GLOBAL WEATHER AND CLIMATE CONSULTING, LLC

TODD MORRIS

CERTIFIED CONSULTING METEOROLOGIST (CCM)
Forecasting, Forensics, Planning, and Expert Witness
805.857.1328 **602.300.5984**

EXPERT WITNESS REPORT OF TODD MORRIS
CERTIFIED CONSULTING METEOROLOGIST (CCM)

Copper State Home Builders, LLC
V.
Moto Holdings, et al

Mesa Arizona
Rainfall Review
Aug 1, 2018 to Feb 28, 2019

June 26, 2021

Dates of Incident:	Aug 1, 2018, to Feb 28, 2019
Incident Location:	2915/2093 N. Norfolk Mesa, AZ 85215
Prepared for:	David Clukey, Partner JacksonWhite, P.C.

Compensation for my services in this matter are $275.00 per hour for report writing and records review, consultations, and other non-testimony services; $400.00 per hour for examination, deposition, arbitration and/or trial testimony; $125.00 per hour for travel.

My CV is attached hereto for the use of the reader and includes my publications over the past 10 years as well as the cases in which I have testified at trial or at deposition over the past 4 years.

Assignment

I was tasked with reviewing the rainfall records for the period from Aug 1, 2018, through and including Feb 28, 2019, at the incident location. This report summarizes that review and also places the rainfall events in a climate perspective.

Forensic weather investigations are similar to performing a storm survey or damage assessment, something I did on a regular basis as a meteorologist with the National Weather Service during my 34.5 years of service. This process follows a strict methodology of collecting information, evaluating the merit of that information, comparing that information to normal, analyzing the pertinent data, and finally drawing a conclusion.

Methodology

I began by collecting and evaluating pertinent weather records for the dates given and surrounding the subject location. These records included:

- National Weather Service (NWS) certifiable surface weather observations for all known observations within a 10-mile radius for Aug 1, 2018 – Feb 28, 2019. This includes the official reporting station for the Mesa, Arizona area – Falcon Field (KFFZ)
- NWS certifiable cooperative weather data for Aug 2018 – Feb 2019
- NWS certifiable Storm Data (including local storm reports) for Aug 2018 – Feb 2019
- NWS certifiable Climatological Data (CD) publications for Aug 2018 – Feb 2019 plus the Annual CDs for 2018 and 2019
- NWS certifiable Daily Weather Maps (surface and aloft) for all significant rain events between Aug 1, 2018, and Feb 28, 2019
- NWS certifiable Advanced Hydrologic Prediction Service (AHPS) observed precipitation for all significant rain events between Aug 1, 2018, and Feb 28, 2019
- Maricopa County Regional Flood Control District certifiable hourly/sub-hourly ALERT rainfall data for nearby stations for all significant rain events between Aug 1, 2018, and Feb 28, 2019
- Citizen Weather Observer Program (CWOP) surface weather observations for all known observations within a 10-mile radius for all significant rain events between Aug 1, 2018, and Feb 28, 2019
- Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) surface weather observations for all known observations within a 10-mile radius for all significant rain events between Aug 1, 2018, and Feb 28, 2019
- U.S. Drought Monitor data for Jan 2018 – Feb 2019

I also examined related video from network media as well as postings on social media such as Facebook and Twitter.

Background/Climatology

The incident location, located in Mesa, Arizona enjoys an arid desert climate much of the year. There are two separate rainfall seasons. The first occurs during the winter months from November through March when the region is subjected to transitory large scale weather systems, often originating from the Pacific Ocean. Nearly 64% of the annual rainfall in Mesa, Arizona occurs during this period.

The second rainfall season occurs during mainly July-September when Arizona is subjected to widespread thunderstorm activity whose moisture supply originates in the Gulf of Mexico, in the Pacific Ocean off the west coast of Mexico and in the Gulf of California[1]. More commonly called Monsoon Season, August and September are climatologically in the heart of the annual monsoon[2][3] season in central Arizona. Almost 31% of the annual rainfall received in Mesa, Arizona occurs during this period[4].

On occasion, dissipating tropical weather systems from the eastern Pacific will bring substantial rainfall to the region, especially in October.

Figure 1 below provides the long-term climate monthly normal rainfall for Mesa Arizona and depicts the two distinct rainfall seasons.

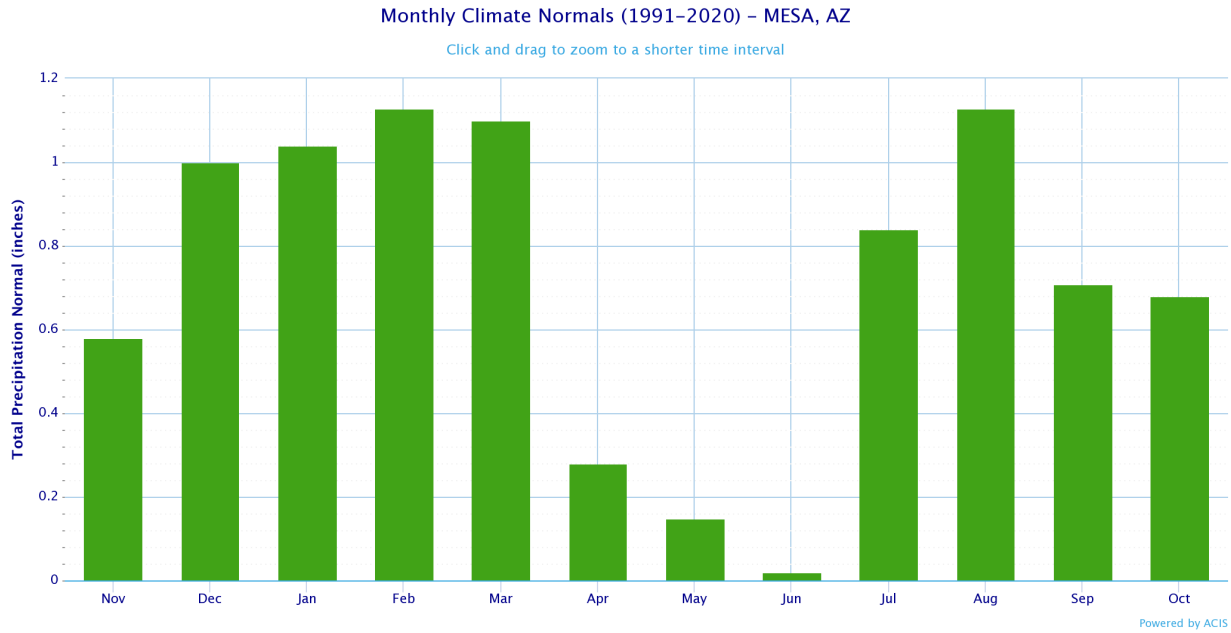


Figure 1 – Monthly Climate Normal Rainfall for Mesa, Az

[1] https://azclimate.asu.edu/climate/climate-of-phoenix-summary/
[2] https://www.wrh.noaa.gov/twc/monsoon/monsoon_whatis.php
[3] https://www.wrh.noaa.gov/twc/monsoon/monsoon_NA.php
[4] https://xmacis.rcc-acis.org/

For climate purposes, the long-term climate station in Mesa (MESA3) was used given this station has the longest record of any active rain gauge in a 10-mile radius with a complete record dating from 1896 to 2017. The station itself is 6.0 miles southwest of the incident location with less than a 150-foot elevation difference.

