

**National
Weather
Service**

Coyote Crier



Volume 9, Issue 1

**Spring/Summer
2005**

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National Weather Service Mission:

"The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community."

Updating Your Personal Information

Please keep your personal information up-to-date. If you have had a change in address, phone number, or email address please let us know as soon as possible so that your new information can be added to our database. Not updating your information could result in you being cut from our spotter list. Having your correct personal information is imperative to the operation of the spotter network.

I would also like to start doing more correspondence with each of you through email. I would like to be able to send out reminders, updates, and general information that is important for you as spotters. In the last few months I have sent out an email stating that I was trying out all the email addresses that we had in our database. Unfortunately, I had a large percentage of those emails returned. In order to construct a complete and up-to-date spotter email list I will need each of you to email me so that I have your correct email address. As with all your information, your email addresses **will not** be given to anyone outside of the National

Weather Service office in Tucson. Any emails sent out will have everyone blind carbon copied so that no one can see your email address.

If you have an email address that you would like us to have so that we can send you spotter information and updates, please email me within the next few weeks. **In the subject line of your email please state you spotter number, and the simple statement "updating email address"**. If you do not have an email address or do not wish to share your email address that is not a problem, we will still be updating everyone in Coyote Crier informational letters like this one.

Thank you for your help with this matter,

Pamela Elslager

pamela.elslager@noaa.gov

Visit us on the web:

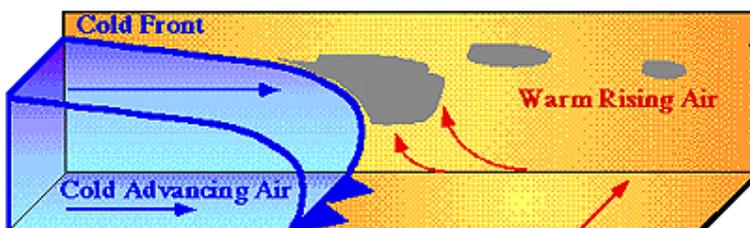
<http://weather.gov/tucson>

What is a front?

By: Brian Francis, Senior Forecaster

What is a **front**? A **front** has a specific definition to someone in the field of meteorology. To the layman, the term **front** can be a misnomer. There have been instances I have heard well-meaning people discussing weather. Someone says, "That *weather front* we had move through last night was really something." In fact, there may have been **no** front associated with the *weather* that occurred "last night." The following information pertaining to fronts is taken from "*Meteorology. The Atmosphere in Action*" by J.R. Eagleman.

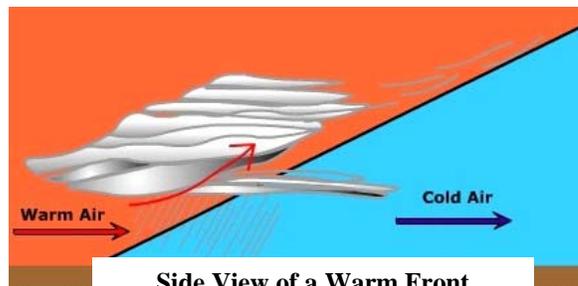
When two different air masses meet a weather front is formed at the boundary. The boundary is frequently quite sharp with very little mixing of the two different air masses. If the colder air is advancing the cold dense air pushes underneath the warm air mass and a **cold front** develops. If the warm air mass is advancing to replace cold air a **warm front** is created with different characteristics from a cold front.



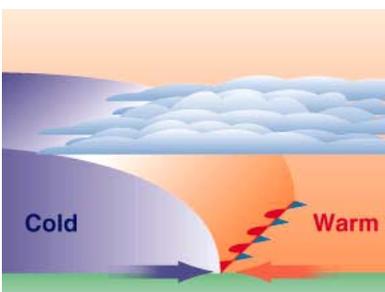
Side View of a Cold Front

If viewed from the side, a cold front would appear as the leading edge of a thin wedge of cold air advancing beneath warmer air with an average slope of 1 km vertically for every 100 km in a horizontal direction. The cold air is denser than the warmer air and pushes it upward. Clouds with vertical growth (cumulonimbus) are common near a cold front because of rapid uplift of warm air.

A warm front viewed from the side would appear as an even thinner wedge of cold air being pushed along as the leading air in the warm air mass glides over it. The typical slope of the warm front is 1 km vertically for every 200 km in a horizontal direction. Since the slope is less than for a cold front the weather associated with a warm front is less violent. Clouds of a more stratified nature (nimbostratus) with steady soaking rains are commonly associated with warm fronts.



