

Rain Files for TVA Service Area and Surrounding Areas for use with WinSLAMM

Rain files were created to support WinSLAMM use in the TVA service area, and surrounding communities. Figure 1 is a region map showing the TVA service area. NOAA rainfall data was obtained on CD-ROMs, published by Earth Info, Inc. of Golden Colorado. The available data were reviewed and locations were selected that had many continuous years of data. The data from these locations were then converted into the WinSLAMM rain file format and further tested. The rain files contained the starting date and time, ending date and time, and total rain depth for each rain. The rain file creator module compiles continuous hourly rain data into separate events. For these files, all rains were considered (at least 0.01 inches in depth), and individual rain events were separated if more than 6 hours of no rain was observed. Therefore, up to three different rain events could occur in any one day, and rains can span multiple days. WinSLAMM also calculates inter-event durations, rain durations, and average rain intensities from this information for further use in the model.

Figure 2 is a screen dump showing the plot available in WinSLAMM to examine and edit the rain files. This plot enabled data gaps to be easily seen, and gave a graphical display of the ranges of the rain depths, especially the frequency of the largest events. If the rains were apparently not continuous, either the site was not used, or the file was divided into subfiles, each having continuous records. Each file was then used with a WinSLAMM analysis to ensure that overall suitability. Rain data from 84 communities near and within the TVA service area was used to create formatted rain files for use with WinSLAMM. Figure 3 is a plot of these 84 sites. The TVA service area is well represented.

The program was also recently modified to enable evaluations of monthly rain patterns for all years in the rain file. Tables 1 and 2 show the monthly summaries for Knoxville, TN, rain depths, while Tables 3 and 4 show the monthly rain event numbers. These tables are created as a *.csv file by the WinSLAMM rain file utility. These files summarize the monthly rain depths and numbers, along with statistical summaries. Most importantly, they calculate the deviations for each year, compared to the overall average conditions. In these tables, the first and last years were eliminated from the statistical summaries if some leading and ending months had no recorded rains. These files were then imported into a spreadsheet and sorted by absolute deviation. This enabled us to select typical rain years for initial analyses. The typical rain years were based on low deviations (in both total depth and number of events) and in monthly variations. In some cases, the years having the smallest deviation from the long-term average had highly skewed monthly values.

Table 5 is a summary of the final set of WinSLAMM rain files created for use in the TVA service area. This table shows the full file name, the city and state, and location, along with the start and ending dates of rains in the file, plus simple rain statistics. It is recommended that most of the preliminary evaluations of alternative stormwater controls use the typical rain year. The

most promising set of stormwater controls can then be evaluated using the complete rain file containing many years of data. In some cases, the city has two rain files due to a data gap. Either the longest, or the most recent rain file, may be used for the final analyses.

