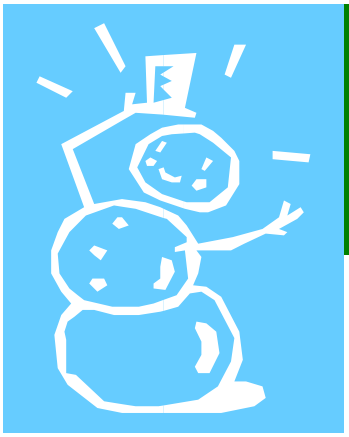


Sage Winds

Serving Southwest Idaho and Southeast Oregon Spotters and cooperative Observers

Volume 2, Issue 1 **Fall/ Winter 2006-2007**

National Weather Service Boise, ID

Coming Soon—SkyWarn Spotter Recognition Day!

The National Weather Service in Boise, Idaho is looking for licensed Amateur Radio operators to help us man the radios during SkyWarn Recognition Day. We have radios that cover the entire radio wavelength spectrum from 70 cm to 80 meters.

SkyWarn Recognition day runs from 5pm Friday December 1 through 5pm Saturday December 2. If you would like to be here the entire 24 hours, we would be glad to host you. But if your interest is only for an hour or two, please come.

SkyWarn Recognition Day was developed in 1999 by the National Weather Service and the American Radio Relay League. It celebrates the contributions that volunteer SkyWarn radio operators make to the National Weather Service. During the day SkyWarn operators are encouraged to contact other radio operators across the world and spread the word about how amateur radio can be used for the protection of life and property.

If you would like to volunteer, contact Paul Flatt or Dawn Fishler at (208) 334-9861 (paul.flatt@noaa.gov or dawn.fishler@noaa.gov).

Come for the day, come for an hour. Get a personalized tour of the NWS Forecast office while you use our radios to contact other SkyWarn spotters from across the country. A contest could be set up, just for fun, to see how many contacts can be made.

More information on SkyWarn Recognition day can be found at http://www.crh.noaa.gov/hamradio/index.php

Those SkyWarn Spotters who are not radio operators are welcome to visit the Boise weather office for a personalized tour during an open house we will be having from 11 am to 3 pm on Saturday, December 2. Snacks will be provided.

Event details:

- **Saturday, December 2**
- **11am—3 pm**
- **National Weather Service, Boise**

  3833 S Development Ave.

  Bldg 3807

  Boise, ID 83705
- **Snacks will be provided**

(We are co-located with the National Interagency Fire Center, next to the Airport)

Inside this issue:

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."

The Trouble With Predicting Winter Precipitation Type

By Stephen Parker, Lead Forecaster

As you all know, things do not always go according to plan when predicting the type of precipitation we will see during a winter storm. In the populated valleys, we have seen rains with the temperature at 33 or 34 degrees F, even though heavy snow was forecast. We have also occasionally seen heavy snow when a cold rain was forecast. For the mountains, predicting the snow level is always a difficult, especially when it can change rapidly right in the middle of a storm. Lastly, icing events present special forecasting issues, and are perhaps the most dangerous weather phenomenon the winter season has to offer. In these next few paragraphs, we will give you an idea of the complexities of winter precipitation forecasting.

It all starts with determining how cold the air is - both near and well above the ground, and how it may change as a winter system moves into the area. If the air above you is all above freezing, then there's no doubt that rain will fall. If it is all below freezing, typically you get snow (although, believe it or not, sometimes you don't!). The most difficult situations arise when the air above you alternates between layers of above and below freezing temperatures. This can lead to sleet, snow, rain, and/or freezing rain, depending on the location, depth, and exact temperature of each layer at any given location. And these temperatures can vary greatly over short distances.

As an example, if both the air near the ground and the ground itself are below freezing, but a few thousand feet above the ground there is a layer of air that is several degrees above freezing, you stand a good chance for freezing rain or sleet (See Figure 1). When freezing rain occurs, it means that snow, forming in very cold air well above either of these layers, has fallen into the warm layer and melted, then fallen through the lower cold layer and frozen upon hitting the ground. If the near-surface cold layer is too cold or too deep, the rain will likely freeze into small ice pellets before hitting the ground. Most folks call this sleet. Of course, there are always more possibilities. If the warm layer is not large or warm enough, the snow will just fall right through it and land as a relatively wet snow.