Side View of a Warm Front

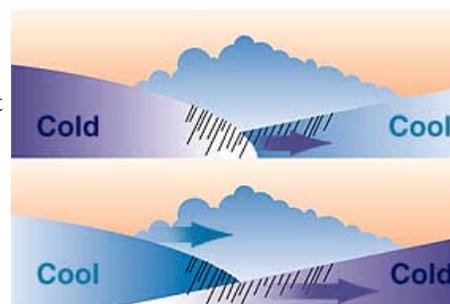


Side View of a Stationary Front

Another type of frontal system is a **stationary front**. Mountain ranges or specific weather patterns can cause either cold or warm fronts to stall and become stationary. This happens when a weather front moves into a parallel position to the jet stream, thus losing its source of energy for movement and becoming a stationary front. If the front is oriented east-west and the surface pressure patterns provide strong southerly airflow south of the stationary front, with northerly flow north of the front, rainfall may continue for several days over the same area and cause severe flooding. Precipitation continues as long as the front remains with the warm humid air from the south flowing up over the wedge of cold air to condense into clouds and rain.

Finally, the fourth type of front is the **occluded front**. Since a cold front normally travels faster than a warm front, the occluded front is formed as a cold front overtakes a warm front. Occluded fronts are very rare occurrences in Arizona weather patterns.

Hopefully, the above summary provides the reader with a better understanding of fronts. Keep in mind that the definitions provided are quite general.



Side View of an Occluded Front

The Spotter's Role in Helping with the Warning Decision

By: Dawn Fishler, Student Intern

While the nation's attention was focused on Hurricane Charley hitting the Gulf Coast of Florida on Friday, August 13, 2004; we in Southeast Arizona had our own strong set of storms develop. The combination of plenty of moisture, daytime heating, and a low pressure system moving through Southern California caused a widespread outbreak of showers and thunderstorms. Storms began to build and intensify throughout the afternoon and evening as outflow boundaries from multiple storms converged, leading to severe weather which included rainfall rates exceeding an inch per hour in some locations. The National Weather Service issued a total of six severe thunderstorm warnings, eight flash flood warnings, and multiple urban and small stream flood advisories, starting with the first warning being issued at 12:33 pm MST through when the last advisory expired at 6:00 am MST the following morning.

Much of the information we received about the nature of these storms was obtained through calls that spotters made to the Weather Service. Spotters play a vital role in the warning decision process being that they can provide pertinent information as to the true nature of the storms that may not be apparent to the forecasters via satellite or radar. Many times, the basis of a warning may rely upon storm characteristics reported to the Weather Service by spotters. Spotter reports can also help to verify the warnings that the Weather Service issues. A spotter who had reported one inch hail helped to verify a severe thunderstorm warning issued that afternoon, while many flooding reports helped to verify flash flood warnings.

Thanks to reports made to the Weather Service by spotters, law enforcement, and Weather Service gages, five severe thunderstorm warnings and three flash flood warnings verified for this severe weather event.



Composite Reflectivity 4:33 pm
MST on August 13, 2004



Color Enhanced Water Vapor Satellite,
2:00 pm MST, August 13, 2004. The
complex that impacted Arizona and
Hurricane Charley, impacting
Florida, can clearly be seen.

Advanced Flash Flood Reporting

By: Mike Schaffner, Service Hydrologist

Reporting of flash flooding in real time is extremely valuable during the monsoon season. In addition to reporting as the event is taking place, spotters may report flooding within 24 hours of the event. So if you happen to arrive home several hours after a storm, it is not too late to provide valuable information that the National Weather Service can use to evaluate and improve our flash flood program.

An excellent item to report is **high water marks**. A high water mark is evidence of a flood. In particular it is evidence of the highest point that flood waters rose.

High water marks might be a line of fresh mud on a concrete wall, twigs and small branches caught up in a tree, or scarring on a tree due to the abrasive action of flood waters. Since high water marks may be present from previous floods, it is important to look for flood evidence as soon as possible.

When entering a wash or creek

during the monsoon, personal safety is of paramount importance. Do not examine high water marks if additional rain is falling upstream. Never enter a wash if water is still flowing.

If a significant wash or creek crosses your private property, you can even install a staff gage. A **staff gage** can be something as simple as a strong piece of wood that is painted in foot segments. This will allow the observer to estimate flow depth some distance away or even with binoculars. If installing a staff gage, we would appreciate a few photos of the staff gage. The photos looking both upstream and downstream from the staff gage. Also the location of the staff gage (latitude and longitude would be ideal) will be needed.

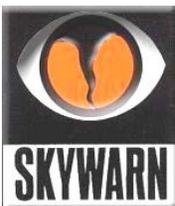
When reporting flooding after the fact: 1.) Provide an estimated depth of the flood based on high water marks, 2.) About how wide the channel was, and 3.) If water came out if

its banks.

As always, any type of **flooding should be reported in real time**. Information to report includes: 1.) Closed roads due to flooding, 2.) Impassible roads due to high water, 3.) Swift-water rescues, 4.) Water out of its banks, 5.) Homes or businesses flooded due to a wash or stream out of its banks, and 6.) Any type of debris flow/mudslide caused by heavy rains (these will typically be in mountainous terrain).



