



M E M O R A N D U M

TO:	North Central Texas Counci iSWM Implementation Sub	l of Governments committee	DATE: April 12, 2021					
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SUBJECT:	Re-evaluate 85th Percentile Rainfall Requirements							

INTRODUCTION

The North Central Council of Governments (NCTCOG) Integrated Stormwater Management (iSWM) Technical Manual on Water Quality, based on a rainfall analysis, identifies 1.5-inches as the average depth of rainfall associated with the 85th-percentile storm for the NCTCOG region. The iSWM Technical Manual recommends complete capture of the runoff generated by the 85th-percentile storm as the basis for design of stormwater management systems to treat water quality and a minimum detention period of 24-hours. The volumetric runoff coefficient (RV) and the water quality protection volume (WQV) associated with the 85th-percentile storm are calculated using equations (1) and (2) shown below. In inches, WQV may be expressed using equation (3).

$$R_V = 0.05 + 0.009 * I \tag{1}$$

where,

 R_V = volumetric runoff coefficient

I = percent impervious cover (%)

$$WQ_V = \frac{1.5 * R_v * A}{12}$$
(2)

where,

WQV = water quality protection volume (acre-feet)

RV = volumetric runoff coefficient

A = drainage area (acres)

$$Q_{WV} = 1.5 * R_V$$
 (3)

where,

QWV = water quality protection volume (inches)

The purpose of this task is to re-evaluate the 85th-percentile storm runoff capture as stipulated in the iSWM Technical Manual. Specifically, long-term rainfall hourly data at National Climactic Data Center (NCDC) stations in the NCTCOG region were analyzed using the Urban Watersheds Research Institute (UWRI) Water Quality Capture Optimization and Statistics Model (WQ-COSM)¹.

¹ https://www.uwtrshd.com/downloads/water-quality-capture-optimization-statistical-model-wq-cosm

METHODS

The methods used by WQ-COSM to determine the water quality capture volume (WQCV) basin size using WQ-COSM are summarized below.

- 1. WQ-COSM uses continuous sub-daily rainfall data to identify individual storms based on a user-specified inter-event dry period. The program subsequently screens out small user-specified non-runoff producing rainfall events and large outlier storms prior to calculating runoff.
- 2. The filtered rainfall data is used to calculate continuous runoff at each time increment. Runoff may be calculated using the Rational, Horton or Green-Ampt methods.
- 3. Conducts a simple mass balance of runoff volume and number of storms captured based on a range of increasing WQCV basin size and user-specified time to empty WQCV basin.
- 4. Reports optimal WQCV basin size based on the "point of diminishing return" determined from plots of runoff volume and number of storm events captured against a range of WQCV basin sizes.

The Tarrant Regional Water District (TRWD) recently revised the estimates for water quality volume (WQV) using a continuous hydrology simulation model. While the runoff capture is still based on the 85th-percentile storm event, the WQV accounts for basin drain time. No other similar methodologies were found in Texas at this time.

The input parameters required by WQ-COSM are shown in Figure 1. The ranges of input parameters recommended by the developers of WQ-COSM are summarized in Table 1.

Parameter Name	Recommer	nded Range	Default	Units	
	Min	Max	Values		
Dry Period Separation for New Storm	6	12	6	hours	
Minimum Storm Depth Needed for Runoff	0.06	0.12	0.08	inches	
WQCV Basin Emptying Time	12	96	40	hours	
Drying Period	3	7	5	days	

Table 1. Recommended Ranges for WQ-COSM Input Parameters.

Input Parameters Summary Sheet

WQ-COSM v3.1.01 (January 2020)



Figure 1. WQ-COSM Input Parameters.

WQ-COSM was used to determine optimal WQCV basin size for all National Climactic Data Center (NCDC) stations with at least 30-years of hourly precipitation data in the NCTCOG region (Figure 2). Default values (Table 1) were used for dry period separation for new storms, minimum storm depth needed for runoff, WQCV basin emptying time and drying period. Catchment imperviousness was assumed at 100%. Continuous hourly rainfall data for the stations shown in Figure 2 were downloaded from the National Centers for Environmental Information (NCEI) Climate Data Online Map Server (https://gis.ncdc.noaa.gov/maps/ncei/cdo/hourly?layers=001).



Figure 2. NCDC Hourly Stations with 30-years of Rainfall Data.

The results of the analysis using WQ-COSM for the Fort Worth Meacham Field (COOP:413284) to determine optimal WQCV basin size are shown in Figure 3. The results of the analysis suggest that the optimal WQCV basin size is 0.95-inches (based on runoff volume capture) and 0.88-inches (based on storm events capture). Reducing the WQCV basin emptying time to 24-hours from 40-hours results in slightly lower WQCV basin sizes - 0.88-inches based on runoff volume and 0.80-inches based on storm events captured. Increasing the dry period separation for new storm to 12-hours from 6-hours results in higher WQCV basin sizes - 0.98-inches based on runoff volume and 0.89-inches

In contrast, the water quality protection volume (Q_{WV}) using the current iSWM Technical Manual methodology is calculated as 1.43-inches, assuming 100% imperviousness and 85th-percentile storm depth of 1.5-inches. The 85th-percentile 24-hour rainfall depth for the Fort Worth Meacham Field based on the NCDC continuous data from 1940 to 2013 is 1.2-inches. The Q_{WV} using 1.2-inches as the 85th-percentile rainfall depth is calculated as 1.14-inches. The results of the WQCV analysis for all stations shown in Figure 2 are summarized in Appendix A. The re-calculated 85th-percentile storm depths using continuous rainfall data for the same locations are summarized in Appendix B.

WQCV Table 100% Imperviousness											
Ontimized	Values:										
WC	CV Based	on Runoff Vo	olume Captu	red	W	WQCV Based on Storm Events Captured					
								•			
Percent of			Number of	Percent of	Percent of		Number of		Percent of		
Volume		Volume	Storms	Storms	Storms		Storms	Volume	Volume		
Captured	WQCV	Captured	Captured	Captured	Captured	WQCV	Captured	Captured	Captured		
(%)	(in)	(in)		(%)	(%)	(in)		(%)	(%)		
84.9%	0.9525	1441.85	2,934	87.31%	85.6%	0.8763	2,878	1400.38	82.41%		
Incrementa	al WQCV Va	alues:									
WC	CV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Percent of			Number of	Percent of	Percent of		Number of		Percent of		
Volume		Volume	Storms	Storms	Storms		Storms	Volume	Volume		
Captured	WQCV	Captured	Captured	Captured	Captured	WQCV	Captured	Captured	Captured		
(%)	(in)	(in)		(%)	(%)	(in)		(%)	(%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0525	169.93	42	1.25%	10.0%	0.1020	336	317.95	18.71%		
20.0%	0.1099	339.85	420	12.51%	20.0%	0.1335	672	405.34	23.85%		
30.0%	0.1750	509.78	1,004	29.89%	30.0%	0.1756	1,008	511.18	30.08%		
40.0%	0.2520	679.70	1,432	42.61%	40.0%	0.2341	1,344	644.61	37.93%		
50.0%	0.3449	849.63	1,832	54.51%	50.0%	0.3027	1,680	779.15	45.85%		
60.0%	0.4586	1019.56	2,181	64.92%	60.0%	0.4008	2,016	937.57	55.18%		
70.0%	0.6045	1189.48	2,494	74.23%	70.0%	0.5321	2,352	1110.69	65.36%		
72.5%	0.6491	1231.96	2,567	76.39%	72.5%	0.5748	2,436	1157.21	68.10%		
75.0%	0.6960	1274.44	2,643	78.65%	75.0%	0.6196	2,520	1204.36	70.88%		
77.5%	0.7492	1316.93	2,734	81.37%	77.5%	0.6725	2,604	1253.88	73.79%		
80.0%	0.8100	1359.41	2,813	83.73%	80.0%	0.7224	2,688	1295.51	76.24%		
82.5%	0.8789	1401.89	2,880	85.70%	82.5%	0.7754	2,772	1336.10	78.63%		
85.0%	0.9574	1444.37	2,937	87.40%	85.0%	0.8494	2,856	1384.87	81.50%		
87.5%	1.0469	1486.85	3,000	89.28%	87.5%	0.9622	2,940	1446.81	85.14%		
90.0%	1.1536	1529.33	3,063	91.15%	90.0%	1.0845	3,024	1502.78	88.44%		
92.5%	1.2856	1571.81	3,131	93.19%	92.5%	1.2406	3,108	1558.39	91.71%		
95.0%	1.4654	1614.30	3,201	95.28%	95.0%	1.4396	3,192	1609.26	94.70%		
97.5%	1.7687	1656.78	3,279	97.59%	97.5%	1.7525	3,276	1655.22	97.41%		
100.0%	3.5050	1699.26	3,360	100.00%	100.0%	3.5050	3,360	1699.26	100.00%		



Figure 3. Optimal WQCV Basin Size using WQ-COSM for the Fort Worth Meacham Field.

A scatter plot of the water quality capture volume (WQCV) using WQ-COSM against the water quality protection volume calculated using the NCTCOG method is shown in Figure 4. The plot suggests that WQCV is generally lower than QWV for the NCDC stations shown in Figure 2.



Figure 4. Scatter Plot of WQCV and QWV.

CONCLUSIONS

The water quality capture volume was calculated using the empirical approach recommended in the iSWM Technical Manual and the Water Quality Capture Optimization Statistical Model (WQ-COSM). The results based on the iSWM method results in a higher volume capture requirement. The optimal capture volume calculated using WQ-COSM are slightly lower than those calculated using the iSWM equations. Note however that the WQ-COSM outcomes are sensitive to the input parameters and should be carefully reviewed while calculating optimal water quality capture volumes.

The WQ-COSM methodology is based on analyzing long-term continuous rainfall-runoff data to determine the capacity of a detention basin for optimal runoff capture. Basins sized using the WQ-COSM methodology may or may not completely capture the runoff associated with the 85th-percentile storm. The 85th-percentile storm event is often regarded as a reasonable target event to address the vast majority of smaller, pollutant-loaded storms. The analysis presented herein using WQ-COSM generally shows a smaller capture volume than the 85th-percentile storm event. However, neither WQ-COSM nor the 85th-percentile analysis determine the actual amount of pollutants removed. Depending on site-specific water quality compliance targets, pollutant capture should be evaluated through monitoring or water quality modeling. The initial estimated basin sizes determined using the required methodology should be revised accordingly based on pollutant capture. The methods discussed herein also do not evaluate the cost of pollutant removal based on basin capacity. Supplementary analyses that determine the optimal basin size based on the cost of pollutant removal (such as the USEPA's SUSTAIN model²) may also be considered.

