



NATIONAL WEATHER SERVICE, LAS VEGAS NEVADA

The Desert Sun

SKYWARN Spotter Newsletter

Summer 2009

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This newsletter serves the following counties:

Nevada: Clark, Lincoln, Nye, Esmeralda

Arizona: Mohave

California: Inyo, San Bernardino

Contacts:

NWS Las Vegas Admin Line (702) 263-9744

Web Address:
www.wrh.noaa.gov/vef

Forecast Line:
(702) 736-3854

Where is the Monsoon?

Mike Staudenmaier, Meteorologist In Charge

As you are well aware our summer thunderstorm season so far has been much pretty hit and miss. With more thunderstorms in June than we normally get, to a dry and dusty July and early August, the monsoon is somewhat odd this year. What is going on?

The summer thunderstorm season across the Desert Southwest occurs during a period meteorologists call the "North American Monsoon." The term "monsoon" comes from an Arabic word meaning "season." It is typically associated with a change in the prevailing wind which persists for several months, bringing with it a change in the overall character and pattern of the weather. A classic example of this change occurs in India and Southeast Asia, where winter is dominated by a cool, dry "northeast" monsoon flow; while in summer the "southwest monsoon" leads to their rainy season.

Similarly in the southwest United States the winds aloft also shift between the winter and summer seasons; a westerly flow in the winter then from a more southeast direction during the summer. This shift is also accompanied by a wind reversal in the lower atmosphere over the Gulf of California; coming out of the north during the winter months and the south during the summer. These prevailing wind changes and the resulting altered character of the weather qualify the general circulation as a "monsoon" system.

Climatologically, the Las Vegas forecast area (southern Nevada, northwest Arizona, and southeast California) actually lies on the western edge of the monsoon moisture regime throughout the summer. This leads to periods of dry weather punctuated with periods of active thunderstorms. When moisture comes into the region primarily in the mid- and upper-levels (above 12,000 feet), the primary threat with thunderstorms is typically associated with damaging winds and fire starts from lightning. This is because the moisture is concentrated aloft. As storms mature and then collapse, precipitation falling through the dry air in the lower atmosphere evaporates (aka virga) and the cool heavier air aloft accelerates toward the earth, creating strong downburst winds at impact. When deeper moisture (muggy days) moves into the region, the hot air near the surface is humid and the heavy rainfall associated with slow moving thunderstorms increases the threat of flash flooding. No matter what, thunderstorms pose great dangers to the public in a variety of ways, such as flash floods, lightning, strong winds and decreased visibility. That is why the spotter program is so important to weather forecasters, by providing ground truth reports.

So what has happened this year to keep the monsoonal moisture primarily east and south of us so far? If you remember back in June, we had an unusual weather pattern develop with series of low pressure systems affecting the desert southwest, which resulted in an early start to our summer thunderstorms. However, because the moisture was primarily aloft, these thunderstorms mainly produced light amounts of rainfall, and strong gusty winds. When high pressure strengthened over the southwest U.S. by the end of June and into July, the center of the high was situated more to the east than normal (possibly a result of the incredible drought going on in Texas right now). This has kept us in a more persistent southwest flow rather than the usual south or southeast wind flow that typifies our "monsoon." So with the moisture out of our area, we're left with warm and dry conditions. We are hopeful that this pattern will evolve into a more classic monsoon pattern later this summer. However, there is a developing El Niño in the Pacific Ocean, which can lead to a drier than normal monsoon season (but a better chance for fall tropical storm remnants to move further northward and affect the southwest U.S.). We'll have to wait and see which one wins out. For up to the date information on the evolving El Niño, check out:

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.pdf

Outreach Update From the Desk of the WCM

By Faith Borden

Outreach activities continue at full strength at the Las Vegas National Weather Service Office. I am very excited to report we had two StormReady ceremonies. The City of North Las Vegas renewed their StormReady status on 11 May. Since this was a second renewal they had to complete the whole application process again. This is not an easy task as the requirements have become more stringent since they first became StormReady in 2003. On 21 July, San Bernardino County became StormReady. This is an incredible accomplishment as it is the largest county in the United States. San Bernardino County is the same square mileage size as 4 Eastern States put together; Rhode Island, Delaware, Connecticut, and New Jersey. In addition, it is covered by three National Weather Service Office; San Diego, Las Vegas, and Phoenix. So what is StormReady? StormReady <http://www.stormready.noaa.gov/> is safety program that helps arm America's communities with the communication and safety skills needed to save lives and property—before and during the event. StormReady helps community leaders and emergency managers strengthen local safety programs. StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. No community is storm proof, but StormReady can help communities save lives. Congratulations to North Las Vegas and San Bernardino County!