Often, the atmosphere is changing rapidly due to winds above the surface. These winds move layers of air around, and as a result, all three types of precipitation can occur within a few hours or just a few miles of each other. This becomes quite difficult for us to forecast, and can be quite frustrating for all of you. The difference between snow and rain can be as little as one degree in just one of these layers of air!

We will continue to do our very best to bring you the most accurate winter weather forecasts possible, and now you know just a little more about how tricky it can be.

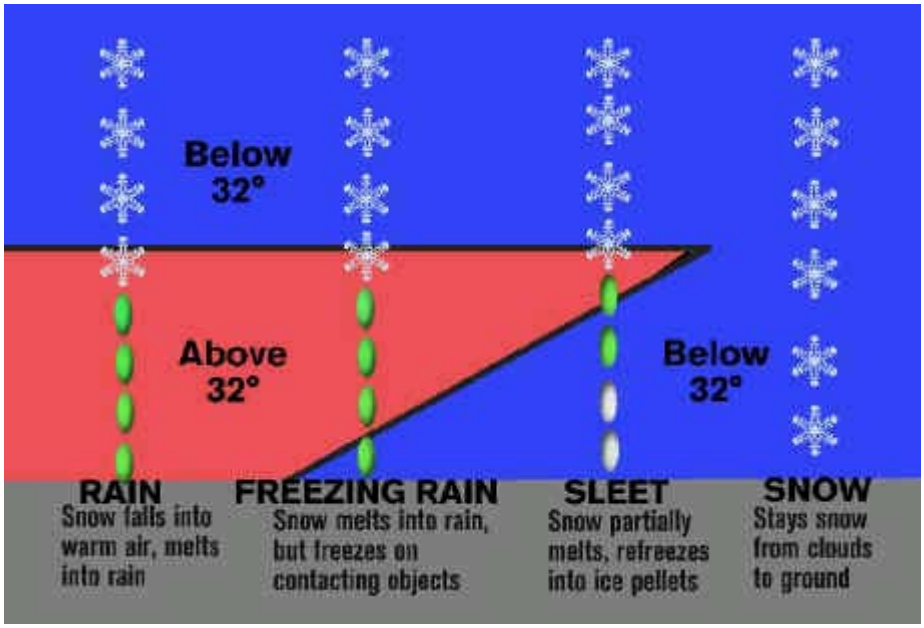


Figure 1: A schematic of how 4 different surface precipitation types can all result, even if initially snow fell from the cloud, depending on the vertical temperature profile.

How to Properly Measure Snowfall

Whenever there is a snowfall in Southeast Oregon and Southwest it is especially important for the National Weather Service in Boise to get accurate snowfall measurements from all across the area. Snowfall can vary greatly over a small distance so please do not assume that we have enough reports and always call in your snowfall totals.

To learn how to properly measure snowfall we are first going to define a few items.

***Snowfall** is the depth of new snow that has fallen in the last 6 to 24 hours.
***Snow water equivalent of snowfall** is the water equivalent of all the new snowfall.
***Total snow depth** is the total amount of ALL snow on the ground, old and new.
***Snow water equivalent of total snow depth** is the water equivalent of the total snow depth.

Before the snowfall season begins, place a snowboard outside on a level surface. A snowboard is usually just a piece of plywood that is ideally 16 x 16 inches and painted white (to minimize heating by sunlight) which serves as a flat space for accurate snowfall measurements. Don't place your snowboard in a large open space where wind could cause snow to blow off the board and cause low measurements. Erroneously high measurements will occur if you place the board near a house or a fence where snow drifts can accumulate. If you live in an area where snow remains on the ground throughout the winter season then place a flag or a marker of some kind that will alert you to where the snowboard is. If a snowboard is unavailable then try to take multiple measurements, with a ruler, on other hard surfaces to get an idea of how much snow had fallen. Ideally take and report measurements every six hours and then report your 24 hour total. The snowboard should be cleared no more than every 6 hours and no less than every 24 hours. Report snowfall to the nearest tenth of an inch.