² <u>https://www.epa.gov/water-research/system-urban-stormwater-treatment-and-analysis-integration-sustain</u>

Our recommendation to the iSWM Technical committee based on the water quality capture volume following the WQ-COSM methodology and comparison water quality protection volume based on the 85th-percentile storm runoff are as follows -

- 1) The WQ-COSM methodology optimizes WQCV based on a long-term analysis of rainfall data and therefore provides a sound basis for BMP sizing. The WQCV determined using WQ-COSM is consistently smaller than the volume determined for complete capture of the 85th-percentile storm. A smaller WQCV also implies lower capital costs. The WQCV based on the WQ-COSM methodology is therefore recommended as an alternate option to the iSWM's 85th-percentile storm capture method.
- 2) Instances where a BMP is being designed to address specific water quality targets, it is recommended that the capture volume be calculated using both methods to evaluate if the level of treatment required to meet water quality criteria by one or the other or both methods. The low-cost option capable of achieving water quality goals should be selected.

Appendix A WQ-COSM Results for Selected NCDC Stations

WQCV Table 100% Imperviousness											
Optimized	Values:										
WC	CV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red		
			· ·								
Percent of			Number of	Percent of	Percent of		Number of		Percent of		
Volume		Volume	Storms	Storms	Storms		Storms	Volume	Volume		
Captured	WQCV	Captured	Captured	Captured	Captured	WQCV	Captured	Captured	Captured		
(%)	(in)	(in)		(%)	(%)	(in)		(%)	(%)		
86.2%	0.9808	1279.59	2,837	89.68%	88.0%	0.9082	2,783	1249.14	84.10%		
Incrementa	al WQCV V	alues:									
WC	CV Based	on Runoff Vo	plume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red		
Deve ent of			Number of	Deveent of	Deveent of		Number of		Deveout of		
Percent of		Volumo	Number of	Percent of	Percent of		Number of	Volumo	Volume		
Captured	WOCV	Captured	Captured	Captured	Captured	WOCV	Captured	Captured	Captured		
(%)	(in)	(in)	Captureu	(%)	(%)	(in)	Captured	(%)	(%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0500	148.53	30	0.96%	10.0%	0.0972	316	277.53	18.68%		
20.0%	0.1049	297.06	402	12.72%	20.0%	0.1256	633	349.42	23.52%		
30.0%	0.1677	445.59	988	31.23%	30.0%	0.1613	949	432.34	29.11%		
40.0%	0.2430	594.12	1,401	44.28%	40.0%	0.2131	1,265	539.90	36.35%		
50.0%	0.3329	742.65	1,756	55.52%	50.0%	0.2860	1,582	669.67	45.09%		
60.0%	0.4411	891.18	2,070	65.43%	60.0%	0.3750	1,898	804.66	54.18%		
70.0%	0.5818	1039.71	2,384	75.37%	70.0%	0.5004	2,214	959.11	64.57%		
72.5%	0.6265	1076.84	2,449	77.43%	72.5%	0.5374	2,293	996.56	67.10%		
75.0%	0.6742	1113.97	2,517	79.57%	75.0%	0.5760	2,372	1034.12	69.62%		
77.5%	0.7265	1151.11	2,588	81.82%	77.5%	0.6280	2,451	1078.11	72.59%		
80.0%	0.7878	1188.24	2,662	84.17%	80.0%	0.6842	2,530	1121.11	75.48%		
82.5%	0.8573	1225.37	2,740	86.63%	82.5%	0.7442	2,609	1161.85	78.22%		
85.0%	0.9381	1262.50	2,805	88.69%	85.0%	0.8106	2,689	1201.06	80.86%		
87.5%	1.0342	1299.64	2,870	90.75%	87.5%	0.8875	2,768	1239.91	83.48%		
90.0%	1.1491	1336.77	2,918	92.24%	90.0%	0.9948	2,847	1285.07	86.52%		
92.5%	1.2878	1373.90	2,964	93.71%	92.5%	1.1696	2,926	1342.86	90.41%		
95.0%	1.4720	1411.03	3,031	95.83%	95.0%	1.3951	3,005	1397.36	94.08%		
97.5%	1.8122	1448.17	3,098	97.94%	97.5%	1.6766	3,084	1436.47	96.71%		
100.0%	3.9232	1400.00	3,103	100.00%	100.0%	3.9232	3,103	1405.30	100.00%		
100.0% 90.0%		V	VQCV Tal	ble 100)% Imper	viousnes	S	•			
80.0%		and a second									
70.0%	5	17									
60.0%	5										
50.0%	5										
3 40.0%	5										
₿ 30.0%	5										
20.0%	5										
10.0%	5 🥬										
0.0% C	0.0% 0.0000 0.5000 1.0000 1.5000 2.0000 2.5000 3.0000 3.5000 4.0000 4.5000 WOCV (inches)										
		 % Runoff Optimize 	Volume Captur	ed e Captured	% S	itorm Events Ca timized Storm E	ptured				
		•		-	- 1-						

Figure 5. Optimal WQCV Basin Size using WQ-COSM for the LAKE BRIDGEPORT DAM TX US (COOP:414972).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
83.5%	0.9808	1387.72	2.871	87.22%	83.5%	0.8355	2.748	1305.92	78.60%			
Increase			_,				_,					
WC	CV Based (alues: on Bunoff Vo	olume Captu	red	W	OCV Based	on Storm Ev	ents Cantur	ed			
110	Let Buood (
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0552	166.15	17	0.53%	10.0%	0.1003	329	291.07	17.52%			
20.0%	0.1161	332.31	504	15.31%	20.0%	0.1301	658	368.78	22.20%			
30.0%	0.1863	498.46	1,082	32.88%	30.0%	0.1711	987	465.06	27.99%			
40.0%	0.2696	664.61	1,505	45.73%	40.0%	0.2265	1,316	583.75	35.13%			
50.0%	0.3690	830.77	1,883	57.21%	50.0%	0.3037	1,646	725.36	43.66%			
60.0%	0.4914	996.92	2,197	66.75%	60.0%	0.4008	1,975	876.20	52.73%			
70.0%	0.6479	1163.07	2,506	76.14%	70.0%	0.5428	2,304	1056.62	63.59%			
72.5%	0.6968	1204.61	2,580	78.40%	72.5%	0.5834	2,386	1101.26	66.28%			
75.0%	0.7494	1246.15	2,650	80.53%	75.0%	0.6276	2,468	1143.68	68.83%			
77.5%	0.8071	1287.69	2,716	82.52%	77.5%	0.6766	2,551	1187.78	71.49%			
80.0%	0.8719	1329.23	2,789	84.75%	80.0%	0.7342	2,633	1234.99	74.33%			
82.5%	0.9466	1370.77	2,841	86.32%	82.5%	0.8063	2,715	1287.22	77.47%			
85.0%	1.0322	1412.30	2,909	88.40%	85.0%	0.8840	2,797	1335.96	80.41%			
87.5%	1.1313	1453.84	2,960	89.94%	87.5%	0.9913	2,880	1392.94	83.83%			
90.0%	1.2459	1495.38	3,017	91.66%	90.0%	1.1350	2,962	1455.31	87.59%			
92.5%	1.3865	1536.92	3,073	93.39%	92.5%	1.3108	3,044	1515.80	91.23%			
95.0%	1.5718	1578.46	3,144	95.52%	95.0%	1.5314	3,126	1570.87	94.54%			
97.5%	1.8729	1620.00	3,205	97.38%	97.5%	1.9042	3,209	1623.22	97.69%			
100.0%	3.3420	1661.53	3,291	100.00%	100.0%	3.3420	3,291	1661.53	100.00%			



Figure 6. Optimal WQCV Basin Size using WQ-COSM for the LAVON DAM TX US (COOP:415094).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	CV Based	on Runoff Vo	olume Captu	red	W	WQCV Based on Storm Events Captured						
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
04.270	1.0270	1200.04	2,001	00.00 /8	02.470	0.0000	2,200	1200.03	70.9476			
Incrementa	al WQCV Va	alues:										
WC	CV Based o	on Runoff Vo	plume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0567	152.03	54	1.98%	10.0%	0.1065	275	275.98	18.15%			
20.0%	0.1188	304.05	374	13.61%	20.0%	0.1405	550	353.71	23.27%			
30.0%	0.1897	456.08	854	31.06%	30.0%	0.1831	825	443.55	29.18%			
40.0%	0.2744	608.10	1,193	43.38%	40.0%	0.2459	1,100	562.02	36.97%			
50.0%	0.3759	760.13	1,507	54.81%	50.0%	0.3308	1,375	698.48	45.94%			
60.0%	0.5001	912.16	1,803	65.60%	60.0%	0.4289	1,649	829.22	54.54%			
70.0%	0.6624	1064.18	2,057	74.84%	70.0%	0.5721	1,924	985.24	64.81%			
72.5%	0.7128	1102.19	2,114	76.89%	72.5%	0.6180	1,993	1025.87	67.48%			
75.0%	0.7665	1140.20	2,169	78.91%	75.0%	0.6665	2,062	1067.23	70.20%			
77.5%	0.8243	1178.20	2,224	80.91%	77.5%	0.7279	2,130	1113.58	73.25%			
80.0%	0.8923	1216.21	2,296	83.53%	80.0%	0.7982	2,199	1161.17	76.38%			
82.5%	0.9689	1254.22	2,348	85.42%	82.5%	0.8656	2,268	1201.31	79.02%			
85.0%	1.0544	1292.22	2,394	87.10%	85.0%	0.9499	2,337	1245.00	81.89%			
87.5%	1.1527	1330.23	2,455	89.29%	87.5%	1.0742	2,405	1300.52	85.55%			
90.0%	1.2734	1368.23	2,502	91.00%	90.0%	1.2012	2,474	1346.07	88.54%			
92.5%	1.4190	1406.24	2,562	93.19%	92.5%	1.3714	2,543	1394.77	91.75%			
95.0%	1.6121	1444.25	2,618	95.23%	95.0%	1.5830	2,612	1439.45	94.68%			
97.5%	1.9161	1482.25	2,674	97.28%	97.5%	1.9828	2,680	1488.02	97.88%			
100.0%	3.5355	1520.26	2,749	100.00%	100.0%	3.5355	2,749	1520.26	100.00%			