For actual month to month rainfall analysis, several other rain gauges within a 5-mile radius were used. See both Table 1 and Figure 2 for reference. The Falcon Field rain gauge, owned and operated by the Salt River Project (SRP), proved most useful given this station provides data at 5-min intervals and is located a mere tenth of a mile (528 feet) north of the incident location.

Metadata								
ID	Name	Type	Lat	Lon	Elev	Dist	Obs Time	Min Freq
	Incident Location		33.4687	-111.7405	1372	0		
SRP36	Falcon Field	SRP	33.4700	-111.7400	1366	0.1N	NA	5 Min
KFFZ	Falcon Field	ASOS	33.4667	-111.7333	1391	0.4E	NA	5 Min
AZ068	Falcon Field	ALERT	33.4546	-111.7293	1373	1.2SE	NA	15 Min
AZ066	Salt River @ Val Vista Dr	ALERT	33.4842	-111.7618	1270	1.7NW	NA	15 Min
AZ339	Hermosa Vista Park	ALERT	33.4557	-111.7704	1310	2.0SW	NA	15 Min
EW4431	Mesa	CWOP	33.4473	-111.8080	1260	4.2W	NA	15 Min
EMSA3	East Mesa - 022782	COOP	33.4191	-111.6444	1518	6.5SE	1700	Daily
MESA3	Mesa - 025467 (CLOSED)	COOP	33.4114	-111.8183	1235	6.0SW	800	Daily
NOTES								
CWOP = Citizen Weather Observer Program								
ASOS = Automated Surface Observing Program (NWS)								
ALERT = Automated Local Evaluation in RealTime (MCFCD)								
SRP = Salt River Project								
COOP = Cooperative Observer Network								

Table 1 – Metadata for Rain Gauges Used in Analysis

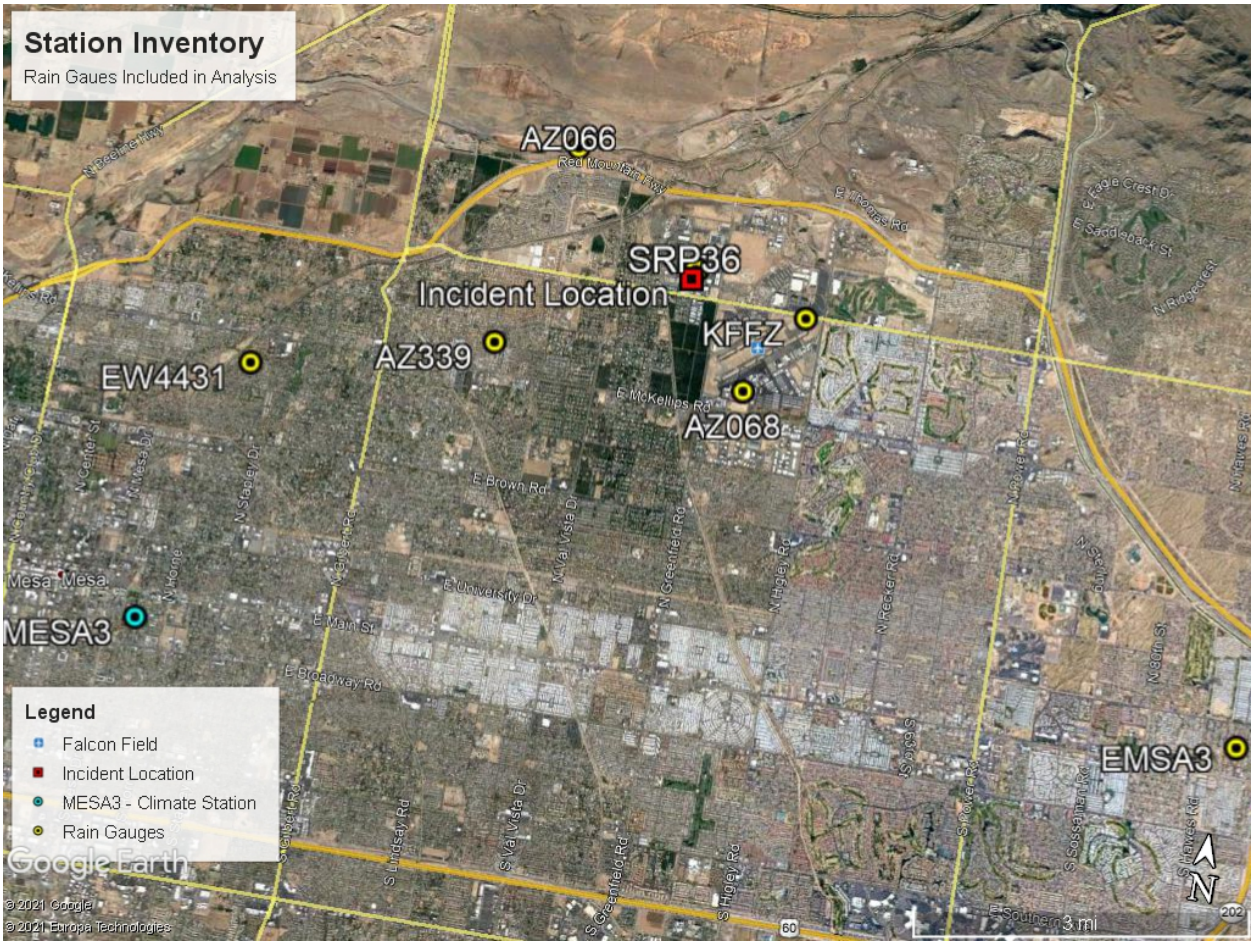


Figure 2 – Mapped Rain Gauges Used in Analysis

Analysis

Weather in the southwest is highly influenced by the position and strength of a dome of warm high-pressure in the upper levels of the atmosphere during the monsoon months. Small movements or relocations of this high-pressure center can mean the difference between a day ripe for thunderstorms and a day of hot dry sunshine. In addition, the amount and distribution of low-level moisture across the desert southwest is the other factor important for general thunderstorm development. In the non-monsoon months, rain versus no rain is highly predicated on the existence and strength of passing weather systems.

