

True-color Visible Satellite, Aug. 12, 2014 6:00 PM MST

Flood Control District of Maricopa County

Engineering Division, Flood Warning Branch

Storm Report : August 12, 2014 Vicinity of South Mountain Park - Phoenix, AZ



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METEOROLOGY

A high-grade Monsoon pattern aided by forcing from a passing inverted trough led to the development of an organized thunderstorm complex which moved over the South Mountain area from the southeast during the evening of August 12th producing heavy rainfall.

Synopsis:

On the day of the event, the large scale atmospheric pattern was characterized by the Monsoon ridge centered over the CO/NM border; meanwhile an upper-level inverted trough (IT) was centered over the central Baja of California. The positioning of these key larger-scale features resulted in south/southeast steering flow through much of the atmosphere (Figure 2, below). Well above average moisture values, aided by an overnight gulf surge, were observed across southcentral AZ with precipitable water values measured in the 1.90"- 2.10" range and surface dewpoints running in the upper 60s. Morning weather model guidance showed the leading edge of an inverted trough crossing the US/Mexico border during the late morning hours before overspreading the southcentral deserts by the late afternoon. Scattered and well organized thunderstorms were forecast to develop along this leading arc due to strong upper-level forcing (divergence) as it moved north into Maricopa County.

The information above along with concerns for a widespread rain event across the County was relayed by Flood Control District (FCD) forecasters through the Afternoon Weather Outlook issued at 11:20 am MST. Given the high grade assigned to the weather pattern for the day along with the knowledge that heavy rain had fallen over County watersheds the previous 24-36hrs, a Flash Flood Watch was issued at 12:00 pm MST. Thunderstorm initiation began shortly after the noon hour across Pima and Pinal counties. Widespread thunderstorms quickly congealed into an organized cluster moving north toward southeastern portions of Maricopa County.

The mid-afternoon hours on August 12th became increasingly favorable for a widespread heavy rainfall event across southcentral portions of Maricopa County. FCD forecasters issued a Flash Flood Watch UPDATE at 4:40pm MST that included the Phoenix South Forecast Zone in the Flash Flood Watch. The hourly Convective Quantitative Precipitation Forecast at 5:06pm MST (Table 1, below) was generated before the development of the South Mountain Park storm and shows an atmosphere primed for heavy rainfall. Of particular note are the 1-hr and 30-min forecast storm rain rates for the Phoenix South Forecast Zone, as well as individual locations within the South Mountain Park area (highlighted in yellow). Also of note were elevated Monsoon Checklist scores (highlighted in blue) which were used to diagnose the moisture content, stability, and advection within the atmosphere. Further evidence of a moist and unstable atmosphere can be seen by looking at the 00Z (5:00pm MST) Phoenix Upper-Air Sounding (Figure 3, below).

Storm Summary and Radar Analysis

A severe thunderstorm developed along the northern periphery of the storm complex moving into the Southeast Valley around 4:55pm MST. In addition to heavy rains and strong downdraft winds, this storm proceeded to kick off an outflow boundary traveling northwest

toward the central Valley and helped to initiate new thunderstorms over the South Mountain Park area. FCD forecasters issued a Message-1 Alert for the Phoenix South Forecast Zone at 5:13 pm calling for rain rates around 1.00"-1.25"/20-30 min. along with the threat for runoff in normally dry washes valid through 6:45 pm. These storms continued to rapidly intensify and began dropping heavy rain as they remained nearly stationary over the South Mountain Park area. At 5:59pm MST, FCD forecasters issued a Message-3 Flash Flood Warning (see Appendix B) for Phoenix South specifically for South Mountain Park and vicinity valid through 8:00 pm MST after heavy rainfall reports from area ALERT rain gages.

Radar analysis of the thunderstorm at 6:05 pm MST showed a large area with Base Reflectivity values around 50-60 dbz over the South Mountain Park area signifying heavy rainfall. Base Velocity images from the same time indicated a downburst feature (evidence of intense downdraft winds). The Dual Polarization radar was also showing high Correlation Coefficient (CC) values coupled with the large Specific Differential Phase (Kdp) values around 2.5-4.0 deg/km. This was another heavy rain signature (radar estimated rainfall rates of 4-6"/hr) within the main core of the storm.

Storm progression was toward the west/northwest for the following 60 minutes with continued enhanced development on the southwestern flank due to outflow boundary interaction. Heavy rain fell from Ahwatukee north through the South Mountain Village communities and west through the Laveen and Komatkee areas. By 7:00pm MST the storm had weakened considerably with the leading outflow boundary already advancing into and through the west Valley.

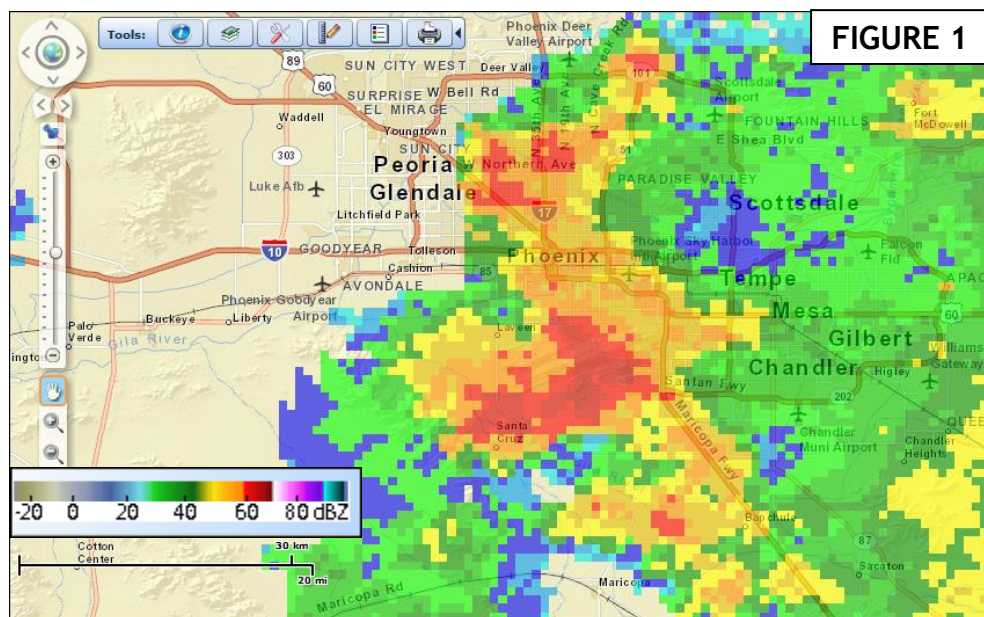


Figure 1: Radar base reflectivity image from National Climatic Data Center archive - Aug. 12, 2014 at 6:00 PM MST.

