2023 Storm Reports

March 2023

Northeastern Clark County

The winter of 2022-23 saw higher than normal snowfall throughout the western United States. A warm winter storm moved through Nevada and Utah on the weekend of March 11-12 bringing widespread rain, which triggered rapid melting of the snowpack in the Virgin River and Meadow Valley Wash basins.

Elevated flow in the Virgin River was first detected on March 11 and an alarm was triggered by a water level sensor at Scenic Bridge, AZ on March 12th. After consulting with the local National Weather Service and the Colorado River Basin Forecast Center, District hydrologists informed City of Mesquite Public Works of the increased flow that was in progress and more snowmelt runoff was expected. The local United States Geological Survey (USGS) office measured a peak flow of 9,200cfs at the Virgin Narrows gauge. Virgin riverbank erosion and damage to a couple of properties were noted.

Rapid snowmelt also filled the nearly depleted Echo Canyon Reservoir in Lincoln County, Nevada, to the point where flow overtopped the spillway. At one point, emergency managers were concerned the berm could potentially fail, which fortunately didn't occur. Flow in the normally dry section of Meadow Valley Wash was observed by a District gauge, roughly 7 miles north-northeast of Glendale, Nevada, for over one week.

Figure 1 - Echo Canyon Reservoir March 18, 2023

Figure 2 - Flow at Meadow Valley Wash near Glendale, NV

March 15, 2023

Laughlin

Summary by Steve Parrish, CCRFCD General Manager. On March 15th a pretty significant storm impacted Laughlin, NV and Bullhead, AZ. It appears that this was a sizeable, but isolated, event that occurred in an area where we don't have any rain gauges. Our gauges did pick up some rainfall, but none recorded enough rain to warrant much concern at the time. We are still working on getting the radar for the storm from the NWS, but the rain seemed to be concentrated in the area upstream (west) of Casino Drive near Bruce Woodbury Parkway. Runoff traveled down Bruce Woodbury Parkway and went through an existing pipe that is under capacity. This caused a significant amount of water to pass over Casino Drive and flow through the parking areas of the Aquarius, Edgewater and Colorado Belle Hotels. There is some pretty dramatic video of water draining down the slopes into the Colorado River, but this is something that is not unexpected. There are reports of a swift water rescue by Clark County Fire. Five people were rescued out of a Tahoe when the driver tried to cross the flows passing over Casino Drive and got stuck. One person in Bullhead was rescued out of a flood channel. He was hanging on a tree and a hook and ladder had to extend out to rescue the man. He is lucky to be alive. There are no reports of deaths. The Clark County Building Department has received no complaints or concerns about any structural damage to homes or businesses. Although the casinos seemed to survive the event unscathed, there does appear to be some damage to ancillary buildings (shacks) that were in the flow path of the runoff.

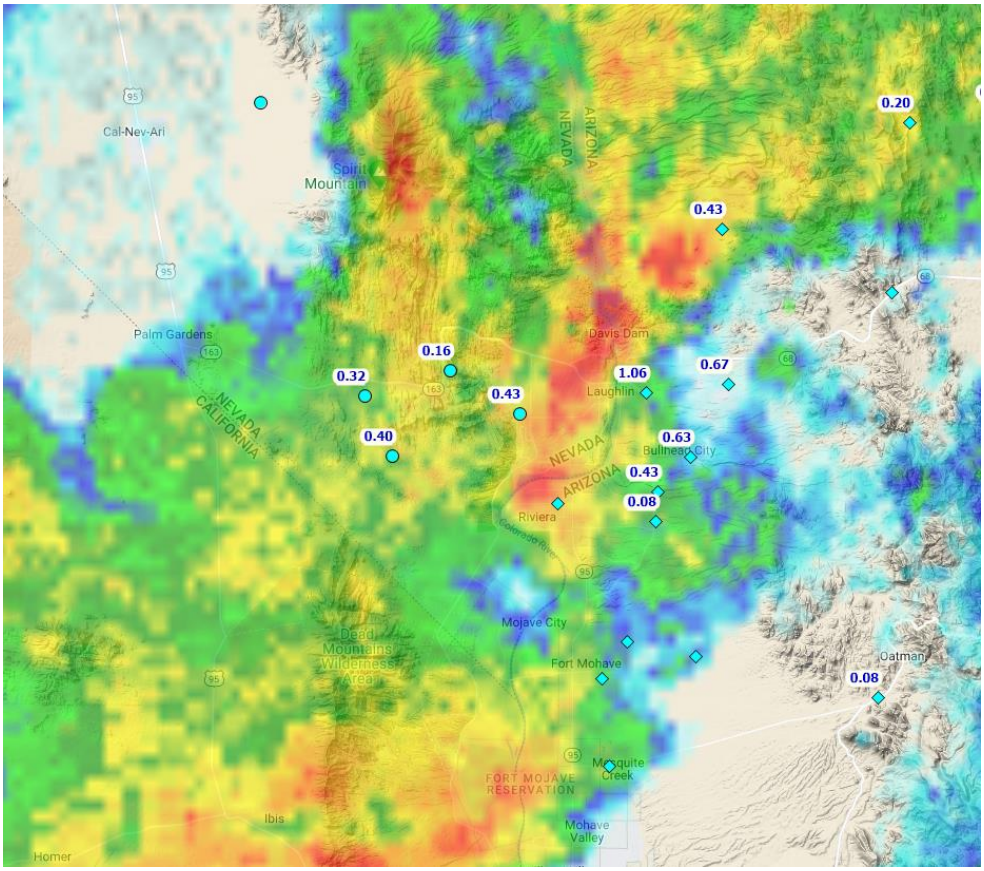

Figure 3 - March 15, 2023, at 4:45pm.

June 15-16, 2023

Las Vegas Valley

Climatologically, June is the driest month of the year in Clark County as the average rainfall at Harry Reid International Airport is only 0.04". An unusually late season winter storm moved inland from the southern California coast and slowly passed through Clark County. Gauges in the Las Vegas valley reported rainfall amounts around 0.10" in the east to 0.50" in the west. Rainfall totals exceeding one inch were reported in the Spring Mountains. Fortunately, the long duration of this storm meant few opportunities for flooding occurred.

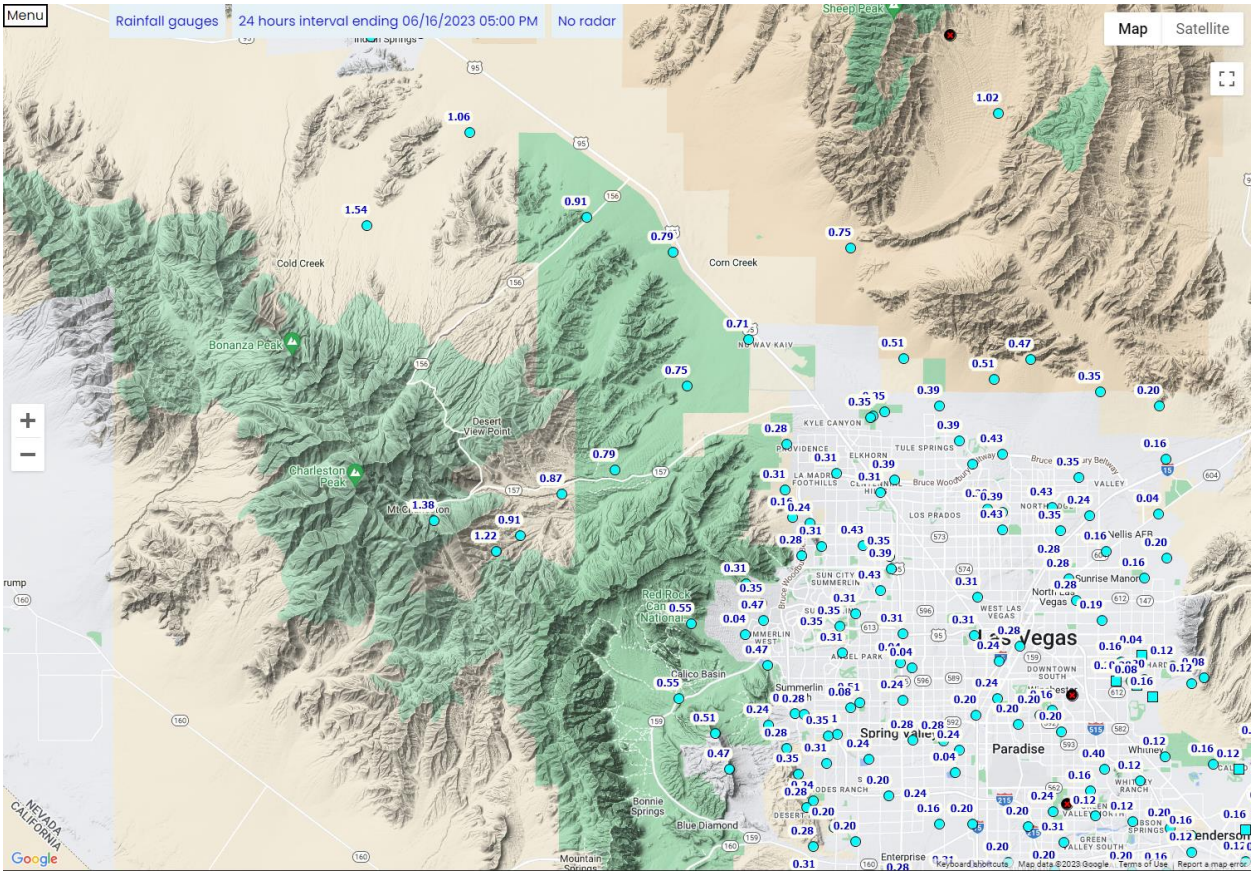

Figure 4 - 24-Hour Rainfall

July 17, 2023

Henderson

A moisture surge up the Colorado River valley increased dewpoints in southern Clark County. The National Weather Service anticipated the primary hazards associated with forecasted afternoon thunderstorms would be strong winds and lightning. Early storms that developed in the McCullough Range south of Henderson were accompanied by the issuance of severe thunderstorm warnings. As these initial storms moved to the north-northeast, additional back-to-back storms were developing in the same locations (training), creating additional rainfall in places already experiencing runoff. A Flash Flood Warning was initially issued for the region around the McCullough Hills area. Later, a Flash Flood Advisory was also issued for the Railroad Pass area.

Black Mountain DB reported a max depth of 1.30'.

Mission Hills DB reported a max depth of 2.72'.

Pioneer DB reported a max depth of 4.35'.

