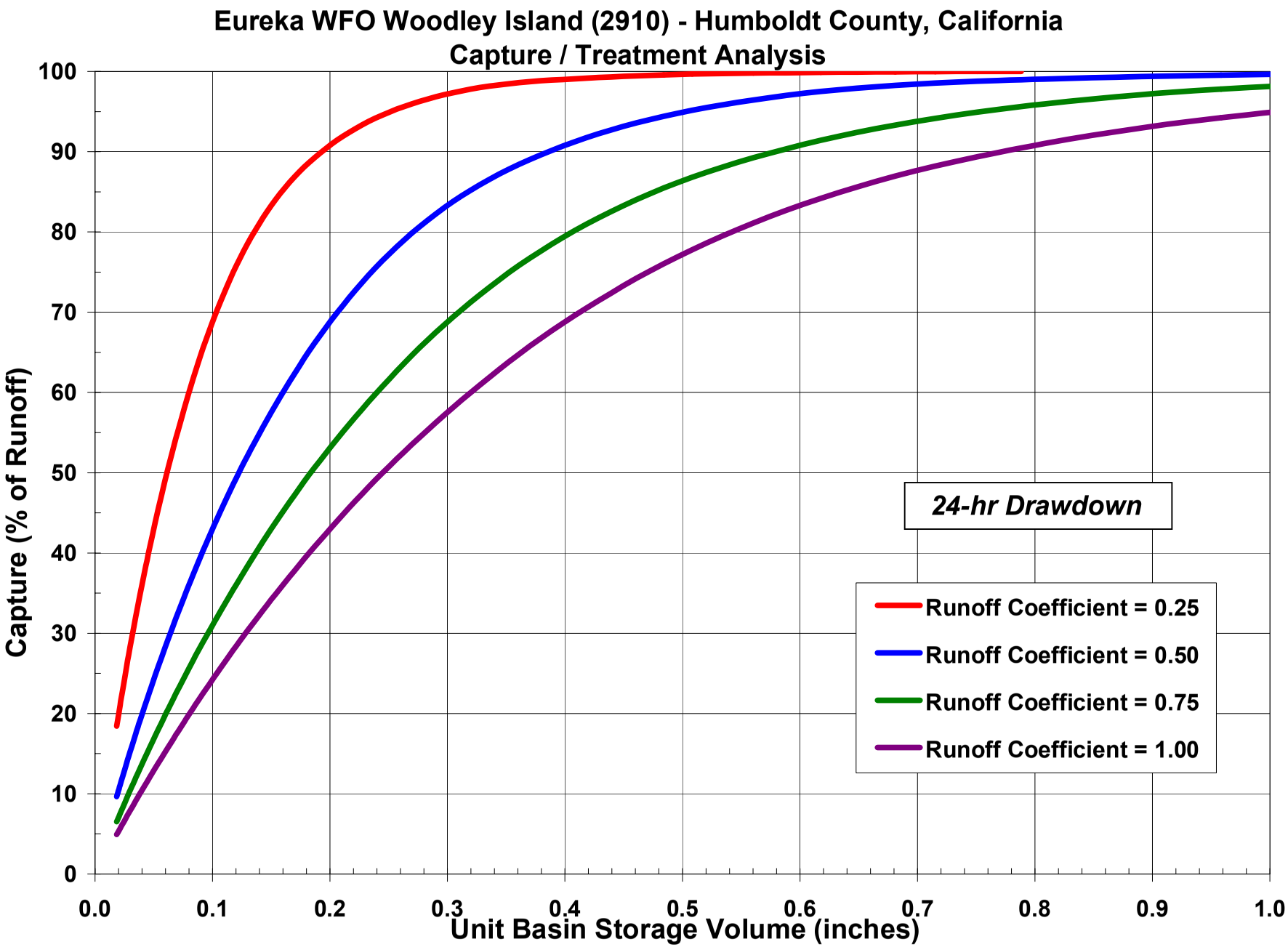
| GENERAL INFORMATION | | | RECORD INFORMATION | | | |
|---|---|---|---|---|---|---|
| STATION NAME | NAME USED IN HANDBOOK | STATION ID | PRECIP INCREMENT | START YEAR | END YEAR | # OF YEARS |
| EUREKA WFO WOODLEY IS | EUREKA WFO WOODLEY ISLAND | 2910 | 60Min Sum | 1948 | 2001 | 54 |
| REDDING MUNICIPAL AP | REDDING MUNICIPAL AIRPORT | 7304 | 60Min Sum | 1986 | 2001 | 16 |
| OAKLAND WSO AP | OAKLAND WSO AIRPORT | 6335 | 60Min Sum | 1948 | 1986 | 37 |
| SAN JOSE | SAN JOSE | 7821 | 60Min Sum | 1948 | 2001 | 54 |
| SACRAMENTO 5 ESE | SACRAMENTO 5 ESE | 7633 | 60Min Sum | 1936 | 2001 | 66 |
| TRUCKEE RS | TRUCKEE RANGER STATION | 9043 | 60Min Sum | 1948 | 2001 | 54 |
| FRESNO YOSEMITE INTL | FRESNO YOSEMITE INTERNATIONAL AIRPORT | 3257 | 60Min Sum | 1948 | 2001 | 54 |
| BAKERSFIELD AP | BAKERSFIELD AIRPORT | 442 | 60Min Sum | 1948 | 2001 | 54 |
| BISHOP AP | BISHOP AIRPORT | 822 | 60Min Sum | 1948 | 2001 | 49 |
| SANTA MARIA WSO ARPT | SANTA MARIA WSO AIRPORT | 7946 | 60Min Sum | 1948 | 2001 | 54 |
| LOS ANGELES WSO ARPT | LOS ANGELES WSO AIRPORT | 5114 | 60Min Sum | 1948 | 2001 | 54 |
| LAGUNA BEACH 2 | LAGUNA BEACH | 4650 | 60Min Sum | 1948 | 2001 | 54 |
| SILVERADO RANGER STN | SILVERADO RANGER STATION | 8243 | 60Min Sum | 1948 | 2001 | 53 |
| RIVERSIDE CITRUS EXP ST | RIVERSIDE CITRUS EXPERIMENT STATION | 7473 | 60Min Sum | 1948 | 2001 | 54 |
| VICTORVILLE PUMP PLANT | VICTORVILLE PUMP PLANT | 9325 | 60Min Sum | 1948 | 2001 | 54 |
| SAN DIEGO WSO AIRPORT | SAN DIEGO WSO AIRPORT | 7740 | 60Min Sum | 1948 | 2001 | 54 |
| THERMAL AIRPORT | THERMAL AIRPORT | 48892 | | 1950 | 2002 | |
| OXNARD EQUIPMENT YARD | OXNARD EQUIPMENT YARD | 168 | | 1956 | 1996 | 40 |
| SANTA SUSANA | SANTA SUSANA | 193 | | 1956 | 1998 | 42 |

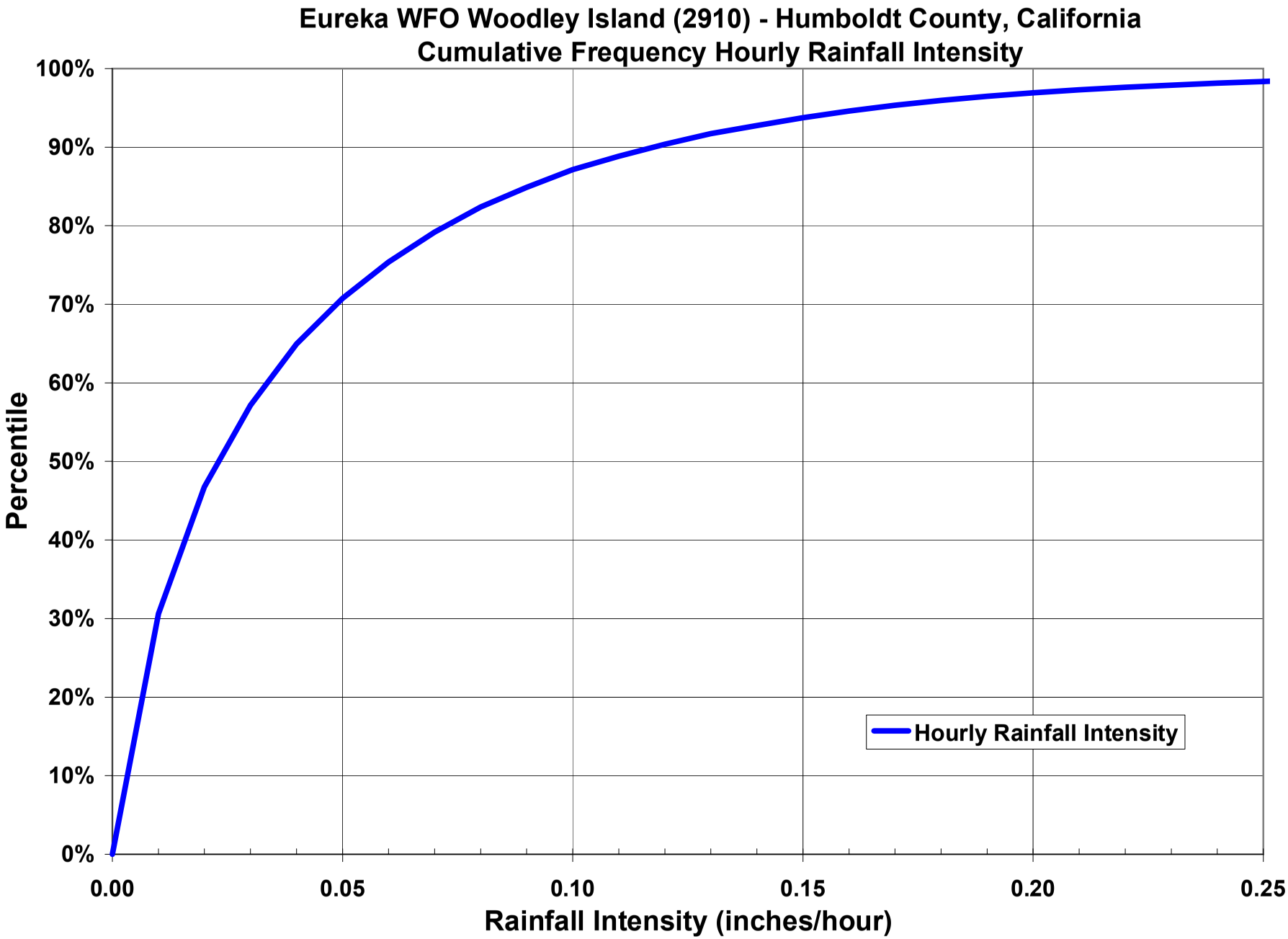
**RAIN GAGE DATA TABLE**

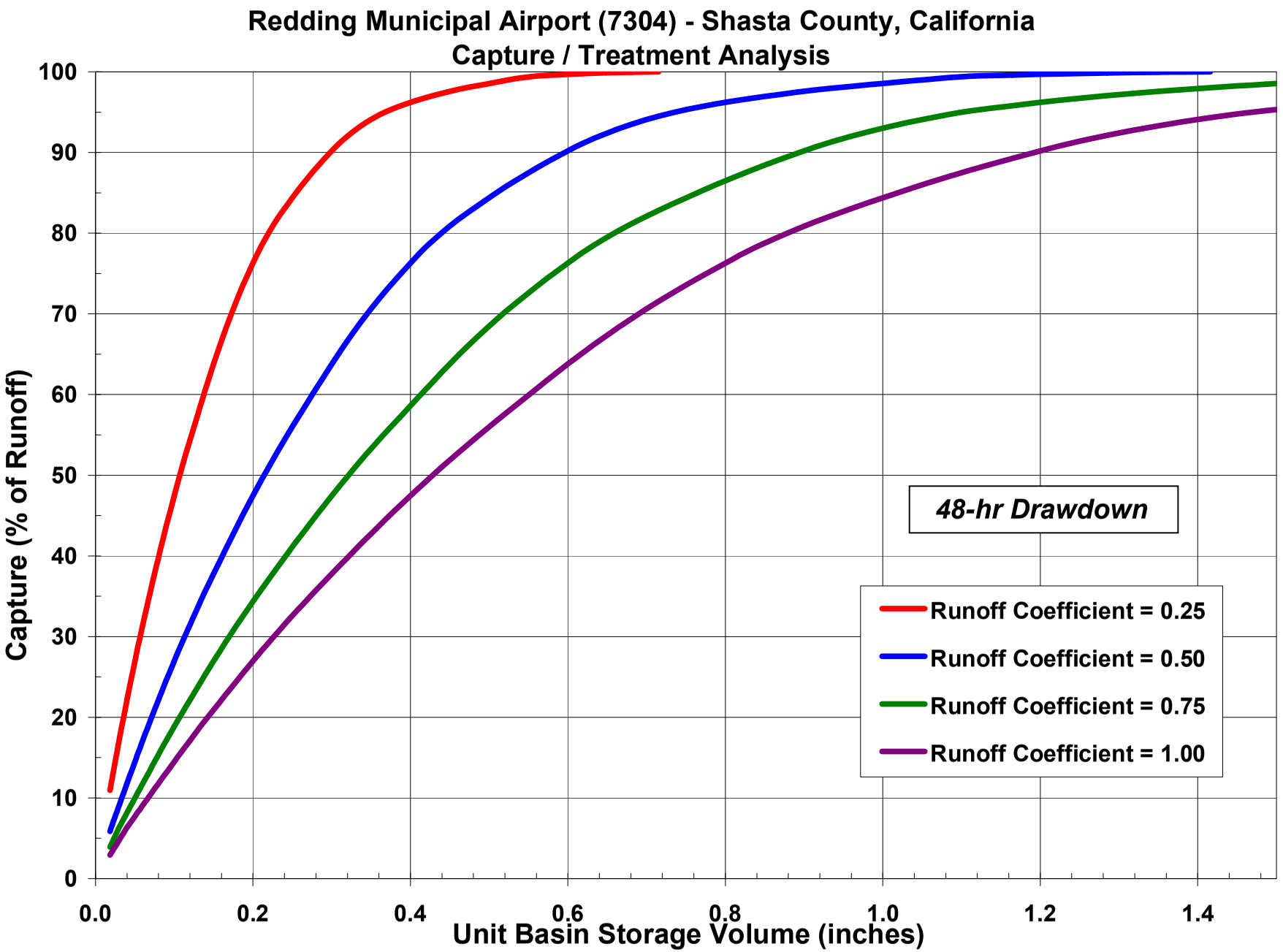
| GENERAL INFORMATION | | | RAINFALL STATISTICS | | | |
|---|---|---|---|---|---|---|
| STATION NAME | NAME USED IN HANDBOOK | STATION ID | AVG IN. | MAX IN. | MIN IN. | P6 IN |
| EUREKA WFO WOODLEY IS | EUREKA WFO WOODLEY ISLAND | 2910 | 38.34 | 67.21 | 21.71 | 0.65 |
| REDDING MUNICIPAL AP | REDDING MUNICIPAL AIRPORT | 7304 | | | | 0.55 |
| OAKLAND WSO AP | OAKLAND WSO AIRPORT | 6335 | 18.35 | 29.37 | 8.64 | 0.55 |
| SAN JOSE | SAN JOSE | 7821 | 14.4 | 31.49 | 6.12 | 0.60 |
| SACRAMENTO 5 ESE | SACRAMENTO 5 ESE | 7633 | 19.1 | 34.71 | 6.6 | 0.55 |
| TRUCKEE RS | TRUCKEE RANGER STATION | 9043 | 23.67 | 55.2 | 11.82 | 0.45 |
| FRESNO YOSEMITE INTL | FRESNO YOSEMITE INTERNATIONAL AIRPORT | 3257 | 10.94 | 21.61 | 5.96 | 0.50 |
| BAKERSFIELD AP | BAKERSFIELD AIRPORT | 442 | 5.94 | 12.72 | 1.87 | 0.55 |
| BISHOP AP | BISHOP AIRPORT | 822 | 5.48 | 17.09 | 1.82 | 0.38 |
| SANTA MARIA WSO ARPT | SANTA MARIA WSO AIRPORT | 7946 | 12.9 | 27 | 3.3 | 0.65 |
| LOS ANGELES WSO ARPT | LOS ANGELES WSO AIRPORT | 5114 | 12.19 | 29.46 | 4.19 | 0.60 |
| LAGUNA BEACH 2 | LAGUNA BEACH | 4650 | 10.75 | 26 | 2.3 | 0.58 |
| SILVERADO RANGER STN | SILVERADO RANGER STATION | 8243 | 14.85 | 35.1 | 2.39 | 0.55 |
| RIVERSIDE CITRUS EXP ST | RIVERSIDE CITRUS EXPERIMENT STATION | 7473 | 8.93 | 22.99 | 1.52 | 0.50 |
| VICTORVILLE PUMP PLANT | VICTORVILLE PUMP PLANT | 9325 | 4.23 | 12.9 | 0.69 | 0.47 |
| SAN DIEGO WSO AIRPORT | SAN DIEGO WSO AIRPORT | 7740 | 9.83 | 19.41 | 3.41 | 0.57 |
| THERMAL AIRPORT | THERMAL AIRPORT | 48892 | | | | 0.47 |
| OXNARD EQUIPMENT YARD | OXNARD EQUIPMENT YARD | 168 | | | | 0.65 |
| SANTA SUSANA | SANTA SUSANA | 193 | | | | 0.55 |

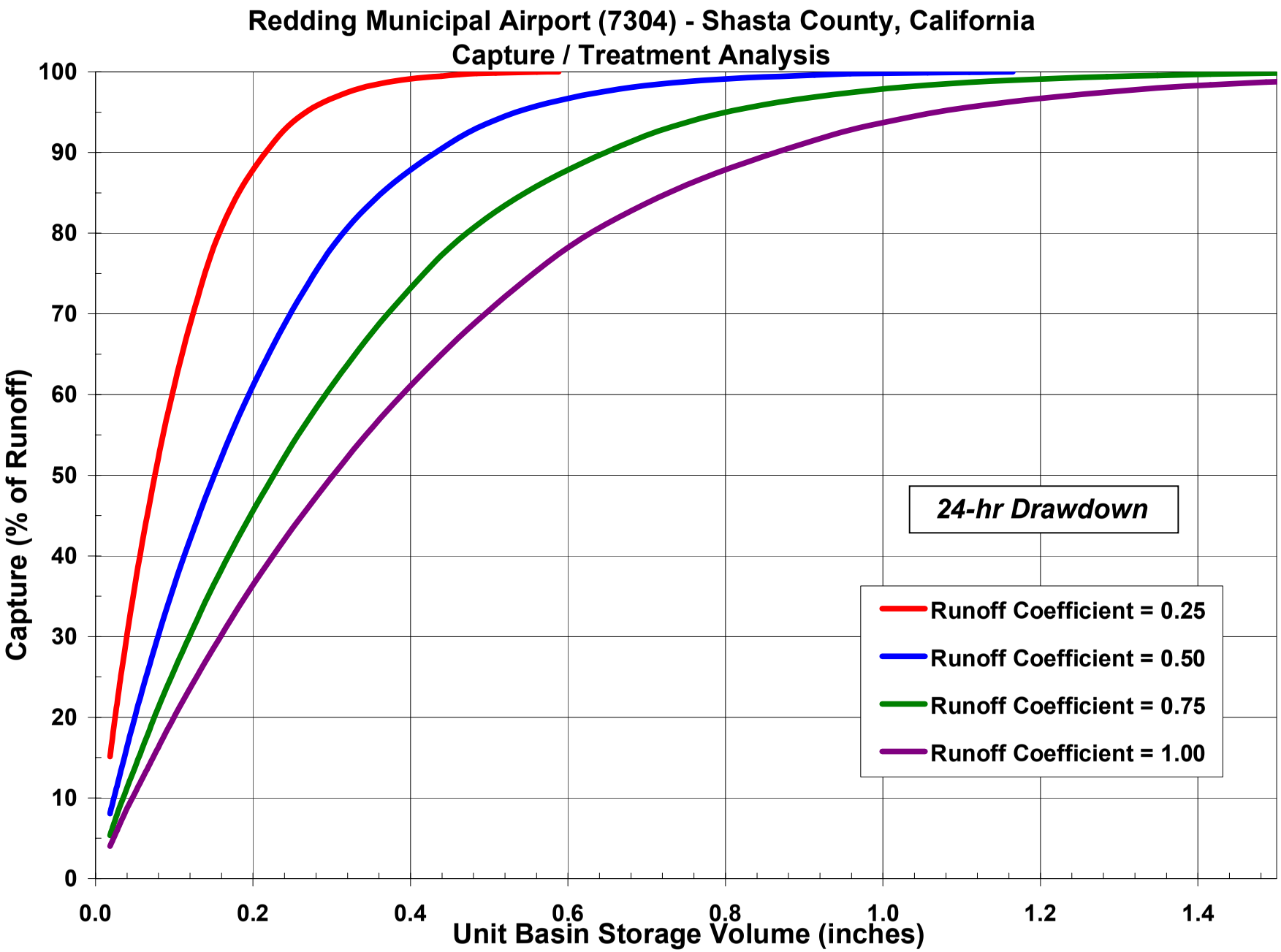
P6 is mean storm depth. Refer to Urban Runoff Quality Management (WEF/ASCE, 1998, Page 176)

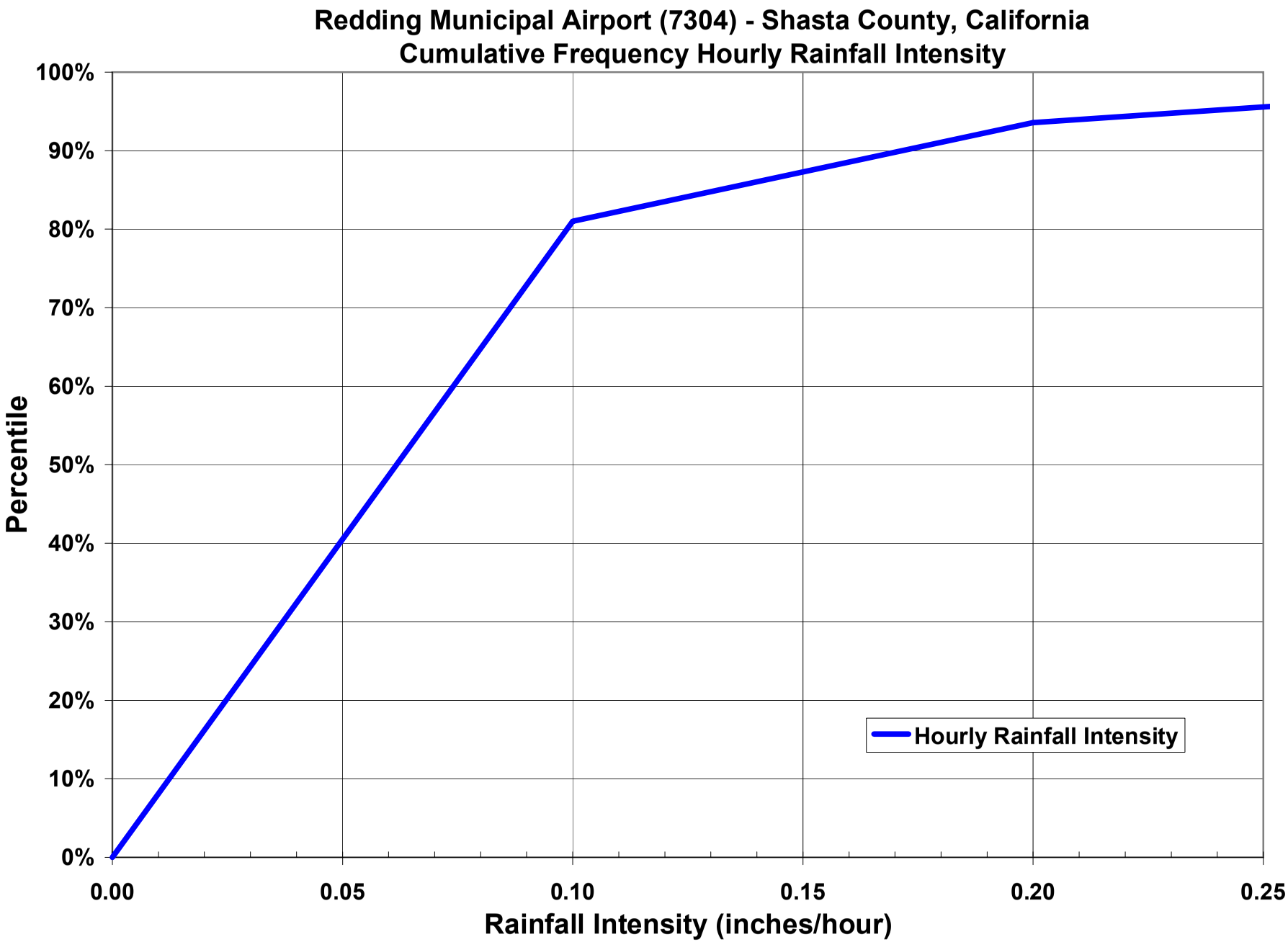

Eureka WFO Woodley Island (2910) - Humboldt County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

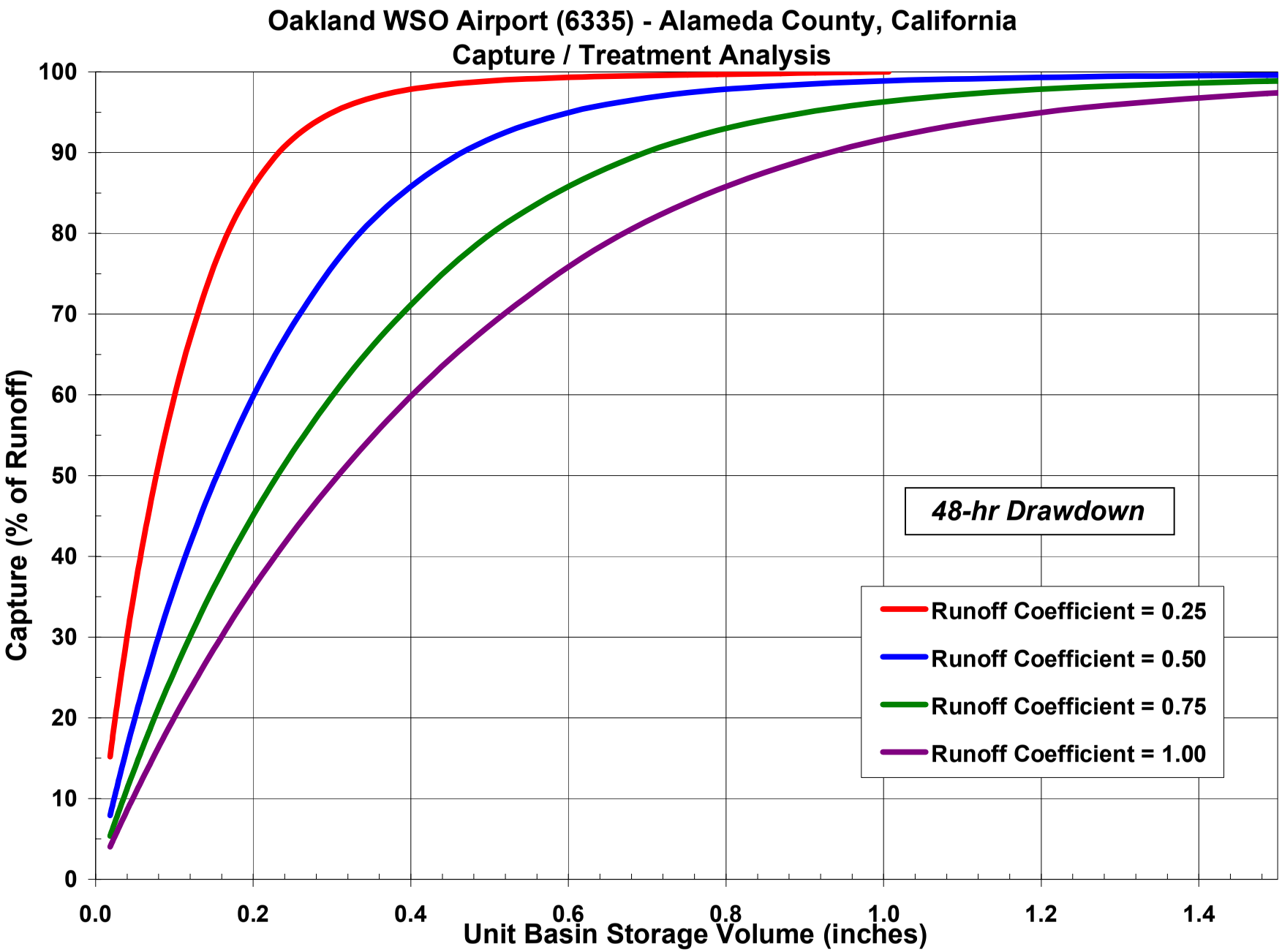

Eureka WFO Woodley Island (2910) - Humboldt County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