4-Panel 00Z Synoptic Setup 08/13/2014

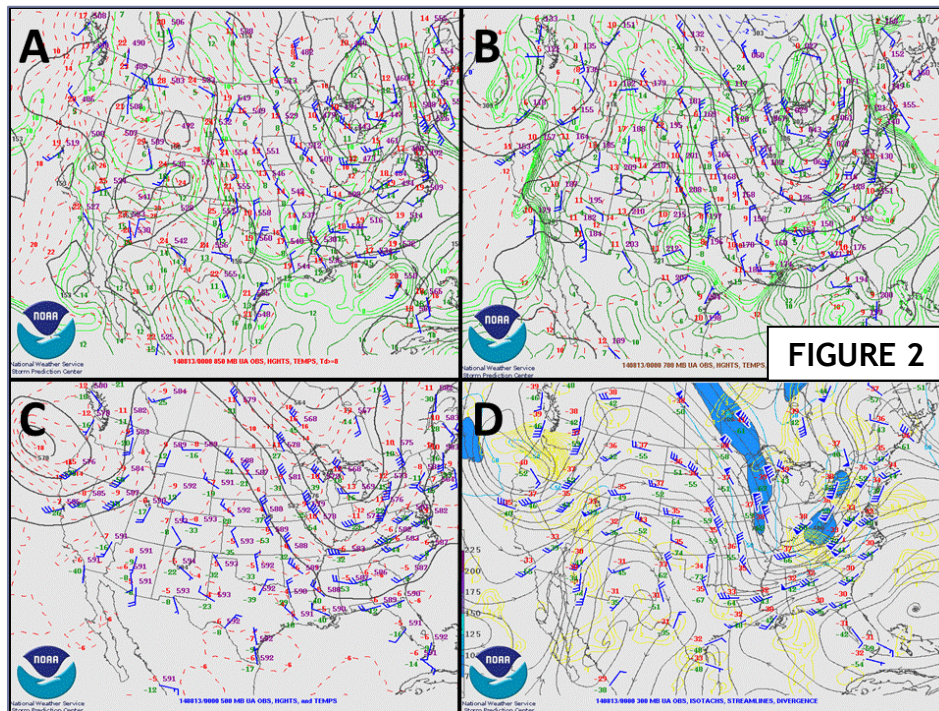


Figure 2 above depicts the synoptic setup at 5:00 PM MST on August 12th 2014. The images are from the Storm Prediction Center upper air maps archive. **A)** is the 850mb map: the black lines are heights, the red dashed lines are isotherms, the green lines are isodrosotherms, blue barbs are wind speed, and station observations are plotted at each available location. **B)** is the 700mb map: variables colored the same as A. **C)** is the 500mb map: variables colored the same as in A. **D)** is the 300mb map: the black lines are stream lines, the yellow lines are divergence, and station obs. are plotted at each available location.

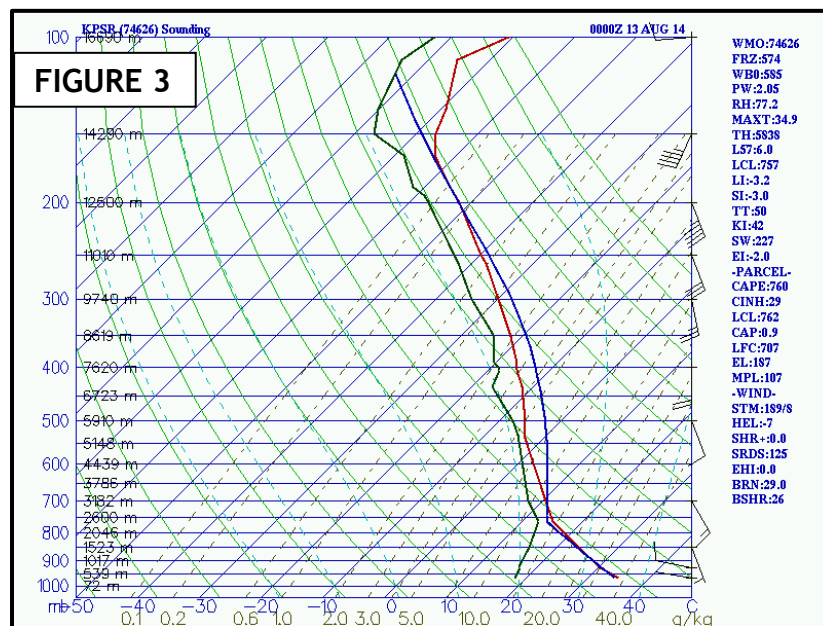


Figure 3 above is a Skew-T/log P (vertical profile of the atmosphere above Phoenix) diagram at 5:00pm MST on August, 12th, 2014. The vertical axis is pressure (mb), while the horizontal axis is temperature (C) and mixing ratio (g/kg). Temperature, moisture, and wind speed/direction observations are plotted within the diagram. Various other thermodynamic variables are plotted of the far right vertical axis and are used in measuring atmospheric stability.

Flood Control District of Maricopa County ALERT System
Current Air Parcel Attributes and
Quantitative Precipitation Forecast
Spring and Monsoon Season
Tue Aug 12 17:06:14 MST 2014

TABLE 1

TABLE 1: MODEL (RAP) BASED PARCEL ATTRIBUTES AND QPF

Maricopa County	Station	Air	Dewp.	Wind	Wind	Parcel	LCL	LCL	Warm	MALR	Convect. QPF			QPF W/Mult.		
	Elev.	Temp.	Temp.	dir.	Gust	Sfc Pres	Pres	Temp.	Layer		1hr.	30m.	10m.	1hr.	30m.	10m.
	(ft)	(F)	(F)		(mph)	(mb)	(mb)	(C)	(Km)	(C/Km)	(in)	(in)	(in)	(in)	(in)	(in)
700mb Elevated Storm	*****	50.7	50.4	S	3.4	703.0	701.2	10.2	2.2	4.6	1.01	0.70	0.42	0.00	0.00	0.00
850mb Elevated Storm	*****	67.0	62.4	SE	8.0	849.9	818.1	16.3	3.9	4.2	1.74	1.22	0.73	3.48	2.43	1.46
Surface based Storm	*****	80.0	73.4	E	10.3	966.3	916.1	22.1	5.7	3.9	3.42	2.39	1.44	6.83	4.78	2.87

