

# 2016 Wyoming Forest Health Highlights



*Figure 1. Orange trees toward bottom right indicate ponderosa pine mortality caused by bark beetles in the Black Hills of Wyoming. While mountain pine beetle has affected nearly 448,000 acres in the Black Hills National Forest and adjacent lands over the past twenty years, the epidemic has wound down. Photo: Ryan DeSantis*

Wyoming has a land area of over 62.6 million acres, and elevations range from a low of 3,099 feet on the Belle Fourche River in Crook County in the northeastern corner of the state, to 13,804 feet on Gannett Peak in Fremont County. Approximately 19 percent of Wyoming, or about 11.8 million acres, is forested. Wyoming's forests provide clean water and air, wood products, habitat for wildlife and other biota, forage for livestock, the foundation of a profitable travel and tourism economy, and places for recreation and spiritual reflection.

Wyoming's forests are facing significant challenges. Bark beetle infestations, drought, highly destructive wildfires, introduction of invasive non-native species, and increased residential development are happening at a level not seen in recent history. Such challenges may inhibit the ability of our forests to provide the full range of multiple uses and values people enjoy and rely on.

Most of Wyoming’s forests are located at higher elevations on federal land. Lodgepole pine is the most dominant forest type, followed in order of prevalence by spruce-fir, ponderosa pine, Douglas-fir, juniper, aspen, whitebark pine, and limber pine. More than half of Wyoming’s forest land is administered by the U.S. Forest Service, 17 percent is privately-owned (including Indian Trust Land), 15 percent is administered by the National Park Service, 11 percent is administered by the Bureau of Land Management, and 4 percent is owned by state, county, and various other federal agencies.

(Excerpt from Governor’s Task Force Final Report, January, 2015)

**Mountain pine beetle (MPB) activity** declined from 34,000 acres in 2015 to 6,300 acres in 2016. The epidemic has ended across Wyoming.

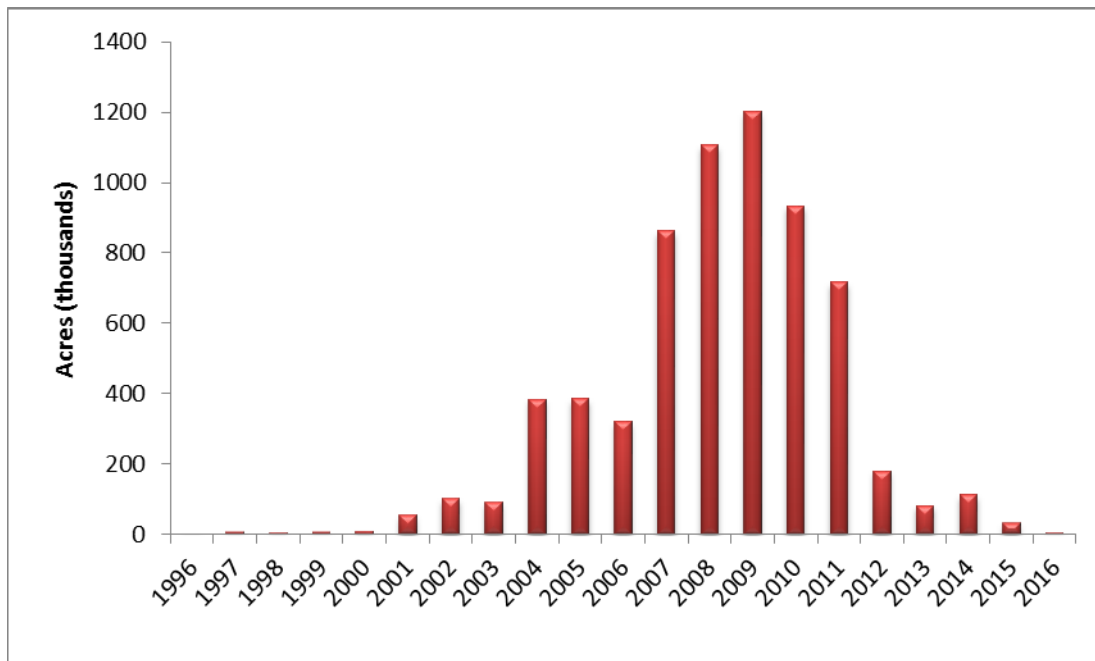


Figure 2. Annual acres of observed mountain pine beetle activity in Wyoming. Not all areas are surveyed every year. Figure courtesy U.S. Forest Service

- Western Wyoming high elevation limber and whitebark pines, to which MPB-caused damage had not previously been observed during the recent epidemic, accounted for 3,000 of the affected acres.
- A very low amount of ponderosa pine in northeastern Wyoming’s Black Hills were affected, although there were increased levels of tree mortality from engraver beetles.

