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2011 FOREST HEALTH CONDITIONS REPORT STATE AND PRIVATE LANDS

The most impressive events affecting forest health in 2011, was the unprecedented amount of damage and destruction to our forests, caused by the two major fires in eastern and southeast Arizona. An estimated 500,000 acres of forests and woodlands were affected by the fires. However, damage by the Wallow fire was variable depending on vegetation type, elevation, slope, aspect, fire behavior, and local weather conditions. The most heavily damaged vegetation type was ponderosa pine, mainly due to the small size and high density of the trees. About 150 years ago our ponderosa pine forests were mainly open and park like. With groups of large trees surrounded by scattered smaller ones, and interspersed with extensive expanses of native grasses. These large ponderosa pines were highly adapted to frequent low intensity fires. The mixed conifer vegetation type experienced more variable fire damage, with many burned areas exhibiting the desired mosaic pattern, which can help increase species and age diversity and improve wildlife habitat.

Wallow Fire



But some higher elevation mixed conifer sites on steep slopes were severely burned by the fire. However, aspen which is a major component of this vegetation type should largely benefit from the burns. It's a species which has drastically declined mainly at the lower elevations--but is highly adapted to fire by quickly producing many sprouts. Significant recovery of aspen is anticipated in the burned areas.



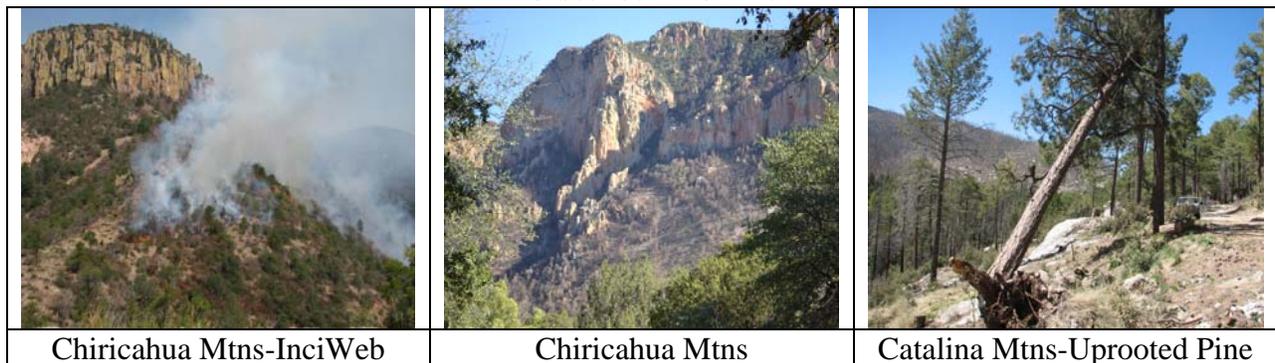
The high elevation spruce-fir vegetation type was probably helped the most by the Wallow fire. It's a vegetation type which has evolved to survive stand-replacing fires about every 150 years, allowing seedlings to become established, and resetting the ecological succession process after a major disturbance. Interestingly, at lower elevations the pinyon-juniper vegetation type on the northeast side of the fire, did not burn very well even after being intentionally ignited by firefighters.

Wallow Fire



The effects of the Horseshoe Two fire on the Chiricahua Mountains will be very complex due to the rough terrain and the additional vegetation types, which burned on this isolated mountain range. And like the Wallow fire, damage was variable depending on vegetation type, elevation, slope, aspect, fire behavior, and local weather conditions. However, based on a previous fire on the Catalina mountains also in the southeast, additional losses of surviving pines and other conifers is expected in the coming years, on the Chiricahua Mountains at higher elevations. During wet winters, surviving trees located along and on top of steep slopes and along canyons, will very likely be uprooted or broken off by strong prevailing winds. Loss of the surrounding trees to fire eliminates their supporting roots for the remaining trees growing in wet soils.

Horseshoe Two Fire



Prior to the big fires, lack of bark beetle activity statewide was going to be the major non-event in 2011. And even though the populations of these insects throughout the state was at low levels, ponderosa and pinyon pines scattered throughout the communities of Payson and Prescott, did see an increase in bark beetle mortality late in 2010. They may have been partially fueled by the extensive storm damage observed during the El Niño winter of 2009-2010. Damaged pines are excellent breeding material for bark beetles. The ponderosa pine trees damaged by the Hardy and Schultz fires in the Flagstaff area in June 2010, and the tornado damage that occurred mainly near Flagstaff in October 2010, were also expected to increase bark beetle numbers in that area in 2011.

