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# Office of the State Forester

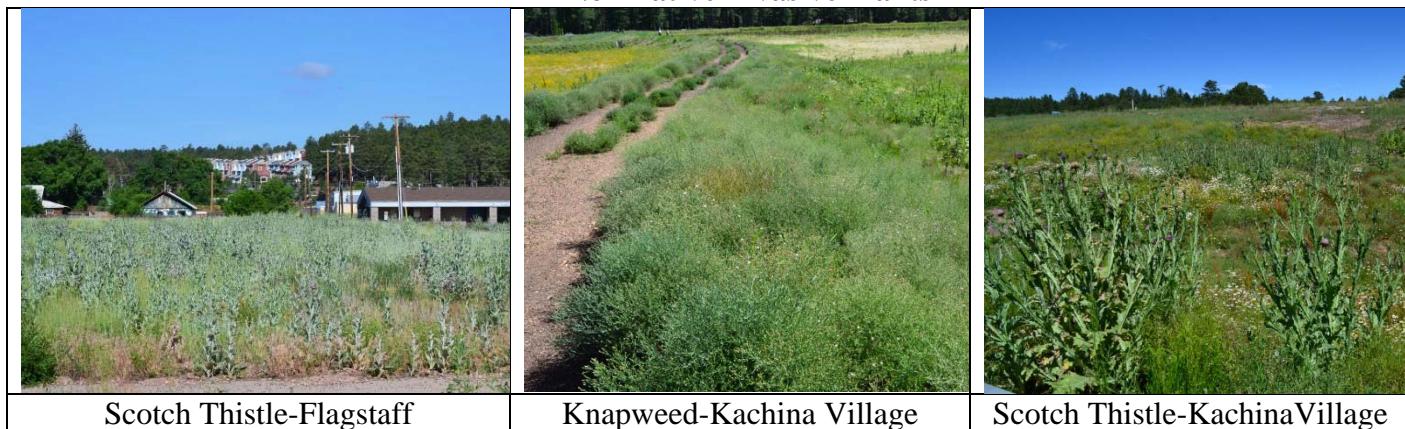
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## 2015 FOREST HEALTH CONDITIONS REPORT STATE AND PRIVATE LANDS

The dramatic expansion of non-native invasive plants had the greatest impact to forest and woodland health in 2015. Likely generated by the three consecutive wet monsoons, mainly thistles and knapweeds spread widely throughout the Flagstaff area, by the Little Colorado River in Greer, and in the communities of Pine-Strawberry. Large populations of Scotch and Musk thistle and Diffuse and Spotted Knapweed were identified in summer throughout Flagstaff, Kachina Village, Black Bill Park, Fort Valley, Bellemont and further south at the Mund's Park interchange.

### Non-native Invasive Plants



Scotch Thistle-Flagstaff

Knapweed-Kachina Village

Scotch Thistle-Kachina Village

An estimated eleven acres of Musk thistle was noted in late July, at the entrance to Greer along the Little Colorado River, and plants were traced all the way down to Eagar. A new pocket of Scotch thistle was identified in Strawberry in July, and Musk thistle first identified in 2011 in the community continued to spread. Scotch thistle identified in Pine in 2012 has also dispersed along Pine Creek.



Musk Thistle-Greer

Musk Thistle

Scotch Thistle-Strawberry

An assortment of defoliating insects was reported in 2015, and may have been tied to increased survival following another mild winter.

The inexorable spread of pinyon needle scale, a native defoliating insect in the pinyon-juniper woodlands, continued in the state in two new areas in 2015. The infestations of pinyon pine transplants first detected in Sedona in 2012 and 2013, has now spread up both sides of Lower Oak Creek Canyon on native pinyons. Infested pinyons were found all the way past Midgely Bridge and past the Grasshopper Point recreation area. More infested pinyon transplants were identified in a subdivision just east of Cottonwood. The isolated pocket of infested pinyons off the Highway 260 right-of-way southwest of Clay Springs in eastern Arizona, and identified in 2013, has expanded mainly east in 2015.