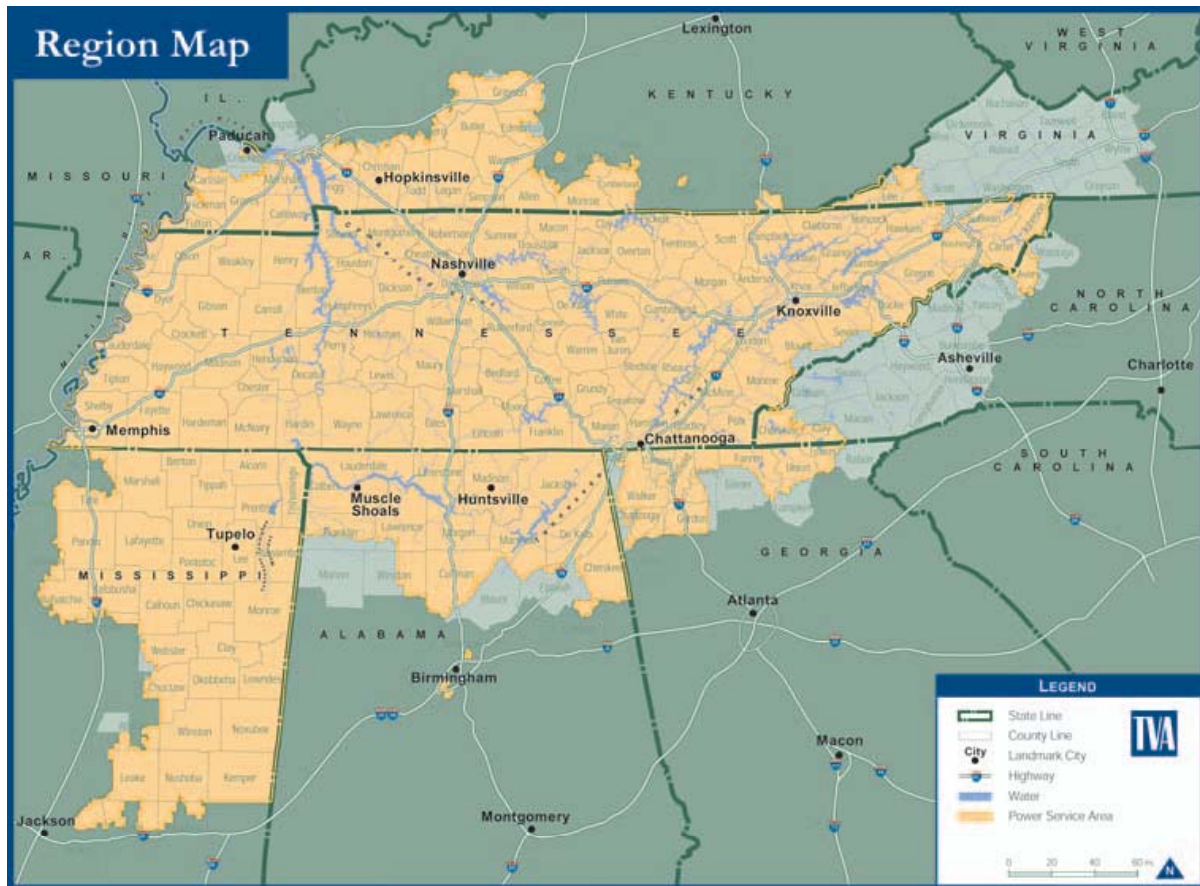


Figure 1. TVA Service Area.

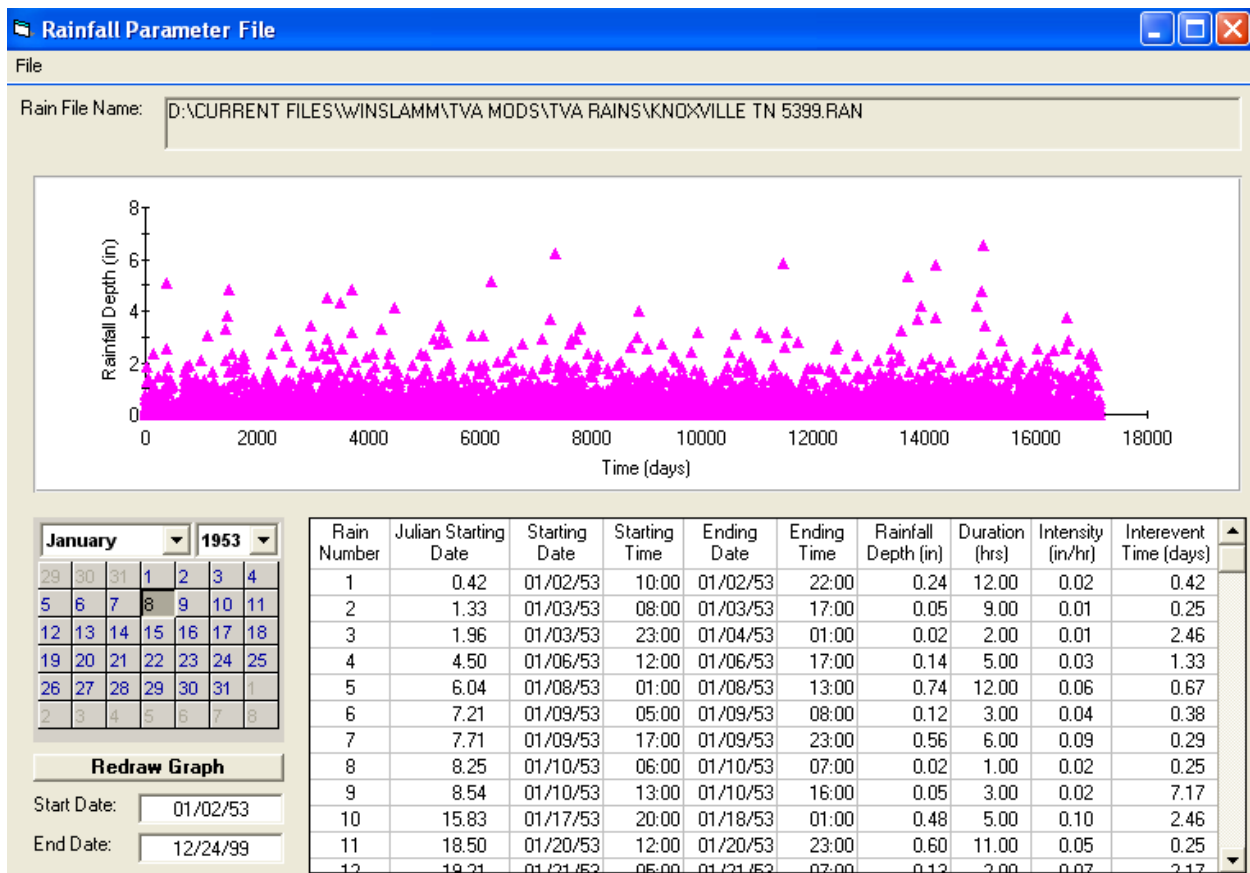


Figure 2. Example plot of all rains at Knoxville, TN, 1953 through 1999.

