

**FUELS TREATMENT EFFECTIVENESS MONITORING REPORT INTERACTION OF THE DOG HEAD FIRE
WITH FUELBREAK TREATMENTS PUEBLO OF ISLETA, NEW MEXICO
BUREAU OF INDIAN AFFAIRS, SOUTHERN PUEBLOS AGENCY**

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Photo courtesy of Dog Head Fire Facebook page

Chronology of Events

The Dog Head Fire (2016-NMCIF-000277, P3KAQ2) was first reported at 11:33 a.m. on June 14, 2016 in the Manzano Mountains on the Cibola National Forest east of Fourth of July Campground. As common in the Southwest during this time of the year, conditions were disposed to fire establishment and growth with relative humidity in the single digits, daytime temperatures in the 70's, and gusty winds out of the southwest.

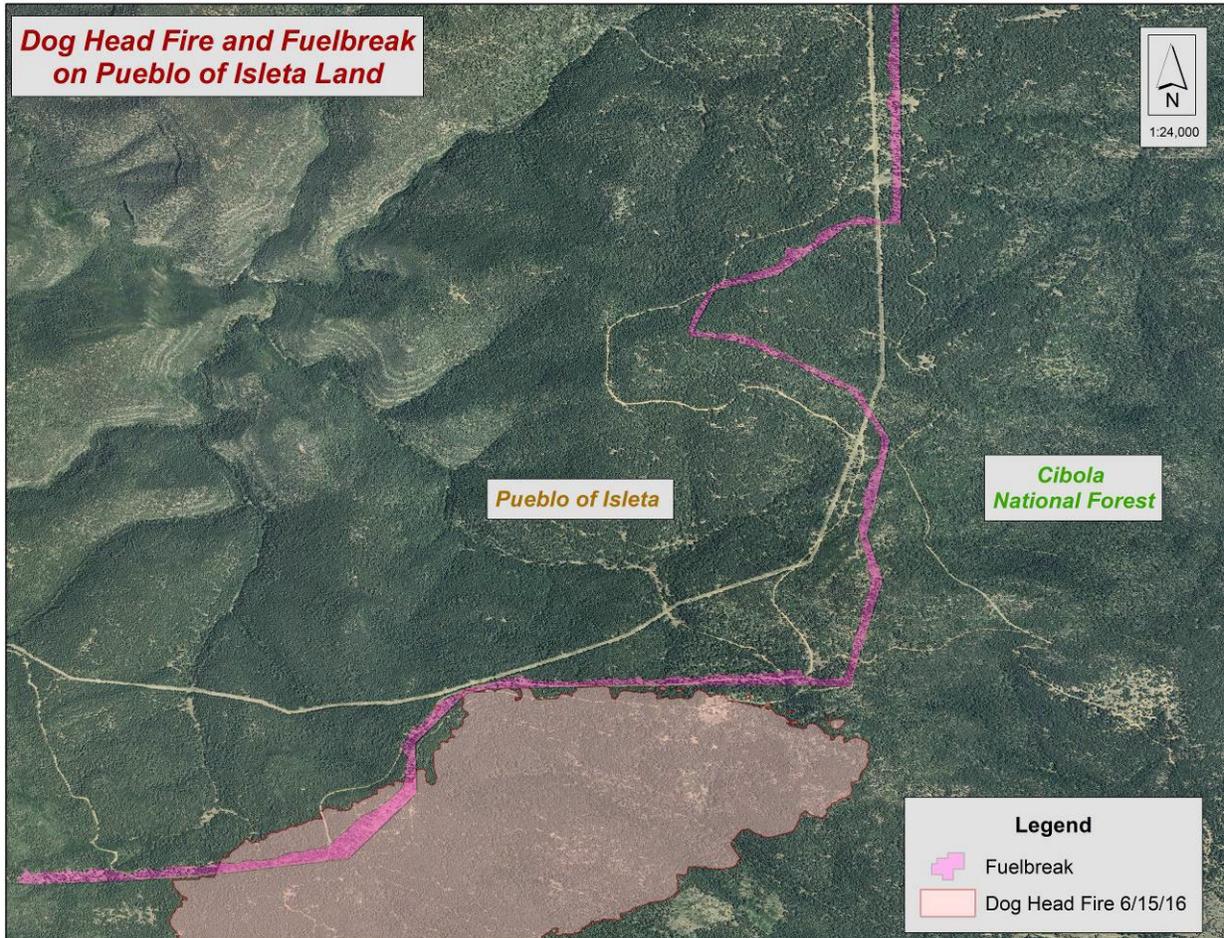
The fire spread initially through a ponderosa pine forest, and exhibited active and passive crown fire behavior for most of the first day. Fire behavior intensified as it progressed toward the northeast. Spotting occurred up to ¼ mile ahead of the main fire.