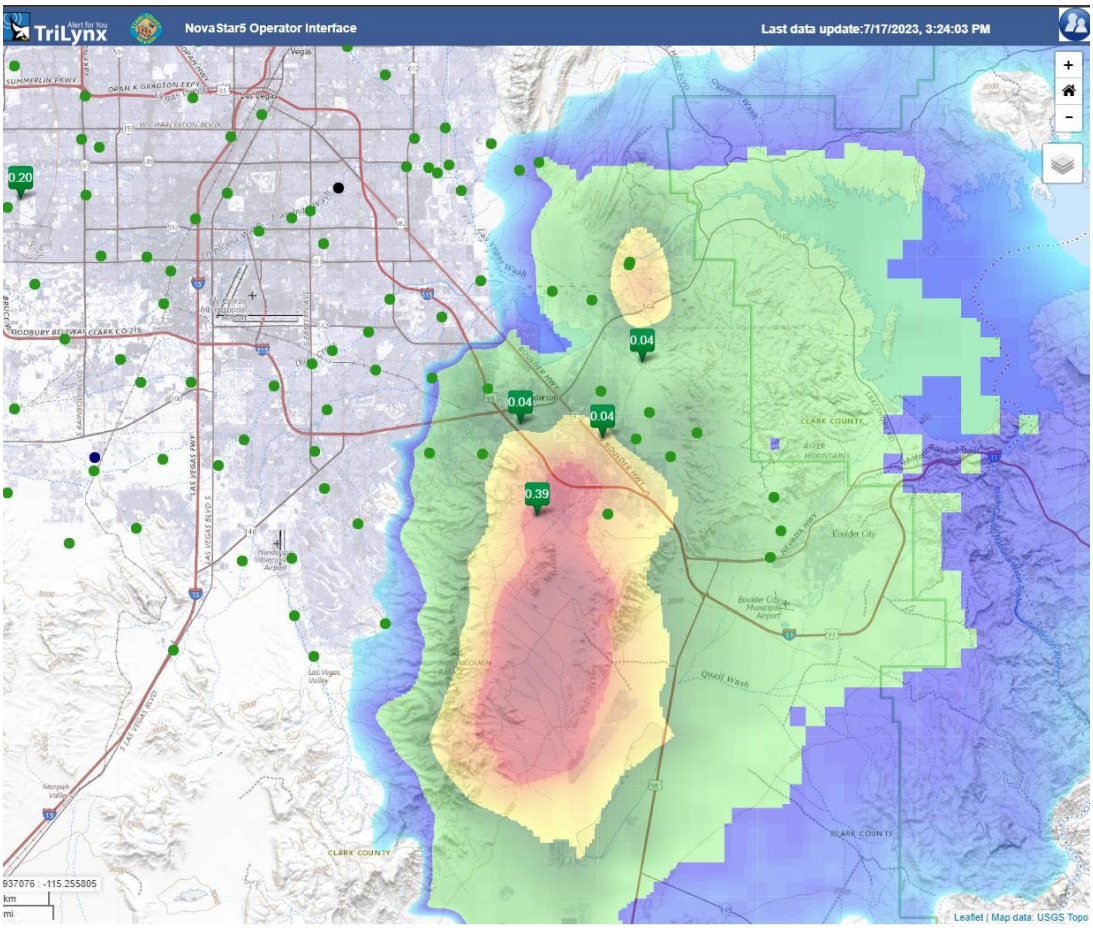

Figure 5 - Rainfall Map With Radar Overlay

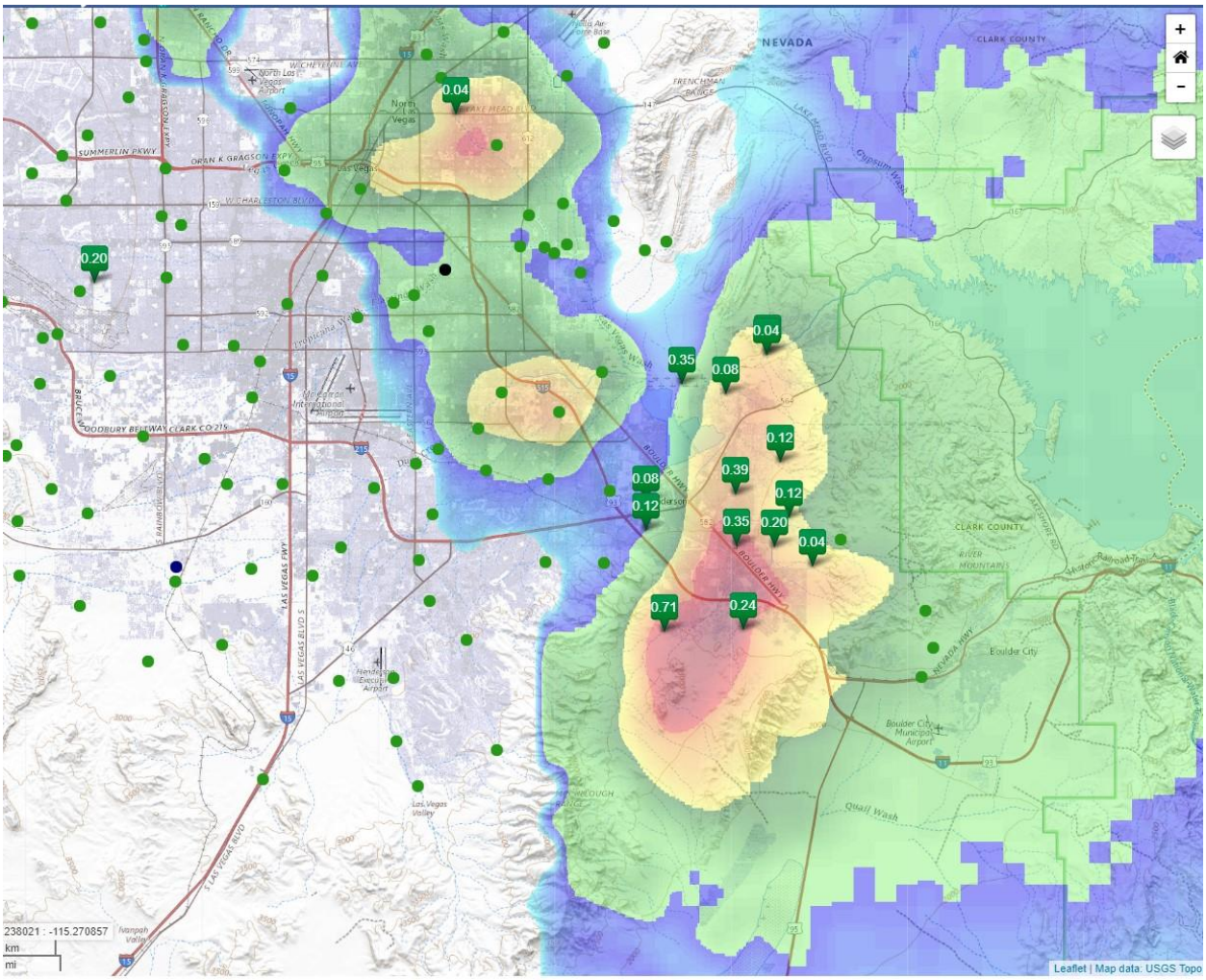

Figure 6 - Rainfall Map With Radar Overlay

August 1, 2023

Jean

Dewpoints started the day around 55°F – 60°F as a monsoon moisture surge entered Clark County. By early afternoon a cluster of nearly stationary thunderstorms formed around the District's rain gauge 4964 (Jean SE). In less than one hour, rainfall occurred at a rate of 2.09 inches, exceeding the 100-year storm return interval rate of 2.06 inches in one hour.

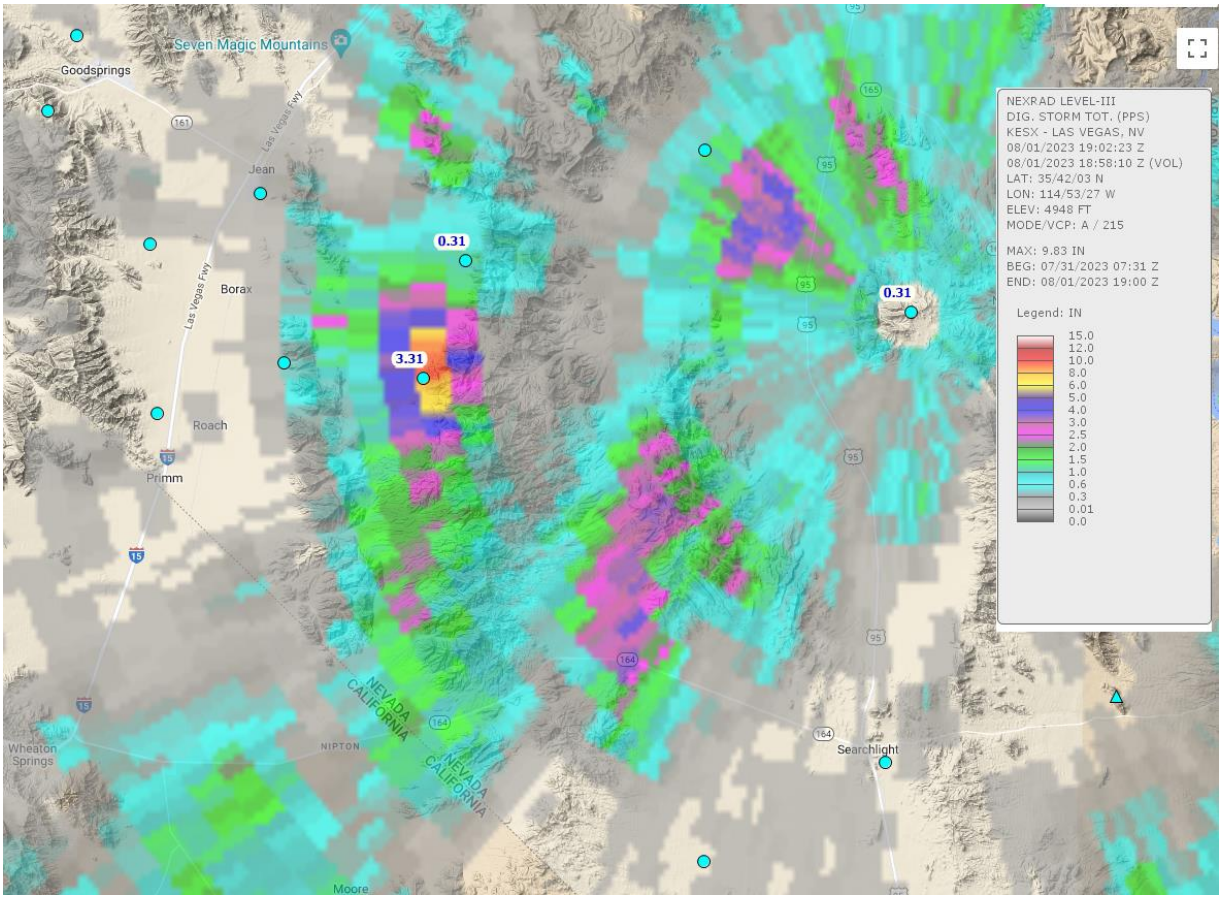

Figure 7 - Jean SE Storm Total Rainfall

Report: Rain Summary 19 (Goodsprings/Jean/Primm Edit

Data analysis: Rainfall Intensity@1 hour

Ending time: 08/01/2023 15:30:00 Interval: 1 hour Now

Date and Time	Interval	4924	4914	4944	4954	4964	4974	4984	4994	9008
Units		in	in	in	in	in	in	in	in	in
08/01/2023 12:00:00	1 hour	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0.00	
08/01/2023 13:00:00	1 hour	0.00	0.00	0.00	0.00	1.50	0.00	0.08	0.00	
08/01/2023 14:00:00	1 hour	0.00	0.00	0.00	0.00	2.09	0.00	0.28	0.00	
08/01/2023 15:00:00	1 hour	0.00	0.00	0.00	0.00	1.02	0.00	0.00	0.00	

Figure 8 - Rainfall Intensity at Jean SE Rain Gauge (4964)

Storm runoff from the thunderstorms at the District's Jean SE (4964) rain gauge produced flow in multiple alluvial fan distributary channels and dirt roads but stopped well short of Jean/Roach Dry Lake Beds by roughly 2.5 miles.

Figure 9 - Storm Runoff Flowed Towards Jean/Roach Dry Lake Beds

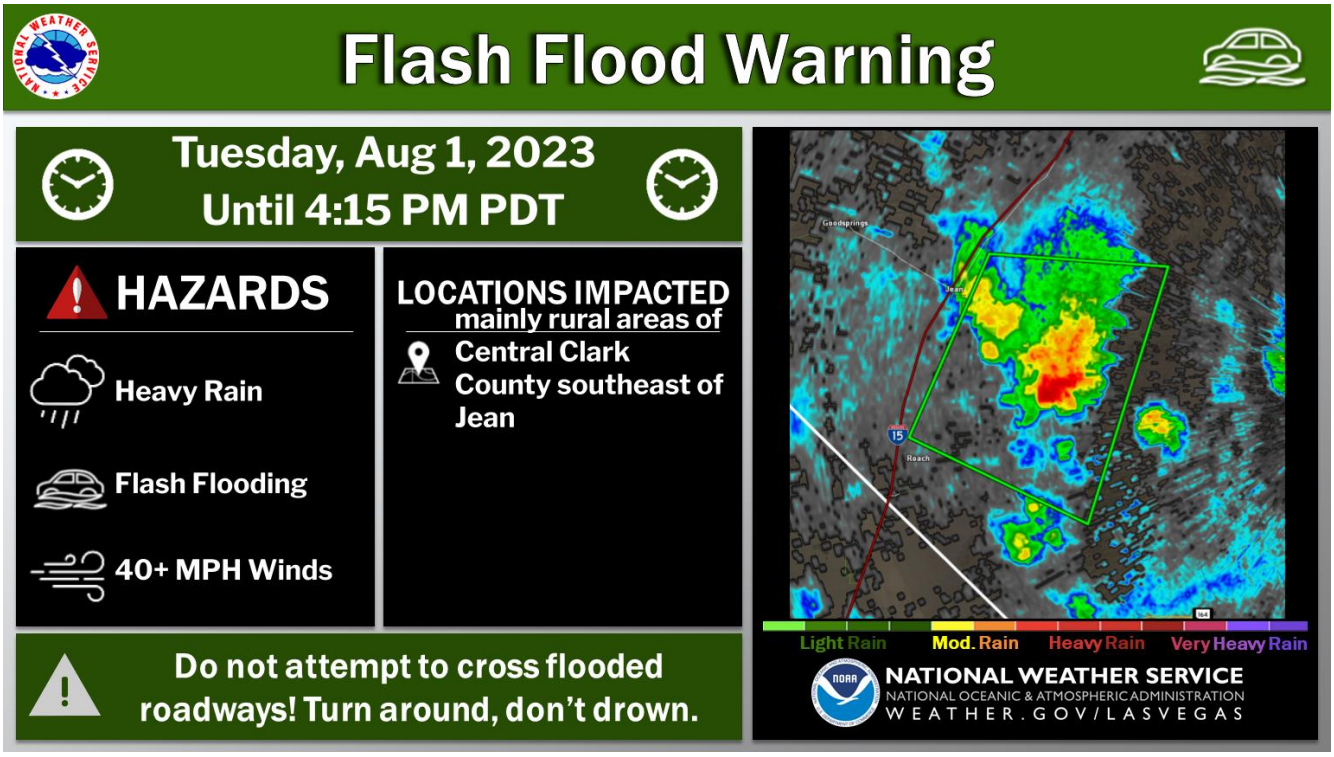

Figure 10 - Flash Flood Warning Issued At 5:03pm.

August 1, 2023

Western Las Vegas Valley

A monsoon moisture push northward up the Colorado River basin elevated dewpoints to around 55°F – 60°F throughout much of Clark County. Rain showers developed in the Spring Mountains in the early afternoon, becoming more intense over the next several hours. At 5:03pm the National weather Service (NWS) issued the first Flash Flood Warning for the western Las Vegas valley (see Figure 6) based on high rainfall rates on radar, but not reflected by rain gauge reports which sometimes occurs.

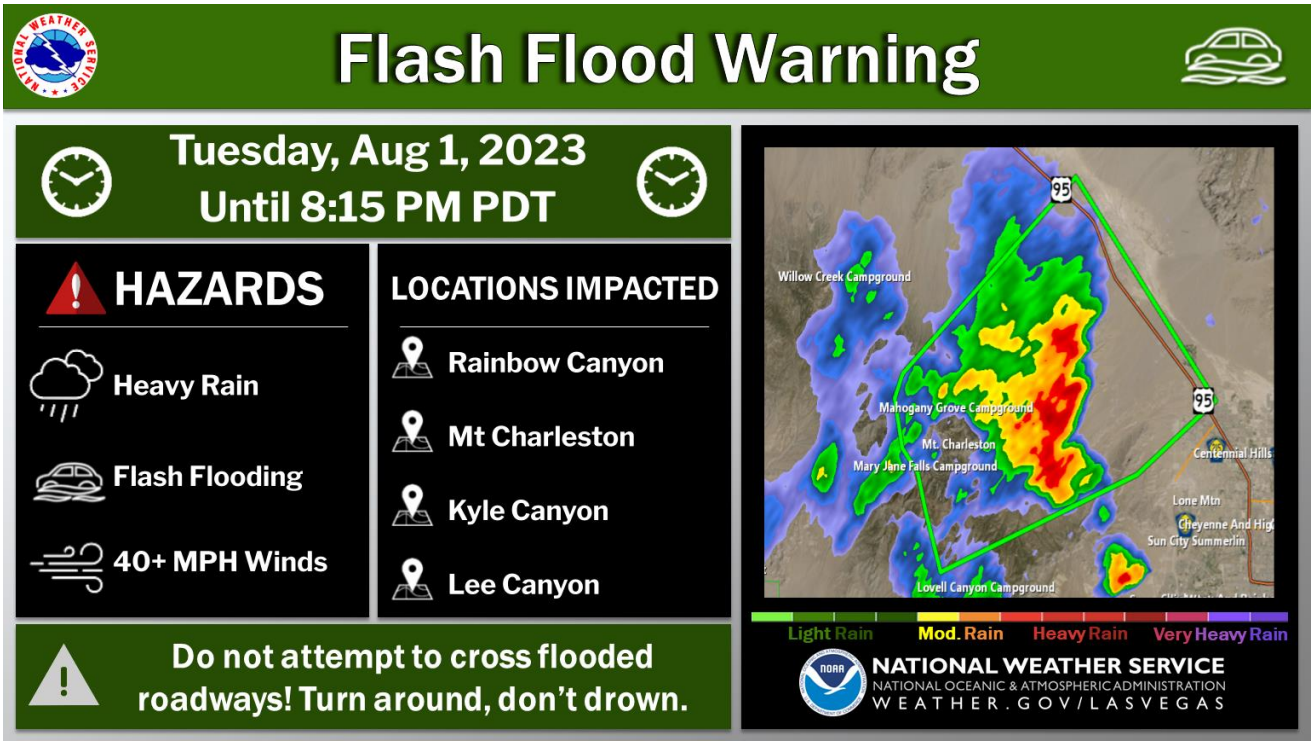

Figure 11 - Flash Flood Warning Issued At 5:03pm.

