

Rainfall Event and Data System (READS)

Annual Report

for the Year 2008

February 2009

**Southern Sandoval County
Arroyo Flood Control Authority
(SSCAFCA)**



2008 Storm Monitors

In 2008, SSCAFCA was able to welcome 18 new members to the READS program (see Figure 1). This increases our total number of active storm monitors to 36. We would like to extend a warm welcome to all our new volunteers. We also want to thank our many faithful rain monitors who have been sending SSCAFCA valuable data for years. Keep up the good work!

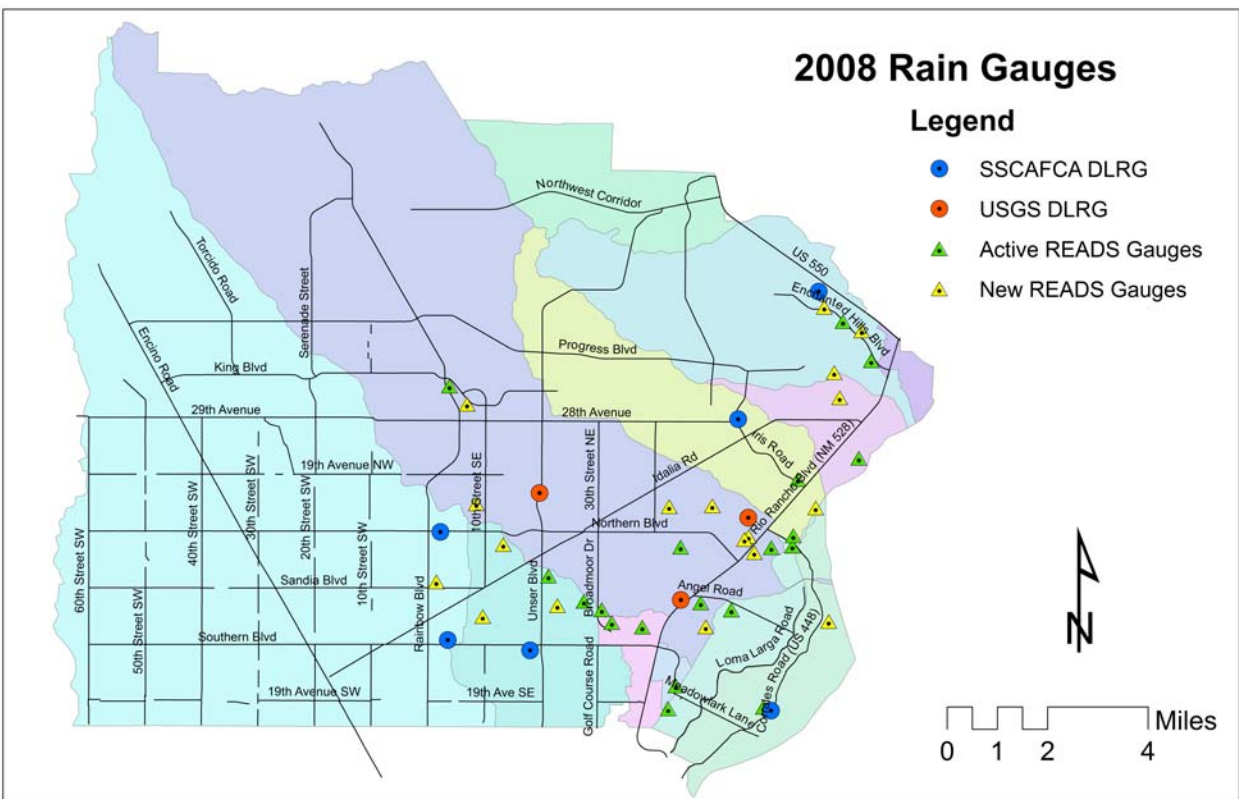


Figure 1: Map of SSCAFCA's jurisdictional area showing the locations of all active rain gauges in 2008.

