Experts discuss early start to Southwest fire season

The Southwest's fire season started in February, a month earlier than usual. Dry conditions throughout the state led Arizona Governor Janet Napolitano to declare a state of emergency regarding the wildfire season on February 22. New Mexico's conditions are just as bad as Arizona's, if not worse(Figure 1). With this in mind, CLIMAS invited several people with expertise in fire management, behavior, and history to share some of their insight during a March 1 roundtable discussion.

During March 10-12, heavy precipitation visited our region, including substantial snow throughout eastern Arizona's high elevations. While this precipitation undoubtedly temporarily decreased fire potential, the concerns expressed by our fire roundtable experts are likely to be important factors when temperatures rise and relative humidities decrease during the arid foresummer in May and June.

Roundtable Participants

Rich Naden
Fire meteorologist,
Southwest Coordination Center, Predictive Services

Stephen Campbell
Natural resource specialist, and director
UA Cooperative Extension, Navajo County

Thomas Swetnam
Fire ecologist, and director
UA Laboratory of Tree-Ring Research

Melanie Lenart
Roundtable moderator and research associate,
Climate Assessment for the Southwest (CLIMAS)

Lenart: Thank you all for participating today. Maybe a good start would be for Rich to give us some background on the region as a whole, and what we're facing right now. Phoenix hasn't had rain since October 18 and the rest of the state isn't much better. I don't know if New Mexico is getting any rain today [as predicted] or in the same situation, so why don't you tell us about it?

Naden: Albuquerque had the driest November through February in city history. The whole region—Arizona, New Mexico, and West Texas—is the same way. Things are very dry and we've had almost no winter precipitation. The storm track has been further north. It appears to be related to the La Niña pattern, which is pretty typical. So that's where we stand right now, and we've already had some fires. We have our sleeves rolled up for quite a season.

Lenart: Can you tell us about the fires? One started in Arizona yesterday. Is it under control yet?

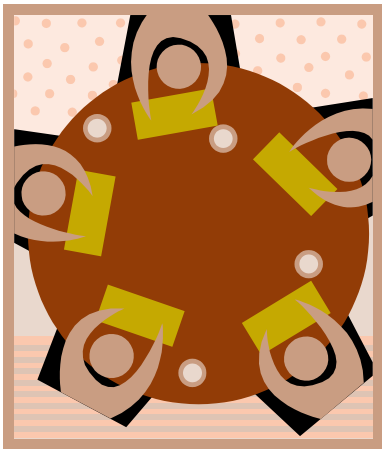
Naden: They're getting it under control. Control hasn't been a big problem so far but this type of activity this early in the year is indicative of what's to come. That's our concern right now—there are no huge indications of large storms except possibly during next week. It's probably too little, too late because the snowfall has been so low throughout the region.

Lenart: This year we're more concerned about forests than grasslands, right?

Naden: Last year, the snow we had geared the focus toward lowland grass and finer fuels. It's difficult to say that there won't be problems with finer fuels this year since it's been so dry. More of them developed last year and they're still around, and the timber areas are dry and vulnerable. We're preparing for a major season for all fuel types.

Lenart: Steve, you're in the White Mountains of Northern Arizona. How are conditions there?

Campbell: Well, we're doing better than everyone else—we've had 0.17 of an inch of moisture since October. We're worried about everything from the tamarisk corridors in the Little Colorado basin to the PJ [pinyon-juniper] grasslands that extend back toward the conifer and spruce. As of March 1, we're at



4 percent of our normal snowfall in the mixed conifer and spruce areas and at less than 1 percent of what it should be for the juniper and ponderosa pine. We have a tremendous amount of standing grasses and wildflowers—which everyone enjoyed so much during the summer and are now dry weeds—across almost the entire pinyon and juniper area. I guess we could just call it juniper now because almost all of our pinyons are dead [from drought and bark beetles]. There is also a lot of buildup of finer fuels which could carry a fire through the woodland juniper and, in fact, that kind of fire could happen any minute. The right set of conditions could be very ugly for that area.

Lenart: Tom, could you tell us how the El Niño and La Niña conditions affect this?