Prior to Aug 2018, much of Arizona including the Mesa area had seen well below normal rainfall in almost all other months in 2018. In fact, there was no rain recorded in the Mesa area during Mar-May 2018. Up to Jul 31, 2018, the 2018 rainfall was about 25% of normal.

The U.S. Drought Monitor[5] for Jul 31, 2018, placed nearly all of Maricopa County in Extreme Drought as a result of the long-term lack of precipitation. See Figure 3 below.

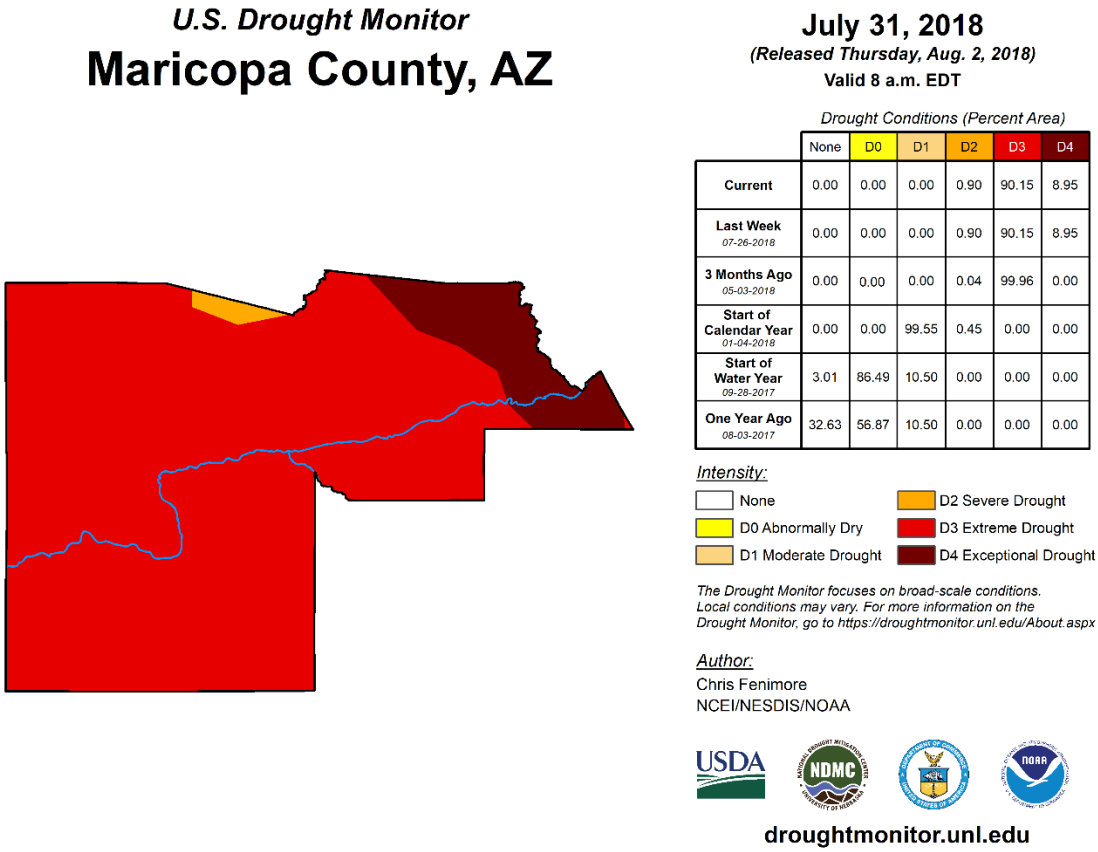


Figure 3 – U.S. Drought Monitor Analysis for Jul 31, 2018

After Jul 31, 2018, the drought and rainfall situation began to change. The remainder of my analysis will focus on the period from Aug 1, 2018, through Feb 28, 2019.

If we use the closest identified rain gauge (SRP – Falcon Field) and compare the recorded monthly rainfall to normal, we can see from a monthly perspective how wet or dry the period from Aug 1, 2018, to Feb 28, 2019, was.