TABLE 2: MSP FORECAST ZONE AVERAGEGED SURFACE BASED QPF

MSP Forecast Zone	Air	Dewp.	Convect. QPF			QPF W/Mult.			Antecedent Observed Rainfall			
	Temp.	Temp.	1hr.	30m.	10m.	1hr.	30m.	10m.	3hr.	1day	2day	3day
	(F)	(F)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)
Phoenix South	93.4	66.4	2.25	1.57	0.94	0.00	0.00	0.00	0.00	0.02	0.02	0.02

TABLE 3: SURFACE BASED PARCEL ATTRIBUTES AND QPF

Weather Station Name	Station	Air	Dewp.	Wind	Wind	Parcel	LCL	LCL	Warm	MALR	Convect. QPF			QPF W/Mult.		
	Elev.	Temp.	Temp.	dir.	Gust	Sfc Pres	Pres	Temp.	Layer		1hr.	30m.	10m.	1hr.	30m.	10m.
	(ft)	(F)	(F)		(mph)	(mb)	(mb)	(C)	(Km)	(C/Km)	(in)	(in)	(in)	(in)	(in)	(in)
City of Glendale	1150.0	95.5	65.9	WSW	5.0	976.3	770.1	15.1	3.6	4.2	2.14	1.50	0.90	4.29	3.00	1.80
Durango Complex	1050.0	92.7	67.4	WSW	11.0	974.6	795.3	16.4	4.0	4.2	2.37	1.66	1.00	4.75	3.32	1.99
South Mtn. Fan	1270.0	94.1	66.9	N	9.0	968.4	778.5	15.9	3.8	4.2	2.30	1.61	0.96	4.59	3.21	1.93
South Mtn. Park	2255.0	88.5	66.1	N	6.0	935.9	781.1	16.1	3.9	4.2	2.32	1.63	0.98	4.64	3.25	1.95

TABLE 4: CURRENT THERMODYNAMIC VARIABLES AND INDICES (RAP MODEL)

Precipitable Water (inches)	=	2.10	:	Total atmospheric column water, GPS based from SUOMINET at PHX SRP Location, updated hourly
CAPE (J/Kg)	=	891.30	:	Surface based CAPE value, measures convective instability
CIN (J/kg)	=	-43.02	:	Surface based CIN value, measures convective inhibition
W-Max (m/s)	=	42.22	:	Maximum convective t-storm updraft speed, to convert to mph multiply W-Max by 2.0
Lifted Index	=	-2.20	:	>2 no convection, 2-0 showers & iso. t-storms, 0-(-2) t-storms probable, <-2 severe storms
Showalter Index	=	-1.76	:	>3 no convection, 3-1 showers & iso. t-storms, 1-(-2) t-storms probable, <-2 severe storms
K-Index	=	40.94	:	<15 0%, 15-20 <20%, 21-25 20-40%, 26-30 40-60%, 31-35 60-80%, 36-40 80-90%, >40 >90%
Total Totals (CT+VT)	=	45.87	:	44-47 light to mod., 48-51 mod. & few heavy, 52-55 heavy & few severe, >55 numerous heavy

CURRENT MONSOON CHECKLIST PARAMETERS

Moisture	=	160	:	normal values 40-90, if t-storms develop >30% chance Flash Flooding if moist total is >150
Stability	=	130	:	normal values 70-90, if t-storms develop >30% chance wind gusts >50mph if Stab total is >150
Advection	=	100	:	normal values 40-90, based on upstream K-Index Values and 5-hr dewpoint trends
Monsoon Checklist Total	=	390	:	Areal Coverage of rain <80 0%, 81-180 <10%, 181-305 10-20%, 306-395 30-50%, >395 >50%

TABLE 2

Local Storm Reports recorded by NWS the evening of 8/12/2014

Location	Time (MST)	Report
4 NNW Gilbert	4:39 pm	Spotter at Baseline and Gilbert reporting near zero visibility in very heavy rain with street flooding and peas size hail
3 ESE Mesa	4:55 pm	Two-foot diameter tree fell over stone fence blocking road at Stapley and Main St.
2 E Gilbert	5:04 pm	Downed trees near intersection of Warner and Greenfield
1 SSE ASU	5:50 pm	Downed 25-foot 1.5 foot diameter tree at intersection of Rural and Broadway
1 NNE Ahwatukee	6:00 pm	0.74 inches of rain recorded in 30 minutes
1 NNE Ahwatukee	6:30 pm	Measured 1.05 inches rain in 1 hour with street flooding and the drainage washes running
3 WNW S. Mtn. Park	7:30 pm	Measured 3.20 inches storm total. 27 th Ave. flooded with 18 in. deep water between Dobbins and Baseline at time of report. Numerous stalled cars.