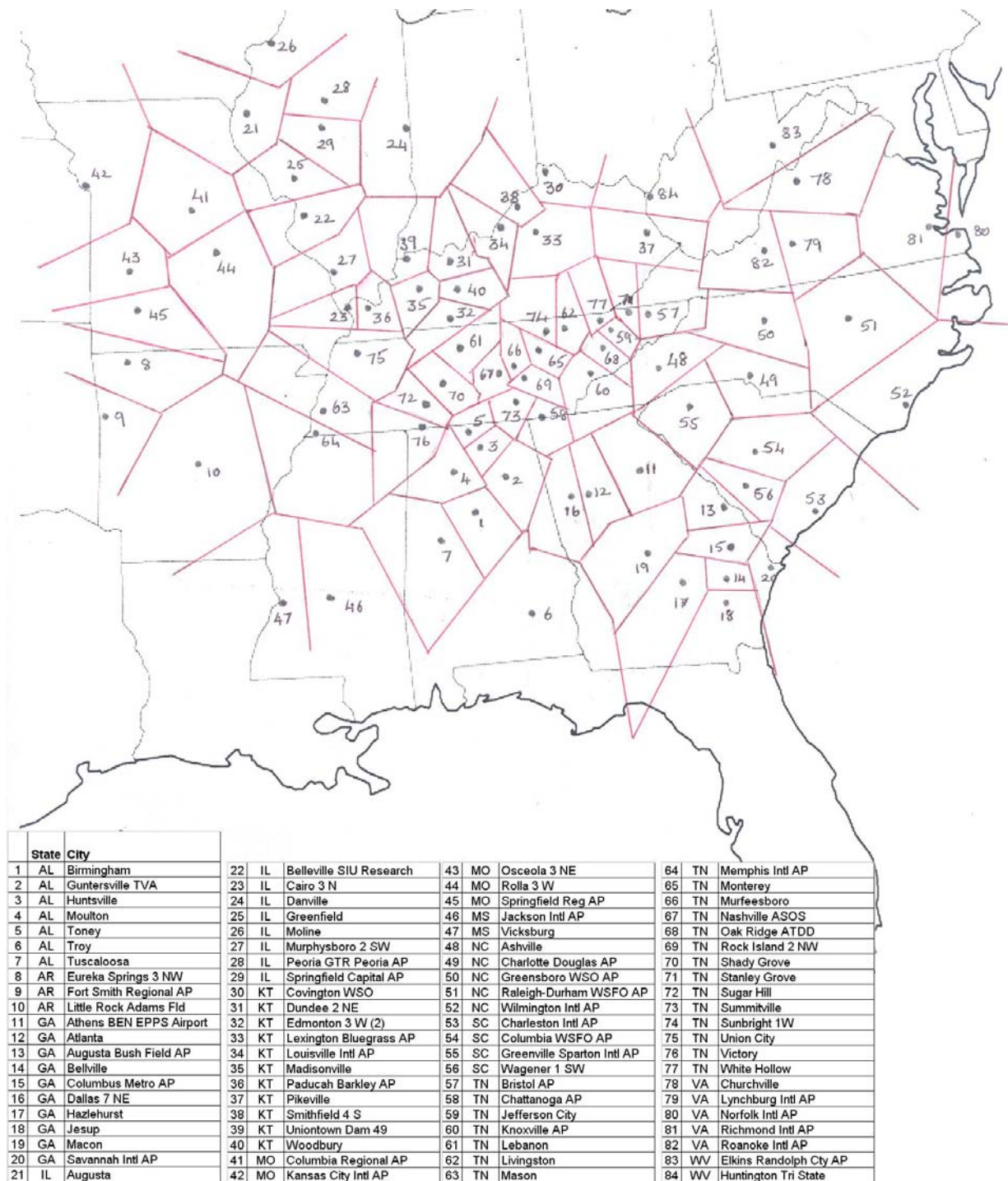


Figure 3. Rain files created for WinSLAMM analyses near TVA service area.

Table 1. Knoxville, TN monthly rain depths, from 1953 through 1998

Year	Jan	Feb	...	Dec	Total	Deviation From Average	Absolute Deviation	Count	Average	Standard Deviation	COV	Min	Max
1953	4.16	6.18	...	3.36	39.55	-7.53	7.53	12	3.30	1.60	0.48	0.68	6.18
1954	11.74	3.40	...	5.97	41.03	-6.05	6.05	12	3.42	3.06	0.90	0.64	11.74
1955	1.62	5.62	...	2.73	41.09	-5.99	5.99	12	3.42	1.21	0.35	1.62	5.62
1956	3.18	8.29	...	8.06	47.36	0.28	0.28	12	3.95	2.31	0.59	1.45	8.29
1957	11.24	6.27	...	5.18	61.51	14.43	14.43	12	5.13	2.75	0.54	0.70	11.24
1958	2.43	2.49	...	2.19	37.23	-9.85	9.85	12	3.10	1.54	0.50	0.64	5.57
1959	4.09	4.24	...	4.03	45.27	-1.81	1.81	12	3.77	1.13	0.30	0.93	5.00
1960	3.39	3.00	...	3.69	40.26	-6.82	6.82	12	3.35	1.21	0.36	1.12	4.89
1961	2.47	7.82	...	11.94	54.73	7.65	7.65	12	4.56	3.18	0.70	0.50	11.94
1962	5.92	7.96	...	3.67	54.28	7.20	7.20	12	4.52	2.02	0.45	1.88	7.96
1963	4.20	3.54	...	3.38	48.66	1.58	1.58	12	4.06	2.29	0.56	0.00	9.92
1964	4.20	4.08	...	4.02	45.41	-1.67	1.67	12	3.78	1.93	0.51	0.46	6.98
1965	3.94	3.25	...	0.45	40.81	-6.27	6.27	12	3.40	2.25	0.66	0.45	9.31
1966	3.88	4.69	...	2.66	45.87	-1.21	1.21	12	3.82	1.09	0.29	2.27	5.44
1967	2.67	4.58	...	6.95	55.66	8.58	8.58	12	4.64	2.29	0.49	2.00	10.09
1968	4.13	0.79	...	3.22	35.76	-11.32	11.32	12	2.98	1.20	0.40	0.79	4.78
1969	6.77	2.93	...	7.74	48.98	1.90	1.90	12	4.08	2.40	0.59	1.33	7.74
1970	3.04	2.86	...	4.67	43.43	-3.65	3.65	12	3.62	1.76	0.49	0.74	7.20
1971	5.03	4.93	...	5.48	50.44	3.36	3.36	12	4.20	1.78	0.42	1.98	8.76
1972	7.35	4.19	...	7.02	58.01	10.93	10.93	12	4.83	1.77	0.37	1.61	7.35
1973	3.24	2.59	...	7.38	58.03	10.95	10.95	12	4.84	2.41	0.50	1.03	10.24
1974	7.05	5.24	...	4.44	59.33	12.25	12.25	12	4.94	2.43	0.49	2.35	10.98
1975	4.66	4.68	...	3.59	45.27	-1.81	1.81	12	3.77	2.30	0.61	1.61	10.42
1976	3.86	2.18	...	4.42	42.44	-4.64	4.64	12	3.54	1.36	0.38	0.98	5.33
1977	2.55	1.52	...	3.30	50.93	3.85	3.85	12	4.24	2.27	0.53	1.08	6.96
1978	5.22	1.01	...	7.22	43.88	-3.20	3.20	12	3.66	1.98	0.54	0.61	7.22
1979	4.87	4.17	...	1.99	52.65	5.57	5.57	12	4.39	2.24	0.51	1.97	9.47
1980	5.47	1.78	...	1.78	40.39	-6.69	6.69	12	3.37	2.04	0.61	1.53	8.72
1981	1.05	3.74	...	4.14	43.79	-3.29	3.29	12	3.65	1.43	0.39	1.05	6.09
1982	6.03	4.88	...	3.70	54.70	7.62	7.62	12	4.56	1.58	0.35	2.66	6.60
1983	1.58	2.90	...	5.69	42.48	-4.60	4.60	12	3.54	1.60	0.45	0.95	5.88