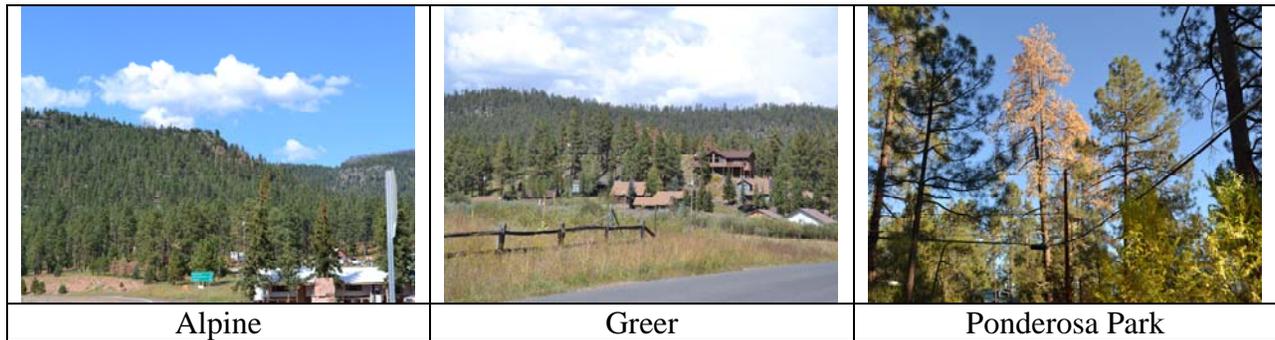
And finally, the La Niña forecast for the winter of 2010-2011 of below normal precipitation and above normal temperatures was also expected to increase bark beetle populations statewide.

However, the fact that we didn't experience above normal temperatures during the winter of 2010-2011, may have been one reason why bark beetle numbers were way down in 2011. Instead we experienced some very cold temperatures in November and December of 2010. And additional cold snaps were reported in January and February of 2011, followed by the unusual cold and late spring storm on May 18th and 19th. Very cold temperatures for extended periods of time during winter can cause mortality of overwintering stages of bark beetles on pines. Coupled with the lack of significant snowfall, which can act to insulate overwintering stages, this may have been the main reasons why bark beetle activity was minimal in 2011.

In fact bark beetle mortality was not detected on ponderosa pines until late August in the Alpine and Greer areas, adjacent to the forests burned by the Wallow fire. But there appeared to be no connection between the two events.

Finally in late September, the first bark beetle-infested ponderosa pines were confirmed in the community of Ponderosa Park and the surrounding forest in Yavapai County.

Bark Beetles



Probably the most interesting observation noted in 2011 which may have future repercussions, was the massive dust storm that arose in the Phoenix metropolitan area on July 5th. It towered an estimated 4000 to 5000 feet into the sky and was about 100 miles wide, traveling all the way up to the Payson and Pine-Strawberry area on July 6th. It was also noted west of Strawberry over to Camp Verde on July 6th. These areas may experience spread or increase in windborne forest insects and diseases including moths, scale insects, spores from rust and root disease, and the seeds of non-native invasive plants.

July Dust Storm



Fall webworm continued to defoliate an assortment of trees in northern Arizona in 2011. Cold winter temperatures apparently had no effect on the cocoons spun by the mature caterpillars, in protected places in the soil. Curiously, mature caterpillars were identified in late September scattered on a walnut tree in the Show Low area. This is late in the year for this insect in this area, and may be indicative of a delayed life cycle or a second generation. In addition, webbing produced by this caterpillar was observed on two new non-native hosts, including Pin oak in Show Low and Redbud in Pine.

They were also detected in Upper Oak Creek Canyon in August on walnuts and appear to be spreading up the canyon. It's possible they may show up in the Flagstaff area in the near future if the moths can find suitable hosts to lay their eggs.

Fall Webworm

		
Mature Caterpillar-Show Low	Pin Oak-New Host	Upper Oak Creek Canyon

Tent caterpillars were scattered in spring in the Payson and Prescott areas feeding on a couple of hosts. One interesting observation on a group of chokecherries north of Payson in early May, involved heavily defoliated trees which re-foliated in summer, and were again heavily defoliated by Fall webworm in September. The chokecherries should survive the two defoliations, but may lose some branches if the dual defoliations occur again in the future.

