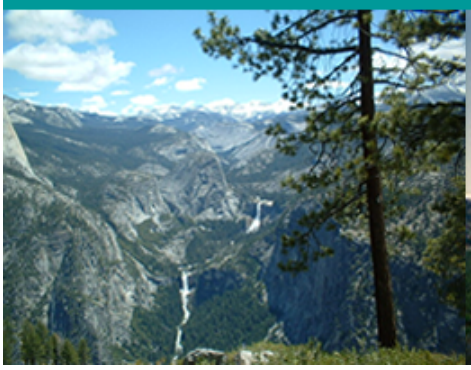
In The Clear

The Weather Newsletter For Interior Central California



Winter 2009 Edition | National Weather Service/Hanford, CA

National Weatherman's Day

By Jim Allsopp, NWS Chicago, IL

Thursday, February 5 is National Weatherman's Day, commemorating the birth of John Jeffries in 1744. Jeffries, one of America's first weather observers, began taking daily weather observations in Boston in 1774 and he took the first balloon observation in 1784. This is a day to recognize the men and women who collectively provide Americans with the best weather, water, and climate forecasts and warning services of any nation.

Many of us take weather information for granted. Turn on a light switch, you get light. Turn on your television or radio, or check a web site and you get the weather forecast. It's easy to forget that around the clock, dedicated meteorologists and weathercasters are vigilantly creating forecasts to help you plan your day, and issuing warnings to help keep you safe.

The men and women at your local National Weather Service (NWS) forecast office gather the raw weather data, analyze the data, and study numerical computer models in order to issue the weather and river forecasts and warnings to protect life and property. Specialized marine and aviation forecasts help enhance the Nation's economy. Spot forecasts help firefighters control wildfires and emergency management officials contain hazardous chemical spills. Extensive climate records help engineers, architects, researchers, insurance companies and utilities.

…continued on page 23…

New Director of the National Oceanic and Atmospheric Administration

President-elect Obama has chosen Dr. Jane Lubchenco to be the next NOAA administrator. Dr. Lubchenco, a highly regarded scientist at Oregon State University, is well known for her active interest in climate change and ocean conservation, as well as her efforts to encourage scientists to speak publicly about their research. The NOAA administrator is one of the very first sub-Cabinet appointments announced by the President-elect, reflecting the significance of our agency.

(by William J. Brennan, acting NOAA administrator)

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SKYWARN Recognition Day

By James Brotherton, Warning Coordination Meteorologist

On December 1, 2008, the annual SKYWARN Recognition Day was held. This is a national event to celebrate the volunteer efforts of the NWS network of storm spotters and amateur radio operators. SKYWARN Recognition Day (SRD) was developed in 1999 by the National Weather Service and the American Radio Relay League (ARRL). During the day, SKYWARN operators visit NWS offices and contact other radio operators across the world. Information regarding SRD is available at http://hamradio.noaa.gov.

Every year, for a 24 hour time period, amateur radio operators around the country convene at local NWS offices to help recognize this important program. Contacts are made with other NWS offices and other radio volunteers. This year, as in years past, NWS Hanford participated with a 24 hour staff of volunteers at the Hanford office. This year featured much more favorable atmospheric conditions in comparison to last year and with new radio systems installed at NWS Hanford, numerous contacts were made with people all over the world.

The staff at NWS Hanford, along with our SKYWARN radio volunteers, is very excited about the renewed interest in the SKYWARN program, and the improvements continually being made to our local radio setup. Our long term goal continues to be to improve the equipment and organization of the local program, with the end result being better communications during extreme weather events and improved reporting of unusual weather phenomenon and property damages. We would like to thank the countless hours of volunteer time spent by our SKYWARN volunteers, especially Bruce Buhler, Edwin Vonderbeck, David Harler, David Whitehead, Michael Enquist, and Guss Keith. We would also like to thank NWS Western Region Headquarters for the assistance with improving our emergency radio communications station. Without the efforts of these individuals, we would not be where we are today!

As always, thanks also to all the volunteers that came out to NWS Hanford to celebrate and participate in 2008 SKYWARN Recognition Day! We can't wait for SRD 2009 later this year in December! If you would like more information on our local SKYWARN program or would like to become a part of our local amateur radio group that supports the NWS during severe weather events, please contact james.brotherton@noaa.gov.

David Whitehead working the amateur radio station at NWS Hanford during 2008 SRD

CoCoRaHs

Community Collaborative Rain, Hail and Snow Network

Because…. "*Rain Doesn't Fall the Same on All*"

By Bill Peterson, Hydrometeorological Technician

CoCoRaHs California kicked off on October 1st and has so far been an overwhelming success. To date, there are nearly 300 volunteers statewide. However, there is room for many more. For those of you unaware of what exactly CoCoRaHs is, it is a non-profit organization of volunteer backyard observers whose purpose is to help 'fill in the gaps' where measurable precipitation normally is not recorded. Folks just like you are relied upon to accurately measure and report your findings on a simple to use form via the internet to the CoCoRaHs web-site. YOUR local National Weather Service will then use this information in its forecasts and post storm reporting.

Our CWA currently has 16 volunteers and to each one of you, I'd like to express my gratitude for all the observations you've taken over the past several weeks. So far, the 16 of us have been responsible for approximately 700 daily reports totaling over 35 inches of rainfall and over 20 inches of snow that otherwise would not have been reported. Keep 'em coming! Also, if you know anyone who may want to participate, please guide them to the CoCoRaHs website at www.cocorahs.org or they can contact me at william.peterson@noaa.gov

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Attention Motorists!

Need to know the latest road reports when you are traveling?
CalTrans has set up a special number you can call to find out the status of roads.
Dial 1-800-427-ROAD.

NEW CLIMATE PRODUCTS FOR THE HANFORD, MADERA AND MERCED MUNICIPAL AIRPORTS

By Gary Sanger
Climate Services Focal Point
WFO San Joaquin Valley-Hanford

ASOS - Copyright National Weather Service (location: rooftop of NWS National Headquarters in Silver Spring, Maryland)

On November 18th, 2008, the National Weather Service began issuing daily and monthly climatological reports for the airports at Hanford, Madera and Merced. These reports are similar to the daily and monthly reports for Bakersfield and Fresno, but with a few important differences.

Daily and monthly climatological reports can be issued for ASOS (Automated Surface Observing System) sites after a minimum of 10 years of operational service. The National Climatic Data Center (NCDC) requires a minimum of 10 years of operational data before preliminary records can be established for a reporting station, and these records are incorporated in the daily and monthly summaries. The ASOS's at the municipal airports at Hanford, Madera and Merced met this requirement in 2008.