Figure 7. Optimal WQCV Basin Size using WQ-COSM for the LEWISVILLE DAM TX US (COOP:415192).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	CV Based	on Runoff Vo	olume Captu	red	W	WQCV Based on Storm Events Captured						
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
51.576	0.7143	12.55	22	10.31 /0	00.176	0.3003	21	10.01	30.3378			
Incrementa	al WQCV Va	alues:										
WC	CV Based	on Runoff Vo	plume Captu	red	W	QCV Based	on Storm Ev	ents Captu	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0793	2.14	1	1.97%	10.0%	0.1115	3	3.00	14.02%			
20.0%	0.1617	4.28	10	30.86%	20.0%	0.1305	6	3.50	16.38%			
30.0%	0.2636	6.42	12	39.84%	30.0%	0.1552	9	4.13	19.30%			
40.0%	0.3880	8.56	17	54.04%	40.0%	0.2660	12	6.46	30.22%			
50.0%	0.5559	10.69	20	65.43%	50.0%	0.3571	16	8.09	37.81%			
60.0%	0.7654	12.83	23	74.19%	60.0%	0.4335	19	9.21	43.07%			
70.0%	1.0443	14.97	24	77.42%	70.0%	0.7069	22	12.32	57.62%			
72.5%	1.1193	15.51	24	77.42%	72.5%	0.7260	22	12.50	58.43%			
75.0%	1.1944	16.04	24	77.42%	75.0%	0.8990	23	13.92	65.09%			
77.5%	1.2694	16.58	24	77.42%	77.5%	1.2820	24	16.67	77.92%			
80.0%	1.3498	17.11	25	80.65%	80.0%	1.3202	25	16.93	79.15%			
82.5%	1.4433	17.65	27	87.10%	82.5%	1.3935	26	17.36	81.17%			
85.0%	1.5371	18.18	27	87.10%	85.0%	1.4126	26	17.47	81.68%			
87.5%	1.6341	18.71	27	87.10%	87.5%	1.7303	27	19.16	89.60%			
90.0%	1.7485	19.25	27	88.69%	90.0%	1.7685	28	19.34	90.44%			
92.5%	1.8634	19.78	28	90.32%	92.5%	2.2008	29	21.16	98.93%			
95.0%	1.9792	20.32	28	90.32%	95.0%	2.2771	29	21.35	99.84%			
97.5%	2.1162	20.85	28	90.32%	97.5%	2.2962	30	21.37	99.92%			
100.0%	2.3153	21.39	31	100.00%	100.0%	2.3153	31	21.39	100.00%			



Figure 8. Optimal WQCV Basin Size using WQ-COSM for the MCKINNEY MUNICIPAL AIRPORT TX US (COOP:415766).

	WQCV Table 100% Imperviousness										
Optimized	Values:										
WC	CV Based o	on Runoff Vo	olume Captu	red	W	WQCV Based on Storm Events Captured					
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%) 84.9%	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
04.378	1.0411	004.02	1,000	00.7578	04.576	0.0745	1,004	000.10	10.0078		
Incrementa	al WQCV Va	alues:									
WC	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red		
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0540	105.40	1	0.03%	10.0%	0.1078	223	200.40	19.01%		
20.0%	0.1145	210.79	284	12.73%	20.0%	0.1324	446	238.52	22.63%		
30.0%	0.1861	316.19	820	36.79%	30.0%	0.1571	669	276.65	26.25%		
40.0%	0.2721	421.59	1,088	48.80%	40.0%	0.2075	892	343.42	32.58%		
50.0%	0.3745	526.98	1,315	58.99%	50.0%	0.2831	1,115	433.57	41.14%		
60.0%	0.4980	632.38	1,552	69.58%	60.0%	0.3864	1,338	538.20	51.06%		
70.0%	0.6592	737.78	1,745	78.23%	70.0%	0.5048	1,561	637.28	60.47%		
72.5%	0.7096	764.13	1,787	80.15%	72.5%	0.5517	1,617	670.03	63.57%		
75.0%	0.7630	790.48	1,827	81.91%	75.0%	0.5986	1,673	701.28	66.54%		
77.5%	0.8215	816.83	1,860	83.39%	77.5%	0.6455	1,728	729.52	69.22%		
80.0%	0.8873	843.17	1,902	85.29%	80.0%	0.7054	1,784	761.97	72.29%		
82.5%	0.9608	869.52	1,942	87.10%	82.5%	0.7863	1,840	800.99	76.00%		
85.0%	1.0454	895.87	1,982	88.88%	85.0%	0.8775	1,896	839.36	79.64%		
87.5%	1.1440	922.22	2,021	90.63%	87.5%	0.9791	1,951	875.72	83.09%		
90.0%	1.2619	948.57	2,065	92.60%	90.0%	1.1049	2,007	912.30	86.56%		
92.5%	1.4164	974.92	2,110	94.62%	92.5%	1.2549	2,063	947.27	89.88%		
95.0%	1.6468	1001.27	2,156	96.66%	95.0%	1.4552	2,119	980.01	92.98%		
97.5%	2.0426	1027.62	2,190	98.21%	97.5%	1.8453	2,174	1016.49	96.44%		
100.0%	3.6645	1053.97	2,230	100.00%	100.0%	3.6645	2,230	1053.97	100.00%		



Figure 9. Optimal WQCV Basin Size using WQ-COSM for the MIDLOTHIAN TX US (COOP:415897).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	WQCV Based on Storm Events Captured						
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
84.0%	0.9090	1133.22	2,506	86.92%	84.7%	0.8417	2,443	1101.42	81.68%			
Incrementa	al WQCV Va	alues:							ļ.			
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0512	134.85	8	0.26%	10.0%	0.0929	288	235.90	17.49%			
20.0%	0.1076	269.69	449	15.58%	20.0%	0.1193	577	296.42	21.98%			
30.0%	0.1731	404.54	968	33.57%	30.0%	0.1554	865	370.97	27.51%			
40.0%	0.2510	539.39	1,330	46.14%	40.0%	0.2063	1,153	466.41	34.59%			
50.0%	0.3430	674.24	1,596	55.37%	50.0%	0.2841	1,442	590.62	43.80%			
60.0%	0.4559	809.08	1,889	65.52%	60.0%	0.3916	1,730	/35.70	54.56%			
70.0%	0.5996	943.93	2,177	75.50%	70.0%	0.5141	2,018	001.10	66.92%			
72.3%	0.6807	9/7.04	2,224	78.01%	72.5%	0.5497	2,090	901.19	60.03%			
77.5%	0.0007	1045.07	2,273	81 18%	77.5%	0.6533	2 234	985.25	73.06%			
80.0%	0.7984	1078.78	2,395	83.07%	80.0%	0.7139	2,204	1027.53	76.20%			
82.5%	0.8635	1112.49	2,468	85.62%	82.5%	0.7808	2.378	1068.56	79.24%			
85.0%	0.9387	1146.20	2.527	87.66%	85.0%	0.8482	2.451	1104.72	81.92%			
87.5%	1.0276	1179.91	2,577	89.37%	87.5%	0.9324	2,523	1143.42	84.79%			
90.0%	1.1328	1213.63	2,635	91.41%	90.0%	1.0555	2,595	1189.42	88.20%			
92.5%	1.2639	1247.34	2,688	93.24%	92.5%	1.2007	2,667	1232.09	91.37%			
95.0%	1.4402	1281.05	2,750	95.40%	95.0%	1.4135	2,739	1277.00	94.70%			
97.5%	1.7489	1314.76	2,818	97.73%	97.5%	1.7110	2,811	1311.56	97.26%			
100.0%	3.1648	1348.47	2,883	100.00%	100.0%	3.1648	2,883	1348.47	100.00%			



Figure 10. Optimal WQCV Basin Size using WQ-COSM for the MINERAL WELLS 1 SSW TX US (COOP:415957).

	WQCV Table 100% Imperviousness										
Optimized	Values:										
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	WQCV Based on Storm Events Captured					
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
84.4%	0.9258	233.54	383	84.36%	84.4%	0.9258	383	233.54	84.44%		
Incrementa	al WQCV Va	alues:									
WC	CV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red		
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0559	27.66	8	1.80%	10.0%	0.1014	45	48.60	17.57%		
20.0%	0.1164	55.32	62	13.57%	20.0%	0.1469	91	68.37	24.72%		
30.0%	0.1846	82.97	117	25.82%	30.0%	0.2124	136	93.46	33.79%		
40.0%	0.2621	110.63	167	36.87%	40.0%	0.2853	182	118.21	42.74%		
50.0%	0.3524	138.29	221	48.59%	50.0%	0.3657	227	141.80	51.27%		
60.0%	0.4645	165.95	270	59.44%	60.0%	0.4709	272	167.41	60.53%		
70.0%	0.6073	193.61	314	69.13%	70.0%	0.6244	318	196.49	71.04%		
72.5%	0.6503	200.52	324	71.41%	72.5%	0.6702	329	203.63	73.62%		
75.0%	0.6958	207.44	335	73.80%	75.0%	0.7225	341	211.12	76.33%		
//.5%	0.7459	214.35	345	/6.05%	//.5%	0.7702	352	217.37	/8.59%		
80.0%	0.8034	221.27	362	/9./4%	80.0%	0.8072	363	221./1	80.16%		
82.5%	0.8686	228.18	374	82.38%	82.5%	0.8728	375	228.60	82.65%		
85.0%	0.9432	235.10	386	85.03%	85.0%	0.9424	386	235.02	84.97%		
87.5%	1.0297	242.01	393	86.60%	87.5%	1.0529	397	243.62	88.08%		
90.0%	1.1360	248.92	407	89.58%	90.0%	1.1/95	409	251.39	90.89%		
92.5%	1.2634	255.84	412	90.81%	92.5%	1.3/10	420	260.91	94.33%		
95.0%	1.4194	262.75	423	93.28%	95.0%	1.4941	431	265.16	95.87%		
97.5%	1./319	269.67	442	97.25%	97.5%	1.//10	443	270.23	97.70%		
100.0%	3.2231	2/6.58	454	100.00%	100.0%	3.2231	454	276.58	100.00%		



Figure 11. Optimal WQCV Basin Size using WQ-COSM for the MINERAL WELLS AIRPORT TX US (COOP:415958).

WQCV Table 100% Imperviousness											
Optimized	Values:										
WC	CV Based o	on Runoff Vo	olume Captu	red	W	WQCV Based on Storm Events Captured					
Percent of Volume Captured	WQCV	Volume Captured	Number of Storms Captured	Percent of Storms Captured	Percent of Storms Captured	WQCV	Number of Storms Captured	Volume Captured	Percent of Volume Captured		
85.0%	1.0632	1248 64	2 534	88 74%	84.3%	0.8931	2 407	1172 27	79.80%		
00.070	1.0002	12+0.0+	2,004	00.7470	04.070	0.0001	2,407	1172.27	10.0070		
Incrementa	al WQCV Va	alues:									
WC	CV Based o	on Runoff Vo	plume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0560	146.90	23	0.81%	10.0%	0.1089	286	273.90	18.65%		
20.0%	0.1182	293.79	383	13.42%	20.0%	0.1361	571	331.99	22.60%		
30.0%	0.1905	440.69	1,014	35.51%	30.0%	0.1633	857	390.08	26.56%		
40.0%	0.2767	587.58	1,348	47.21%	40.0%	0.2210	1,142	494.65	33.67%		
50.0%	0.3798	734.48	1,638	57.36%	50.0%	0.3043	1,428	629.21	42.83%		
60.0%	0.5041	881.37	1,935	67.78%	60.0%	0.4078	1,713	770.74	52.47%		
70.0%	0.6684	1028.27	2,187	76.60%	70.0%	0.5392	1,999	915.63	62.33%		
72.5%	0.7186	1064.99	2,241	78.48%	72.5%	0.5808	2,070	954.93	65.01%		
75.0%	0.7715	1101.71	2,293	80.33%	75.0%	0.6322	2,141	998.73	67.99%		
77.5%	0.8318	1138.44	2,348	82.24%	77.5%	0.6910	2,213	1045.49	71.17%		
80.0%	0.8986	1175.16	2,412	84.48%	80.0%	0.7615	2,284	1095.25	74.56%		
82.5%	0.9743	1211.89	2,476	86.73%	82.5%	0.8399	2,355	1143.37	77.84%		
85.0%	1.0631	1248.61	2,533	88.74%	85.0%	0.9138	2,427	1183.21	80.55%		
87.5%	1.1677	1285.33	2,589	90.69%	87.5%	1.0044	2,498	1225.22	83.41%		
90.0%	1.2942	1322.06	2,641	92.49%	90.0%	1.1299	2,570	1272.83	86.65%		
92.5%	1.4537	1358.78	2,690	94.23%	92.5%	1.2947	2,641	1322.19	90.01%		
95.0%	1.6727	1395.50	2,741	96.02%	95.0%	1.5285	2,712	1372.86	93.46%		
97.5%	2.0243	1432.23	2,794	97.85%	97.5%	1.9536	2,784	1426.55	97.11%		
100.0%	3.6574	1468.95	2,855	100.00%	100.0%	3.6574	2,855	1468.95	100.00%		



Figure 12. Optimal WQCV Basin Size using WQ-COSM for the NAVARRO MILLS DAM TX US (COOP:416210).