4-Panel Radar Analysis at 6:00pm MST 08/12/2014

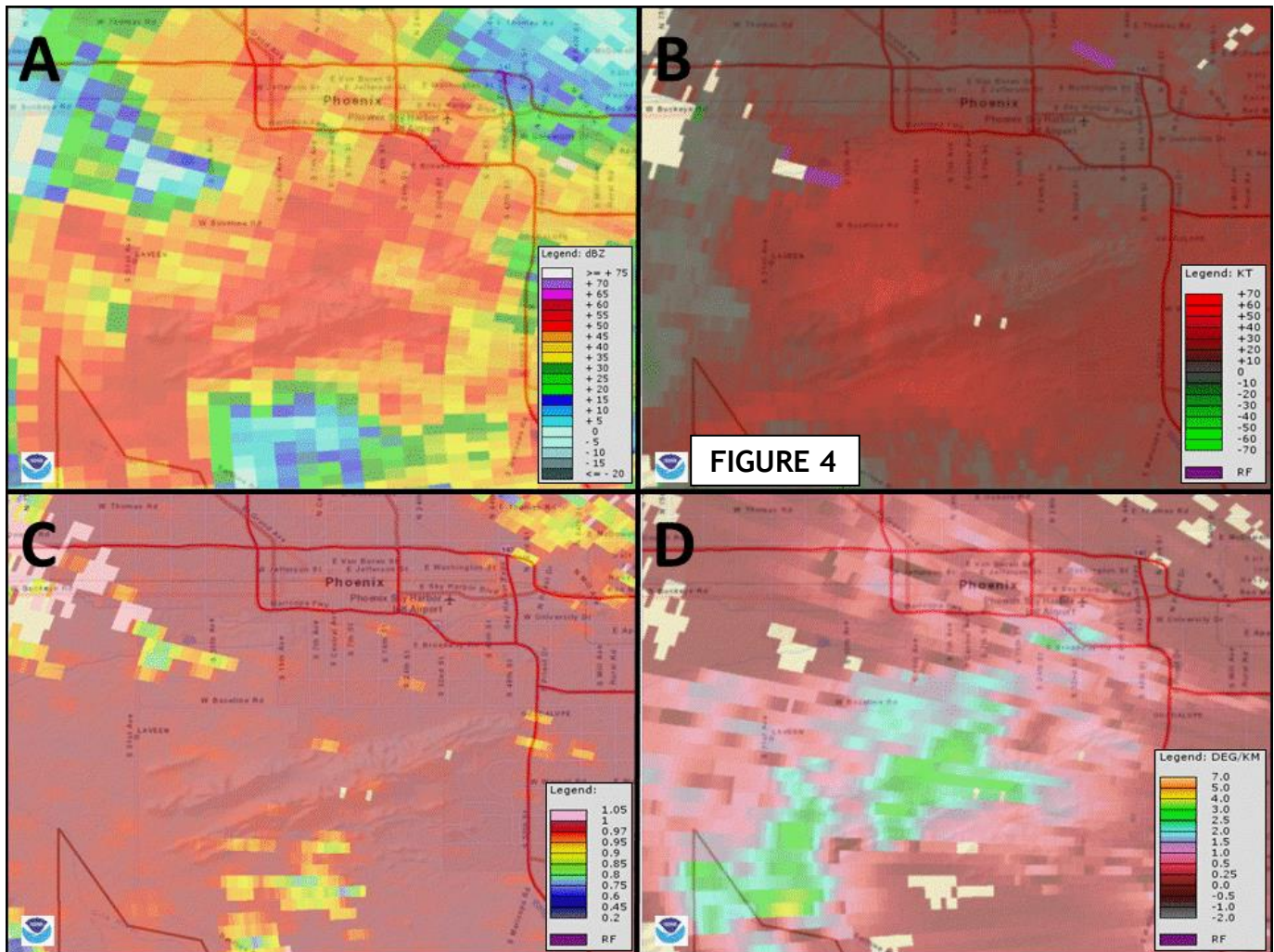


Figure 4: Four radar products from the KIWA WSR-88D at 6:00pm MST on August 12th 2014. Each image was taken at the same vertical radar level of 0.9km. The images were produced using the Weather and Climate Toolkit from NOAA and the Level-3 data was provided from NCDC archive. The red lines on the base map of each image are roads (I-10/I-17 are highlighted for reference). **A)** shows the Digital Hybrid Scan Reflectivity in dbz. **B)** shows the Base Velocity in kts. **C)** shows the Correlation Coefficient in percent. **D)** shows the Specific Differential Phase in deg/km.

PRECIPITATION

Rainfall as recorded by area FCDMC ALERT rain gages in 15-minute increments. These 3-hour totals match the values displayed on Figure 6:

TABLE 3

Time	ID	6525	6510	6560	6535	6550	6500	4500	4510	4755	4575	4700	4710	4515	4765	4505
19:30		0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00
19:15		0.01	0.00	0.08	0.00	0.04	0.00	0.08	0.00	0.04	0.04	0.04	0.04	0.04	0.00	0.00
19:00		0.04	0.04	0.20	0.00	0.04	0.04	0.16	0.08	0.12	0.12	0.04	0.00	0.04	0.08	0.00
18:45		0.25	0.08	0.47	0.04	0.12	0.43	0.16	0.08	0.39	0.13	0.16	0.04	0.00	0.20	0.00
18:30		0.59	0.24	0.39	0.04	0.12	0.04	0.51	0.12	0.59	0.67	0.20	0.28	0.04	0.16	0.04
18:15		0.90	0.43	0.71	0.24	0.12	0.00	0.98	0.28	0.20	0.63	0.12	0.24	0.16	0.00	0.04
18:00		0.59	0.43	0.00	0.12	0.24	0.00	0.04	0.28	0.00	0.00	0.43	0.39	0.00	0.00	0.20
17:45		0.04	0.08	0.00	0.04	0.08	0.04	0.00	0.43	0.00	0.00	0.12	0.16	0.00	0.00	0.00
17:30		0.05	0.24	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17:15		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
17:00		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
16:45		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
Totals:		2.48	1.54	1.85	0.47	0.75	0.59	1.97	1.34	1.38	1.65	1.10	1.14	0.28	0.43	0.28

- 6525 - South Mountain Park Headquarters; alignments of Elliot and 7th Ave.
- 6510 - South Mountain Park Weather Station; alignments of Elliot Rd. and 24th St.
- 6560 - South Mountain Fan; alignments of Ray Rd. and 35th Ave.
- 6535 - Pecos Detention Basin; 1/4 mi. SW of I-10 and Loop 202.
- 6550 - Ahwatukee; near 44th St. and Warner Rd.
- 6500 - Guadalupe Flood Retarding Structure; 1/4 mi. SSW of Baseline Rd. and I-10.
- 4500 - Cesar Chavez Park; 1/2 mile SSW of 35th Ave. and Baseline Rd.
- 4510 - Roeser Rd. at 2nd St.
- 4755 - Salt River @ 67th Ave.
- 4575 - Laveen Detention Basin; 43rd Ave. and Southern Ave.
- 4700 - Durango Complex; 1/4 mile SSW of Durango St. and 27th Ave.
- 4710 - Jackson St. at 7th Ave.
- 4515 - Salt River at 40th St.
- 4765 - Buckeye Rd. at 75th Ave.
- 4505 - GateWay Community College; 40th St. at Van Buren St.