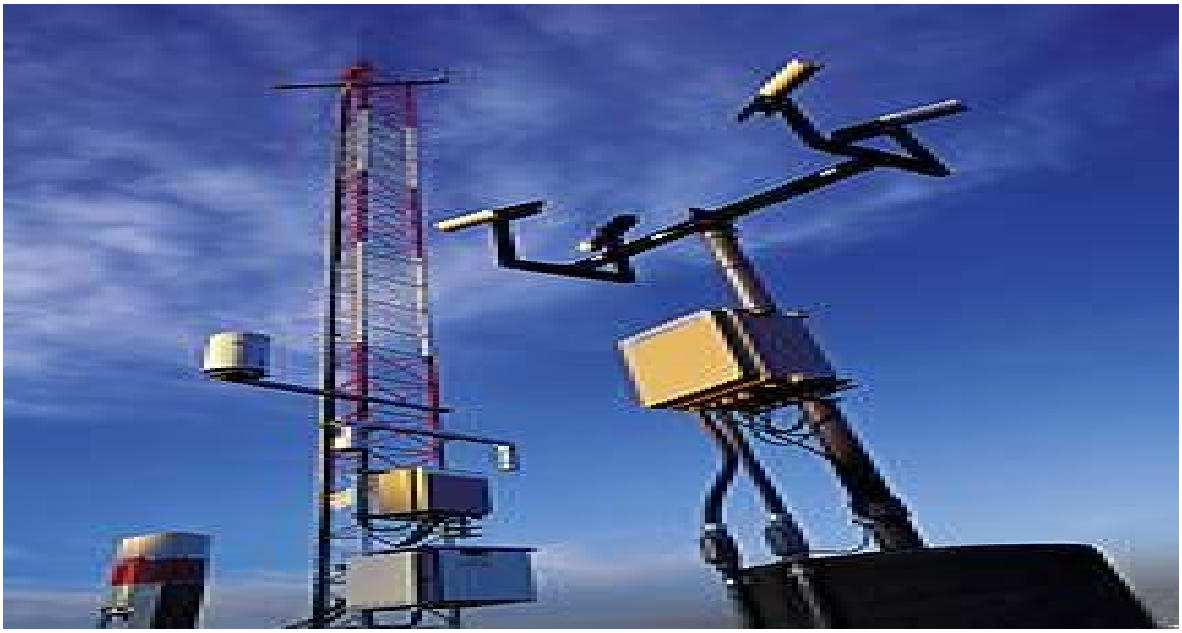
There are two key differences between the summaries for the airport ASOS's and the reports issued for the established airport climatological stations at Bakersfield and Fresno. The main difference is that the airport summaries are valid only for the airports at Hanford, Madera and Merced. These reports supplement the observations from the official climatological stations for those cities. The cooperative climate stations remain the official source of climate data for the three cities, and NCDC certifies and publishes the data from these sites.

The second difference between the daily airport summaries and the Bakersfield and Fresno summaries is that there are no climate normals for the Hanford, Madera and Merced airports. NCDC requires a minimum of 30 years of operational data before temperature and precipitation data can be calculated. The airport ASOS's will not reach this milestone until 2028, which means that the earliest normals can be published for these sites is the 2001-2030 normals set, to be released in 2032.

The question may be asked why we cannot use the normal and records for the established climatological stations in Hanford, Madera and Merced. The reason is due to the nature of these stations, which only report once a day. The observer takes the daily measurement at 8 AM for the preceding 24-hour period, and resets the

instrumentation. (This is due, in part, for safety considerations. The observers are not required to go to the instrument sites—often in remote locations—at midnight.) The ASOS resets its database at midnight standard time, so that the period of observation, while a true midnight-to-midnight observation) is offset from the climatological observation by 8 hours (or by 7 hours during daylight savings time).

Another question is whether similar reports will be issued for the airports at Porterville and Visalia. The answer, at this time, is “no.” The Porterville and Visalia municipal airports have AWOS’s (Automated Weather Observing System), rather than ASOS’s. The AWOS is designed to support civil aviation operations, and while it shares some of the instrumentation with the ASOS, the AWOS is not designed for climatology. The AWOS resets its temperature sensor at 00 UTC (or 00Z), which for the Pacific time zone is 4 PM PST or 5 PM PDT. During the summer, the AWOS reset time is during the peak afternoon heating, and thus the 24-hour reading is not representative of the actual daily temperatures. Also, the National Weather Service does not maintain the AWOS; the FAA provides support to those AWOS’s that transmit observations, with emphasis on those instruments critical to aviation safety and operations. As a result, NCDC does not maintain normals or records for any AWOS site in the United States, and daily or monthly climate summaries for such sites are not authorized.



AWOS - Copyright All Weather, Inc. (location – Mariposa-Yosemite Airport, KMPI)

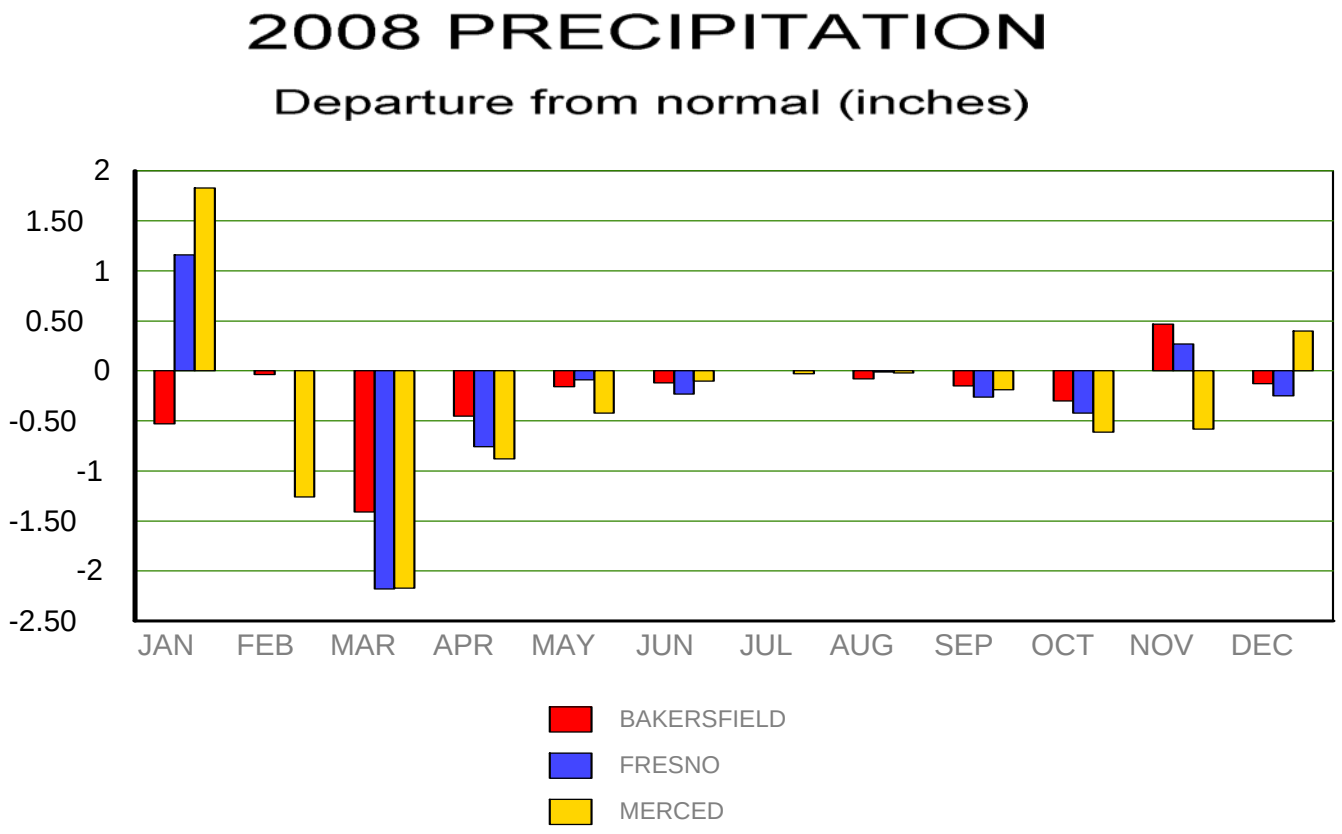
The operational product identifiers for the new airport climate products are:

Product	**Airport**	**NWS Identifier**	**WMO Identifier**
Daily Summary	Hanford	SFOCLIHJO	CDUS46 KHNX
	Madera	SFOCLIMAE	CDUS46 KHNX
	Merced	SFOCLIMCE	CDUS46 KHNX

Product	Airport	NWS Identifier	WMO Identifier
Monthly Summary	Hanford	SFOCLMHJO	CXUS56 KHNX
	Madera	SFOCLMMAE	CXUS56 KHNX
	Merced	SFOCLMMCE	CXUS56 KHNX
Monthly Tabular	Hanford	SFOCF6HJO	CXUS56 KHNX
	Madera	SFOCF6MAE	CXUS56 KHNX
	Merced	SFOCF6MCE	CXUS56 KHNX

Monthly Precipitation Departure from Normal for Fresno, Bakersfield, and Merced for 2008

By Kevin Durfee, Meteorologist



Weather Words

By Kevin Durfee, Meteorologist

WORD BENDER PUZZLE

Directions: Instead of reading in a straight line, each word has one bend in it. One word has been looped for you.