	WQCV Table 100% Imperviousness										
Optimized	Values:										
WC	CV Based	on Runoff Vo	olume Captu	red	WQCV Based on Storm Events Captured				ed		
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
00.0%	1.0032	003.37	1,700	09.03%	00.7%	0.0951	1,099	755.19	00.39%		
Incrementa	al WQCV Va	alues:									
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0539	93.71	0	0.00%	10.0%	0.1101	198	182.84	19.51%		
20.0%	0.1134	187.42	224	11.31%	20.0%	0.1352	396	217.75	23.24%		
30.0%	0.1831	281.14	711	35.91%	30.0%	0.1603	594	252.66	26.96%		
40.0%	0.2674	374.85	957	48.29%	40.0%	0.2100	792	311.65	33.26%		
50.0%	0.3690	468.56	1,174	59.24%	50.0%	0.2824	991	389.33	41.55%		
60.0%	0.4931	562.27	1,376	69.44%	60.0%	0.3773	1,189	475.30	50.72%		
70.0%	0.6530	655.99	1,536	77.55%	70.0%	0.5006	1,387	567.60	60.57%		
72.5%	0.7007	679.41	1,577	79.60%	72.5%	0.5473	1,436	596.80	63.68%		
75.0%	0.7532	702.84	1,615	81.53%	75.0%	0.5994	1,486	627.90	67.00%		
77.5%	0.8122	726.27	1,654	83.47%	77.5%	0.6520	1,535	655.48	69.95%		
80.0%	0.8766	749.70	1,691	85.34%	80.0%	0.7117	1,585	684.32	73.02%		
82.5%	0.9489	773.13	1,725	87.07%	82.5%	0.7818	1,634	714.57	76.25%		
85.0%	1.0335	796.55	1,764	89.03%	85.0%	0.8627	1,684	745.07	79.51%		
87.5%	1.1382	819.98	1,814	91.58%	87.5%	0.9678	1,733	778.51	83.07%		
90.0%	1.2698	843.41	1,852	93.47%	90.0%	1.0696	1,783	805.08	85.91%		
92.5%	1.4451	866.84	1,891	95.45%	92.5%	1.1866	1,832	829.50	88.52%		
95.0%	1.6939	890.27	1,918	96.84%	95.0%	1.4007	1,882	861.46	91.93%		
97.5%	2.1067	913.69	1,948	98.33%	97.5%	1.8231	1,931	899.23	95.96%		
100.0%	3.8275	937.12	1,981	100.00%	100.0%	3.8275	1,981	937.12	100.00%		



Figure 13. Optimal WQCV Basin Size using WQ-COSM for the SPRINGTOWN 4 S TX US (COOP:418563).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
84.9%	0.9330	874.82	1,912	87.36%	85.4%	0.8639	1,868	850.58	82.52%			
Incrementa	al WQCV Va	alues:										
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0520	103.07	2	0.10%	10.0%	0.0974	219	185.96	18.04%			
20.0%	0.1090	206.15	308	14.06%	20.0%	0.1261	438	235.72	22.87%			
30.0%	0.1740	309.22	681	31.11%	30.0%	0.1682	656	300.74	29.18%			
40.0%	0.2502	412.29	983	44.95%	40.0%	0.2216	875	376.16	36.49%			
50.0%	0.3409	515.37	1,233	56.36%	50.0%	0.2812	1,094	450.67	43.72%			
60.0%	0.4549	618.44	1,440	65.84%	60.0%	0.3824	1,313	555.04	53.85%			
70.0%	0.5993	721.52	1,637	74.81%	70.0%	0.5151	1,532	664.75	64.49%			
72.5%	0.6422	747.28	1,683	76.93%	72.5%	0.5557	1,586	693.74	67.31%			
75.0%	0.6883	773.05	1,729	79.03%	75.0%	0.6030	1,641	723.84	70.23%			
77.5%	0.7405	798.82	1,787	81.68%	77.5%	0.6547	1,696	754.28	73.18%			
80.0%	0.7984	824.59	1,829	83.59%	80.0%	0.7076	1,750	/82./2	75.94%			
82.5%	0.8633	850.36	1,867	85.33%	82.5%	0.7567	1,805	806.75	/8.2/%			
85.0%	0.9370	8/6.13	1,914	87.48%	85.0%	0.8520	1,860	846.16	82.09%			
87.5%	1.0221	901.89	1,956	89.39%	87.5%	0.9378	1,915	8/6.40	85.03%			
90.0%	1.12/6	927.66	2,010	91.85%	90.0%	1.0482	1,969	908.93	88.18%			
92.5%	1.2610	953.43	2,046	93.52%	92.5%	1.18/7	2,024	939.98	91.20%			
95.0%	1.4416	9/9.20	2,093	95.65%	95.0%	1.3768	2,079	9/1.14	94.22%			
97.5%	1./210	1004.97	2,129	97.32%	97.5%	1./505	2,133	1006.94	97.69%			
100.0%	3.2481	1030.74	2,188	100.00%	100.0%	3.2481	2,188	1030.74	100.00%			



Figure 14. Optimal WQCV Basin Size using WQ-COSM for the STEPHENVILLE 9 NNE TX US (COOP:418623).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
01.1%	1.0032	1402.55	2,975	90.19%	00.7%	0.9761	2,924	1307.22	00.02%			
Incrementa	al WQCV Va	alues:										
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0522	159.87	49	1.49%	10.0%	0.1065	330	313.73	19.62%			
20.0%	0.1089	319.74	358	10.86%	20.0%	0.1347	660	383.75	24.00%			
30.0%	0.1741	479.61	1,094	33.17%	30.0%	0.1630	989	453.78	28.38%			
40.0%	0.2523	639.48	1,506	45.65%	40.0%	0.2169	1,319	567.10	35.47%			
50.0%	0.3452	799.35	1,820	55.19%	50.0%	0.2936	1,649	711.74	44.52%			
60.0%	0.4598	959.22	2,165	65.64%	60.0%	0.3945	1,979	871.63	54.52%			
70.0%	0.6043	1119.10	2,466	74.76%	70.0%	0.5193	2,309	1030.80	64.48%			
72.5%	0.6486	1159.06	2,544	77.13%	72.5%	0.5637	2,391	1077.59	67.40%			
75.0%	0.6955	1199.03	2,621	79.48%	75.0%	0.6087	2,474	1123.06	70.25%			
77.5%	0.7489	1239.00	2,697	81.79%	77.5%	0.6555	2,556	1165.24	72.89%			
80.0%	0.8100	1278.97	2,777	84.20%	80.0%	0.7074	2,638	1207.97	75.56%			
82.5%	0.8792	1318.93	2,852	86.46%	82.5%	0.7654	2,721	1251.34	78.27%			
85.0%	0.9595	1358.90	2,913	88.32%	85.0%	0.8309	2,803	1291.93	80.81%			
87.5%	1.0536	1398.87	2,969	90.02%	87.5%	0.9207	2,886	1340.48	83.85%			
90.0%	1.1688	1438.84	3,041	92.19%	90.0%	1.0523	2,968	1398.36	87.47%			
92.5%	1.3232	1478.80	3,106	94.18%	92.5%	1.1842	3,051	1443.71	90.31%			
95.0%	1.5416	1518.77	3,171	96.15%	95.0%	1.3990	3,133	1494.40	93.48%			
97.5%	1.9007	1558.74	3,233	98.02%	97.5%	1.7950	3,216	1549.51	96.92%			
100.0%	4.0827	1598.71	3,298	100.00%	100.0%	4.0827	3,298	1598.71	100.00%			



Figure 15. Optimal WQCV Basin Size using WQ-COSM for the WEATHERFORD TX US (COOP:419532).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured	WQCV	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured	Percent of Storms Captured	WQCV (in)	Number of Storms Captured	Volume Captured	Percent of Volume Captured			
86.1%	0.9808	1361 45	2 938	88 48%	84.5%	0.8355	2 805	1285.85	81.28%			
00.170	0.0000	1001.40	2,000	00.4070	04.070	0.0000	2,000	1200.00	01.2070			
Incrementa	al WQCV Va	alues:	L 0 1		14/		0 5					
WC	CV Based (on Runoff Vo	lume Captu	red	VV	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0527	158.19	11	0.33%	10.0%	0.1005	332	289.67	18.31%			
20.0%	0.1108	316.38	450	13.56%	20.0%	0.1296	664	364.70	23.05%			
30.0%	0.1773	474.57	1,029	31.00%	30.0%	0.1716	996	462.16	29.22%			
40.0%	0.2551	632.76	1,441	43.41%	40.0%	0.2311	1,328	587.54	37.14%			
50.0%	0.3461	790.95	1,826	55.00%	50.0%	0.3037	1,660	721.20	45.59%			
60.0%	0.4568	949.15	2,155	64.90%	60.0%	0.3983	1,992	869.39	54.96%			
70.0%	0.5984	1107.34	2,467	74.32%	70.0%	0.5236	2,324	1029.85	65.10%			
72.5%	0.6419	1146.88	2,549	76.79%	72.5%	0.5667	2,407	1076.09	68.02%			
75.0%	0.6904	1186.43	2,623	79.00%	75.0%	0.6104	2,490	1118.20	70.69%			
77.5%	0.7430	1225.98	2,694	81.15%	77.5%	0.6546	2,573	1158.31	73.22%			
80.0%	0.8012	1265.53	2,768	83.38%	80.0%	0.7143	2,656	1205.17	76.18%			
82.5%	0.8679	1305.07	2,840	85.54%	82.5%	0.7781	2,739	1249.94	79.01%			
85.0%	0.9434	1344.62	2,903	87.44%	85.0%	0.8513	2,822	1295.23	81.88%			
87.5%	1.0338	1384.17	2,980	89.75%	87.5%	0.9456	2,905	1345.68	85.07%			
90.0%	1.1426	1423.72	3,037	91.49%	90.0%	1.0496	2,988	1390.28	87.89%			
92.5%	1.2809	1463.27	3,111	93.69%	92.5%	1.2013	3,071	1441.92	91.15%			
95.0%	1.4686	1502.81	3,167	95.38%	95.0%	1.4115	3,154	1491.91	94.31%			
97.5%	1.7740	1542.36	3,249	97.87%	97.5%	1.6969	3,237	1535.02	97.04%			
100.0%	3.3420	1581.91	3,320	100.00%	100.0%	3.3420	3,320	1581.91	100.00%			



