Diseases and Insects in Canyon Creek Recreation Sites

Relevance to Proposed Redesign

Technical Report R2-70

James J. Worrall, Supervisory Pathologist
Amy D. Lockner, Entomologist
Forest Health Protection
Rocky Mountain Region
USDA Forest Service

Todd S. Gardiner, Silviculturist
Grand Mesa, Uncompahgre, and Gunnison National Forests
USDA Forest Service

1. INTRODUCTION

The Ouray Ranger District of the Grand Mesa, Uncompahgre, and Gunnison National Forests is proposing to redesign and redevelop two campgrounds near Ouray. Angel Creek Campground and Thistledown Campground are both about 5 miles from Ouray on Camp Bird Road (Ouray County Road 361). The area is heavily used for recreation and demand for overnight opportunities has increased.

The purpose of this report is to describe disease and insect conditions in and around the campgrounds, especially those that may create tree hazards or otherwise significantly affect the developed forest. Such issues should be considered during planning to reduce hazard and other negative impacts to the infrastructure and forested environment.

The observations reported here are based on a forest health service trip in 2015 (Worrall 2015), earlier visits prompted by tree failures, another visit by Jim Worrall June 7, 2018, and multiple visits and management activities conducted by Todd Gardiner.

2. PAST TREE FAILURES

This is not a complete list of failures that have occurred recently, but some that we were aware of. All were in Angel Creek.

Around 2000, two very large Engelmann spruce fell toward the south directly across site 20. They had red root rot, but much of the root plates lifted out, so there must have been substantial wind involved as well.

Several tree failures in 2015 prompted a survey. Eight large trees (20-30″ DBH) had fallen in the recent past.

- Two were white fir just past site 21 on the creek side of the road (Fig. 1, HA1). They had extensive root decay due to annosus root disease.
- The other was an Engelmann spruce that had some red root rot, which contributed to the failure (Fig. 1, OT2).
- Five were various species, including blue spruce, Engelmann spruce, subalpine fir, and white fir. All had fallen toward the west, away from the creek. The large root plates

Worrall JJ, Gardiner TS, Lockner AD. 2018. Diseases and Insects in Canyon Creek Recreation Sites: Relevance to Proposed Redesign. Technical Report R2-70. USDA Forest Service, Rocky Mountain Region, Lakewood, Colorado. 9 pp.

with fine roots and adhering soil, and lack of decay on fracture surfaces, indicated that these failures were caused by strong winds with no disease or defect contribution.

Since then, several large trees have fallen:

- White fir blowdown southwest of site 26.
- White fir snap/collapse near the base due to very extensive decay by the Indian paint fungus, *Echinodontium tinctorium*, just south of site 24.
- Engelmann spruce near site 24, cause undetermined.

3. ROOT DISEASES

Three root diseases have been documented in Angel Creek.

3.1 Annosus Root Disease

This is by far the most serious root disease of the three. It is almost exclusively restricted to white fir in our area. It decays root systems extensively and causes butt rot. The primary mode of mortality is mechanical failure of roots of green trees, making it a particularly pernicious problem. Often the crowns look full and healthy when the roots are dangerously decayed. The pathogen, *Heterobasidion occidentale*, spreads to neighboring trees through root contacts and grafts, creating expanding root disease centers.

Annosus root disease is most active in the northern half of Angel Creek Campground and mostly on the west side (Fig. 1). In 2018, we found it somewhat more extensive than shown around sites 24 and 27. The center identified as HA5 was found somewhat farther up the gentle slope to the west.

The disease is very difficult to detect in standing trees. In established campgrounds, management guidelines suggest removing host trees within 30-50 feet of a stump or failed tree with evidence of the disease. In new development, avoidance is also an option.

3.2 Red Root Rot

This disease of Engelmann spruce is caused by *Onnia tomentosa*. In our area, it is fairly common but does not seem to be aggressive. It may contribute to root failure of living trees on occasion, but we have not found it causing such extensive decay that trees will fall without substantial wind forces. It was found in 3 widely separated areas in Angel Creek, with no evidence of spreading to other trees.

3.3 Armillaria Root Disease

This disease, caused by *Armillaria solidipes*, can be severe and contribute substantially to hazard in spruce-fir campgrounds. Here we found it only once in Angel Creek in a small white fir, near site 24. It does not seem to be a management concern there.

