

April 10, 2015

Re: Winter Injury at Hazelrodt Recreation Residence Tract, RCSC-06-15

To: Forest Supervisor, Black Hills National Forest

Cc: David Pickford, Kelly Honors, Leslie Barton, Blaine Cook, Roy Mask

James T Blodgett (Plant Pathologist)

USDA Forest Service

Rocky Mountain Region

Forest Health Protection

Rapid City Service Center

8221 S Highway 16

Rapid City, SD 57702

p: 605-716-2783

jblodgett@fs.fed.us

On April 7, 2015, David Pickford (Recreation Specialist), Kelly Honors (NEPA Planner), and I examined trees on both sides of the road from lot 19 to lot 8 in the Hazelrodt Recreation Residence Tract (**Fig. 1**). Although mountain pine beetle is causing mortality in the stand, the visit was regarding ponderosa pines with dying needles (**Fig. 2**) on trees with no mountain pine beetle infestation. Most ponderosa pines were affected, from large trees to seedlings. Fading trees were first reported by a logger in early March. Although there seemed to be more damage around some cabins, symptoms extended several yards from both sides of the road, in the area between lots 13 and 16, and across the creek. The needle damage had several causes, but two types of winter injury (winter desiccation and winter fleck) were the most common causes of dying needles in this area. Winter injury symptoms occur across the landscape, but individual trees vary in symptom expression.

The most striking damage was winter desiccation (**Fig. 3**). Winter desiccation results when soils freeze in the winter, followed by above freezing temperatures. This allows needles to release water to the atmosphere that is not replaced due to the frozen soils. The water lost results in progressive needle mortality starting at needle tips and seldom progressing all the way to the needle base. Thus, a common symptom is uniform light brown needle tips which are green near the stem. Winter desiccation can completely kill foliage, but seldom damages buds and branches. Foliage damaged or killed often remains green when temperatures are cold. The damaged needles turn yellow to brown when temperatures increase in spring, and dead needles are shed in summer. New foliage usually emerges in late spring or early summer. Since buds and branches usually survive, winter desiccation typically results in minor growth loss and aesthetic problems. If buds and/or branches die, multiple stems often form resulting in a bushy tree form. Although not common, topkill or mortality has been reported.

Winter fleck (**Fig. 3**) was likely the most common damage as far as number of trees affected, however it is much less damaging than winter desiccation. Winter desiccation does not cause winter fleck. This can be classified as winter weather injury resulting in needle tissue damage.

Symptoms are different from fungal infection, sucking insects, and air pollutant oxidant injuries that may also cause leaf spots. The exact cause of winter fleck is unclear, but it is associated with sudden drops in temperature, below freezing. This usually does not kill needles, and does not damage buds or branches. However, the freeze associated damage may have resulted in some of the needle tip mortality.

The next most common damage was red band needle blight, also called *Dothistroma* needle blight, caused by a fungal disease (**Fig. 4**). Along with the distinct red to brown bands across needles, this disease can cause complete needle mortality and/or needle tip mortality. Although this disease caused some of the needle damage, symptoms were far less common than the two winter injuries. Many of the trees with needle blight also had winter injury.

Even less common were western gall rust (**Fig. 4**), a fungal disease; and pine tip moth (**Fig. 4**). Western gall rust was causing branch and seedling/sapling mortality in the area. Pine tip moth caused some bud and tip mortality. These damages are not directly related to the main damage and were not too common, but do result in needle mortality which resembles winter desiccation.

Elytroderma needle cast, another fungal disease, is present in the area. It caused a few brooms and can cause needle mortality. However, needle symptoms of this disease were uncommon.

Sucking insects present included pine needle scale, tortes scale, and aphids, but they seldom cause significant damage. Pine needle scale causes leaf spots, but symptoms are distinct from winter fleck. The aphids' colonization resulted in a few dark branches caused by mold growing on their secretions. The mold has little effect on tree health.

Management recommendations:

- Unfortunately, there is nothing one can do to manage for winter desiccation or winter fleck.
 - Most trees had less than 50% crown damage. Those trees will likely recover this summer.
 - Only a few trees had between 50% and 66% crown damage. Most of those trees will recover. Given the stress associated with high needle loss, some of those trees could die if attacked by other damage agents.
 - Very few trees had greater than 66% crown damage. Those trees might die before next spring, especially if buds and/or branches were affected.
- Red band needle blight seldom kills trees thus management is often not needed. In dense stands, stand thinning can increase airflow, which will promote foliage drying and reduced infections. Most of the Hazelrodt area would not be considered dense, and given the mountain pine beetle mortality in this area, additional thinning is not warranted.
- Other damage agents (excluding mountain pine beetle) were either uncommon and/or were not causing significant damage in this area to warrant management.