The 5-minute time distribution for gage 6625 is shown in Figure 3 below:

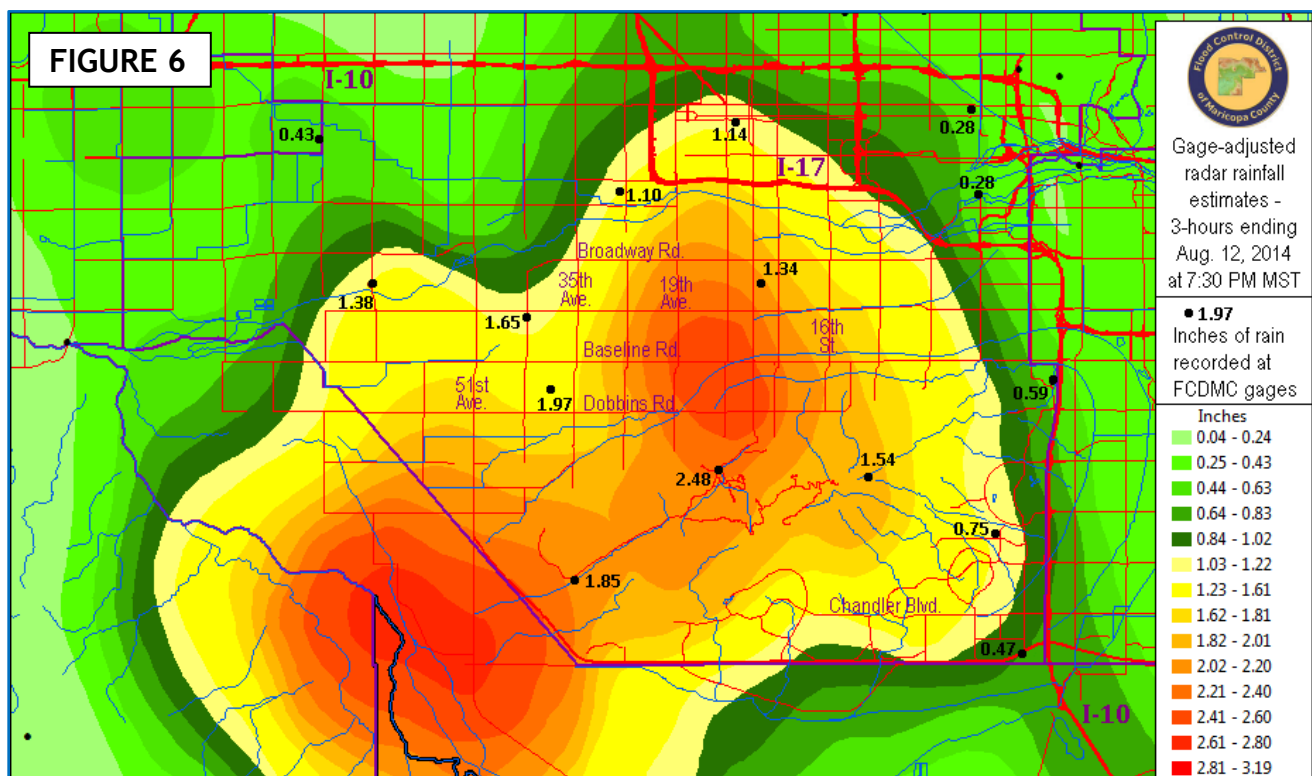
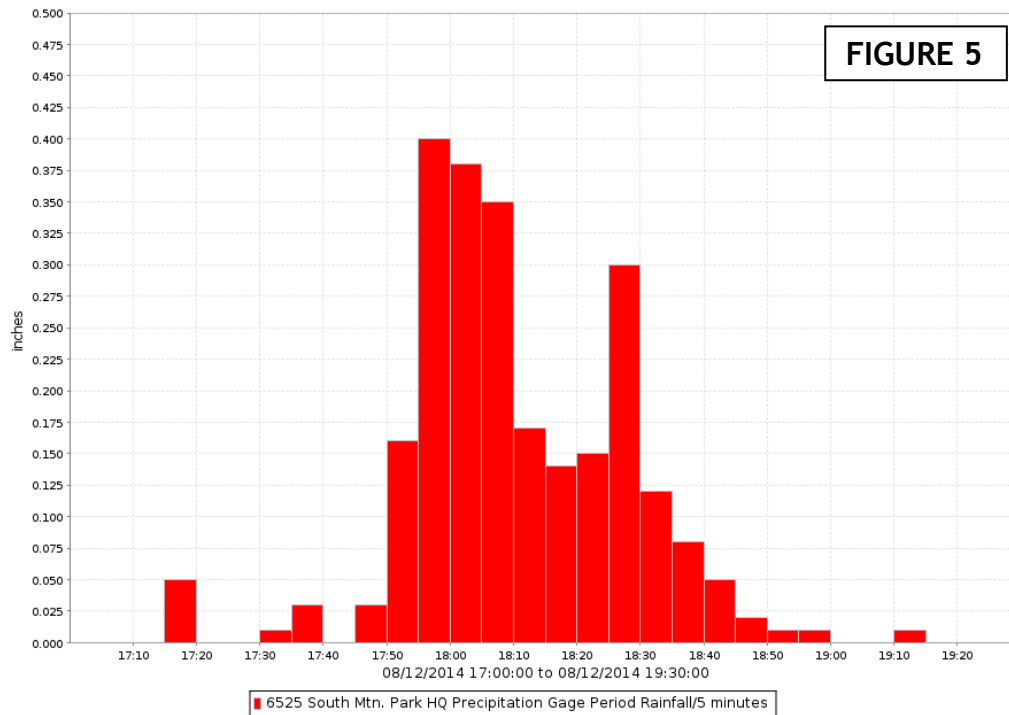


Figure 6 above was created with ESRI ARCMAP®. The colored background represents local gage-adjusted radar rainfall estimates for August 12th, 2012 from 4:30 through 7:30 PM MST. Also shown are the point-rainfall gage readings from FCD ALERT rain gages for the same time period. Keep in mind that the gage measurements and the radar estimates don't always match because of surface winds and the fact that the radar estimates are made a good distance above ground level.

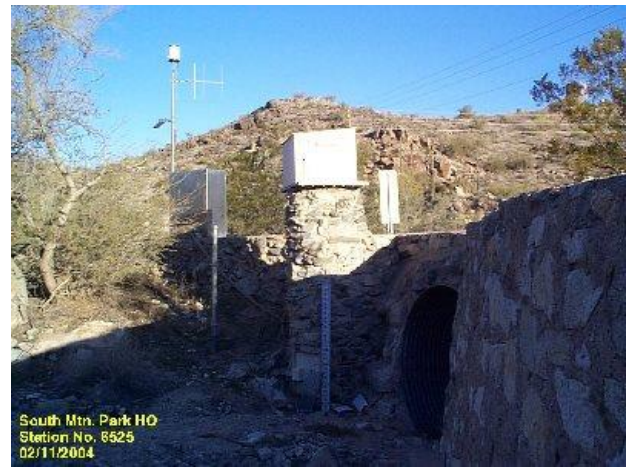
Precipitation Frequency Estimates (inches) for 33.347N 112.085W
Depth-Duration-Frequency (DDF) Table, Annual Maximum Series
From NOAA Atlas 14, Volume I, Version 5