This report summarizes 2008 rainfall data collected by 18 volunteers (Figure 1, green triangles) and nine data logging rain gauges operated by SSCAFCA and the USGS (Figure 1, blue and orange circles). Data collected by our new volunteers – many of whom joined the program toward the end of 2008 – will be included in the 2009 report.

2008 Average Precipitation

Figure 2 shows the average monthly precipitation for SSCAFCA’s jurisdictional area for the year 2008. March was the driest month with an average of only 0.02 inches of rainfall. October was the wettest month with an average of 2.47 inches. The annual average for 2008 was 8.29 inches.

2008 Average Monthly Precipitation for the SSCAFCA Area

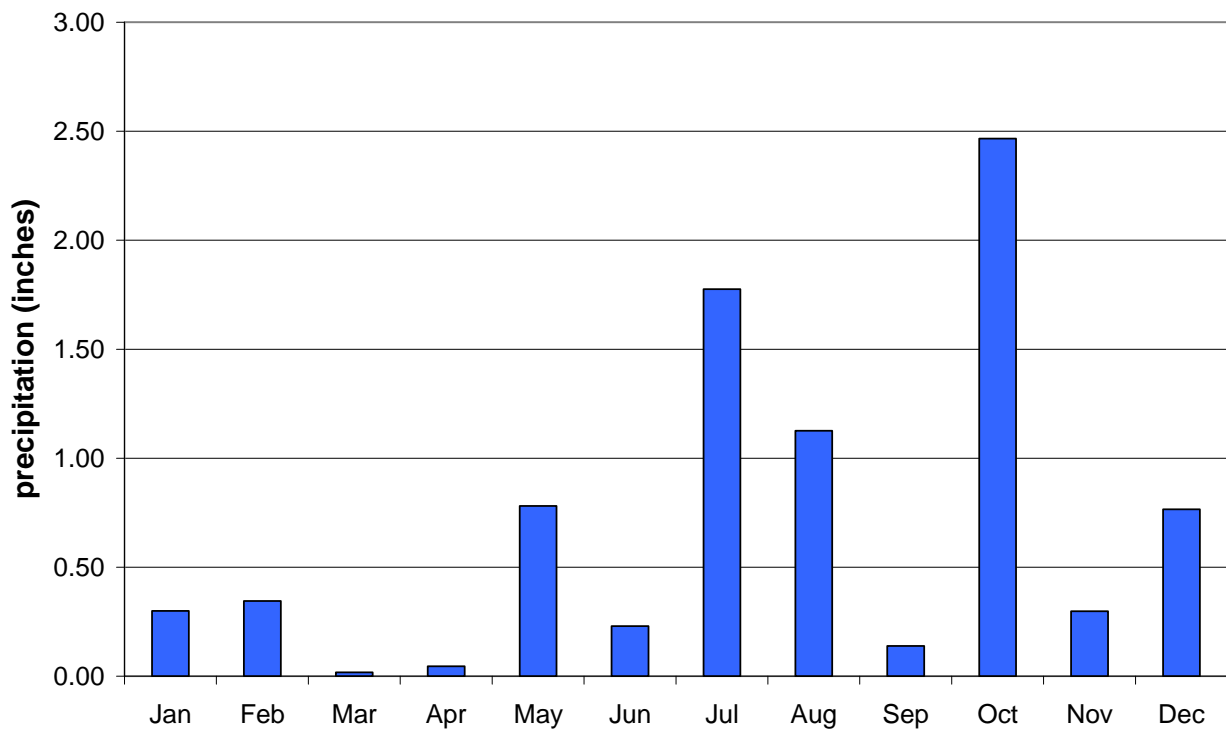


Figure 2: Graph of area-averaged monthly precipitation for the year 2008.

The distribution of average rainfall amounts in 2008 is graphed in Figure 3. The values range from just below six inches (red) to almost ten inches (dark blue). Since most of our rain gauges are located in the south-eastern portion of our jurisdictional area, more detailed data is available for that region.