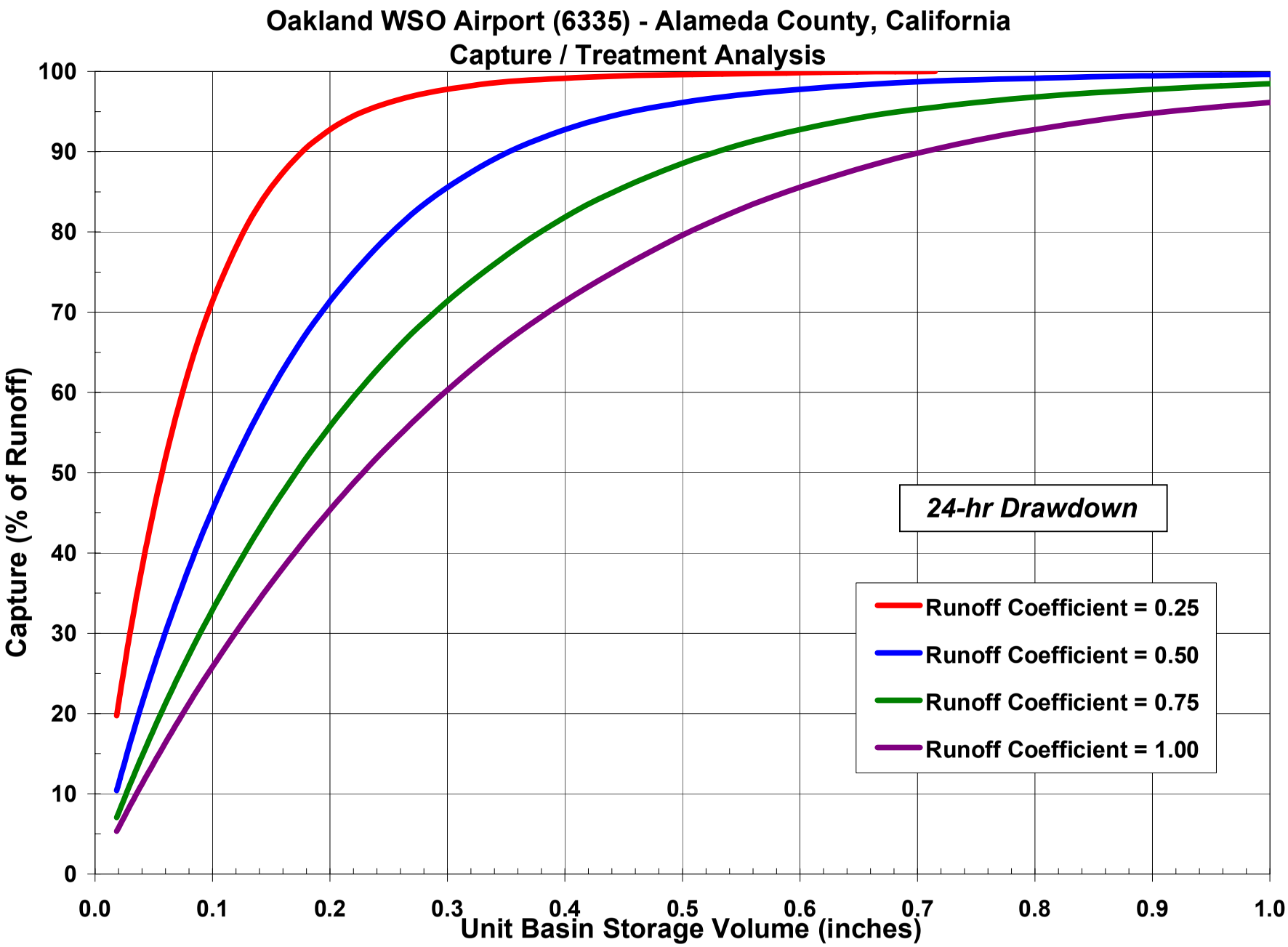

Eureka WFO Woodley Island (2910) - Humboldt County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

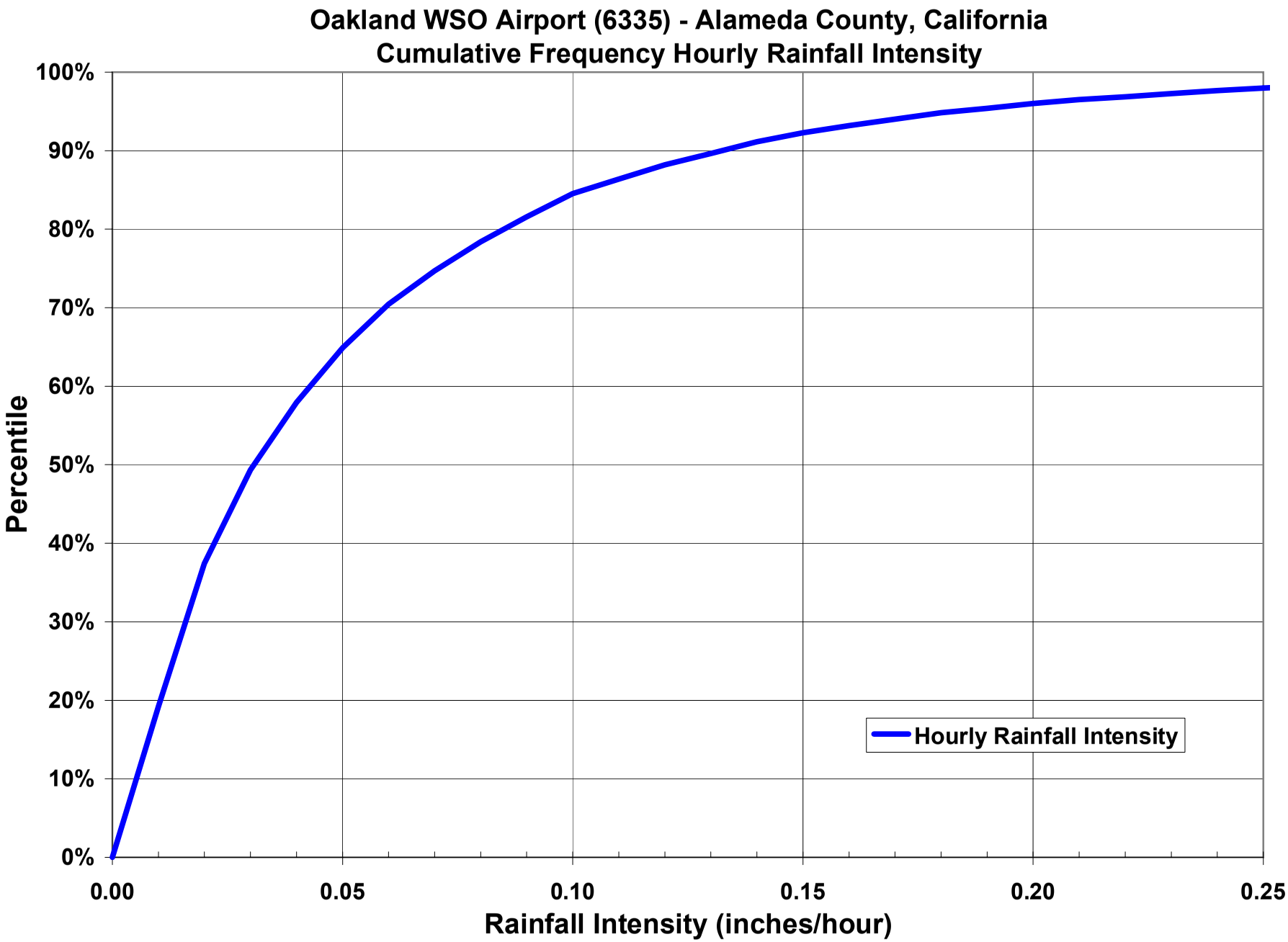

Redding Municipal Airport (7304) - Shasta County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

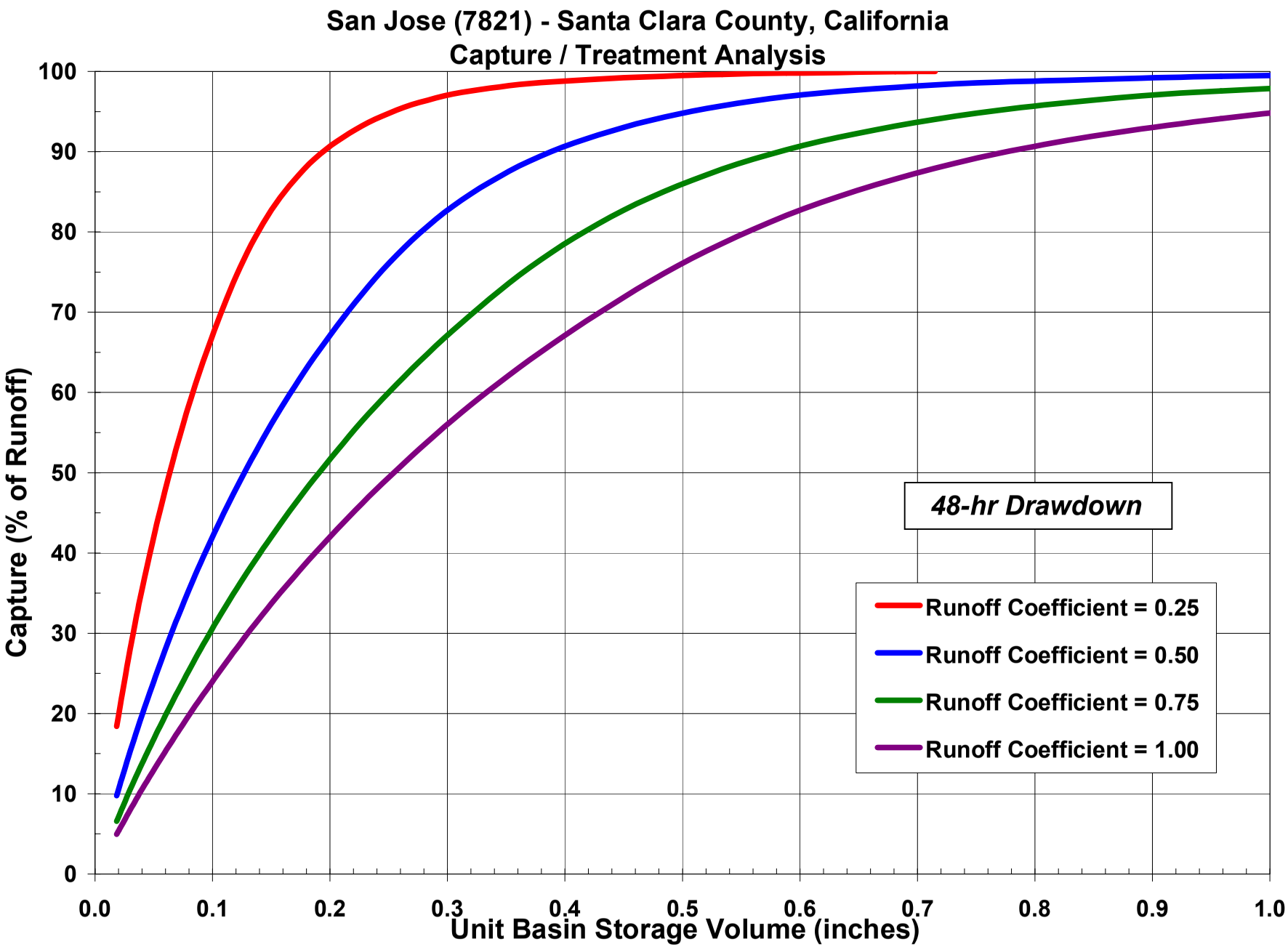

Redding Municipal Airport (7304) - Shasta County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

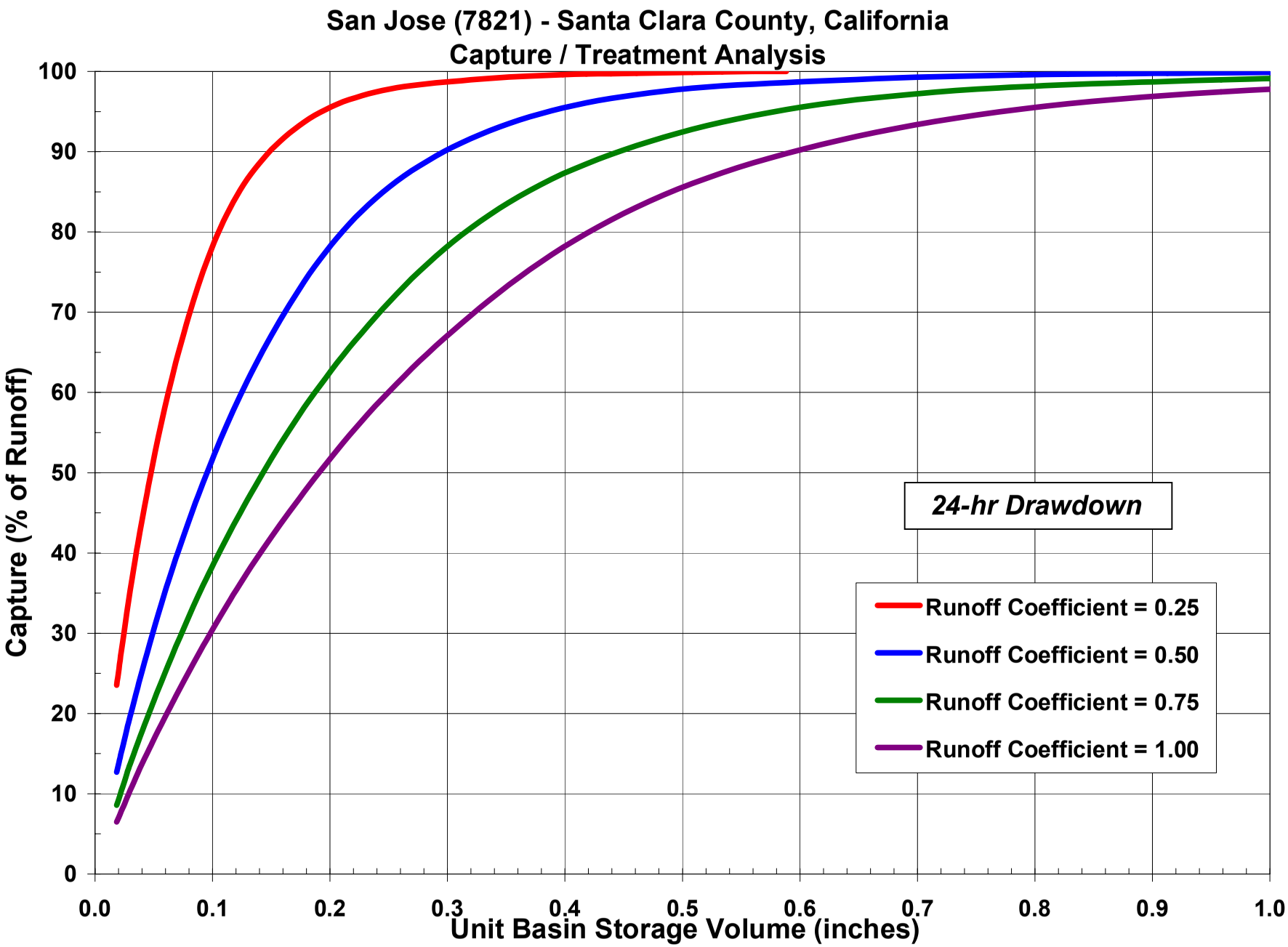

Redding Municipal Airport (7304) - Shasta County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

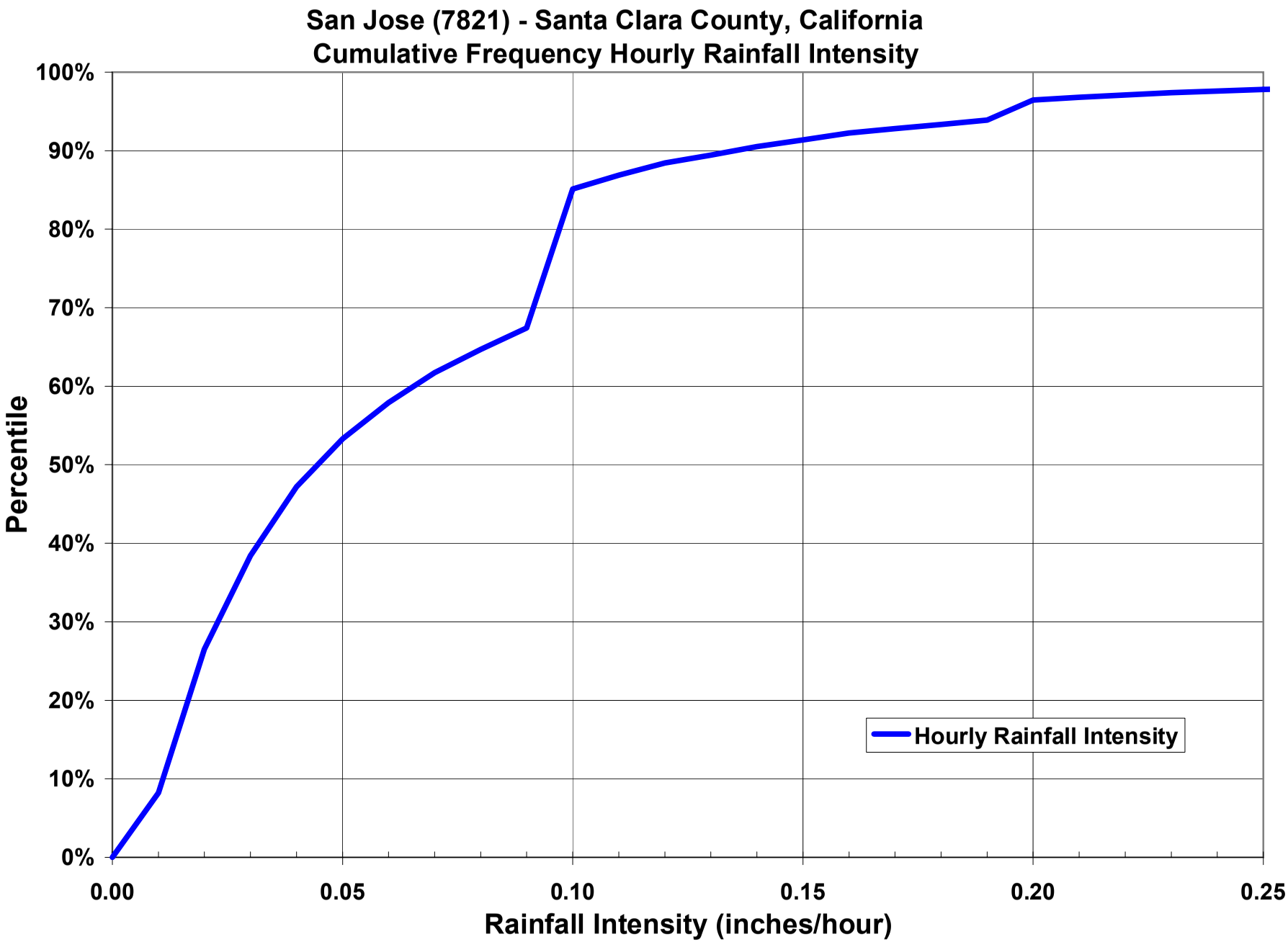

Oakland WSO Airport (6335) - Alameda County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

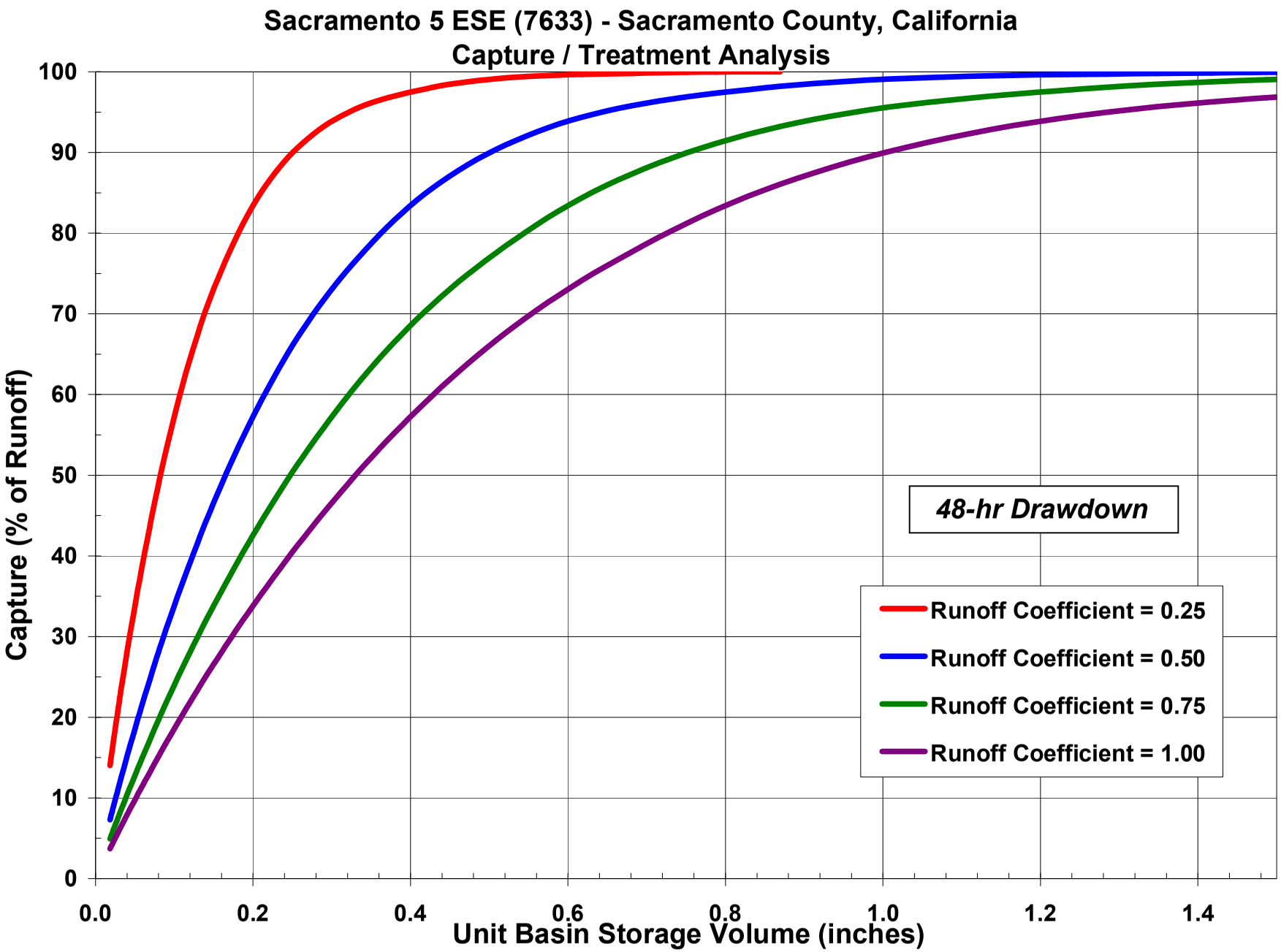

Oakland WSO Airport (6335) - Alameda County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

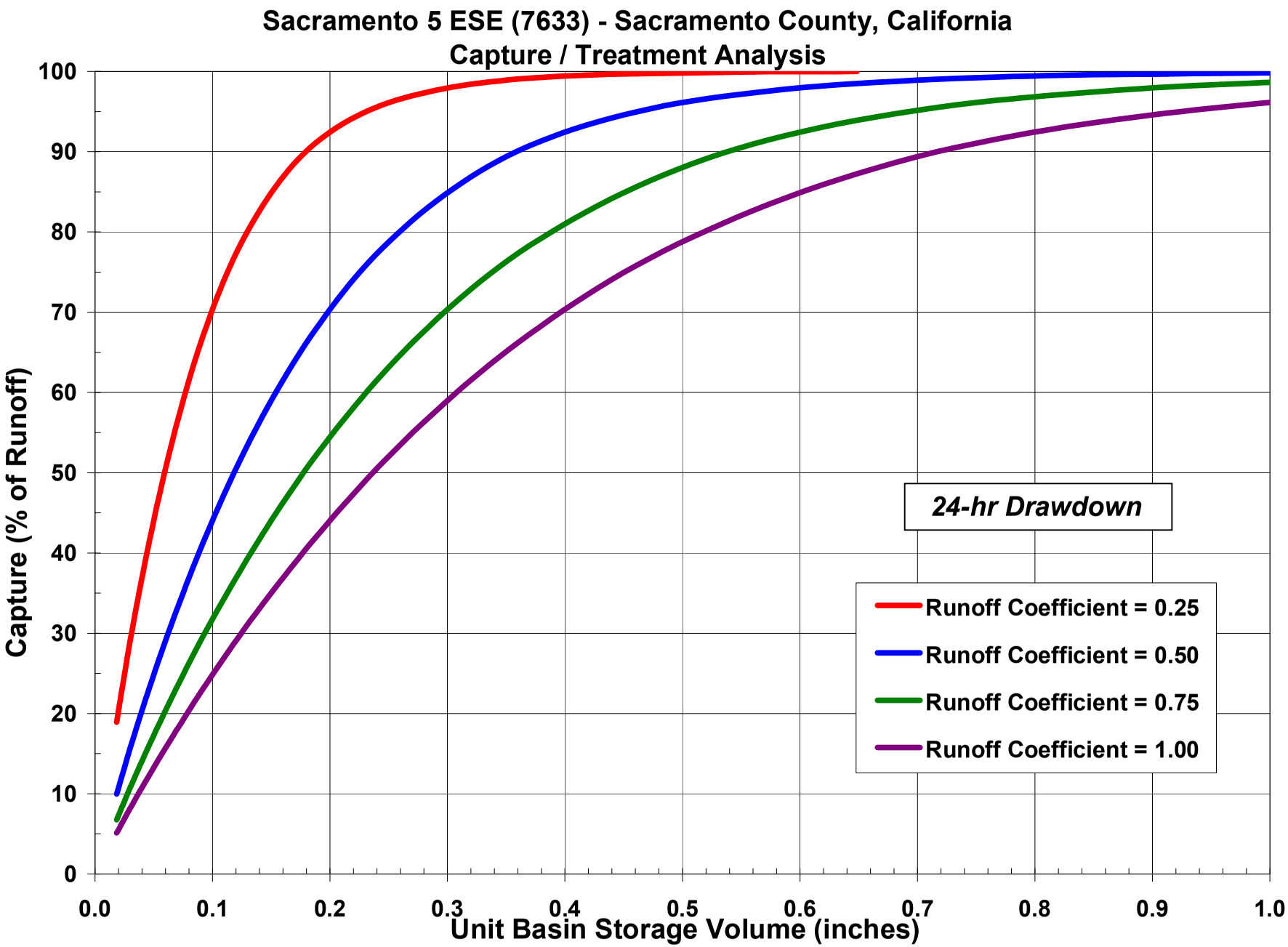

Oakland WSO Airport (6335) - Alameda County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