4. STEM DECAYS

Stem decays contribute to hazard through decay of wood in living stems. Two such diseases have been found in Angel Creek.

4.1 Rust-Red Stringy Rot

This disease, caused by *Echinodontium tinctorium*, the Indian paint fungus, can cause extensive decay in white fir. Large, old infected trees may have only an inch or so of sound wood under the bark. Conks often form on trees with extensive decay, but they are difficult to spot when they are high on the stem.

This disease led to one known failure recently. It was detected on several additional trees, which were removed.

4.2 Red Ring Rot

This disease, caused by *Porodaedalea pini*, is most common on Engelmann spruce in our area. Like rust-red stringy-rot, it occurs sporadically, and decay can become extensive in large, old trees. Infected trees usually do not have conks of the fungus, but punk knots are another indicator that can be detected by an experienced forester.

5. ASPEN DISEASES

Aspen occurs sporadically in both campgrounds. Aspen is often valued in campgrounds by recreation managers because of its fast growth and esthetic appeal. However, aspen is very sensitive to wounding and changes in its environment. There are many diseases that attack aspen at any age, canker diseases being the most serious. As a result, aspen tend to be short-lived in campgrounds. Plans for their replacement must be made while they are young.

Regional policy discourages maintenance or reliance on aspen in campgrounds. Forest Service Manual, R2 Supplement No. 2333.48, Landscaping):

The impacts of tree mortality in campgrounds can diminish a visitor's experience. Of particular concern is the effect of disease and insects on campsites in predominately aspen stands because of (1) safety hazards resulting from tree mortality, (2) alteration of esthetic values, (3) decreased amount of shade, and (4) lack of screening.

After an evaluation has been made as to whether a site developed in an aspen stand is to be retained and/or a new site is to be developed in an aspen stand, other species underplanting with seedlings or transplanting of larger plant materials will be done. Small seedlings will require 20-30 years before providing much shade although they will provide screening. Planting 5-10 foot saplings of some species can better serve user impacts and results are realized sooner.

Arrangements for larger size plant material can be made with, (1) Mt. Sopris Nursery to grow 5 gallon container stock, (2) commercial nurseries for larger sized transplants, or (3) private nurserymen to provide balled and burlapped wildings from National Forest areas similar in environment to planting site.

6. FIR ENGRAVER

Fir engraver (*Scolytus ventralis*) is an important killer of true firs. In our area, it is almost always found in white fir. Trees that are stressed by drought, western spruce budworm, or root disease are more susceptible to fir engraver attack. The fir engraver attacks trees, tops, branches, slash piles, and windthrown trees of 4 inches in diameter or larger. Trees can be killed the first year, or after several years of repeated attacks.

A fir engraver outbreak began around Ouray about 2010. In 2015, a few attacked trees were found in Angel Creek. Mortality since then has required annual removals of dying and dead trees, most on the north end of the campground. The epidemic may be nearing its end now.

7. SPRUCE BEETLE

The widespread, devastating spruce beetle (*Dendroctonus rufipennis*) epidemic in southern Colorado has not yet reached this area. However, it is moving west and north toward this area, and may impact management of Angel Creek Campground in the near future.

No spruce beetle was detected in this area in 2017 (Fig. 3). Two small spots of spruce beetle were seen in 2018 in the upper Weehawken Creek drainage. However, spruce beetle is active east of the Highway 550 corridor, in the Cimarrons and Uncompahgre Wilderness.

8. DOUGLAS-FIR BEETLE

Douglas-fir beetle (*Dendroctonus pseudotsugae*) is a common bark beetle that kills Douglas-fir trees. It generally attacks trees that have been weakened by defoliation, fire, or disease. When beetle populations are low, they can kill small groups of stressed trees. During an outbreak, thousands of trees can be killed.

When a tree has been successfully attacked, the beetles release a pheromone (an anti-aggregant) to tell their cohorts that this tree is "full", and to fly to a different tree. This anti-aggregant is MCH, which has been synthetically produced and is now a tool land managers can use to protect their valuable Douglas-fir trees. MCH bubbles can be stapled to individual trees, and protects stands by preventing beetles from initiating new attacks.