Figure 16. Optimal WQCV Basin Size using WQ-COSM for the ALVORD 3 N TX US (COOP:410206).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	CV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
04.4 /0	0.9900	1149.07	2,309	07.40/0	03.0 /0	0.0373	2,241	1074.57	/0.91/0			
Incremental WQCV Values:												
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0554	136.17	17	0.64%	10.0%	0.1058	270	249.18	18.30%			
20.0%	0.1172	272.34	377	13.96%	20.0%	0.1345	540	307.73	22.60%			
30.0%	0.1888	408.52	901	33.39%	30.0%	0.1677	810	372.57	27.36%			
40.0%	0.2731	544.69	1,216	45.04%	40.0%	0.2299	1,080	478.75	35.16%			
50.0%	0.3726	680.86	1,496	55.42%	50.0%	0.3206	1,350	614.38	45.12%			
60.0%	0.4937	817.03	1,786	66.16%	60.0%	0.4200	1,619	737.75	54.18%			
70.0%	0.6488	953.20	2,023	74.95%	70.0%	0.5506	1,889	871.20	63.98%			
72.5%	0.6953	987.25	2,083	77.18%	72.5%	0.5986	1,957	912.31	67.00%			
75.0%	0.7460	1021.29	2,146	79.52%	75.0%	0.6497	2,024	953.92	70.05%			
77.5%	0.8012	1055.33	2,211	81.92%	77.5%	0.7020	2,092	992.15	72.86%			
80.0%	0.8650	1089.38	2,263	83.85%	80.0%	0.7569	2,159	1028.06	75.50%			
82.5%	0.9365	1123.42	2,317	85.84%	82.5%	0.8203	2,227	1065.52	78.25%			
85.0%	1.0174	1157.46	2,373	87.92%	85.0%	0.9057	2,294	1109.13	81.45%			
87.5%	1.1118	1191.50	2,430	90.05%	87.5%	1.0006	2,362	1150.64	84.50%			
90.0%	1.2279	1225.55	2,476	91.74%	90.0%	1.1097	2,429	1190.78	87.45%			
92.5%	1.3704	1259.59	2,524	93.51%	92.5%	1.2844	2,497	1240.10	91.07%			
95.0%	1.5682	1293.63	2,580	95.58%	95.0%	1.5103	2,564	1285.07	94.37%			
97.5%	1.8894	1327.68	2,639	97.76%	97.5%	1.8233	2,632	1322.50	97.12%			
100.0%	3.1896	1361.72	2,699	100.00%	100.0%	3.1896	2,699	1361.72	100.00%			



Figure 17. Optimal WQCV Basin Size using WQ-COSM for the BARDWELL DAM TX US (COOP:410518).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
00.2%	1.0406	1333.43	2,300	00.43%	04.3%	0.9635	2,320	1290.70	03.00%			
Incremental WQCV Values:												
WC	QCV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0566	154.98	65	2.35%	10.0%	0.1040	275	276.30	17.83%			
20.0%	0.1179	309.96	372	13.52%	20.0%	0.1436	551	371.97	24.00%			
30.0%	0.1875	464.94	786	28.53%	30.0%	0.1958	826	481.80	31.09%			
40.0%	0.2694	619.92	1,133	41.15%	40.0%	0.2605	1,101	604.40	39.00%			
50.0%	0.3667	774.90	1,434	52.10%	50.0%	0.3462	1,377	744.07	48.01%			
60.0%	0.4870	929.87	1,717	62.38%	60.0%	0.4572	1,652	895.78	57.80%			
70.0%	0.6442	1084.85	1,990	72.28%	70.0%	0.6029	1,927	1048.55	67.66%			
72.5%	0.6904	1123.60	2,060	74.82%	72.5%	0.6482	1,996	1088.20	70.22%			
75.0%	0.7418	1162.34	2,112	76.71%	75.0%	0.6936	2,065	1126.27	72.67%			
77.5%	0.7968	1201.09	2,172	78.89%	77.5%	0.7642	2,134	1179.07	76.08%			
80.0%	0.8569	1239.83	2,240	81.38%	80.0%	0.8220	2,202	1217.61	78.57%			
82.5%	0.9239	1278.58	2,288	83.12%	82.5%	0.9001	2,271	1264.79	81.61%			
85.0%	1.0000	1317.32	2,349	85.34%	85.0%	0.9885	2,340	1311.45	84.62%			
87.5%	1.0887	1356.07	2,415	87.73%	87.5%	1.0803	2,409	1352.96	87.30%			
90.0%	1.1986	1394.81	2,485	90.27%	90.0%	1.1812	2,478	1389.19	89.64%			
92.5%	1.3375	1433.56	2,557	92.89%	92.5%	1.3096	2,547	1427.09	92.08%			
95.0%	1.5332	1472.30	2,621	95.19%	95.0%	1.5148	2,615	1469.14	94.80%			
97.5%	1.8631	1511.05	2,680	97.36%	97.5%	1.8866	2,684	1512.97	97.62%			
100.0%	3.5458	1549.79	2,753	100.00%	100.0%	3.5458	2,753	1549.79	100.00%			



Figure 18. Optimal WQCV Basin Size using WQ-COSM for the BENBROOK DAM TX US (COOP:410691).

WQCV Table 100% Imperviousness											
Optimized	Values:										
WQ	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red		
Percent of Volume Captured	WQCV	Volume Captured	Number of Storms Captured	Percent of Storms Captured	Percent of Storms Captured	WQCV	Number of Storms Captured	Volume Captured	Percent of Volume Captured		
83.2%	0.8931	704 16	1 758	88 52%	86.2%	0.8080	1 713	678 71	80.22%		
00.278	0.0001	704.10	1,700	00.0278	00.270	0.0000	1,710	070.71	00.2278		
Incrementa	al WQCV Va	alues:									
WQ	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0492	84.60	0	0.00%	10.0%	0.1073	199	175.39	20.73%		
20.0%	0.1026	169.21	157	7.88%	20.0%	0.1296	397	204.59	24.18%		
30.0%	0.1672	253.81	732	36.86%	30.0%	0.1519	596	233.79	27.63%		
40.0%	0.2457	338.42	983	49.48%	40.0%	0.1823	794	270.72	32.00%		
50.0%	0.3376	423.02	1,169	58.86%	50.0%	0.2491	993	342.12	40.44%		
60.0%	0.4496	507.62	1,362	68.56%	60.0%	0.3504	1,192	433.34	51.22%		
70.0%	0.5939	592.23	1,558	/8.46%	70.0%	0.4667	1,390	518.84	61.33%		
72.5%	0.6400	613.38	1,592	80.16%	72.5%	0.4965	1,440	538.28	63.62%		
75.0%	0.0073	034.33	1,020	01.09%	75.0%	0.5336	1,490	509.02	69.02%		
77.5%	0.7410	676.92	1,000	03.90%	77.3% 00.0%	0.6255	1,539	000.21 611.26	70.93%		
82.5%	0.8705	607.08	1,709	88.01%	82.5%	0.0300	1,009	640.73	75.73%		
85.0%	0.0705	710 1/	1,740	80.78%	85.0%	0.7033	1,030	665.08	79.70%		
87.5%	1 0/22	713.14	1,705	03.70%	87.5%	0.7003	1,000	601.90	91 78%		
90.0%	1 1560	740.23	1,020	91.00%	90.0%	0.0400	1,730	721.63	85.29%		
92.5%	1.3021	782 59	1 884	94.88%	92.5%	1 0912	1,707	750.00	88.65%		
95.0%	1.5004	803 74	1,004	96.27%	95.0%	1.3165	1 887	784.34	92 71%		
97.5%	1.8164	824.89	1,949	98.13%	97.5%	1.6658	1,936	816.82	96.55%		
100.0%	3.3172	846.04	1,986	100.00%	100.0%	3.3172	1,986	846.04	100.00%		



Figure 19. Optimal WQCV Basin Size using WQ-COSM for the BURLESON TX US (COOP:411246).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
00.9%	1.0964	1/00.02	3,240	00.42%	00.4%	1.0964	3,240	1700.02	00.09%			
Incrementa	al WQCV Va	alues:										
WC	QCV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0590	204.78	392	10.66%	10.0%	0.0553	367	192.02	9.38%			
20.0%	0.1242	409.57	822	22.39%	20.0%	0.1109	734	371.12	18.12%			
30.0%	0.1990	614.35	1,277	34.80%	30.0%	0.1667	1,101	531.98	25.98%			
40.0%	0.2872	819.14	1,691	46.08%	40.0%	0.2370	1,468	706.40	34.49%			
50.0%	0.3928	1023.92	2,054	55.94%	50.0%	0.3250	1,836	896.84	43.79%			
60.0%	0.5193	1228.71	2,389	65.08%	60.0%	0.4459	2,203	1115.77	54.49%			
70.0%	0.6807	1433.49	2,718	74.05%	70.0%	0.6102	2,570	1352.16	66.03%			
72.5%	0.7293	1484.69	2,805	76.42%	72.5%	0.6538	2,661	1402.77	68.50%			
75.0%	0.7812	1535.89	2,885	78.60%	75.0%	0.6971	2,753	1452.27	70.92%			
77.5%	0.8401	1587.08	2,965	80.77%	77.5%	0.7550	2,845	1510.06	73.74%			
80.0%	0.9047	1638.28	3,051	83.11%	80.0%	0.8188	2,937	1568.91	76.61%			
82.5%	0.9779	1689.47	3,143	85.61%	82.5%	0.8880	3,029	1626.29	79.41%			
85.0%	1.0623	1740.67	3,213	87.53%	85.0%	0.9562	3,120	1675.24	81.80%			
87.5%	1.1623	1791.87	3,301	89.92%	87.5%	1.0611	3,212	1740.01	84.97%			
90.0%	1.2864	1843.06	3,373	91.87%	90.0%	1.1671	3,304	1794.01	87.60%			
92.5%	1.4417	1894.26	3,441	93.74%	92.5%	1.3329	3,396	1859.86	90.82%			
95.0%	1.6513	1945.45	3,514	95.74%	95.0%	1.5615	3,487	1925.74	94.04%			
97.5%	1.9910	1996.65	3,585	97.66%	97.5%	1.9584	3,579	1993.02	97.32%			
100.0%	4.2103	2047.85	3,671	100.00%	100.0%	4.2103	3,671	2047.85	100.00%			



Figure 20. Optimal WQCV Basin Size using WQ-COSM for the COMMERCE 4 SW TX US (COOP:411921).