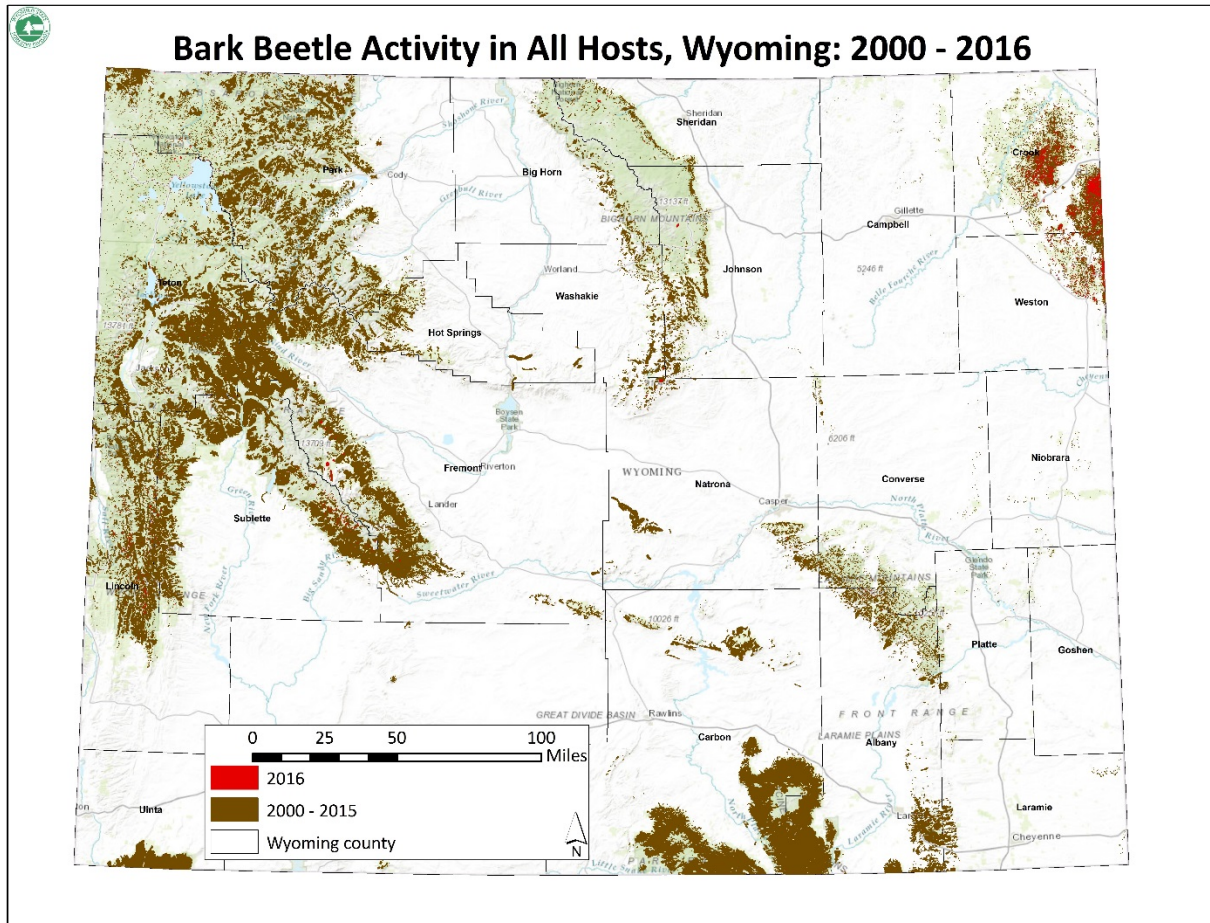


*Figure 3. Trees killed by engraver beetles on Inyan Kara Mountain in the Black Hills of northeastern Wyoming. Orange color indicates trees recently killed by bark beetles, and green color indicates trees not killed by bark beetles. Photo: Ryan DeSantis*

This area has been monitored by finer-scale aerial photo interpretation in cooperation with Wyoming State Forestry Division and neighboring forestry agencies and industries in South Dakota. Beginning in 2017, this area may return to aerial surveying rather than aerial photo interpretation.