Initial attack resources, including six fire engines, two interagency hotshot crews, and an Isleta Department of Natural Resources fire crew constructed fire line around the heel, right flank, and head of the fire. Single engine air tankers, type 2 air tankers and a very large air tanker provided air support. Fortunately, the left flank of the fire was bounded by a fuelbreak extending along the Pueblo of Isleta boundary. Utilizing this fuelbreak and BIA Route 59, fire crews were able to complete a burn-out operation that evening.

Dog Head Fire Retardant Drop. Photo courtesy of Dog Head Fire Facebook Page



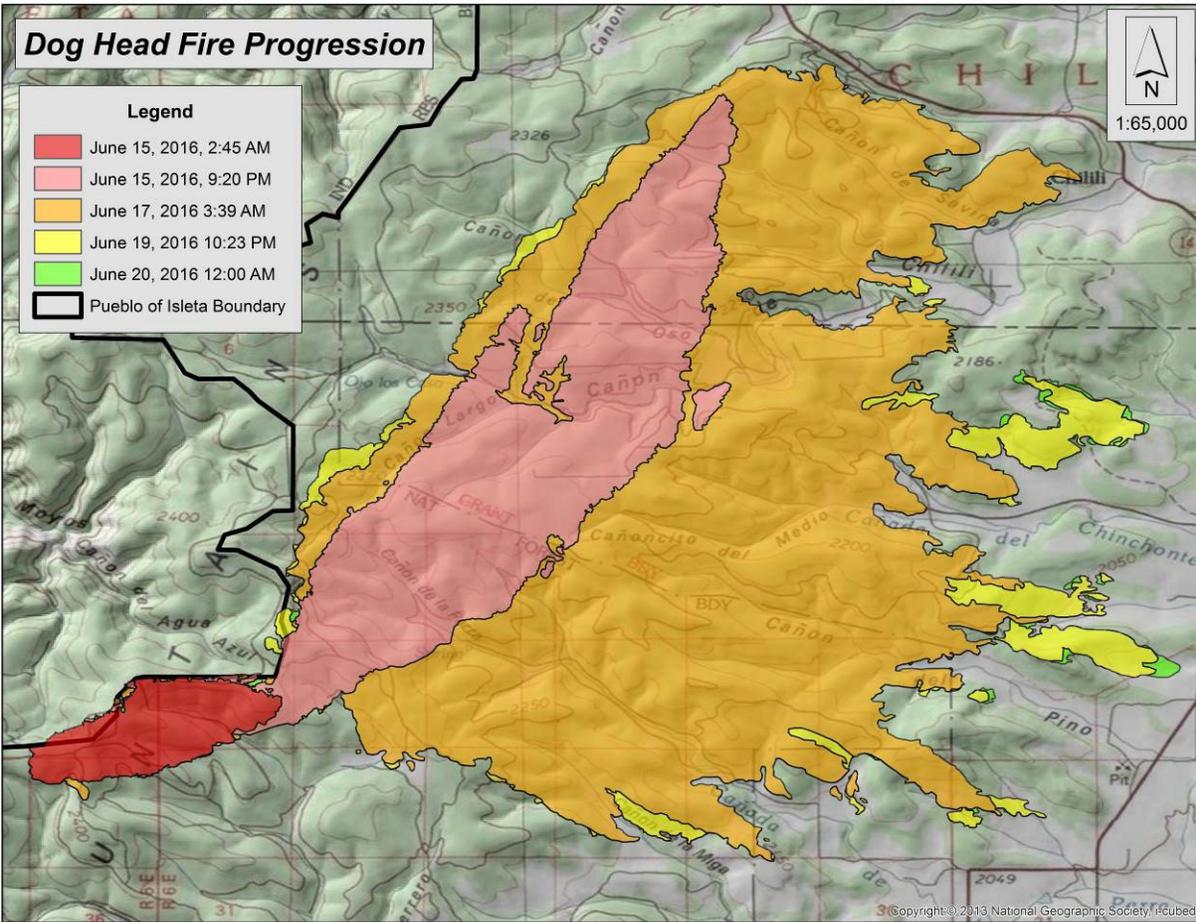
June 15 Fire Perimeter in Relation to Isleta East Boundary Fuelbreak