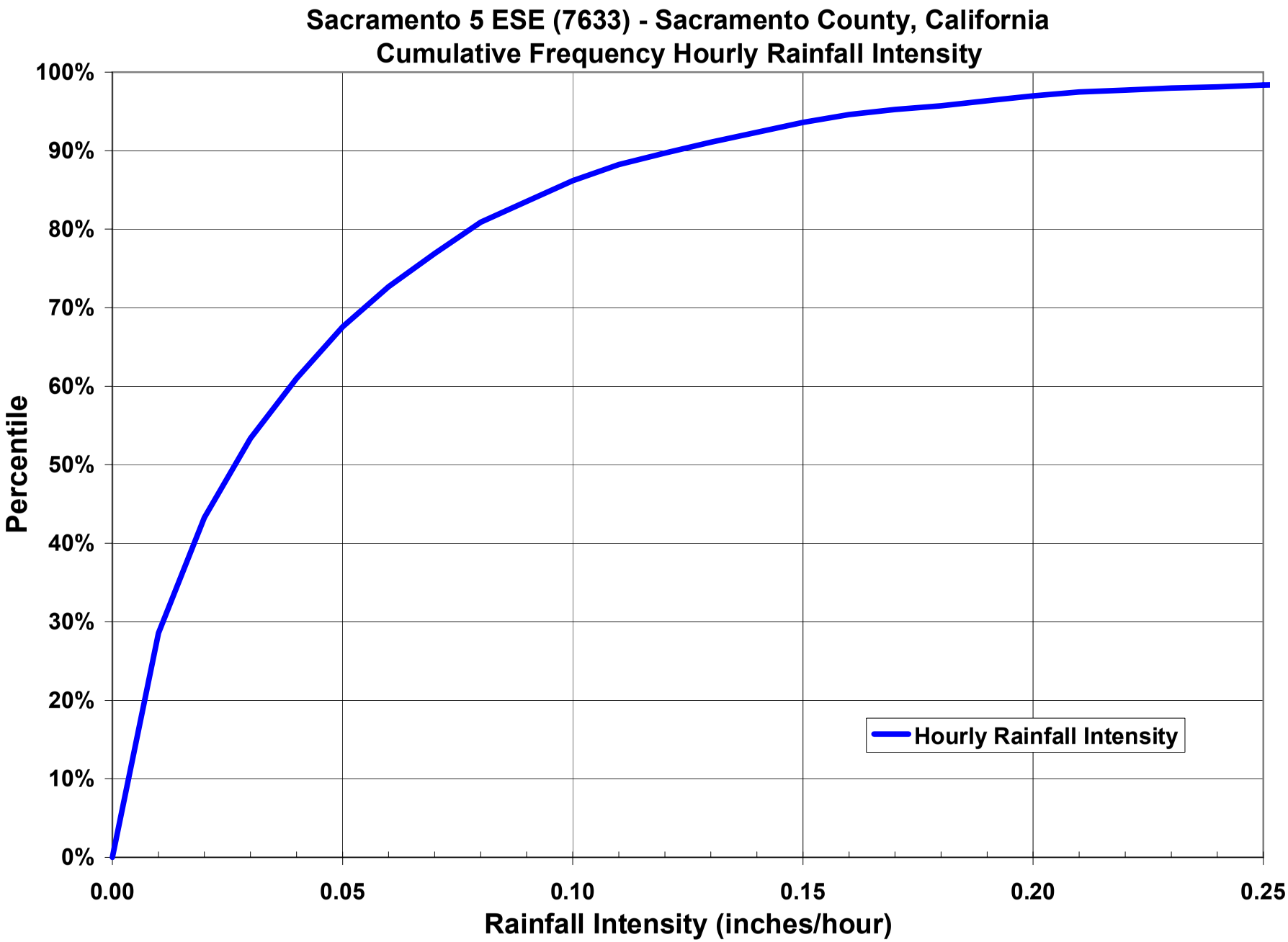

San Jose (7821) - Santa Clara County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

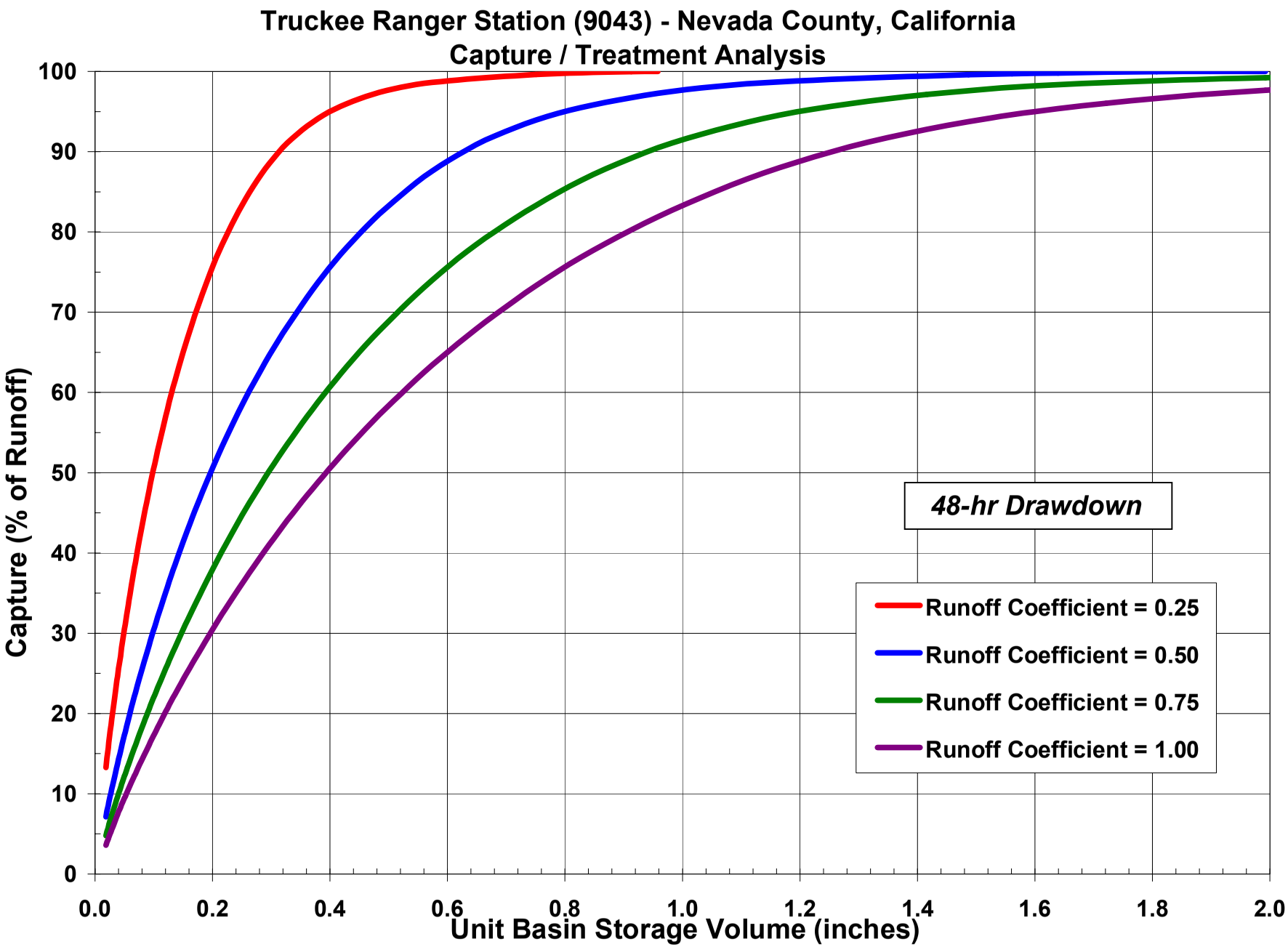

San Jose (7821) - Santa Clara County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

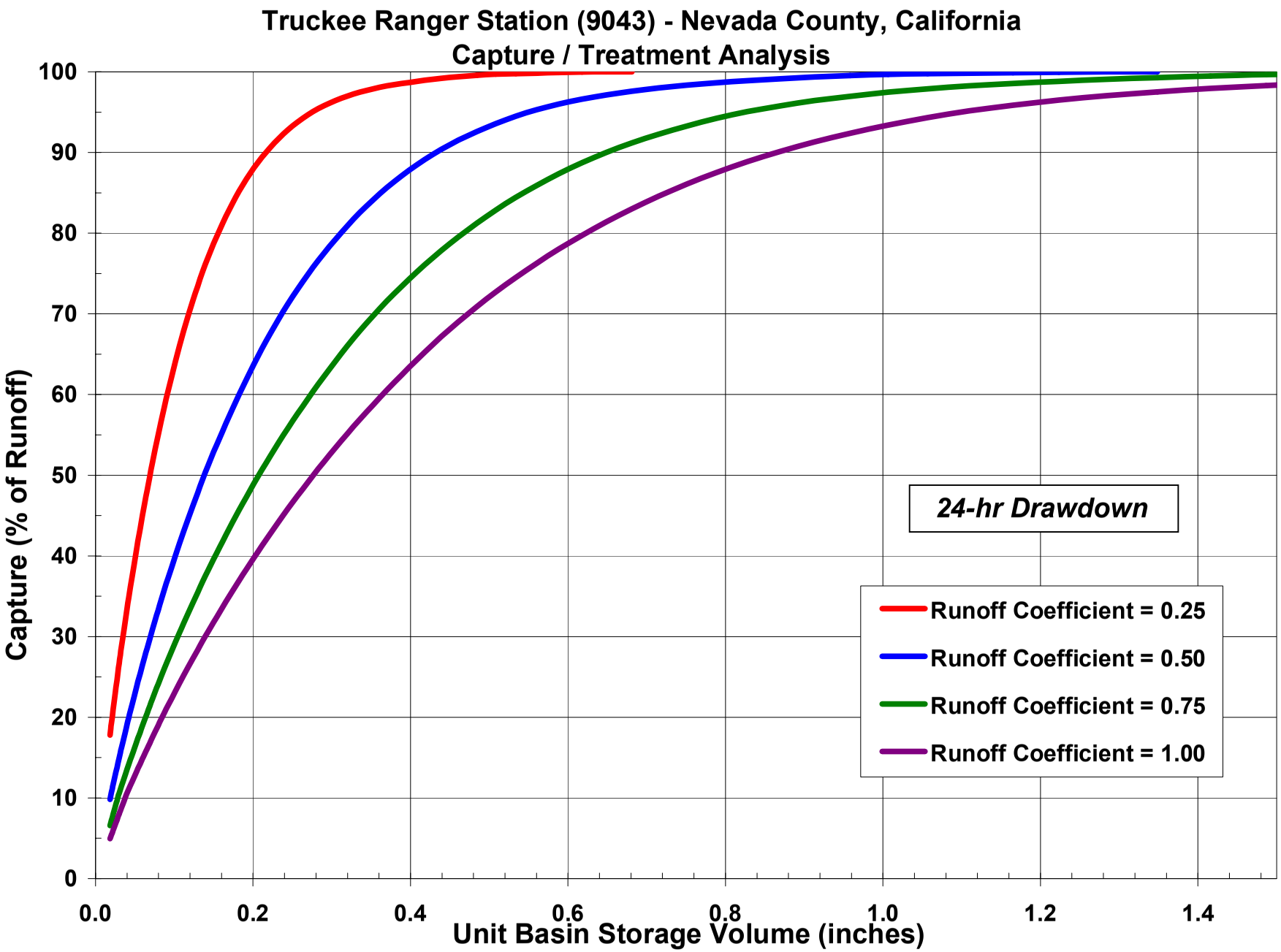

San Jose (7821) - Santa Clara County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

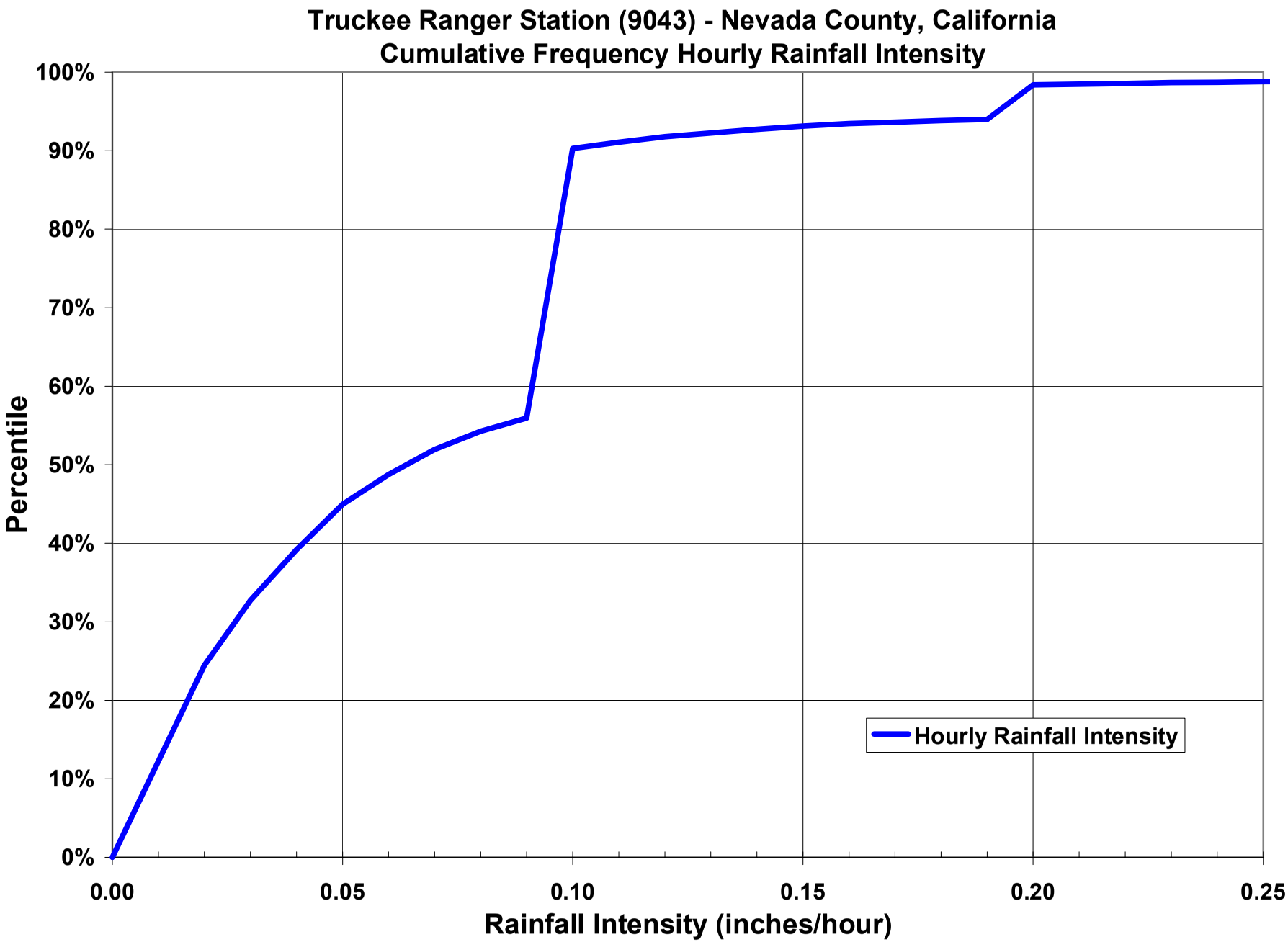

Sacramento 5 ESE (7633) - Sacramento County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

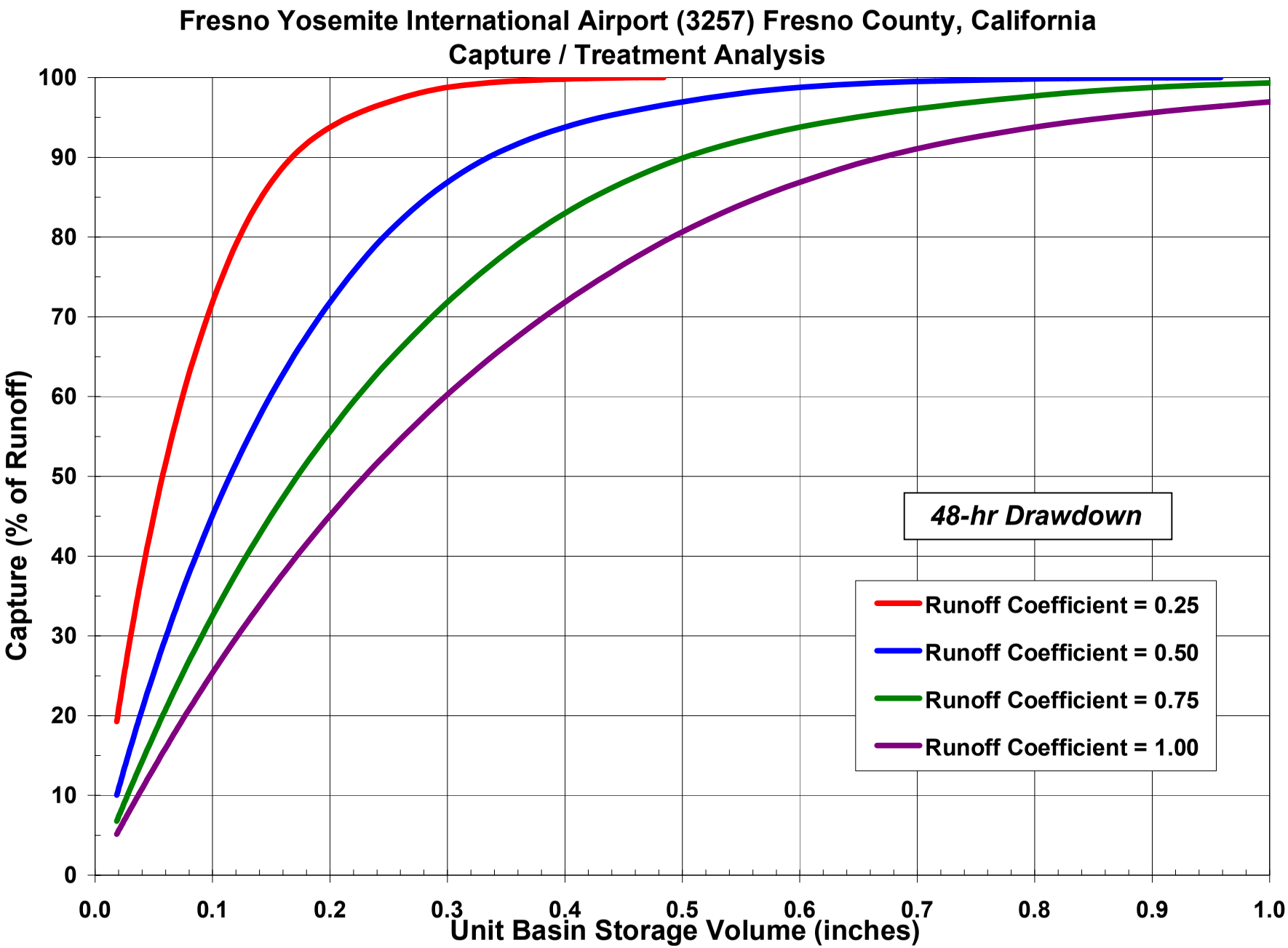

Sacramento 5 ESE (7633) - Sacramento County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

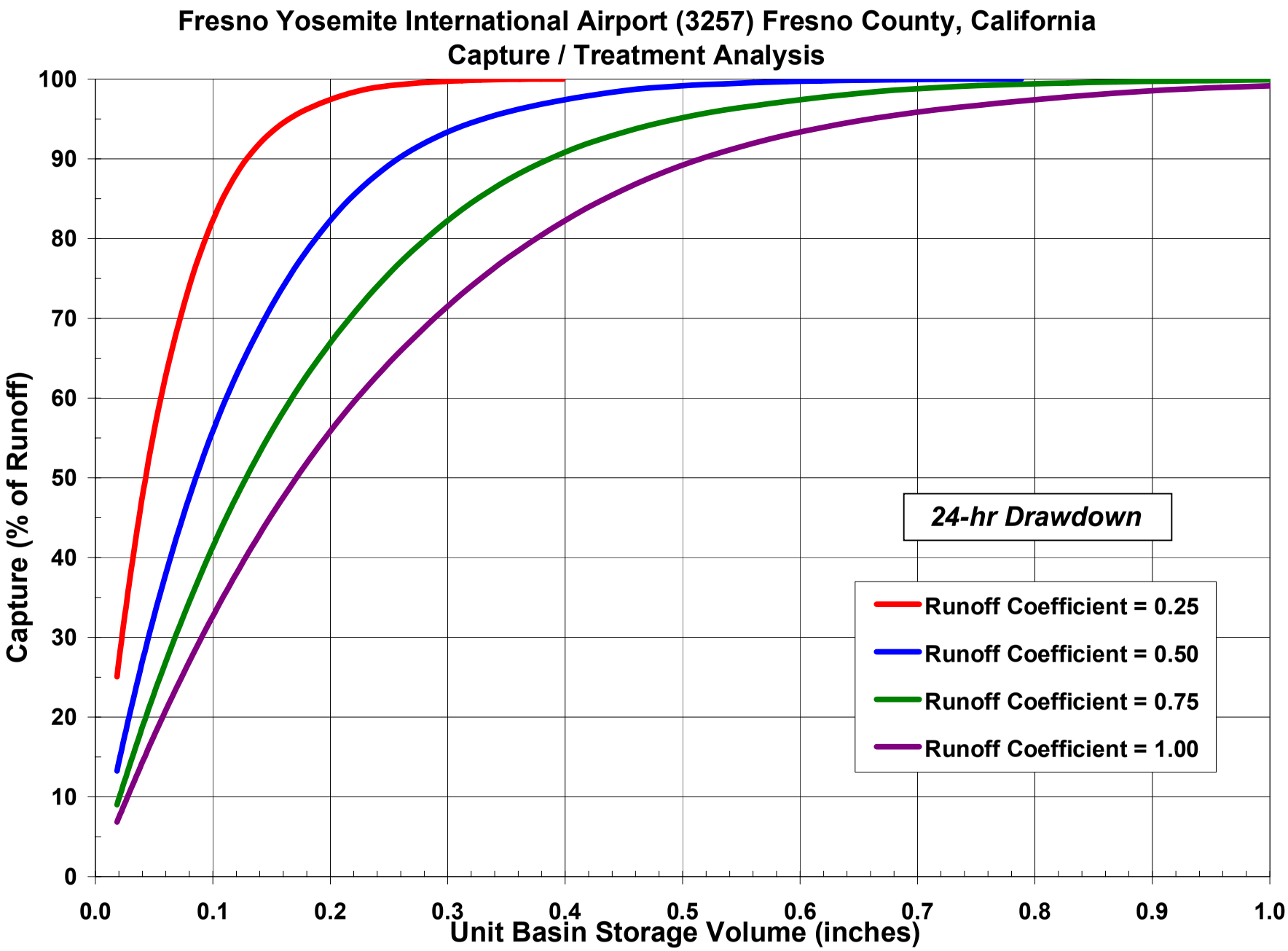

Sacramento 5 ESE (7633) - Sacramento County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

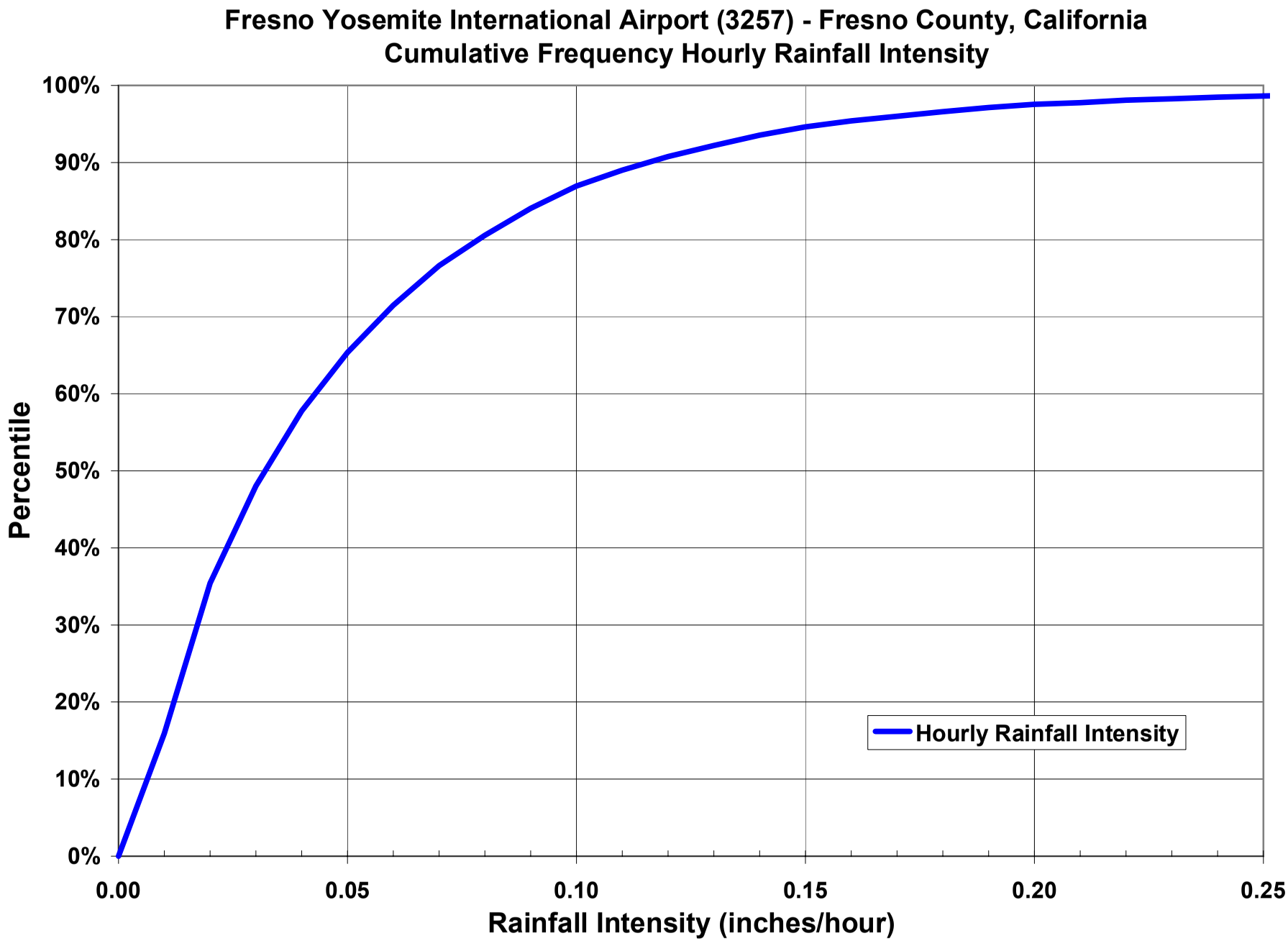

Truckee Ranger Station (9043) - Nevada County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