TABLE 4

AEP (1- in-Y)	5 min	10 min	15 min	30 min	60 min	90 min	2 hr	
2	0.22	0.34	0.42	0.57	0.70		0.82	
5	0.33	0.50	0.62	0.84	1.03		1.19	
10	0.40	0.61	0.76	1.02	1.26		1.44	
25	0.49	0.75	0.93	1.25	1.55		1.78	
50	0.57	0.86	1.07	1.44	1.78		2.01	
100	0.64	0.97	1.20	1.62	2.01		2.27	
200	0.71	1.08	1.34	1.81	2.23		2.52	
500	0.81	1.23	1.52	2.05	2.54		2.85	
1000	0.88	1.34	1.66	2.24	2.77		3.12	

* 90-minute values interpolated, not provided in NOAA 14. AEP is Annual Exceedance Probability								
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1	0.47	0.89	1.16	1.64	2.35	2.43	2.48	Recorded period rainfall from Gage No. 6525 (in)
	20	60	81	108	285	214*	179	Return periods (years) - DDF for 6525
2	0.57	1.09	1.58	1.91	2.76	2.85	2.94	Recorded period rainfall from CoCoRaHS Station No. AZ-MR-326; 2/3 mi. NW of Gage No. 6525 (in)
	50	213	673	293	970	743*	630	Return periods (years) - DDF for 6525
3	0.43	0.75	1.06	1.46	1.81	1.97	1.97	Recorded period rainfall from Gage No. 4500 (in)
	12	22	11	48	49	49*	45	Return periods (years) - DDF for 4500



Precipitation Synopsis

Table 4 presents precipitation frequency statistical estimates from NOAA Atlas 14 at three precipitation measuring points - two FCDMC ALERT gages and one CoCoRaHS observer. [CoCoRaHS](#), the Community Collaborative Rain, Hail and Snow Network, collects daily rainfall measurements from observers nationwide. The observer at station AZ-MR-326, located 2/3 of a mile NW of FCD gage no. 6625, was kind enough to supply the 5-minute distribution for this event (see Appendix A).

Using the gage data and the precipitation frequency estimates from NOAA Atlas 14 (see Table X above), the gage at South Mountain Park HQ (6625) showed a return period of 285 years for the peak 1-hour rainfall and 179 years for the peak 2-hour. Cesar Chavez Park (4500) showed 49 years for its 1-hour data and 45 years for the 2-hour. The CoCoRaHS gage gives a 1-hour return period of 970 years and a 2-hour of 630 years. This CoCoRaHS station had the highest recorded rainfall rates and volume, and when viewed with Figure 6, probably represents an upper bound of the rainfall that fell. Figure 6 suggests that rainfall of at least this intensity fell over an area of about 3 square miles from 19th Ave. to Central Ave. and from Southern Ave. to Dobbins Road.

Maricopa County Storm Severity Index (MCS²I), developed by FCDMC

MCS²I is an index that classifies the severity of a storm based on the area covered, the average rainfall over that area (from gage-adjusted radar estimates), and the storm duration. For this storm, we chose the area from the watershed divide in South Mountain Park north to the Western Canal, and from 32nd St. to 51st Ave. The storm scores an MCS²I of **8.3**, categorized as **Severe** on the MCS²I Scale.