To find the snow water equivalent of snowfall, simply take a round container, such as a coffee can, and push it into the depth of the new snow pack, taking a core of the snow. Take the sample inside and allow to melt and then measure the amount of liquid water in the can. If you do not want to wait for the sample to melt, simply add hot water to the snow sample, making sure to note how much water (to the nearest hundredth of an inch) was added, and then subtract the liquid added from the total amount to find the water equivalent. The snow water equivalent should be measured to the nearest hundredth of an inch.

Many valley locations never have a continuous snow depth, but those in higher elevations can often have 6 inches to many feet of snow that stays on the ground throughout the winter season. Often, we will ask these spotters for the total snow depth at their location. What works best and gives the most accurate measurements is to use another piece of light-colored wood to lay stationary on the ground all winter, marked by a flag so it can be easily found under several feet of snow. Try to find a place that is representative of how much snow you get, not in a snowdrift pile or where it gets blown clear. If you do not have a board, then just take at least three different measurements in undisturbed places in your yard and take an average. Measurements should be made with a ruler or yardstick and reported to the nearest inch.

The snow water equivalent of total snow depth is a great resource to evaluate the potential for flooding due to melting snow and to see what the future forecast water supplies will be. To calculate this amount, follow the same steps that you would when measuring the snowfall liquid equivalent, but cut your core measurement through the entire depth of the snow.

The most useful way to report snowfall is to give specifics such as: 'I received 3 inches of snow on a particular day. It started around 5 am this morning and was heavy at first. The snow stopped between 8 am and 10 am and then it started lightly snowing again before turning to rain at 1 pm. Precipitation ended just after 4 pm.' Being able to give us specifics on when the precipitation stared and ended, what the intensity was while it was falling, the total accumulation between the hour it started and the hour it ended is giving us the most helpful information. This in turn helps us become better forecasters which helps you receive more accurate weather information.

What Products Should I look for to Alert me to Upcoming Winter Weather?

Outlook: Issued 2-4 days in advance of an upcoming system when it looks like conditions will be meeting warning or advisory criteria. Good chance that the event will occur, but lower forecaster confidence than in a watch or warning situation.

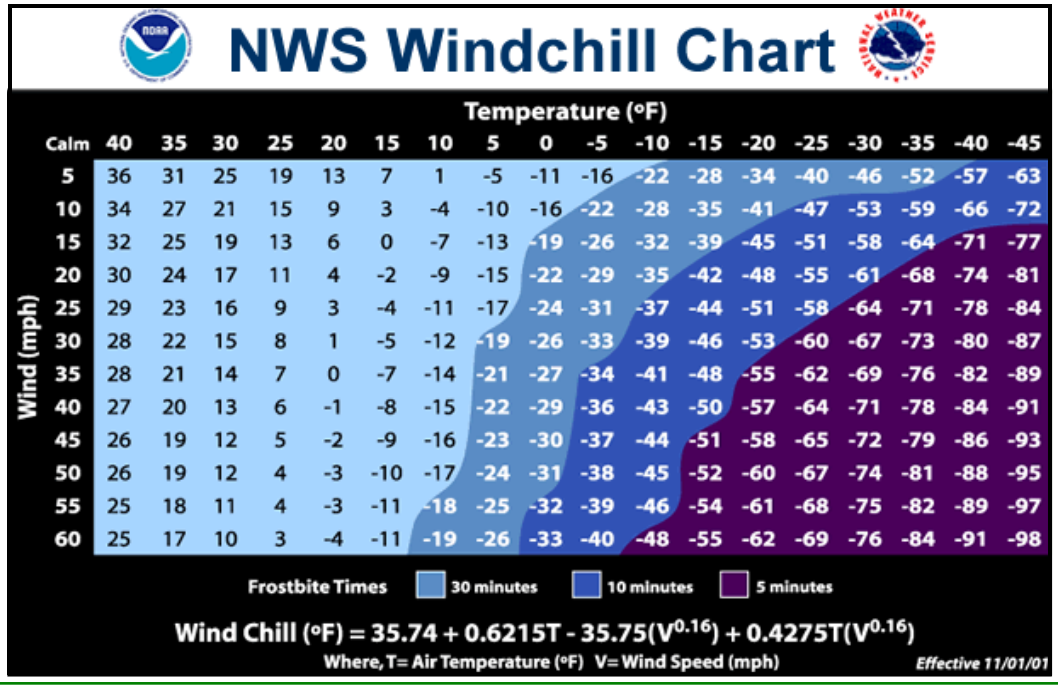
Watch: Issued when confidence is 50% or greater that an event will meet warning criteria. Generally there is a 12 to 48 hour lead time frame.