WQCV Table 100% Imperviousness											
Optimized	Values:										
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)		
86.6%	1.0286	1415.38	2,926	89.56%	87.6%	0.9525	2,862	1381.09	84.46%		
Increment		alues:							·		
WC	QCV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Percent of Volume	WOOV	Volume	Number of Storms	Percent of Storms	Percent of Storms	WOCV	Number of Storms	Volume	Percent of Volume		
(%)	(in)	(in)	Captureu	(%)	(%)	(in)	Captureu	(%)	(%)		
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%		
10.0%	0.0532	163.52	35	1.07%	10.0%	0.1025	327	303.10	18.54%		
20.0%	0.1117	327.03	423	12.94%	20.0%	0.1336	653	384.45	23.51%		
30.0%	0.1783	490.55	1,001	30.65%	30.0%	0.1746	980	482.50	29.51%		
40.0%	0.2567	654.06	1,412	43.22%	40.0%	0.2319	1,307	607.07	37.13%		
50.0%	0.3499	817.58	1,778	54.44%	50.0%	0.3099	1,634	753.02	46.05%		
60.0%	0.4633	981.09	2,117	64.80%	60.0%	0.4061	1,960	902.62	55.20%		
70.0%	0.6117	1144.61	2,448	74.94%	70.0%	0.5284	2,287	1058.99	64.76%		
72.5%	0.6580	1185.49	2,521	77.17%	72.5%	0.5694	2,369	1101.74	67.38%		
75.0%	0.7073	1226.37	2,592	79.34%	75.0%	0.6129	2,450	1145.64	70.06%		
77.5%	0.7610	1267.25	2,660	81.42%	77.5%	0.6648	2,532	1191.46	72.87%		
80.0%	0.8225	1308.13	2,720	83.25%	80.0%	0.7243	2,614	1239.34	75.79%		
82.5%	0.8909	1349.00	2,798	85.65%	82.5%	0.7973	2,695	1291.39	78.98%		
85.0%	0.9705	1389.88	2,878	88.10%	85.0%	0.8733	2,777	1338.82	81.88%		
87.5%	1.0659	1430.76	2,954	90.43%	87.5%	0.9494	2,859	1379.59	84.37%		
90.0%	1.1875	1471.64	3,018	92.37%	90.0%	1.0474	2,940	1423.13	87.03%		
92.5%	1.3491	1512.52	3,086	94.46%	92.5%	1.1967	3,022	1474.43	90.17%		
95.0%	1.5663	1553.40	3,134	95.92%	95.0%	1.4070	3,104	1524.61	93.24%		
97.5%	1.8860	1594.28	3,193	97.72%	97.5%	1.8180	3,185	1587.78	97.10%		
100.0%	3.6574	1635.16	3,267	100.00%	100.0%	3.6574	3,267	1635.16	100.00%		
				ala 100	0/ 100 00 0 10						



Figure 21. Optimal WQCV Basin Size using WQ-COSM for the CRESSON TX US (COOP:412096).

WQCV Table 100% Imperviousness											
Optimized	Values:										
WC	CV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Percent of			Number of	Percent of	Percent of		Number of		Percent of		
Volume		Volume	Storms	Storms	Storms		Storms	Volume	Volume		
Captured	WQCV	Captured	Captured	Captured	Captured	WQCV	Captured	Captured	Captured		
(%)	(in)	(in)		(%)	(%)	(in)		(%)	(%)		
86.2%	1.0023	973.06	1,587	85.69%	83.6%	0.9281	1,549	947.10	83.94%		
Incrementa	al WQCV Va	alues:									
WC	QCV Based of	on Runoff Vo	plume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed		
Derechtef			Number of	Dorocast of	Derector		Number of		Derest of		
Volumo		Volumo	Storme	Storme	Storma		Storms	Volumo	Volumo		
Captured	WOCV	Contured	Contured	Captured	Captured	WOCV	Contured	Captured	Contured		
(%)	(in)	(in)	Captureu	(%)	(%)	(in)	Captureu	(%)	(%)		
(/8)		0.00	0	0.00%	0.0%		0	0.00	0.00%		
10.0%	0.0000	112.83	35	1.87%	10.0%	0.0000	185	205 71	18 23%		
20.0%	0.0570	225.66	222	10 57%	20.0%	0.1072	270	200.71	25 1 99/		
30.0%	0.1104	338 /0	480	25.9/%	30.0%	0.1313	556	375.66	33.20%		
40.0%	0.1072	451.32	695	37 55%	40.0%	0.2110	741	476 52	42 23%		
50.0%	0.3608	564 16	895	48.32%	50.0%	0.2004	926	582.09	51 59%		
60.0%	0.0000	676.99	1.086	58 64%	60.0%	0.4919	1 111	692.00	61.35%		
70.0%	0.6187	789.82	1,000	69 13%	70.0%	0.6351	1,296	800.69	70.96%		
72.5%	0.6612	818.03	1,322	71.39%	72.5%	0.6820	1,343	830.56	73.61%		
75.0%	0.7094	846.23	1.370	73.97%	75.0%	0.7284	1,389	857.13	75.97%		
77.5%	0.7613	874.44	1.420	76.66%	77.5%	0.7788	1.435	883.04	78.26%		
80.0%	0.8190	902.65	1,471	79.42%	80.0%	0.8326	1,482	908.44	80.51%		
82.5%	0.8852	930.86	1,523	82.26%	82.5%	0.8908	1,528	933.24	82.71%		
85.0%	0.9602	959.07	1,566	84.57%	85.0%	0.9759	1,574	964.42	85.47%		
87.5%	1.0467	987.27	1,608	86.81%	87.5%	1.0806	1,621	996.92	88.36%		
90.0%	1.1496	1015.48	1,648	88.98%	90.0%	1.1949	1,667	1026.71	91.00%		
92.5%	1.2764	1043.69	1,698	91.70%	92.5%	1.3267	1,713	1052.67	93.30%		
95.0%	1.4589	1071.90	1,749	94.44%	95.0%	1.5018	1,759	1077.02	95.45%		
97.5%	1.7613	1100.10	1,798	97.08%	97.5%	1.8401	1,806	1104.93	97.93%		
100.0%	3.3411	1128.31	1,852	100.00%	100.0%	3.3411	1,852	1128.31	100.00%		



Figure 22. Optimal WQCV Basin Size using WQ-COSM for the DAL FTW WSCMO AIRPORT TX US (COOP:412242).

WQCV Table 100% Imperviousness												
Optimized	Values:											
WC	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured	WQCV	Volume Captured	Number of Storms Captured	Percent of Storms Captured	Percent of Storms Captured	WQCV	Number of Storms Captured	Volume Captured	Percent of Volume Captured			
(/o) 84.0%	(11)	1684.25	3 102	(^) 86 60%	(/o) 84.5%	0 0220	3.026	1620.08	(/o) 81.20%			
04.0 /0	1.0107	1004.20	3,102	00.00 /0	04.076	0.9229	3,020	1029.00	01.29/0			
Incrementa	al WQCV Va	alues:										
WC	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0569	200.40	305	8.52%	10.0%	0.0668	358	235.26	11.74%			
20.0%	0.1189	400.80	687	19.18%	20.0%	0.1232	716	413.30	20.62%			
30.0%	0.1894	601.20	1,155	32.23%	30.0%	0.1747	1,075	565.04	28.20%			
40.0%	0.2734	801.60	1,589	44.37%	40.0%	0.2415	1,433	727.92	36.32%			
50.0%	0.3750	1002.00	1,963	54.81%	50.0%	0.3246	1,791	906.40	45.23%			
60.0%	0.4993	1202.40	2,335	65.17%	60.0%	0.4405	2,149	1115.37	55.66%			
70.0%	0.6602	1402.81	2,682	74.87%	70.0%	0.5677	2,507	1294.56	64.60%			
72.5%	0.7073	1452.91	2,759	77.02%	72.5%	0.6104	2,597	1348.24	67.28%			
75.0%	0.7616	1503.01	2,837	79.20%	75.0%	0.6631	2,687	1405.89	70.15%			
77.5%	0.8201	1553.11	2,914	81.36%	77.5%	0.7192	2,776	1463.91	73.05%			
80.0%	0.8844	1603.21	2,991	83.50%	80.0%	0.7817	2,866	1521.56	75.93%			
82.5%	0.9589	1653.31	3,059	85.39%	82.5%	0.8536	2,955	1579.55	78.82%			
85.0%	1.0436	1703.41	3,129	87.35%	85.0%	0.9434	3,045	1642.89	81.98%			
87.5%	1.1420	1753.51	3,206	89.49%	87.5%	1.0501	3,134	1707.21	85.19%			
90.0%	1.2636	1803.61	3,280	91.58%	90.0%	1.1705	3,224	1765.78	88.11%			
92.5%	1.4147	1853.71	3,355	93.66%	92.5%	1.3234	3,313	1825.24	91.08%			
95.0%	1.6237	1903.81	3,422	95.54%	95.0%	1.5598	3,403	1890.35	94.33%			
97.5%	1.9379	1953.91	3,483	97.24%	97.5%	1.9719	3,492	1957.56	97.68%			
100.0%	3.6035	2004.01	3,582	100.00%	100.0%	3.6035	3,582	2004.01	100.00%			



Figure 23. Optimal WQCV Basin Size using WQ-COSM for the DALLAS FAA AIRPORT TX US (COOP:412244).