Arrow indicates likely high water mark. Rocks and debris in the flow likely abraded the tree up to near this point. If tree was not abraded, high water mark could be taken as the top of debris accumulated against the tree. Photo from Marijilda Canyon near Saford.



RainNet Spotters

Keep up the good work of calling in your monthly totals of rainfall. Along the same lines of the article on page 1, I would like to start doing more of the RainNet correspondence through email. If you would like to email me your monthly totals instead of calling them in, that

would be fine. In the subject line please state you spotter/rainnet number and the month of the total that you are reporting.

Also, if you are interested in sending in your yearly data through email instead of through mail please let me know and I can email you the rainfall recording form to track on

your computer. At the end of the year you could then email me back the form. If you would still like to do correspondence through phone and mail that would be fine as well. Please let me know which way you would like to do things. Thank you!

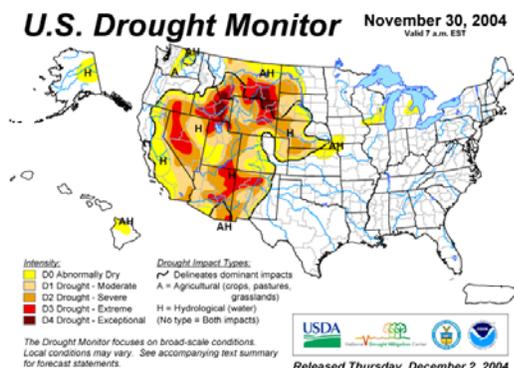
pamela.elslager@noaa.gov

Winter 2004-2005 Rainfall

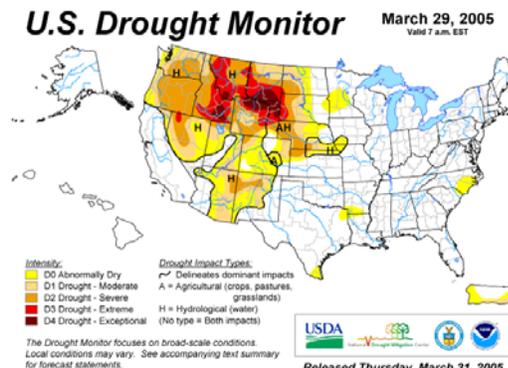
By: John R. Glueck, Senior Forecaster and Climate Focal Point

Rainfall from the 2004-2005 winter season brought short term relief to drought conditions across southeast Arizona. Below is a listing of winter precipitation across southeast Arizona compared with normal and also how it ranked historically. Winter 2004-2005 was above normal for most of southeast Arizona except for Nogales and Benson. Additionally, the winter rainfall ranked in the Top 10 wettest on record. At the end of this page are two U.S. Drought Monitor maps (November 30, 2004 and March 29, 2005) that show the improvements of drought conditions.

Location	Winter rainfall	Normal	Winter ranking	Period of record
Tucson airport	3.33"	2.90"	25th wettest	since 1894
Green Valley	3.66"	2.77"	-	-
Vail	3.84"	2.56"	-	-
Redington	4.89"	4.17"	8th wettest	since 1948
Anvil Ranch	3.48"	2.71"	8th wettest	since 1948
Kitt Peak	9.16"	5.91"	7th wettest	since 1956
Ajo	4.86"	2.22"	5th wettest	since 1914
Organ Pipe N.M.	7.20"	2.80"	4th wettest	since 1948
Eloy	6.03"	3.24"	7th wettest	since 1951
Oracle	7.94"	7.33"	25th wettest	since 1893
San Manuel	4.39"	3.76"	12th wettest	since 1954
Nogales	3.55"	3.87"	-	since 1952
Patagonia	4.51"	4.13"	19th wettest	since 1921
Santa Rita Exp.	6.44"	5.27"	12th wettest	since 1950
Tumacacori N.M.	4.41"	3.71"	11th wettest	since 1948
Fort Thomas	4.71"	3.16"	7th wettest	since 1958
Safford Ag. center	4.37"	2.43"	6th wettest	since 1948
Duncan	5.82"	3.09"	5th wettest	since 1901
Benson	2.41"	2.45"	-	since 1923
Pearce-Sunsites	4.49"	2.62"	6th wettest	since 1950
Willcox	5.00"	3.36"	16th wettest	since 1898
Coronado N.M. HQ.	7.62"	5.48"	9th wettest	since 1960
Sierra Vista	3.04"	2.82"	24th wettest	since 1900
Tombstone	3.76"	2.85"	21st wettest	since 1893
Y Lightning Ranch (Hereford)	4.79"	3.08"	8th wettest	since 1939
Bowie	5.18"	3.12"	8th wettest	since 1899
Chiricahua N.M.	5.25"	4.86"	14th wettest	since 1909
Portal	8.35"	4.57"	7th wettest	since 1951
San Simon	4.20"	2.89"	7th wettest	since 1898
Douglas	5.10"	2.45"	5th wettest	since 1948
McNeal	4.58"	2.23"	5th wettest	since 1960
Rucker Canyon	7.30"	4.30"	9th wettest	since 1948