By the next day (June 15) the fire had spread to 682 acres in size and the Albuquerque Zone Type 3 Incident Management Team (IMT) was ordered.

On June 16 wind speed increased out of the southwest, and relative humidity dropped further. Several spot fires became established within the fuelbreak north of the Pueblo boundary. However, because of the reduced fuel loading within the fuelbreak, these ignitions exhibited only low spread rates and flame lengths. Suppression resources were able to quickly contain them, thereby restricting any further northward spread of the fire onto Pueblo lands. Meanwhile, high winds continued to push the main fire toward the northeast. The fire spread throughout the night, completing a 4,400 acre sustained active crown fire run that extended 6 miles in length. Due to the increasing complexity of the incident the Southwest Area Type 2 IMT was ordered. On June 17 the winds shifted, driving the fire rapidly toward the east, burning an additional 11,700 acres and threatening numerous residences in and around the community of Chilili. Fire crews continued to execute structure protection and direct and indirect suppression actions until fire growth effectively ceased on June 20.

Fire Progression June 15 - 20



The fire encompassed a total of 17,912 acres -- 11,246 acres of privately-owned land, 6,600 acres of National Forest, and 66 acres of Pueblo land. The Progression Map illustrates how the fire skirted the Pueblo boundary, leaving tribal lands relatively untouched.

Extensive forested areas of private and National Forest lands were severely impacted. For National Forest Lands alone, soil burn severity mapping indicates roughly a quarter of the area burned at high severity and half burned at moderate severity. A total of 12 residences and 44 minor structures were damaged or destroyed.

The total cost of fire suppression was approximately \$10,919,000. The short-term costs of necessary emergency stabilization treatments on National Forest lands alone are expected to exceed \$157,000. The full extent of damage to soils and watersheds and consequent long-term rehabilitation costs have yet to be fully realized.