	WQCV Table 100% Imperviousness											
Optimized	Values:											
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured	Percent of Storms Captured	WQCV	Number of Storms Captured	Volume Captured	Percent of Volume Captured			
87.3%	1.0566	1475.31	2.878	89.21%	87.1%	0.9720	2.810	1435.97	85.01%			
011070			2,070	0012170	0	0.07.20	2,010		00.0170			
Incrementa	al WQCV Va	alues:	<u> </u>				<u> </u>					
WC	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed			
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)			
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%			
10.0%	0.0545	168.92	92	2.86%	10.0%	0.1029	323	309.65	18.33%			
20.0%	0.1138	337.83	429	13.29%	20.0%	0.1360	645	395.26	23.40%			
30.0%	0.1813	506.75	1,031	31.96%	30.0%	0.1692	968	480.98	28.47%			
40.0%	0.2615	675.66	1,439	44.60%	40.0%	0.2306	1,290	612.23	36.24%			
50.0%	0.3572	844.58	1,761	54.60%	50.0%	0.3109	1,613	765.49	45.32%			
60.0%	0.4731	1013.50	2,062	63.91%	60.0%	0.4207	1,936	942.76	55.81%			
70.0%	0.6186	1182.41	2,367	73.39%	70.0%	0.5628	2,258	1122.98	66.48%			
72.5%	0.6620	1224.64	2,447	75.85%	72.5%	0.6030	2,339	1167.21	69.10%			
75.0%	0.7111	1266.87	2,524	78.23%	75.0%	0.6470	2,420	1210.04	71.64%			
77.5%	0.7634	1309.10	2,599	80.57%	77.5%	0.6949	2,500	1253.64	74.22%			
80.0%	0.8249	1351.33	2,667	82.68%	80.0%	0.7503	2,581	1298.73	76.89%			
82.5%	0.8936	1393.56	2,738	84.87%	82.5%	0.8196	2,661	1347.69	79.78%			
85.0%	0.9717	1435.79	2,809	87.08%	85.0%	0.8977	2,742	1395.94	82.64%			
87.5%	1.0629	1478.01	2,883	89.37%	87.5%	0.9878	2,823	1443.92	85.48%			
90.0%	1.1738	1520.24	2,955	91.61%	90.0%	1.0891	2,903	1489.19	88.16%			
92.5%	1.3247	1562.47	3,033	94.00%	92.5%	1.2223	2,984	1535.16	90.88%			
95.0%	1.5329	1604.70	3,091	95.83%	95.0%	1.4321	3,065	1586.50	93.92%			
97.5%	1.9102	1646.93	3,156	97.82%	97.5%	1.8287	3,145	1640.01	97.09%			
100.0%	4.0572	1689.16	3,226	100.00%	100.0%	4.0572	3,226	1689.16	100.00%			



Figure 24. Optimal WQCV Basin Size using WQ-COSM for the DENTON 2 SE TX US (COOP:412404).

	WQCV Table 100% Imperviousness												
Optimized	Values:												
WC	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red				
Percent of Volume Captured	WQCV	Volume Captured	Number of Storms Captured	Percent of Storms Captured	Percent of Storms Captured	WQCV	Number of Storms Captured	Volume Captured	Percent of Volume Captured				
(<i>/</i> 0) 8/ 1%	0 9965	1475.66	2 697	(/o) 86 39%	(/0) 86.4%	0 9965	2 697	1475.66	(<i>/</i> 0 <i>)</i> 8/112%				
04.1/0	0.9905	1475.00	2,097	00.39 /0	00.4 /0	0.9905	2,097	1475.00	04.12/0				
Incrementa	al WQCV Va	alues:											
WC	CV Based o	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red				
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)				
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%				
10.0%	0.0582	175.43	281	9.00%	10.0%	0.0647	312	195.01	11.12%				
20.0%	0.1216	350.86	615	19.69%	20.0%	0.1233	624	355.21	20.25%				
30.0%	0.1930	526.28	992	31.77%	30.0%	0.1803	937	498.82	28.43%				
40.0%	0.2766	701.71	1,336	42.81%	40.0%	0.2521	1,249	654.00	37.28%				
50.0%	0.3761	877.14	1,654	52.99%	50.0%	0.3466	1,561	830.82	47.36%				
60.0%	0.4972	1052.57	1,978	63.36%	60.0%	0.4503	1,873	989.75	56.42%				
70.0%	0.6516	1228.00	2,285	73.20%	70.0%	0.5973	2,185	1173.11	66.87%				
72.5%	0.6970	1271.85	2,365	75.77%	72.5%	0.6396	2,263	1216.18	69.33%				
75.0%	0.7500	1315.71	2,441	78.20%	75.0%	0.6829	2,342	1258.65	71.75%				
77.5%	0.8070	1359.57	2,512	80.47%	77.5%	0.7348	2,420	1303.14	74.28%				
80.0%	0.8694	1403.42	2,577	82.54%	80.0%	0.7930	2,498	1349.66	76.94%				
82.5%	0.9425	1447.28	2,651	84.92%	82.5%	0.8681	2,576	1402.68	79.96%				
85.0%	1.0270	1491.14	2,722	87.18%	85.0%	0.9450	2,654	1448.80	82.59%				
87.5%	1.1273	1535.00	2,798	89.64%	87.5%	1.0395	2,732	1497.46	85.36%				
90.0%	1.2509	1578.85	2,856	91.47%	90.0%	1.1508	2,810	1543.69	88.00%				
92.5%	1.4041	1622.71	2,923	93.62%	92.5%	1.3261	2,888	1601.85	91.31%				
95.0%	1.6249	1666.57	2,991	95.81%	95.0%	1.5161	2,966	1647.10	93.89%				
97.5%	1.9942	1710.42	3,052	97.76%	97.5%	1.9348	3,044	1705.10	97.20%				
100.0%	3.7260	1754.28	3,122	100.00%	100.0%	3.7260	3,122	1754.28	100.00%				



Figure 25. Optimal WQCV Basin Size using WQ-COSM for the FERRIS TX US (COOP:413133).

WQCV Table 100% Imperviousness									
Optimized	Values:								
WC	QCV Based of	on Runoff Vo	olume Captu	red	WQCV Based on Storm Events Captured				
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
84.9%	0.9525	1441.85	2,934	87.31%	85.6%	0.8763	2,878	1400.38	82.41%
Incrementa	Incremental WQCV Values:								
WC	CV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%
10.0%	0.0525	169.93	42	1.25%	10.0%	0.1020	336	317.95	18.71%
20.0%	0.1099	339.85	420	12.51%	20.0%	0.1335	672	405.34	23.85%
30.0%	0.1750	509.78	1,004	29.89%	30.0%	0.1756	1,008	511.18	30.08%
40.0% 50.0%	0.2520	679.70 849.63	1,432 1,832	42.61% 54.51%	40.0% 50.0%	0.2341	1,344 1,680	644.61 779.15	37.93% 45.85%
60.0%	0.4586	1019.56	2,181	64.92%	60.0%	0.4008	2,016	937.57	55.18%
70.0%	0.6045	1189.48	2,494	74.23%	70.0%	0.5321	2,352	1110.69	65.36%
72.5%	0.6491	1231.96	2,567	76.39%	72.5%	0.5748	2,436	1157.21	68.10%
75.0%	0.6960	1274.44	2,643	78.65%	75.0%	0.6196	2,520	1204.36	70.88%
77.5%	0.7492	1316.93	2,734	81.37%	77.5%	0.6725	2,604	1253.88	73.79%
80.0%	0.8100	1359.41	2,813	83.73%	80.0%	0.7224	2,688	1295.51	76.24%
82.5%	0.8789	1401.89	2,880	85.70%	82.5%	0.7754	2,772	1336.10	78.63%
85.0%	0.9574	1444.37	2,937	87.40%	85.0%	0.8494	2,856	1384.87	81.50%
87.5%	1.0469	1486.85	3,000	89.28%	87.5%	0.9622	2,940	1446.81	85.14%
90.0%	1.1536	1529.33	3,063	91.15%	90.0%	1.0845	3,024	1502.78	88.44%
92.5%	1.2856	1571.81	3,131	93.19%	92.5%	1.2406	3,108	1558.39	91.71%
95.0%	1.4654	1614.30	3,201	95.28%	95.0%	1.4396	3,192	1609.26	94.70%
97.5%	1.7687	1656.78	3,279	97.59%	97.5%	1.7525	3,276	1655.22	97.41%
100.0%	3.5050	1699.26	3,360	100.00%	100.0%	3.5050	3,360	1699.26	100.00%



Figure 26. Optimal WQCV Basin Size using WQ-COSM for the FORT WORTH MEACHAM FIELD TX US (COOP:413284).

WQCV Table 100% Imperviousness									
Optimized	Values:								
WC	QCV Based	on Runoff Vo	olume Captu	red	WQCV Based on Storm Events Captured				
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
00.1%	1.0047	1220.01	2,191	09.09%	00.4%	0.6559	2,002	1156.70	01.24%
Incremental WQCV Values:									
WC	QCV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%
10.0%	0.0514	142.62	6	0.20%	10.0%	0.0998	314	265.01	18.58%
20.0%	0.1086	285.25	419	13.35%	20.0%	0.1259	628	325.35	22.81%
30.0%	0.1751	427.87	1,067	33.99%	30.0%	0.1550	942	389.96	27.34%
40.0%	0.2554	570.50	1,501	47.83%	40.0%	0.2053	1,256	484.90	34.00%
50.0%	0.3513	713.12	1,850	58.93%	50.0%	0.2718	1,570	596.93	41.85%
60.0%	0.4687	855.74	2,158	68.75%	60.0%	0.3617	1,883	727.65	51.02%
70.0%	0.6182	998.37	2,404	76.58%	70.0%	0.4864	2,197	874.42	61.31%
72.5%	0.6618	1034.02	2,456	78.23%	72.5%	0.5223	2,276	912.17	63.96%
75.0%	0.7109	1069.68	2,520	80.28%	75.0%	0.5790	2,354	964.54	67.63%
77.5%	0.7638	1105.33	2,588	82.43%	77.5%	0.6425	2,433	1018.24	71.39%
80.0%	0.8226	1140.99	2,654	84.56%	80.0%	0.7042	2,511	1064.96	74.67%
82.5%	0.8896	1176.65	2,710	86.34%	82.5%	0.7656	2,590	1106.43	77.58%
85.0%	0.9654	1212.30	2,773	88.35%	85.0%	0.8393	2,668	1149.84	80.62%
87.5%	1.0537	1247.96	2,824	89.97%	87.5%	0.9335	2,747	1197.38	83.95%
90.0%	1.1576	1283.61	2,879	91.70%	90.0%	1.0551	2,825	1248.50	87.54%
92.5%	1.2875	1319.27	2,940	93.66%	92.5%	1.2085	2,904	1298.86	91.07%
95.0%	1.4669	1354.93	3,005	95.72%	95.0%	1.3956	2,982	1342.26	94.11%
97.5%	1.7639	1390.58	3,070	97.80%	97.5%	1.7145	3,061	1386.27	97.20%
100.0%	3.6468	1426.24	3,139	100.00%	100.0%	3.6468	3,139	1426.24	100.00%



Figure 27. Optimal WQCV Basin Size using WQ-COSM for the FORT WORTH WSFO TX US (COOP:413285).