[5] https://droughtmonitor.unl.edu/CurrentMap.aspx

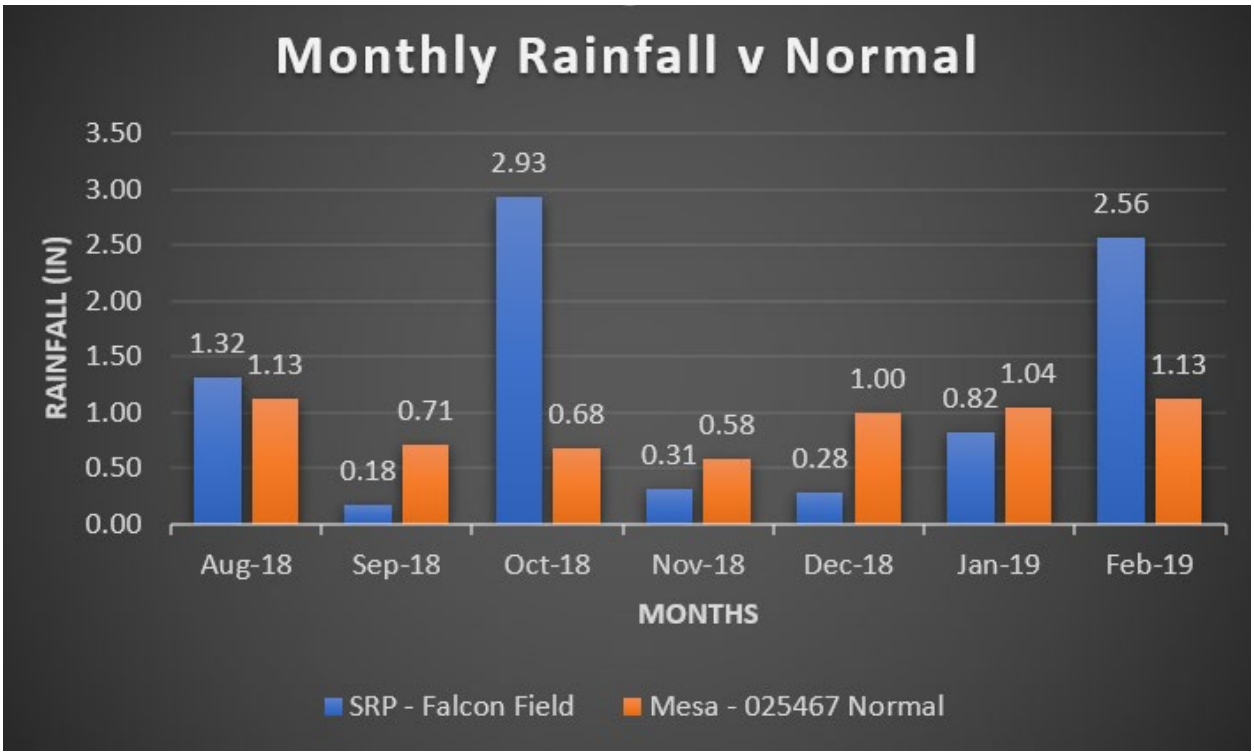


Figure 4 – Monthly Rainfall versus Normal – SRP-Falcon Field

Figure 4 clearly shows rainfall occurring in every month during the period from Aug 2018 through Feb 2019. It also clearly shows that two months (Oct 2018 and Feb 2019) received well above normal rainfall. In the case of Oct 2018, recorded rainfall was more than 4 times the normal amount.

Table 2 provides the monthly rainfall from Aug 2018 through Feb 2019 for all the rain gauges used in this analysis. It clearly shows that the rainfall recorded at the SRP-Falcon Field station was not unique to just that station. Widespread above normal rainfall was observed/recorded in Oct 2018 and Feb 2019.

Mesa AZ Incident								
Monthly Rainfall								
Station Name	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Aug-Feb
SRP - Falcon Field	1.32	0.18	2.93	0.31	0.28	0.82	2.56	8.40
NWS - Falcon Field	MSG	MSG	3.18	0.29	0.35	0.82	3.02	7.66
MCFCD - Falcon Field	2.36	0.20	3.11	0.28	0.35	0.83	2.95	10.08
Salt River @ Val Vista Dr	1.61	0.12	2.52	0.28	0.24	0.87	2.99	8.63
Hermosa Vista Park	1.18	0.20	3.39	0.31	0.28	0.87	2.80	9.03
Mesa	0.89	0.26	2.48	0.38	0.17	0.89	1.75	6.82
East Mesa - 022782	3.23	0.21	2.42	0.30	0.30	1.02	3.39	10.87
Mesa - 025467 Normal	1.13	0.71	0.68	0.58	1.00	1.04	1.13	6.27

Table 2 – Monthly Rainfall for Rain Gauges Used in Analysis

Values in green in Table 2 depict a monthly rainfall total at or above 0.50 inches while a value in blue depict a monthly rainfall total at or above 1.00 inches.

It is worth noting that observed monthly rainfall totals in Aug 2018 also were above normal, but amounts were much more variable. This was due to the highly variable nature of monsoon thunderstorms that occurred from Aug 8-12, 2018, and Aug 23, 2018.

The events of both Oct 2018 and Feb 2019 are worth taking a closer examination due to their extreme nature.

October 2018
There were 3 distinct weather events to impact the incident location during Oct 2018.

The first weather event occurred Oct 1-2, 2018, as the remains of Hurricane Rosa (a category 4 hurricane at its peak) moved over the region. Widespread showers and thunderstorms moved from southwest to northeast from south of the border to northern Arizona. Figure 5 provides a general large-scale view of the observed rainfall and Figure 6 provides some detail as to actual rainfall amounts across central Arizona[6]. The red dot in Figure 6 approximates the incident location. Rainfall for the 2-day period at the incident location was approximately 0.87 inches. This amount exceeded the normal monthly rainfall for October by almost two tenths of an inch.

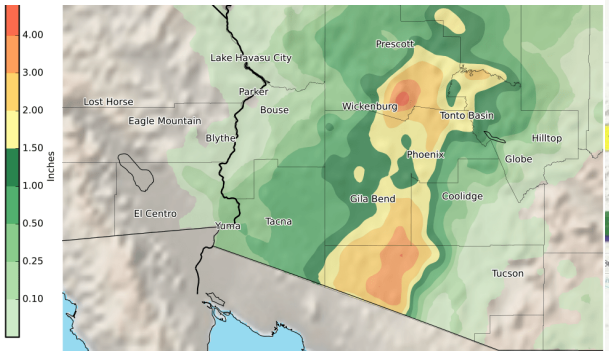


Fig. 5 – Rainfall Isohyets – Oct 1-2, 2018

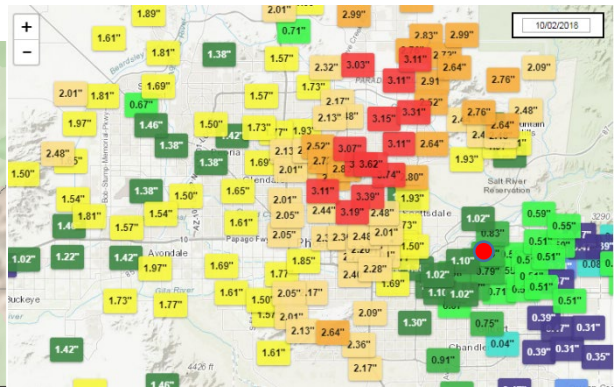


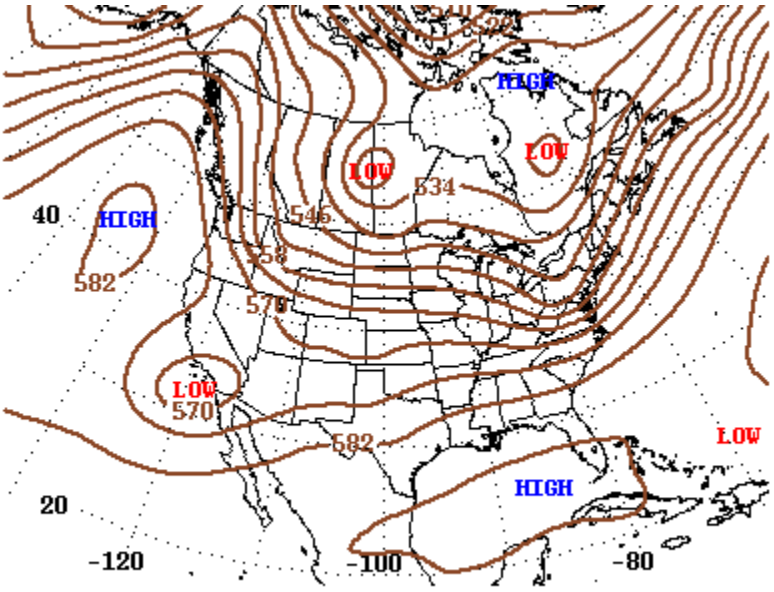
Fig. 6 – Rainfall Totals – Oct 1-2, 2018

The second weather event occurred Oct 7, 2018, as an unseasonable upper-level low pressure trough intensified as it dropped down the west coast and moved over Arizona. Rainfall for this day at the incident location was approximately 0.28 inches.