Warning: Issued when an event matching established criteria is occurring, imminent, or has a significant probability of occurrence within 36 hours.

Advisory: Issued for certain events that have a significant probability of occurrence in the first 36 hours. These events are not defined as life-threatening by themselves, but they could become life-threatening if caution is not exercised.

Common Winter Warnings and Advisories

* **Winter Storm Warning:** Two or more winter events from a single storm including snow and blowing snow, or snow and sleet.
* **Heavy Snow Warning:** While this varies by location, generally four inches in 12 hours or six inches in 24 hours in the valleys, and 6 inches in 12 hours or ten inches in 24 hours in the mountains.
* **Blizzard Warning:** Sustained wind greater than or equal to 35 mph and visibility less than or equal to a quarter of a mile lasting at least 3 hours.
* **Snow Advisory:** Also varies by location, but generally two inches in 12 hours or four inches in 24 hours in the valleys, and three inches in 12 hours or six inches in 24 hours in the mountains. Snow Advisories will not be issued for elevations above 6000 feet.
* **Blowing/Drifting Snow Advisory:** Intermittent visibility less than or equal to a quarter of a mile due to blowing/drifting snow.



The Windchill Temperature is how cold people and animals feel when outside. Windchill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. Therefore, the wind makes it FEEL much colder.

Attention all HAM Radio Operators

I have had requests for NWS Boise Skywarn spotters who are also HAM operators to be able to share their information with each other via radio and/or email. I will NOT share anyone's information without consent, but if you are interested in this option, please send an email to me (Dawn.Fishler@noaa.gov) and I will compile a list of those who want to share. In your email state if you only want your call sign or email address to be shared, or if both can be shared. Also, let me know if I can share your name, whether it is only first name or if it is first and last. Once I have a group established I will send out an email with the information that you want shared to all who responded. HAM operators can then share their weather reports with each other on their radios while the event is occurring.

Why isn't there an extensive HAM operator network for the Boise Weather Service?

Simply, we just don't have enough long-lived, severe weather to have one in place. One option we are putting out there is during the few longer-lived severe events we get here in Idaho if any operators are near the NWS office, they are welcome to stop in and set up a network. Please call the office ahead of time so that we can get you clearance.

El Niño in the Pacific Ocean Likely to Affect Our Weather This Winter

By Jay Breidenbach, Hydrologist

El-Nino conditions developed in the tropical Pacific Ocean in September. El-Nino is a natural phenomenon which occurs on an irregular cycle about once every 3 to 5 years. El Nino can best be seen by comparing current ocean temperatures to long term averages (shown in figure1). During the month of September Sea Surface Temperatures (SST) were above normal in a band extending along the equator from the Coast of South America out to the international date-line southwest of Hawaii. Warmer than normal water in this area of the Pacific Ocean, is expected to disrupt weather patterns around the World this winter. Here in south western Idaho and south eastern Oregon, El Nino conditions usually cause winter to be drier and warmer than normal. It doesn't always work out that way, but it certainly increases the likelihood of experiencing these types of conditions. In fact, that is exactly what the official winter forecast from NOAA's Climate Prediction Center shows—an increased probability of warmer and drier weather over much of the Pacific Northwest. This also means that this winter's snow pack is not likely to be as high last winter which was affected by La-Nina conditions, or cooler than normal water.