#### Pinyon Needle Scale

		
Midgely Bridge	Sedona Transplant	Highway 260

The chronic pinyon needle scale population found over thousands of acres in the Prescott area, continued largely unchanged in 2015. New infestations were noted north of Prescott in Williamson Valley off Camp Wood Road and the Las Vegas Ranch area. Two pinyon seedlings were found for the first time, infested with scale just below the entrance to Mesa Del Caballo north of Payson. A small pocket of pinyons transplanted as a screen years ago, were found infested with scale, next to Highway 89 in the Black Bill Park area NE of Flagstaff. Activity by these insects was once again about a month ahead of schedule statewide, due to the warm winter and spring. Although delayed egg hatch was noted on one tree in Payson in early May.

		
Mesa Del Caballo-Gila County	Prescott	Late Egg Hatch-Payson

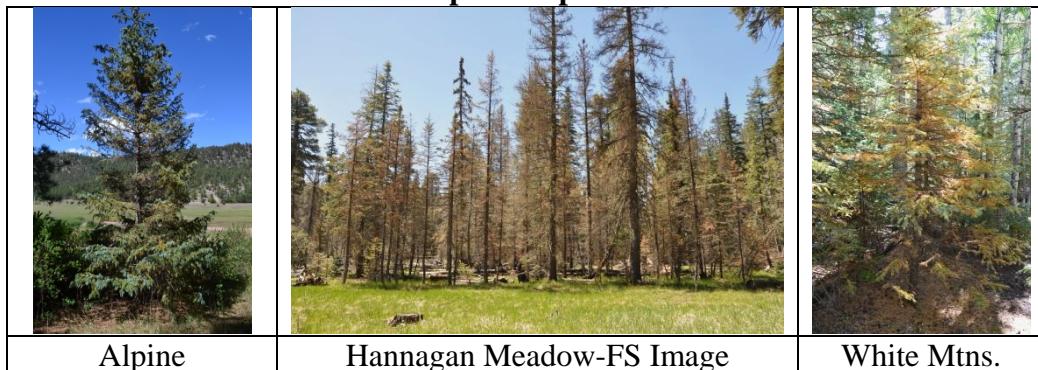
The detection of spruce aphid in the White Mountains in April 2015 in the Hannagan Meadow area, heavily defoliating spruce stands, may be the beginning of another major eruption by this insect. It was also detected in the Alpine area on ornamental spruce trees for the first time, in early June 2015.

Spruce aphid was first reported in Arizona in late 1988 on White Mountain Apache Tribal land. During the mild and dry winter of 1995-96, a dramatic increase in their numbers occurred in the adjacent Apache-Sitgreaves National Forest. In June 1997, the insect was first detected in Pinetop on ornamental spruces. Little activity was noted in the community in 1998-99, and may have been a response to the classic El Niño winter experienced in 1997-98. But by 2000 discoloration and defoliation of trees was very visible throughout the White Mountains. Mortality of spruce was reported in the area in 2004.

The insect was also identified in west Flagstaff in March 2000. Infested ornamental spruce trees were very visible by April. Large populations of the insect were also found in the Snow Bowl area on spruce trees in 2000.

Unusual for forest insects, spruce aphid is very active during winter, largely avoiding predators and parasites. It feeds on the sap of the older needles on the inside of the branch, and can kill small spruces in one season, and seriously defoliate larger ones. If not repeatedly defoliated, larger trees will refoliate in a few years.

#### Spruce Aphid



Another defoliating insect not seen since 1999 was a sycamore bagworm, heavily infesting a pocket of trees along Oak Creek in early July, at the northern boundary of Sedona. The caterpillar stage of this moth constructs a tough silken bag reinforced with bits of foliage, and hang from the branches and trunk like holiday decorations. The sycamores had already been infected with a foliage disease earlier in spring, and were almost completely defoliated by late July. Arizona sycamores in riparian areas are pretty resilient, and it's unlikely that heavily defoliated trees will suffer any serious branch dieback or mortality.