The seemingly random scatter of high and low annual rainfall values is indicative of weather patterns we observe in our region: much of the precipitation can be attributed to summer thunderstorms, which often produce large amounts of rainfall over small areas.

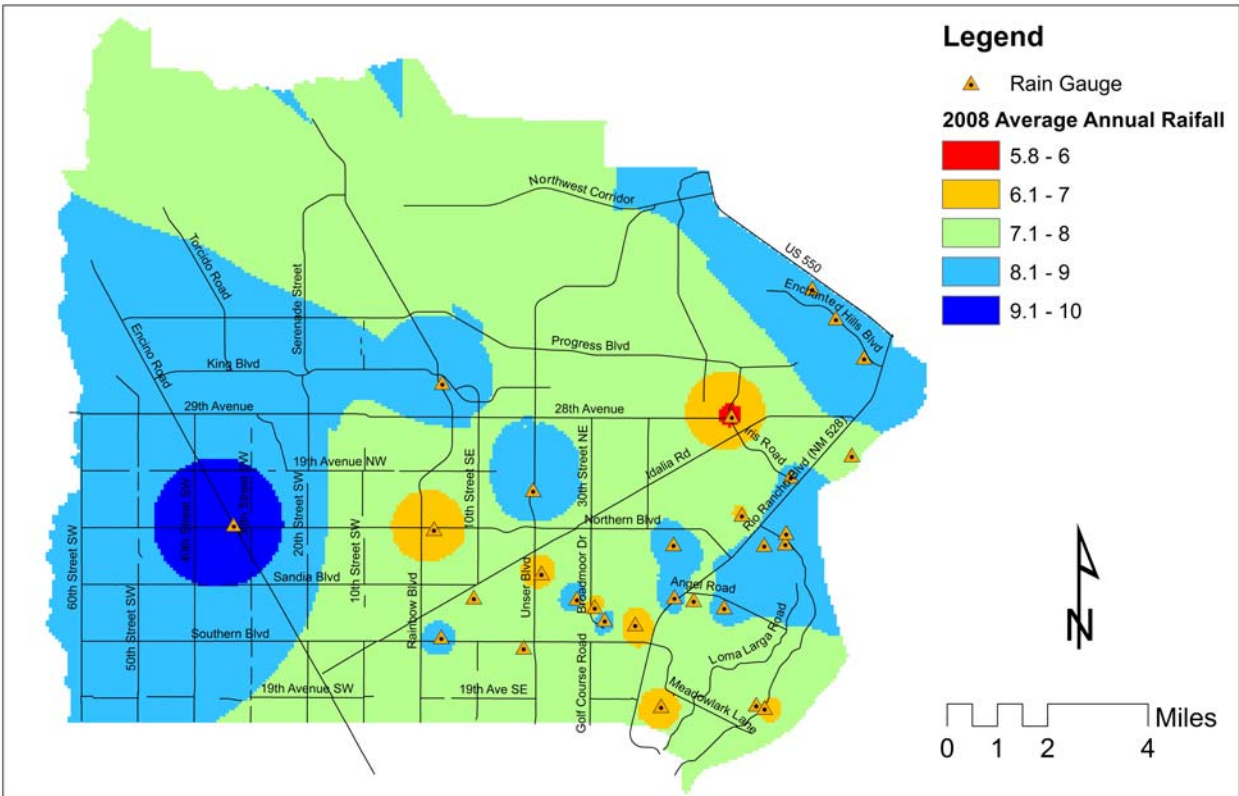


Figure 3: Map showing the distribution of average annual precipitation for the SCAFCA area in 2008.

2008 Individual Rain Gauge Extremes

Table 1 summarizes 2008 extremes recorded by individual stations as compared to the two previous years. In 2008, the station with the highest rainfall reported approximately nine inches; in 2006, almost 20 inches were recorded by one rain gauge! This illustrates the large differences we observe from year to year. No doubt, we live in a dry climate, and the annual rainfall – averaged over thirty years – is 9.3 inches (WRCC website, 2009). But in any given year, the actual rainfall can deviate significantly from the average!