November 30, 2004 drought map



March 29, 2005 drought map

The Voice: NOAA Weather Radio

By: Tom Evans, Warning Coordination Meteorologist

Craig, our name for the automated voice on the NOAA Weather Radio, keeps you updated around-the-clock of weather reports and information to help you prepare for the day ahead. Also, you will always have access to potentially lifesaving emergency information whenever you need it. Weather radios equipped with a special alarm tone feature can sound an alert and give you immediate information about a life-threatening situation. During an emergency, National Weather Service forecasters will interrupt routine weather radio programming and send out the special tone that activates weather radios in the listening area. The hearing and visually impaired also can get these warnings by connecting weather radios with alarm tones to other kinds of attention-getting devices like strobe lights, pagers, bed-shakers, personal computers

and text printers.

“Our goal is to someday have a NOAA Weather Radio in every home, just like a smoke detector, and in all schools, hospitals and other public gathering places. NOAA Weather Radio gives people the kind of information they need to safeguard themselves and their home before, during and after a disaster,” says the Director of the National Weather Service.

To pick up your NOAA Weather Radio check with stores which sell electronic devices, or call the National Weather Service at (520) 670-6526. More information is available through the internet at:

<http://weather.gov/nwr>

Do you have your NOAA Weather Radio?

GET THE INFORMATION YOU NEED... 24 HOURS A DAY... GET A NOAA WEATHER RADIO!



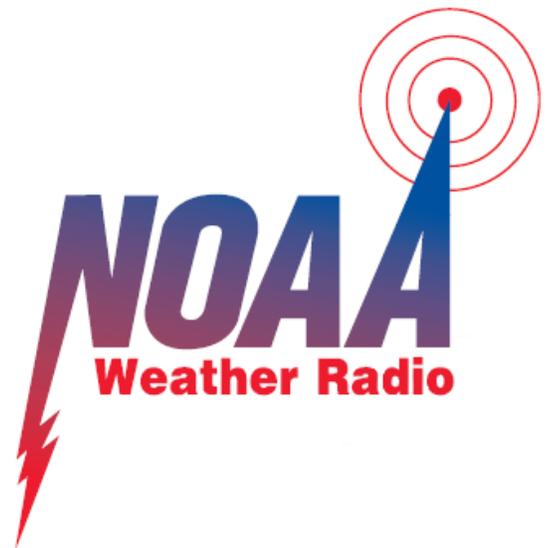
For weather information call the weather line at (520) 881-3333 or listen to:

NOAA Weather Radio At:

WXL-30 (162.400 Mhz) For Eastern Pima and Southeast Pinal Counties

KXI-24 (162.550 Mhz) For Graham, Greenlee, and Cochise Counties

WNG-703 (162.500 Mhz) For Santa Cruz County





520 N. Park Avenue
Suite 304
Tucson, AZ 85719
Phone: 520-670-5156
Fax: 520-670-5167
Email: pamela.elslager@noaa.gov

**NATIONAL WEATHER
SERVICE**

We're on the web:
<http://weather.gov/tucson>

What you should report?

Tornado:	A tornado or a funnel cloud aloft
Heavy Rain:	A half an inch or more , if it fell in less than an hour
Hail:	Pea size (1/4 inch) or larger
High Wind:	Estimated or measured 40 mph or greater
Flooding:	Any kind of flooding
Snow:	One inch or more (2 inches or more if above 5000 ft.)
Visibility:	Less than one mile for any reason (fog, dust, snow)
Death/Injury:	Any weather-related reason
Damage:	Any weather-related reason (most often from wind)
Earthquake:	Any tremor

(520) 670-5162 or 1-800-238-3747

Spotter Training Dates

<u>Date</u>	<u>Time</u>	<u>Location</u>	<u>Class Offered</u>
May 4th	6:30 pm	Safford General Services Building 921 Thatcher Blvd., Safford	Weather 101
May 10th	7:00 pm	U of A Campus, ENRB Room 253 520 N. Park Ave., Tucson	Weather 101
May 18th	6:30 pm	Oscar Yrun Community Center 3020 E. Tacoma St., Sierra Vista	Weather 101
May 21st	1:00 pm	U of A Campus, ENRB Room 253 520 N. Park Ave., Tucson	Weather 101
May 21st	2:30 pm	U of A Campus, ENRB Room 253 520 N. Park Ave., Tucson	Weather 102