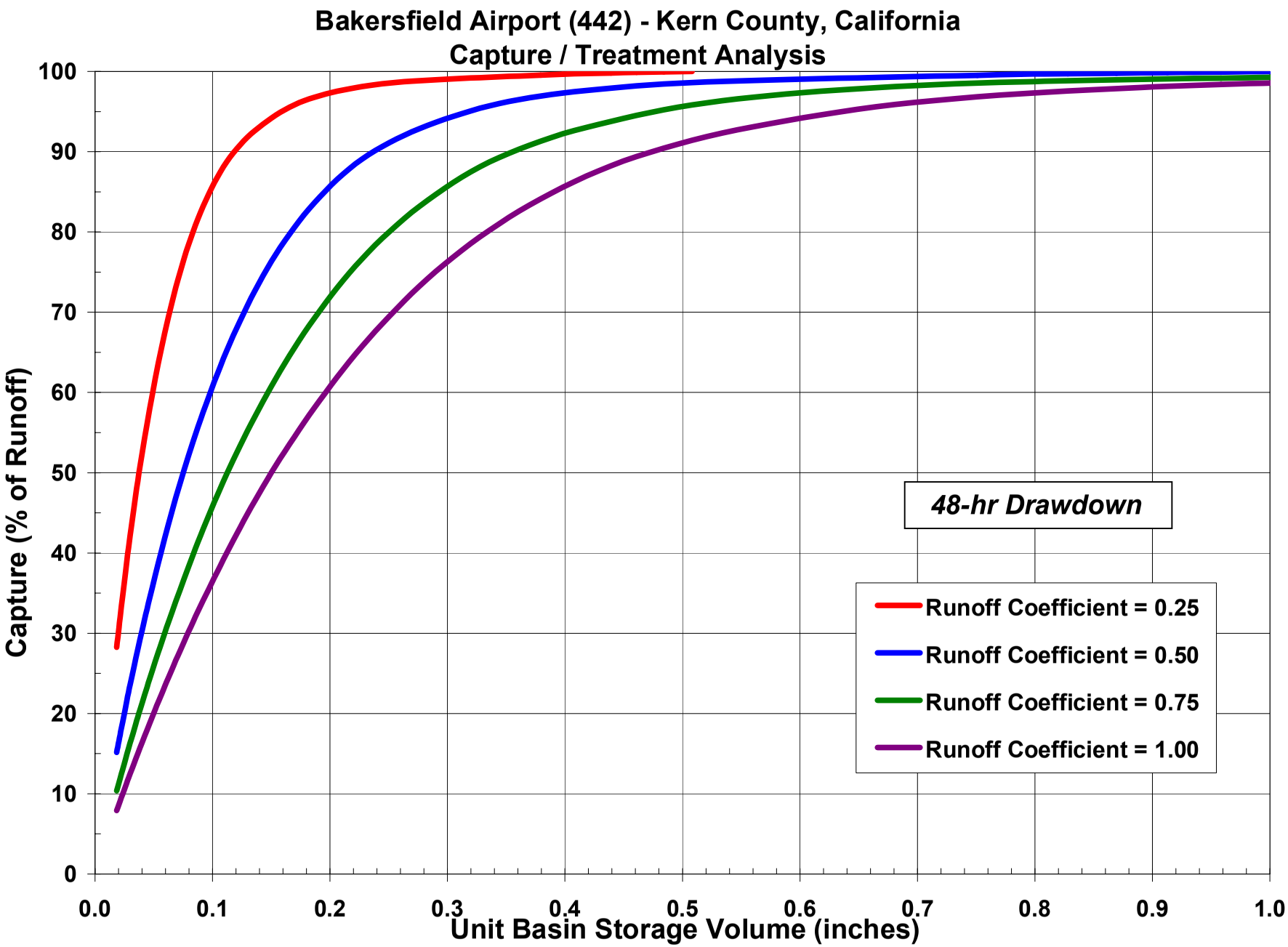

Truckee Ranger Station (9043) - Nevada County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

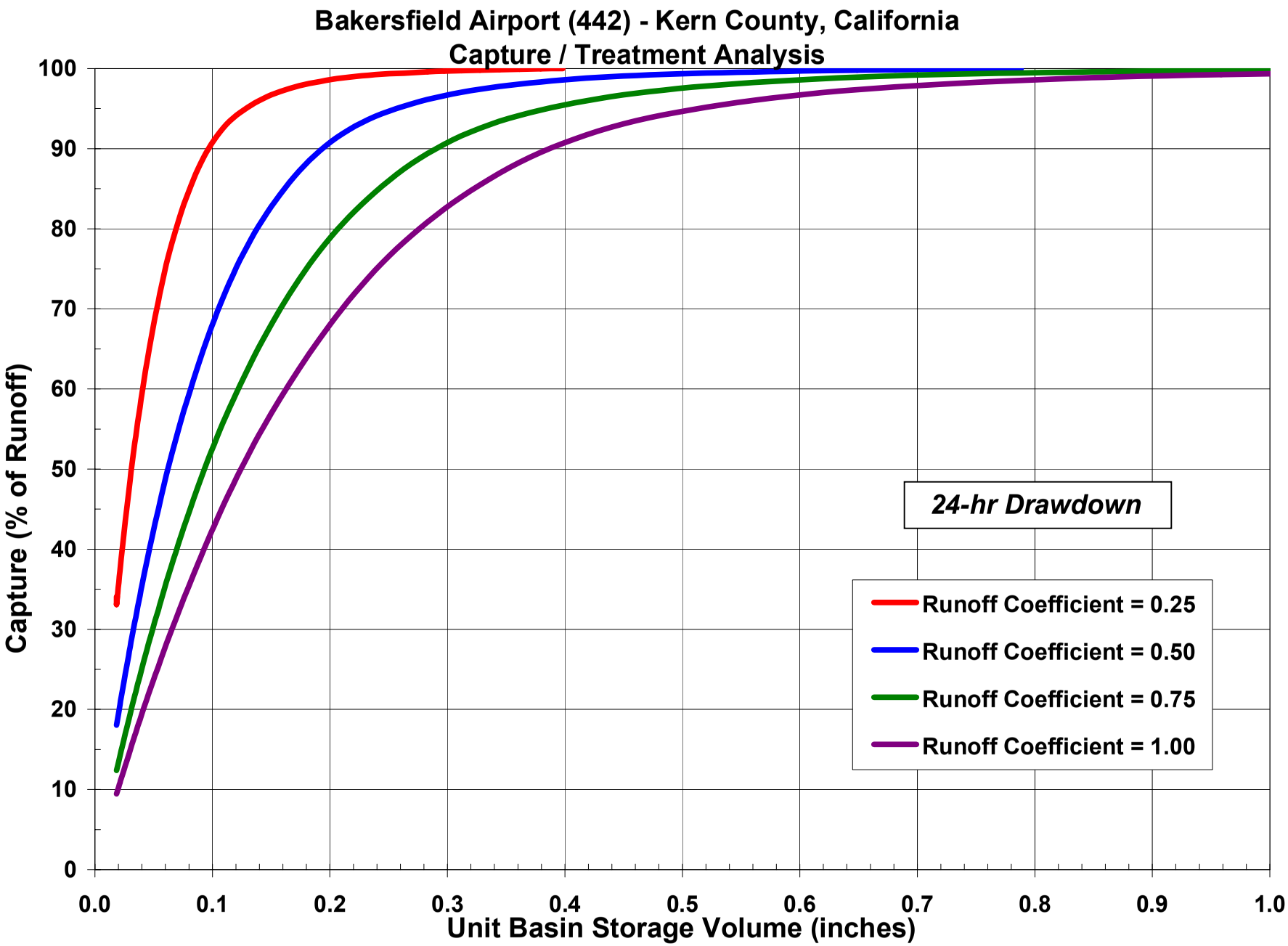

Truckee Ranger Station (9043) - Nevada County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

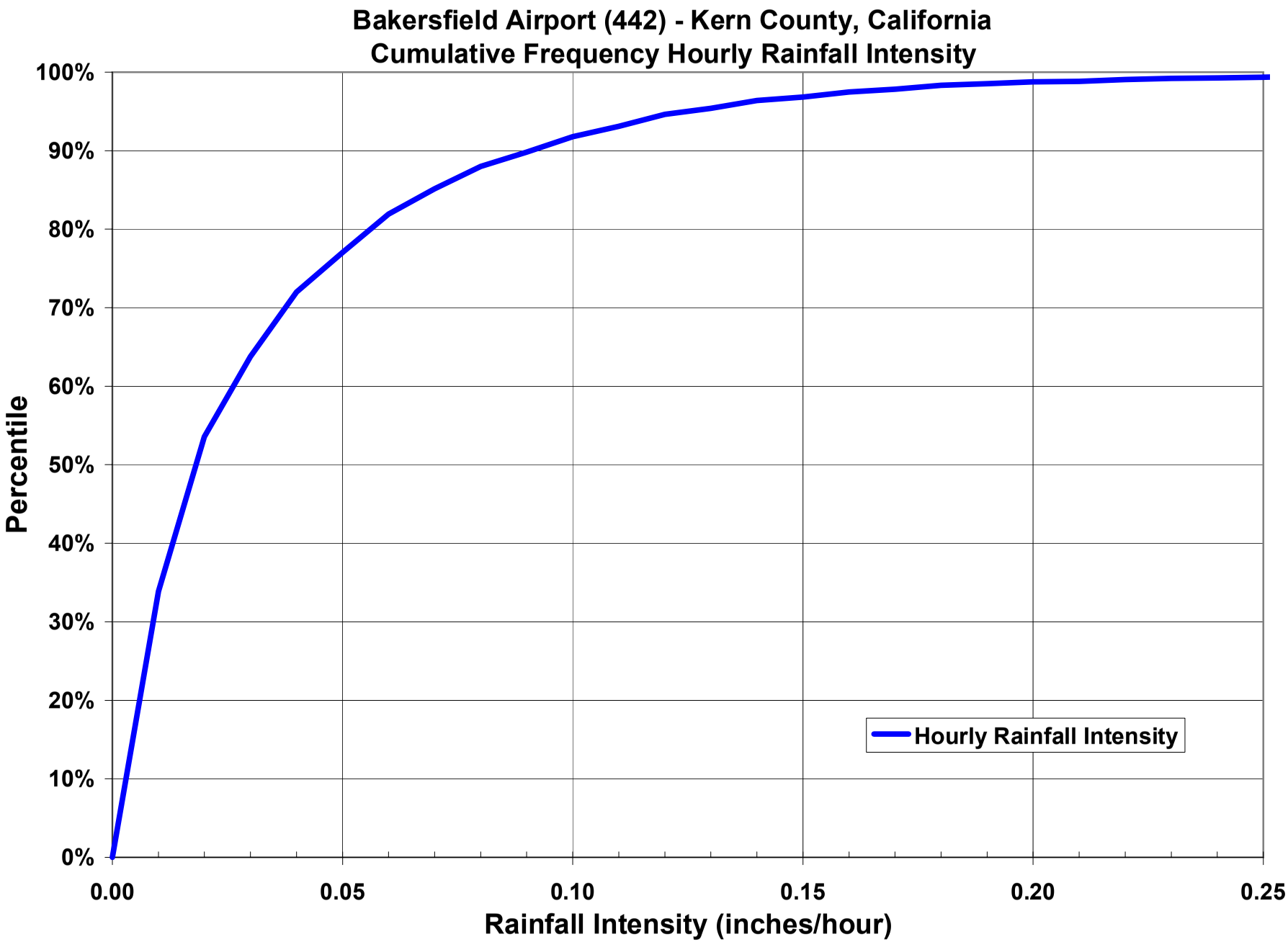

Fresno Yosemite International Airport (3257) Fresno County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

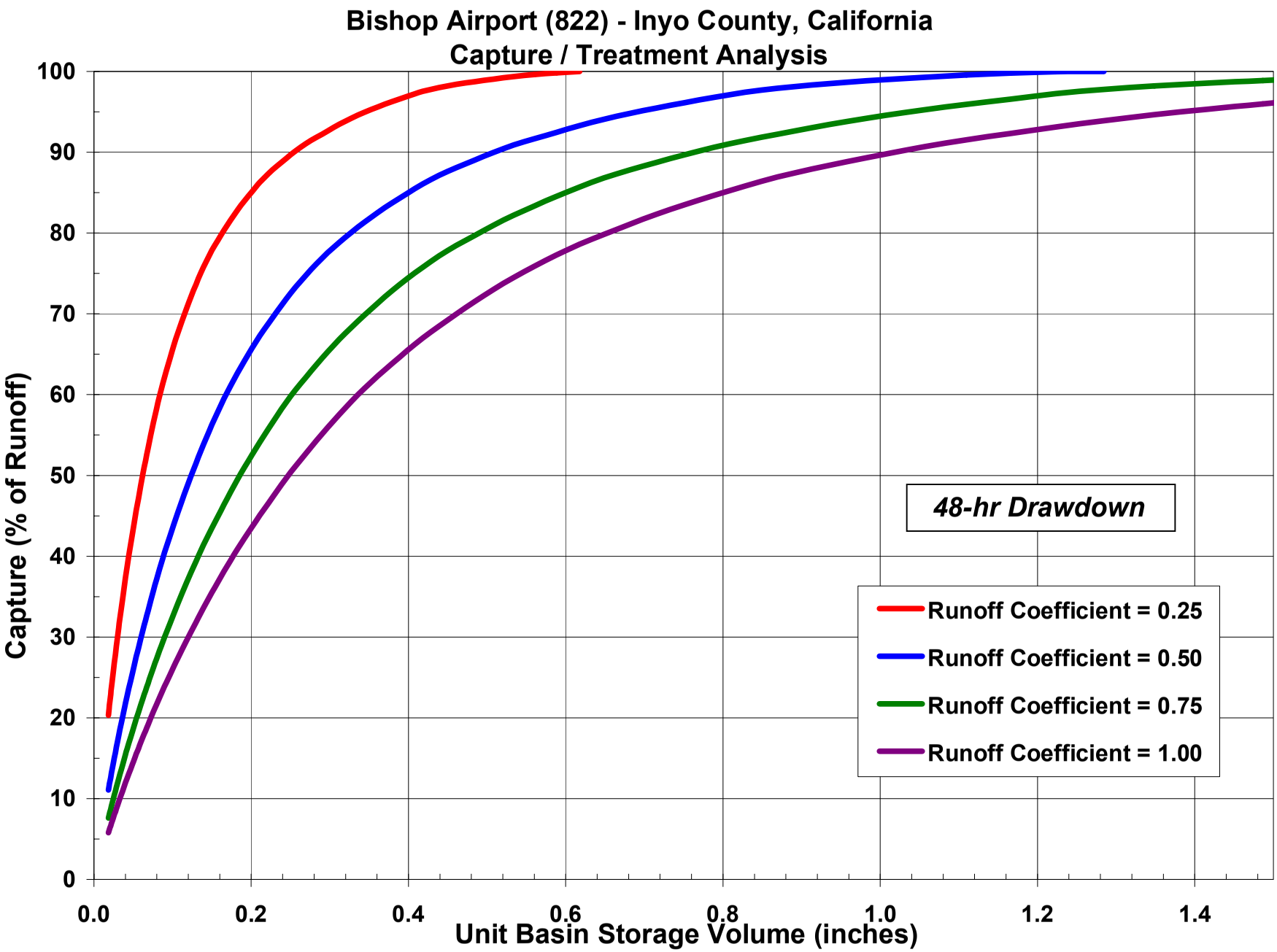

Fresno Yosemite International Airport (3257) Fresno County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

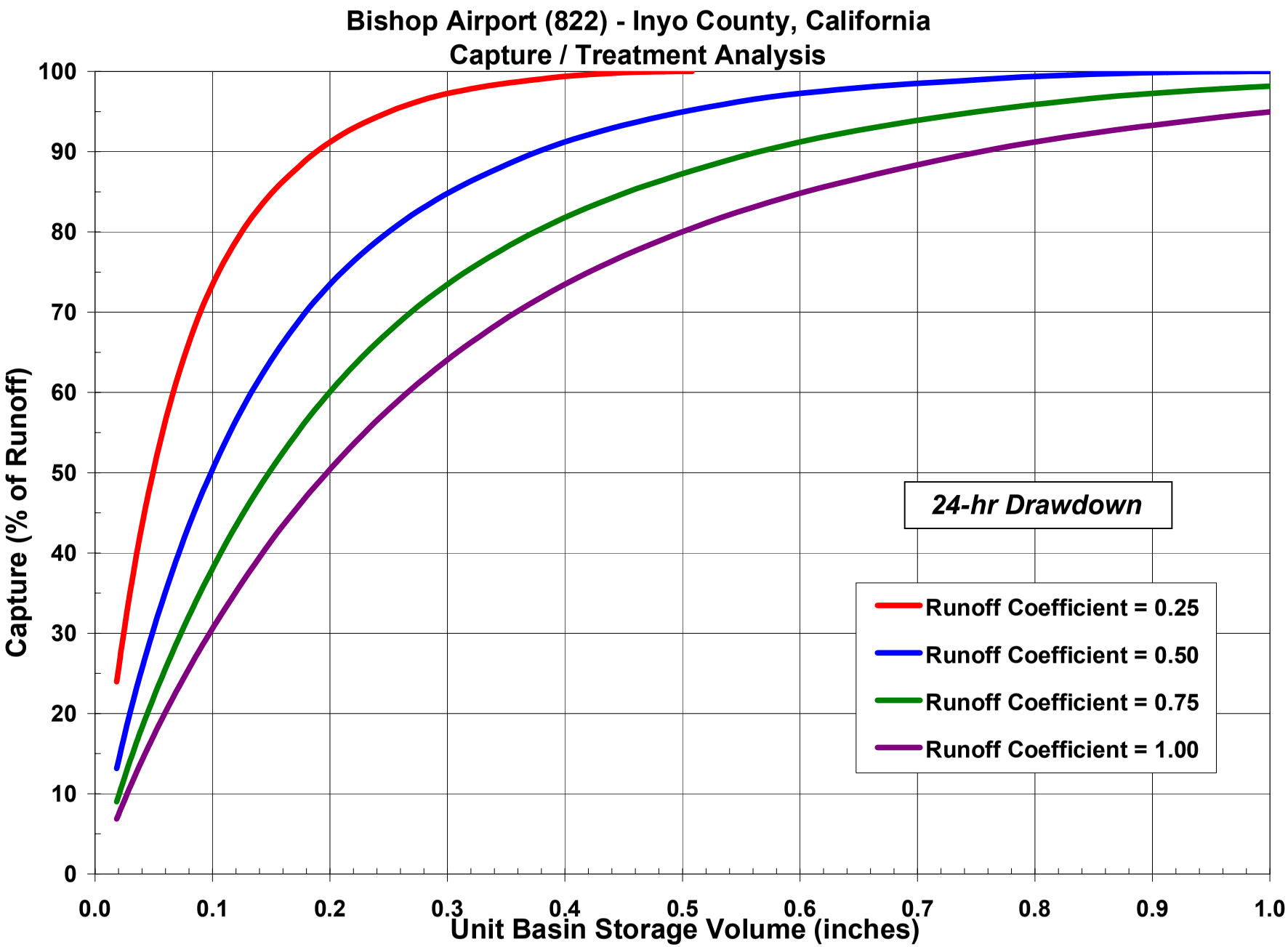

Fresno Yosemite International Airport (3257) - Fresno County, California
Cumulative Frequency Hourly Rainfall Intensity
Percentile
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

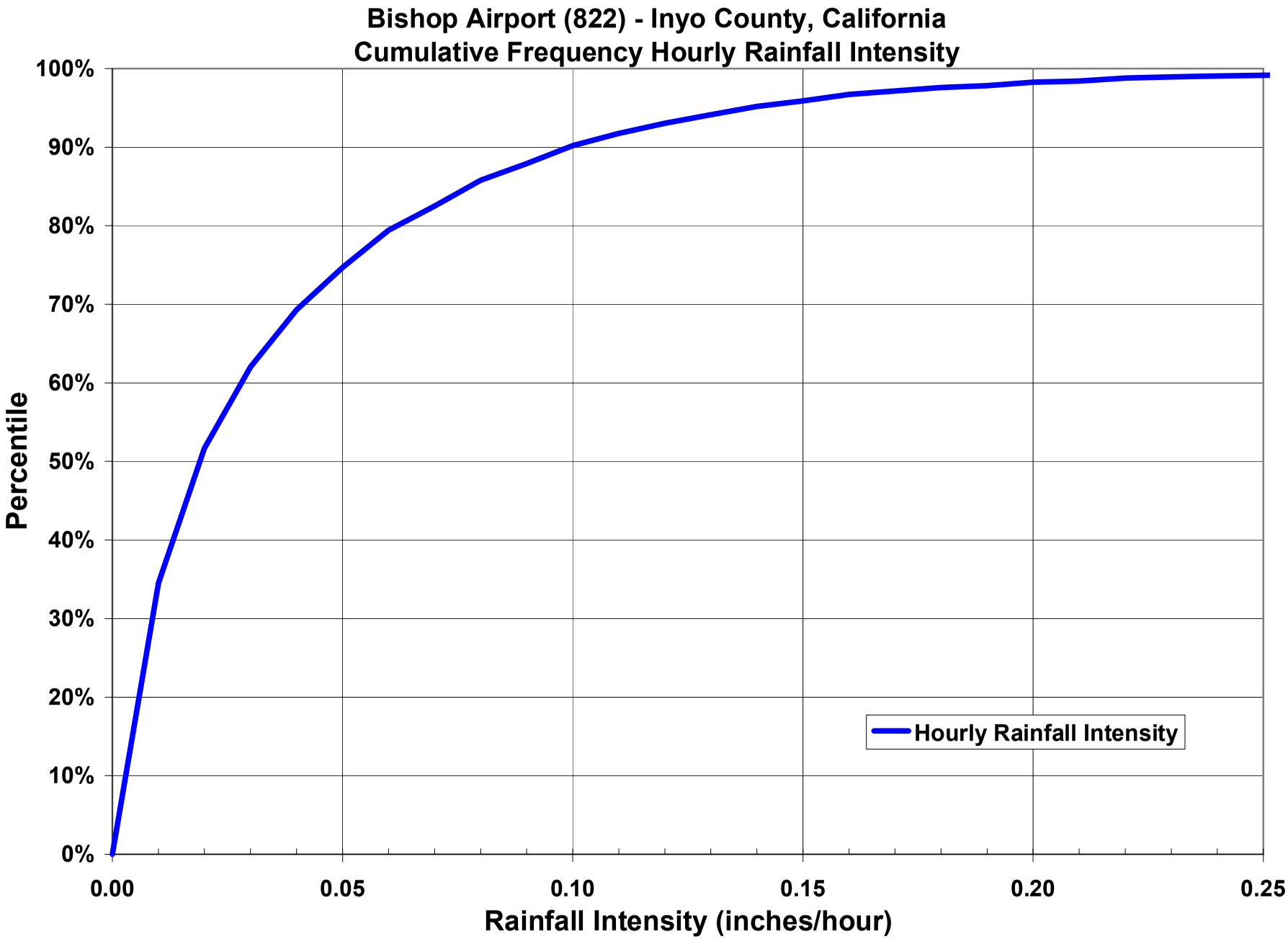

Bakersfield Airport (442) - Kern County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

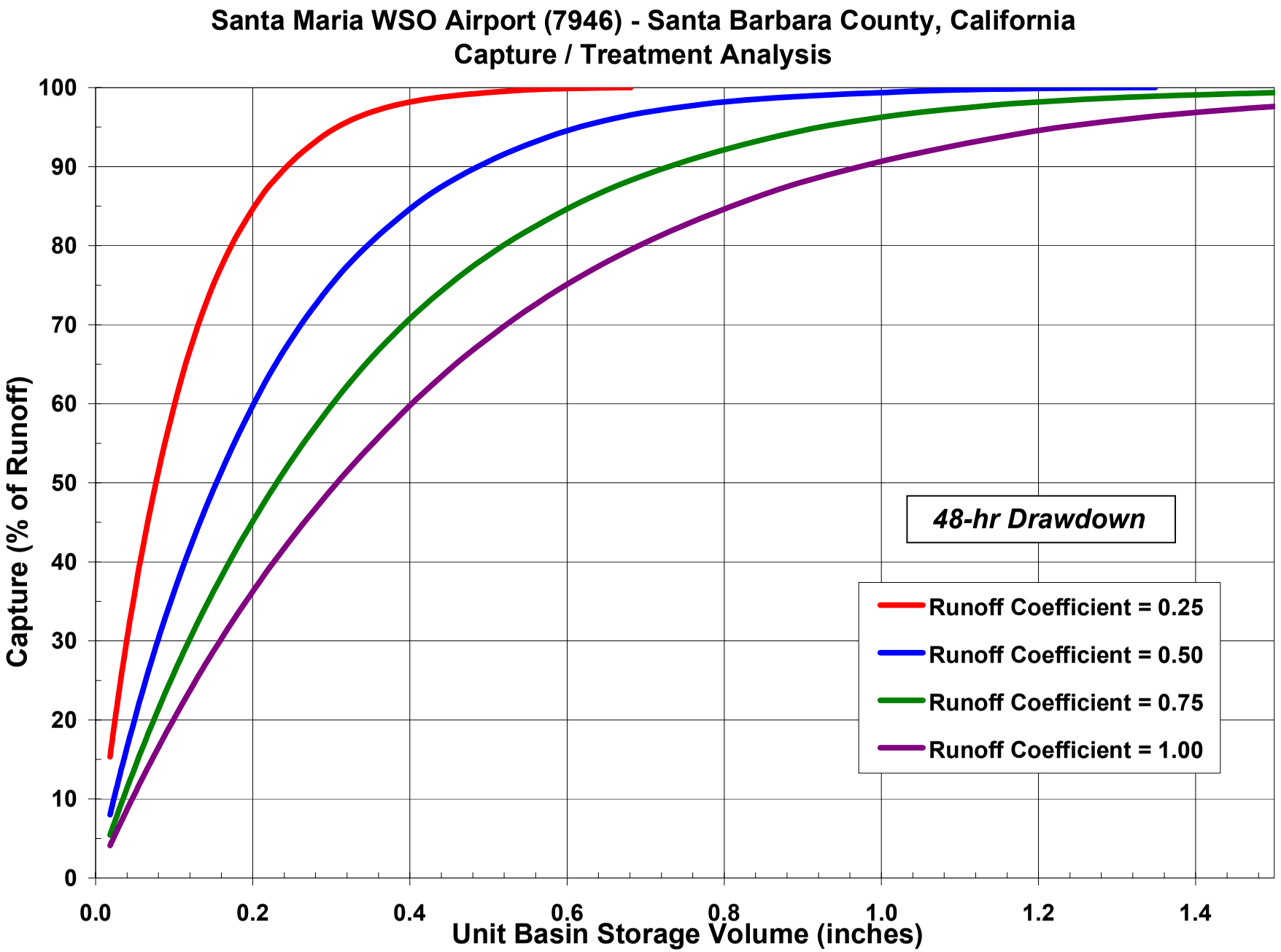

Bakersfield Airport (442) - Kern County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