The third and most significant weather event of the month occurred Oct 13, 2018, as a strong and dynamic upper-level low pressure system developed just off the southern California coast and moved inland across the desert southwest. See Figure 7. A critical factor with this weather system is that it entrained tropical moisture from what was Tropical Storm Sergio. The combination of a strong dynamic weather system with

[6] https://www.weather.gov/psr/FormerHurricaneRosa

abundant tropical moisture in a warm October sun is a perfect recipe for copious amounts of rain and thunderstorms.



500-Millibar Height Contour at 7:00 A.M. E.S.T.

Figure 7 – Upper-Level Weather Map – Oct 13, 2018

Observed rainfall on this date across central Arizona was impressive with some daily rainfall amounts of over 3.00 inches. See Figure 8.

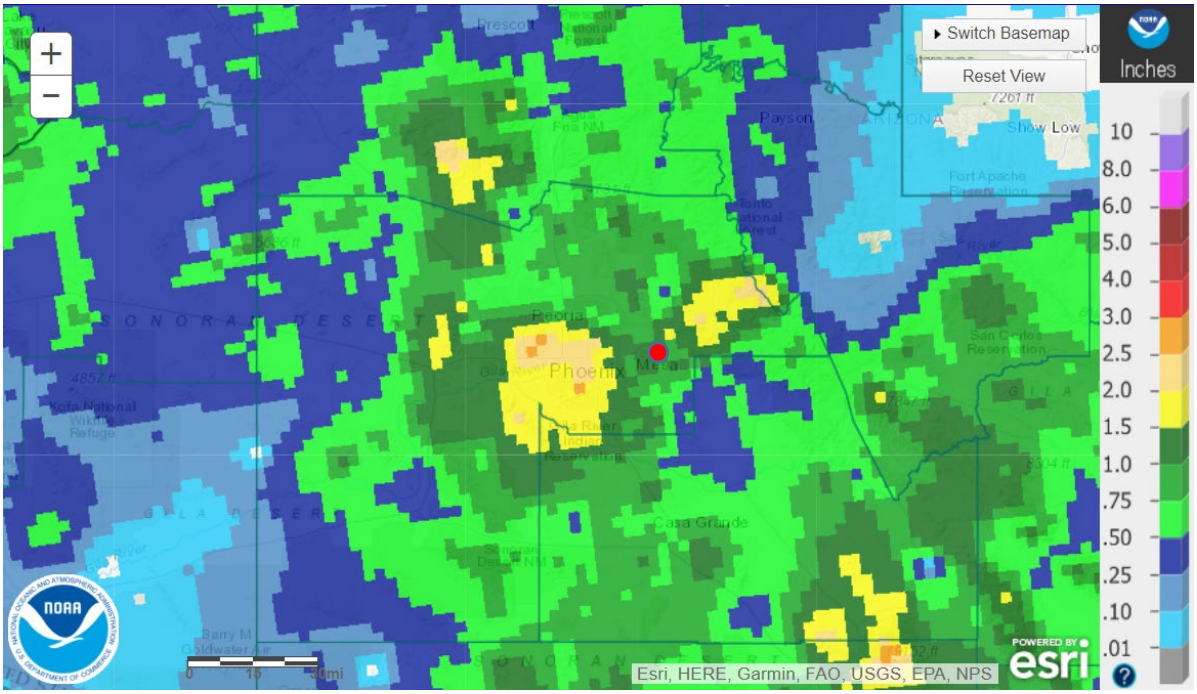


Figure 8 – Rainfall Isohyets – Oct 13, 2018

The red dot in Figure 8 approximates the incident location. Rainfall for this day at the incident location was approximately 1.78 inches. Daily observed rainfall totals for Oct 13, 2018, for surrounding weather stations can be found in Table 3.

Mesa AZ Incident	
Station Name	10/13/2018
SRP - Falcon Field	**1.78**
NWS - Falcon Field	**1.86**
MCFCD - Falcon Field	**1.69**
Salt River @ Val Vista Dr	**1.22**
Hermosa Vista Park	**1.73**
Mesa	**1.12**
East Mesa - 022782	**1.12**
Mesa - 025467 Normal	0.02

Table 3 – Observed Daily Rainfall Totals – Oct 13, 2018

This amount of rain in one calendar day, far and away exceeds the normal monthly total of just 0.02 inches. Statistically speaking, this amount of rain in one calendar day has an average recurrence interval of 5 years[7].

February 2019

This was an active weather month for Arizona. There were 6 rainfall events to impact the incident location with the weather event of Feb 21, 2019, being the most impressive and producing the greatest amount of observed rainfall. In fact, this weather event turned out to be the strongest winter weather system to impact Arizona in 2019[8].

On Feb 21, 2019, a very strong, cold, and dynamic low-pressure system would drop into Arizona from the North. See Figure 9. This winter weather system would bring widespread rain to lower elevations and copious amounts of snow to the higher elevation mountains of Arizona. Rainfall was measured in inches and snowfall was measured in feet.

[7] https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=az

[8] https://mesonet.agron.iastate.edu/wx/afos/p.php?pil=AFDPSR&e=201902210956

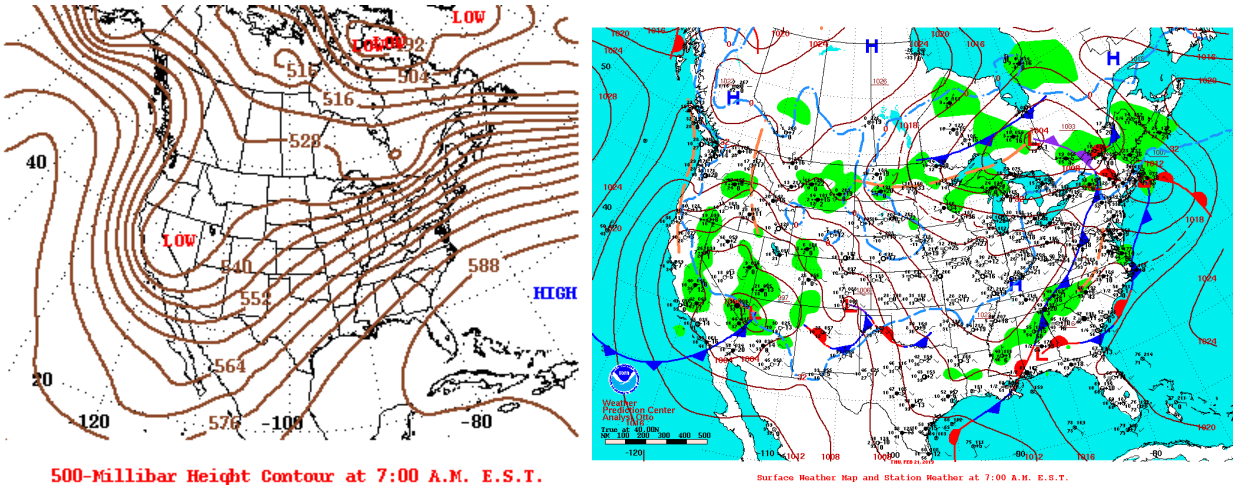


Figure 9 – Upper Air Chart (L) & Surface Weather Map (R) for 0500 on Feb 21, 2019

Observed rainfall on this date across central Arizona was impressive with daily rainfall amounts of over 3.00 inches in some locations. See Figure 10.