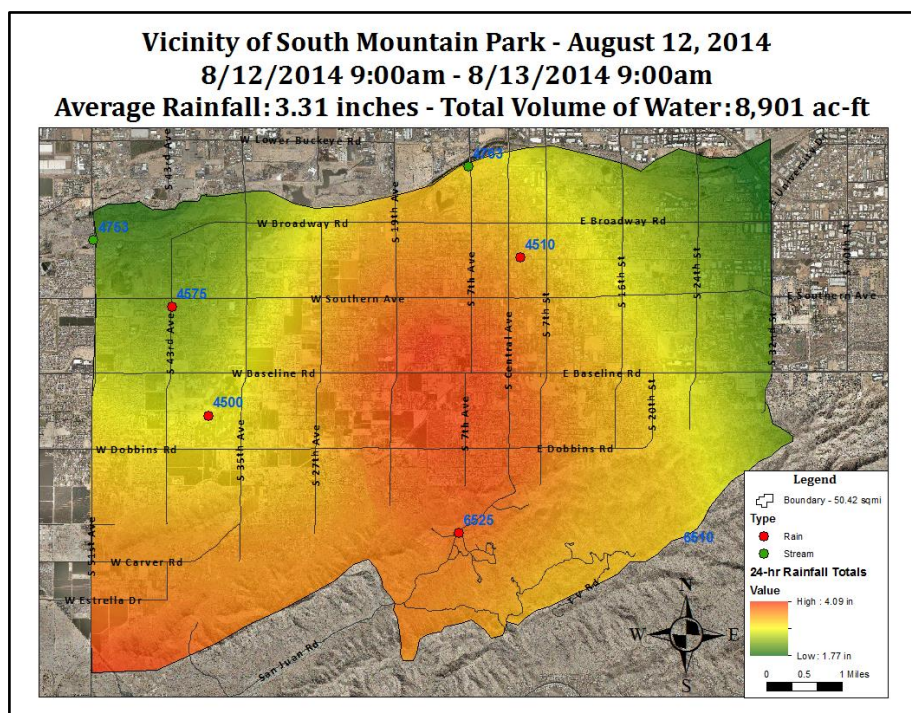
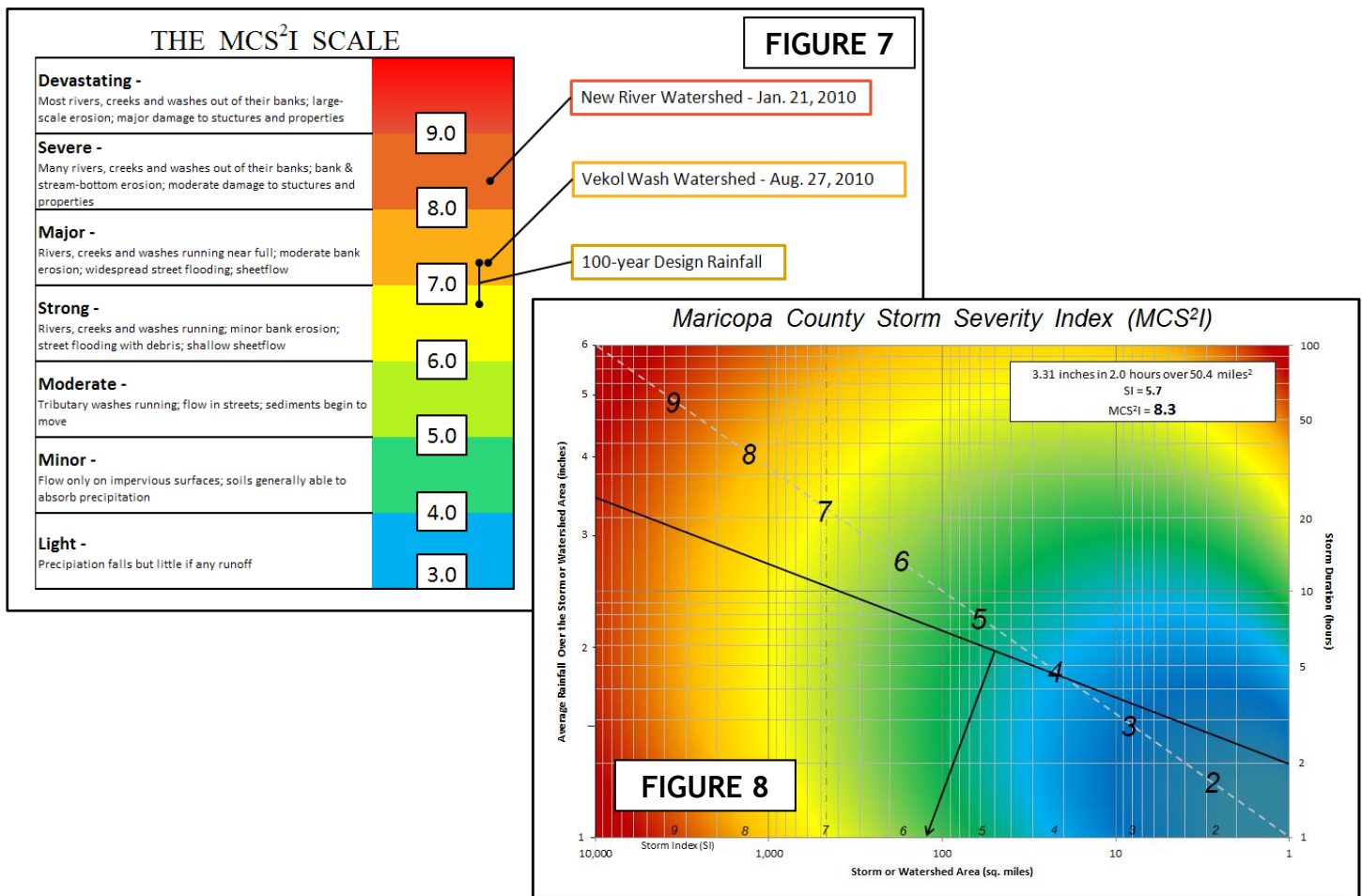
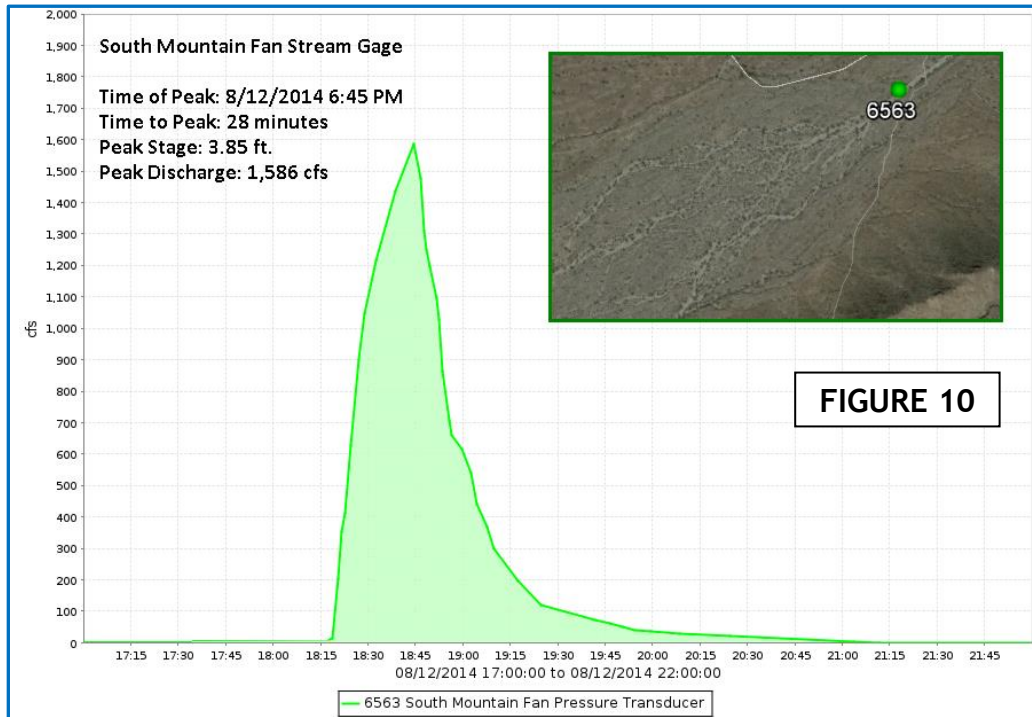
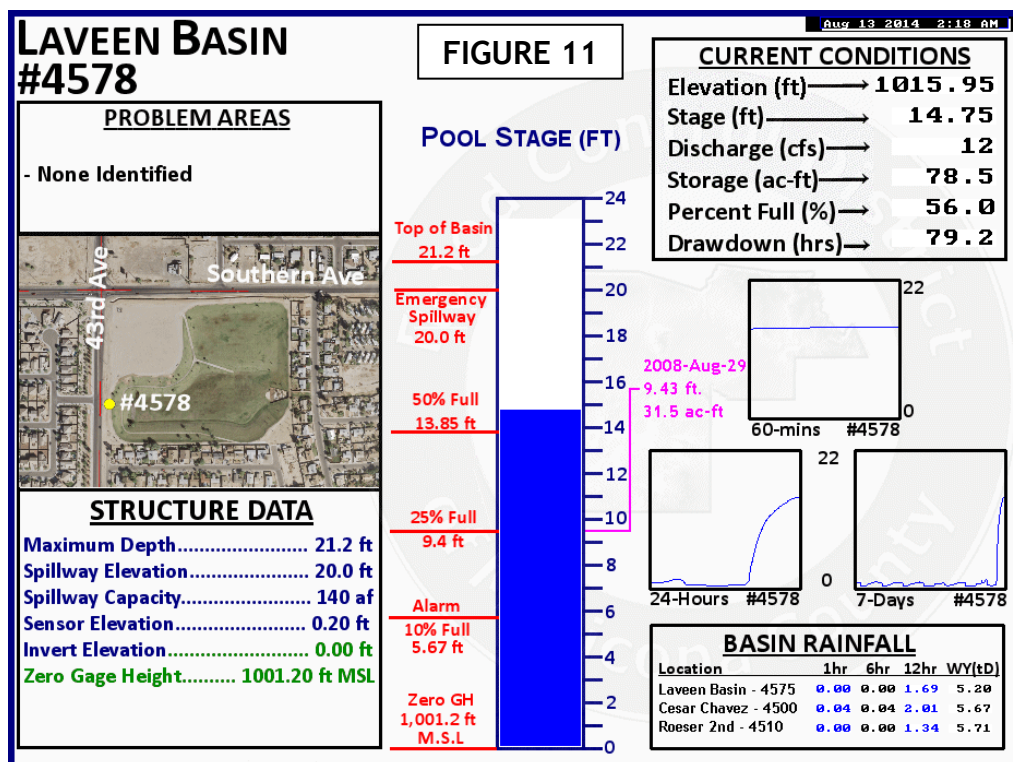