Table 1: Comparison of precipitation extremes for the years 2006 through 2008.

Station Extremes (in inches of rainfall)	Year		
	2006	2007	2008
Highest Annual Precipitation	19.56	13.21	8.88
Highest Monthly Precipitation	6.34	4.17	3.11
Highest Daily Precipitation	2.31	1.17	1.73
Lowest Annual Precipitation	8.71	4.53	5.98

2008 Storms

Figure 4 shows areas of equal precipitation for a storm that occurred on October 5, 2008. Almost all of our gauges recorded some precipitation during the storm. Some areas received nearly two inches of rainfall in a 24 hour period. The highest rainfall values were recorded in the Enchanted Hills area and along NM 528.

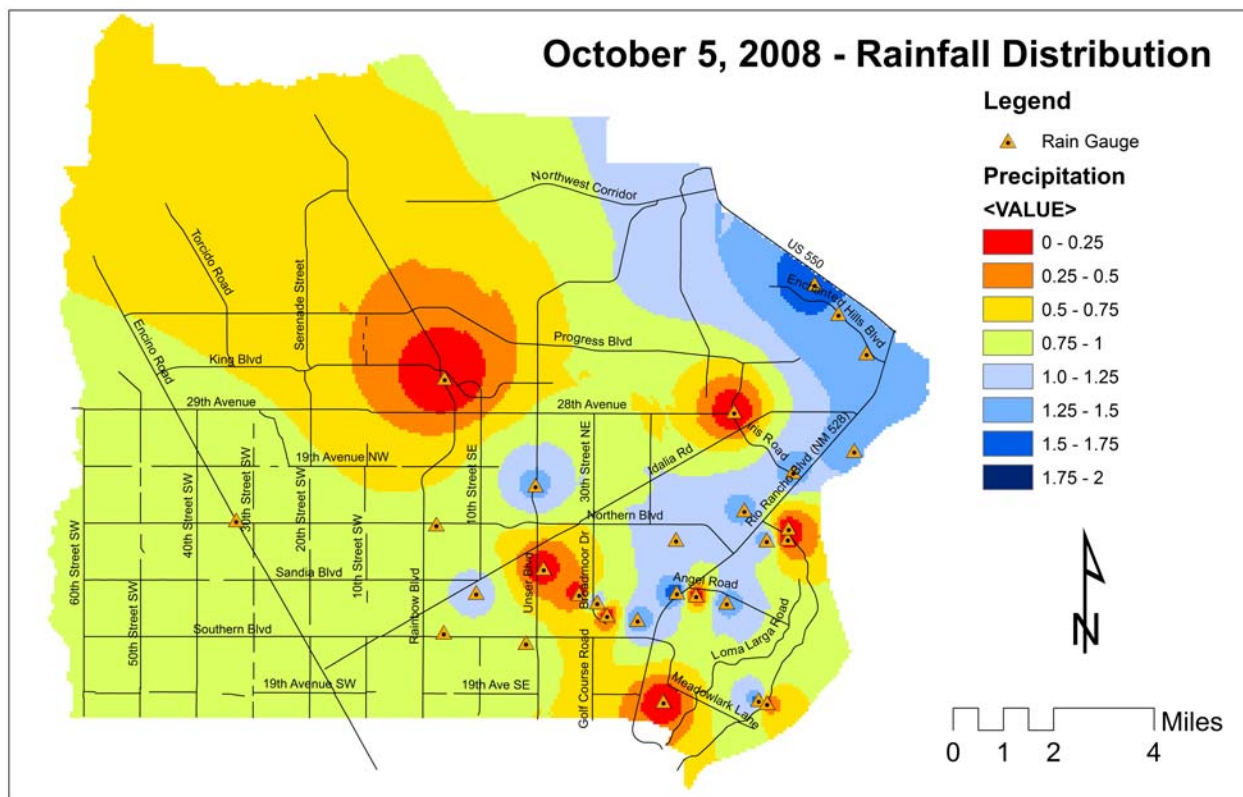


Figure 4: Areas of equal precipitation for the October 5, 2008 storm.