1984	2.26	4.42	...	2.49	48.54	1.46	1.46	12	4.04	2.80	0.69	0.85	10.14
1985	5.38	1.90	...	2.36	36.40	-10.68	10.68	12	3.03	1.57	0.52	0.42	5.39
1986	0.95	3.90	...	4.08	32.48	-14.60	14.60	12	2.71	1.24	0.46	0.69	4.08
1987	4.68	4.63	...	3.85	35.02	-12.06	12.06	12	2.92	1.54	0.53	0.60	4.68
1988	3.93	2.94	...	4.08	34.39	-12.69	12.69	12	2.87	1.18	0.41	0.51	4.82
1989	4.87	6.26	...	2.74	56.13	9.05	9.05	12	4.68	2.32	0.50	1.32	9.34
1990	5.88	6.90	...	8.99	55.16	8.08	8.08	12	4.60	2.41	0.52	1.72	8.99
1991	2.53	6.99	...	5.36	58.26	11.18	11.18	12	4.85	2.45	0.50	1.10	10.11
1992	3.87	3.36	...	6.68	44.23	-2.85	2.85	12	3.69	1.28	0.35	1.77	6.68
1993	4.09	2.20	...	7.04	45.09	-1.99	1.99	12	3.76	1.92	0.51	0.90	7.04
1994	7.08	8.81	...	2.02	63.27	16.19	16.19	12	5.27	3.21	0.61	1.20	11.81
1995	4.90	4.54	...	2.51	42.86	-4.22	4.22	12	3.57	1.91	0.54	0.33	7.05
1996	7.32	1.94	...	4.66	47.58	0.50	0.50	12	3.96	2.28	0.57	0.87	8.01
1997*	5.03	4.88	...	2.08	46.57	-0.51	0.51	12	3.88	1.58	0.41	1.96	6.69
1998	4.36	2.25	...	5.97	50.67	3.59	3.59	12	4.22	2.55	0.60	1.25	9.57

*1997 was selected as a representative year

Table 2. Monthly Summaries for Knoxville, TN rains (monthly rain depths, inches)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Count	46	46	46	46	46	46	46	46	46	46	46	46	46
Average	4.53	4.17	5.10	3.90	4.05	3.90	4.29	3.08	2.94	2.78	3.82	4.54	47.08
Std Dev	2.20	1.95	2.38	1.79	2.02	1.85	2.31	1.53	1.80	1.52	1.88	2.24	7.73
COV	0.49	0.47	0.47	0.46	0.50	0.47	0.54	0.50	0.61	0.55	0.49	0.49	0.16
Minimum	0.95	0.79	1.69	0.98	0.74	0.46	0.33	0.77	0.42	0.00	1.21	0.45	32.48
Maximum	11.74	8.81	11.81	9.57	10.98	8.21	10.09	6.72	9.34	5.99	10.11	11.94	63.27

Table 3. Knoxville, TN monthly rain numbers, from 1953 through 1998

Year	Jan	Feb	...	Dec	Total	Deviation From Average	Absolute Deviation	Count	Average	Standard Deviation	COV	Min	Max
1953	17	10	...	8	114	-2.65	2.65	12	9.50	3.90	0.41	3	17
1954	6	7	...	12	96	-20.65	20.65	12	8.00	2.26	0.28	4	12
1955	6	8	...	7	102	-14.65	14.65	12	8.50	2.47	0.29	4	13
1956	9	18	...	10	126	9.35	9.35	12	10.50	3.68	0.35	6	18
1957	14	13	...	16	146	29.35	29.35	12	12.17	3.86	0.32	7	19