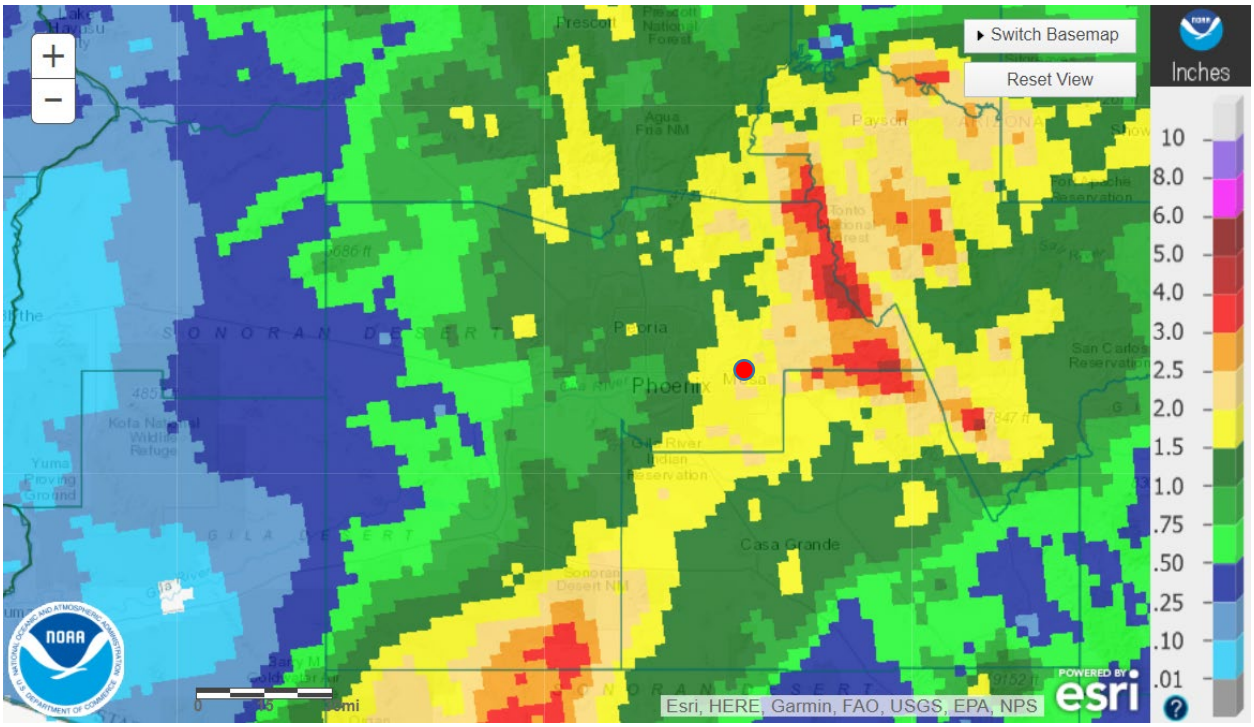


Figure 10 – Rainfall Isohyets – Feb 21, 2019

The red dot in Figure 10 approximates the incident location. Rainfall for this day at the incident location was approximately 1.60 inches. Daily observed rainfall totals for Feb 21, 2019, for surrounding weather stations can be found in Table 4.

Mesa AZ Incident	
Station Name	2/21/2019
SRP - Falcon Field	1.60
NWS - Falcon Field	1.60
MCFCD - Falcon Field	1.65
Salt River @ Val Vista Dr	1.50
Hermosa Vista Park	1.46
Mesa	0.80
East Mesa - 022782	1.64
Mesa - 025467 Normal	0.04

Table 4 – Observed Daily Rainfall Totals – Feb 21, 2019

This amount of rain in one calendar day, far and away exceeds the normal monthly total of just 0.04 inches. Statistically speaking, this amount of rain in one calendar day has an average recurrence interval of 2-4 years[9].

Conclusions/Opinions

Based upon the provided data and after reviewing all the information, it is my professional opinion that:

1. Prior to Aug 1, 2018, the incident location observed well below normal rainfall for 6 out of the 7 preceding months with only 25% of normal rainfall for the first 7 months of 2018. The U.S. Drought Monitor's severe drought designation for the incident location at the end of Jul 2018 was indicative of this situation.
2. Beginning in Aug 2018, this situation began to change with at least a near normal monsoon rainfall month and rainfall in every month from Aug 2018 through Feb 2019.
3. Two of those months (Oct 2018 and Feb 2019) received well above normal rainfall. In the case of Oct 2018, recorded rainfall was more than 4 times the normal amount with 3 distinct weather events to impact the incident location during the month.
4. Oct 13, 2018 was by far the wettest day of not only the month but also the year with approximately 1.78 inches of rain at the incident location. A daily amount that statistically speaking, has an average recurrence interval of 5 years.

[9] https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=az

5. The month of Feb 2019 was highly active with 6 distinct rainfall events to impact the incident location. In fact, the rainfall event of Feb 21, 2019, turned out to be the strongest winter weather system to impact Arizona in 2019 with an average recurrence interval of 2-4 years.

Certification

I certify that the above information contained in this report is true and accurate to the best of my ability and that all analysis and findings expressed in this report were made with accuracy as a professional meteorologist within a reasonable degree of meteorological certainty.

Todd Morris

Todd Morris, CCM
Global Weather and Climate Consulting, LLC

EXPERT QUALIFICATIONS

Professional Experience

President at Global Weather and Climate Consulting LLC

November 2013 – Present (7.5 years)

AMS Certified Consulting Meteorologist (CCM) providing expert witness testimony at trial and depositions as a subject matter expert (SME) on weather, water, marine & climate matters. Including data acquisition, analyses, and reports. Meteorological support to TV/film/commercial productions as well as insurance claims. Also, meteorological considerations for homeland security, counterterrorism, and emergency response.