San Bernardino County July 21, 2009



North Las Vegas, May 11, 2009

It has also been a busy couple of months as it is Storm Spotter Training Season. Several staff members from the office have conducted six spotter talks and trained nearly 50 new spotters since May. Andy Gorelow and Katie LaBelle went to Tecopa, CA, on July 8th. This is very exciting because before the training we had no identified spotter in that area. Tecopa is a town in extreme Southern Inyo County; 90 miles west of Las Vegas, NV; 50 miles north of Baker, CA, and just east of Death Valley National Park. We now have a better way to gain ground truth for that area, and we can use that information to help warn upstream locations such as Death Valley National Park.

I really appreciate Don Maker, Andy and Katie's willingness to conduct spotter talks. Even with all of the great technology we possess, spotters are the eyes and ears that we need so we know what is really happening on the ground. I also want to thank the rest of the staff who were so willing to adjust their schedules so Andy and Katie could give the talks. Talking about spotter information, Edan Lindaman has created a really cool spotter guide that you can find on our website. http://www.wrh.noaa.gov/vef/Spotterguide_ONLINE_Version_files/frame.htm It is a great document that can be used as a refresher guide or as a quick reference. It is designed to be printed and carried around on 4X6 postcards. Check it out! It is best viewed using Internet Explorer.



Andy and I also went to Bishop, CA, in early June. We gave a weather and safety talk to over 100 people. Among other activities we demonstrated inflating a weather balloon before releasing it with a small shoebox filled well wishes attached. Many thanks to Toni Richards from the Paiute Tribe. Toni always does a great job creating interest for our talks, and the Paiute Tribe always treats us great!



Satellites...Our "Eye in the Sky"

Katie LaBelle, Meteorologist Intern

Satellites are a meteorologist's "eye in the sky" and provide a wealth of meteorological information for forecasts, climate and many other facets of weather. The first weather satellite under NOAA became operational in 1960 and has grown over the years in coverage and ability. Today, two types of NOAA satellites hover among the stars: Geostationary Operational Environmental Satellites (GOES), and Polar Orbiting Environmental Monitoring (POES). Each type serves specific purposes, and both are necessary for completing our global weather monitoring system.

With 4 in orbit (one in standby mode and the other 3 in operation) GOES provide continuous observations of the Western Hemisphere at an elevation of 22,240 miles above the earth's surface in a geosynchronous orbit, which means they remain in one position over Earth. Being able to continuously observe the same area makes it very easy to watch the development of atmospheric disturbances, such as hurricanes, thunderstorms and tornadoes. In addition, GOES is also used to estimate rainfall, cloud temperatures, snowfall accumulations, and other intensive data analysis.

Polar orbiting satellites, POES, also offer daily global observations. They circle around the Earth 14 times daily at 517 miles above the earth's surface collecting global data for a variety of land, ocean and atmospheric parameters. In addition to very high resolution images, POES also supports a broad range of environmental monitoring applications including weather analysis, climate research, global sea surface temperature measurements, ocean dynamics research, volcanic eruption monitoring, fire detection, and even search and rescue!



Satellites assist us by providing different types of photographic observations (visual, infra-red and water vapor), 24 hours a day, 7 days a week. Without them, many facets of environmental science would be lacking the vital data that is needed to better understand the world around us.



Did you know that...

In addition to satellites, meteorologists rely heavily on radar data to help forecast the threatening weather that affects our daily lives. Doppler radar is a very important piece of technology that can be used in a variety of different ways. The National Weather Service provides several different radar images from the network of Doppler Radars across the country.

...Stay tuned for the next Desert Sun for the full scoop!

Climate Capsule: Las Vegas Thunderstorms of the Past

Chris Stachelski, Meteorologist

Thunderstorms occur every summer in the Las Vegas Valley, and some storms manage to leave a lasting memory. This summer marks a milestone for three high impact thunderstorm events which left millions of dollars in damages, and proves that even in a city known as a "sunny and dry" place, hazardous weather can and does occur.