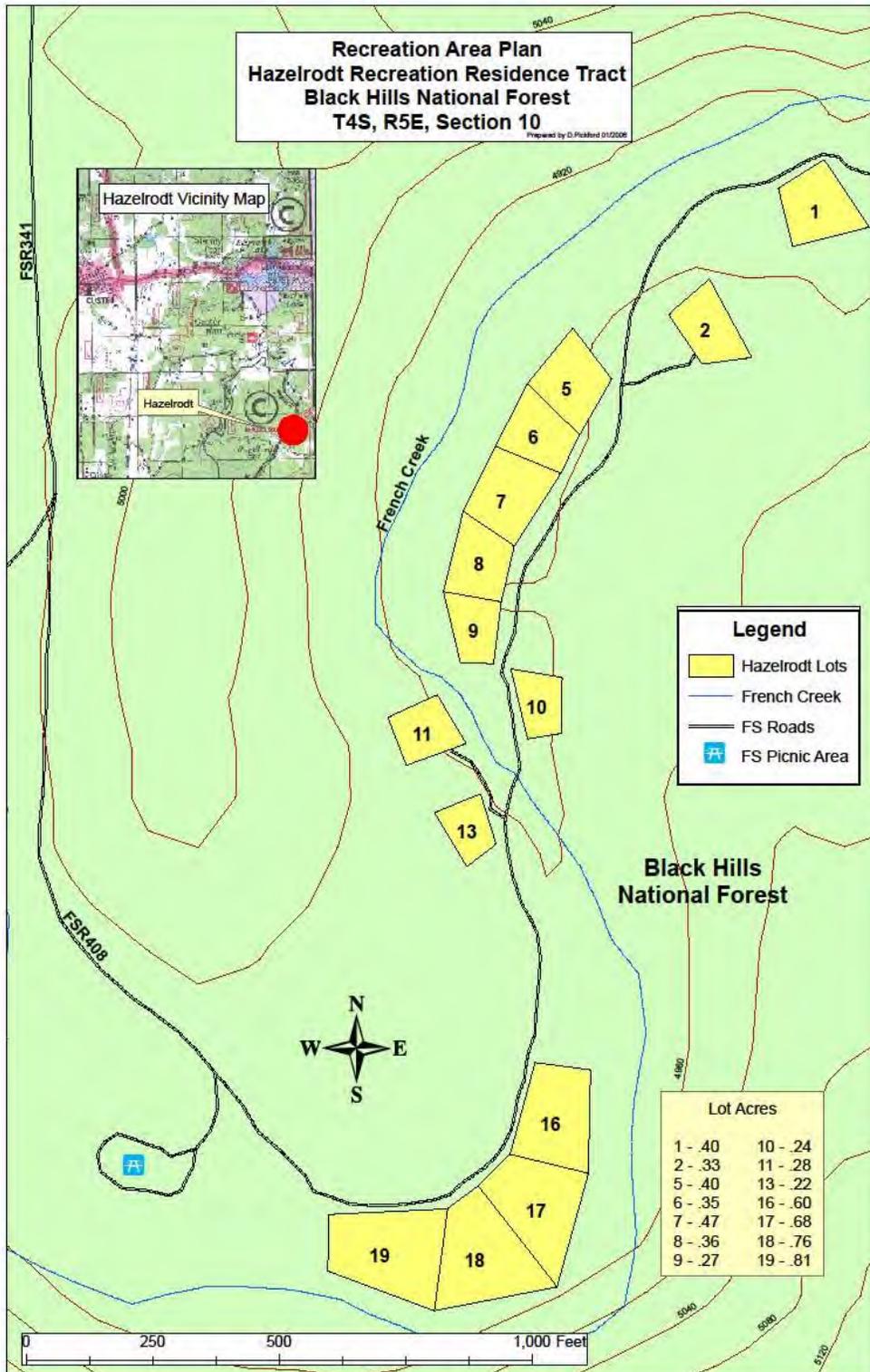


Figure 1. The area examined included both sides of the road from lot 19 to lot 8 in the Hazelrodt Recreation Residence Tract.



Figure 2. Unhealthy ponderosa pines in the Hazelrodt Recreation Residence Tract.



Figure 3. Ponderosa pines with winter desiccation (left and middle) and winter fleck (right) from the Hazelrodt Recreation Residence Tract.



Figure 4. Red band needle blight (left), western gall rust with rodent chewing (middle), and pine tip moth (right) in ponderosa pine. Left and middle photos are from the Hazelrodt Recreation Residence Tract. Ponderosa pine tip moth is from Donald Owen, CA Dept. of For. and Fire Protection, Bugwood.org.