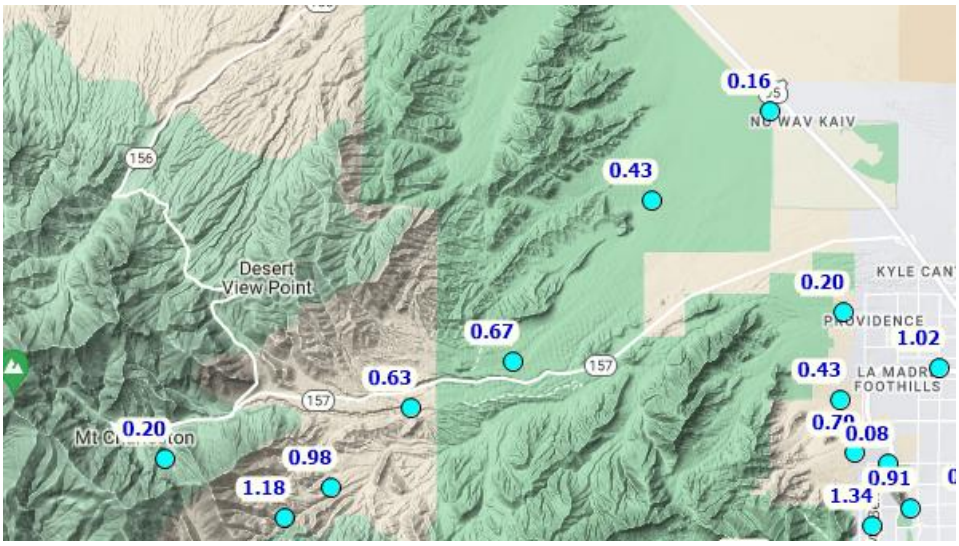

Figure 12 - Storm Total Rain Gauge Data Kyle Canyon To Rainbow Canyon.

As these storms moved southeastward, rain gauges in Summerlin and Red Rock began registering high rainfall amounts and rates of accumulation, which necessitated a second Flash Flood Warning.

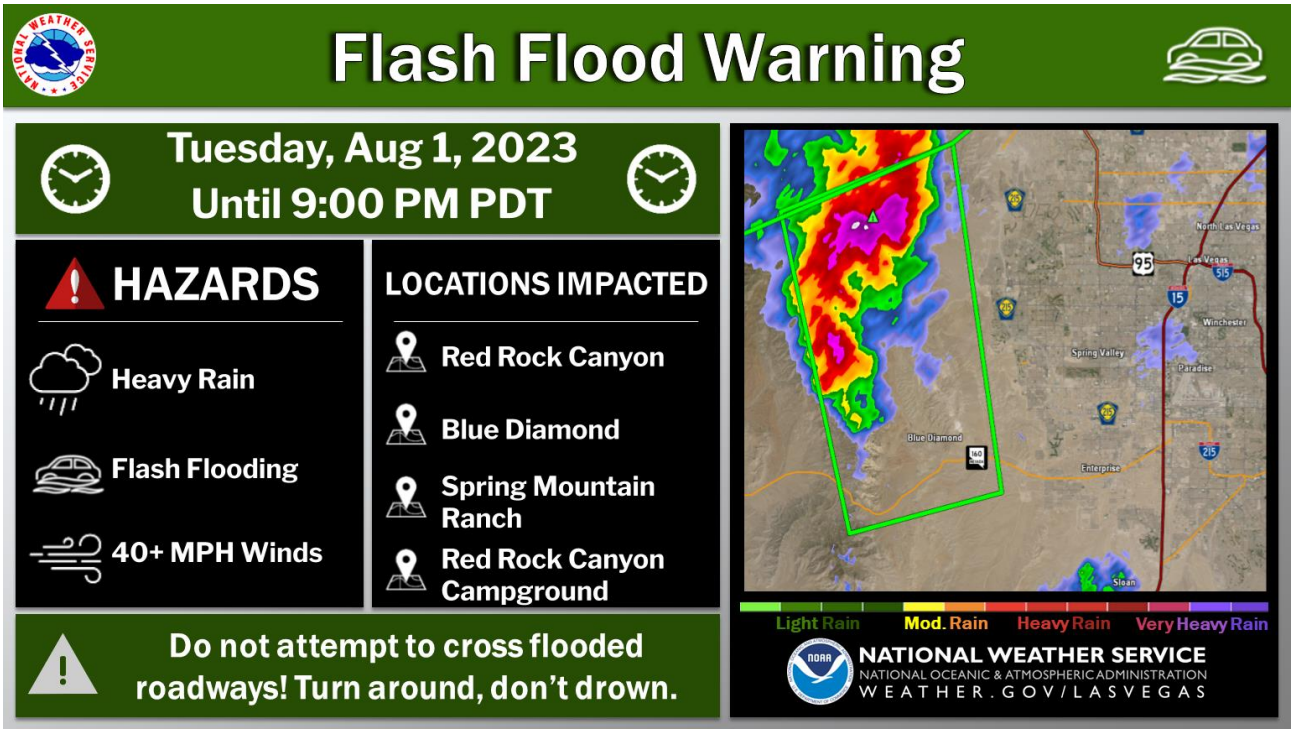

Figure 13 - NWS Issued A Second Flash Flood Warning At 5:58pm For The Red Rock Area.

Figure 14 - Flooding at Total Eclipse Street Near Alexander Road, Just West Of US 95.

A car drives on a flooded road in Summerlin West amid heavy rain on Tuesday, Aug. 1, 2023. (Bizuayehu Tesfaye/Las Vegas Review-Journal)

The rainfall intensity at Brownstone Canyon (Gauge 4329) at one point was the equivalent of a 25-year return interval event. Summerlin NW (Gauge 4209) reported an even higher rainfall rate exceeding the 100-year return interval.

Rain Gauge tipping buckets were pulled from Brownstone Canyon (4329), which reported 1.54”; Summerlin NW (4209), which reported 1.85”; and Jean SE (4964), which reported 3.31”. Existing calibrations were rechecked, and measured test tips were within 3% of the manufacturer’s tolerance.

Report: Rain Summary 08 (Central Las Vegas 1) Edit

Data analysis: Rainfall Intensity@1 hour

Ending time: 08/01/2023 19:00:00 Interval: 1 hour Now

Date and Time	Interval	4204	4209	4214	4219	4224	4229	4234	4239	4244	4249	4264	4329
Units		in	in	in	in	in	in	in	in	in	in	in	in
08/01/2023 18:00:00	1 hour	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
08/01/2023 19:00:00	1 hour	0.79	1.85	0.08	0.00	0.08	0.00	0.00	0.28	0.00	0.00	0.00	1.50

Report: Rain Summary 08 (Central Las Vegas 1) Edit

Data analysis: Rainfall Intensity@15 minutes

Ending time: 08/01/2023 19:00:00 Interval: 15 minutes Now

Date and Time	Interval	4204	4209	4214	4219	4224	4229	4234	4239	4244	4249	4264	4329
Units		in	in	in	in	in	in	in	in	in	in	in	in
08/01/2023 17:15:00	15 minutes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
08/01/2023 17:30:00	15 minutes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/01/2023 17:45:00	15 minutes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/01/2023 18:00:00	15 minutes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/01/2023 18:15:00	15 minutes	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28
08/01/2023 18:30:00	15 minutes	0.59	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75
08/01/2023 18:45:00	15 minutes	0.59	1.42	0.04	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.67
08/01/2023 19:00:00	15 minutes	0.00	0.24	0.04	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.51

Figure 15 - 4209=Summerlin NW, 4329=Brownstone Canyon Gauges.

After 6:00pm NWS weather radar was showing the storms moving were now moving eastward. The radar also showed new storms developing southwest of the I-15/US 95 interchange moving towards the north-northeast, as well as storms in the Sheep Mountains moving southward. These three storm systems were going to merge and potentially intensify in the vicinity of the North Las Vegas airport; thus, NWS issued a third Flash Flood Warning for this area.

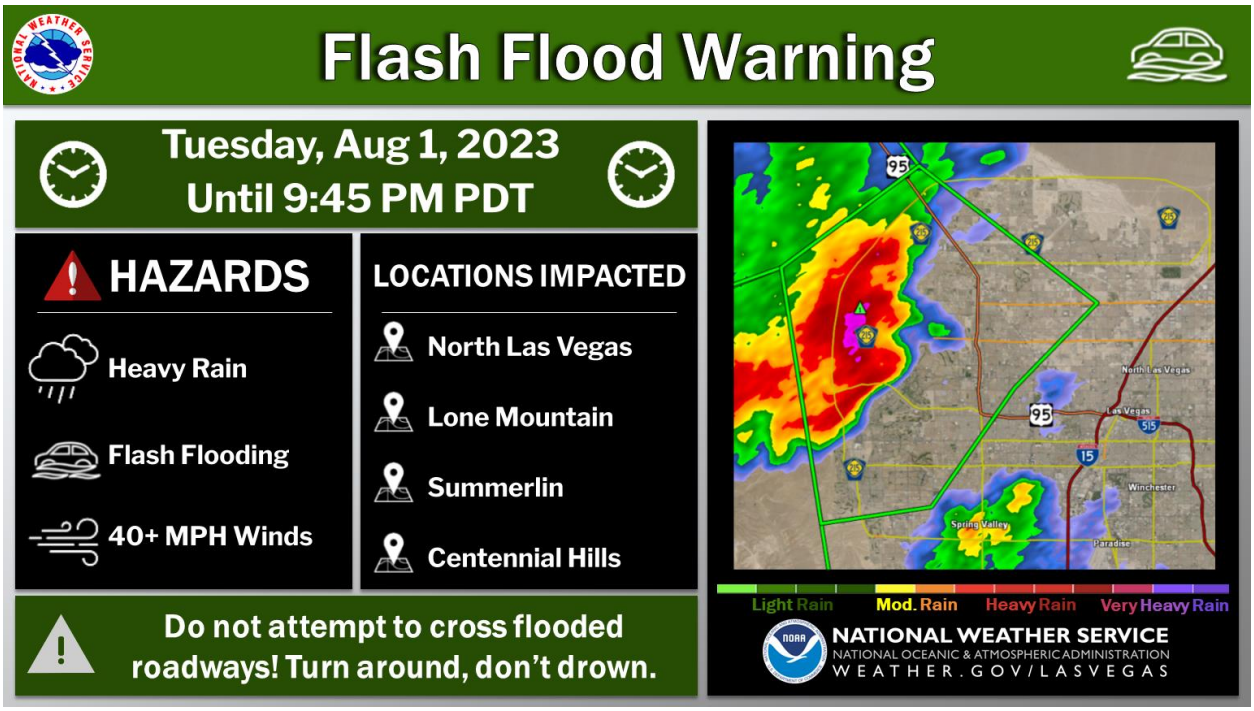

Figure 16 - NWS Issued A Third Flash Flood Warning For The Western Las Vegas Valley At 6:35pm.

Peak depths noted by FTRS water level measuring sensors verified well when compared to high water marks. Notable sediment deposition occurred at Grand Park DB. All impacted stormwater detention basins peak storage was below 25% of capacity.

Gowan South DB (4259) – Peak depth was 4.17 feet.

Rancho DB (4519) – Peak depth was 5.90 feet.

Beltway at Lone Mountain DB (4264) – Peak depth was 10.80 feet.

Lone Mountain DB (4269) – Peak Depth was 7.96 feet.

Grand Park DB (4201) – Peak depth was 10.24 feet.

Red Rock DB (4344) – Peak depth was 6.54 feet.

August 18-21, 2023

Tropical Storm Hilary

A tropical cyclone was developing off the coast of Central America on Tuesday, August 15, 2023. After consulting with the Las Vegas National Weather Service (NWS) office, The District sent the first e-mail to local entities and partners regarding the storm with recommendations to start preparing for heavy rains and begin homeless outreach.

On Wednesday, August 16, 2023, the NWS held its first webinar on Tropical Storm Hilary. The storm was expected to develop rapidly and travel parallel to the west coast of Baja California. Historically, any tropical storms or hurricanes that pass by the Baja spur allow tropical moisture to circulate counterclockwise around the storm and travel northward up the Colorado River Valley towards Clark County.