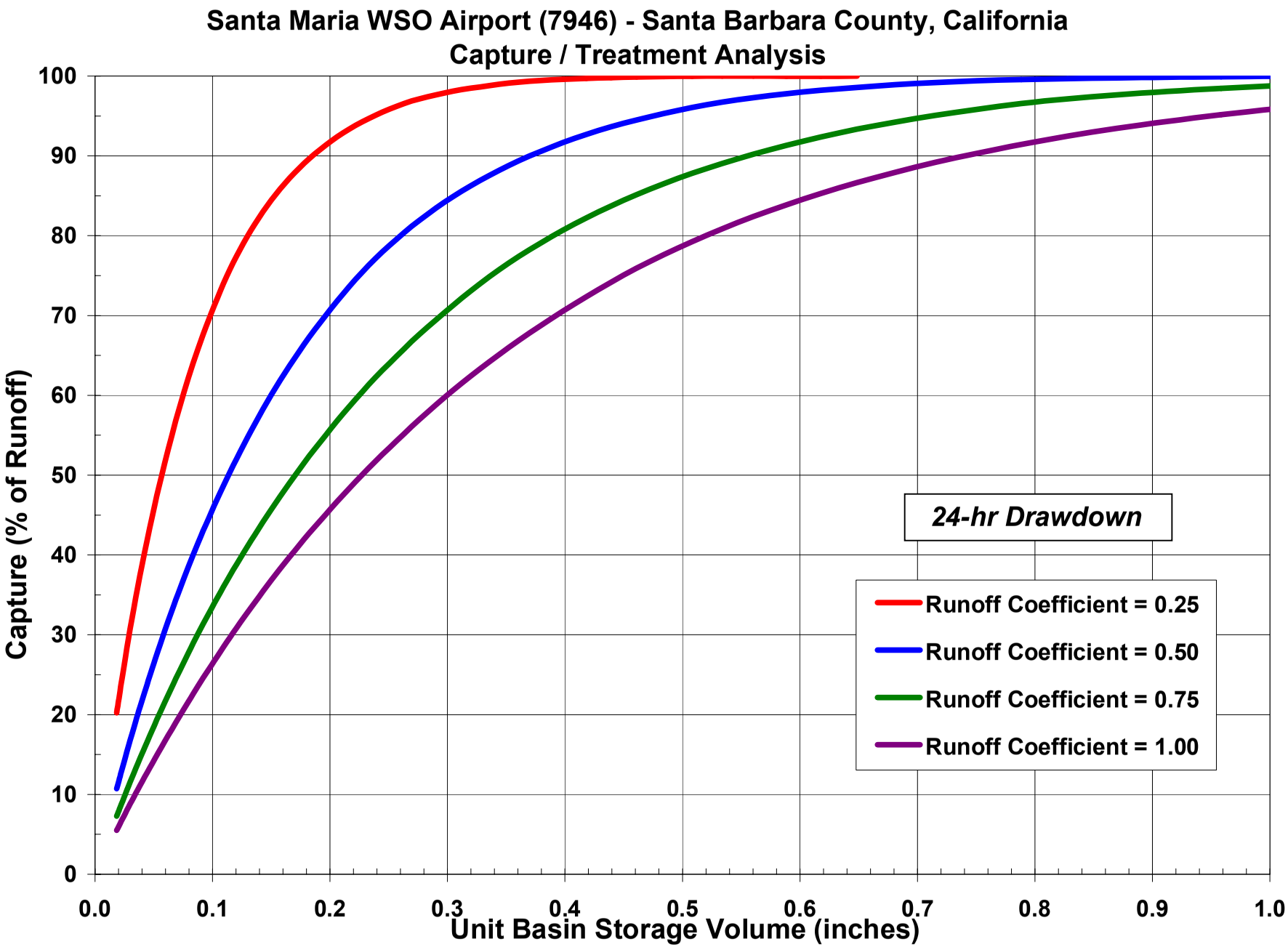

Bakersfield Airport (442) - Kern County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

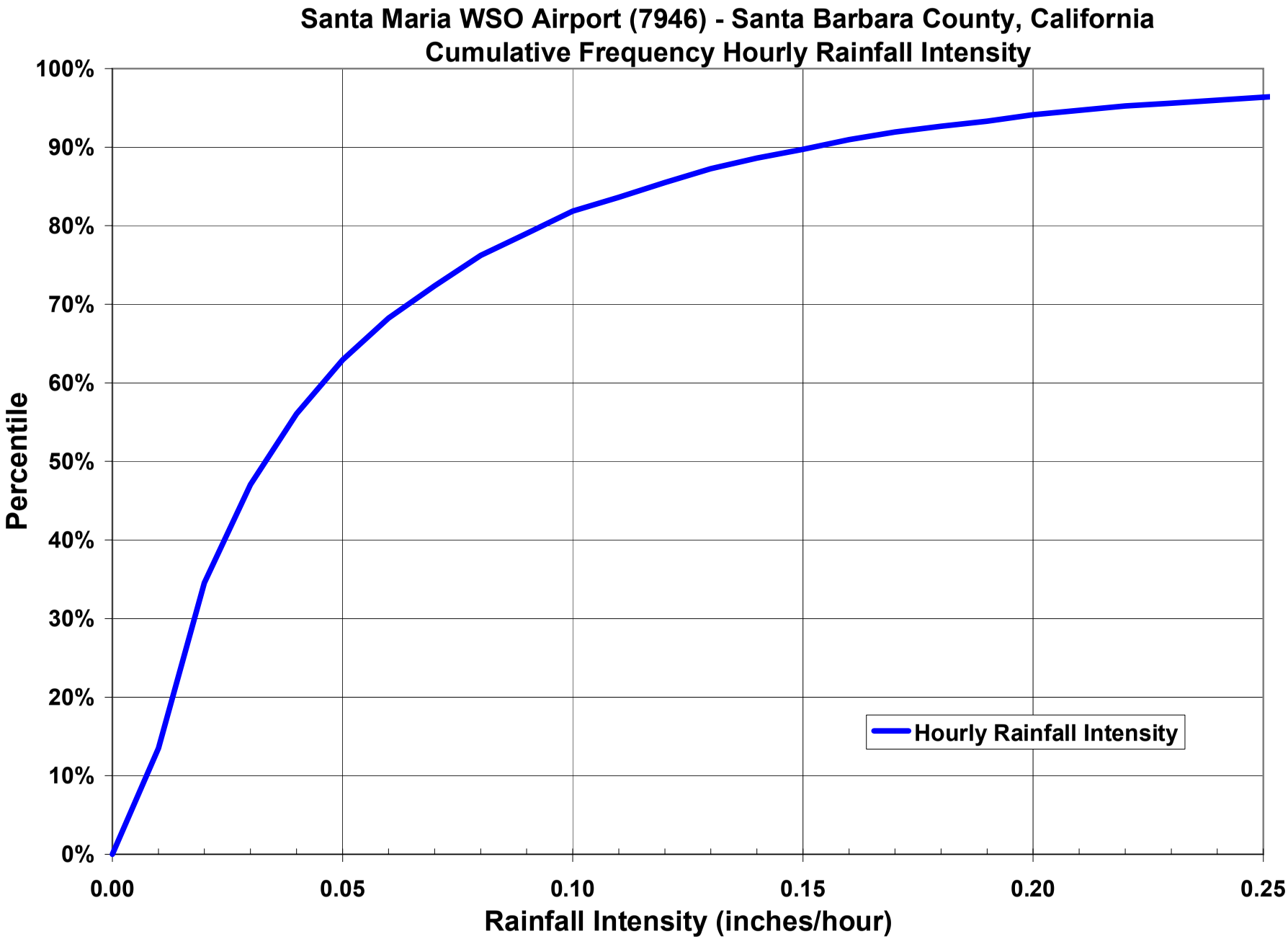

Bishop Airport (822) - Inyo County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

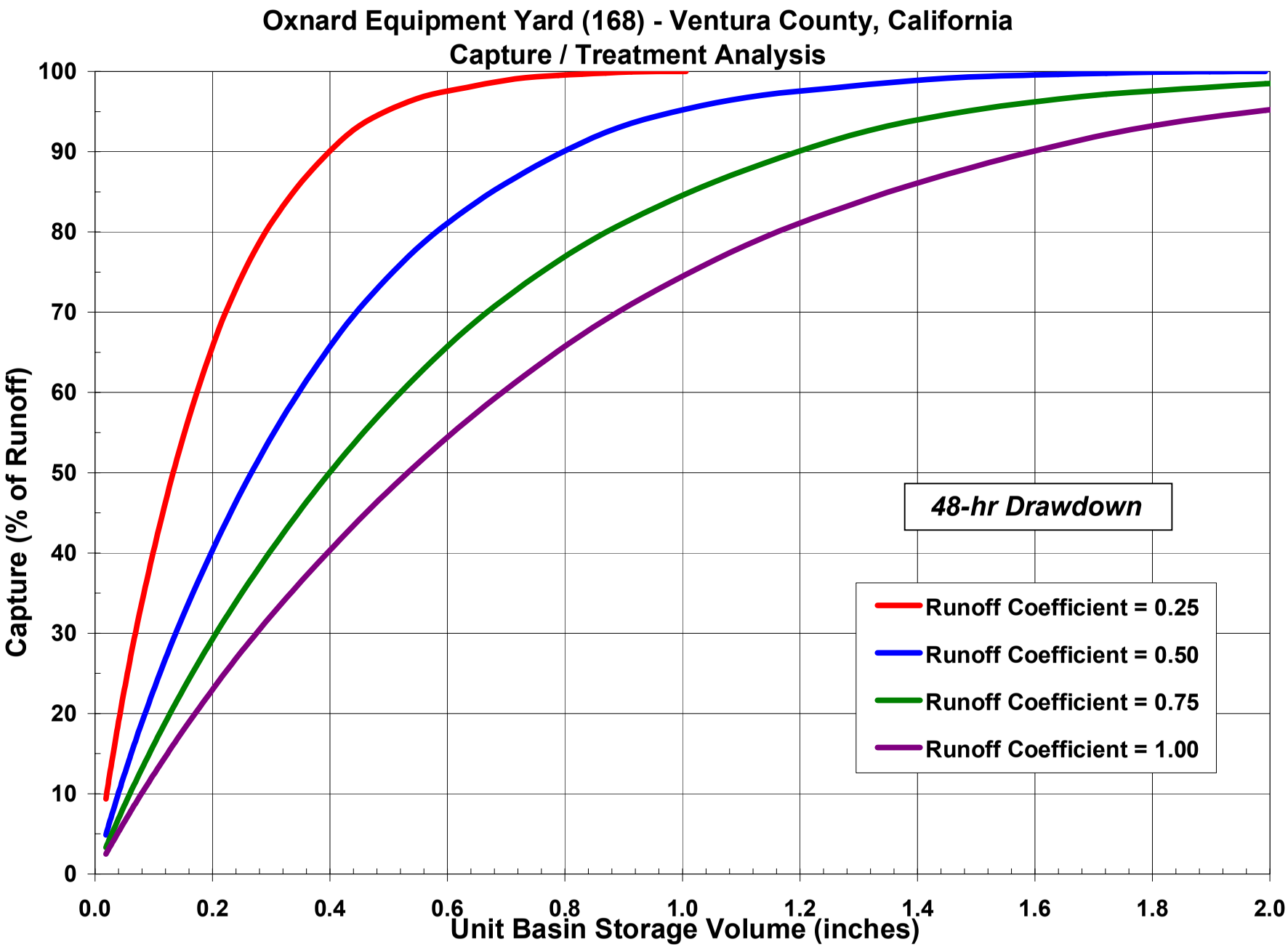

Bishop Airport (822) - Inyo County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

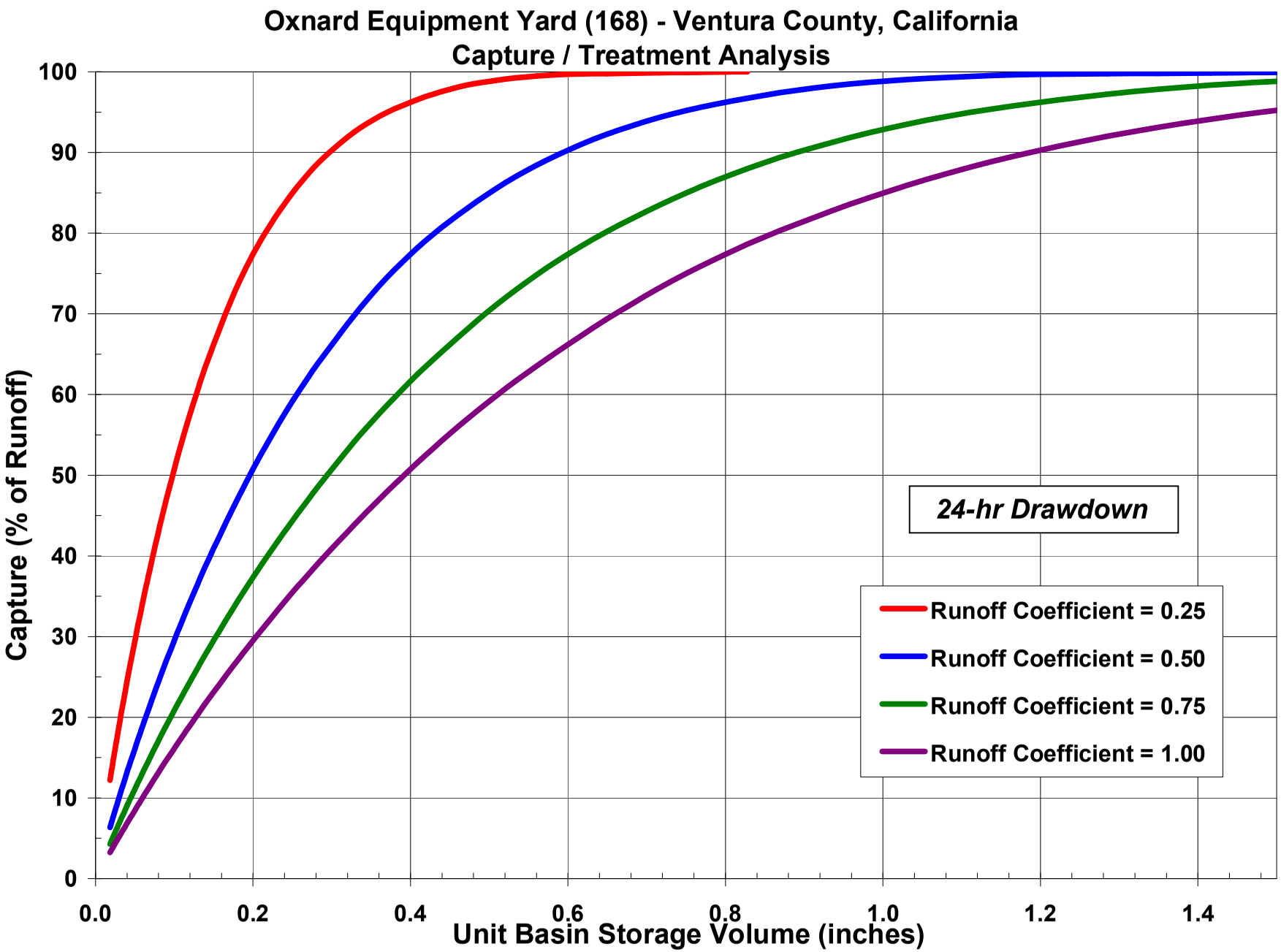

Bishop Airport (822) - Inyo County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

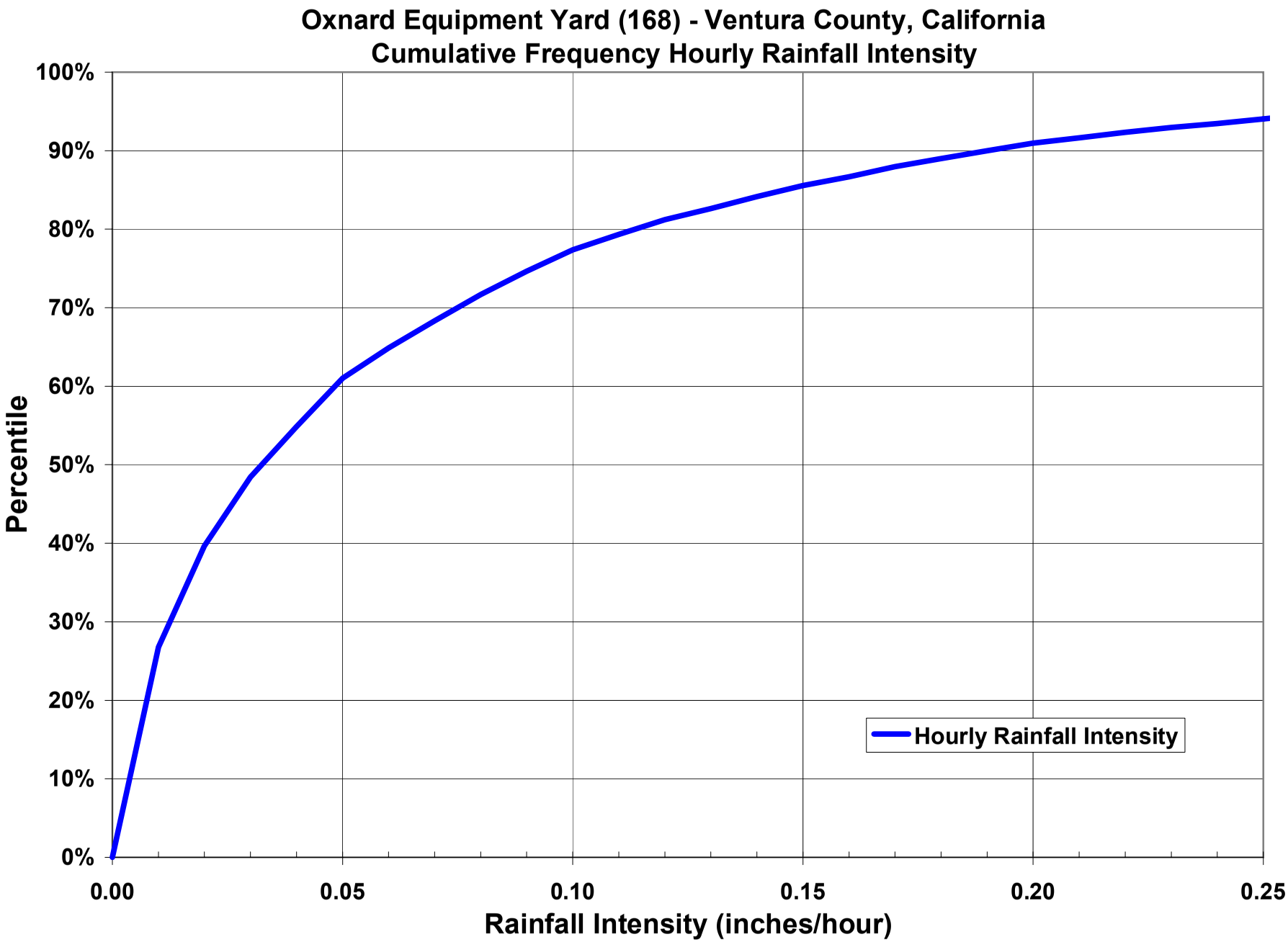

Santa Maria WSO Airport (7946) - Santa Barbara County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

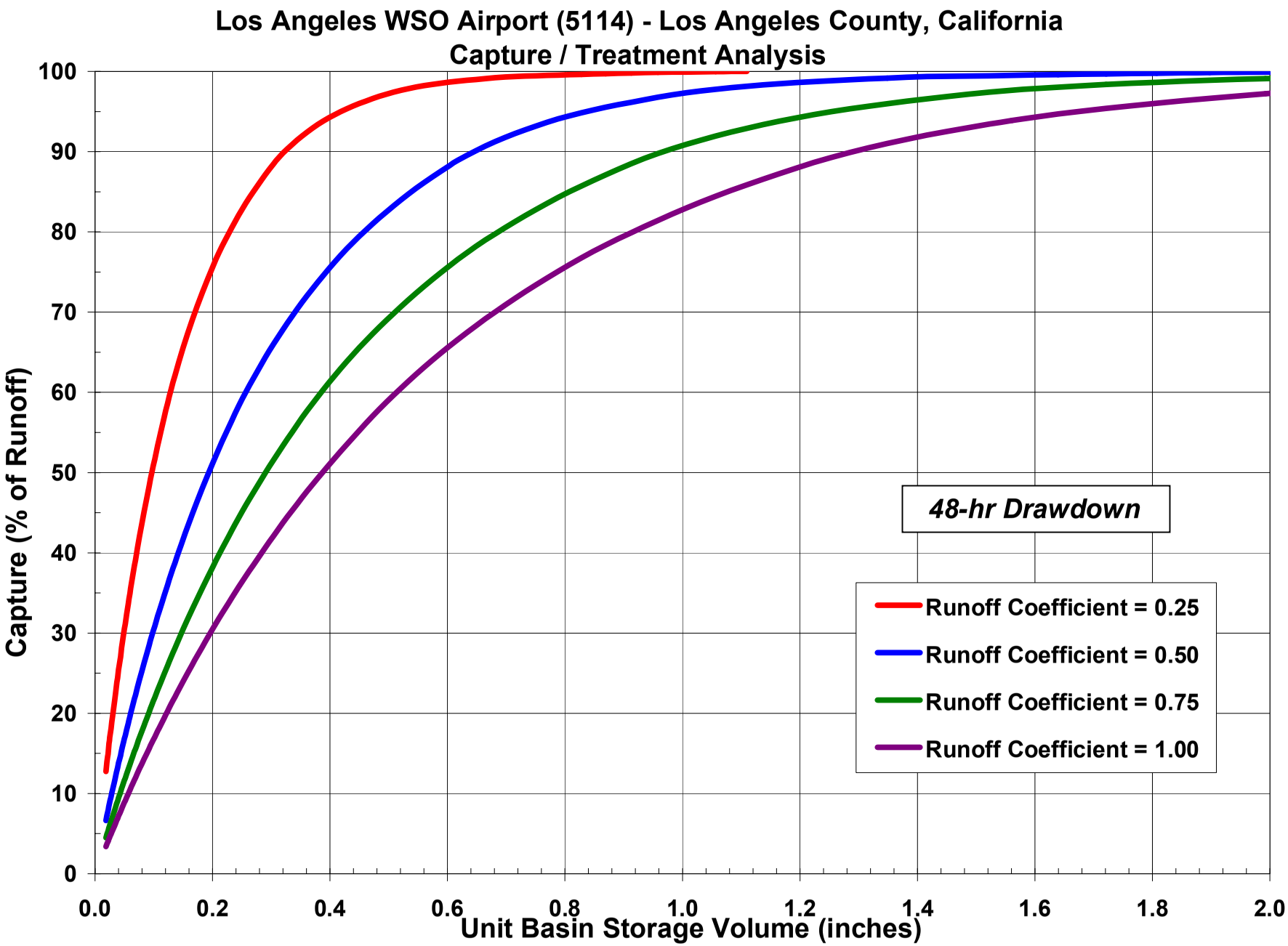

Santa Maria WSO Airport (7946) - Santa Barbara County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

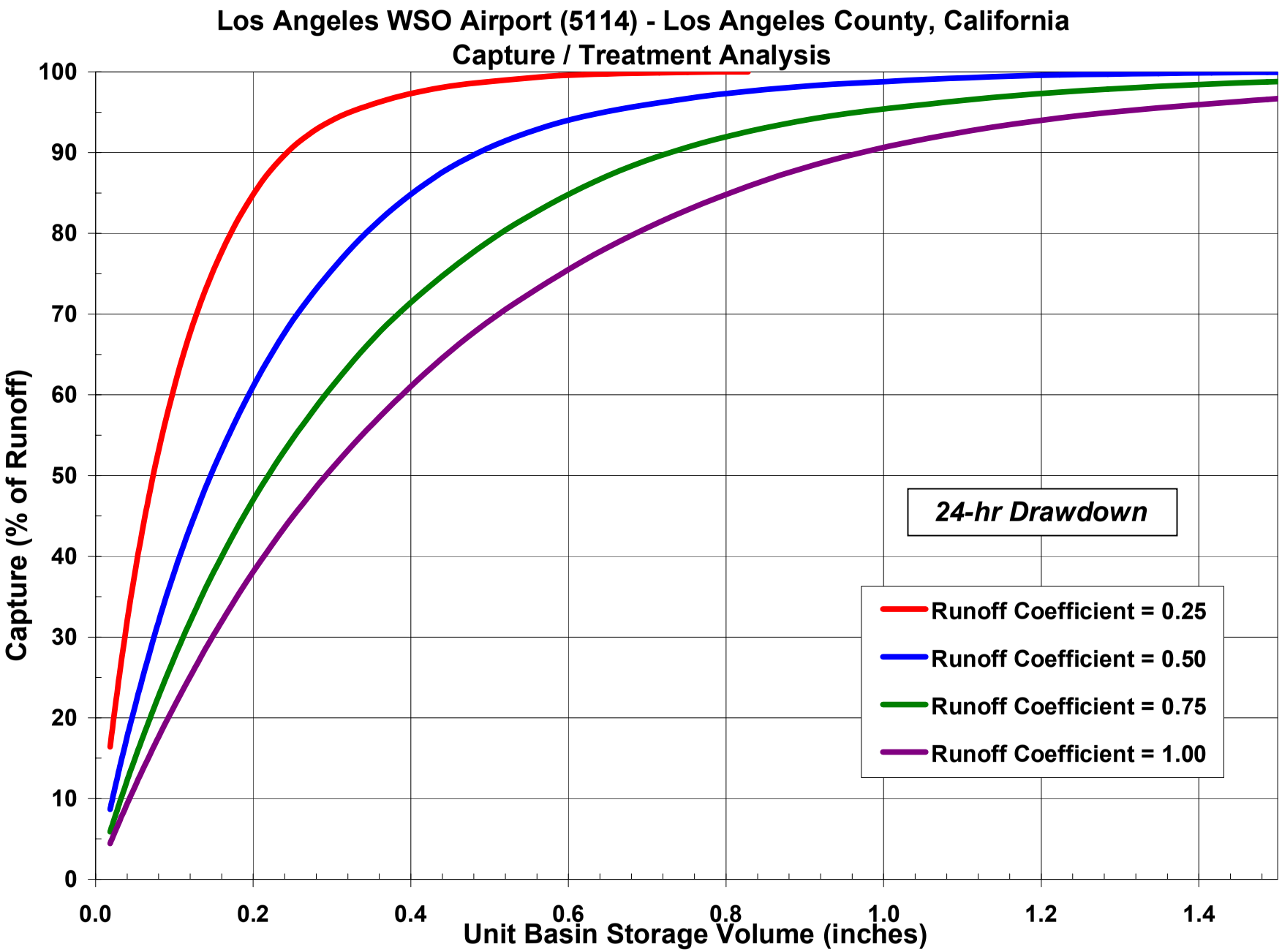

Santa Maria WSO Airport (7946) - Santa Barbara County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

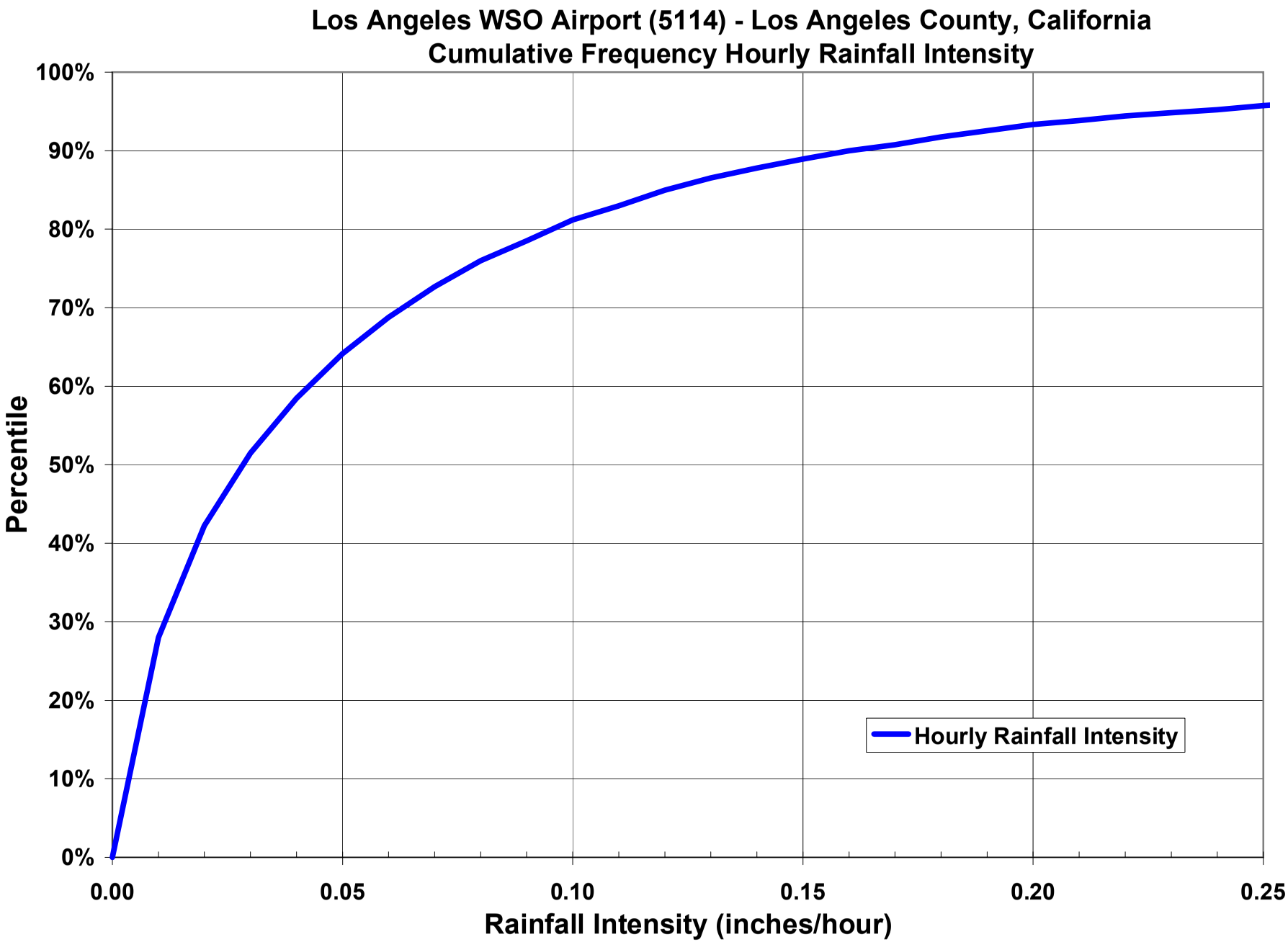

Oxnard Equipment Yard (168) - Ventura County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