- Recent clients include:
  - Chevron Corporation
  - Los Angeles Department of Water and Power
  - California Department of Forestry and Fire Protection
  - California Department of Transportation
  - Long Beach Container Terminal
  - City of Santa Barbara
  - City of Los Angeles
  - Gila Valley Irrigation District
  - Signature Aviation
  - Worley Parsons Engineering
  - Toyota Motor Company
  - Chevrolet Automobile Corporation
  - Laguna Art Museum
  - Saatchi & Saatchi Advertising Company
  - Believe Media Company
  - Bridgestone Corporation
  - Southern California Edison
  - Nevada Department of Justice
  - Pacific Gas & Electric

- Recent cases include:
  - Vasquez v. Los Angeles Unified School District – Plaintiff **(Deposition Given)**
  - City of Los Angeles v. Tetra Design Inc. – Plaintiff **(Deposition Given)**
  - Streightiff v. Hilton – Defendant
  - Nuno, Alyssa v. City of Santa Barbara – Defendant
  - Anderson v. State of Arizona & United States of America – Plaintiff
  - AIG v. Signature Aviation – Defendant **(Deposition Given)**

- Dept. of Forestry & Fire Protection v. California Resources Corporation, et al - Plaintiff
- CalFire v. Southern California Edison Company – Plaintiff
- Bisogno, Robin, et al v. CA Dept. of Transportation – Defendant
- Sliskovich v. Mid-Century Insurance Company – Defendant
- Noble Textile, Inc. v. United Specialty Insurance Company – Defendant
- Lou v. Little Lake City School District – Defendant **(Deposition Given)**
- Valerie Meyers v. National Weather Service (NWS) – Defendant **(Deposition x 2)**
- Citizens Against Radiation Exposure (CARE) v. National Weather Service
- 82 additional cases as an associate to Air, Weather and Sea Conditions, Inc.

Regional Coordinator for Impact-Based Decision Support Services at National Weather Service Western Region Headquarters (Retired) – Salt Lake City, UT

January 2011 – January 2016 (5 years)

Brought the weather decision needs of federal, state, local and tribal partners/stakeholders together with the services and capabilities of the NWS forecast offices in the western U.S. Supported NWS efforts in the west to create an Operational Decision Support Division and an enhanced Regional Operations Center function including the selection of staff, creating/modifying policy/procedures, and providing recommendations/ input to senior staff. Supported efforts to meet NWS Strategic Plan goals of a Weather Ready Nation.

Acting Meteorologist in Charge at National Weather Service - Phoenix, AZ

March 2015 - June 2015 (4 months)

Managed all weather forecast/support activities for central Arizona and southeast California including WFO PSR. This included managing office operations and systems, managing observational networks, providing leadership and oversight to all staff and programs within area of responsibility and within the confines of the mission of the NWS. This included managing and directing day-to-day operations of the WFO including the issuance of forecasts, outlooks, watches, warnings, the oversight of the public service unit, cooperative observer program and NOAA Weather Radio Program.

Acting Deputy Regional Director at National Weather Service - Western Region Headquarters – Salt Lake City, UT

August 2012 - October 2012 (3 months)

Assisted in providing leadership, direction, management and supervision of NWS Western Region. Developed short and long-range plans, including new approaches to problems, and required resources given existing capabilities.

Physical Scientist at National Weather Service - Los Angeles/Oxnard, CA

2003 - 2011 (8 years)

Program management of several critical operational office programs within WFO Los Angeles/Oxnard.

Subject-Matter-Expert (SME) for Los Angeles Terrorism Early Warning Group (TEW) – Los Angeles, CA
2005-2009 (4 years)
Provided weather support/briefings to the TEW (run by Los Angeles County) for exercises and emerging threats. This included analysis of meteorological conditions and their impact on planning, preparedness, and emergency response.

Meteorologist in Charge (MIC) at National Weather Service - Los Angeles/Oxnard, CA
1994 - *2003 (9 years)*
Managed all weather forecast/support activities for southern California including WFO LOX and 1 CWSU. This included managing office operations and systems, managing observational networks, providing leadership and oversight to all staff and programs within area of responsibility and within the confines of the mission of the NWS. This included managing and directing day-to-day operations of the WFO including the issuance of forecasts, outlooks, watches, warnings, the oversight of the public service unit, cooperative observer program and NOAA Weather Radio Program.

Deputy Meteorologist in Charge (DMIC) at National Weather Service - Los Angeles, CA
1992 - 1994 (2 years)
Managed and directed day-to-day operations of the WSFO including the issuance of forecasts, outlooks, watches, warnings, the oversight of the public service unit and NOAA Weather Radio Program.

Meteorologist in Charge (MIC) at National Weather Service - Santa Maria, CA
1990 - 1992 (2 years)
Supervised all weather services/support at a small WSO whose primary responsibilities were agricultural forecasting, pilot briefings and surface observations.

Evaluations Officer at National Weather Service - Milwaukee, WI
1988 - 1990 (2 years)
Performed service evaluations of all FSS's and WSO's within the state of Wisconsin as well as forecast responsibilities on all forecast desks including public, marine, aviation and severe weather.

General Forecaster at National Weather Service - Milwaukee, WI
1985 - 1988 (3 years)

Meteorologist Intern at National Weather Service - Reno, NV
1981 - 1985 (4 years)

Certifications

Certified Consulting Meteorologist
American Meteorological Society License #702 February 2014

NWS Weather Observer
Department of Commerce National Weather Service June 1981

Private Pilot
Department of Transportation Federal Aviation Administration January 1978

Professional Affiliations

American Meteorological Society (AMS), Certified Consulting Meteorologist (CCM)
National Council of Industrial Meteorologists (NCIM), Full Member
American Meteorological Society (AMS), Full Member
National Weather Association (NWA), Full Member
Los Angeles Terrorism Early Warning Group (TEW)
National Weather Service (NWS) Weather Spotter
Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) Member
International Association of Emergency Managers (IAEM), annual Conference Member

---

Honors and Awards

Bronze Medal Group Award
Department of Commerce
January 2015
For the provision of an integrated set of innovative decision support services during the on-going California Drought Emergency.

Bronze Medal Group Award
Department of Commerce
December 2008
For outstanding forecasting and briefing efforts over an extended period to the DHS/FEMA (JFO), established in response to the October 2007 southern CA fire siege.

Gold Medal Group Award
Department of Commerce
January 2005
For the service provided during the southern CA rain/floods of Jan. 2005.