Interestingly, bagworms were also identified on an ornamental Chinese evergreen elm in the Tucson area in late August, and may be part of the population that may be found on Arizona sycamores, in the Sabino Canyon area.

### Bagworms

		
Lower Oak Creek Canyon	Sycamore Bagworms	Evergreen Elm Bagworms

In mid-September, yet another insect was detected in Oak Creek Canyon heavily defoliating box elders trees growing along the creek. Defoliation was so complete on some box elders that cocoons produced by the caterpillars were found stuck to walnut leaves. The caterpillar stage of this tussock moth species was first noted causing heavy defoliation of box elders in 2012, in the canyon below Midgely Bridge. However, in 2015 it was visible up and down the canyon with defoliation light to heavy depending on the location. Box elder is another resilient riparian species that should recover from the loss of foliage caused by this insect.

### Box Elder Tussock Moth Caterpillar

		
Defoliation		Caterpillar & Cocoons on Walnut

A second defoliator of Box Elder was identified for the second time in another riparian area in Cave Creek, in the Chiricahua Mountains in southeast Arizona, in early October. Maple tussock caterpillars were first noted defoliating trees in the area in 2013. Increased defoliation along the creek was seen in 2015 and is indicative of a population on the rise. Defoliated box elders should recover from the annual defoliation unless the eruption continues for several more years.

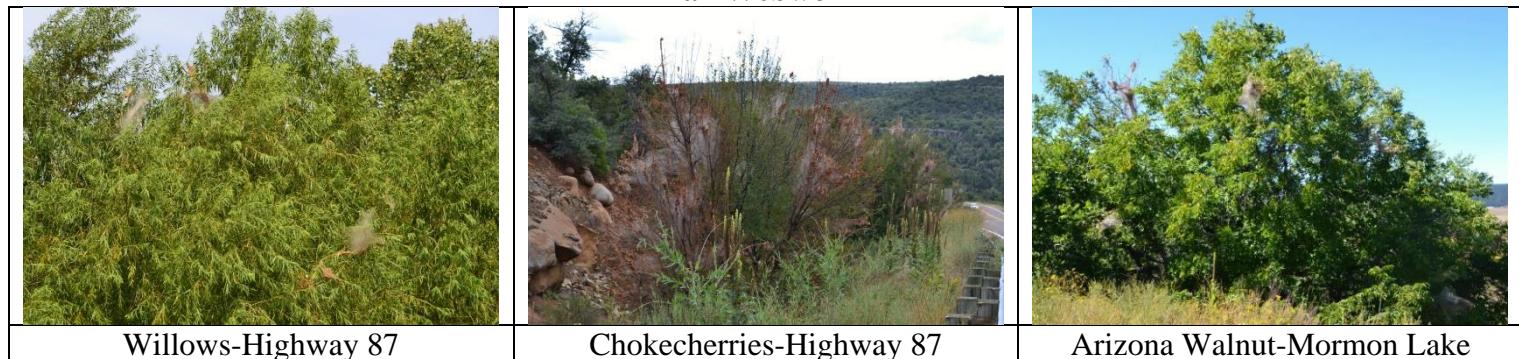
### Maple Tussock Caterpillar



Fall webworm was detected for the first time in the upper Sonoran desert in northeast Maricopa County, on willows growing along Highway 87, in early September. They are typically found in northern Gila County above 5000 feet, feeding mainly on AZ walnut. Heavily defoliated chokecherries were once again noted in Star Valley and along Highway 87 south of Pine. The fall webworm population first detected on walnuts around Mormon Lake in 2012 was even more widespread in 2015.

Fall webworm was also identified scattered on AZ alder, NM locust and AZ walnuts growing along the Catalina highway, from the Forest Service Palisades visitor center to Summerhaven. They were first identified in this area at 8000 feet in elevation in 2012, but have not caused any serious defoliation. A heavily infested ornamental purple-leaf plum was observed in the community of Overgaard, and also an Arizona walnut and several Siberian elms in Eagar in September.