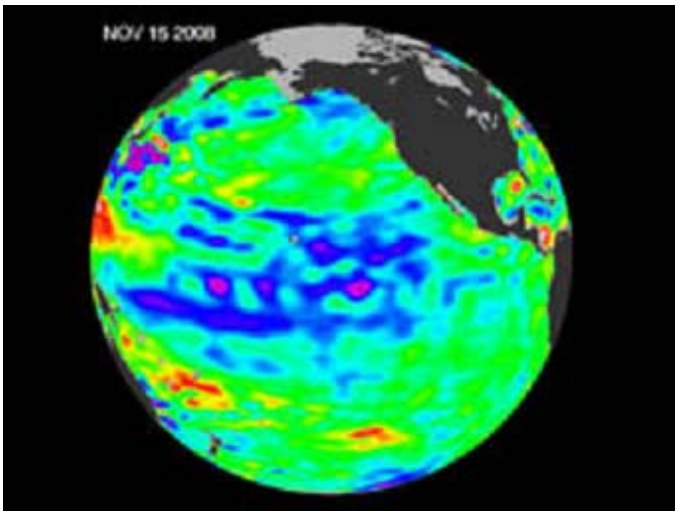
C	Y	C	L	G	U	E	E	L	U	O	H	U	R	S	I	W	T	S	U	R
O	H	S	O	B	W	S	A	M	B	N	I	A	T	R	S	N	O	M	I	N
N	B	I	C	E	R	P	I	N	B	A	N	E	M	K	O	O	N	U	P	O
O	O	W	N	R	O	N	I	O	L	B	A	R	O	M	E	I	E	R	T	L
R	O	T	O	O	E	A	O	O	U	K	O	O	N	I	H	T	E	W	F	C
F	C	H	S	T	S	N	O	W	S	T	E	R	Y	C	B	C	O	F	L	Y
T	W	I	S	U	E	I	S	S	T	C	U	M	U	L	I	S	R	R	O	C
S	M	N	D	E	N	T	N	O	I	T	A	T	I	P	U	O	B	O	W	E
N	U	F	I	A	O	O	E	U	D	R	I	Z	O	O	N	S	U	N	S	L
O	L	G	M	C	Y	C	S	D	R	A	Z	Z	Z	T	G	U	S	T	F	A
W	U	I	U	S	I	C	L	O	S	N	O	M	Z	L	O	R	T	F	R	M
S	T	O	T	S	I	W	T	O	R	E	N	A	C	I	R	D	E	R	O	R
O	S	H	E	H	T	O	O	N	N	M	S	A	M	I	R	A	E	T	H	E
O	U	R	R	R	E	N	R	N	A	E	O	E	N	A	U	G	S	L	E	C
N	L	E	E	W	C	R	H	Y	G	R	O	M	I	R	H	I	U	H	C	L
C	D	A	G	E	I	O	M	A	W	O	B	N	E	O	W	A	L	S	E	I
E	H	E	A	G	L	A	R	E	T	H	U	R	E	T	E	M	U	E	T	C
L	M	I	R	E	U	Z	H	W	O	E	S	N	I	M	E	L	O	F	E	I
I	P	I	C	E	L	S	Z	I	R	D	M	U	C	T	B	R	A	R	O	W
P	C	I	E	K	G	I	T	S	N	A	D	O	I	C	L	U	Z	Z	A	D
I	M	I	R	A	G	U	L	F	R	O	N	T	R	A	N	I	S	R	L	B
C	E	R	P	T	A	S	A	F	T	U	O	K	I	T	S	U	D	R	E	E

anemometer	✓*cyclone*	*mirage*	*thermal*
barometer	*drizzle*	*monsoon*	*thunder*
blizzard	*gust front*	*nimbus*	*tornado*
blustery	*hurricane*	*outflow*	*tsunami*
celsius	*hygrometer*	*precipitation*	*twister*
chinook	*icicle*	*rainbow*	
cumulus	*leeward*	*snowstorm*	

See Solution on Page 18

CLIMATE CHANGE

By Brian Ochs and Gary Sanger
Climate Service Focal Points



Eastern Central Pacific Ocean - Image from NASA

Climate change is a natural phenomenon. Temperatures will rise and fall from one year to the next, so that certain years have temperatures that are warmer or colder, and precipitation is drier or wetter, than normal. The climatological normal for a station is the average temperature and precipitation over a 30 year period as calculated by the National Climatic Data Center (NCDC). At the end of each decade, NCDC computes a new set of normals for each official observation site, with the data set released a year or two into the new decade.

According to findings in the latest research literature, including the 4th Assessment Report from the International Panel of Climate Change, average temperatures have generally been trending up, most noticeably in the last decade, over North America and throughout the globe, especially in the northern hemisphere. Causes of these temperature increases are attributed to multiple factors, including the emissions of "greenhouse gases" from natural processes (such as geothermal and biological) and anthropogenic causes, or human activity. There is some uncertainty as to the impacts of specific sources of emission on the increase in temperature.

Climate change with respect to the central California interior might mean warmer temperatures and shorter winter precipitation seasons. Rainfall in the San Joaquin Valley and the Kern desert, and snowpack in the mountains, might begin to accumulate later in the season, and the majority of the precipitation could end earlier in the season. The precipitation intensity could increase during these shortened wetter periods, with the same amount of rainfall occurring over fewer days. Mountain snows could begin to melt earlier, so that rivers and lakes will fill up sooner and then evaporate as temperatures increase during the spring and summer months. Snow levels, or elevations at which snow occurs, may even increase. If the current trend continues, temperatures could become warmer more days of the year, with an increase in the number of years with above-normal temperatures.

In terms of linking greenhouse gas emissions, particularly due to anthropogenic causes, with frequency of extreme weather events, there is less certainty. Extreme weather events could include extreme cold, heat, intensity of winter storms, and severe weather, such as hurricanes, tornadoes, and severe thunderstorms. Some climate change experts, however, believe the intensity and frequency of these events will increase.

For more in-depth information on climate change, start with NOAA Watch on the web at www.noaawatch.gov

San Joaquin Valley Fog

By Brian Ochs
Assistant Climate Service Focal Point

Satellite Image of San Joaquin Valley Fog – from NASA

Fog, or simply a cloud that forms on the ground, is a common occurrence during the months of November through February in the San Joaquin Valley. During these months, hours of sunlight are the fewest, and sun angles are the lowest so that sunlight striking the earth's surface is less direct, unlike during the summer months when sunlight is most direct and allows for more hours of sunlight.

There are times during these months when strong low pressure systems that produce most of the annual precipitation do not impact the area. In fact, strong high pressure systems can linger over the valley for up to several weeks at a time during these months. When high pressure dominates, air tends to be quite stable with little or no wind from altitudes starting at the ground to tens of thousands of feet above. After a clear day or anytime after any cloud cover clears, the surface air temperature quickly cools to or near (within 2 or 3 degrees Fahrenheit) the dewpoint, which is the temperature needed for condensation of water vapor to occur (that is, cloud development, including fog). The air above the valley is usually warmer and drier; the air can warm with increasing height to over 10,000 feet above the ground. A layer of air associated with warming with increasing height is called an inversion. This inversion acts as a lid or cap to keep the cooler and denser air trapped at the lower levels with little or no interaction with the air above it. This atmospheric setup along with ground moisture is favorable for this famous "Tule Fog." This phenomenon is named after the tule grass wetlands that were prevalent in the Central Valley of California prior to the widespread agriculture that is now present in the area.