Forests were examined by Wyoming State Forestry Division to detect MPB activity. There has been a noticeable decline of MPB observed over the past few years. Infrequent single-tree hits were remotely scattered and no large mortality pockets or beetle outbreaks were observed.

Many of the areas east of the Continental Divide located outside of National Forest lands are either recovering from past bark beetle activity or were not attacked by MPB.

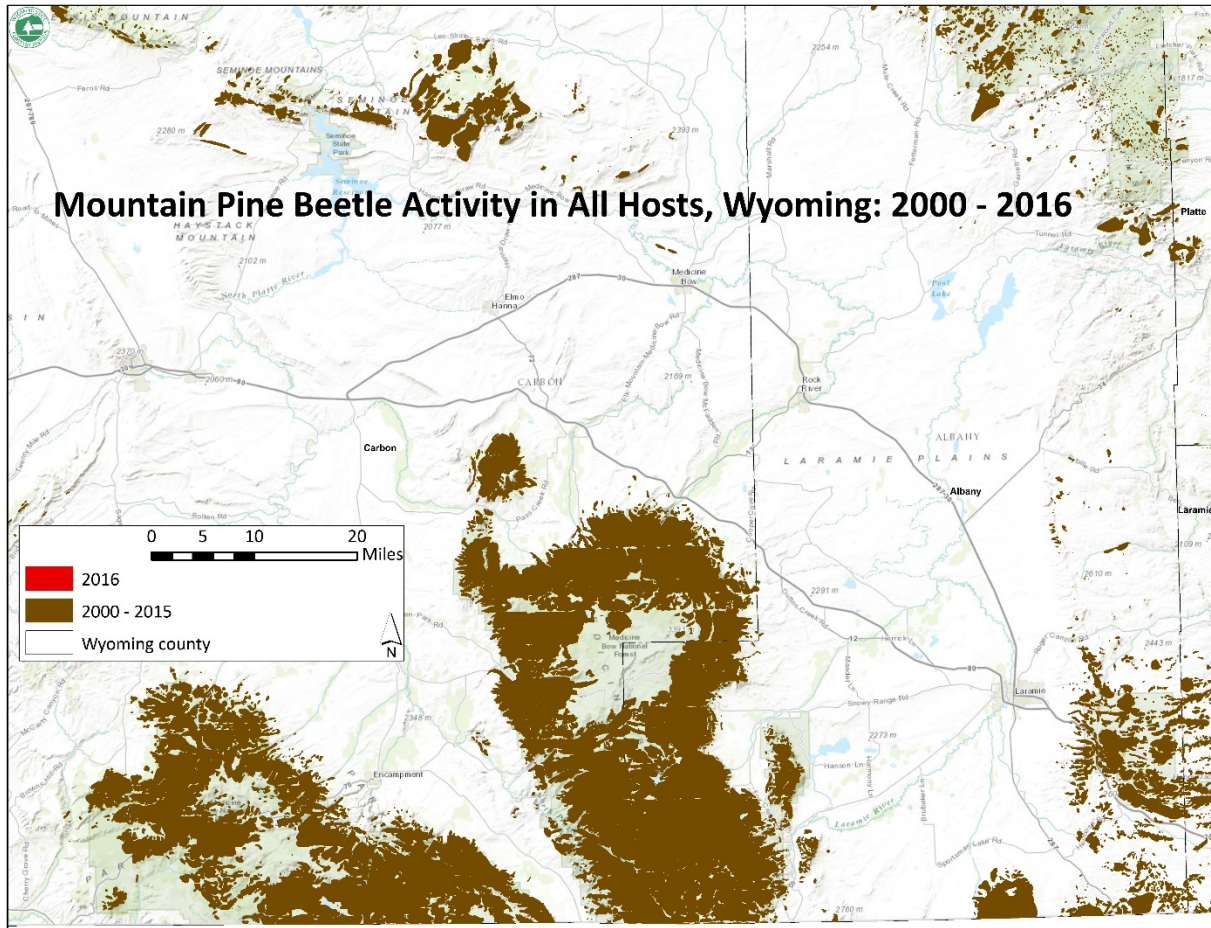


*Figure 4. Bark beetle activity in Wyoming. Due to the nature of aerial surveys, this data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented in the data because these agents are not detectable from aerial surveys. The data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. The insect and disease data is available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this data for purposes other than those for which it was intended may yield inaccurate or misleading results. Map courtesy Wyoming State Forestry Division & U.S. Forest Service.*