### Fall Webworm



A native leafhopper was observed again in the Pine area in late summer, and has continued to discolor and defoliate Arizona walnuts in other parts of northern Gila County for several years. They were even more abundant in the Williamson Valley area north of Prescott, causing very noticeable discoloration of leaves of groups of walnuts. A small pocket of discolored walnuts was also noted in Bear Canyon in the Catalina Mountains in late August.

A second species of leafhopper was discovered on a group of willows in the Show Low area late in September. The discoloration and the excess moisture secreted as honeydew by the insect were very noticeable on the leaves.

A combination of heavy walnut leafhopper discoloration and fall webworm activity was identified on walnuts, on both sides of Highway 60 north of Salt River Canyon in late September.

### Leafhoppers

		
Williamson Valley	Pine	Williamson Valley

		
Bear Canyon	Show Low	Show Low

A number of foliage diseases and other weather-related events were recorded in 2015. The unusual precipitation experienced in May, and another active monsoon season triggered an assortment of forest and woodland health issues.

The pinyon needle cast disease noted mainly on the north side of Nutrioso near a reservoir in 2014 expanded dramatically in 2015. An estimated 250 acres of pinyon were heavily infected with scattered trees and pockets noted elsewhere in the community. Banded and discolored needles were very visible on infected pinyons, along with extensive needle loss. In addition, pinyon needle cast was found affecting a large area in SW Eagar in June, in Gila County near the Payson airport in May and East Verde Estates in July, and widespread in the Red Lake area north of Williams in July.

### Pinyon Needle Cast Disease

		
Nutrioso	Discolored and Banded Needles	Nutrioso
		
Eagar	East Verde Estates	Red Lake Area

A report received of widespread Gambel oak leaf discoloration in Strawberry Creek in late August, prompted a follow-up search for this new foliage disease in other parts of the state. Although widely scattered similar symptoms had been noted before on individual oaks, no attention was focused on it until it was found in several areas in 2015. Additional areas with heavy leaf discoloration included the west end of Christopher Creek loop and Highway 260, White Spar road and Ponderosa Park in Prescott, Upper Oak Creek Canyon, NE side of Mormon Lake and scattered throughout Lakeside-Pinetop.

### Gambel Oak Foliage Disease

		
Strawberry	Christopher Ck.	Discolored Leaves

### Gambel Oak Foliage Disease

		
Prescott	Oak Ck. Canyon	Mormon Lake

In early summer extensive discoloration of Arizona sycamores caused by anthracnose disease, was noted in Sunflower, Star Valley, Little Green Valley, Christopher and Tonto Creek in Gila County. The first infected trees were noted in Oak Creek Canyon in mid-May, and eventually spread throughout the canyon by summer. Scattered sycamores can usually be found with the foliage disease every year, but in 2015 much larger areas were infected with this disease, and likely exacerbated by the May precipitation.

### Sycamore Anthracnose

		
Sunflower	Discolored Leaves	Little Green Valley

The detection of willow leaf rust in Star Valley in Gila County in early September, quickly led to the discovery of this foliage disease in Prescott, Mormon Lake and its widespread presence along the Little Colorado River just west of Eagar. In addition, individual trees and pockets of infected aspens were seen in Flagstaff and Sunrise in the White Mountains. Aspen leaf rust was last seen in the White Mountains heavily infecting trees in September of 2007. Easily the most dramatic infestations noted for the first time in 2015, occurred along the Little Colorado River on willows.

### Aspen and Willow Rust Foliage Disease

		
Prescott	Little Colorado Bridge	Infected Willows

		
Infected Willow Leaves	Infected Aspen Leaves-Flagstaff	Infected Aspen Sprouts-Flagstaff

Even plants growing at lower elevations experienced heavy infestations of a rust disease. On the western slopes of the Hualapai Mountains, catclaw acacia leaf rust was readily visible on the plants. The characteristic brooms produced by the disease were spread throughout the branches.