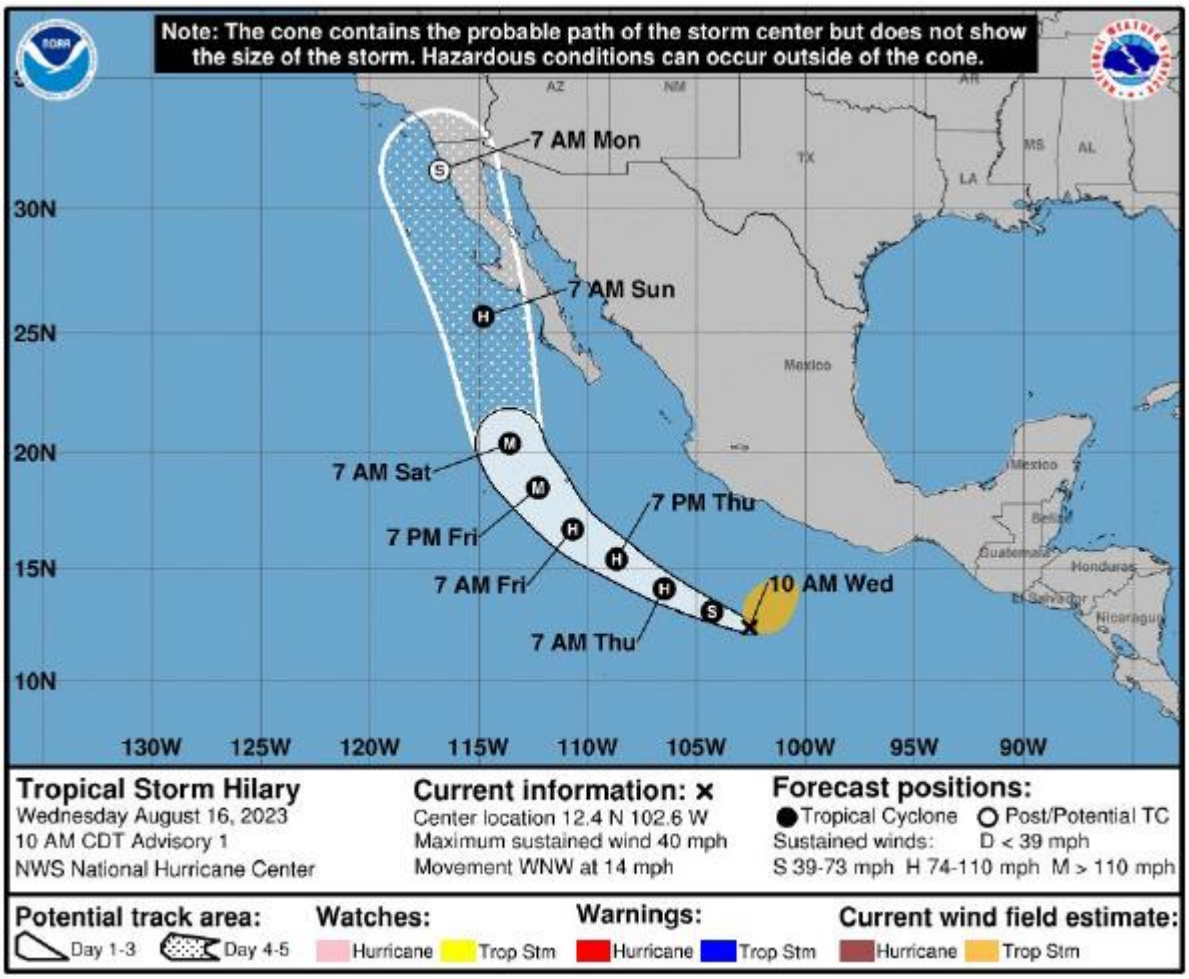

Figure 17 - Tropical Storm Hilary Forecast Track

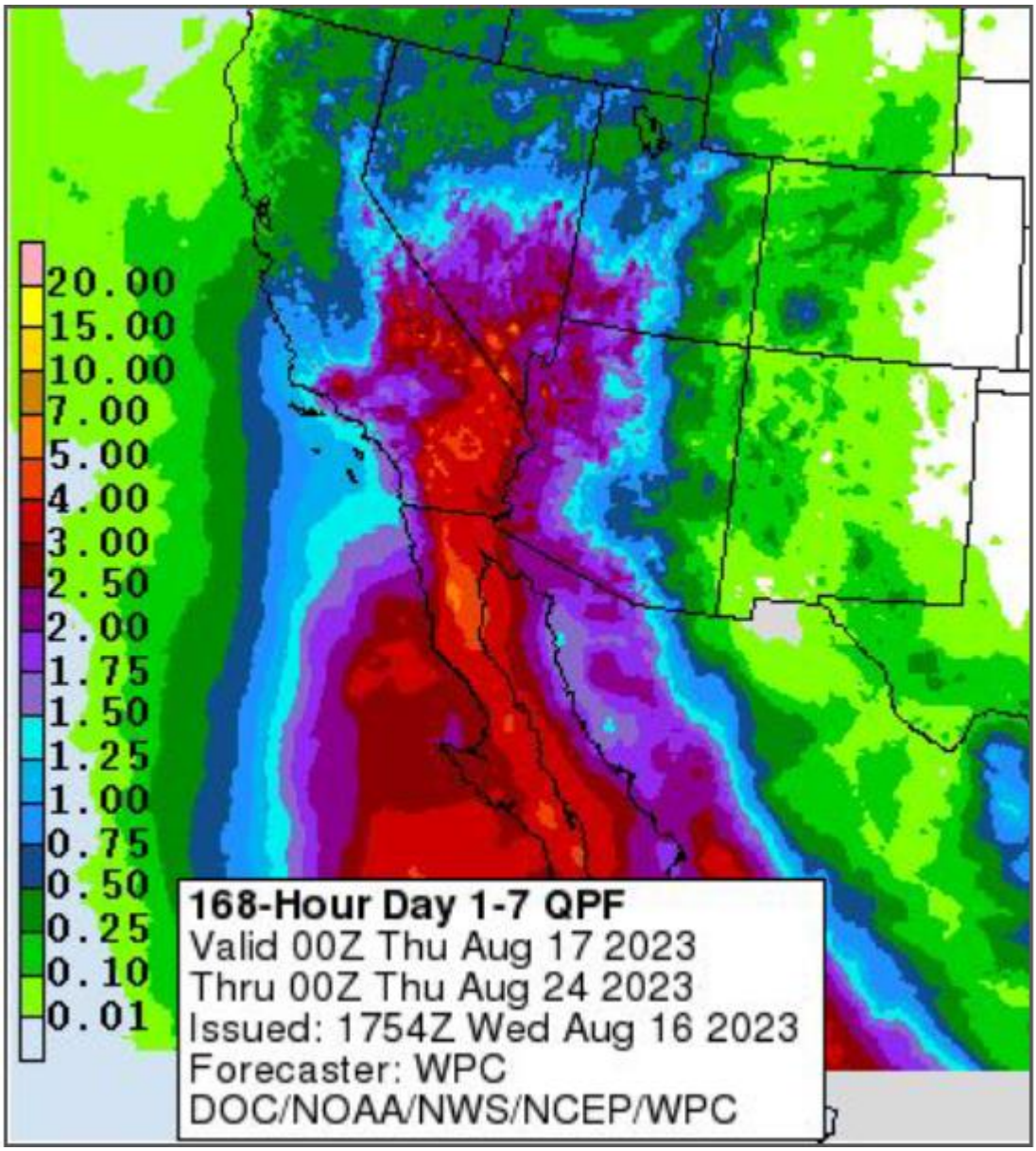

Figure 18 - Initial Precipitation Amount Forecast

Hilary was forecasted to make landfall and enter California as a tropical storm. This was a rare event that last occurred 84 years prior. The storm's intensity elevated atmospheric precipitable water to record levels.

As the weekend approached, the local NWS office kept regional partners up to date with twice daily conference calls. The NWS Weather Prediction Center forecasted a high chance of flash flooding in California and Nevada.

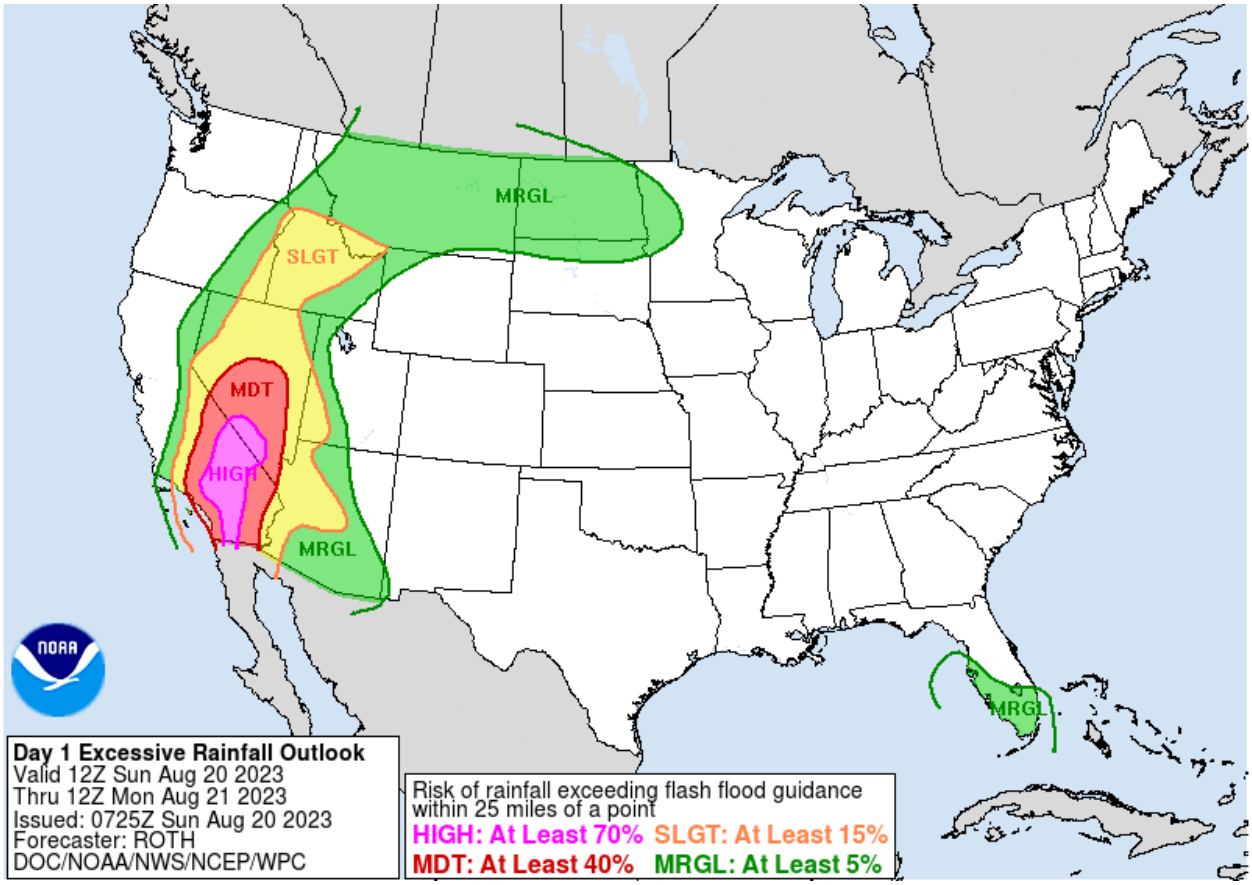

Figure 19 - Weather Prediction Center Outlook

A preview of what was to come began on Friday, August 18th as dewpoints were rising from the low 40s to the mid 50-degree range. Widespread showers and thunderstorms erupted throughout Clark County. Most locations received rainfall amounts between 0.10”- 0.50”, while the south-central Las Vegas Valley saw heavier rainfall up to 0.87”, and the Desert Tortoise Center weather station reported nearly 1.00 inch.

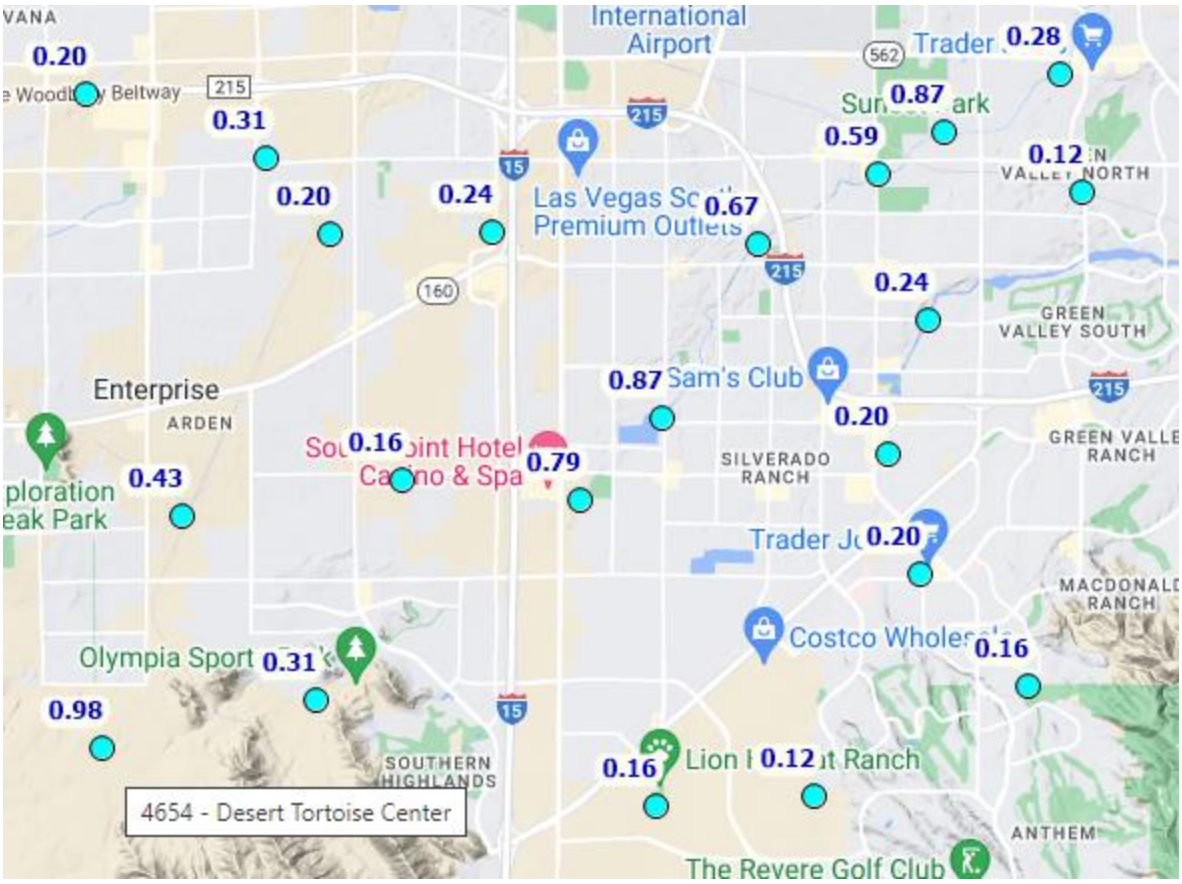

Figure 20 – August 18 Rainfall Totals In South-Central Las Vegas Valley

Light rain continued throughout much of Clark County on Saturday, August 19th. One significant note was the south-southeasterly component of the wind field meant precipitation totals in the Spring Mountains was climbing due to the increased effect of orographic lift.