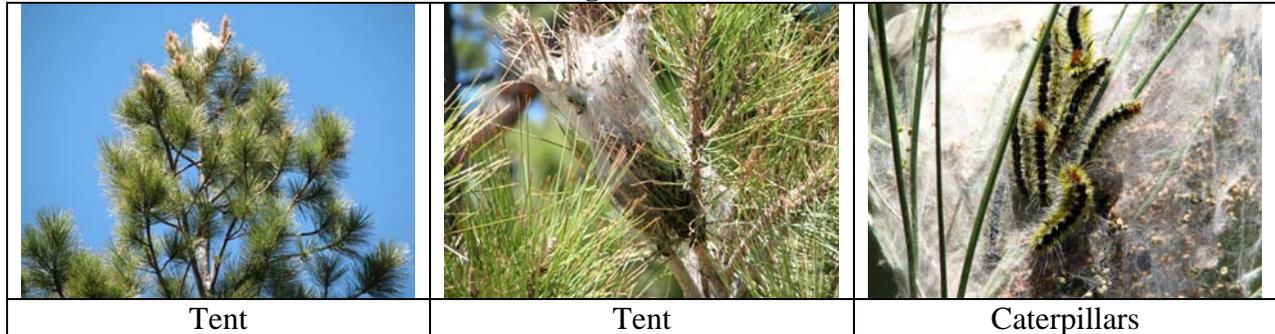
And tent caterpillars remained very active on the Catalina Mountains in May, mainly on aspen and willow for the third consecutive year. They were also identified feeding for the first time on a native currant in the southern part of the state.

Tent Caterpillars

		
Chokecherry-Payson Area	Emory Oak-Prescott	Currant-Catalina Mtns

Tiger moth tents containing the caterpillars which produce the white webbing were very visible in the Forest Lakes area, mainly on the tops of ponderosa pines. Populations of this insect have been reported in the past in this area, and have also been found infrequently from Flagstaff all the way over to the White Mountains. More unusual was the Tiger moth tent found on pinyon in the Eagar area in April. They are one of the few forest insects active during winter, and the defoliation caused by the caterpillars is usually more unsightly than damaging to the pine.

Tiger Moth



Non-native invasive plants continued to spread in forests and woodlands in 2011. Blue mustard, a native plant of Russia or southwest Asia, has spread throughout the western portion of the U.S. The plant tends to seed in disturbed soils, and was very noticeable in Prescott around the Rodeo grounds and north of Prescott in the Williamson Valley area in March. It was also very visible scattered along the right-of-way in Prescott Valley all the way over to Prescott Country Club. Blue mustard is a prolific seed producer and the seeds remain viable for many years.

Blue Mustard



The usual assortment of miscellaneous insects, diseases and other forest pathogens were also encountered in 2011. In addition, the very cold temperatures experienced during the winter caused extensive discoloration of junipers in the Heber-Overgaard and Show Low areas. Affected junipers were mainly resprouts that occurred after the Rodeo-Chediski fire in 2002. The widespread discoloration may have been initially attributed to drought. Scattered winter injury was also detected throughout the Village of Oak Creek on an assortment of ornamental plants. Pinyon needle scale continued to defoliate trees over thousands of acres in the Prescott area, and in three areas in and around Payson in spring. A single colony of Bull Pine sawflies was detected on a sapling ponderosa pine in Walker in early March, and is another forest insect active during winter. And probably the most colorful observation was the sulfur-colored fruiting body of Brown Rot fungus on a Gambel oak in Colcord Estates, with feeding and mating Pleasing Fungus Beetles attached. The most complex was the detection of Silky flycatchers feeding on non-native Elm leaf beetles, feeding on non-native Siberian Elms in the Payson area in August.

Miscellaneous Detections

		
Winter Injury-Junipers	Bull Pine Sawflies-Walker	Brown Rot Fungus

With the dry and warm La Niña effect well established this winter in Arizona, forest insect and disease activity and weather-related events in 2012 should be very interesting and complex.

For further information about any of the detections in this report, contact Bob Celaya, Forest Health Specialist, Arizona State Forestry Division at 602-771-1415. bobcelaya@azsf.gov