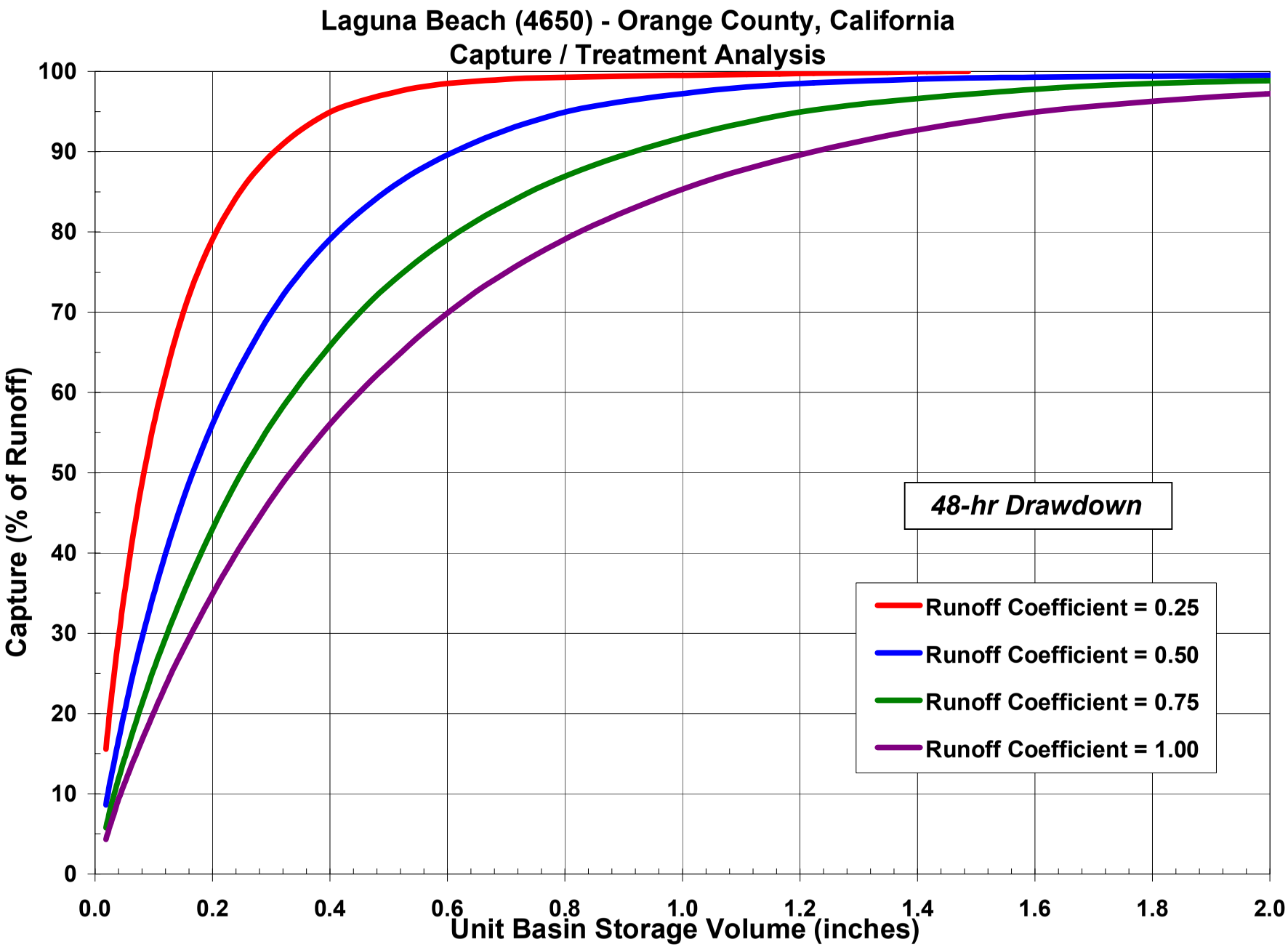

Oxnard Equipment Yard (168) - Ventura County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

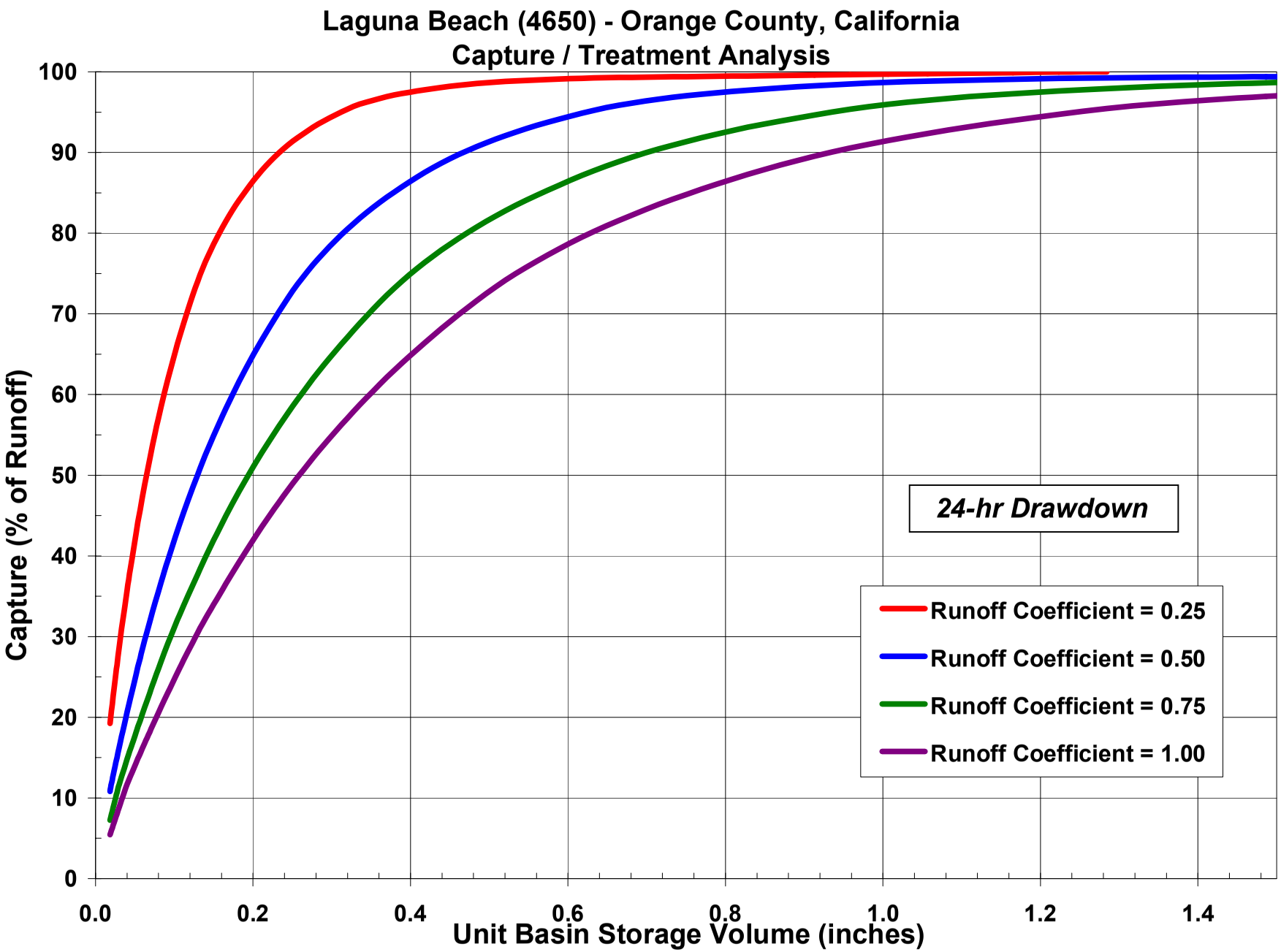

Oxnard Equipment Yard (168) - Ventura County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

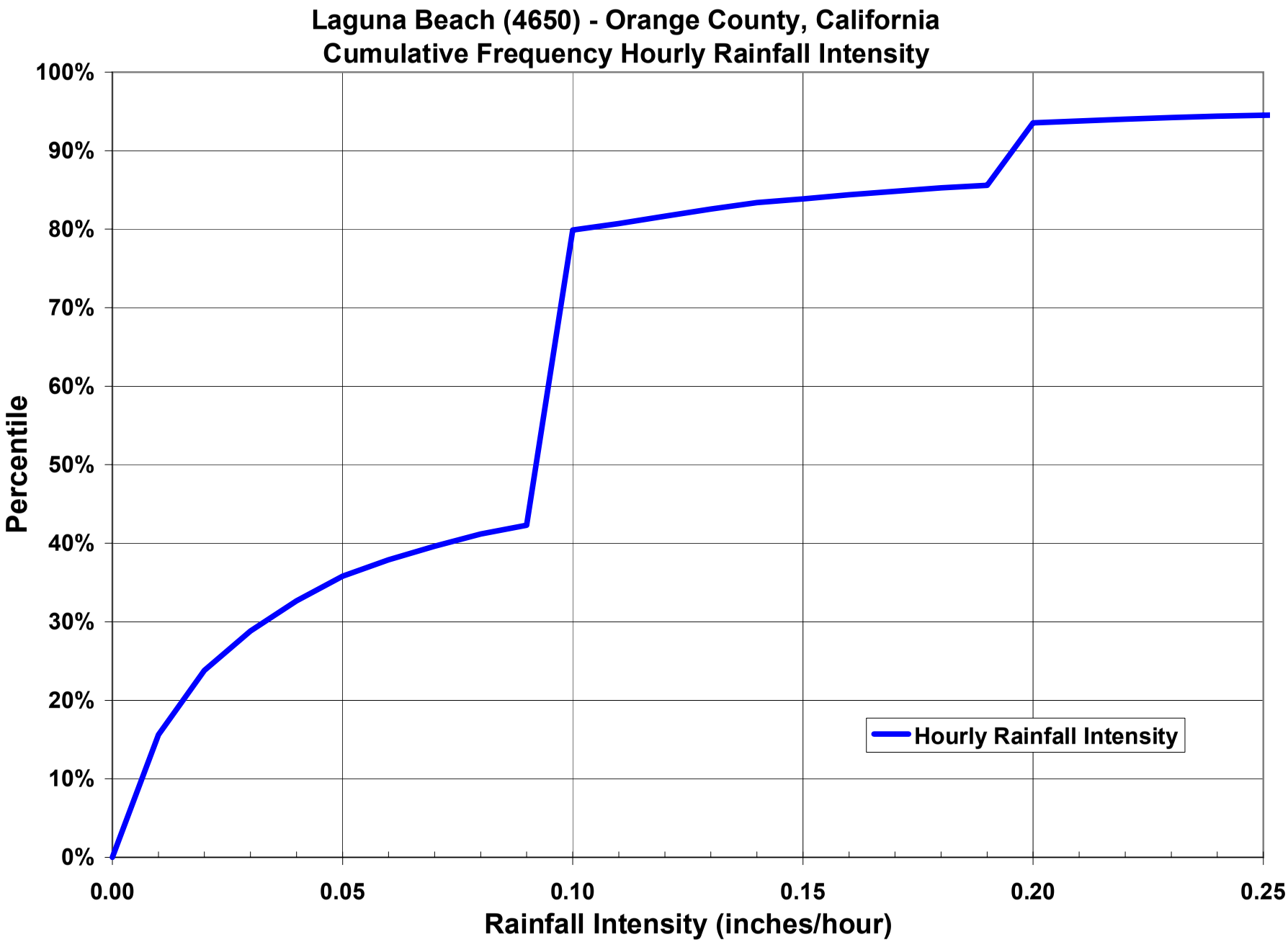

Los Angeles WSO Airport (5114) - Los Angeles County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

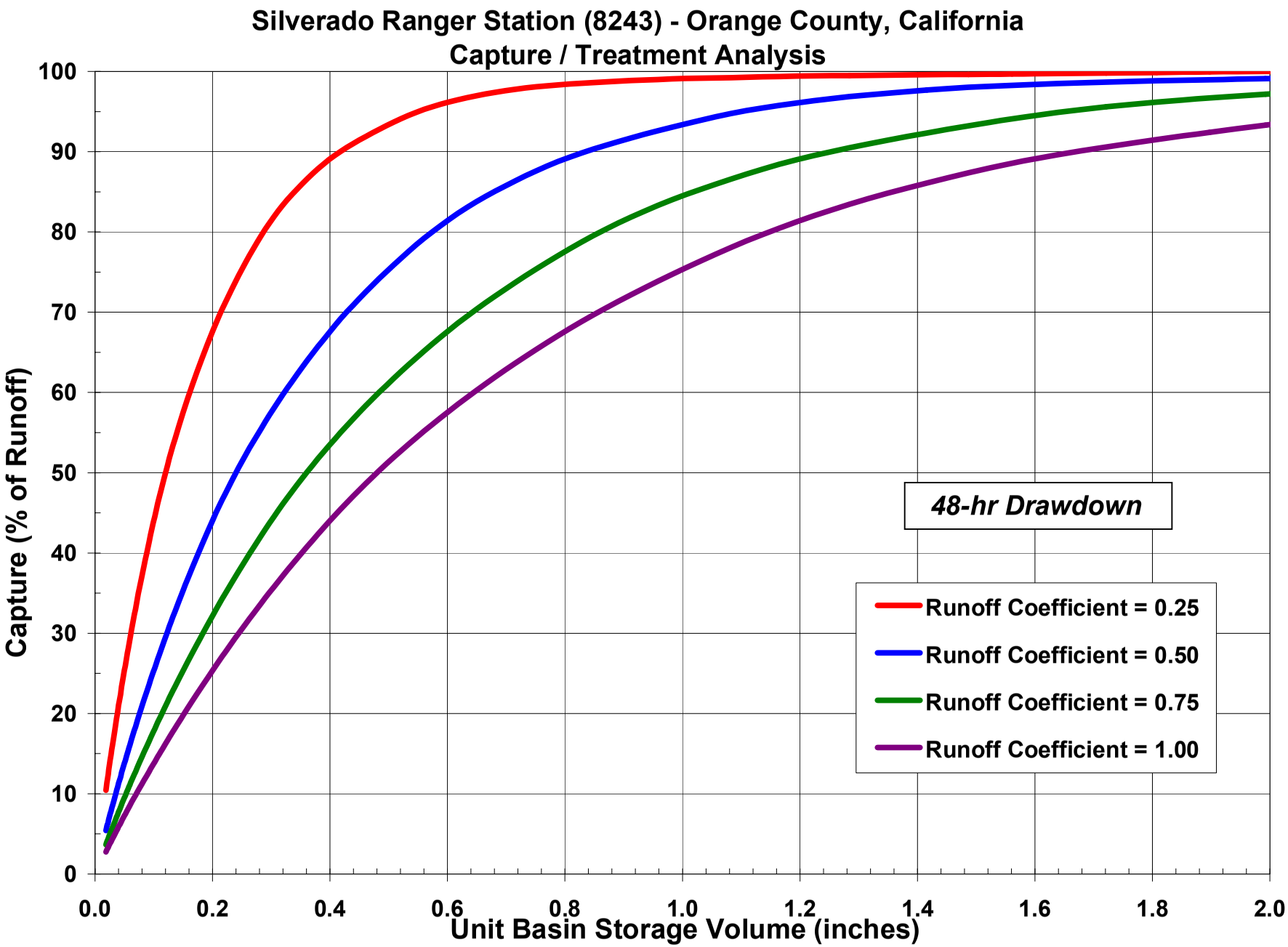

Los Angeles WSO Airport (5114) - Los Angeles County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

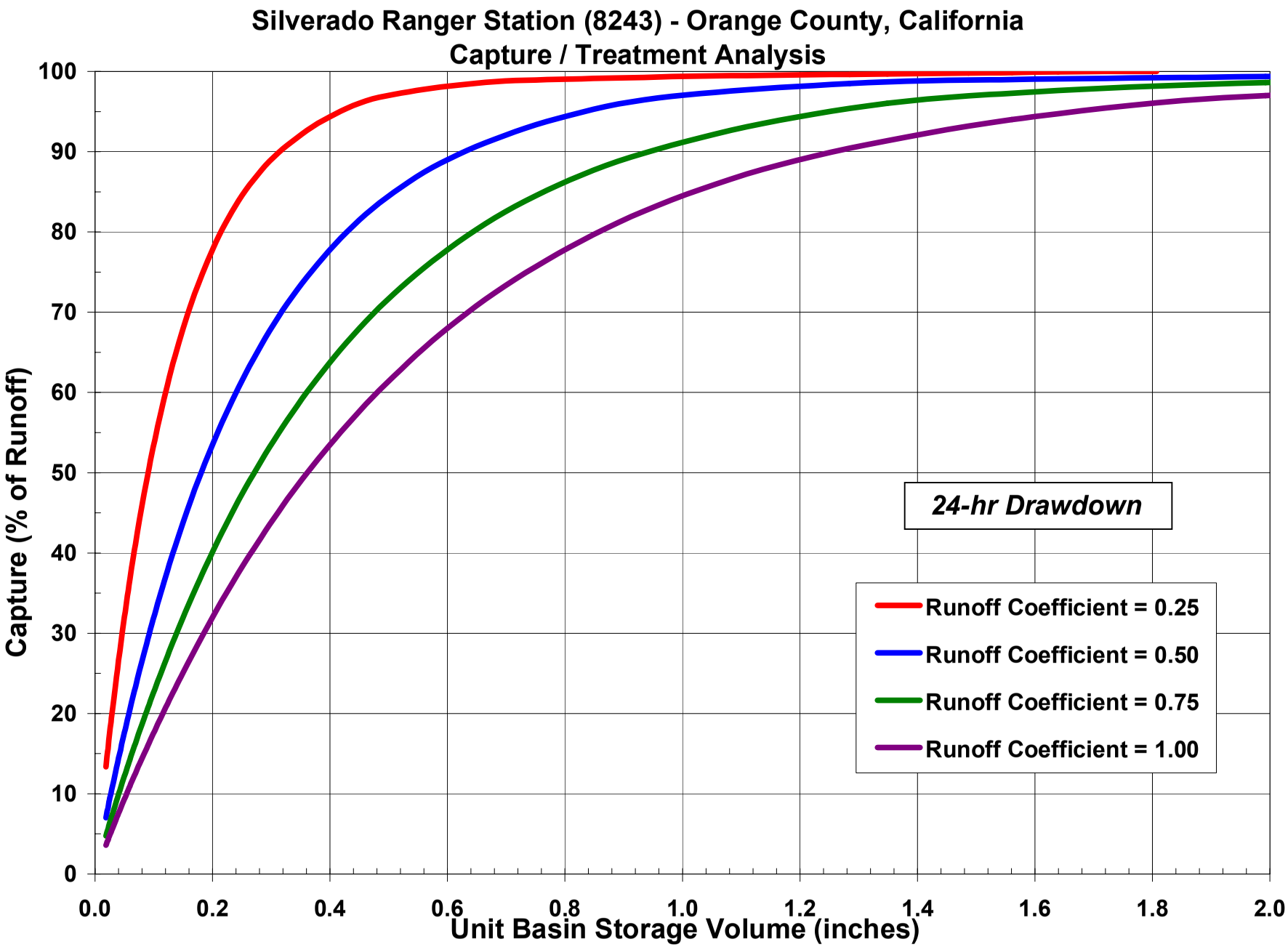

Los Angeles WSO Airport (5114) - Los Angeles County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

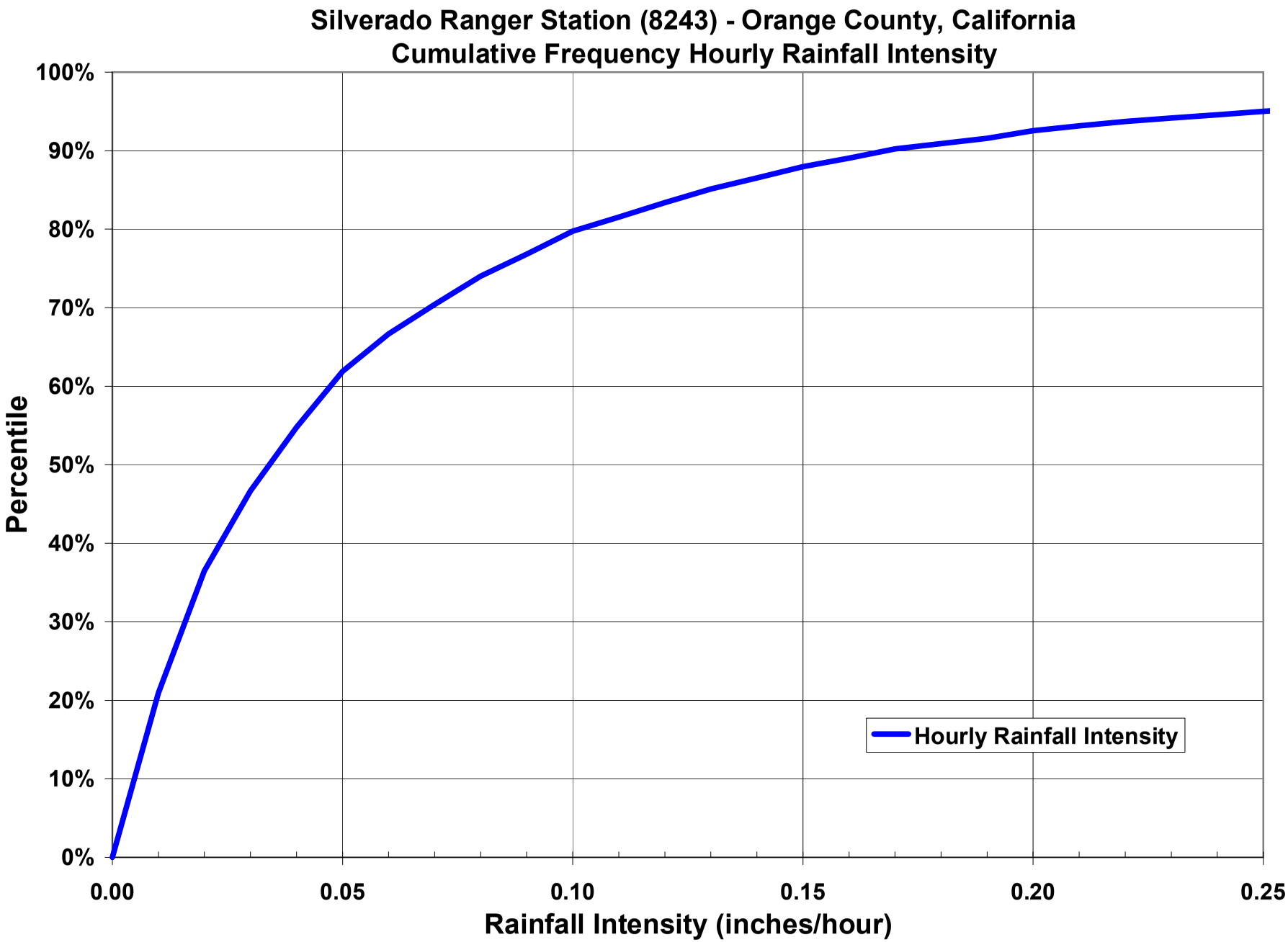

Laguna Beach (4650) - Orange County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

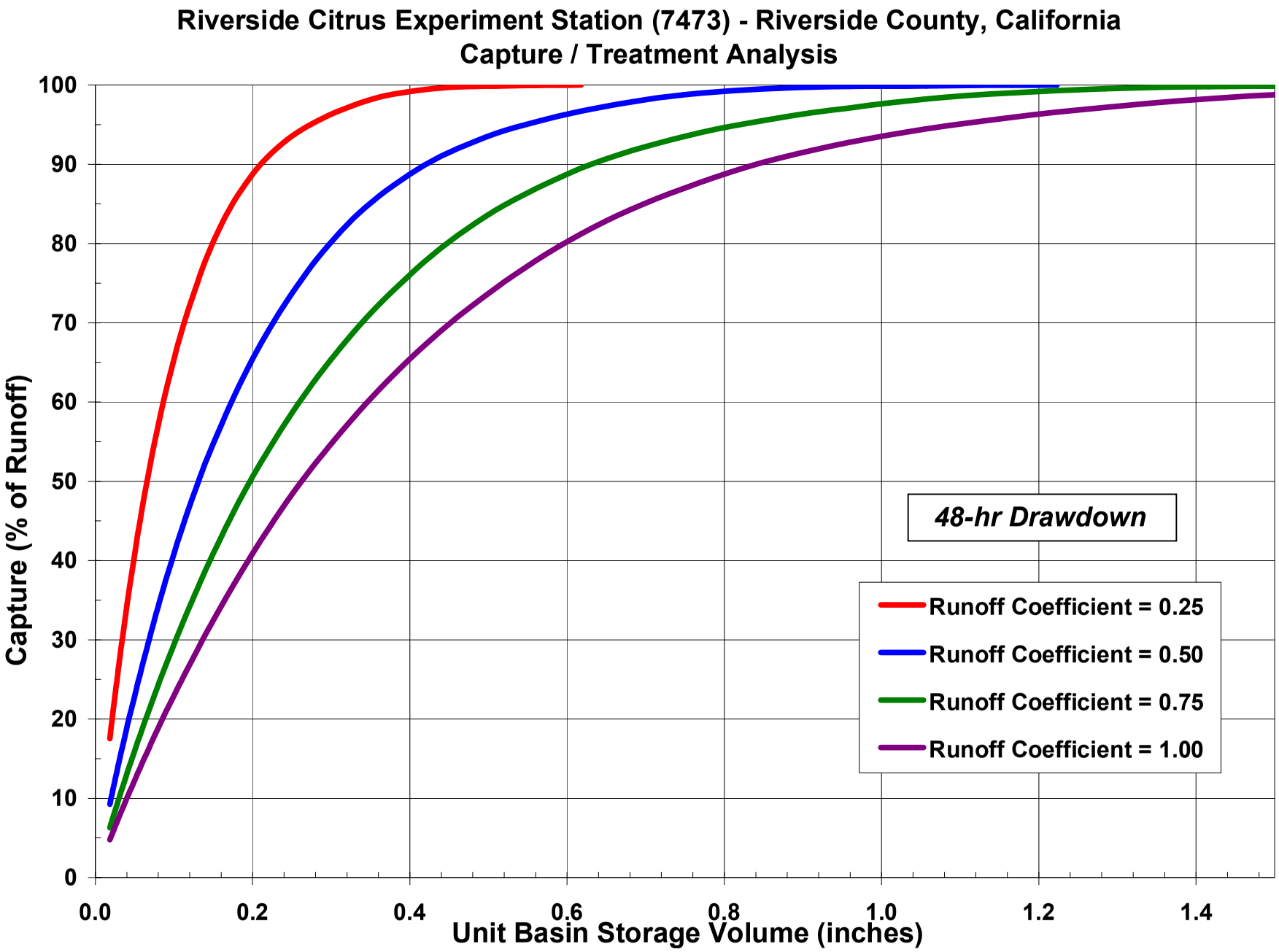

Laguna Beach (4650) - Orange County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