Silver Medal Group Award
Department of Commerce
November 2004
For weather support given to firefighting personnel during the wildfires of Oct./Nov. 2003.

Bronze Medal Group Award
Department of Commerce
December 1998
For public service performed resulting in lives/property saved during the El Nino events of 1997/98.

Isaac Cline Award
National Weather Service - Los Angeles
August 2008
For providing exceptional and dedicated support of operations over an extended period to the DHS/FEMA Joint Field Office, established in response to the October 2007 southern CA fire siege.

Certificate of Appreciation
Tri-Advisory Conference - National Ski Patrol, Far West Division
November 2006
In providing education in the name of service and safety.

30 Year Length of Service Award
Department of Commerce
February 2012
In recognition of 30 years of government service.

Projects

Climate Information for Disaster Management - Bridging the Weather and Climate Timescales
February 2015 to January 2016
Members: Todd Morris, Andrea Bair, Alison Meadows, Zack Guido, Mike Crimmins, Robert Scripp, Jonathan McLeod

Co-author The Federal Emergency Management Agency (FEMA) Region IX (CA, AZ, NV, and Pacific Islands) has based disaster management preparations on weather information for decades. Climate information, which conditions weather risk, however, has been underutilized. The Climate Assessment of the Southwest (CLIMAS), the National Weather Service (NWS) Western Region, and the Response Division of FEMA Region IX have co-designed a hydroclimate dashboard tool that is integrated into FEMA disaster management, stewarded by the NWS, and studied by CLIMAS. The hydroclimate dashboard includes a short narrative and supporting graphics and information that cover historical climate risk, current conditions, and climate outlooks. The dashboard provides an opportunity to leverage climate information to help FEMA Region IX better monitor, anticipate, and prepare for potential disaster.

Weather (and Decision Support) for Emergency Managers

October 2012 to January 2013

Members: Todd Morris, Jay Rosenthal

Co-author Basic meteorological concepts and understanding play a big role in the response to this nation's natural and man-made disasters, as well as planned responses to terrorist threats against urban and rural areas. Issues such as land-sea breeze circulations, mountain and valley winds, coastal cloud cover, vertical and horizontal wind shear, normal diurnal fluctuations, and the impact of certain predictable and terrain enhanced windstorms all play crucial roles in determining who is at risk, and what strategies are most effective in minimizing harm to people and structures. The ability of the National Weather Service, with its Incident Meteorologists and decision support services, together with rapidly advancing technology in assimilating data over small time and spatial scales, provides the emergency manager or incident commander with a host of essential real-time support capabilities. This paper attempts to identify and highlight the value of this real-time support capability.

Weather Support to FEMA/DHS Joint Field Office Established in Response to the Devastating Southern California Wildfires of October 2007

October 2007 to July 2008

Members: Todd Morris, Eric Boldt

Author An Incident Support Specialist Overview - On October 24, 2007, President George W. Bush, signed a Major Disaster Declaration for the State of California for severe wildfires affecting Southern California. The Disaster Declaration put into motion federally funded and state coordinated response and recovery efforts, including establishing a FEMA/DHS Joint Field Office. Weather support for this function was provided by an Incident Support Specialist (ISS) from the National Weather Service in Los Angeles/Oxnard, CA. This paper is an overview of those local efforts, including the products and services provided, and an examination of the complexities involved. It also discusses the lessons learned and the successes realized.

History of Weather Observations Los Angeles, CA 1847-1948

January 2006 to January 2006

Members: Todd Morris, Glen Conner, Curt Kaplan

Contributor The turbulent times in California brought the United States Army to the Los Angeles area. An Assistant Surgeon accompanied the small force to provide medical care for the 121 soldiers in Kearny's Dragoons. On the morning of 5 June 1847, duty required Assistant Surgeon, Dr. John S. Griffin of that unit, to record the weather conditions at his post in El Pueblo de Los Angeles. On 20 June 1847, he began recording the "clearness of the sky" and in July he recorded rainfall when it occurred. So began the first official weather observations in Los Angeles. From our vantage point one hundred sixty-nine years later, we are astounded by the survival of that record. Equally astounding is the succession of improvements in meteorology that have occurred between that first observation and the forecasts now being generated by the modern National Weather Service Forecast Office for the Los Angeles area.

NOAA Technical Memorandum NWS WR-261 - Climate of Los Angeles

January 1999 to October 2001

Members: Todd Morris, David Bruno, Gary Ryan, Curt Kaplan

Contributor and Editor We hope and trust that readers will find The Climate of Los Angeles, California to be both useful and informative, not only as a data source, but as an important document that broadens the understanding of weather and climate systems that affect southern California.

National Weather Digest, Volume 14, Issue 4, Pages 14-18 - "The Possible Influence of an Existing Snow Field on the Track of a Surface Low Pressure-A Case Study"

January 1989 to November 1989

Members: Todd Morris

Author One of the challenges for meteorologists who deal with winter storms is accurately forecasting the position and track of the surface low-pressure center. This can help determine not only precipitation type but also where the greatest amount of precipitation will fall. A case study was examined which fit an "old and unwritten" rule of thumb. This theory is that the surface low-pressure center will track along the southern edge of an existing snow field. The case study fit perfectly, physical reasoning is included, and further investigations are encouraged.

Skills & Expertise

Meteorology	**Coordination**	**Preparedness**
Weather	**Coaching**	**Air Quality**
Climatology	**Training**	**GIS**
Weather Forecasting	**Policy**	**CAMEO**
Environmental Science	**Government**	**Weather Radar**
Decision Support	**Remote Sensing**	**Environmental Policy**
Incident Command Sys/NIMS	**Weather Observing**	**Storm Surveys/Damage Assess**
Program Management	**Hydrology**	**Hazard Mitigation**
Project Management	**Severe Weather**	**Technical Writing**
Budget Monitoring	**Emergency Management**	**Technical Support**
Research	**Disaster Response**	**Strategic Planning**

Education

FEMA – Washington, D.C.

Occupational Certificates, Incident Command System/NIMS (ICS 300, 400, 700, 800), 2008-2010

Emergency Management Institute - Emmetsburg, MD
Occupational Certificate, Emergency Management, 2008 - 2008

Texas A&M University
Occupational Certificate, Emergency Management, 2006 - 2006

NTL Institute - Alexandria, VA
Occupational Certificate, Human Interaction, 2003 - 2003

Army Management Staff College - Ft. Belvoir, VA
Occupational Certificate, Personnel Management, 2001 - 2001

SUNY Albany
Coursework completed, Radar Meteorology/Hydrology, 1984 - 1984

University of Wisconsin-Madison
Bachelor of Science (BS), Meteorology, 1978 – 1982