In southern and southeastern Wyoming, including the Medicine Bow National Forest and adjacent lands in Carbon, Albany, Laramie, Platte, Converse and Natrona counties, approximately 600 acres of limber pine were affected by MPB in 2016. No new MPB activity was observed in lodgepole or ponderosa pines, but dead standing trees are common, as indicated by brown polygons in Figure 4.



*Figure 5. In this aerial photo, mountain pine beetle (MPB)-killed lodgepole pine in the Medicine Bow National Forest appears as gray shapes amongst the darker green of young lodgepole pine regeneration and the pale yellow of recent harvests. Smoke from the 2016 Beaver Creek Fire, which burned in areas of dead standing MPB-killed lodgepole pine, is visible near top-left. Photo: Ryan DeSantis*

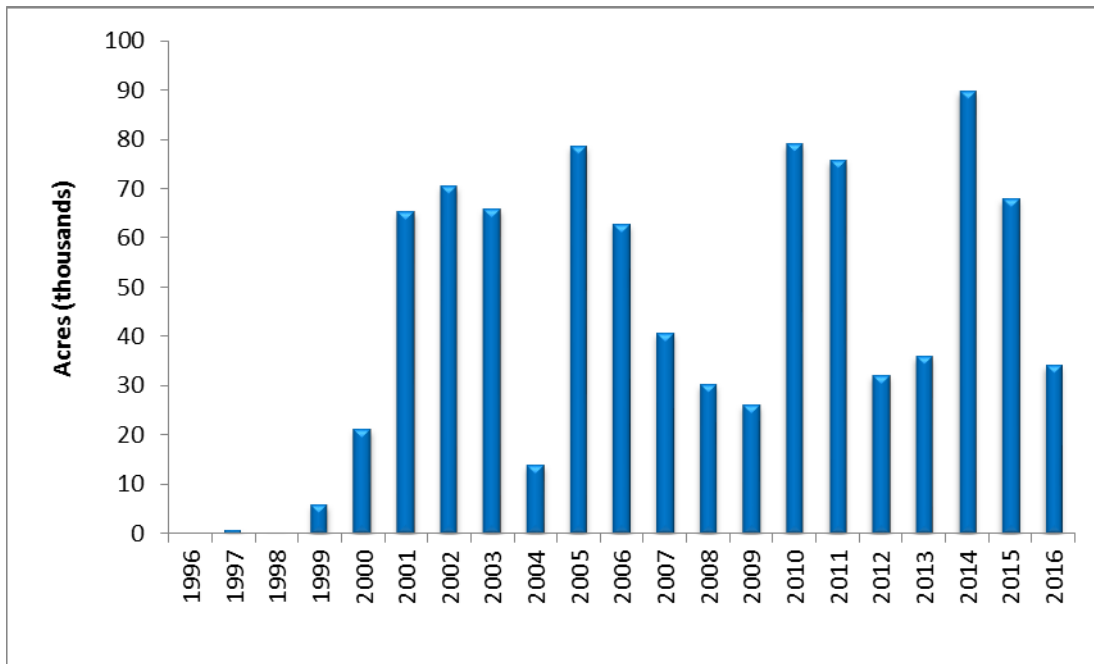


*Figure 6. Mountain pine beetle (MPB) activity in southern Wyoming's Sierra Madre and Snowy Ranges. While MPB caused substantial mortality over many years, very little MPB-caused damage was identified in 2016. Due to the nature of aerial surveys, this data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented in the data because these agents are not detectable from aerial surveys. The data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. The insect and disease data is available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this data for purposes other than those for which it was intended may yield inaccurate or misleading results. Map courtesy Wyoming State Forestry Division & U.S. Forest Service*

In western Wyoming including the Wasatch-Cache, Shoshone and Bridger-Teton National Forests and adjacent lands in Uinta, Lincoln, Sublette, Fremont, Park and Teton counties, MPB activity declined from 30,000 acres in 2015 to 4,100 acres in 2016. In north-central Wyoming including the Bighorn National Forest and adjacent lands in Washakie, Johnson, Sheridan and

Bighorn counties, large areas of forest remain unaffected by MPB, which was only detected on approximately 700 acres. However, this area remains highly susceptible to MPB. In northeast Wyoming including the Black Hills National Forest and other areas in Crook and Weston counties, aerial photo interpretation has revealed lower levels of MPB- killed trees recently. Ground surveys indicate mountain pine beetle has returned to endemic, low levels. Aerial observations and ground surveys indicate elevated tree mortality from engraver beetles in areas such as Inyan Kara Mountain (Figure 3). Engraver beetles are common during droughts.