Swetnam: We first started looking at this about 15 years ago when everyone became interested in looking at El Niño relationships to precipitation. Almost immediately, we saw that in the statistics of area-burned in the Southwest, you have larger areas burned during La Niña years with lower rainfall. During El Niño, things are wetter and the area burned is usually smaller. There's a lot of variability, though—every year is different. In the long-term record from tree rings going back 300 to 500 years, we see the same relationships. Drought

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years are well correlated with fire years. In the pine forests, not only is there a relationship between drought and fire, there (also are correlations with) wet conditions one to three years prior. So when dry years follow wet years, that combination tends to result in large areas burned in forest landscapes.

Lenart: That's what we're facing this year?

Swetnam: Last winter was extremely wet with an impressive wildflower season, as Steve pointed out. Last year we had a very healthy production of vegetation in the lowlands and then it got really hot and dry and, as you know, a lot of the lower elevation areas burned last year. But these fine fuels have built up over time and weren't all burned last year.

Lenart: Rich, how do you manage for a season like this?

Naden: As far as management is concerned, we don't have any additional staff yet. That may change quickly. We're bringing in a fire behavior analyst next week and are gearing up our outlooks several weeks to a month early—the seasonal outlook should be ready by the end of March. We don't have any other significant staffing changes because we're a resource maneuvering type of outfit. We're expecting some serious problems throughout the elevation types and in all fuel types—the stage is set since there are lots of fine fuels out there, the snowpack is almost nonexistent, and the trees are ready to go. We need to get the message out to homeowners.

Lenart: I know the Southwest fire season tends to start earlier than others in the country, so are you able to get resources from outside the region to help out?

Naden: We're definitely hoping so. Since the season does start earlier than almost all others except the Southeast, and we've been loaning some of our resources to the Texas-Oklahoma-Arkansas area, we should be able to bring people in. We're hoping that our season will end earlier, too, but that's just a nice thought. We're praying that the monsoons come early. Some research suggests that when we have a season like this [with such low snowpack], the monsoon tends to come a bit earlier and be more robust.

Figure 1. The current Southwest Coordination Center significant fire potential outlook shows above-normal fire potential for much of the Southwest. This outlook is valid March 1–31, 2006. Source: http://gacc.nifc.gov/swcc/predictive/outlooks/outlooks.htm.

Swetnam: Some studies have shown a slight tendency for early monsoonal moisture in a season like this but it's a weaker relationship than the El Niño/La Niña relationship to winter precipitation. Rich, do you know of any management initiatives with regard to prescribed burning in a situation like this? I'm wondering if the land management agencies move into a different mode in a season like this, or if prescribed burning is still on a forest-by-forest case.

Naden: The weather this year has allowed us to meet prescribed burning targets throughout the winter because of the lack of snow and other precipitation. We can start pulling back now as the windy season approaches. Any further burns will be very tightly regulated.

Campbell: In the Apache Sitgreaves area, we have two concepts in use. There's the natural fire, e.g. lightning fire, which happens in an area where we can let it do its thing. Generally that is associated with the regular fire season into the monsoon season. The other side of the coin is our prescribed fire which we use in conjunction with thinning from below. Our prescribed burning throughout the winter has also been very aggressive, even within communities, but as we're getting into the season, the community gets more worried about burning. I don't know that the public knows how important low-intensity prescribed fire is to us in terms of thinning so that we can better manage the wildfire later. Even the Rodeo-Chediski fire demonstrated that in the areas where managed fire, thinning, and extraction had preceded it, the fire went to ground and there wasn't a lot of [tree] mortality. Teaching the public that all fire is not bad is something that takes a long time.

Lenart: What about property owners who live in or near the forests—is there anything they can do at this point?

Campbell: There's a lot they can do. In six weeks, any owner could clean up a property of less than two acres. They need to start at their house regardless of what the neighbor has done. They should start at the wall of their house and work outward, making sure there aren't any paths—e.g. strips of grass, dead leaves, or branches on highly flammable plants—through which fire can directly contact the structure. The next thing to do is clean up the ground of all the fuels up to the property boundary so that ground fire isn't a possibility and all the fire ladders are off the trees. Then they can look at the aerial portion of their trees. They don't have to have every tree standing alone but there has to

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be no way for fire to bridge from tree to tree or group. They should try to get to a point where there are 25- to 30-foot separations between canopy edges and 75 percent of what they see above them is empty sky. Once they've done all of that, they can worry about what the neighbor has done.