The basic rule when driving is to slow down in areas of dense fog. Visibility can suddenly change in areas where fog is patchy rather than widespread. For example, you might be driving where you can see for a mile or more at one moment, then seconds later you enter a fog bank where the visibility abruptly falls to less than a few hundred feet. Fog can be widespread throughout the entire San Joaquin Valley; visibilities usually vary from less than a couple of hundred feet to up to one mile. When widespread

fog is present, visibility is continuously below a quarter mile for many miles, especially in the favored areas near riverbeds and any low lying areas, and can last beyond the usual time of day that is associated with fog (mostly from evening to mid-morning).

After fog develops, it can linger into the late morning and even the afternoon hours before any clearing, lifting of cloud ceilings, or improvements in visibility occur. Sometimes the fog will clear, but it will still remain cloudy for several days with a deck of stratus clouds. The clouds remain after the fog lifts because a thick stratus deck that is more difficult to dissipate (which can be up to a few thousand feet thick) formed above the fog. These stratus clouds will linger for days after high pressure has settled over the area with no fog present in the valley but in higher areas near the mountains (such as the foothills). Until the next low pressure system arrives, the fog will usually redevelop after sunset if no stratus deck lingers through the rest of the day or it clears out during the night. Until the persistent stratus deck has set up or a low pressure system returns, the valley fog can usually be expected to redevelop.

Winter Weather Safety

By Brian Ochs

Photo from NWS Billings, Montana website (location – western Montana)

Some winter weather tips for this winter season in the higher elevations:

- Roads are often impassible during and after snowfall; chains are often required on major highways with significant snow or ice cover, pay close attention to road conditions by calling Caltrans at 1-800-427-7623 or going to their website at www.dot.ca.gov. You can then enter any

highway number that is a state route, U.S. highway, or an interstate at the top of the web page where it says "Check Current Highway Conditions."

- In the mountains it is advisable to carry a winter survival kit anytime venturing into the higher elevations. There are roads that are infrequently maintained such as county roads and unpaved roads. These roads can be impassable, especially without four-wheel drive or snow tires.
- A winter survival kit may contain the following items (not necessarily limited to the following):
    - high calorie and non-perishable food such as granola bars, dried fruits, and nuts
    - snow shovel
    - candles and waterproof matches
    - 2 empty cans (A small one can be used for melting water, and a larger one could be used as an emergency toilet).
    - bottled water
    - blankets or newspaper
    - radio and batteries (A radio with NOAA Weather Radio channels in addition to the AM and FM bands would be even more helpful; this enables monitoring of weather conditions and any statements including advisories, watches, and warnings directly from the nearest NWS forecast office as well as non-weather related civil emergencies).
    - mobile phone with a charger and extra batteries
    - flashlight with extra batteries
    - knife
    - sand or cat litter for traction or rubber traction ramps
    - compass and road maps
    - tools (An auto emergency kit would be advisable; these kits usually have multiple helpful items such as road flares, battery booster cables, and screwdrivers).
    - windshield scraper and brush
    - first aid kit (Some vehicles, including SUVs, are already equipped with these. Also, check expiration dates of supplies and replace as needed).
    - at least one extra set of clothing such as earmuffs, gloves or mittens (mittens are better for keeping in body heat), scarves, jacket, long underwear, pants, and a long-sleeved shirt

- If you are stuck on the side of the road in deep snow in your vehicle and are able to run the engine, run the heater for a few minutes every hour to conserve fuel. Ensure the exhaust (pipe) is clear of any obstructions such as snow (this is where that snow shovel would come in handy). Limit using the vehicle battery (e.g., lights and radio) when the engine is not running.

For more information consult the NWS publication, "Winter Storms, The Deceptive Killers." Copies are available at the forecast offices, including in Hanford or on the internet at http://www.nws.noaa.gov/om/brochures.shtml (click the Winter Storms link for the brochure). There is also a publication on winter storms available from the American Red Cross (www.redcross.org) If you have any questions, contact your nearest NWS forecast office or American Red Cross office.

Chartin' the Changes

By Gary Sanger, Senior Meteorologist & Climate Services Focal Point
Brian Ochs, Assistant Climate Services Focal Point

JULY 2008 WEATHER SUMMARY

There was little change in the weather pattern over the central California interior for the first three days of July, as an upper-level ridge of high pressure centered over Arizona kept central and southern San Joaquin Valley high temperatures in the mid to upper 90s. By the 3rd, an upper-level low approached the Oregon coast. A trough associated with the low moved through the state on Independence Day, bringing as much as 8 degrees cooling to the central California interior and dropping central/south Valley highs into the mid 80s to around 90. The airports at Madera and Merced both reported highs for July 4th of only 86 degrees, and neither Bakersfield nor Fresno got warmer than 90.

The trough moved northeast of the region on July 5th as the upper-level ridge over Arizona built back over California, and another ridge over the east Pacific spread eastward. The two ridges merged, pushing the jet stream north of the state and bringing a strong warming trend. The numerical forecast models had indicated this warming trend several days in advance, and the National Weather Service Forecast Office in Hanford began issuing Special Weather Statements in the afternoon of July 4th on the upcoming unseasonably hot weather.

As the ridge strengthened, temperatures warmed several degrees daily. A Heat Advisory was issued during the afternoon of July 8th for temperatures in the central and southern San Joaquin Valley expected to be above 105 degrees over the next few days.

The center of the ridge moved north to over Oregon, with circulation around the ridge core setting up an east-to-west flow over the Southern Sierra Nevada. Thunderstorms developed over Mono County during the afternoon of July 7th, and drifted over the crest into Yosemite National Park. The next day, convection developed over the eastern California deserts, spreading westward into the mountains and Kern deserts. Mid-level clouds from these thunderstorms spread over the Hanford Warning/Forecast Area on the 9th, keeping overnight temperatures warm. In the mountains and deserts, the clouds reduced the solar heating. As a result, convection was limited.

Temperatures rose to 10-15 degrees above normal by July 10th. Fresno reached a high of 112 on July 10th, and Bakersfield reached 111 degrees. Low temperatures for the two cities were in the lower to mid 80s both on the 9th (although this was due more to the clouds over the region) and on the 10th, setting record high minimum temperatures on both days. Compounding the impact of the increasing temperatures, smoke from Piute fire began drifting into the Kern Mountains and south end of the San Joaquin Valley on the 7th, then spread northward over the next several days.

The upper-level ridge moved inland on July 11th, with a trough moving to along the coast. This pattern set up a southerly flow aloft over California, drawing up monsoonal moisture from the southeast on the 12th. Thunderstorms formed over the Tulare County Mountains by the early afternoon of the 12th. The storms become stronger as they spread south into Kern County. A strong thunderstorm over the Piute Wildfire area dropped

locally heavy rain on land denuded by the fire. This resulted in runoff filling creeks and streams, with a mud and debris flow flooding part of the town Lake Isabella.

Strong thunderstorms over the El Paso Mountains during the afternoon of July 13th caused flash flooding on the Randsburg Road, with erosion of the road. Later storms over the Piute Mountains caused flooding of Erskine Creek with mud and debris flows again moving into the town of Lake Isabella.

Afternoon and evening thunderstorms continued through the 15th, with activity diminishing on the 16th. Flooding was observed in the Thompson Canyon, Erskine Creek, and Kelso Canyon areas. The town of Lake Isabella experienced three days of mud and debris flows flooding parts of the town.