1958	9	7	...	4	114	-2.65	2.65	12	9.50	3.80	0.40	4	15
1959	8	12	...	9	121	4.35	4.35	12	10.08	2.68	0.27	6	14
1960	11	10	...	9	117	0.35	0.35	12	9.75	2.83	0.29	6	15
1961	10	9	...	12	130	13.35	13.35	12	10.83	2.66	0.25	6	15
1962	12	11	...	7	111	-5.65	5.65	12	9.25	2.26	0.24	6	13
1963	11	9	...	7	119	2.35	2.35	12	9.92	4.94	0.50	0	19
1964	8	12	...	9	111	-5.65	5.65	12	9.25	3.60	0.39	4	17
1965	6	10	...	5	105	-11.65	11.65	12	8.75	3.14	0.36	4	12
1966	12	10	...	9	125	8.35	8.35	12	10.42	2.61	0.25	6	16
1967	6	8	...	10	110	-6.65	6.65	12	9.17	3.83	0.42	5	17
1968	8	5	...	6	110	-6.65	6.65	12	9.17	2.92	0.32	5	13
1969	13	7	...	10	113	-3.65	3.65	12	9.42	2.19	0.23	5	13
1970	10	12	...	11	123	6.35	6.35	12	10.25	2.99	0.29	5	15
1971	14	10	...	14	136	19.35	19.35	12	11.33	3.11	0.27	7	16
1972	13	14	...	15	140	23.35	23.35	12	11.67	2.93	0.25	7	16
1973	9	8	...	10	124	7.35	7.35	12	10.33	2.99	0.29	6	15
1974	12	12	...	12	125	8.35	8.35	12	10.42	4.03	0.39	1	15
1975	12	13	...	6	111	-5.65	5.65	12	9.25	2.77	0.30	6	13
1976	10	7	...	7	110	-6.65	6.65	12	9.17	3.16	0.34	4	14
1977	12	4	...	11	129	12.35	12.35	12	10.75	4.20	0.39	4	17
1978	12	7	...	11	115	-1.65	1.65	12	9.58	3.03	0.32	5	16
1979	10	11	...	8	130	13.35	13.35	12	10.83	3.79	0.35	8	19
1980	9	6	...	6	96	-20.65	20.65	12	8.00	3.41	0.43	3	15
1981	5	9	...	11	109	-7.65	7.65	12	9.08	2.54	0.28	5	13
1982	10	13	...	9	126	9.35	9.35	12	10.50	2.43	0.23	6	13
1983	8	11	...	10	112	-4.65	4.65	12	9.33	2.06	0.22	6	12
1984	5	10	...	10	116	-0.65	0.65	12	9.67	3.73	0.39	2	15
1985	11	6	...	7	117	0.35	0.35	12	9.75	3.19	0.33	3	15
1986	2	8	...	10	94	-22.65	22.65	12	7.83	2.92	0.37	2	14
1987	10	9	...	9	107	-9.65	9.65	12	8.92	2.81	0.32	4	13
1988	9	6	...	8	97	-19.65	19.65	12	8.08	3.00	0.37	3	13
1989	11	15	...	9	132	15.35	15.35	12	11.00	2.59	0.24	8	15
1990	8	10	...	12	104	-12.65	12.65	12	8.67	1.97	0.23	5	12
1991	11	9	...	8	116	-0.65	0.65	12	9.67	4.23	0.44	2	17
1992	6	7	...	14	124	7.35	7.35	12	10.33	3.17	0.31	6	15
1993	11	7	...	7	104	-12.65	12.65	12	8.67	3.06	0.35	4	15

1994	10	7	...	8	116	-0.65	0.65	12	9.67	3.58	0.37	6	16
1995	13	12	...	9	122	5.35	5.35	12	10.17	2.25	0.22	8	15
1996	11	6	...	11	125	8.35	8.35	12	10.42	3.32	0.32	4	14
1997*	10	11	...	9	120	3.35	3.35	12	10.00	3.28	0.33	5	17
1998	11	7	...	9	116	-0.65	0.65	12	9.67	3.28	0.34	5	14

*1997 was selected as a representative year

Table 4. Monthly Summaries for Knoxville, TN rains (monthly rain events, numbers of events)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Count	46	46	46	46	46	46	46	46	46	46	46	46	46
Average	9.80	9.41	11.22	10.41	10.98	10.96	11.30	9.24	7.96	7.22	8.78	9.37	116.65
Std Dev	2.82	2.86	2.57	2.81	2.70	3.88	3.49	2.72	3.34	2.74	2.81	2.53	11.53
COV	0.29	0.30	0.23	0.27	0.25	0.35	0.31	0.29	0.42	0.38	0.32	0.27	0.10
Minimum	2	4	5	5	5	3	4	4	2	0	4	4	94
Maximum	17	18	16	17	18	17	19	16	19	14	16	16	146

Table 5. Descriptions of Rain Files Created for use with WinSLAMM in and near TVA Service Area