Thistledown Campground has a significant component of Douglas-fir, and the beetle has been active on the surrounding hillsides, resulting in pockets of mortality. Thistledown was treated with MCH in 2017 and 2018 to preclude the spread of Douglas-fir beetle into the campground.. To date, MCH treatments have been highly effective.

9. CONSIDERATIONS FOR REDESIGN

9.1 Thistledown

For the most part, Thistledown is in good shape for development, especially the portion east of the road and north of Weehawken Creek. Douglas-fir is generally a resilient species with few problems in campgrounds, and the stand there is mostly young. The aspen there are young also. Where pure aspen exists and future forest vegetation is desired, planting or transplanting of other species should be done to prepare for the death of the aspen. During placement of sites, every effort should be made to remove aspen rather than Douglas-fir.

On the north side of the road/west of Weehawken Creek, the picture is not so bright. Aspen there are more mature and some of them are deteriorating. Farther up the creek there is an abrubt change of stand type to largely pure, dense white fir. For reasons noted above, the white fir stand should be avoided. If development occurs near it, trees should be individually inspected first to ensure that diseased and defective trees are removed. Where Douglas-fir exists, avoid cutting it.

MCH treatments should be continued while Douglas-fir beetle is active in the area.

9.2 Angel Creek

In the last several years, the District has been diligent about inspecting and removing dead and dying trees and living hazard trees from Angel Creek Campground. An initial effort to remove hazard trees was completed in 2017 and involved the removal of hundreds of trees, including aspen and white fir. A second round of forest health thinning and hazard tree removal is currently underway with the Colorado State Forest Service through Good Neighbor Authority. This thinning and hazard tree effort will be complete by October 2018.

This is good management, and helps prepare for redevelopment. However, there are some issues that must be taken into account during redesign.

9.2.1 Hazard tree inspections

The Region requires annual inspection for hazard trees by trained personnel in developed sites, followed by immediate corrective action of high-priority deficiencies before sites can be opened. Documentation and records of inspections are to be maintained on the District (Forest Service Manual, R2 Supplement No. 2300-93-6 (2332.1, Safety and Sanitation), effective 8/15/93).

At some interval, the inspections may be detailed, tree-by-tree inspection with records, and in intervening years, these may be walk-through inspections. In Angel Creek, given the species present, stand maturity, and the diseases and insects involved, inspections are very important. Inspectors should be trained to detect the diseases and insects mentioned in this report, as well as other hazard defects.

Additionally, when decisions are being made where to place sites, tree inspections should be concurrent. Some trees have a brighter future than others, and we should preferentially remove the older, larger, and defective trees to create roads and campsites.

9.2.2 Annosus root disease

Annosus root disease is the biggest threat to visitor safety in Angel Creek. Removal of white fir killed by fir engraver has the silver lining of removing the host of this disease. Where white fir remains in or near known root disease centers, there are two ways to approach a redesign:

1. **Do not place campsites in or near the disease centers**. Given that the centers cover much of the hillside area around sites 24/27, as well as the west side of the road in the northern half of the campground, this would eliminate from consideration much of the area suitable for development (including two existing campsites). As such, this option may not be feasible.
2. Before construction, remove any white fir that are both within striking distance of new or existing developments and within 30-50 feet of known or discovered annosus root disease center. This would remove trees with a higher than average likelihood of infection. It would also continue a process initiated by fir engraver to reduce the white fir component in the campground. Because the area under consideration is mostly white fir, this may require planting other species to replace the forest cover.

9.2.3 Aspen

In portions of the campground dominated by aspen, preferentially remove the larger, older trees. In the long run, it should be expected that the older aspen will die. These will be removed after annual inspections. As noted in the next section, planting other species now to replace them will help maintain forest cover.

9.2.4 Vegetation management

It is recommended that a vegetation management plan be developed for Angel Creek Campground, as described in the regional guide for developed sites (Burke *et al.* 2003). This would incorporate measures to maintain and expand forest cover into the future as desired, taking into account the possibility of losing all mature spruce to spruce beetle, continued loss of white fir to fir engraver and hazard tree removal, and continued loss of aspen to canker diseases.

10. BIBLIOGRAPHY

Burke J, Cross F, Devore P, George R, Hitchings D, *et al.* 2003. Vegetation Management Planning Guide: Planning and Implementation for Developed Sites in Region 2. Lakewood, Colorado: USDA Forest Service, Rocky Mountain Region. 37 p.