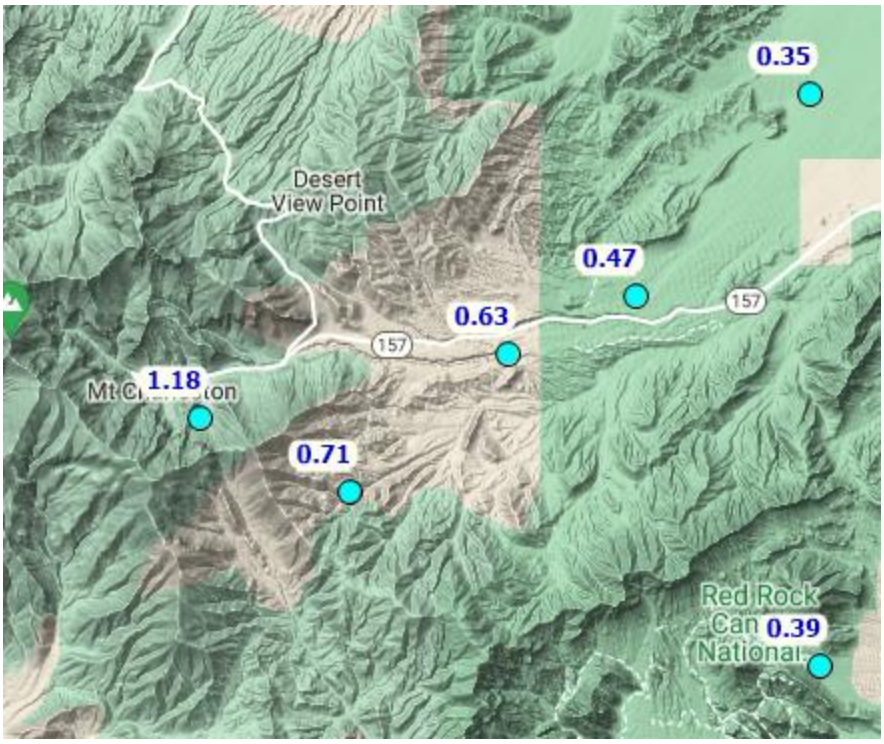

Figure 21 - August 19 Rainfall Totals In The Spring Mountains

As expected, Hillary maintained Tropical Storm intensity after making landfall. It's closest point of approach to Clark County occurred late Sunday evening. As it continued moving northward, increased moisture advection maintained 24-hour rainfall rates around 0.25"- 0.75" throughout much of the county. Increasing orographic lift around higher terrain, especially in the Spring Mountains, allowed higher rainfall rates exceeding 2 inches as measured by District gauges.

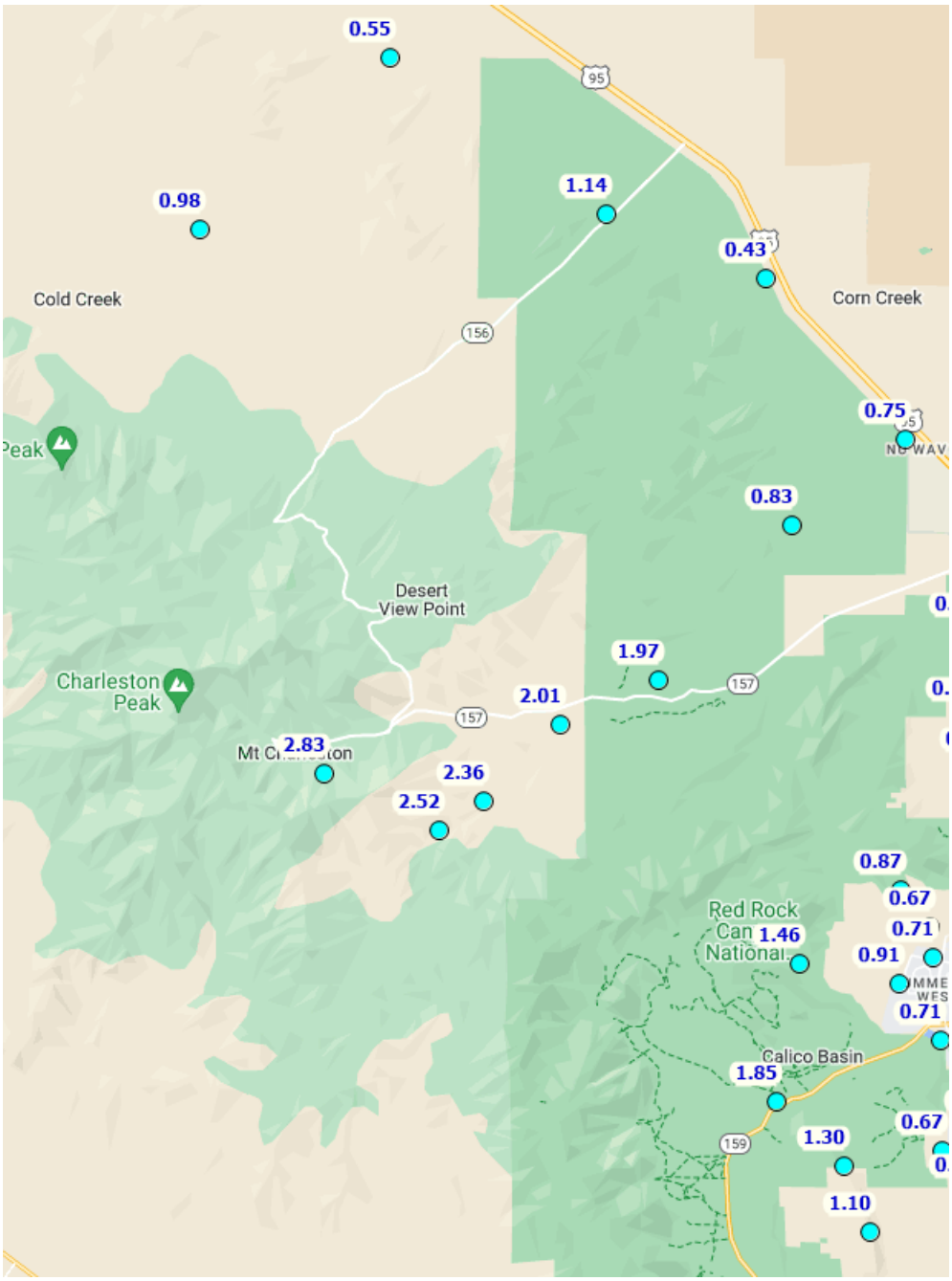

Figure 22 – 24-Hour Rainfall For August 20, 2023

Coinciding with Hilary's closest point of approach was the heaviest rainfall measured by District gauges between August 20 at 7:00pm through August 21 at 8:00am.

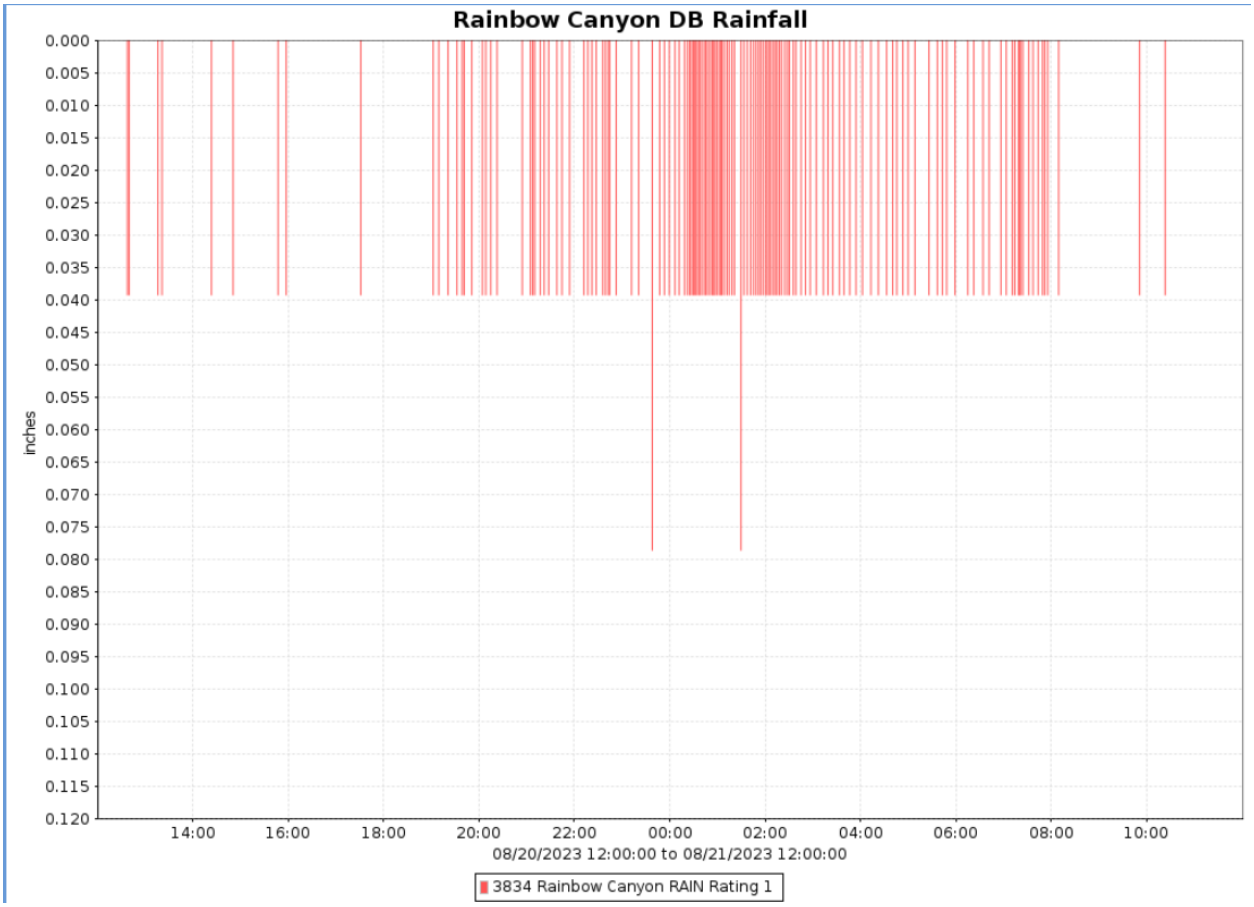

Figure 23 - Rainbow Canyon Rain Gauge Measured 5.20" in 13 hours.

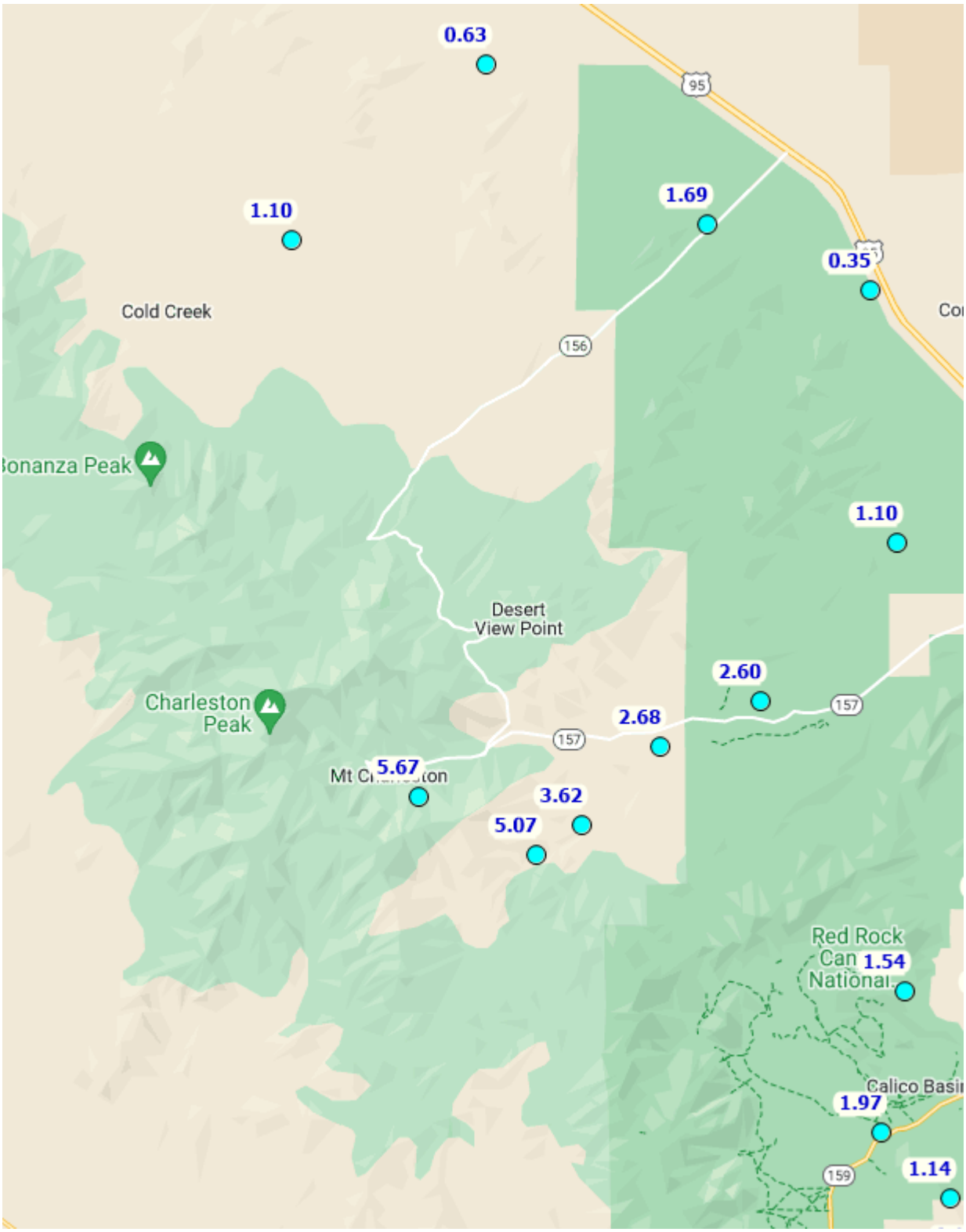

Figure 24 - 24-Hour Rainfall Ending August 21 At Noon.