State	City	Latitude	Longitude	Elevation (ft)	WinSLAMM Rain File Name (*.RAN)	Beginning Date	Ending Date	Number of Rains	Average Rain Depth per Year (inches)	Average Number of Rains per Year	Typical Year
AL	Birmingham (1)	N 33 33 46	W 86 45 12	644	Birmingham AL 5378	1/2/1953	9/26/1978	2826	54.1	110.0	1978
AL	Birmingham (2)	N 33 33 46	W 86 45 12	644	Birmingham AL 8799	8/2/1987	10/10/1999	1237	51.2	103.5	1997
AL	Guntersville TVA (2)	N 34 22 00	W 86 17 00	610	Guntersville TVA AL 6280	4/5/1962	9/30/1980	1660	47.9	90.4	1969
AL	Huntsville	N 34 38 13	W 86 46 30	629	Huntsville AL 5899	11/1/1958	12/21/1999	4425	56.6	107.9	1959
AL	Moulton	N 34 28 00	W 87 18 00	630	Moulton AL 5377	1/2/1953	7/28/1977	2340	52.0	95.5	1971
AL	Toney	N 34 54 00	W 86 44 00	830	Toney AL 5380	1/2/1953	9/30/1980	2531	51.8	92.0	1974
AL	Troy (1)	N 31 48 27	W 85 58 20	542	Troy AL 5382	1/2/1953	2/27/1982	2387	47.2	81.7	n/a
AL	Troy (2)	N 31 48 27	W 85 58 20	542	Troy AL 8599	6/1/1985	12/21/1999	1215	50.5	84.2	1996
AL	Tuscaloosa (1)	N 33 13 14	W 87 36 41	170	Tuscaloosa AL 5867	1/20/1958	12/24/1967	854	48.3	87.1	n/a
AL	Tuscaloosa (2)	N 33 13 14	W 87 36 41	170	Tuscaloosa AL 6873	4/2/1968	8/18/1973	482	48.0	86.0	1970
AR	Eureka Springs 3 NW Fort Smith Regional AP	N 36 24 59	W 93 47 30	1420	Uureka Springs 3 NW AR 5399	1/16/1953	12/26/1999	3565	42.5	75.8	1978
AR		N 35 19 59	W 94 21 45	449	Fort Smith Reg AP AR 5399	1/16/1953	12/12/1999	4130	42.0	88.4	1987
AR	Little Rock Adams Fld	N 34 43 38	W 92 14 20	258	Little Rock Adams Fld AR 5399	1/7/1953	12/29/1975	2153	49.2	93.0	1962
GA	Athens BEN EPPS Airport	N 33 56 53	W 83 19 39	785	Athens BEN EPPA AP GA 5899	5/1/1958	12/21/1999	4093	50.1	98.6	1984
GA	Atlanta	N 33 38 25	W 84 25 37	1026	Atlanta GA 5899	5/1/1958	12/21/1999	4093	50.1	98.6	1973
GA	Augusta Bush Field AP (1)	N 33 22 11	W 81 57 53	131	Augusta Bush Field AP GA 5388	1/2/1953	5/25/1988	3429	43.5	96.7	1984
GA	Augusta Bush Field AP (2)	N 33 22 11	W 81 57 53	131	Augusta Bush Field AP GA 8999	5/1/1989	12/21/1999	1067	45.7	99.7	1997
GA	Bellville	N 32 09 00	W 81 58 00	190	Bellville GA 5380	1/2/1953	1/31/1980	2133	43.3	78.4	1956
GA	Columbus Metro AP	N 32 30 58	W 84 56 32	392	Columbus Metro AP GA 5399	1/2/1953	12/21/1999	4727	49.1	101.1	1994
GA	Dallas 7 NE	N 33 59 17	W 84 44 51	1100	Dallas 7 NE GA 5399	1/2/1953	12/21/1999	4065	47.7	86.5	1968
GA	Hazlehurst	N 31 53 16	W 82 34 51	250	Hazlehurst GA 5399	1/2/1953	12/22/1999	3725	44.0	79.6	1984
GA	Jesup	N 31 36 29	W 81 52 47	100	Jesup GA 5399	1/8/1953	12/13/1999	3650	43.2	78.0	1993
GA	Macon	N 32 41 05	W 83 39 10	343	Macon Middle GA Reg AP GA 5399	1/2/1953	12/21/1999	4741	45.1	101.1	1970
GA	Savannah Intl AP	N 32 07 48	W 81 12 36	46	Savannah Intl AP GA 5399	1/2/1953	12/22/1999	4934	50.2	105.2	1993
IL	Augusta	N 40 14 16	W 90 56 44	680	Augusta IL 5399	1/20/1953	12/15/1999	3374	32.5	72.0	1968