FIGURE 9

RUNOFF



There are two water-level gages in the area affected by this storm - one stream gage on the west side of South Mountain Park (South Mtn. Fan # 6563) and one stage gage on Laveen Basin (#4578) at Southern and 43rd Ave. 6563 was installed on 6/9/1993, 4578 on 11/7/2006. For both sites, this storm generated a new record for the gage. The 1,586 cfs at South Mtn. Fan is more than twice the previous recorded high of 757 cfs on 7/7/1999. To this point Laveen Basin's highest impoundment had been 25% of capacity on 08/29/2008. In this event it reached 56%, a storage volume of 78.5 acre-feet.



SELECTED DATA SOURCES

1. National Weather Service, Warning Decision Training Branch, Norman, OK - Dual-Polarization Radar Training module Heavy Rain:
<http://www.wdtb.noaa.gov/Courses/dualpol/index.html>
2. National Atmospheric and Oceanic Administration, National Climatic Data Center, Asheville, NC - Radar Data Archive and Climate and Weather Toolkit:
<http://www.ncdc.noaa.gov/oa/radar/radardata.html>
3. National Weather Service, Storm Prediction Center, Norman, OK:
<http://www.spc.noaa.gov/obswx/maps/>
4. Flood Control District of Maricopa County, Phoenix, AZ
<http://www.fcd.maricopa.gov> and <http://www.reportaflood.org>
5. National Weather Service, Warning Decision Training Branch, Norman, OK - Dual-Polarization Radar Training module Heavy Rain:
<http://www.wdtb.noaa.gov/courses/dualpol/>
6. National Weather Service, Weather Forecast Office, Phoenix, AZ - Local Storm Reports archive: <http://www.wrh.noaa.gov/psr/>
7. National Atmospheric and Oceanic Administration, National Climatic Data Center, Asheville, NC - Radar Data Archive and Climate and Weather Toolkit:
<http://www.ncdc.noaa.gov/oa/radar/radardata.html>
8. National Weather Service, Storm Prediction Center, Norman, OK:
<http://www.spc.noaa.gov/obswx/maps/>
9. USGS Arizona:
<http://az.water.usgs.gov>
10. CoCoRaHS Precipitation Observation Network
<http://www.cocorahs.org>

Appendix A

5-minute precipitation data recorded at CoCoRaHS station No. AZ-MR-326
August 12, 2014 from 5:00 PM to 7:30 PM

1			Rain	Rain
2	Date	Time		Rate
206	8/12/2014	5:00	0.00	0.00
207	8/12/2014	5:05	0.00	0.00
208	8/12/2014	5:10	0.00	0.00
209	8/12/2014	5:15	0.00	0.00
210	8/12/2014	5:20	0.01	0.00
211	8/12/2014	5:25	0.07	2.34
212	8/12/2014	5:30	0.00	0.08
213	8/12/2014	5:35	0.00	0.05
214	8/12/2014	5:40	0.01	0.05
215	8/12/2014	5:45	0.03	0.67
216	8/12/2014	5:50	0.00	0.10
217	8/12/2014	5:55	0.06	1.78
218	8/12/2014	6:00	0.23	4.84
219	8/12/2014	6:05	0.52	11.29
220	8/12/2014	6:10	0.57	18.00
221	8/12/2014	6:15	0.29	6.55
222	8/12/2014	6:20	0.16	3.02
223	8/12/2014	6:25	0.14	2.95
224	8/12/2014	6:30	0.32	9.14
225	8/12/2014	6:35	0.26	6.00
226	8/12/2014	6:40	0.10	3.10
227	8/12/2014	6:45	0.08	1.20
228	8/12/2014	6:50	0.03	1.12
229	8/12/2014	6:55	0.03	0.59
230	8/12/2014	7:00	0.02	0.33
231	8/12/2014	7:05	0.00	0.09
232	8/12/2014	7:10	0.00	0.05
233	8/12/2014	7:15	0.01	0.05
234	8/12/2014	7:20	0.00	0.05
235	8/12/2014	7:25	0.01	0.05
236	8/12/2014	7:30	0.00	0.04

APPENDIX B

Flood Control District of Maricopa County
Meteorological Services Program (MSP)

--- MESSAGE 3 ---

--- FLASH FLOOD WARNING ---



Find us on Facebook

Date: Tuesday August 12, 2014
Time: 5:59 PM MST
Forecaster: Henz, D.
Phone: 602-506-8701 (ALERT Room)
602-768-2000 (Cell)

LINKS:

Weather radar from NWS

MSP Forecast Zones Map

FCDMC Google Map Data Display

Comments:

Heavy rain is currently falling over most locations within the Phoenix South Forecast Zone with totals approaching 0.75"-1.00" over the last 30-45minutes around the South Mountains and heavy rain is expected to continue over the next hour. Flash Flooding within the Phoenix South Forecast Zone is possible over the next 2 hours. Further information on any excessive runoff within local washes will be distributed promptly with further updates.

Forecast Zone	Warning is Valid (X)	Valid Time
Phoenix South	X	Now-8pm

Note: A Flash Flood Warning is issued when flooding conditions are imminent or occurring.

This warning is not intended for public dissemination. Please expedite this information to affected emergency response organizations (police, fire, transportation, etc.) within your area. Also, please take appropriate actions to prepare for possible flooding. Further information will be provided as it becomes available.