**Spruce beetle** activity declined from 68,000 acres in 2015 to 34,000 acres in 2016.



*Figure 7. Annual acres of observed spruce beetle activity in Wyoming. Not all areas are surveyed every year. Figure courtesy U.S. Forest Service*

Most spruce beetle activity was confined to western Wyoming (Figure 8). Spruce mortality caused by spruce beetle was identified on 20,000 acres previously uninfested by spruce beetle. Since 1996, 702,000 acres have been affected by spruce beetle in Wyoming, leaving many dead standing spruce trees in higher elevations.

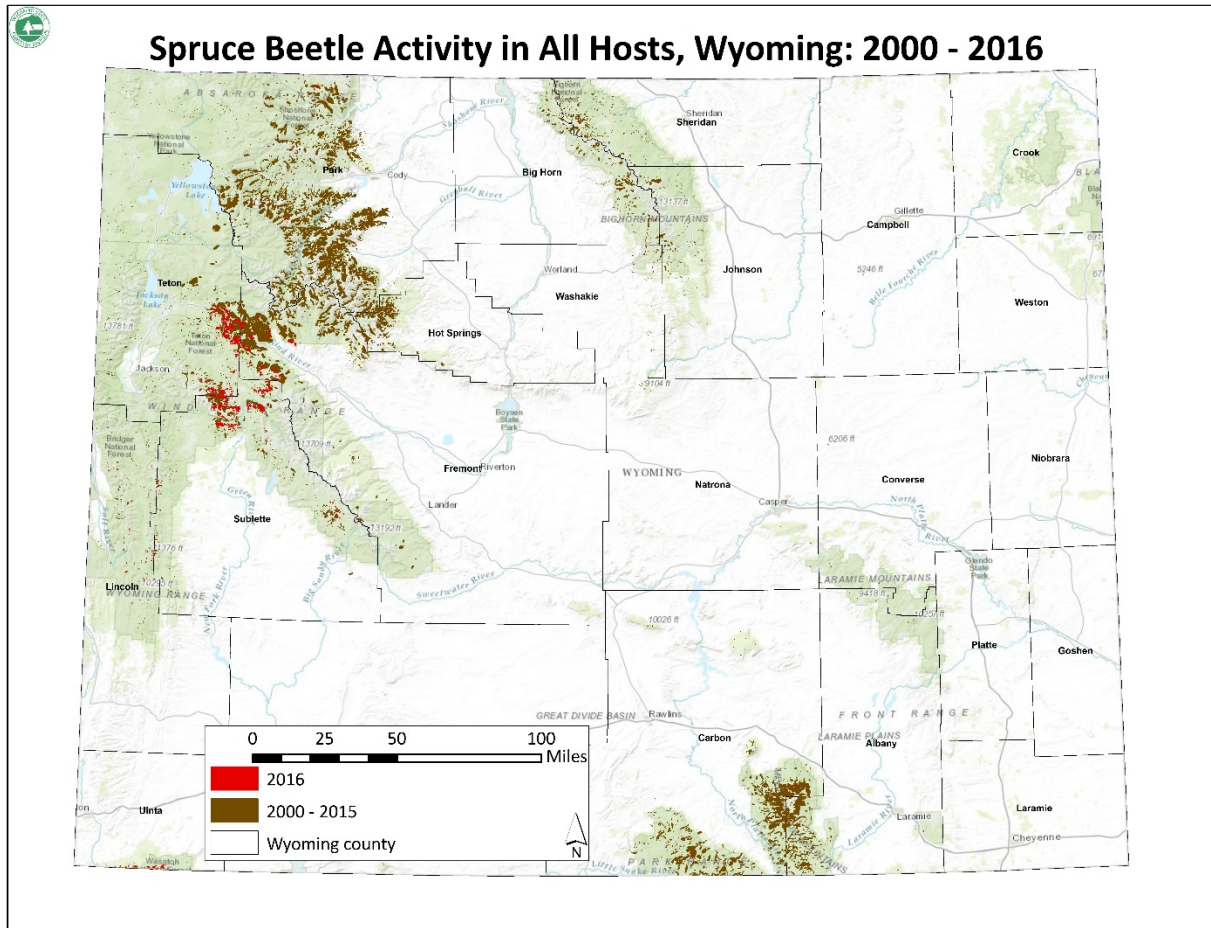


Figure 8. Spruce Beetle activity in Wyoming. Due to the nature of aerial surveys, this data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented in the data because these agents are not detectable from aerial surveys. The data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. The insect and disease data is available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this data for purposes other than those for which it was intended may yield inaccurate or misleading results. Map courtesy Wyoming State Forestry Division & U.S. Forest Service

**Douglas-fir beetle** mortality has been detected on over 430,000 acres across Wyoming since the early 2000s. Recently it has returned to endemic levels. Only 100 acres were affected by Douglas-fir beetle in 2016.





*Figure 9. Douglas-fir mortality in Shell Canyon, Bighorn National Forest. Photo: Kendra Schotzko*

**Subalpine Fir Decline** – Although subalpine fir decline can be found throughout Wyoming’s high elevation forests, mortality of subalpine fir is often less intense than in associated spruce. Mortality often becomes more noticeable after successive years. In 2016, 25,000 acres of Wyoming’s forests had varying levels of subalpine fir killed by western balsam bark beetle and fungi associated with subalpine fir decline.



*Figure 10. Subalpine fir mortality is often detected at low levels across large areas. Photo: Kendra Schotzko*



*Figure 11. Over time, low levels of subalpine fir mortality can accumulate into significant levels of overstory mortality. Photo: Kendra Schotzko*