IL	Belleville SIU Research	N 38 31 12	W 89 50 48	450	Belleville SIU Research IL 5399	1/2/1953	12/12/1999	3605	35.0	77.4	1997
IL	Cairo 3 N	N 37 02 33	W 89 11 08	310	Cairo 3N IL 5387	1/2/1953	9/29/1987	3479	47.4	100.4	1959
IL	Danville	N 40 08 20	W 87 38 54	558	Danville IL 5399	1/2/1953	12/27/1999	4283	35.8	91.4	1968
IL	Greenfield	N 39 20 33	W 90 12 21	548	Greenfield IL 5599	5/7/1955	12/10/1999	3633	34.3	81.7	1995
IL	Moline	N 41 27 55	W 90 31 24	592	Moline WSO AP IL 5399	1/4/1953	12/27/1999	4884	37.1	104.3	1964
IL	Murphysboro 2 SW Peoria GTR Peoria AP	N 37 45 39	W 89 21 56	550	Murphysboro 2 SW IL 5399	1/2/1953	12/13/1999	4009	42.6	85.6	1995
IL		N 40 40 03	W 89 41 02	650	Peoria GTR AP IL 5399	1/2/1953	12/27/1999	4949	35.4	105.5	1972
IL	Springfield Capital AP	N 39 50 41	W 89 41 02	594	Springfield Capital AP IL 5399	1/2/1953	12/24/1999	4857	34.7	103.5	1969
KT	Covington WSO	N 39 02 35	W 84 40 18	869	Covington WSO KT 5399	1/2/1953	12/28/1999	5702	40.9	121.5	1991
KT	Dundee 2 NE	N 37 34 50	W 86 46 37	450	Dundee 2 NE KT 5399	1/2/1953	12/14/1999	3888	42.0	83.1	1965
KT	Edmonton 3 W (2) Lexington Bluegrass AP	N 36 59 00	W 85 39 00	780	Edmonton 3 W KT 5777 Lexington Bluegrass AP KT 5399	7/9/1957	7/26/1977	1854	46.1	93.7	1966
KT		N 38 02 27	W 84 36 21	980		1/2/1953	12/27/1999	5600	44.9	119.5	1993
KT	Louisville Intl AP	N 38 10 52	W 85 44 21	488	Louisville Intl KT 5399	1/2/1953	12/27/1999	5308	42.8	113.4	1971
KT	Madisonville	N 37 20 48	W 87 31 28	440	Madisonville KT 5399	1/2/1953	12/20/1999	3925	42.3	84.5	1966
KT	Paducah Barkley AP	N 37 03 23	W 88 46 27	413	Paducah Barkey AP KT 8499	10/5/1984	12/19/1999	1481	44.0	97.8	1995
KT	Pikeville (1)	N 37 29 00	W 82 31 00	686	Pikeville KT 5368	1/2/1953	11/24/1968	1641	39.7	103.5	1964
KT	Pikeville (2)	N 37 29 00	W 82 31 00	686	Pikeville KT 6976	7/20/1969	10/31/1976	672	50.3	95.3	n/a
KT	Smithfield 4 S Uniontown Dam 49 (1)	N 38 20 00	W 85 17 10	850	Smithfield 4S KT 5399	1/2/1953	12/24/1999	4174	42.7	90.0	1962
KT		N 37 46 00	W 87 57 00	361	Uniontown Dam 49 KT 5369	1/2/1953	11/19/1969	1202	33.2	72.5	1954
KT	Woodbury	N 37 11 03	W 86 38 07	465	Woodbury KT 5399	1/2/1953	12/20/1999	3902	41.7	83.5	1966
MO	Columbia Regional AP	N 38 49 01	W 92 13 06	893	Columbia Reg AP MO 6999	10/2/1969	12/19/1999	3065	40.3	101.5	1977
MO	Kansas City Intl AP	N 39 17 50	W 94 43 30	1005	Kansas City Intl AP MO 7299	11/1/1972	12/19/1999	2538	37.5	93.9	1990
MO	Osceola 3 NE	N 38 05 00	W 93 39 00	840	Osceola 3 NE MO 5380	1/1/1953	4/14/1980	2154	35.0	78.9	1959
MO	Rolla 3 W	N 37 57 00	W 91 50 11	869	Rolla 3W MO 5376	1/1/1953	12/10/1976	1878	35.0	79.4	1964
MO	Springfield Reg AP	N 37 14 23	W 93 23 23	1259	Springfield Reg AP MO 5399	1/1/1953	12/27/1999	4674	42.0	99.7	1995
MS	Jackson Intl AP	N 32 19 14	W 90 04 40	330	Jackson Int AP MS 6399	7/17/1963	12/21/1999	3644	54.2	100.1	1995
MS	Vicksburg	N 32 21 00	W 90 53 00	295	Vicksburg MS 5367	1/1/1953	6/29/1967	1383	49.5	95.6	1958
NC	Ashville	N 35 35 43	W 82 33 24	2238	AshvilleWSO AP NC 6499 Charlotte Douglas AP NC 5399	9/12/1964	12/21/1999	3887	46.8	110.9	1969
NC	Charlotte Douglas AP	N 35 13 21	W 80 57 15	728		1/2/1953	12/22/1999	4653	42.6	99.3	1967
NC	Greensboro WSO AP	N 36 05 51	W 79 56 37	897	Greensboro WSO AO NC 5399	1/2/1953	12/22/1999	4776	42.3	101.9	1969
NC	Raleigh-Durham WSFO AP	N 35 52 14	W 78 47 11	416	Raleigh Durham WSFO AP NC 5399	1/2/1953	12/22/1999	4574	41.8	97.5	1961
NC	Wilmington Intl AP	N 34 16 03	W 77 53 59	33	Wilmington Intl AP NC 5399	1/2/1953	12/22/1999	5157	54.8	109.7	1964