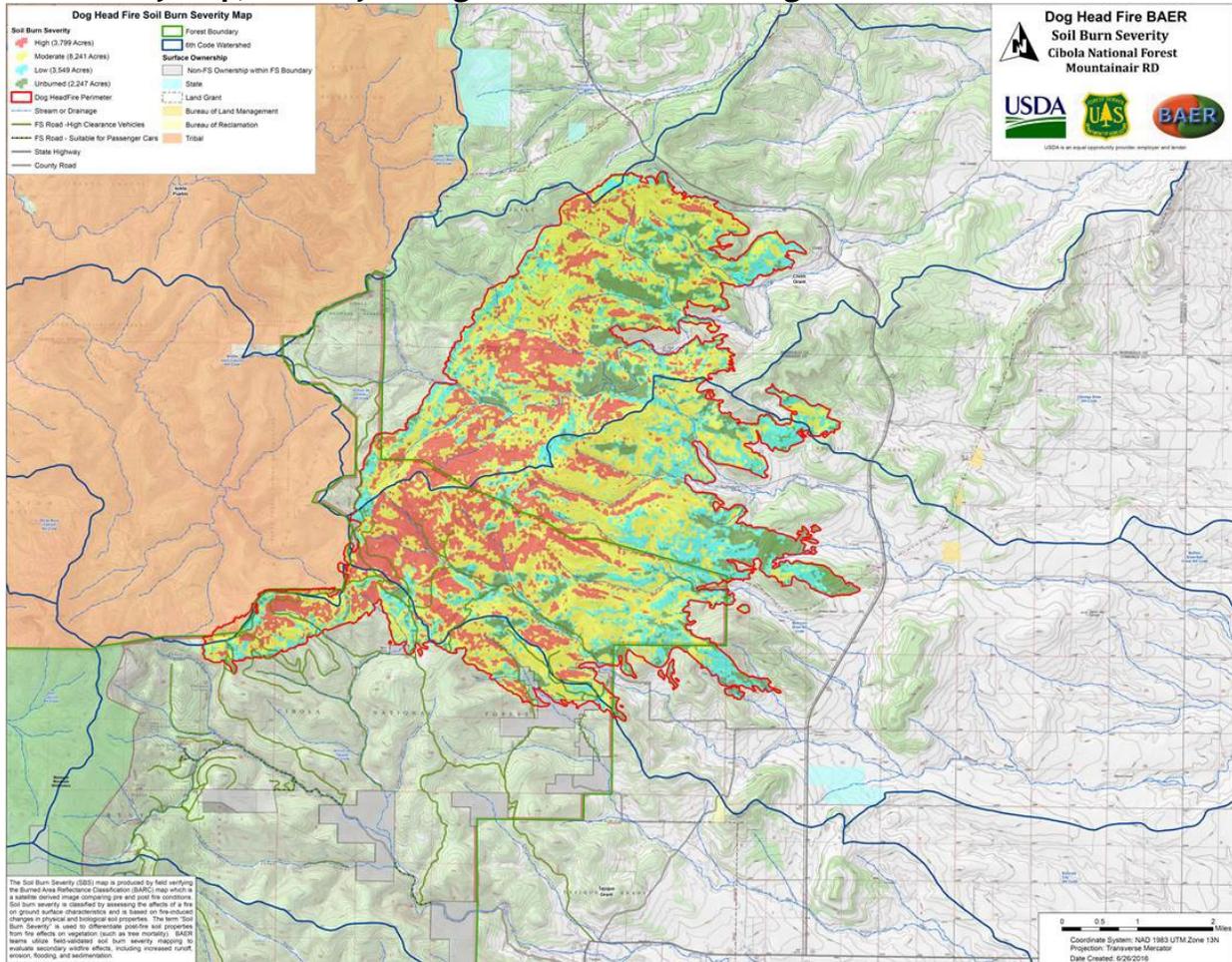
Moderate Burn Severity Area



High Burn Severity in Densely Forested Area



Burn Severity Map, courtesy of Dog Head Fire Facebook Page



Isleta East Boundary Fuelbreak

The Isleta East Boundary Fuelbreak is situated in the Manzano Mountains along the southern and eastern boundary of Pueblo lands. The fuelbreak averages 130 feet in width and extends approximately 5.9 miles in length for a total area of 85 acres. Thinning, lopping, piling, chipping and mechanized shredding treatments were applied to modify the fuelbed, creating open-canopy forest conditions with a limited understory component and light surface fuel loading. Work was conducted in 2004 and 2005, with some follow-up treatments in 2012. The project cost a total of **\$106,000** to complete. Allowing for inflation, the present value of the treatments is approximately \$129,000, which equates to \$1,518/acre.