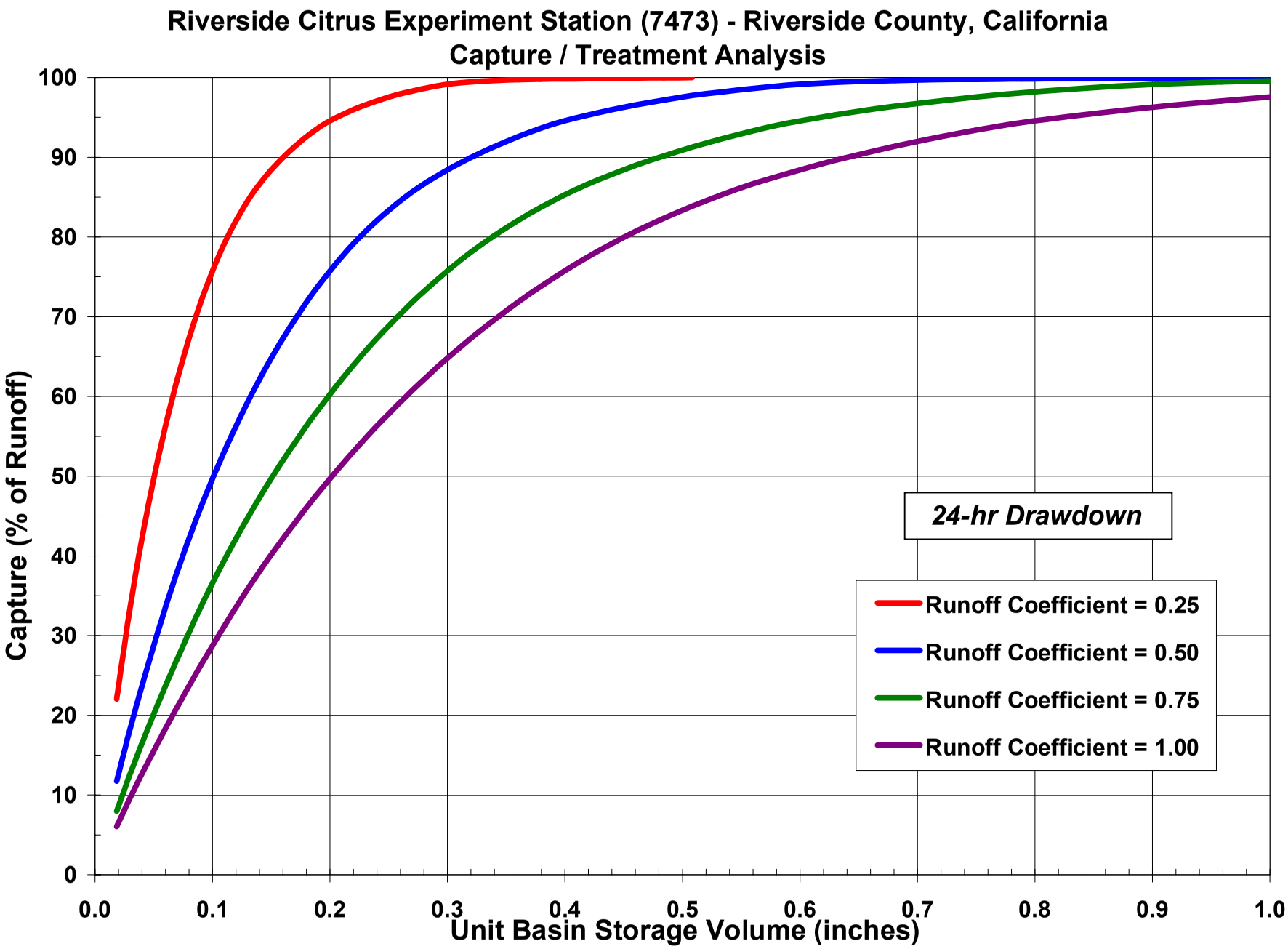

Laguna Beach (4650) - Orange County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

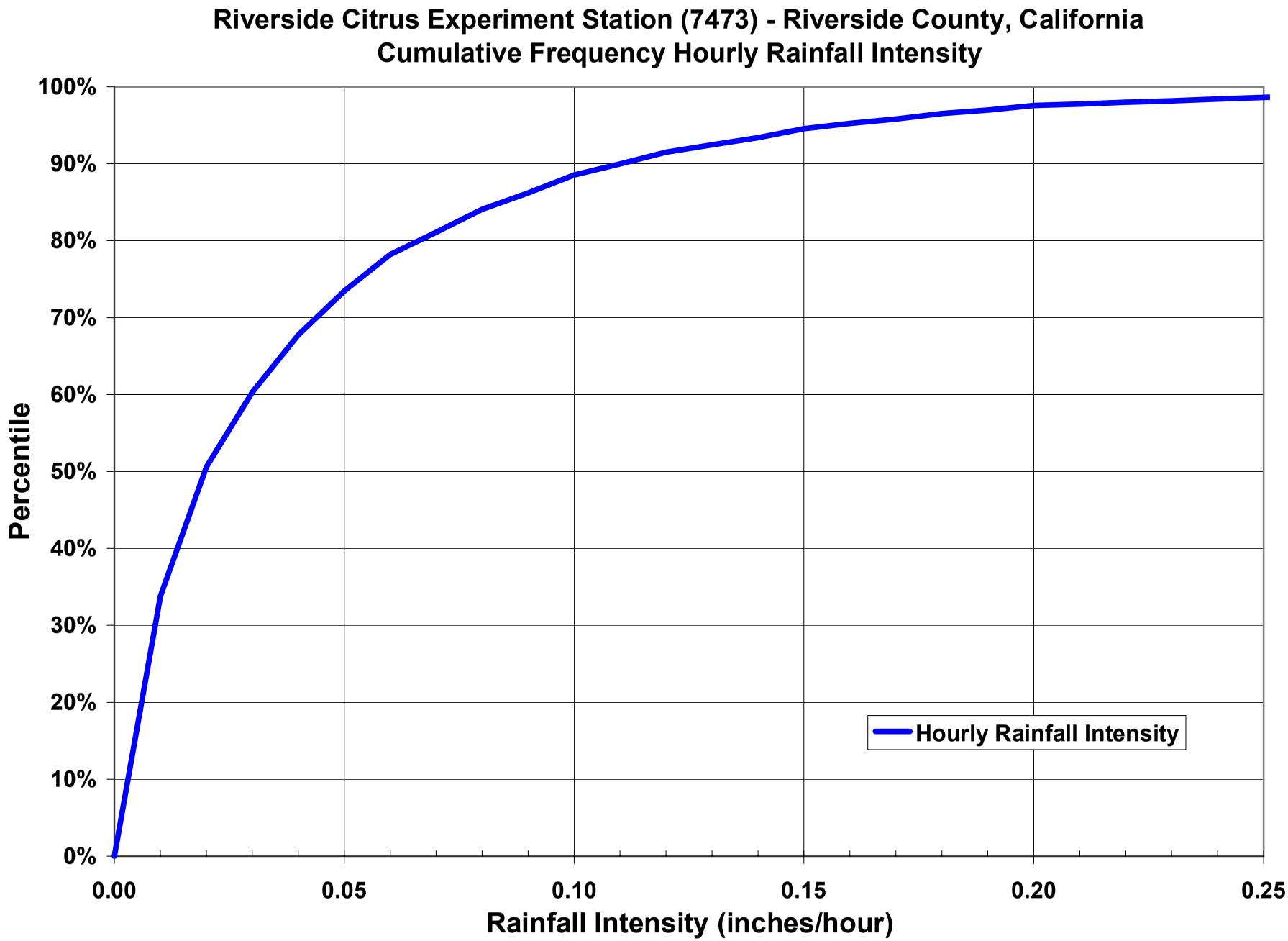

Silverado Ranger Station (8243) - Orange County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

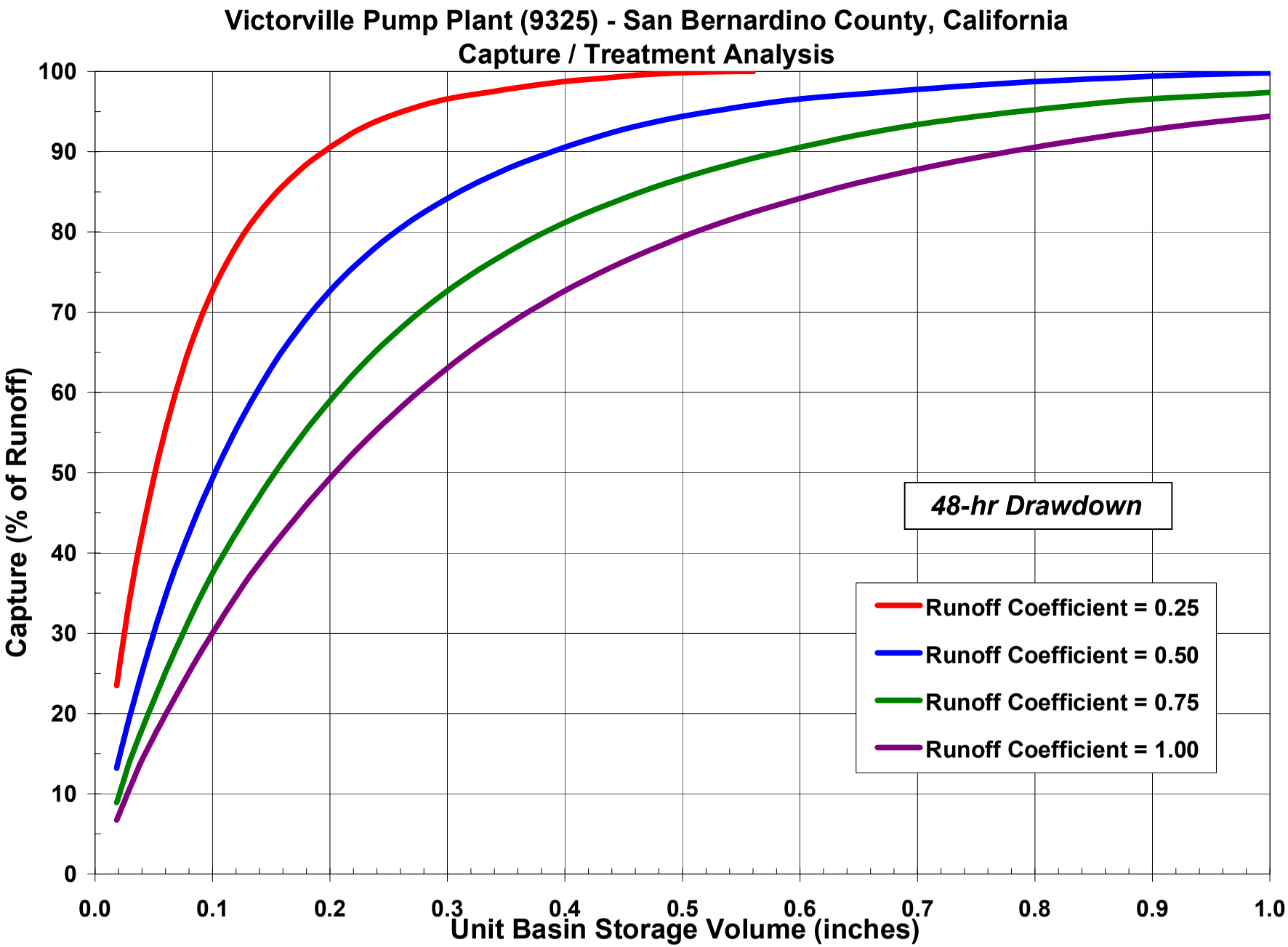

Silverado Ranger Station (8243) - Orange County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

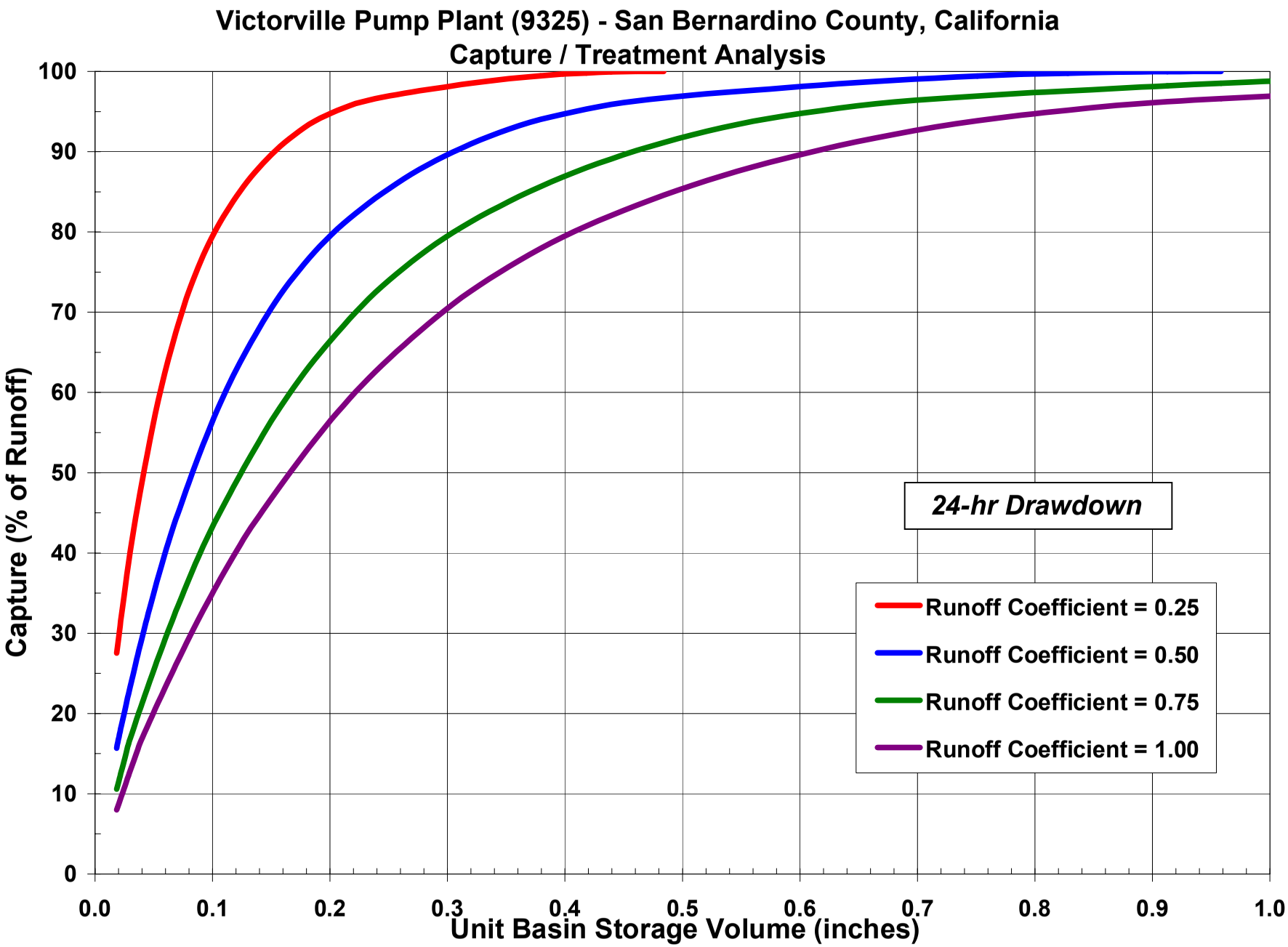

Silverado Ranger Station (8243) - Orange County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

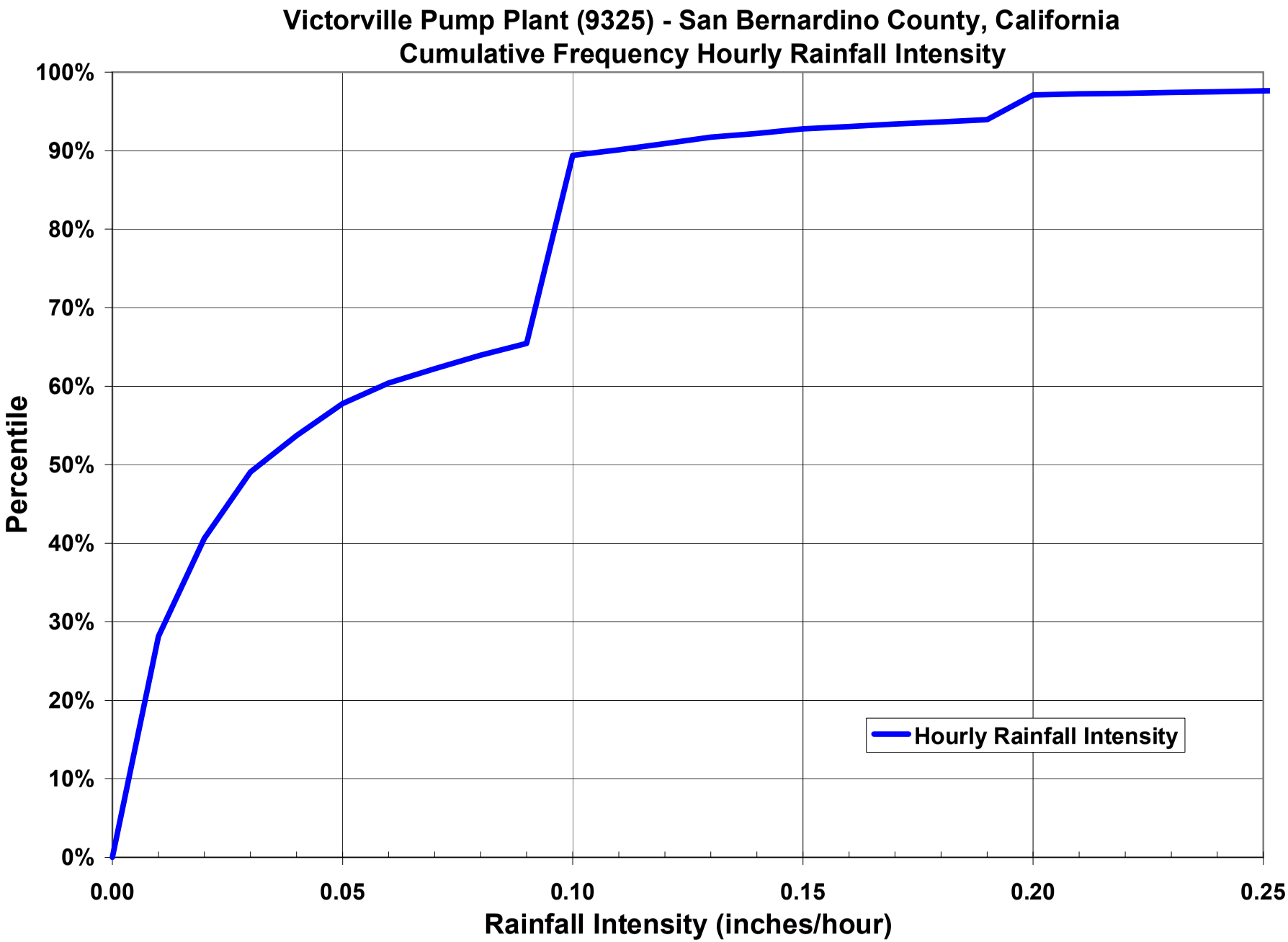

Riverside Citrus Experiment Station (7473) - Riverside County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

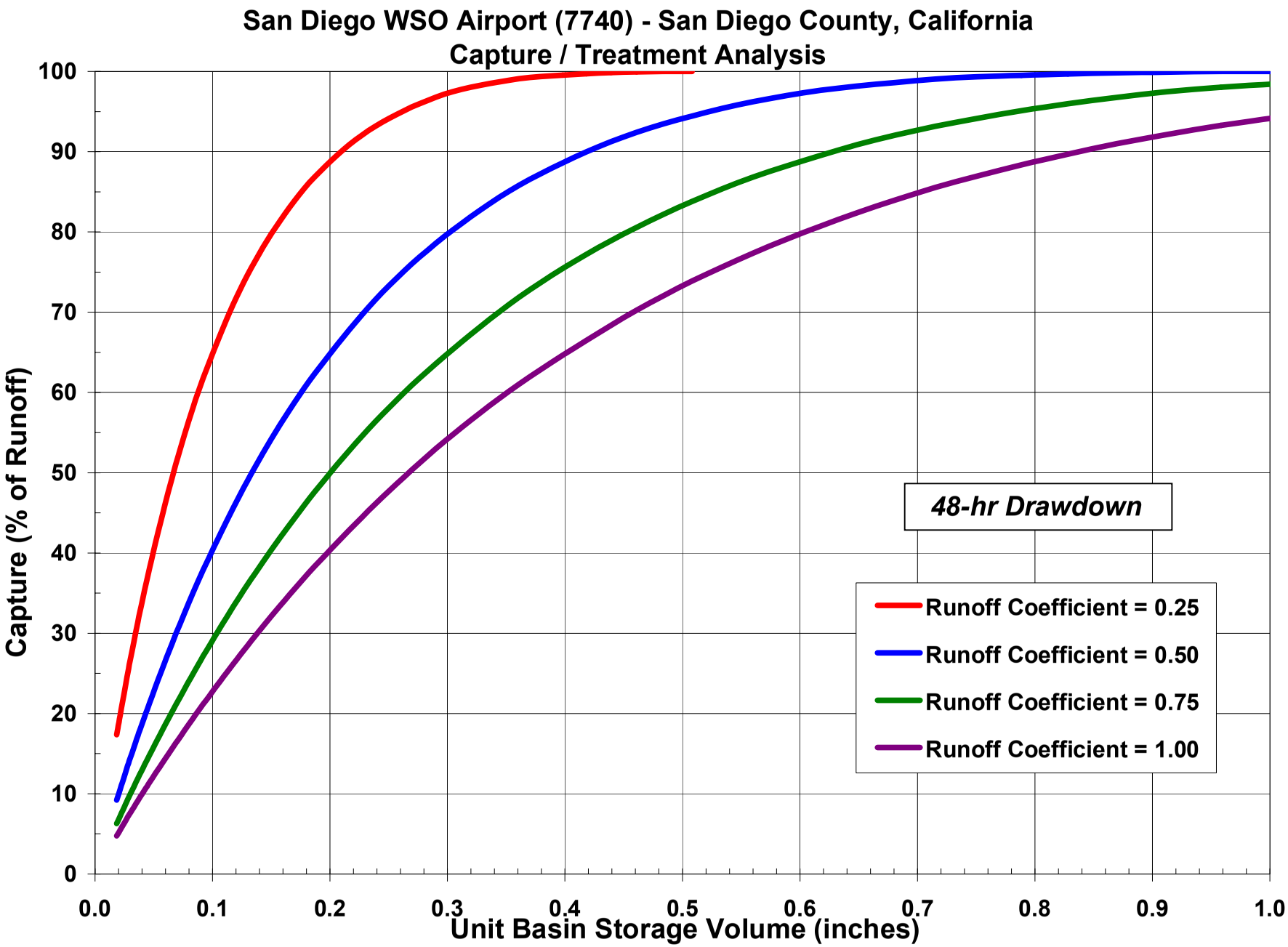

Riverside Citrus Experiment Station (7473) - Riverside County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

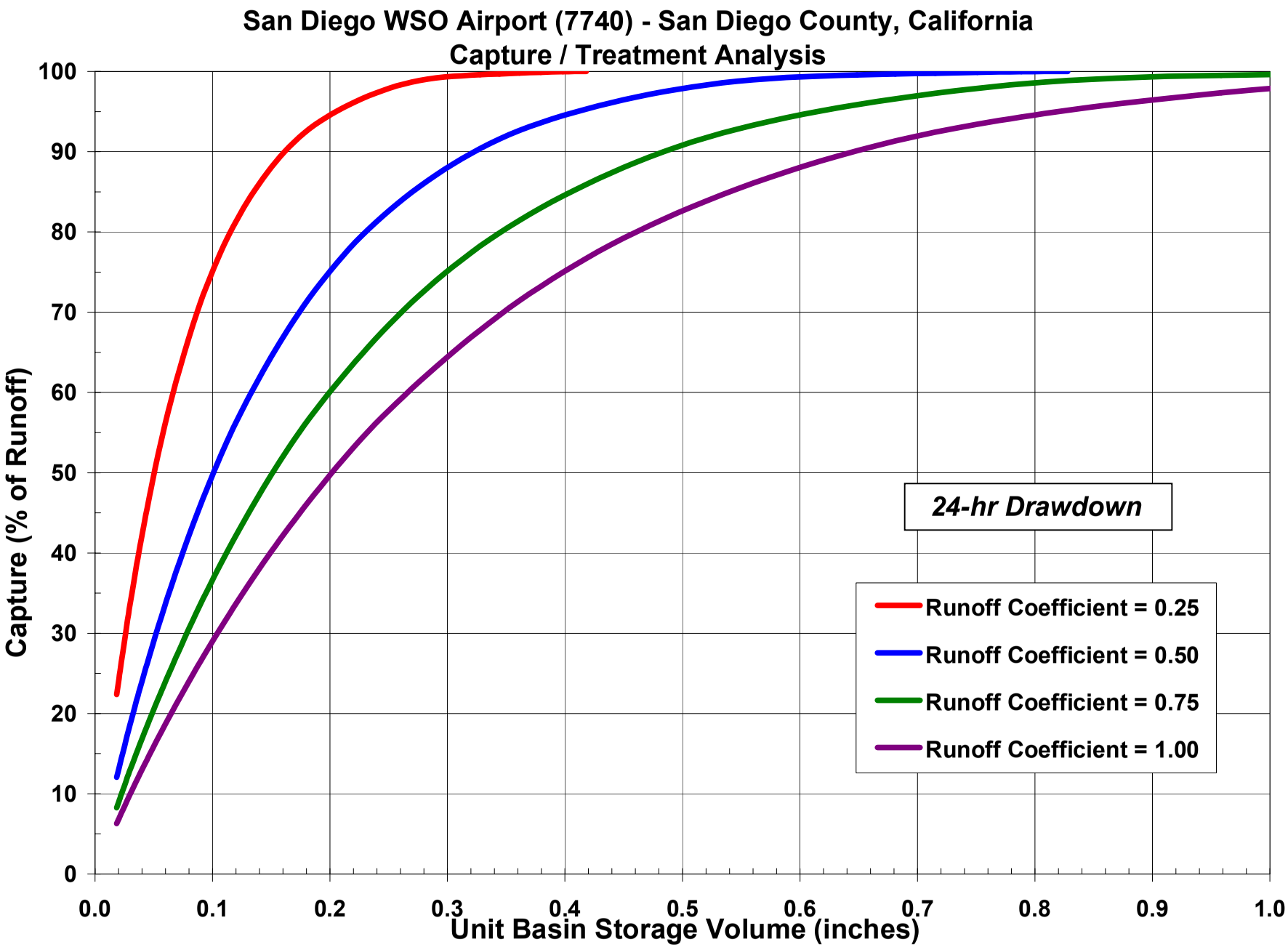

Riverside Citrus Experiment Station (7473) - Riverside County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