The upper-level ridge built back into California on the 17th-19th. A thunderstorm north of Ridgecrest during the afternoon of July 17th dropped ½-inch diameter hail. The next two days brought the mountains and deserts a brief respite from the thunderstorms. An upper-level trough approached California on the 20th, bringing another surge of monsoonal moisture into the eastern Kern deserts. Outflow boundaries from nocturnal convection over Arizona and northern Mexico generated pre-dawn showers over the China Lake Naval Air Warfare Center and spread clouds across the mountains and the San Joaquin Valley. With the warm, unstable airmass over the region, showers and thunderstorms developed over the Tehachapi Mountains and drifted north into Kern County around sunrise. One storm strengthened into a thunderstorm near Delano, and brought the first measurable rain to Visalia and Fresno since May 27th. 0.01 inch of rain fell at Fresno-Yosemite International Airport, and the Visalia Municipal Airport recorded 0.03 inch of rain from the storm. Widespread mid-level clouds accompanied the monsoonal moisture, and these clouds, in conjunction with a push of low-level marine air through the Sacramento Delta, brought sharp cooling to much of the central and southern San Joaquin Valley on the 20th and 21st. The high temperature for Fresno on July 19th was 102. The next day, Fresno could only reach a high of 89 degrees, a difference of 13 degrees.

One large thunderstorm formed over Barstow during the afternoon of July 20th. As the storm collapsed, strong outflow winds pushed across the Kern County deserts, triggering thunderstorms that produced flash flooding that affected much of Ridgecrest.

An upper-level ridge of high pressure built back into California beginning on July 23rd. Fresno warmed to a high of 99 that day, and was back into triple digits the following day. An upper-level trough on July 28th deepened the marine layer along the coast and brought cooling the San Joaquin Valley, with temperatures falling to near normal. Upper-level ridging returned to the central California interior on the 30th, for warmer weather. High temperatures in the warmest parts central and southern San Joaquin Valley reached the century mark on the last day of the month, although Bakersfield and Fresno stayed in the upper 90s.

AUGUST 2008 WEATHER SUMMARY

Through most of the first 10 days of August, the central California interior was between high pressure centered over the Desert Southwest and a series of upper-level troughs in the eastern Pacific Ocean and the Pacific Northwest. This pattern kept a mainly southwest flow aloft over the state, and limited mountain and desert convection by keeping the bulk of the monsoonal moisture south and east of the region. Inyokern was the only station to report any precipitation on August 4th, and that was only a trace of rain. Central and southern San

Joaquin Valley temperatures during the first part of the month were near to slightly above normal, generally ranging from the mid 90s to around 100. The main exception occurred on the 8th and 9th, when a strong offshore trough deepened the marine layer to around 3000 feet along the central California coast. This allowed marine air to push through the Sacramento Delta into the northern half of the San Joaquin Valley, as well as allowing marine air to also spill through the Pacheco Pass into western Merced County.

There was a sharp temperature demarcation in the central San Joaquin Valley on August 8th, as the high at the Madera Municipal Airport only reached 94 degrees, while Fresno, only about 20 miles to the south, saw the high temperature climb to 99.

As the trough moved through the region on August 9th, the coastal marine layer continued to deepen and spill into the San Joaquin Valley. Temperatures finally fell to a degree or two below normal, but this was short-lived. The trough moved east of California by the 11th, allowing a ridge to build into California for warmer temperatures. The ridge dominated the weather pattern over California the next few days, then the ridge center moved east. This turned the flow aloft southeast and brought another surge of monsoonal moisture into California. Thunderstorms developed over the mountains of Kern and Tulare Counties on August 14th, with Tehachapi receiving a trace of rain. The focus for convection moved northward up the Southern Sierra Nevada over the next few days (with Lodgepole getting 0.01 inch of rain on the 16th—the only measurable precipitation reported in the central California interior during August) as the flow aloft gradually turned southwesterly, and by the 17th, thunderstorms were confined to mainly north of Yosemite National Park.

The mechanism for turning the flow aloft was the shifting of the ridge core westward. This also brought the warmest temperatures of the month to Bakersfield and Fresno on August 15th, when Meadows Field reached 105, and the Fresno-Yosemite International Airport was two degrees warmer. These temperatures would not be matched for two weeks.

A sharp change in the weather pattern occurred on August 18th as a strong upper-level trough moved into California. Central and southern San Joaquin Valley high temperatures fell from near 100 degrees on the 17th to the mid 90s the next day, and into the mid to upper 80s on the 19th. Both Bakersfield and Fresno had a high temperature of 88 on August 19th, the only day Fresno was under 90 for the entire month of August. With marine air over the south end of the San Joaquin Valley by the surrounding mountains, Bakersfield was even cooler on the 20th, reaching a high of only 87. These were the only two days in August that Meadows Field did not have a high of at least 90.

An upper-level ridge over the Southwestern United States built back into California on the 21st, and temperatures had warmed to above normal the next day. A weak trough dropped temperatures to near normal on August 26th, but the ridge quickly rebounded. As the ridge strengthened, temperatures warmed to around 10 degrees above normal by August 29th, with the highs at Bakersfield and Fresno matching the hottest day of the month (previously, the 15th). Bakersfield matched its hottest day again on August 30th, for three days at 105. Fresno hit 107 only twice, on the 15th and 29th.

August ended with the arrival of another deep upper-level trough, which brought a sharp cool down. Bakersfield had a high of only 93 degrees on the 31st, down 12 degrees for the high of 105 the previous day. The cooling was even stronger at Fresno, which dropped from a high of 106 on the 30th to a high of only 90 the next day—a fall of 16 degrees.

SEPTEMBER 2008 WEATHER SUMMARY

September began with an upper-level trough over California, which cooled temperatures to several degrees below normal. The trough moved eastward on the 2nd, and the marine air over the San Joaquin Valley mixed out rapidly, resulting in strong warming. The high temperature at Fresno on September 1st was 86 degrees; the high the next day was 96, a 10-degree warming.

High pressure aloft moved into California behind the trough, and pushed temperatures well above normal. The high temperature at Fresno peaked at 106 degrees on September 7th, some 13 degrees above normal. Fresno had its last 100-degree day of the year on the next day, which was Fresno's 44th day of 100 or higher for 2008. Only 2003 had more days in triple digits—49—since the start of the current century in 2001. Bakersfield had four 100-degree days in September, for a total of 25 days in triple digits for the year. (See below for 2008 100-degree day statistics.)

The strong heat also caused lifting of the moisture-starved air over the Southern Sierra Nevada crest, resulting in cumulus development on September 7th and 8th, and even an isolated thunderstorm or two.

An upper-level trough moved into northern California on the 7th, then slowly dropped south through the state. This trough brought a cooling trend to the region, with temperatures falling to near normal on the 7th, and a few more degrees cooler the next day. As the trough dropped south, a closed low developed within the trough. This low brought mid- and upper-level instability to the Southern Sierra Nevada on September 10th, resulting in the development of isolated afternoon and evening thunderstorms.

An upper-level ridge built west into California from the Great Basin on the 11th, bringing a dry and stable airmass. Temperatures warmed to above normal on the 12th and stayed near or above normal through September 16th. Even a push of marine air into the San Joaquin Valley on the 13th could only cool temperatures to normal or a degree or two below.

An upper-level low moved through northern California on September 17th, bringing a few showers to the Kern County mountains and strong cooling to the central California interior. The marine layer spilled into the San Joaquin Valley, where the Chowchilla wind profiler reported a depth of 2000 feet for the marine air. Fresno saw 9 degrees cooling from the 16th to the 17th, representative of most of the San Joaquin Valley, and temperatures continued to cool the next several days before bottoming out in the lower 80s on September 20th.