**Western spruce budworm** – Defoliation of Douglas-fir and spruce by western spruce budworm was detected on over 211,000 acres, with large budworm-caused mortality polygons mapped primarily in western Wyoming. Western spruce budworm larvae feed on Douglas-fir, subalpine fir and Engelmann spruce foliage in the spring. Larval feeding can decrease growth, kill the tops of trees, or kill trees outright if heavy defoliation occurs across multiple years. Defoliation of large areas can lead to a brownish cast to the forest.



*Figure 12. Western spruce budworm damage to trees near Clarks Fork, Shoshone National Forest, 2016. Photo: Kendra Schotzko*



*Figure 13. Western spruce budworm damage in the Powder River Basin, Wyoming, 2016. Photo: Al Dymerski*

**Marssonina leaf blight** of aspen was observed in most parts of Wyoming but was not causing significant aspen mortality.



*Figure 14. Marssonina leaf blight on aspen in western Wyoming. Photo: Ryan DeSantis*

September, 2016 surveys in Yellowstone National Park did not detect any non-native invasive **balsam woolly adelgid**. **Rusty tussock moth**, another non-native invasive insect, was found in the southern Bighorns.



*Figure 15. Rusty tussock moth eggs in southern Bighorns. Photo: Kelly Norris*

**Monitoring for non-native invasive insects continues.** No damage caused by gypsy moth was observed during the annual detection survey, although gypsy moths were found in traps in Lovell in 2015 and Casper in 2016. Subsequent delimiting trapping in Lovell and Casper did not detect any additional moths. Emerald ash borer (EAB) has not been detected in Wyoming but USDA APHIS-PPQ, Wyoming Department of Agriculture and Wyoming State Forestry Division continue collaborating on EAB planning. This is critical considering there is an established EAB population in Boulder County, Colorado, which is 60 miles south of Wyoming's border. There are also established EAB populations in eastern Nebraska. EAB could inadvertently be transported to suitable ash tree hosts in Wyoming in infested firewood, so Wyoming State Forestry Division continues educational efforts to reduce the potential for accidental introduction of EAB to Wyoming.

**Wyoming State Forestry Division Highlights** – WSFD is committed to providing professional forestry service, information, and education to the citizens of Wyoming to achieve resilient forests and communities. In 2016, Wyoming State Forestry Division treated more than 7,000 acres in Wyoming, predominantly on private and state lands, as part of forest management, forest health and wildfire mitigation efforts.

**For more information or for assistance, please contact:**



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