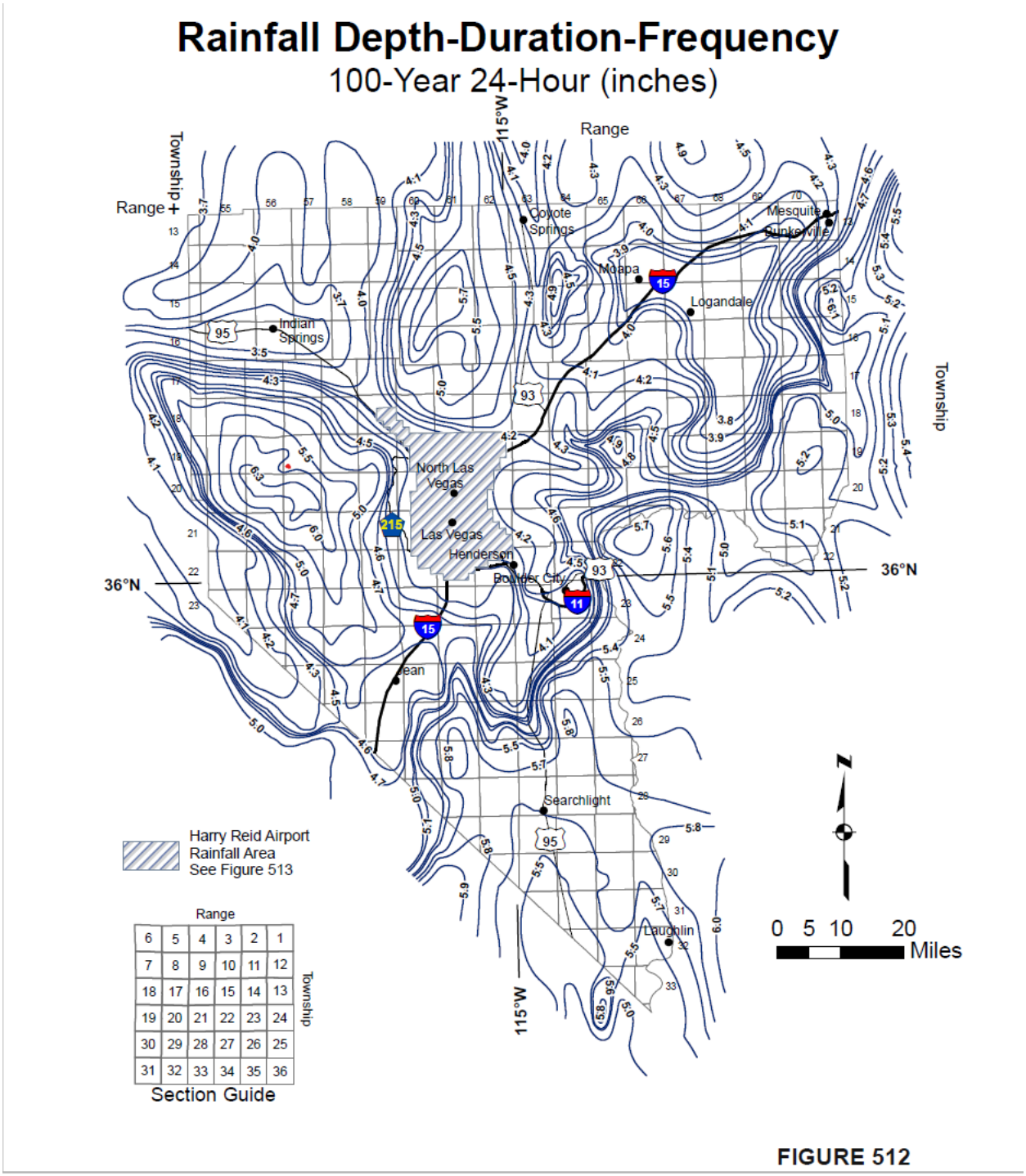

Figure 25 - Rainbow Canyon Gauge (Red dot at township 19 Range 57)

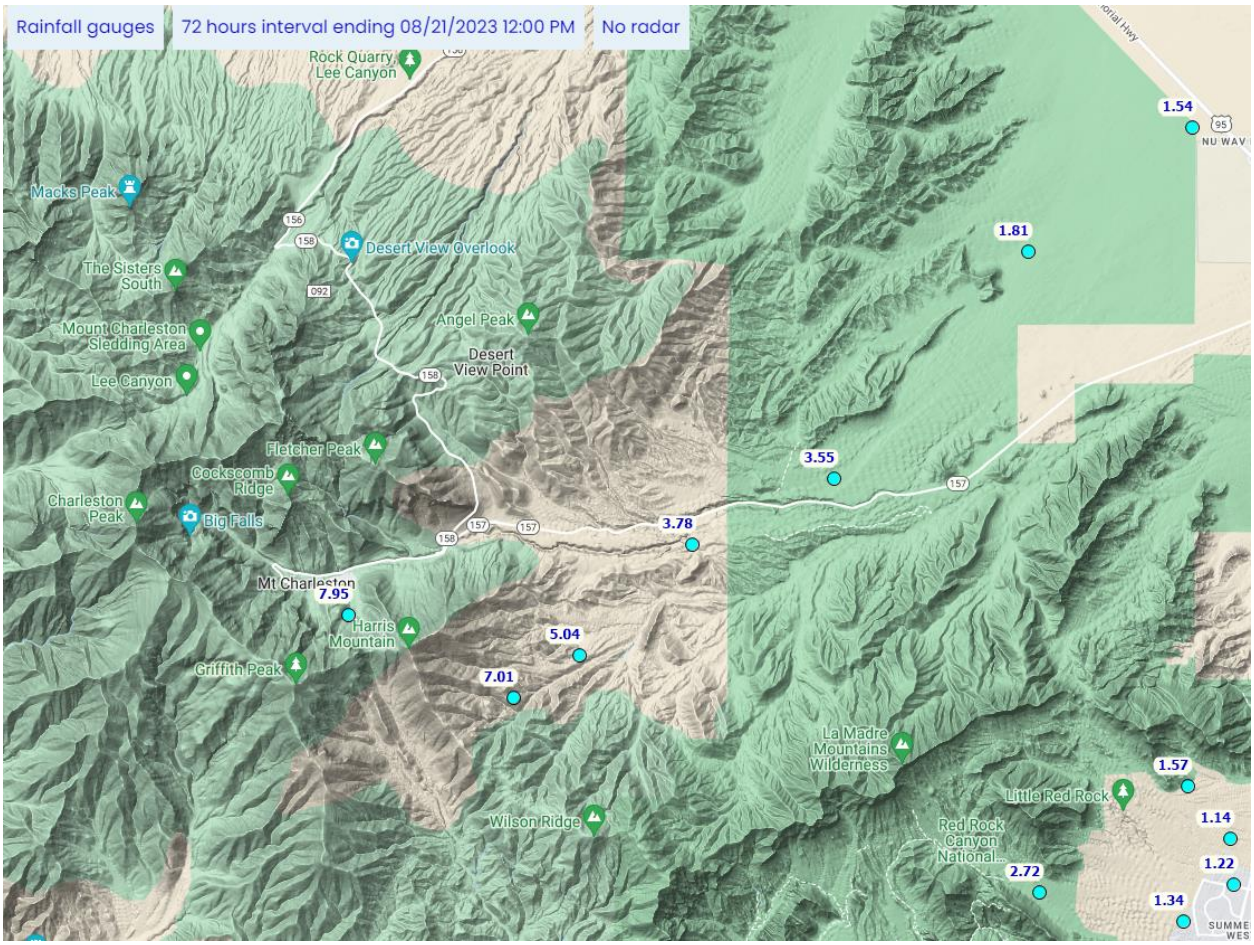

Figure 26 - 72-Hour Rainfall

The majority of storm impacts occurred in the Spring Mountains. According to the Clark County Office of Emergency Management & Homeland Security there were 12 structures with minor damage, 2 with major damage, and one destroyed. 2 individuals and one pet needed rescue. Kyle and Lee Canyons have been closed to the public due to multiple road segments having been washed out. Electricity has been cut off and a boil water order is in place for residents.

One suspected drowning was reported by the Clark County Coroner's Office.

Case 23-05218 (name redacted) age 56 of Las Vegas, was found in the 5400 block of Club House Drive on Friday August 25, 2023, death was pronounced at 1220 hours. This is believed to be related to LVMPD response on 8/22/2023 where two individuals were reported to be in deep water of a wash area. They were unable to be recovered. The cause and manner of his death are pending. There has been no follow-up report on the second individual.

The NWS weather radar Digital Storm Total Precipitation for a period of 41 hours ending at 5:00pm is displayed below. An issue with the radar rainfall algorithm in the Spring Mountains is the terrain itself. Clouds developing orographically often drape over the ridgelines, making it a challenge to distinguish between highly reflective precipitation and mountain peaks.

Even though it appears the Storm Total Precipitation algorithm was on the low side when compared to District gauge data, it's still useful to note that higher rainfall amounts were along the ridgeline between Kyle Canyon and Lee Canyon, which is not surprising considering how much damage was reported in the areas.

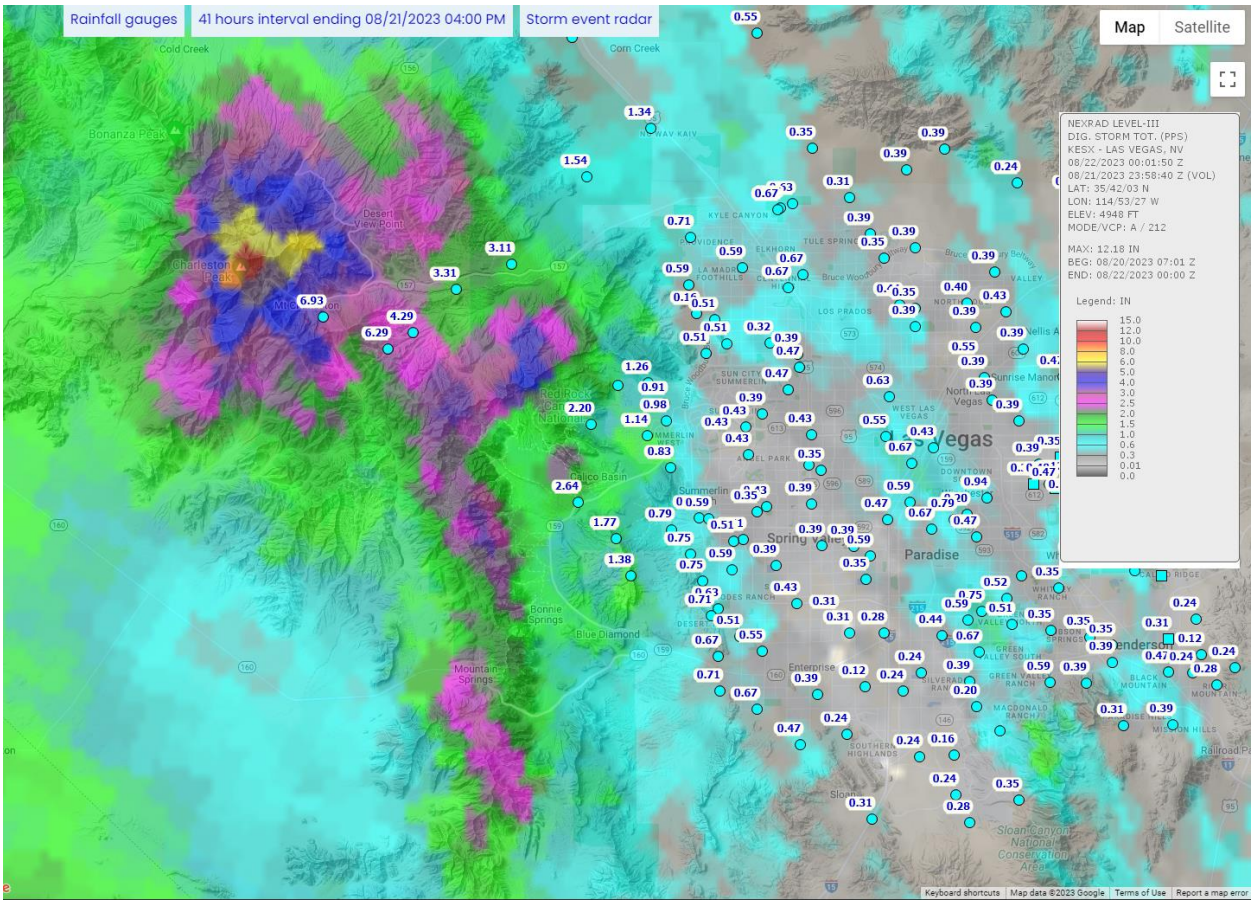

Figure 27 - Radar & Gauge Map Overlayed

Figure 28 - Echo Road At Kyle Canyon

Figure 29 - Debris Piled Around A Building

Figure 30 - Debris Piled Up To The Ski Lift Motor

Figure 31 - Kyle Canyon Road Damaged

August 23, 2023

The Strip

Isolated thunderstorms initiated around the Las Vegas Valley on the evening of August 23rd. Moderate precipitation occurred around the strip with one notable exception, The District gauge at DI Super Arterial (Station 4384) would report a total of 1.34 inches with the heaviest intensity occurring around 9:00pm, corresponding with a 10-year return interval . The tipping bucket was pulled, and the unit's calibration was within manufacturer's tolerance. The gauge at Rio Pump Site (4386) reported 0.55 inches, equivalent to a 5-year return interval.

The Clark County Fire Department rescued one individual on East Flamingo Road near Koval Lane. Additional reports of two individuals needing rescue from flood waters were not verified.