10 Years Ago: The Las Vegas Flash Flood of July 8, 1999

On July 8, 1999 the worst flash flood event in modern Las Vegas history took place. Monsoonal moisture triggered showers and thunderstorms that moved across the Las Vegas Valley in the late morning hours unleashing heavy rainfall that triggered flash flooding. Most of the Las Vegas Valley except the far northeast part saw over an inch of rain, with the highest storm total reported (3.23 inches) occurred near the intersection of Paradise and Windmill Roads in the southern part of the valley. Record flows occurred on parts of the Flamingo and Las Vegas Washes, as well as the Duck Creek Wash. Damage from this storm totaled around \$25 million dollars (1999 figures), making this by far the most costliest flood event ever in the Las Vegas Valley. Two people died in the storm, one was a motorist involved in a weather-related accident, and the other a transient who was caught in wash that filled with floodwaters. (Continued on next page)



Flood Damage Along Boulder Highway. Photo Courtesy CCRFCD

Road flooding was extensive throughout the valley, including portions of Las Vegas Boulevard. Floodwaters inundated a number of buildings including the Forum Shops at Caesars which saw up to 2 feet of water inside. On the east side of the valley, a mobile home park near the Flamingo Wash suffered erosion resulting in one home falling into the wash and four others destroyed by rushing water, and swift water rescues totaled over 200 across the valley. Although flood control measures have increased significantly since 1999, this flood event was extensive due to the magnitude of rain falling on such a large area.

15 Years Ago: The Hilton Sign Thunderstorm of July 18, 1994

Thunderstorms in Las Vegas often make news when they cause flash flooding, but in July 1994 a thunderstorm struck the Las Vegas Valley with destructive winds that totaled an estimated \$50 million in damages. This ranks as the most costly weather event ever in Las Vegas history. A surge of monsoonal moisture initiated thunderstorm development across northern Clark County which moved southward towards the Las Vegas Valley during the evening hours, leaving a trail of damage. Winds gusted to 78 mph at Nellis Air Force Base, setting an all-time record wind gust at that location, and 90 mph was recorded at Overton Beach. Across the Las Vegas Valley strong winds tore apart structures, uprooted trees, sparked several fires, and downed power lines which knocked out power to over 200,000 people, some for over 48 hours. A \$5 million sign belonging to the Las Vegas Hilton, billed as the world's tallest free standing sign, was toppled and shredded by the force of the winds. A number of minor injuries were also reported as people were hit by wind-tossed debris.

The Las Vegas Hilton Sign damaged by a thunderstorm. Photo Courtesy: The Las Vegas Review-Journal



20 Years Ago: The McCarran Airport Microburst of August 8, 1989

A moist, unstable environment resulted in creating thunderstorms across the Mojave Desert by mid-day on August 8, 1989. One of these storms moved north across the Las Vegas Valley during the late afternoon producing two strong wind events. These events were the result of a microburst outflow as the storm moved north first impacting the Henderson Executive Airport and then onto McCarran International Airport. When downbursts affect an area less than 2.5 miles, it is known as a microburst. The first wind event gusts occurred at what is now the Henderson Executive Airport (previously named Henderson Sky Harbor Airport) where a number of planes were damaged or destroyed. Fifteen



minutes later, a cloud of dust rolled into McCarran International Airport followed shortly after by heavy rain and powerful winds. A wind gust of 90 mph was recorded by the National Weather Service which ranks as the highest wind gust ever in official Las Vegas weather records. However, a gust of 99 mph was clocked by FAA wind equipment also at McCarran Airport. According to Charlie Schlott (ret.), one of the weather observers on duty in the McCarran control tower stated, "It didn't last very long, but it produced significant damage to mostly parked aircraft." In all, 82 planes were damaged or destroyed at both airports and several hangers were destroyed resulting in \$14 million in damages. While the two airports bore the brunt of the storm, some nearby neighborhoods had just a trace of rain and little wind. Fortunately, there were no injuries or deaths reported with either microburst.

Wind damage to a hangar at McCarran Airport. Photo Courtesy: The Las Vegas Review-Journal



Fun Page

Unscramble the weather equipment related words and then use them to solve the crossword puzzle below.