Lenart: We've been talking about the role of precipitation in increasing the fire risk. Does anyone want to comment on the role of the rising temperatures on this season and seasons in the future?

Swetnam: Drought is, of course, related to warmer temperatures as well as moisture deficits. We've been seeing trends of warmer temperatures in the Southwest which leads to reduced snowpack and earlier runoff, giving the soil and fuels more time to dry out. We don't know as much about the long-term temperature relationships with fire as we do with precipitation, but we're beginning to identify some patterns. Tony Westerling, at Scripps Institution in San Diego, has found a relationship between increased temperatures and fire occurrence over the last 50 years in the western US. [For more information, see the *Bulletin of the American Meteorological Society*, May 2003, page 595.] Large fires have been occurring in recent years in middle elevation pine forests, but if temperatures continue to increase and the drought worsens, we may begin to see more fires occurring at the highest elevations in spruce and fir forests.

Naden: Temperature also affects fuel moisture. In general, the warmer the temperatures are, the lower the fuel moisture is. This leads to longer burning times in winter which continues into the spring and summer. As long as we have this warming, which I believe will continue through the foreseeable future, this will be a problem. The snow totals will probably continue decreasing and occurring only at higher elevations, so runoff will decrease, and eventually we will have groundwater problems as well. If we don't have colder nights, the trees—which are already drought-stressed—will become more vulnerable to insects.

Campbell: Temperature can be a component of fire behavior which spills over into intensity and severity of the burn. In the Rodeo-Chediski fire [of 2002] we had nighttime fire behaviors—connected to higher nighttime temperatures—[leading to fires] that never really abated the way they should have. In Mount Baldy, Paradise, and some other areas, we've completed almost 170 years without a major fire. Tree stands are degraded, so there are high amounts of dead and downed trees, which gives us many tons of fuel. If we have a fire start that misses the initial attack [of firefighters], we could potentially burn off that entire area.

Lenart: I think we're all properly scared now. Are there any final comments?

Campbell: There are a lot of other things we can do and are doing to reduce the fear level. All of our fire districts and local governments have developed fire restriction ordinances so we're taking a coordinated approach with the agencies to keep from restricting people's activities so we don't drive them deeper into the forests and canyons. Every major fire in the White Mountains has come at a time when we had forest restrictions and closures. For example, the Three Forks fire [of 2004] was caused by campers who had moved back into hidden areas because of restrictions in other areas.

Lenart: So are you trying to leave fringes of forests open so people can get in without having to hide out?

Campbell: Yes. We're looking at keeping campgrounds and other improved areas open and at modifying the restrictions which would outlaw, for example, charcoal grills. You couldn't go out on your back patio and grill a steak if the restrictions were in effect on the edge of a forest. The effect of that grill on the community is minor compared to the effect if someone takes it deeper into the forest and dumps their charcoal remnants. We're trying not to push people out of the areas where we can have a fast response time.

Naden: I'd like to say a bit more about weather. We're significantly concerned with regard to the overly dry November through February. The storm predicted for the week of the tenth here should help us out a bit but there's no doubt that by late March to early April the [fire] season will be upon us. We hope for a strong monsoon for our water resources and reservoir levels as well as for fire management. Arizona is always above normal in terms of temperatures except when we have extensive cloud cover and even then we don't get below normal. We'll have to see how the forests deal with extended warm temperatures over time.

Swetnam: A combination of forest changes have occurred because of past land-uses and management. Some forests have become very dense because of past logging that was not followed up with thinning of the many trees that regenerated after the logging. Intensive livestock grazing and fire suppression also led to reduced wildfires, and this allowed many trees to establish and forest fuels to accumulate. Invasive species have now become a huge problem, as was evident last summer when large areas of the Sonoran Desert burned. Invasive species that burn very readily, like buffelgrass and red brome, have moved into the desert, where fires rarely if ever burned before. Now, add to all of these problems climate change and increasing human populations, and you can see what a mess we're in! Our challenge is to get the message out, not to scare people as much as to move them to action... Community involvement is the key.

Lenart: Thank you all for your insights.