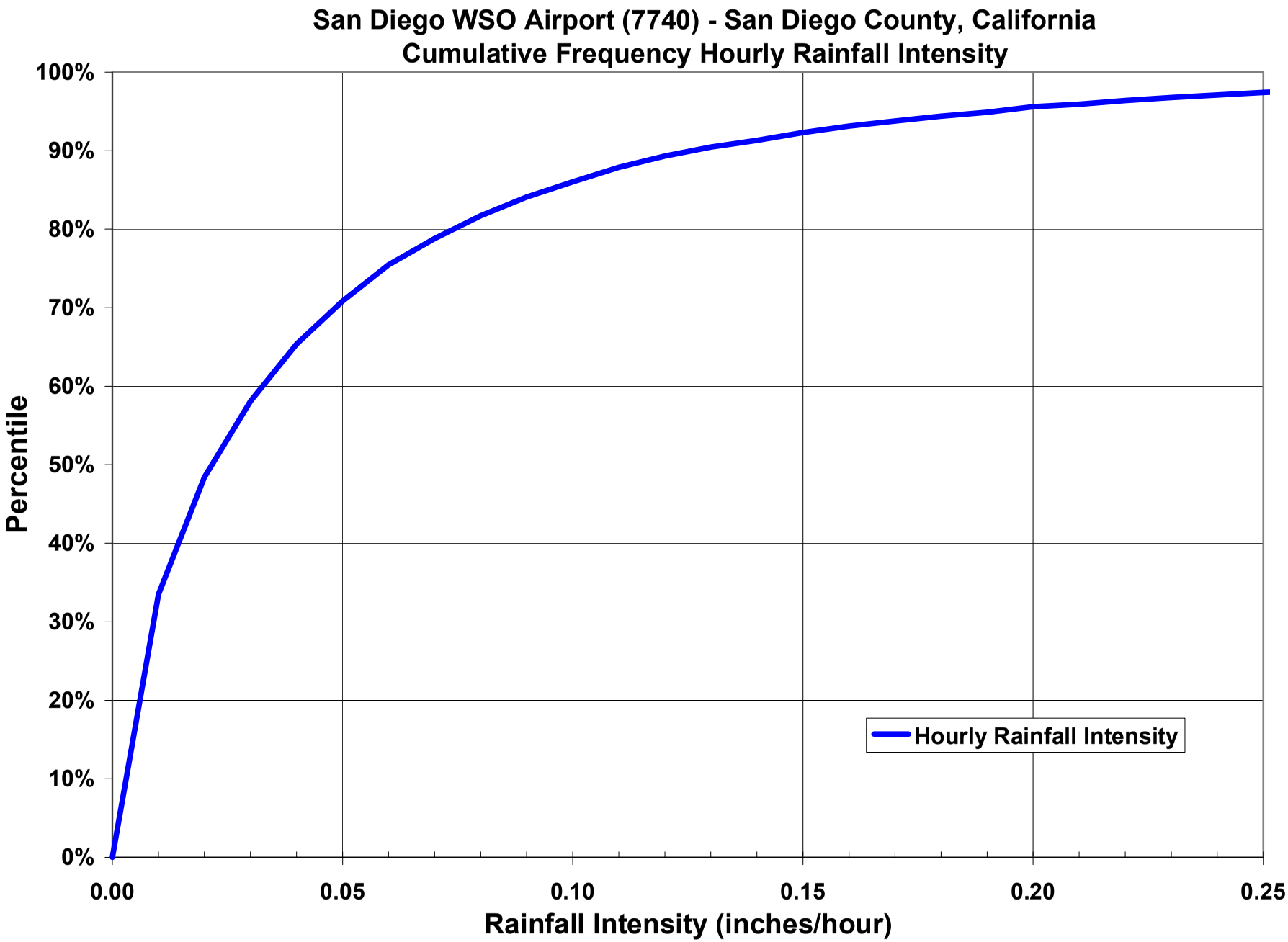

Victorville Pump Plant (9325) - San Bernardino County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

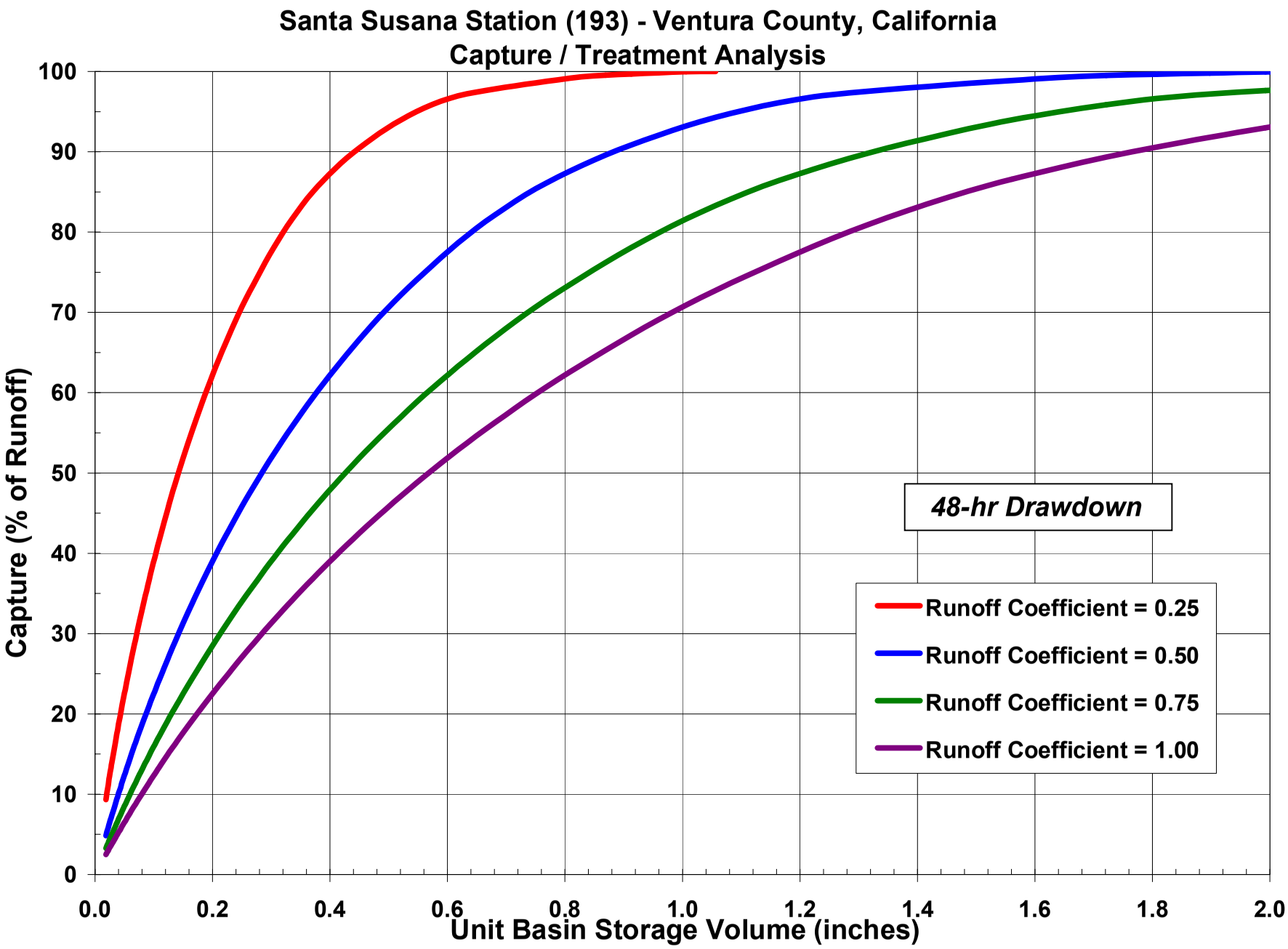

Victorville Pump Plant (9325) - San Bernardino County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

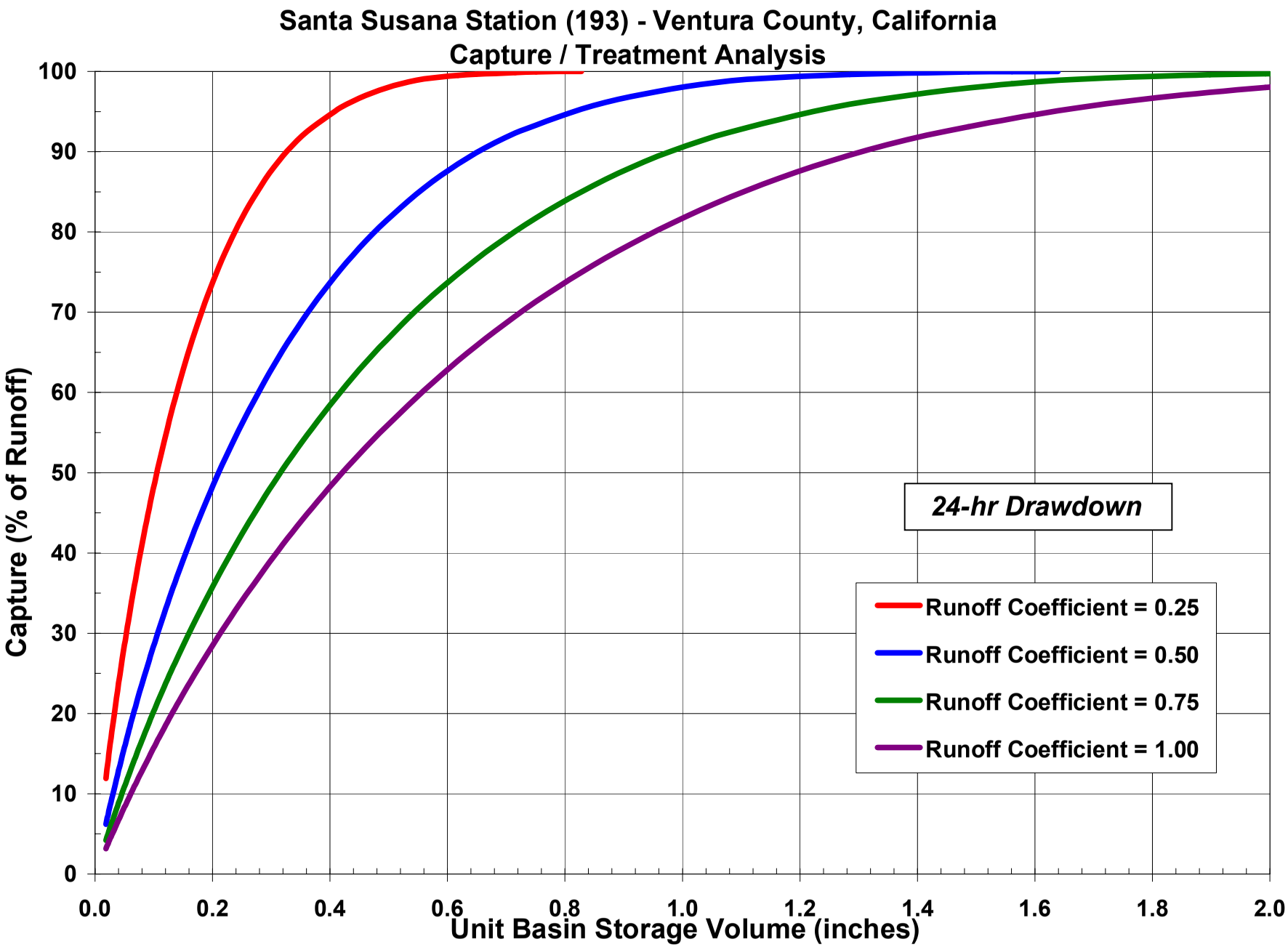

Victorville Pump Plant (9325) - San Bernardino County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

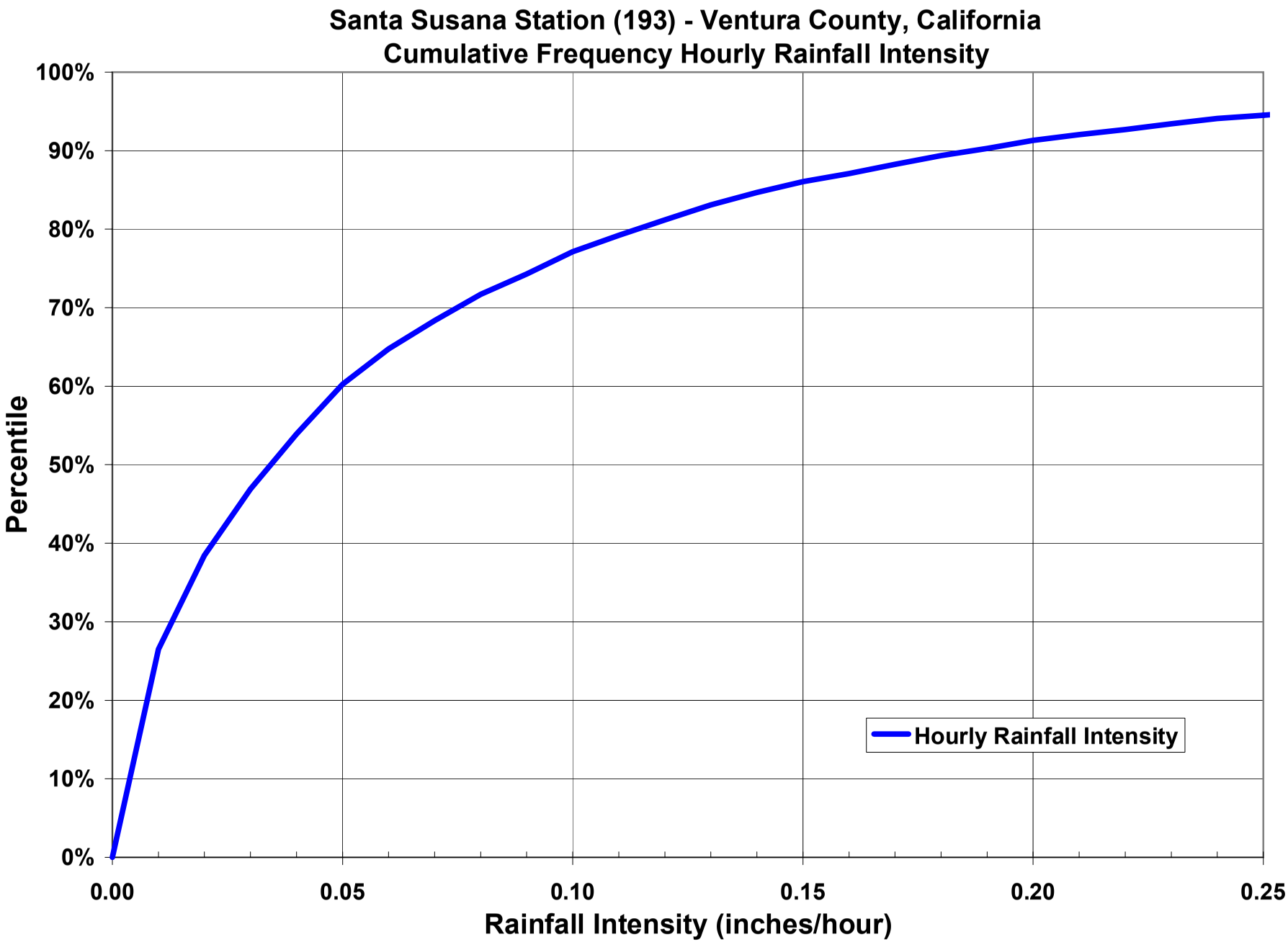

San Diego WSO Airport (7740) - San Diego County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

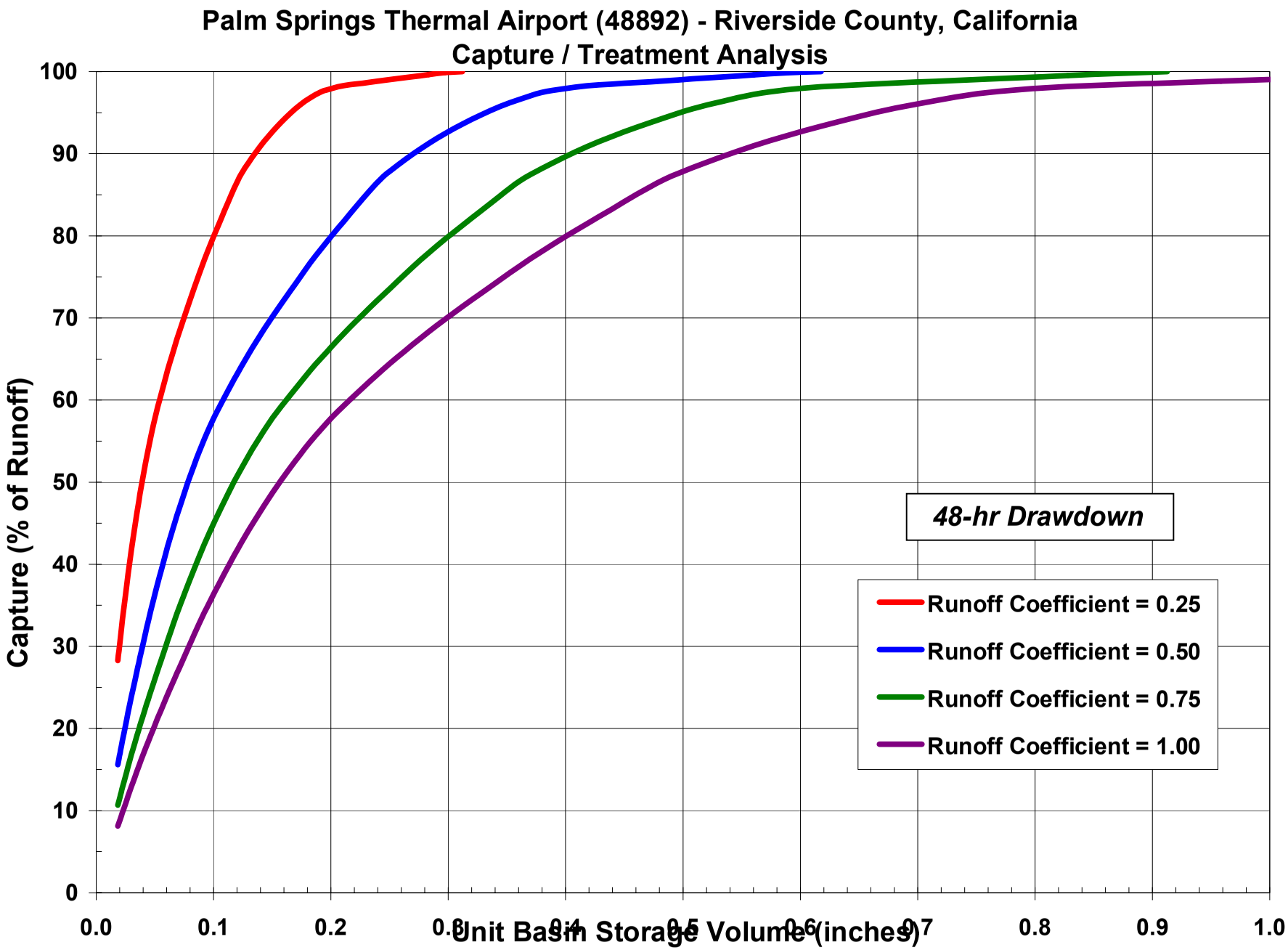

San Diego WSO Airport (7740) - San Diego County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00

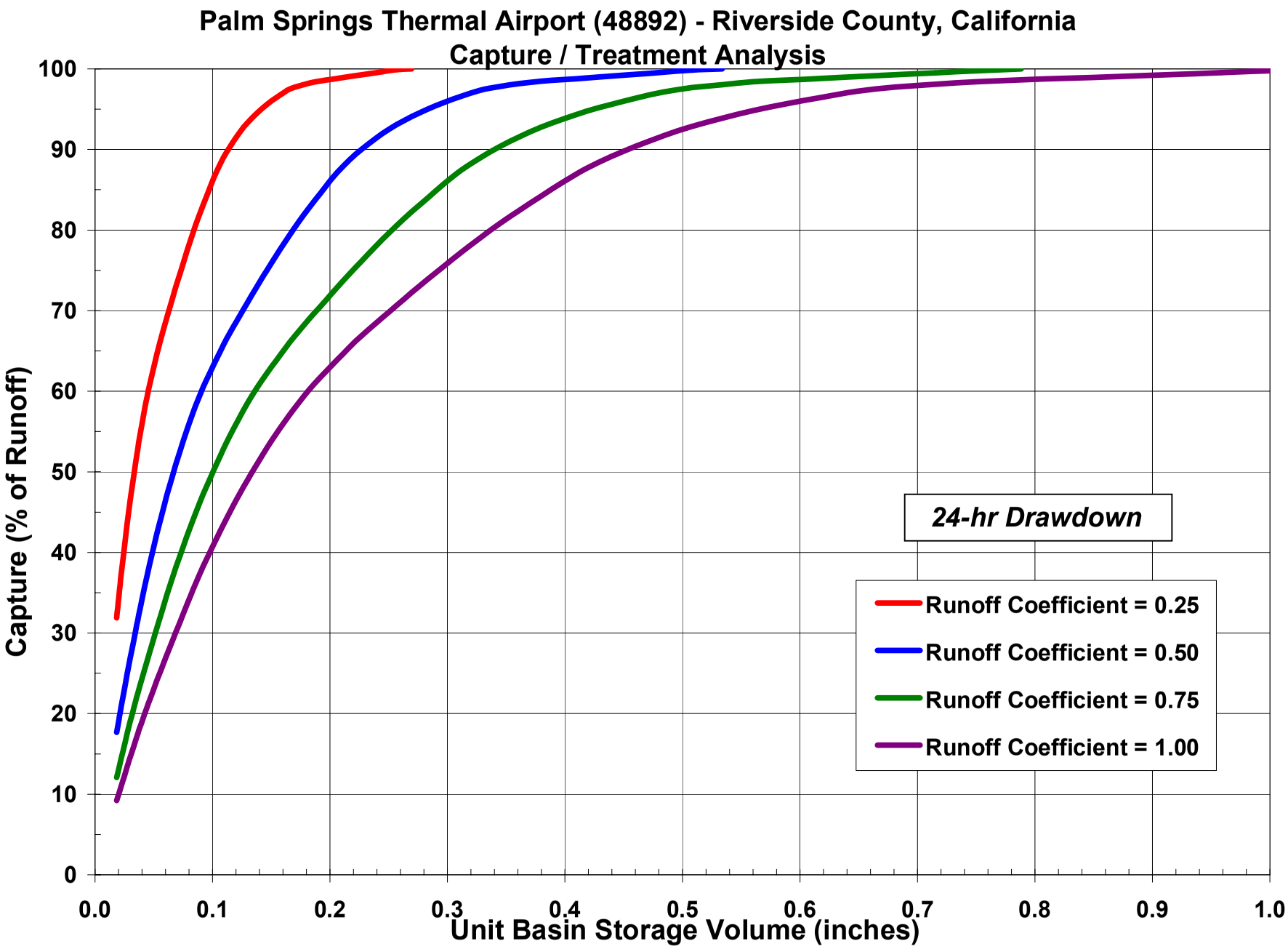

San Diego WSO Airport (7740) - San Diego County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity

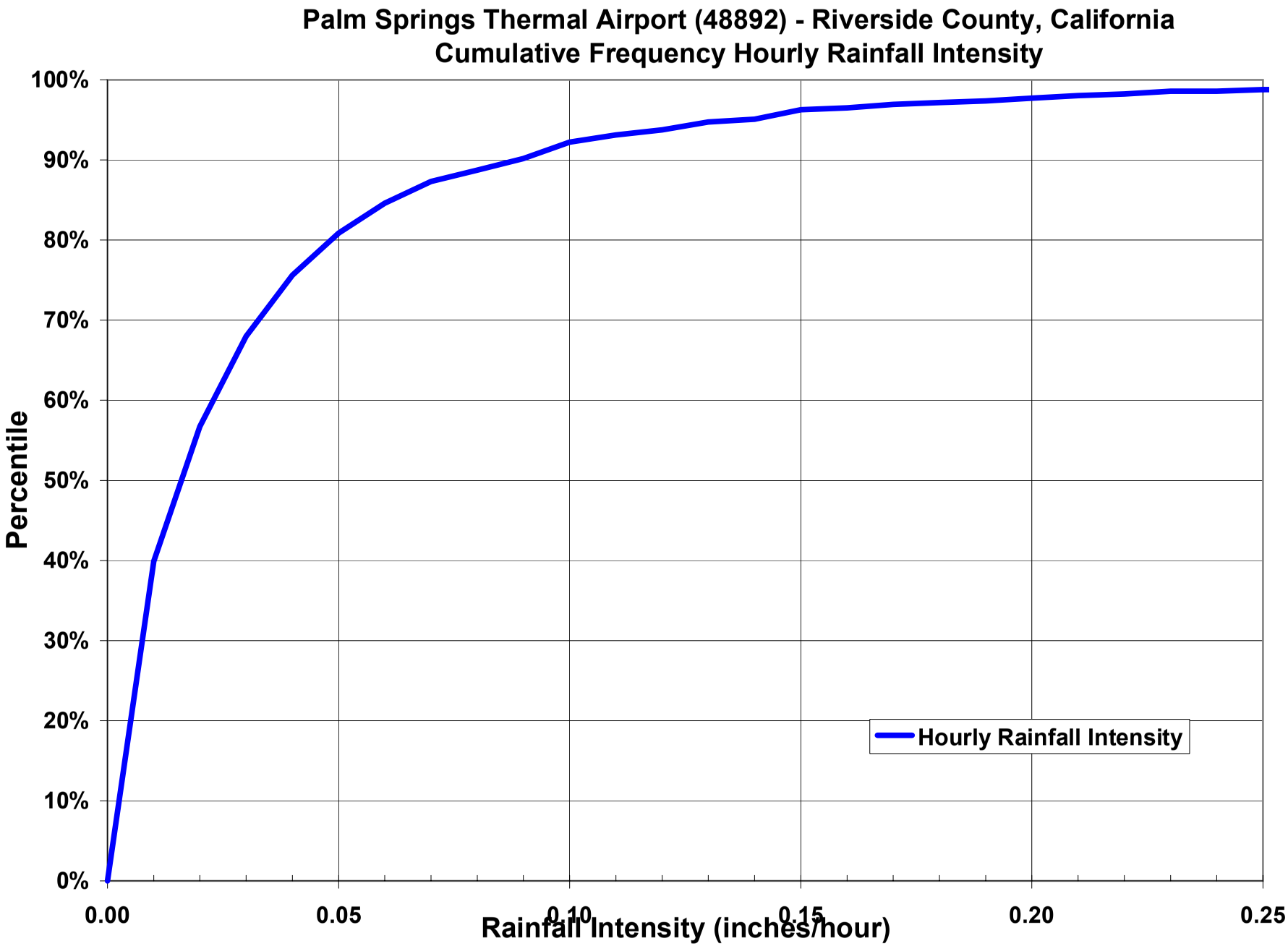

Santa Susana Station (193) - Ventura County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00


Santa Susana Station (193) - Ventura County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00


Santa Susana Station (193) - Ventura County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity


Palm Springs Thermal Airport (48892) - Riverside County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
48-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00


Palm Springs Thermal Airport (48892) - Riverside County, California
Capture / Treatment Analysis
Capture (% of Runoff)
100
90
80
70
60
50
40
30
20
10
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Unit Basin Storage Volume (inches)
24-hr Drawdown
Runoff Coefficient = 0.25
Runoff Coefficient = 0.50
Runoff Coefficient = 0.75
Runoff Coefficient = 1.00


Palm Springs Thermal Airport (48892) - Riverside County, California
Cumulative Frequency Hourly Rainfall Intensity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentile
0.00
0.05
0.10
0.15
0.20
0.25
Rainfall Intensity (inches/hour)
Hourly Rainfall Intensity