WQCV Table 100% Imperviousness									
Optimized	Values:								
WC	QCV Based of	on Runoff Vo	olume Captu	red	WQCV Based on Storm Events Captured				
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
85.8%	1.1004	1156.85	1,944	87.29%	87.3%	1.1004	1,944	1156.85	85.83%
Incremental WQCV Values:									
WC	QCV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%
10.0%	0.0604	134.78	69	3.09%	10.0%	0.1079	223	233.77	17.34%
20.0%	0.1261	269.56	312	14.02%	20.0%	0.1531	445	322.71	23.94%
30.0%	0.2000	404.33	631	28.35%	30.0%	0.2099	668	421.00	31.24%
40.0%	0.2862	539.11	905	40.63%	40.0%	0.2808	891	531.33	39.42%
50.0%	0.3877	673.89	1,134	50.90%	50.0%	0.3779	1,114	661.44	49.08%
60.0%	0.5131	808.67	1,389	62.39%	60.0%	0.4802	1,336	777.01	57.65%
70.0%	0.6757	943.45	1,603	71.96%	70.0%	0.6410	1,559	918.00	68.11%
72.5%	0.7238	977.14	1,663	74.66%	72.5%	0.6853	1,615	950.16	70.50%
75.0%	0.7781	1010.84	1,718	77.15%	75.0%	0.7298	1,670	981.37	72.81%
77.5%	0.8369	1044.53	1,772	79.59%	77.5%	0.7862	1,726	1015.72	75.36%
80.0%	0.9025	1078.23	1,827	82.05%	80.0%	0.8477	1,782	1050.16	77.92%
82.5%	0.9786	1111.92	1,881	84.47%	82.5%	0.9167	1,837	1084.50	80.47%
85.0%	1.0673	1145.62	1,929	86.60%	85.0%	1.0003	1,893	1120.24	83.12%
87.5%	1.1706	1179.31	1,976	88.73%	87.5%	1.1103	1,949	1160.21	86.08%
90.0%	1.2973	1213.00	2,035	91.37%	90.0%	1.2338	2,004	1197.37	88.84%
92.5%	1.4669	1246.70	2,084	93.57%	92.5%	1.3731	2,060	1229.23	91.20%
95.0%	1.6977	1280.39	2,125	95.41%	95.0%	1.6406	2,116	1273.21	94.47%
97.5%	2.0734	1314.09	2,170	97.43%	97.5%	2.1056	2,171	1316.34	97.67%
100.0%	3.9941	1347.78	2,227	100.00%	100.0%	3.9941	2,227	1347.78	100.00%



Figure 28. Optimal WQCV Basin Size using WQ-COSM for the FRISCO TX US (COOP:413370).

WQCV Table 100% Imperviousness									
Optimized	Values:								
WC	CV Based of	on Runoff Vo	olume Captu	red	WQCV Based on Storm Events Captured				
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
85.7%	0.9923	1384.94	2,979	88.28%	80.7%	0.9129	2,924	1344.59	83.18%
Incremental WQCV Values:									
WC	CV Based	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	ed
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%
10.0%	0.0523	161.65	29	0.86%	10.0%	0.1049	337	310.18	19.19%
20.0%	0.1100	323.29	397	11.75%	20.0%	0.1342	675	384.94	23.81%
30.0%	0.1764	484.94	1,063	31.51%	30.0%	0.1680	1,012	466.95	28.89%
40.0%	0.2552	646.59	1,505	44.60%	40.0%	0.2241	1,350	586.05	36.25%
50.0%	0.3494	808.24	1,881	55.75%	50.0%	0.2990	1,687	725.50	44.88%
60.0%	0.4638	969.88	2,244	66.50%	60.0%	0.3886	2,024	868.88	53.75%
70.0%	0.6132	1131.53	2,561	75.90%	70.0%	0.5120	2,362	1026.74	63.52%
72.5%	0.6584	1171.94	2,630	77.95%	72.5%	0.5484	2,446	1067.90	66.06%
75.0%	0.7073	1212.35	2,697	79.94%	75.0%	0.5954	2,531	1114.39	68.94%
77.5%	0.7630	1252.77	2,769	82.06%	77.5%	0.6474	2,615	1162.80	71.93%
80.0%	0.8240	1293.18	2,840	84.18%	80.0%	0.7088	2,699	1213.56	75.07%
82.5%	0.8923	1333.59	2,908	86.19%	82.5%	0.7746	2,784	1261.04	78.01%
85.0%	0.9700	1374.00	2,965	87.89%	85.0%	0.8498	2,868	1309.01	80.98%
87.5%	1.0591	1414.41	3,024	89.64%	87.5%	0.9491	2,952	1363.92	84.38%
90.0%	1.1661	1454.82	3,105	92.03%	90.0%	1.0736	3,037	1420.40	87.87%
92.5%	1.3079	1495.24	3,174	94.07%	92.5%	1.1892	3,121	1462.81	90.49%
95.0%	1.5025	1535.65	3,234	95.86%	95.0%	1.3981	3,205	1515.64	93.76%
97.5%	1.8067	1576.06	3,296	97.68%	97.5%	1.7729	3,290	1572.68	97.29%
100.0%	3.7311	1616.47	3,374	100.00%	100.0%	3.7311	3,374	1616.47	100.00%



Figure 29. Optimal WQCV Basin Size using WQ-COSM for the GRAPEVINE DAM TX US (COOP:413691).

WQCV Table 100% Imperviousness									
Optimized	Values:								
WC	QCV Based of	on Runoff Vo	olume Captu	red	WQCV Based on Storm Events Captured				
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
86.2%	1.0676	1335.56	2,991	90.42%	86.7%	0.8968	2,867	1259.82	81.34%
Incrementa	al WQCV Va	alues:							
WC	CV Based of	on Runoff Vo	olume Captu	red	W	QCV Based	on Storm Ev	ents Captur	red
Percent of Volume Captured (%)	WQCV (in)	Volume Captured (in)	Number of Storms Captured	Percent of Storms Captured (%)	Percent of Storms Captured (%)	WQCV (in)	Number of Storms Captured	Volume Captured (%)	Percent of Volume Captured (%)
0.0%	0.0000	0.00	0	0.00%	0.0%	0.0000	0	0.00	0.00%
10.0%	0.0524	154.89	26	0.78%	10.0%	0.1076	331	303.84	19.62%
20.0%	0.1102	309.78	364	11.01%	20.0%	0.1331	662	362.89	23.43%
30.0%	0.1783	464.67	1,191	35.99%	30.0%	0.1585	992	421.93	27.24%
40.0%	0.2600	619.55	1,608	48.59%	40.0%	0.2039	1,323	513.60	33.16%
50.0%	0.3599	774.44	1,952	59.00%	50.0%	0.2730	1,654	640.26	41.34%
60.0%	0.4818	929.33	2,264	68.45%	60.0%	0.3716	1,985	790.24	51.02%
70.0%	0.6358	1084.22	2,546	76.97%	70.0%	0.5047	2,316	956.11	61.73%
72.5%	0.6812	1122.94	2,610	78.90%	72.5%	0.5473	2,398	1000.62	64.60%
75.0%	0.7350	1161.67	2,689	81.28%	75.0%	0.5915	2,481	1045.45	67.50%
77.5%	0.7928	1200.39	2,765	83.57%	77.5%	0.6482	2,564	1094.81	70.68%
80.0%	0.8572	1239.11	2,834	85.69%	80.0%	0.7061	2,646	1141.02	73.67%
82.5%	0.9313	1277.83	2,894	87.50%	82.5%	0.7626	2,729	1181.44	76.28%
85.0%	1.0184	1316.55	2,962	89.54%	85.0%	0.8357	2,812	1226.40	79.18%
87.5%	1.1214	1355.28	3,020	91.30%	87.5%	0.9315	2,895	1277.92	82.51%
90.0%	1.2480	1394.00	3,079	93.08%	90.0%	1.0431	2,977	1326.27	85.63%
92.5%	1.4103	1432.72	3,139	94.90%	92.5%	1.2045	3,060	1381.77	89.21%
95.0%	1.6412	1471.44	3,198	96.67%	95.0%	1.4189	3,143	1434.44	92.61%
97.5%	2.0269	1510.17	3,247	98.15%	97.5%	1.8395	3,225	1493.84	96.45%
100.0%	4.0143	1548.89	3,308	100.00%	100.0%	4.0143	3,308	1548.89	100.00%



Figure 30. Optimal WQCV Basin Size using WQ-COSM for the JUSTIN TX US (COOP:414679).

Appendix B Re-calculated 85th-percentile Storm Depth

The 85th-percentile 24-hour storm depths re-calculated for the NCDC stations shown in Figure 2 using continuous rainfall data are summarized in Table 2.

	5 -percentine storin Depth based on	NCDC COntinu		ala.
Station	Station Name	Start Date	End Date	85th-pct Storm Depth (inches)
COOP:412404	DENTON 2 SE TX US	8/29/1946	12/21/2013	1.26
COOP:411921	COMMERCE 4 SW TX US	8/13/1948	12/21/2013	1.33
COOP:411246	BURLESON TX US	12/1/1982	12/21/2013	1.30
COOP:410691	BENBROOK DAM TX US	6/1/1949	12/21/2013	1.25
COOP:413370	FRISCO TX US	10/1/1966	12/21/2013	1.30
COOP:412096	CRESSON TX US	9/25/1946	12/21/2013	1.20
COOP:413284	FORT WORTH MEACHAM FIELD TX US	1/6/1940	12/29/2013	1.20
COOP:413285	FORT WORTH WSFO TX US	5/10/1948	1/1/2014	1.30
COOP:412242	DAL FTW WSCMO AIRPORT TX US	2/1/1974	12/29/2013	1.20
COOP:413133	FERRIS TX US	7/1/1946	12/20/2013	1.30
COOP:410518	BARDWELL DAM TX US	4/1/1965	12/21/2013	1.30
COOP:412244	DALLAS FAA AIRPORT TX US	11/4/1940	12/21/2013	1.30
COOP:410206	ALVORD 3 N TX US	4/8/1942	12/21/2013	1.23
COOP:415958	MINERAL WELLS AIRPORT TX US	3/18/1948	12/29/2013	1.20
COOP:415957	MINERAL WELLS 1 SSW TX US	3/1/1952	12/21/2013	1.30
COOP:415192	LEWISVILLE DAM TX US	7/1/1949	1/1/2014	1.28
COOP:415094	LAVON DAM TX US	7/1/1949	1/1/2014	1.30
COOP:413691	GRAPEVINE DAM TX US	6/1/1949	1/1/2014	1.30
COOP:416210	NAVARRO MILLS DAM TX US	8/1/1962	12/21/2013	1.30
COOP:418563	SPRINGTOWN 4 S TX US	11/1/1977	12/21/2013	1.30
COOP:415897	MIDLOTHIAN TX US	1/1/1974	12/21/2013	1.40
COOP:418623	STEPHENVILLE 9 NNE TX US	7/15/1940	12/21/2013	1.20
COOP:414972	LAKE BRIDGEPORT DAM TX US	8/1/1946	12/21/2013	1.20
COOP:415766	MCKINNEY MUNICIPAL AIRPORT TX US	4/1/1957	1/1/2014	1.97
COOP:414679	JUSTIN TX US	1/1/1954	12/21/2013	1.30
COOP:419532	WEATHERFORD TX US	10/1/1947	12/21/2013	1.20

Table 2. 85th-percentile Storm Depth based on NCDC Continuous Rainfall Data.