An upper-level ridge began building into California on September 22nd, and temperatures began quickly warming. Bakersfield warmed 7 degrees from the 22nd to the 23rd, and warmed another 7 degrees from the 23rd to the 24th. Fresno warmed 6 degrees each of these days, as central and southern San Joaquin Valley high temperatures reached the mid 90s by the 24th, and the upper 90s by the 28th. A weak trough that moved through California on the 25th brought only a degree or two of cooling, with temperatures quickly recovering the next day.

By September 27th, a southeast flow aloft over California was drawing moisture into the state. A few clouds developed over the Southern Sierra Nevada, heralding an increase in instability over the region that culminated in the development of showers and thunderstorms on the 29th over the Southern Sierra Nevada, Tehachapi

Mountains and the Kern County deserts. A few showers even spread into the south end of the San Joaquin Valley, with Bakersfield seeing a trace of rain fall at Meadows Field. Clouds over the region cooled temperatures by a couple of degrees, but the San Joaquin Valley only dropped into the mid 90s, nearly 15 degrees above normal.

Bakersfield ended September with an average temperature of 78.9 degrees, tying with September 1977 for the 13th warmest September in over a century of temperature records. Although Fresno's average temperature for September 2008 was a degree cooler, the average of 77.9 degrees gave Fresno its 8th warmest September in 120 years of records.

100-DEGREE STATISTICS FOR 2008

	BAKERSFIELD			FRESNO		
	2008	2007	2006	2008	2007	2006
MAY	2	0	0	4	0	1
JUNE	4	3	8	8	4	12
JULY	6	12	20	11	14	20
AUGUST	9	10	3	16	14	4
SEPTEMBER	4	3	4	5	3	4
TOTAL	25	28	35	44	35	41

OCTOBER 2008 WEATHER SUMMARY

October was overall a warm and dry month. However, during the first week and last day of the month there was precipitation and cooler temperatures and even a period during the second week of the month with cooler than normal, but dry and windy weather. An upper-level ridge over California at the beginning of October warmed temperatures to above normal on the 1st and 2nd. October began quite warm with highs mostly in the mid 90s on the 1st for much of the forecast and warning area, including the San Joaquin Valley and the Kern County portion of the Mojave Desert, and then temperatures began to cool a little (mostly mid to upper 80s for highs) on the 2nd. A trough reached California on the 3rd, with temperatures throughout the San Joaquin Valley plunging into the mid-upper 70s (a drop of 8-11 degrees from the previous day), and further cooling into the mid 70s for the next two days. Light precipitation fell in the valley within the Hanford warning/forecast area with amounts up to a tenth of an inch, while heavier amounts from 0.70 inch to just above 1.00 inch fell in the Sierra Nevada and nearby foothills.

After the trough that remained over the region on the 4th and 5th of the month was replaced by high pressure, temperatures warmed back to near to slightly above normal from the 6th until the 8th before another low pressure system approached central California by the 9th. This time there was no precipitation associated with this low pressure; the effects were mainly below normal temperatures for the next four days with the warmest highs only in the mid 60s to near 70 that occurred in the valley. From the 9th until the 11th there were several stations in the mountain passes, canyons, and deserts that recorded gusty winds up to 55 mph due to passage of the low pressure system. On the morning of the 11th temperatures reached to around freezing in several locations throughout the San Joaquin Valley; this was the day for when our first frost advisory for the fall 2008 season was issued.

High pressure began to redevelop over the region by the 12th when temperatures began to steadily increase until temperatures peaked again as high as the lower 90s in the valley on the 17th. Temperatures in the deserts were in the 60s prior to arrival of this high pressure system, and then quickly warmed to the 80s. Temperatures remained above normal with highs mostly in the 80s in the valley and desert and the mid 60s to mid 70s for most of the higher elevations from the 13th until near the end of the month. There was little change in temperatures during this period due to the persistence of high pressure. The air became quite dry starting the third week of the month so that low temperatures were able to fall to around normal values instead of remaining above normal; this continued until almost the end of the month.

The next series of low pressure systems approached the Hanford forecast and warning area by the early morning hours of the 30th. Even on the 30th temperatures remained mostly in the 80s in the valley and desert along with increased cloud cover since warm air remained ahead of the trough. The southern end of the San Joaquin Valley experienced gusty winds and blowing dust during the much of the daylight hours of the 30th (winds in Bakersfield gusted to over 35 mph) before the next and last low pressure system for the month that brought measureable rainfall in the valley on the 31st arrived. On the last day of the month there were rainfall amounts as high as 0.15 inch in the valley, and amounts ranged from around a half inch to just above an inch for much of the foothills and higher elevations of the Sierra Nevada. Prior to the rainfall that occurred on the last day of the month, there were new minimum temperature records set in Fresno and Bakersfield. Fresno had a low of 61 (prior record was 59 set in 1983), and Bakersfield had a low of 65 (beating the old record of 58 set in 1987).

NOVEMBER 2008 WEATHER SUMMARY

November was overall a warm month with precipitation amounts that were generally around normal to above normal throughout the forecast area. High pressure dominated for most of the month, particularly the second and third weeks of the month. However, the first and last weeks of the month were cool and wet due to long-wave troughs of low pressure which allowed for generally normal precipitation. Were it not for these brief periods of rainfall, November would have been an even warmer month. This month was the 10th warmest for Fresno and the 19th warmest for Bakersfield since records began for these locations. The month basically began with above normal precipitation and below normal temperatures until Veteran's Day, when temperatures began to warm and remained above normal until the week before Thanksgiving. Temperatures generally fell back to below normal by the week of Thanksgiving when fog returned to the valley, except for the low pressure system that brought quite a bit of rainfall to the valley on the night of the 25th and the entire day of 26th. By Thanksgiving morning (the 27th), fog returned to the valley as soon as the rain ended; temperatures were below normal there for the remainder of the month. Temperatures began to rebound over the foothills, mountains, and desert for the last two days of the month. However, most precipitation fell as rain throughout the area, including the mountains.

The storm that arrived at the beginning of November brought locally heavy rain to the Kern County deserts and gusty winds to both the mountains and the deserts. Road flooding was reported near Randsburg and Rosamond, and rain falling on the El Paso Mountains produced runoff that flooded the Red Rock-Randsburg Road. West winds gusted to 45-50 mph over the Kern County mountain and desert areas on the 4th as a dry cold front moved through central California in the wake of the storm.

The next storm arrived November 8th. Showers and thunderstorms developed over the San Joaquin Valley floor during the evening, with one thunderstorm dropping 0.37 inch of rain in only 10 minutes. Minor street flooding was reported from this storm, possibly due to debris-clogged storm drains.

The middle two weeks of the month proved much warmer than normal with several record high temperatures broken. A persistent upper-level ridge over California from November 10th through around the end of the third week of the month allowed temperatures to warm to well above normal; the warmest period during this time was from the 15th until the 17th when daily maximum temperatures reached the lower 80s.

The high pressure ridge that brought these record and near-record temperatures to the central and southern San Joaquin Valley at mid-month also evaporated moisture from the soil. With moisture in the lowest levels of the airmass over the Valley floor, conditions were primed for Tule Fog development. The Valley fog began to develop during the early morning of November 13th. This first fog episode was characterized by its patchy nature. It formed primarily in the lowest areas of the San Joaquin Valley and burned off by the late morning. As the high-pressure ridge continued to strengthen, fog development was mostly inhibited as the lowest levels of the atmosphere dried out. As the ridge began to weaken and temperatures cooled, humidity over the Valley floor began to increase again, and the airmass began cooling to near saturation overnight.

Dense fog developed near Visalia during the evening of November 21st and became widespread through much of the Valley by daybreak on the 22nd. Dense fog redeveloped during the night of the 22nd-23rd, and continued through late morning. This scenario was repeated the next night as well, before an approaching upper-level trough further weakened the ridge and brought enough mixing to inhibit fog development.