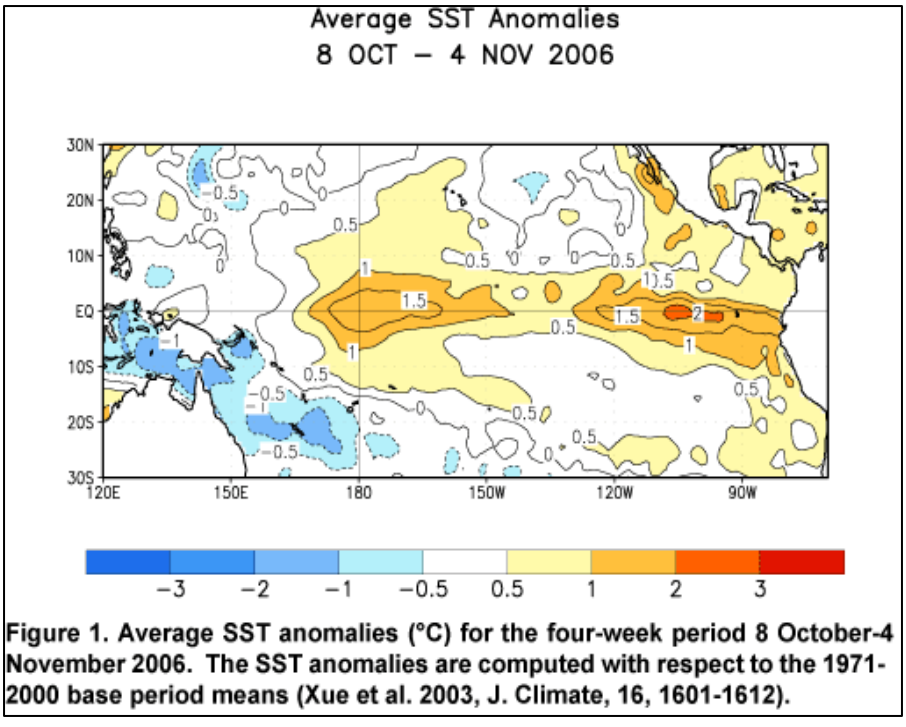


Figure 1. Average SST anomalies (°C) for the four-week period 8 October-4 November 2006. The SST anomalies are computed with respect to the 1971-2000 base period means (Xue et al. 2003, J. Climate, 16, 1601-1612).

Busy Fire Season For Boise National Weather Service

By Coleen Decker, Assistant Fire Weather Program Manager and Incident Meteorologist

The Summer of 2006 was an active Fire Weather season for the National Weather Service Forecast Office in Boise. During the months of July, August and September, we had a total of 22 Incident Meteorologists (IMETs) assigned to wildfires in our County Warning Forecast Area (CWFA). These specialized weather forecasters worked on location specifically for incident management teams of fire fighters, mainly in Valley and Boise Counties. In addition to these 22 professionals, four IMET trainees gained valuable on-site experience with weather forecasting and briefing their customers.

Fire fighters and decision makers on wildfires are particularly interested in wind shifts, temperature inversions, and dryness level trends. The IMETs assigned to our area coordinated closely with each other and the Boise NWS team on a daily basis about these specific weather concerns and many other details that pertained to fire weather including Fire Weather Watches and Red Flag Warnings. These Watches and Warnings are issued for rare events including combinations of extremely dry fuels, low humidity, and strong wind. They are also issued for land management agencies whenever the weather forecast team anticipates dry lightning in areas of extremely dry grass or timber.

In all, about 800,000 acres were burned within the boundary of our Forecast area. Conversations with the Boise and Payette National Forest staff indicate that the severity of these wildfires was minimal on most counts. As a result, much of the fire that burned this season was helpful to Mother Nature as it cleaned up the understory ladder fuels that could potentially lead to more intense burning.