Figure 5 shows the location of two gauges in the Montoyas Arroyo Watershed. The data logging rain gauge (DLRG 909) records precipitation in five minute intervals. Located approximately 6.5 miles downstream from the rain gauge – in the Harvey Jones Channel at the bottom of the watershed – is a surface water gauging station. The gauging station, operated by the USGS for SSCAFCA, records when and how much water flows through the channel.

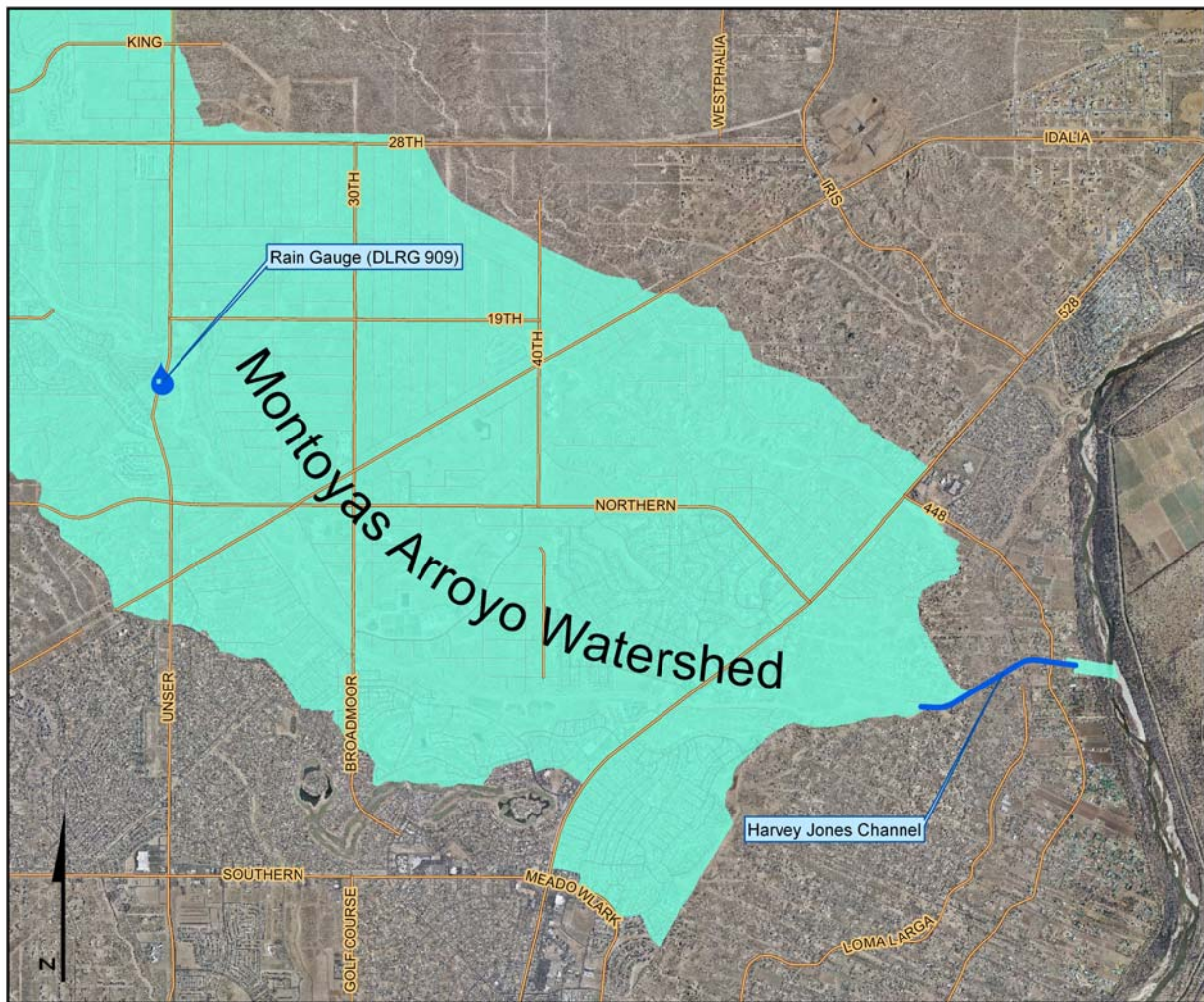


Figure 5: Map of the lower Montoyas Arroyo Watershed; highlighted in blue are the locations of a data logging rain gauge and the Harvey Jones Channel.

Data recorded by the two gauges during the October 5 storm is plotted in Figure 6. The blue bars represent rainfall intensity over time (also called a hyetograph). The data indicates that the event started late on October 4. For several hours, the rainfall intensity was relatively constant at around 0.15 inches per hour with some minor peaks and breaks. Shortly before 6 am on October 5, a brief period of high intensity (approximately 2 inches per hour) was recorded.