Southeast winds ahead of the approaching upper-level trough brought gusts to 45-50 mph over the Kern County mountains, but these winds did not work down to the San Joaquin Valley floor.

The trough brought significant rainfall amounts to the region on November 25th-26th, with Fresno and Bakersfield receiving around half of their monthly rain totals from this storm. Rainfall amounts in the Kern County mountains locally exceeded 1.5 inches, while sites in the central and southern San Joaquin Valley saw amounts up to three-quarters of an inch. A Flash Flood Watch was issued for the Piute burn area south of Lake Isabella, but fortunately the ground was able to absorb the rainfall.

There was little snow in the mountains, as the low pressure systems during the month each brought some influx of tropical, moist air, keeping snow levels initially at 9000 feet or higher. Snow levels began falling during the morning of the 26th, with light snow falling at Hume Lake. By mid-morning, the California Highway Patrol had chain restrictions on Highway 168, as there was enough snow on the road to impede travel. Also, just after Thanksgiving, there were some trace amounts of snow in the mountains in Kern County after the rain tapered off, since the air had cooled off sufficiently by that time.

With abundant ground moisture, dense fog developed over parts of the central and southern San Joaquin Valley during the early morning of the 27th. The fog lifted into a stratus layer during the afternoon and evening, keeping the Valley free on dense fog the night of the 27th-28th. Dense fog did redevelop just before daybreak on the 29th, lasting into the late morning. November ended on a foggy note in the central and south Valley, with dense fog developing shortly after midnight on the 30th and persisting through midday.

As far as the rainfall totals go, locations in the northwestern side of the valley reported from around a tenth of an inch to just over half inch for the month; this was the driest area of the San Joaquin Valley. The entire southern side of the San Joaquin Valley received most of its rainfall during the nighttime on the 25th and the early morning hours of the 26th, particularly along interstate 5 and the Kern county portion of highway 99. Both

Fresno and Bakersfield had above normal monthly rainfall totals; Fresno was 1.37 inches which was 0.27 inch above the normal. Bakersfield reported 1.06 inches for the month which was 0.47 inch above normal. Bakersfield was 1.9 degrees above normal with a monthly average temperature of 67.2, and Fresno was 67.6 degrees, or 4.6 degrees above the normal of 63 degrees (10th warmest November on record).

DECEMBER 2008 WEATHER SUMMARY

December began with the central California interior under an upper-level high-pressure ridge. This ridge brought a stable airmass to the region, and strengthened the inversion over the San Joaquin Valley. As a result, areas of low clouds and night/morning dense fog were a daily occurrence during the first few days of the month. Drizzle occurred during the morning of December 2nd, and enough moisture condensed out of the lowest levels of the atmosphere for a respite from widespread dense fog on the 3rd and 4th, although patchy dense fog did occur. Rather than widespread dense fog, a layer of low altitude stratus formed and persisted over the San Joaquin Valley. More widespread dense fog returned to the central and southern San Joaquin Valley on the 5th and 6th.

An upper-level low that developed southwest of Point Conception moved onshore into southern California during the night of December 6th-7th, then it moved across the southern part of the state during the day. The low drew a fetch of subtropical moisture into the central California interior from the south, with up to a half inch of rain falling in the Kern County mountains and deserts, and two inches of new snow falling as far north as Ponderosa in the Sierra Nevada in southern Tulare County.

Behind the departing low, an upper-level ridge over the eastern Pacific built back into California, bringing more stratus and patchy fog during the morning of December 8th. A weak upper-level disturbance moved over the central California interior, bringing light rain to the central and southern San Joaquin Valley; a few hundredths of an inch fell at Fresno. High pressure rebuilt over the central California interior, bringing more dense fog to the central and southern San Joaquin Valley.

The weather pattern changed on December 12th, as a series of upper-level troughs began moving through the central California interior. These troughs brought several days of precipitation to the region, as well as a push of unseasonably cold air. The first storm brought up to an inch of rain to the central and southern San Joaquin Valley, and heavy snow to the Southern Sierra Nevada and Tehachapi Mountains. Wofford Heights, near the southern end of the Sierra Nevada received a foot of new snow on December 15th, as did Camp Nelson, further north in Tulare County. Despite the low snow levels, little snow fell in the Sierra Nevada foothills.

The next storm reached the central California Interior during the afternoon of December 16th. This storm dropped south along the coast, and as a result had a stronger impact on the Kern County mountains and desert than on the Sierra Nevada north of Kings Canyon. In the Kern desert, California City had 6 inches of new snow, and Rosamond received 2 inches. In the Kern County mountains, a foot of snow fell at Alpine Mountain. Rain that developed over San Luis Obispo and Monterey Counties during the afternoon of the 16th moved into the west side of the San Joaquin Valley, and actually produced light snowfall at Harris Ranch.

As the storm crossed southern California and into Arizona, skies cleared over the central California interior. In the central and southern San Joaquin Valley, temperatures fell into the mid 20s during the morning of December 18th. The lowest temperatures were recorded in Merced and western Fresno Counties, where durations below 28 degrees were as much as 5 hours.

The next storm arrived on the 21st, bringing another round of rain and mountain snow to the region. SNOTEL observations in the Southern Sierra Nevada indicated that between one and two feet of snow fell over the higher elevations on the 21st and 22nd. Another storm reached California on Christmas Eve, but there was little (if any) break between the instability showers behind the exiting storm and the arrival of the new system. Snow levels fell below 3000 feet with this storm, with snow falling at Kernville. Gusty winds moved through the region on Christmas Day, with gusts to around 40 mph hitting Hanford around midday.

After this system passed, widespread dense fog did not return for several days. This lack of sky cover, combined with light winds, allowed for good radiational cooling. This resulted in three days of freezing temperatures in the central and southern San Joaquin Valley, although widespread critical temperatures were not reported.

High pressure returned to the region by the 30th, and widespread fog returned with patchy dense fog over the central and southern San Joaquin Valley just after sunset during that evening. The fog remained through the afternoon hours of the 31st. Cloud ceilings began to rise, and visibility began to improve over the central and south valley on New Year's Eve, just before the start of the New Year.

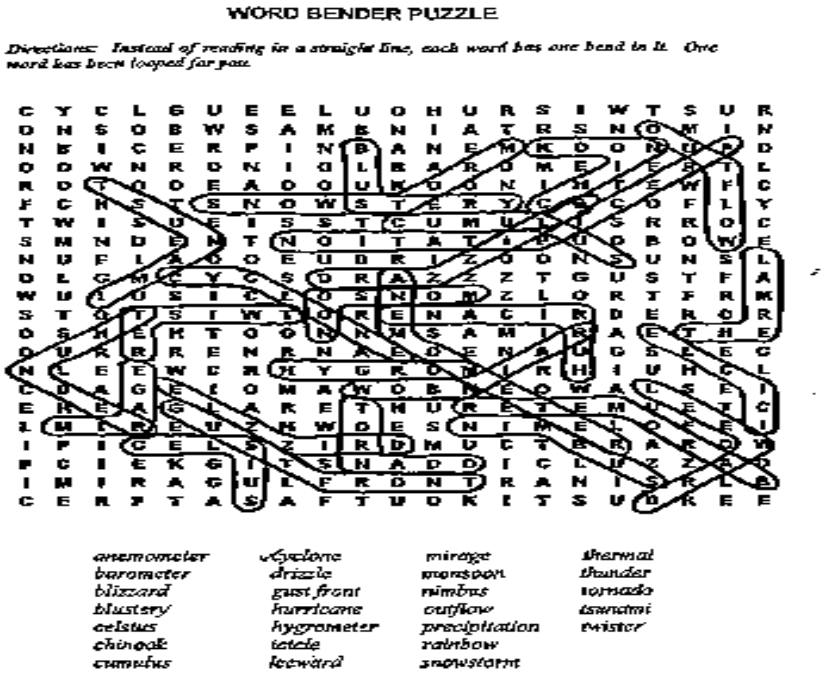
Bakersfield ended the 2008 calendar year with only 3.24 inches of rain (49.9 percent of normal), for its eighth driest calendar year on record. This was the second consecutive dry year for Bakersfield, as 2007 was the fifth driest year on record. Fresno fared better, with a calendar year total of 8.46 inches, or 75.3 percent of normal.