At least three precipitation events have led to a transition from wildfire season to what we call "Spot" season: one on the 19th and 20th of September; another on October 4th; and yet another on October 15th and 16th. Fire Weather duties at the Boise NWS Forecast Office have shifted focus from wildfire to prescribed fuel treatment as a result. Spring and Fall weather conditions lend themselves to controlled burning for fire agencies and many "Burn Bosses" rely on our Spot Weather Forecasts to get a jump on the weather they can expect if they burn. So far this season the Boise NWS has issued 340 such Spot Forecasts and depending on the weather could see a few dozen more before the Fire Weather Season comes to an end October 29th.

Above: Coleen Decker, Incident Meteorologist (IMET), gets ready to take a vertical measurement of the atmosphere while on a fire site this summer.

What is an IMET?

Incident Meteorologists (IMETs) are a group of about 70 meteorologists within the National Weather Service who are specially trained to go to wildfires and other incidents to provide weather forecasts and briefings to incident responders and command staff. The meteorologist's forecasts ensure the safety of operations and allow responders to plan operations taking into account one of the most changeable aspects of an incident, the weather.

To become certified, IMETs have to undergo a series of trainings, including a week-long workshop held here in Boise at the National Interagency Fire Center (NIFC) during the early spring. Even those who are certified must attend this training annually to keep their certifications. IMET trainees also need to go on at least two fire assignments with a certified IMET.

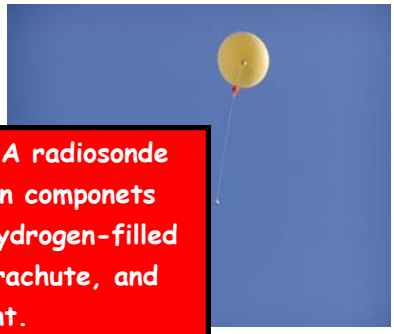
IMETs need to forecast all the local microclimates and circulations that set up during each day. Here in the west, mountains make for especially complex terrain. When a strong wind event takes place this can be extremely hazardous to the fire fighters on the front line. IMETs need to figure out how the terrain will affect the flow, which is generally channeled through valleys and drainages. The specialized forecast IMETs give during events help to save lives and bring resources to where they need to be.

As the IMET program continues to expand, these specialized meteorologists are not only responding to fires but are also having the capability to respond to high impact environmental all-hazard events. This past May a week long all-hazard training was held at NIFC to expand their knowledge of these events.

IMETs have been protecting the nation's incident responders for nearly 90 years and will continue to be an extremely valuable aid for years to come.

The End of an Era

The end of October had brought the end of an era for the old MicroArt Upper Air system, which has been in use since the 1980s. It is being replaced by the new Radiosonde Replacement System (RRS) which will be using GPS technology to track the instrument as it makes its ascent up to over 100,000 feet above sea level. The RRS will be more reliable than the old system and will be easier to maintain. The MicroArt system used radio signals to relay the information from the instrument back to the antenna. This information was then fed into a computer to quality control and transmit the incoming data. This computer was antiquated—one of the first IBM computers ever made for personal use. Due to such old equipment, parts were hard to maintain and at rare times a flight was missed due to equipment failure.



Above right: A radiosonde in flight. Main componets include the hydrogen-filled balloon, a parachute, and the instrument.
Right: The inflation building at the Boise, NWS prior to the upgrade.
Left: The crane replacing the dome with the new tracking device inside.
Photo by: Valerie Mills, Lead Forecaster

The RRS will be using GPS technology transmitting the radiosonde signal to satellites and back to the computer in our office, making it far easier to track over its two hour flight. The new computer will be up-to-date, using current PC technology, and will offer far more editing and viewing options. There will be more levels sampled which will lead to a more accurate Skew-T/ Log-P upper air plot.

These upper air soundings are taken twice a day and are part of the most important observational data that forecasters have available. The data is also used in all weather models.