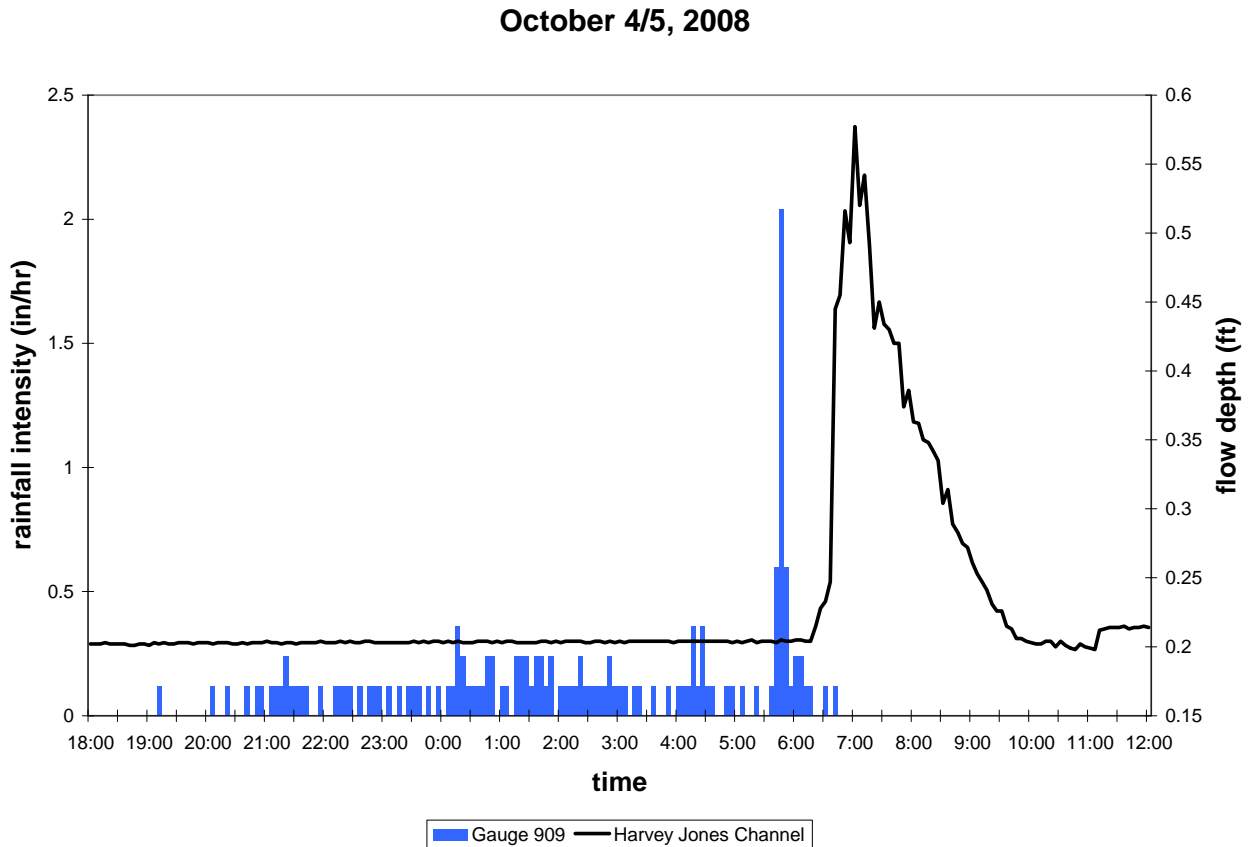


Figure 6: Rainfall intensity recorded by one rain gauge (blue bars) and discharge in the Harvey Jones Channel (black line) for a storm that occurred on October 4/5, 2008.

As a result of this storm, flows were recorded in the Harvey Jones Channel downstream (black line). No water was present in the channel (i.e. the black line is flat) until approximately 6:30 am on October 5. The time lag between the rainfall peak (approximately 5:45 am) and water flowing in the channel (approximately 6:30 am) is due to several factors: initially, precipitation is absorbed by the ground; if it rains less than a certain threshold, water never reaches the arroyos.

After the threshold is exceeded, water starts running off on the surface; the runoff collects in arroyos and is conveyed downstream toward the river. During the storm depicted here, the time lag between the rainfall peak and flows in the channel was approximately 45 minutes. If it took a drop of water 45 minutes to travel the 6.5 miles from the rain gauge to the gauging station in the channel, it moved through the arroyo at average speeds well above 10 feet per second. This is why it is important to stay out of arroyos and channels, particularly during and after rain events – water moves faster than the average person can run!

Please keep in mind that the data graphed in Figure 6 only represents one particular storm. The relationship between rainfall and runoff depends on many different factors. The October 5 storm is only intended as an example, and cannot be applied to all rainfall events.

Questions?

This report is intended to give some examples of how rainfall information is used by SSCAFCA. The data you collect is very important for us, and we thank you for your efforts. Please contact our office at 892-7246 with any questions or send an email to Gerhard gschoener@sscafca.com.