Both Fresno and Bakersfield had warmer than normal years. Bakersfield had an annual average temperature of 66.0 degrees, 1 degree above normal. Fresno had an annual average temperature of 65.1 degrees, or 1.9 degrees above normal. This was enough to give Fresno a tie for its ninth warmest year on record. (Bakersfield tied for its 30th warmest year).

Runnin' the Numbers		Fresno			Bakersfield		
		July 2008	August 2008	September 2008	July 2008	August 2008	September 2008
TEMPERATURE (^{O}F)	Average Maximum	98.9	99.4	94.0	97.2	98.1	92.7
	Average Monthly	83.8	84.1	78.0	84.9	85.1	78.9
	Departure from Normal	2.4	4.2	3.4	1.8	3.2	2.2
	Average Minimum	68.7	68.8	61.9	72.5	72.0	65.0
	Maximum	112	107	106	111	105	100
	Date(s)	10th	15th, 29th	7th	10th	15th, 29th, 30th	5th, 6th, 7th, 8th
	Minimum	61	61	55	64	63	58
	Date(s)	22nd	20th	18th	22nd	20th	18th, 19th, 20th, 21st
	Number of Days Max ≥100	11	16	5	6	9	4
	Number of Days Max ≥90	30	30	22	31	29	22
	Number of days Min ≤32	0	0	0	0	0	0
PRECIPITATION (In.)	Total	0.01	0	0	0	0	Trace
	Departure from Normal	0	-0.01	-0.26	0	-0.08	-0.15
	Greatest in 24 hrs	0.01	--	--	--	--	Trace
	Date(s)	20th	--	--	--	--	29th
	Number days w/precip.	1	0	0	0	0	1
	Seasonal Total	0.01	0.01	0.01	0	0	Trace
	Departure from Normal	0	-0.01	-0.27	0	-0.08	-0.23
	Compared to Normal	100%	50%	3.6%	100%	0%	0%
WIND (mph)	Peak Speed	29	32	26	30	23	22
	Direction	NW	SW	NE	N	NW	N, NW
	Date(s)	20th	1st	29th	30th	17th, 31st	1st, 2nd
PRESS (in.)	Highest	30.01	29.98	30.03	30.00	29.98	30.03
	Date	16th	10th	20th	16th	10th	20th
	Lowest	29.60	29.52	29.61	29.59	29.50	29.60
	Date	10th	30th	8th	10th	30th	8th

Runnin' the Numbers		Fresno			Bakersfield		
		October 2008	November 2008	December 2008	October 2008	November 2008	December 2008
TEMPERATURE (^{o}F)	Average Maximum	81.1	67.6	51.8	81.2	67.2	52.7
	Average Monthly	67.1	57.5	44.9	67.9	57.7	45.7
	Departure from Normal	2.1	4.8	-0.3	0.7	2.9	-1.5
	Average Minimum	53.1	47.3	38.0	54.5	48.1	38.6
	Maximum	96	81	58	93	84	64
	Date(s)	1st	16th, 17th	9th	1st	17th	1st
	Minimum	40	37	31	43	42	32
	Date(s)	12th	24th	18th	12th	6th, 24th	27th, 28th
	Number of Days Max ≥90	2	0	0	2	0	0
	Number of days Min ≤32	0	0	5	0	0	2
PRECIPITATION (In.)	Total	0.23	1.37	1.09	Trace	1.06	0.63
	Departure from Normal	-0.45	0.27	-0.25	-0.30	0.47	-0.13
	Greatest in 24 hrs	0.15	0.75	0.62	Trace	0.63	0.37
	Date(s)	30th-31st	25th-26th	14th-15th	3rd, 4th, 30th, 31st	25th-26th	15th-16th
	Number days w/precip.	4	7	10	4	9	7
	Seasonal Total	0.24	1.61	2.70	Trace	1.06	1.69
	Departure from Normal	-0.69	-0.42	-0.67	-0.53	-0.06	-0.19
	Compared to Normal	25.8%	79.3%	80.1%	0%	94.6%	89.9%
WIND (mph)	Peak Speed	33	28	41	40	31	39
	Direction	NW	NW, SW	W	SE	NW	W
	Date(s)	9th	4th, 26th	25th	30th	9th	25th
	Date	13th	6th	27th	13th	6th	27th
	Lowest	29.75	29.80	29,66	29.77	29.78	29.69
	Date	4th	9th	25th	3rd	8th	25th

Weather Words (answers from puzzle on page 6)



National Weatherman's Day **(continued from page 1)…**

The primary mission of the NWS is to provide the American public with the best possible warning service to save lives. Recent severe weather statistics show that we continue to improve our capability to warn the public of impending hazardous weather. Nationally, lead time for flash flood warnings improved from 22 minutes in 1993 to 78 minutes in 2008. Accuracy over the same time period increased from 71 percent to 91 percent. Lead time for tornado warnings has increased from 6 minutes in 1993 to 13 minutes today. Tornado warning accuracy increased from 43 percent to 72 percent. Winter storm accuracy in 2008 was 89 percent with an average lead time of 17 hours. Since 1990, the Tropical Prediction Center's 24 to 72 hour tropical storm forecast track errors have been reduced by more than 50%. These more accurate and longer lead time warnings help communities stay safe.

Locally, the Chicago NWS forecast office, which serves 23 counties in northern Illinois and northwest Indiana, had an accuracy of 84 percent for tornado warnings in 2008 with an average lead time of 16 minutes. For the stronger and more dangerous EF2 and greater tornadoes, the numbers improve to 99 percent and 20 minutes, respectively. Flash flood warning accuracy was 79 percent with an average lead time of 126 minutes. For winter storms, accuracy was 90 percent and average lead time 18.9 hours.

But the NWS couldn't accomplish its mission without a diverse group of partners helping in the process.

Nationwide, more than 11,000 volunteer Cooperative Observers take regular measurements of temperature, precipitation and other data, which is used by forecasters and climatologists. Nearly 300,000 volunteer storm spotters are trained by the NWS to provide visual reports of severe weather conditions to forecast offices and local emergency management officials. Volunteer amateur radio operators provide critical emergency communications during severe weather.

The Chicago NWS office has a network of 85 dedicated volunteer Cooperative Observers throughout north central and northeast Illinois and northwest Indiana. In addition, there are about 30 supplemental snow observers and 30 supplemental rainfall observers in the area. Around 500 volunteer observers report through the new Community Collaborative Rain, Hail, and Snow (CoCoRaHS) network. The office also recently started a new volunteer ice spotter network to provide forecasters reports of ice jam flooding on area rivers in winter. About 2500 people attend Skywarn severe storm spotter training classes in the local area each year.

Most of the colorful weather graphics seen on television and in newspapers come from another member of the America's weather team. Commercial weather companies enhance the presentation of the NWS data and information for their clients in the media and in many weather-sensitive industries, and provide customized forecasts and services for clients.

And finally, television weathercasters are the most visible members of the America's weather team. They are the trusted faces many people turn to for weather information, and they relay the NWS’s official watches and warnings for hazardous weather.

On National Weatherman's Day, the NWS would like to thank all of the volunteers and our partners in television and commercial weather services. Thank you!

In The Clear is a newsletter issued by the:

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