SC	Charleston Intl AP	N 32 53 55	W 80 02 25	40	Charleston Intl AP SC 5499	2/3/1954	12/22/1999	4901	52.9	107.3	1993
SC	Columbia WSFO AP	N 33 56 44	W 81 07 19	213	Columbia WSFO AP SC 5499	1/10/1954	12/22/1999	4469	48.3	97.3	1992
SC	Greenville Spartan Intl AP	N 34 53 05	W 82 13 26	943	Greenville Spartanburg Intl AP SC 6399	1/10/1963	12/21/1999	3845	50.4	104.1	1994
SC	Wagener 1 SW	N 33 38 00	W 81 23 00	430	Wagener 1 SW SC 5399	1/2/1953	12/21/1999	3816	43.8	81.5	1993
TN	Bristol AP	N 36 28 23	W 82 24 16	1500	Bristol TN 5399	1/2/1953	12/24/1999	5743	40.9	122.3	1995
TN	Chattanooga AP	N 35 01 52	W 85 12 05	671	Chattanooga TN 5399	1/2/1953	12/21/1999	5187	52.8	110.9	1997
TN	Jefferson City	N 36 07 20	W 83 28 26	1108	Jefferson City TN 5395	1/3/1953	12/10/1994	3788	37.8	90.2	1988
TN	Knoxville AP	N 35 49 05	W 83 59 09	962	Knoxville TN 5399	1/2/1953	12/24/1999	5461	47.1	116.7	1997
TN	Lebanon	N 36 13 44	W 86 19 04	525	Lebanon TN 5399	1/2/1953	12/13/1999	4474	49.4	95.3	1966
TN	Livingston (1)	N 36 26 00	W 85 17 00	960	Livingston 5 NE TN 5386	1/2/1953	10/25/1986	3593	51.7	106.6	1966
TN	Mason	N 35 24 56	W 89 31 53	319	Mason TN 5399	1/2/1953	12/27/1999	4014	45.7	85.4	1985
TN	Memphis Intl AP	N 35 03 23	W 89 59 11	254	Memphis Intl AP TN 5395	1/1/1953	8/19/1995	4146	51.7	97.0	1988
TN	Monterey	N 36 09 15	W 85 15 50	1860	Monterey TN 6599	11/8/1965	12/13/1999	3732	58.4	110.1	1976
TN	Murfreesboro	N 35 55 16	W 86 22 43	550	Murfreesboro TN 5399	1/2/1953	12/13/1999	4515	49.2	96.4	1995
TN	Nashville ASOS	N 36 07 31	W 86 40 35	600	Nashville TN 5394	1/2/1953	12/20/1999	5082	47.0	108.5	1991
TN	Oak Ridge ATDD	N 36 00 10	W 84 14 55	905	Oak Ridge TN 5399	1/2/1953	12/24/1999	5404	54.0	115.5	1997
TN	Rock Island 2 NW	N 35 48 21	W 85 38 05	870	Rock Island TN 5399	1/2/1953	12/13/1999	4076	45.3	87.0	1962
TN	Shady Grove	N 35 45 00	W 87 17 00	551	Shady Grove TN 5380	1/2/1953	9/29/1980	2615	50.0	94.3	1975
TN	Stanley Grove	N 36 29 00	W 82 56 00	1302	Stanley Grove TN 5380	1/2/1953	9/30/1980	2821	43.7	101.9	1966
TN	Sugar Hill	N 35 32 00	W 87 49 00	531	Sugar Hill TN 5376	1/2/1953	9/2/1976	2230	52.1	94.7	1968
TN	Summitville	N 35 33 00	W 85 59 00	1122	Summitville TN 5380	1/2/1953	9/30/1980	2741	53.0	99.4	1971
TN	Sunbright 1W	N 36 14 57	W 84 41 49	1495	Sunbright 1W TN 5399	1/17/1953	10/10/1999	4342	47.1	93.0	1971
TN	Union City (1)	N 36 23 33	W 89 01 54	350	Union City TN 5369	1/2/1953	11/27/1969	1342	43.1	80.4	n/a
TN	Union City (2)	N 36 23 33	W 89 01 54	350	Union City TN 7299	8/12/1972	12/12/1999	2345	47.5	86.0	1985
TN	Victory	N 35 05 00	W 87 49 00	971	Victory TN 5380	1/2/1953	9/30/1980	2625	52.8	95.1	1969
TN	White Hollow	N 36 22 00	W 83 54 00	1503	White Hollow TN 5379	1/2/1953	1/27/1979	1964	48.0	75.3	1969
VA	Churchville	N 38 14 00	W 79 10 00	1480	Churchville VA 5372	1/2/1953	12/31/1972	1637	33.5	80.9	1962
VA	Lynchburg Intl AP	N 37 19 15	W 79 12 24	940	Lynchburg Intl AP 5399	1/2/1953	12/24/1999	4786	40.1	102.0	1962
VA	Norfolk Intl AP	N 36 54 12	W 76 11 32	30	Norfolk Intl AP VA 5399	8/2/1953	12/22/1999	4794	44.7	103.4	1977
VA	Richmond Intl AP	N 37 30 18	W 77 19 13	164	Richmond Intl AP VA 5399	1/1/1953	12/22/1999	4713	43.1	100.4	1993
VA	Roanoke Intl AP	N 37 19 01	W 79 58 27	1175	Roanoke Intl AP VA 5399	1/2/1953	12/24/1999	4944	40.4	105.5	1970
WV	Elkins Randolph Cty AP	N 38 53 07	W 79 51 10	1979	Elkins Randolph City AP WV 6194	9/4/1961	8/17/1994	5256	44.4	159.5	1973
WV	Huntington Tri State	N 38 21 54	W 82 33 18	824	Huntington Tri State WV 6299	1/2/1962	12/28/1999	4896	41.4	129.4	1984