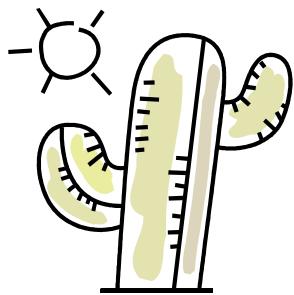
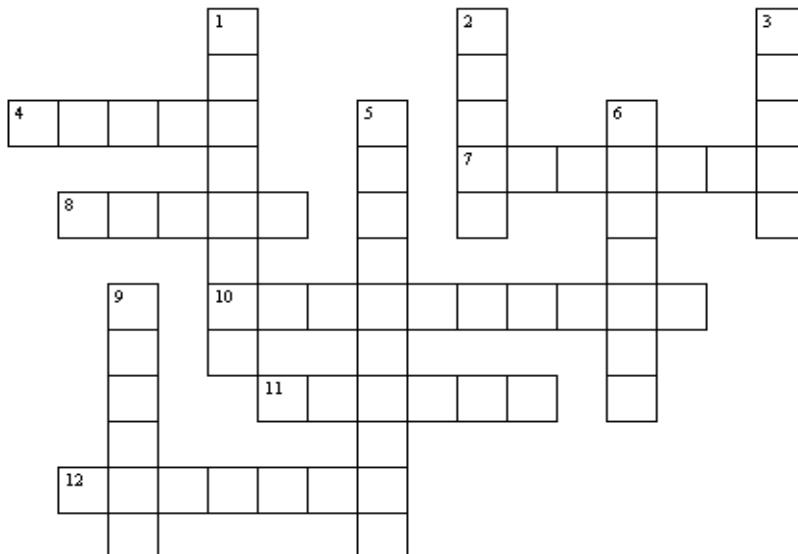
Down

1. SRRCTEUN _____
2. ROSLA _____
3. RRDAA _____
5. EEDROATIRM _____
6. AEWTERH _____
9. EPASLN _____

Across

4. ROVAP _____
7. NNAETAN _____
8. TAWRE _____
10. YOPORAGTPH _____
11. NEYREG _____
12. MILCTAE _____

Crossword



Skywarn Spotter Program

Andy Gorelow, Storm Spotter Coordinator

Once again, the Storm Spotter program has wrapped up another successful training season with nearly 50 new spotters signed up. This year we took our travels west and north to cities like to Caliente, Barstow, Joshua Tree and Tecopa. The Tecopa trip was very exciting for us because prior to this year we had no spotters anywhere in southern Inyo County south of Death Valley. The community was very excited to have us come down and provide the training, and in the end we signed up 10 new spotters. Having spotters in this location will be extremely helpful, not only because of people living in Tecopa or the nearby town of Shoshone, but also the close proximity to Death Valley National Park.

We have already started planning out training sessions for next year, and we will likely be heading mostly east and south to places like Kingman, Bullhead City/Laughlin, Needles, Lake Havasu City, and Pahrump. Of course, there may be more added as time goes by. Also, if you are part of a group and would like a spotter training class, please call the office and we can set something up. Weatherwise, this has been a fairly quiet year, but our need for spotters is greater than ever. We rely heavily on spotter information to determine whether or not to issue warnings, and to help verify a current warning. If you think it's interesting, please let us know. Contact me at (702)263-9744 or email andy.gorelow@noaa.gov .

Spotter Appreciation Day

Donald Maker, Storm Spotter Coordinator

We would like to show our appreciation and gratitude to all of the Skywarn Spotters that have volunteered their time, effort and dedication to helping us "Save lives & property," in their community by having a "**Spotter Appreciation Day**" on Saturday, October 3, 2009 between 10am - 3pm PDT/MST (AZ spotters). Come on out and have a great time! Some of the activities include: A tour of the facility every hour, Meet some of the forecasters you've given spotter reports to, participate in the Cloud Identification Competition, and test your Spotter knowledge, and other fun stuff. So that we can have an idea of how many spotters will be coming please **RSVP** via phone (702) 263-9744 ext. 268, or email donald.maker@noaa.gov by Friday, September 25, 2009. So Mark Your Calendars! We Look Forward to Seeing You.

Final Mass Mailing of The Desert Sun

Donald Maker, Editor

During the past 2 mass mailings of the Desert Sun Newsletter there have been a significant amount of newsletters returned for a number of reasons (e.g. no longer at that address, no forwarding address, etc). So in an effort to reduce our paper usage, postage and printing costs we will begin mailing the newsletter only to those of you that respond to this article by calling or writing that you wish to remain on our newsletter mailing list. Not only is the current issue available on our website www.weather.gov/lasvegas, but so are the previous issues. Our mailing address is WFO Las Vegas, 7851 Dean Martin Drive, Las Vegas, NV 89139, and our office phone number 702-263-9744 or use the spotter hotline.

Answers to Fun Page Crossword

ACROSS vapor antenna water topography energy climate

DOWN currents solar radar radiometer weather panels