A Spider's Influence on Forecasting and Flying

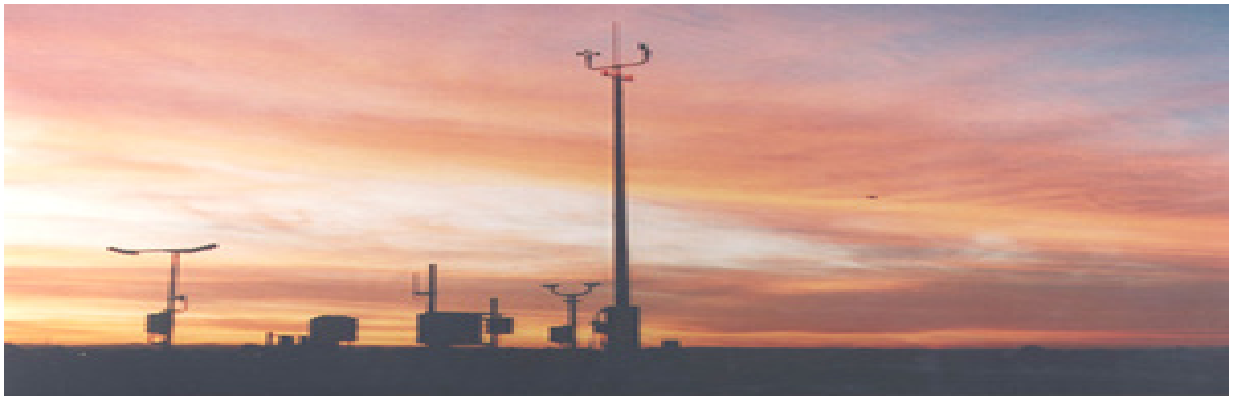
By Dave Groenert, Forecaster and Aviation Focal Point

Four times a day, meteorologists at the National Weather Service office in Boise, Idaho make a forecast for five airports in Southwest Idaho and Southeast Oregon (Boise, McCall, Twin Falls, Baker, and Burns).

These forecasts describe the wind, visibility, sky cover, and weather expected to occur over the succeeding 24 hours within 5 miles of each airport. The variables are observed via a remote sensing instrument known as an Automated Surface Observing Systems (ASOS) similar to the one pictured on the left.

While forecasting those four variables are a challenge to begin with; during the fall Mother Nature adds another variable. Spider webs. Each fall newly hatched spiders, known as spiderlings, climb up onto a nearby object, anchor themselves to that object, and then send a silk string into out into the air. These strings, also known as gossamers, get caught up in the breeze and lift the spiderlings into the air, which is referred to as ballooning. It is the silk strings that these spiders both anchor themselves with and travel on that can interfere with the ASOS. Of the different weather conditions these stations measure, the visibility sensor is most affected by the accumulation of the gossamers. The sensor reports a reduced visibility, sometimes down to less than one mile, as a result of the buildup of spider silk. In this way it affects pilots flying into the airport and the meteorologists making forecasts for the airport.

The observation of visibility at an airport is important to pilots, who use it to determine whether or not they can safely navigate the airspace in the vicinity of an airport. Meteorologists use the visibility observations, as well as observations of other variables, to make any necessary amendments to their forecasts. A false report of low visibility can unnecessarily keep a pilot grounded and result in an unrealistic forecast. From a meteorologist's prospective there are other variables which can help narrow down the cause of reduced visibilities. Upon determining the cause of the reported lower visibilities forecasters can relay this information to the necessary outlets so that pilots are able to make a better informed decision. Typically it is the smaller, more remote airports that are affected by spider silk. Depending on the amount of accumulated gossamers the false visibility sensors can be cleared by an increase in the wind, the occurrence of precipitation, or by manually cleaning the sensor. An example of just how much spider silk can be deposited on an ASOS can be seen below. The information on how spiders launch themselves to the wind (told as if you were the spider) was found at: http://www.mdc.mo.gov/conmag/1998/10/60.htm



Spotter Reports That Proved to be Critical in an Important Warning Decision

By George Skari, Lead Forecaster

On June 4, 2006, a devastating F2 tornado occurred in the tiny community of Bear, ID in Adams County. This tornado was the strongest tornado to occur in Idaho in 50 years. Tornadoes are rare in Idaho and Eastern Oregon, but when they do occur, they are usually the smaller and weaker variety F0 or F1 on the Fujita scale of intensity. On this seemingly quiet Sunday morning, however, several areas in Baker County, Oregon and Adams County, Idaho were shaken by the destructive forces of nature.