### Catclaw Acacia Foliage Rust

		
Heavily Infected Acacia	Broom	Infected Leaflets

None of these needle and foliage diseases identified in 2015, are expected to cause any serious dieback or mortality to their hosts, but some growth loss is expected due to the reduction in photosynthetic surface.

Another weather-related event was extensive defoliation and damage to ponderosa pines, following an intense hailstorm in the Parks area west of Flagstaff in early July. About a square mile was affected by a storm that reportedly lasted almost an hour. Small ponderosa pine seedlings and saplings growing out in the open, suffered major damage to branches and twigs. Yellow rabbitbrush growing out in the open, was almost completely defoliated with many of the branch tips broken off. The ground was littered with pine needles and cones underneath large groups of defoliated ponderosa pines.

#### Hailstorm Damage

Hailstorm Damage		
Twig Damage	Pine Needle Litter	Pine Needles and Cones
		

Pine engraver beetle populations in the forests and woodlands in Arizona continue at nearly historically low levels. In fact, activity by these bark beetles was largely associated with lightning strikes during the summer monsoon. It is not unusual for these beetles to infest a lightning-damaged tree and then kill a pocket of surrounding pines. Isolated mountain ranges including the Catalina's outside of Tucson and the Hualapai's near Kingman, exhibited this condition.

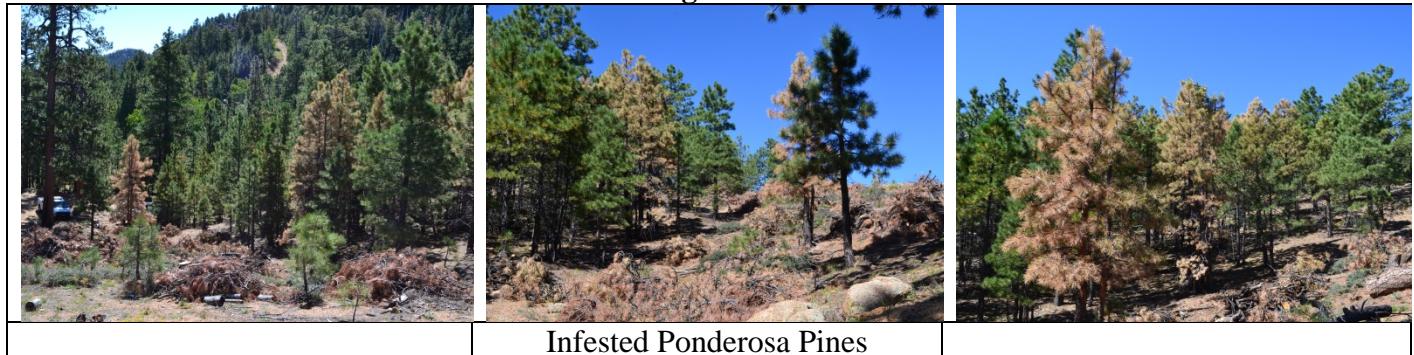
#### Pine Engraver Beetles

Catalina Mountains	Bark Beetles	Hualapai Mountains
		

The localized eruption noted in the Bear Canyon area of the Catalina Mountains, on hundreds of ponderosa pine in early summer of 2014, largely returned to endemic levels in 2015. A few pines were detected with new bark beetle attacks in August.

The only significant bark beetle activity noted in the state in 2015 occurred on the Hualapai Mountains, following fire prevention thinning of ponderosa pines during summer. In an area that has rarely seen much beetle activity over the years, production of green pine thinning slash attracted and generated a large population of these insects, which quickly infested a number of surrounding green pines.