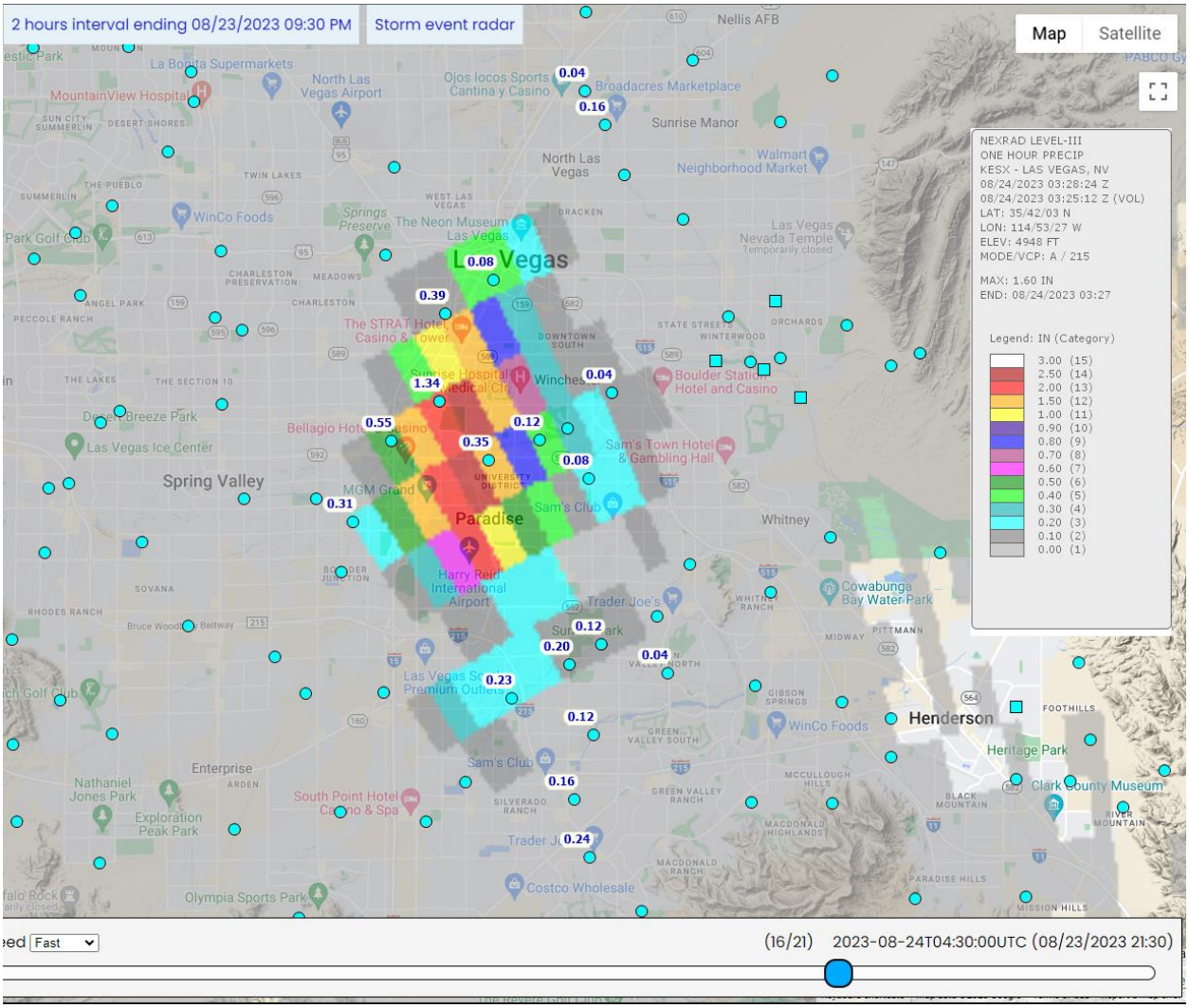

Figure 32 - Radar Display From The evening of August 23rd.

Report: Rain Summary 09 (Central Las Vegas 2)

Data analysis: Period Rainfall

Ending time: 08/23/2023 21:30:00 Interval: 10 min

Date and Time	Interval	4384	4386
Units		in	in
08/23/2023 20:40:00	10 minutes	0.00	0.00
08/23/2023 20:50:00	10 minutes	0.55	0.47
08/23/2023 21:00:00	10 minutes	0.59	0.00
08/23/2023 21:10:00	10 minutes	0.00	0.00
08/23/2023 21:20:00	10 minutes	0.04	0.08
08/23/2023 21:30:00	10 minutes	0.16	0.00

Figure 33 - 10-Year Return Interval In Red, 5-Year Interval In Yellow.

September 1-2, 2023

Strong Monsoon

High pressure to the east of Nevada and low pressure off of the Pacific Northwest allowed a strong push of tropical moisture into Southern Nevada. Dewpoints in the mid-60s were observed on both days. Weather forecast models predicted the increased moisture and heavy rainfall potential days in advance and the District recommended to the homeless advocate community to begin outreach on Wednesday, August 30th.

The morning of September first saw widespread thunderstorms move through Clark County, which impacted many streets. Stormwater detention basins easily contained the runoff.

Additional storms developed during the afternoon impacting the western half of Clark County. Storm cells moved from southwest to northeast while new storms sprung up where previous storms had developed creating a training (back-to-back) effect. These lines of storms also slowly drifted eastward over the Spring Mountains creating a rainfall over runoff event. Since normally dry basins were still containing morning runoff, there was some concern that the afternoon storms, with rainfall rates of two to three inches per hour could test the limits of some basins. This concern faded a few hours after the storms moved northeastward out of the valley as no basin exceeded its 50% design capacity.

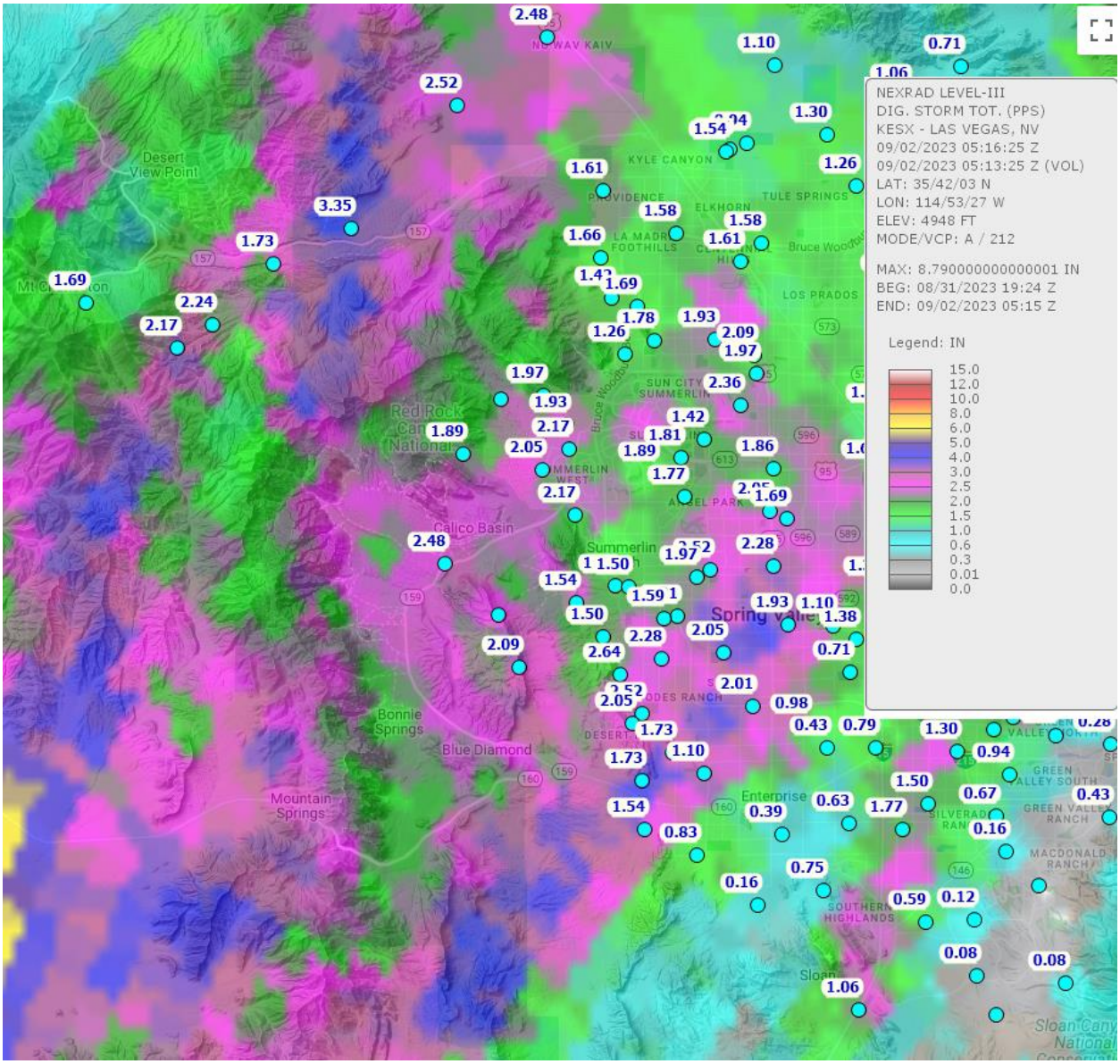

Figure 34 - Western Las Vegas Valley 34 Hour Rainfall Ending At 9/1/2023 At 10:15pm.

Station	Maximum Depth (Feet)	Peak Discharge	Peak Storage	Spillway, Embankment or 100-Year WSE	Percent Storage Capacity Used
Kyle Canyon DB (4029)	7.57	132	95	2300	4%
Upper Las Vegas Wash DB (4024)	14.22	2090	319	1980	16%
Floyd Lamb South EEA (4019)	7.04	43	52	437	12%
Rancho DB (4519)	12.70	123	149	321	46%
Beltway At Lone Mountain DB (4264)	14.98	45	35	270	13%
Gowan North DB (4254)	12.24	396	414	960	43%
Gowan South DB (4259)	11.74	367	211	630	33%
Red Rock DB (4344)	20.05	1112	502	2000	25%
R-4 DB (4444) (High Water Mark)	5.25	105	18	340	5%
F-1 Debris Basin (4404)	14.64	79	21	55	38%
Upper Flamingo DB (4349)	11.81	189	616	1882	33%
Blue Diamond DB (4414)	16.81	127	212	2268	9%
Upper Duck Creek DB (4639)	8.30	186	166	2578	6%
Duck Creek Railroad DB (4649)	8.11	178	230	818	28%
Tropicana DB North Bay (4474)	30.08	437	148	806	18%
Tropicana DB South Bay (4474)	25.10	n/a	200	806	25%
Lower Flamingo DB (4369)	7.85	672	77	222	35%
Winnick Av. (4382)	4.00	n/a	n/a	n/a	n/a
Las Vegas Wash at Nellis Blvd (4004)	11.59	8237	n/a	n/a	n/a
Flamingo Wash East of Nellis Blvd (4395)	11.42	3868	n/a	n/a	n/a
Las Vegas Wash abv. Flamingo Confluence (4084)	11.20	5473	n/a	n/a	n/a
Las Vegas Wash at the Club at Sunrise (4599) (USGS)	5.08	10643	n/a	n/a	n/a
Las Vegas Wash below Vegas Valley Dr. (4089) (USGS)	14.82	20756**	n/a	n/a	n/a
Rainbow Garden Weir (4099)	8.45	11953	n/a	n/a	n/a
LV Wash at Pabco Rd (4544) (USGS Bubbler)	3.98	10057	n/a	n/a	n/a
Muddy River at Glendale Bridge (3269)	12.89	2385	n/a	n/a	n/a
Muddy River at Cooper Street (3299)	2.01	613	n/a	n/a	n/a
** 4089 Discharge extrapolated by NS5 above 13.79' depth.					
** USGS will perform a Step Backwater Analysis					
Current as of September 11, 2023					

Figure 35 - Basin And Channel Maximum Depths

Since the local National Weather Service office issued a Flash Flood Watch on Thursday, August 31, 2023, through midnight September 2, 2023, there were 16 Flash Flood Warnings and 4 Flash Flood Advisories issued for Clark County.

The CCRFCD FTRS notified District personnel of heavy rainfall and significant water level increases throughout Clark County by disseminating text messages when certain thresholds were met. In the 48-hour period of September 1-2, a total of 642 alarms were triggered.

The Clark County Coroner's Office reported deaths on September 2nd and a third victim was found on September 6th. Summaries are provided below.

Case 23-05406

(Name redacted), age 13 of Las Vegas, was found in the 5600 block of Boulder Highway on Saturday, Sept. 2, at 3:17p.m. He reportedly had been floating on an innertube in floodwater when he was injured and taken to Sunrise Hospital, where he died the next day on Sept. 3, at 2:35 a.m. The cause of his death was determined by the office to be drowning. The manner of death was ruled accidental.

Case 23-05382

Additionally, the Clark County Office of Coroner/Medical Examiner is investigating a second case involving a possible drowning victim from the weekend storms. The body of an unhoused man reported missing on Friday evening was found in a detention basin near Rainbow Boulevard and Westcliff Drive at approximately 4:45 a.m. on Saturday, Sept.2. Our office is working to identify the victim and notify his next of kin. The cause and manner of his death are pending.

Case 23-05464

The body of an unidentified male was brought to the attention of LVMPD by unhoused persons who found this male in Tropicana Basin Wash at approximately 2:44 am on 9/6/2023. Death was pronounced on 09/06/2023 at 5:25am. Our office is working to identify the victim and notify his next of kin. The cause and manner of his death are pending.

Significant rainfall also impacted Sunrise/Frenchman Mountains.

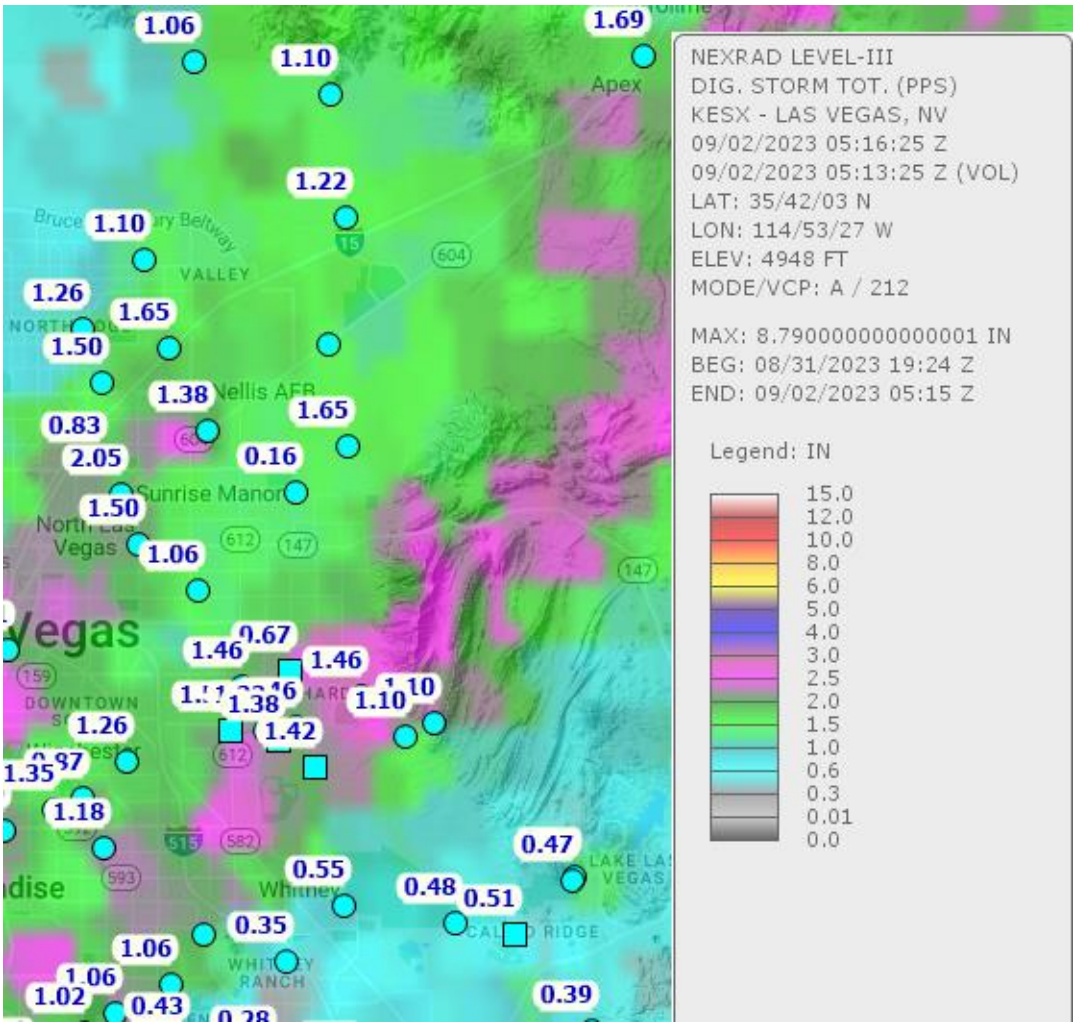

Figure 36 - 34-Hour Rainfall Around Sunrise/Frenchman Mountains

Runoff south of East Lake Mead Blvd. travelled westward (downhill). Along Piccadilly Drive the flow entered a drainage culvert near Albertsons; however, it was discovered after the storm that a passenger vehicle wound up in the culvert. This prevented a portion of the flow from entering the underground box culvert and wound-up overtopping Hollywood Blvd.