References

Western Regional Climate Center (WRCC) website: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nm2100>. Accessed in February, 2009.

2008 MRG Data

Gage #	1	6	8	10	11	13	14	18	20	23	31	34	36	37	38	39	41	42	43	44	45	46	47
Jan	0.50	0.00	0.00	0.38	0.51	0.00	0.40	0.50	0.17	0.44	0.48	0.42	0.42	0.42	0.00	0.33	0.00	0.49	0.00	0.36	0.00	0.34	0.00
Feb	0.56	0.54	0.00	0.30	0.93	0.00	0.00	0.80	0.20	0.47	0.50	0.62	0.74	0.73	0.60	0.47	0.00	0.49	0.62	0.00	0.00	0.46	0.00
Mar	0.07	0.00	0.00	0.00	0.07	0.00	0.00	0.02	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Apr	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.04	0.00	0.04	0.06	0.06	0.04	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.02	0.00
May	0.60	0.25	0.00	0.80	0.66	0.00	0.86	0.77	0.40	0.50	0.76	0.58	0.54	0.60	0.64	0.88	0.08	0.74	0.38	0.00	0.00	0.65	0.00
Jun	0.20	0.06	0.00	0.02	0.00	0.00	0.03	0.03	0.08	0.12	0.03	0.14	0.00	0.23	0.05	0.08	0.22	0.11	0.04	0.00	0.00	0.11	0.00
Jul	2.04	0.99	0.00	1.92	1.03	0.00	1.57	0.00	0.43	2.06	1.59	2.12	1.25	2.42	1.42	1.67	1.72	2.15	1.19	0.00	0.21	2.32	1.83
Aug	0.45	0.55	0.00	1.82	1.29	0.00	1.85	0.00	0.00	1.35	0.87	0.91	1.26	0.89	1.08	1.10	0.79	0.76	0.84	1.33	0.00	1.84	1.03
Sep	0.00	0.03	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.05	0.76	0.08	0.08	0.00	0.07	0.05	0.02	0.07	0.00	0.00	0.00	0.01	0.00
Oct	0.00	2.24	0.00	2.38	2.47	0.00	2.41	0.00	0.00	2.85	2.72	2.54	2.99	0.00	2.81	2.46	1.00	2.78	2.71	0.00	0.00	0.00	2.61
Nov	0.00	0.00	0.00	0.23	0.27	0.00	0.24	0.00	0.00	0.25	0.30	0.31	0.27	0.00	0.29	0.32	0.00	0.31	0.39	0.00	0.00	0.00	0.00
Dec	0.00	0.00	0.00	0.58	0.94	0.00	0.54	0.00	0.00	0.75	0.76	0.61	1.37	0.00	0.61	0.87	0.00	0.66	0.63	0.00	0.00	0.00	0.00
annual	4.42	4.66	0.00	8.47	8.17	0.00	8.03	2.16	1.28	8.88	8.84	8.42	8.96	5.35	7.57	8.24	3.83	8.62	6.80	1.69	0.21	5.75	5.47