Worrall JJ. 2015. Root Diseases and Hazard Trees in Canyon Creek Campgrounds, Ouray RD, GMUG. Service Trip Report GSC-15-03. Sept. 4, 2015. Gunnison, Colorado: USDA Forest Service, Rocky Mountain Region, Forest Health Protection, Gunnison Service Center. 7 p.

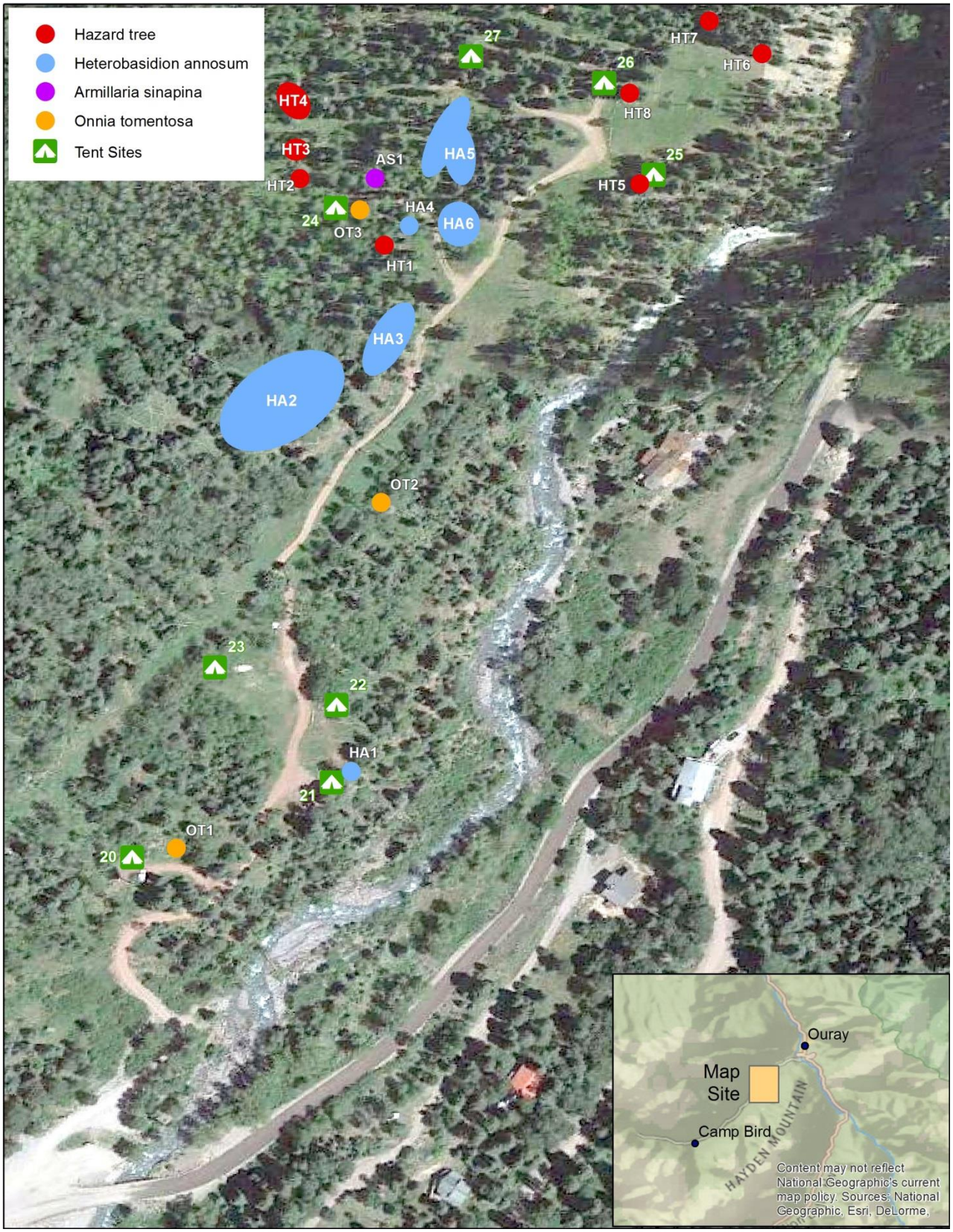

Fig. 1. Angel Creek Campground with campsite locations, hazard trees, and root diseases that were found in 2015. See the 2015 service trip report for details.