The meteorologists on duty at the Boise National Weather Service Office made extensive use of spotters in the path of the supercell thunderstorm that produced the large scale blow down of trees as well as the Bear, ID tornado. The first calls were made to spotters in Unity, OR who gave us ground truth reports of high winds estimated to be 60 mph, followed by additional calls to spotters in Sumpter, OR who confirmed that the storm was producing large hail, high winds and heavy rain as it passed over them. It was because of these timely and detailed reports combined with our analysis and interrogation of Doppler radar images the forecast team on duty was able to determine that a severe thunderstorm was occurring. This storm was along a squall line just west of Baker City, OR and was likely developing into something much larger and more destructive than is usual, especially in our area of the country.

As the line of storms moved northeast and intensified between Halfway, OR and Hells Canyon, additional spotters were alerted ahead of the storm in Adams County, where the supercell thunderstorm was now heading. Just minutes after the first calls to spotters in Cuprum, ID and in Bear, ID, these same spotters called back with reports of numerous trees blow down, structures falling around them, and one person that was trapped inside a home due to falling debris. These first hand reports at ground zero enabled the forecasters to pinpoint the exact location of the intense supercell and make critical warning decisions with very good lead time.

Had it not been for these timely and accurate reports by our spotters along the storm track, we may not have know exactly what was happening in real time and perhaps a critical warning may have been missed. Instead, we had an almost ideal situation of having ground truth information of what was happening under this severe thunderstorm. The spotters provided extremely valuable information and were diligent and calm calling in the information while at the same time facing property damage and possible bodily harm in the path of the tornado.

All of your reports are always extremely valuable to us and some reports, such as those on June 4th, proved to be critical in making important life-saving decisions. This was a rare and destructive event, but it can happen even here, an area generally not associated with abundant severe weather. You just never know when you may get a phone call from the National Weather Service. We express our sincere gratitude to you in providing an important service. Keep up the great work!

Left: A picture of the blown down trees in Bear, ID

Right: The actual storm as seen by radar as it passed over Cuprum and Bear, ID

National Weather Service

NIFC-National Weather Service
3833 S. Development Ave.
Building 3807
Boise, ID 83705

Phone: 208-334-9860
Fax: 208-334-1662
E-mail: Boi.Spotter@noaa.gov

Always Report!

Every Report benefits the warning process that may save lives! Never assume that we already have the information you could provide.

NOAA's Weather Radio

NOAA Weather Radio Frequencies:

Boise: 162.550 MHz

McCall: 162.475 MHz

Payette: 162.400 MHz

Twin Falls: 162.40 MHz

Mark Trail image courtesy of North America Syndicate, Inc., World Rights Reserved

Working Together to Save Lives

Skywarn Spotter Reporting Criteria:

Call us when your observe:

* **Tornado:** All tornadoes
* **Funnel Clouds:** All funnel clouds, watch for rotation
* **Hail:** 1/2" in diameter and larger
* **Near continuous Lightning**
* **Winds:** All winds greater than 35 mph
* **Heavy Rain:** Falling at a rate of 1" per hour or greater (1/2" in 30 minutes), or more than 1" per day in the winter
* **Freezing Rain:** Any measurable freezing rain
* **Heavy Snow**: 1" per hour or greater, or storm total 4" or more, or snow causing road closures
* **Flooding:** Any water flowing where it doesn't normally or rivers flowing above their banks
* **Low visibility:** Visibility less than 1/4 mile for any reason
* **Weather Related Damage, Death, or Injury:** If weather causes damage, death or injury, please let us know

We're on the Web!
http://weather.gov/boise

*****Please remember that to keep your information up to date. If you wanted a COLOR copy of the newsletter please send your email address to: Dawn.Fishler@noaa.gov*****