Gage #	48	51	52	53	54	55	56	57	58	59	60	61	63	64	65	66	67	68	69	70	16415	UN02
Jan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb	0.60	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52
Mar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Apr	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
May	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82
Jun	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Jul	1.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	2.09
Aug	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66
Sep	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16
Oct	2.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	3.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55
Nov	0.32	0.00	0.27	0.29	0.30	0.29	0.26	0.31	0.26	0.24	0.27	0.04	0.28	0.28	0.24	0.23	0.03	0.29	0.00	0.23	0.00	0.27
Dec	0.00	0.00	0.52	0.74	0.66	0.94	0.62	0.00	0.00	0.01	1.13	0.56	0.81	0.95	0.48	0.55	0.69	0.51	0.00	0.47	0.00	0.60
annual	6.02	0.73	0.79	1.03	0.96	1.23	0.88	0.31	0.26	0.25	1.40	1.30	1.09	4.34	0.72	0.78	0.72	0.80	0.00	0.70	0.66	7.78

2008 DLRG Data

Gage #	901	902	903	904	905	906	907	908	909	910	912
Jan	0.35	0.39	0.00	0.40	0.39	0.47	0.42	0.37	0.60	0.24	0.39
Feb	0.57	0.54	0.01	0.00	0.54	0.45	0.62	0.65	0.54	0.00	0.54
Mar	0.02	0.01	0.07	0.00	0.01	0.02	0.03	0.01	0.01	0.02	0.01
Apr	0.03	0.02	0.07	0.00	0.00	0.05	0.07	0.04	0.03	0.12	0.00
May	0.48	0.34	0.55	0.66	0.05	0.80	0.55	0.59	0.71	1.10	0.05
Jun	0.07	0.07	0.19	0.02	0.09	0.30	0.19	0.08	0.14	0.60	0.10
Jul	1.88	1.06	0.91	1.44	1.05	2.16	0.91	1.42	1.43	2.45	1.99
Aug	1.60	1.91	0.73	1.41	1.09	0.89	0.73	1.04	1.22	1.24	0.66
Sep	0.00	0.01	0.14	0.01	0.00	0.02	0.14	0.12	0.17	0.33	0.19
Oct	2.51	2.35	2.15	0.67	2.15	2.24	2.15	3.37	3.04	2.47	2.75
Nov	0.20	0.20	0.33	0.21	0.24	0.29	0.33	0.33	0.29	0.31	0.27
Dec	0.44	0.43	0.66	0.49	0.64	0.53	0.66	0.62	0.77	0.89	0.64
annual	8.15	7.33	5.81	5.31	6.25	8.22	6.80	8.64	8.95	9.77	7.59