Figure 37 - Vehicle In Culvert

Figure 38 - Debris Across Hollywood Blvd.

As runoff continued to flow westward it culminated into significant flow with ponding on Lake Mead Blvd. at Mt. Hood St. and extending just west of Sloan Channel.

Figure 39 - Lake Mead Blvd. & Mt. Hood St.

Flooding also impacted an apartment complex at Tropicana Blvd. at Andover Dr.

SR160 to Pahrump was also closed for several hours.

Figure 40 - SR160 Closed

September 1, 2023, Summaries

Grapevine Springs 2 (3914) 30-minute rainfall peak rate was a 50-year return interval, but over six hours it was over a 100-year return interval.

Report: Rain Summary 22 (Spring Mountains) Edit

Data analysis: Period Rainfall

Ending time: 09/01/2023 20:15:00 Interval: 30minutes Now

Date and Time	Interval	3854	3844	3864	3834	3914	3929	3954	3949
Units		in	in	in	in	in	in	in	in
09/01/2023 14:45:00	30 minutes	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
09/01/2023 15:15:00	30 minutes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09/01/2023 15:45:00	30 minutes	0.16	0.08	0.12	0.08	0.00	0.00	0.00	0.00
09/01/2023 16:15:00	30 minutes	0.08	0.04	0.00	0.16	0.04	0.00	0.00	0.00
09/01/2023 16:45:00	30 minutes	0.08	0.04	0.04	0.24	0.00	0.00	0.00	0.00
09/01/2023 17:15:00	30 minutes	1.10	0.91	0.63	0.24	0.24	0.00	0.00	0.00
09/01/2023 17:45:00	30 minutes	0.08	0.16	0.20	0.12	1.58	0.63	0.04	0.04
09/01/2023 18:15:00	30 minutes	0.04	0.24	0.16	0.24	0.39	0.79	0.63	1.10
09/01/2023 18:45:00	30 minutes	0.31	0.28	0.28	0.08	0.51	0.47	0.79	0.12
09/01/2023 19:15:00	30 minutes	0.04	0.20	0.16	0.16	0.35	0.28	0.55	0.12
09/01/2023 19:45:00	30 minutes	0.12	0.16	0.08	0.16	0.08	0.12	0.24	0.00
09/01/2023 20:15:00	30 minutes	0.08	0.12	0.08	0.16	0.08	0.16	0.16	0.00
		2.09	2.20	1.73	1.61	3.31	2.44	2.40	1.38

Report: Rain Summary 22 (Spring Mountains) Edit

Data analysis: Period Rainfall

Ending time: 09/01/2023 20:15:00 Interval: 6hours Now

Date and Time	Interval	3854	3844	3864	3834	3914	3929	3954	3949
Units		in	in	in	in	in	in	in	in
09/01/2023 20:15:00	6 hours	2.09	2.20	1.73	1.61	3.31	2.44	2.40	1.38

3854 Harris Springs 1 RAIN
3844 Harris Springs 2 RAIN
3864 Harris Springs 3 RAIN
3834 Rainbow Canyon RAIN
3914 Grapevine Springs 2 RAIN
3929 Grapevine Springs 1 RAIN
3954 Tule Springs NW RAIN
3949 Corn Creek NW RAIN

Red Rock Canyon's (4324) highest intensity rainfall was a 25-year return interval as was the peak six-hour period.

Report: Rain Summary 10 (Flamingo Wash 1) Edit
Data analysis: Period Rainfall
Ending time: 09/01/2023 19:00:00 Interval: 10 minutes Now

Date and Time	Interval	4304	4309	4314	4319	4324	4329	4334	4339	4344	4349	3844	3864	3834
Units		in	in	in	in	in	in	in	in	in	in	in	in	in
09/01/2023 18:10:00	10 minutes	0.12	0.28	0.00	0.24	0.12	0.12	0.04	0.16	0.08	0.12	0.12	0.04	0.04
09/01/2023 18:20:00	10 minutes	0.04	0.08	0.00	0.12	0.23	0.04	0.04	0.12	0.12	0.08	0.04	0.08	0.04
09/01/2023 18:30:00	10 minutes	0.00	0.16	0.00	0.04	0.12	0.24	0.00	0.08	0.00	0.19	0.08	0.16	0.08
09/01/2023 18:40:00	10 minutes	0.20	0.04	0.00	0.00	0.24	0.08	0.00	0.12	0.08	0.04	0.16	0.04	0.00
09/01/2023 18:50:00	10 minutes	0.24	0.00	0.00	0.00	0.82	0.12	0.00	0.00	0.51	0.04	0.08	0.04	0.08
09/01/2023 19:00:00	10 minutes	0.35	0.00	0.00	0.35	0.16	0.63	0.04	0.16	0.63	0.00	0.12	0.08	0.04
		0.94	0.55	0.00	0.75	1.69	1.22	0.12	0.63	1.42	0.47	0.59	0.43	0.28

Date and Time	Interval	4304	4309	4314	4319	4324	4329	4334	4339	4344	4349	3844	3864	3834
Units		in	in	in	in	in	in	in	in	in	in	in	in	in
09/01/2023 21:00:00	6 hours	1.69	1.73	0.00	1.26	2.32	1.77	0.67	1.42	2.09	1.57	2.20	1.73	1.65

4304 Blue Diamond Ridge South RAIN
4309 Desert Inn DB RAIN
4314 Blue Diamond Ridge North RAIN
4319 Beltway Channel at Town Center RAIN
4324 Red Rock Canyon RAIN
4329 Brownstone Canyon RAIN
4334 Upper Flamingo 1 RAIN
4339 Beltway Channel at Peace Way RAIN
4344 Red Rock DB RAIN
4349 Upper Flamingo DB RAIN
3844 Harris Springs 2 RAIN
3864 Harris Springs 3 RAIN
3834 Rainbow Canyon RAIN

Each highlighted interval represents a 25-year return interval.

Report: Rain Summary 14 (Las Vegas Valley)
Data analysis: Period Rainfall
Ending time: 09/01/2023 20:00:00 Interval: 5 minutes Now

Date and Time	Interval	4504	4509	4514	4519	3007200	3047800	3043200	4269	4259	4254
Units		in	in	in	in	in	in	in	in	in	in
09/01/2023 18:05:00	5 minutes	0.00	0.00	0.00	0.00	0.00	0.12	0.12	0.00	0.00	0.00
09/01/2023 18:10:00	5 minutes	0.00	0.00	0.00	0.00	0.00	0.08	0.04	0.00	0.04	0.00
09/01/2023 18:15:00	5 minutes	0.00	0.00	0.04	0.00	0.00	0.04	0.04	0.00	0.00	0.04
09/01/2023 18:20:00	5 minutes	0.00	0.00	0.04	0.00	0.00	0.04	0.04	0.04	0.12	0.04
09/01/2023 18:25:00	5 minutes	0.24	0.00	0.04	0.04	0.00	0.12	0.12	0.27	0.00	0.24
09/01/2023 18:30:00	5 minutes	0.12	0.24	0.08	0.16	0.00	0.00	0.04	0.16	0.24	0.12
09/01/2023 18:35:00	5 minutes	0.08	0.20	0.16	0.16	0.16	0.00	0.04	0.12	0.16	0.20
09/01/2023 18:40:00	5 minutes	0.00	0.16	0.12	0.24	0.04	0.04	0.00	0.00	0.04	0.00
09/01/2023 18:45:00	5 minutes	0.00	0.00	0.12	0.04	0.12	0.00	0.00	0.04	0.08	0.08
09/01/2023 18:50:00	5 minutes	0.00	0.08	0.04	0.04	0.08	0.12	0.08	0.00	0.00	0.08
09/01/2023 18:55:00	5 minutes	0.03	0.00	0.00	0.00	0.12	0.39	0.08	0.00	0.00	0.00
09/01/2023 19:00:00	5 minutes	0.04	0.04	0.08	0.04	0.00	0.31	0.47	0.04	0.00	0.04
09/01/2023 19:05:00	5 minutes	0.12	0.00	0.12	0.00	0.00	0.08	0.28	0.15	0.00	0.00
09/01/2023 19:10:00	5 minutes	0.24	0.08	0.20	0.00	0.00	0.12	0.08	0.20	0.24	0.20
09/01/2023 19:15:00	5 minutes	0.16	0.20	0.11	0.08	0.00	0.08	0.04	0.44	0.31	0.39
09/01/2023 19:20:00	5 minutes	0.04	0.23	0.16	0.24	0.00	0.04	0.08	0.12	0.24	0.28
09/01/2023 19:25:00	5 minutes	0.00	0.20	0.04	0.28	0.04	0.04	0.04	0.00	0.12	0.04
09/01/2023 19:30:00	5 minutes	0.03	0.00	0.04	0.08	0.24	0.04	0.04	0.00	0.00	0.00
09/01/2023 19:35:00	5 minutes	0.00	0.00	0.04	0.12	0.20	0.00	0.00	0.00	0.00	0.00
09/01/2023 19:40:00	5 minutes	0.00	0.04	0.00	0.00	0.08	0.08	0.04	0.04	0.00	0.00
09/01/2023 19:45:00	5 minutes	0.04	0.00	0.04	0.00	0.04	0.04	0.04	0.00	0.04	0.12
09/01/2023 19:50:00	5 minutes	0.00	0.00	0.00	0.04	0.00	0.04	0.04	0.00	0.00	0.04
09/01/2023 19:55:00	5 minutes	0.04	0.04	0.04	0.00	0.04	0.00	0.00	0.04	0.04	0.00
09/01/2023 20:00:00	5 minutes	0.00	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.00	0.00

Date and Time	Interval	4504	4509	4514	4519	3007200	3047800	3043200	4269	4259	4254
Units		in	in	in	in	in	in	in	in	in	in
09/01/2023 20:00:00	2 hours	1.18	1.50	1.54	1.57	1.14	1.85	1.77	1.66	1.65	1.89

4504 Beltway Channel at Cheyenne RAIN
4509 Fort Apache DB RAIN
4514 CAM-10 DB RAIN
4519 Rancho DB RAIN
3007200 Park Highlands West DB RAIN
3047800 Summerlin DB (DB 5) RAIN (4203)
3043200 Grand Park DB RAIN (4201)
4269 Lone Mountain DB RAIN
4259 Gowan South DB RAIN
4254 Lower Gowan North DB RAIN

Hualapai at Maule (4464) was a 10-year return interval in 6 hours.

Date and Time	Interval	4609	4619	4624	4629	4634	4639	4644	4649	4654	3041300	4464	4694
Units		in	in	in	in	in	in	in	in	in	in	in	in
09/01/2023 20:30:00	6 hours	0.67	0.04	0.04	0.12	0.00	1.18	0.43	0.35	0.16	0.43	1.81	0.55

4609 Cactus near Durango RAIN
4619 Lower Duck Creek DB RAIN
4624 Duck Creek at Paradise RAIN
4629 Duck Creek at JoRae RAIN
4634 Duck Creek at Eastern RAIN
4639 Upper Duck Creek DB RAIN
4644 NWS Offices RAIN
4649 Duck Creek Railroad DB RAIN
4654 Tortoise Center RAIN
3041300 Fire Station 97 RAIN (4701)
4464 Hualapai at Maule (F-3) DB RAIN
4694 Duck Creek at Broadbent RAIN

On September 2, 2023, I-15 was closed for seven hours after runoff from heavy rainfall near Jean, NV inundated the interstate, especially the southbound lanes.

Figure 41 - I-15 Flooded

September 2, 2023, Summary

Jean Southwest (4944) had a 25-year return interval in 30 minutes, but more impressive was the two-hour total of 3.31 inches exceeding the 100-year return interval.

Report: Rain Summary 19 (Goodsprings/Jean/Primm/SV) Edit

Data analysis: Period Rainfall

Ending time: 09/02/2023 17:15:00 Interval: 30 minutes Now

Date and Time	Interval	4944	4924	4914	4954	4964	4974	4984	4994	5004
Units		in	in	in	in	in	in	in	in	in
09/02/2023 15:45:00	30 minutes	0.31	0.12	0.04	0.00	0.00	0.00	0.00	0.00	0.00
09/02/2023 16:15:00	30 minutes	1.38	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00
09/02/2023 16:45:00	30 minutes	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00
09/02/2023 17:15:00	30 minutes	0.39	0.00	0.00	0.40	0.00	0.28	0.00	0.79	0.00

Report: Rain Summary 19 (Goodsprings/Jean/Primm/SV) Edit

Data analysis: Period Rainfall

Ending time: 09/02/2023 17:15:00 Interval: 2 hours Now

Date and Time	Interval	4944	4924	4914	4954	4964	4974	4984	4994	5004
Units		in	in	in	in	in	in	in	in	in
09/02/2023 17:15:00	2 hours	3.31	0.12	0.04	0.63	0.00	0.28	0.00	1.18	0.00

4944 Jean Southwest RAIN
4924 Goodsprings 1 RAIN
4914 Goodsprings 2 RAIN
4954 Jean Airport RAIN
4964 Jean SE RAIN
4974 Jean SE3 RAIN
4984 Jean SE2 RAIN
4994 Primm RAIN
5004 Sandy Valley RAIN