#### Pine Engraver Beetles

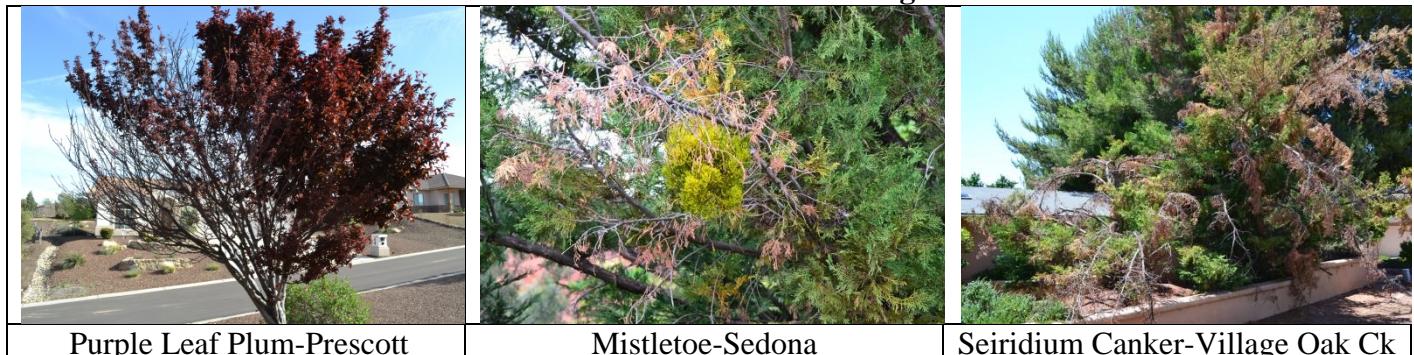


Infested Ponderosa Pines

An assortment of miscellaneous insects, pathogens, parasitic plants, abiotic agents and unknown anomalies were also encountered in 2015.

Distortion of leaves on a purple-leaf plum was observed in the Prescott area in April, and has been reported before, but no causal agent(s) identified. In early May, a native species of true mistletoe was found infesting a hybrid Leyland cypress in Sedona, for the first time. In late June, two more Leyland cypress was found in the Village of Oak Creek, likely damaged severely by Seiridium canker.

#### Miscellaneous Insects and Pathogens



Purple Leaf Plum-Prescott

Mistletoe-Sedona

Seiridium Canker-Village Oak Ck

Deicing salt damage and mortality mainly to ponderosa pine, continues to be an issue along right-of-ways in Arizona. It was very visible for several miles along highway 89A north of Oak Creek Canyon in June. A species of scarab beetle heavily skeletonized leaves on a Gambel oak just west of Heber, and also infested non-native Mullein plants growing in the understory in July. This beetle has been noted in the past on native Ceanothus shrubs, but has not caused any damage.

#### Miscellaneous Insects and Pathogens

		
Deicing Salt Damage and Mortality	Scarab Beetle on Mullein	Gambel Oak Leaf Skeletonization

A sycamore lace bug normally found in riparian areas where the native host is present, was also seen in the north side of Tucson, discoloring leaves of planted sycamores in an office complex in August. In early September, bright orange fly maggots were found feeding on the rust infections on willows in the Prescott area. The unusual lacy and transparent cocoons of an inchworm were seen once again, on desert willows growing along the road leading to the Hualapai Mountains, outside of Kingman. A few caterpillars were still found on the hosts in late September. In early October, a couple of new defoliating caterpillars were identified in the Cave Creek Canyon area in the Chiricahua Mountains, attesting to the great biodiversity found in the area.

#### Miscellaneous Insects and Pathogens

		
Sycamore Lace bug Discoloration	Sycamore Lace bugs	Maggots on Willow Leaf Rust

### Miscellaneous Insects and Pathogens

		
Inchworm and Cocoon	Tussock Moth Caterpillar	Sycamore Caterpillar

The very strong monsoon experienced in 2015 in most areas of the state, for the third year in a row, and the unusual precipitation in May very likely contributed to the presence of many of the insects, pathogens and invasive plants seen during the year.

A strong El Niño is forecast for winter and spring of 2016, and will have a definite influence on the health of our forests and woodlands, comparable to 1997-1998.

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 or [bobcelaya@azsf.gov](mailto:bobcelaya@azsf.gov)

You can also contact Chris Erickson, Forest Program Specialist at 602-771-1407 or [ChrisErickson@azsf.gov](mailto:ChrisErickson@azsf.gov)

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