Fig. 2. Closeup of northern section of Angel Creek Campground.

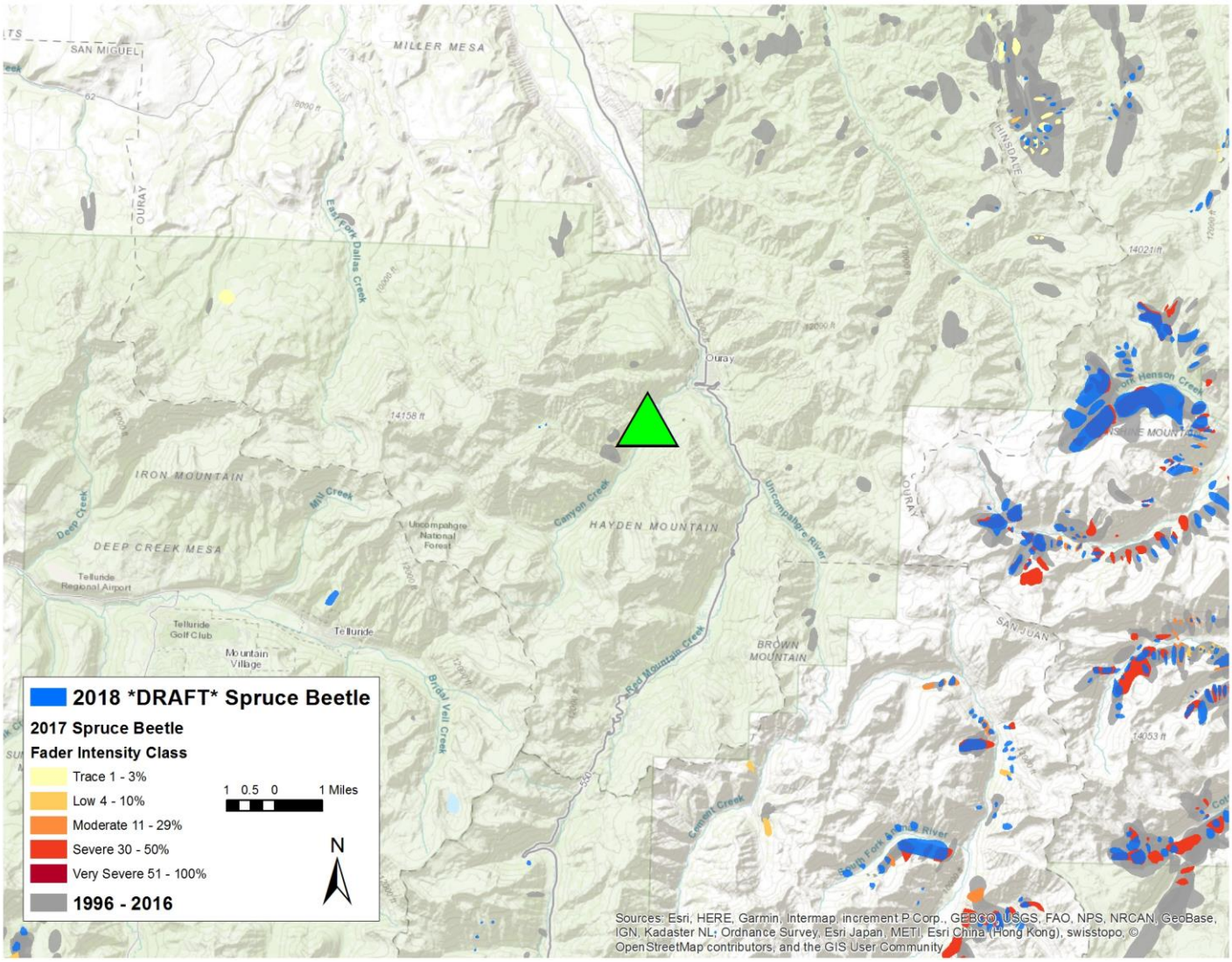

Fig. 3. Spruce beetle detection by aerial survey. The triangle is Angel Creek CG. Current 2018 detection is in blue. Note the two small blue polygons west of the campground near upper Weehawken Creek. Map by Jennifer Ross.