Low Intensity Fire Experienced in Fuelbreak



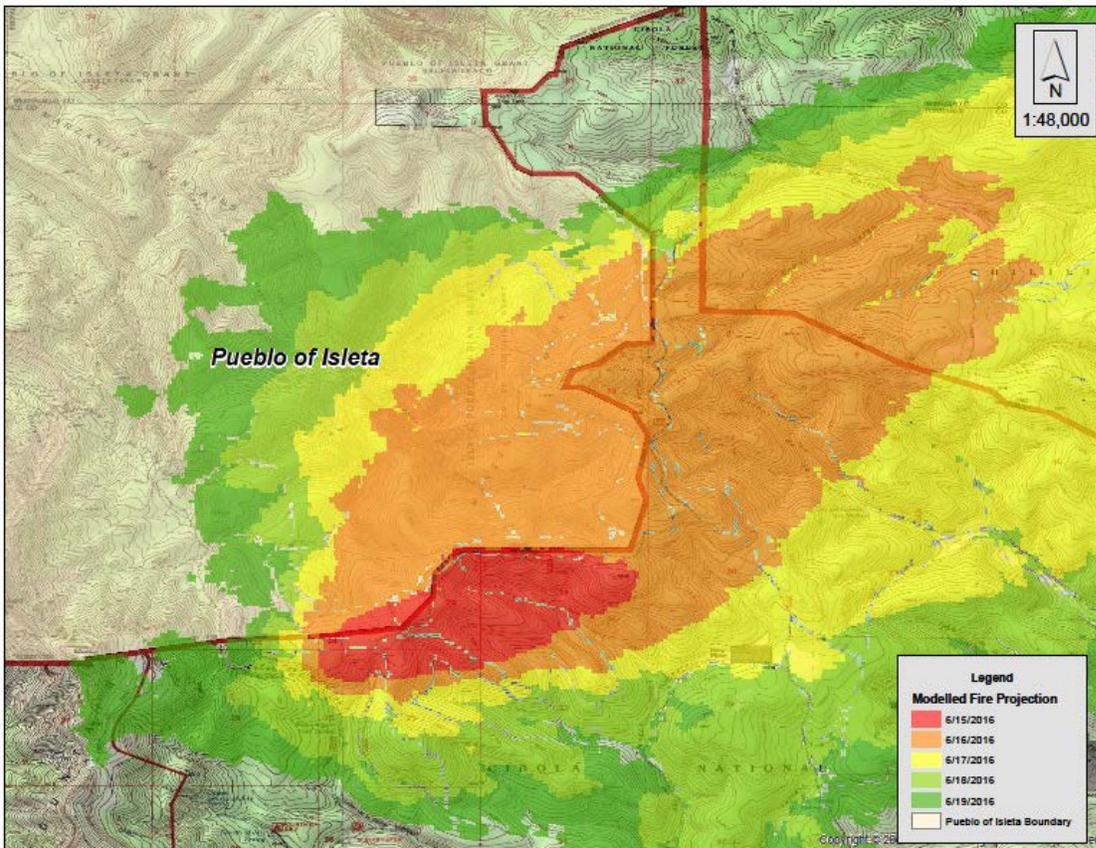
Analysis of Cost Avoidance

When tested by the Dog Head Fire the Isleta East Boundary Fuelbreak accomplished what it was designed for. The fire's energy diminished markedly as it progressed into treated areas. This, together with the favorable topography and existing road access enhanced firefighter safety, allowed for effective burn-out operations, and facilitated control of wind-driven spot ignitions. In total, only 66 acres of Pueblo lands burned. Due to the relatively low fire intensity on these lands, impacts to soils and other natural resources were very limited.

The question remains though -- what could have occurred if the fuelbreak had not been in place? The Near Term Fire Behavior (NTFB) model was used to simulate potential fire growth in the absence of the fuelbreak. The simulation was run through the Wildland Fire Decision Support System (WFDSS) using default Landfire fuel models and other landscape data, and actual fire weather and fuel moisture values.

In the absence of the fuelbreak, the projection indicates the fire may have crossed the Pueblo boundary and spread further to the north, impacting additional tribal and non-tribal lands. Since it is apparent tribal lands would have experienced the most dramatic increase in acres burned, the focus of this analysis is limited to these lands alone.

NTFB Projection of Potential Fire Spread onto Pueblo Lands



The projection indicates if the fire had not been stopped at the fuel break, it could have impacted an additional 4,520 acres of tribal land, an area comprising most of the headwaters of Blue Water and Moyos Canyons. These montane woodlands and timberlands are particularly rare on the Pueblo and embody qualities that are highly valued by the Tribe. The vast majority of Pueblo lands are high desert grass and scrublands. High elevation forested habitats constitute only 11 percent of the Pueblo landbase. Damage to these areas would have constituted a serious impact to the Tribe's traditional, cultural and economic resources.

Avoided Fire Suppression Costs

The actual total fire suppression cost of the Dog Head Fire was approximately \$10,919,000. The cost per acre from this figure is: $\$10,919,000 / 17,912 \text{ acres} = \$610/\text{acre}$. Applying this to the projected additional acreage on the Pueblo of Isleta yields: $\$610/\text{acre} \times 4,520 \text{ acres} = \mathbf{\$2,757,000}$ of potential fire suppression cost savings.

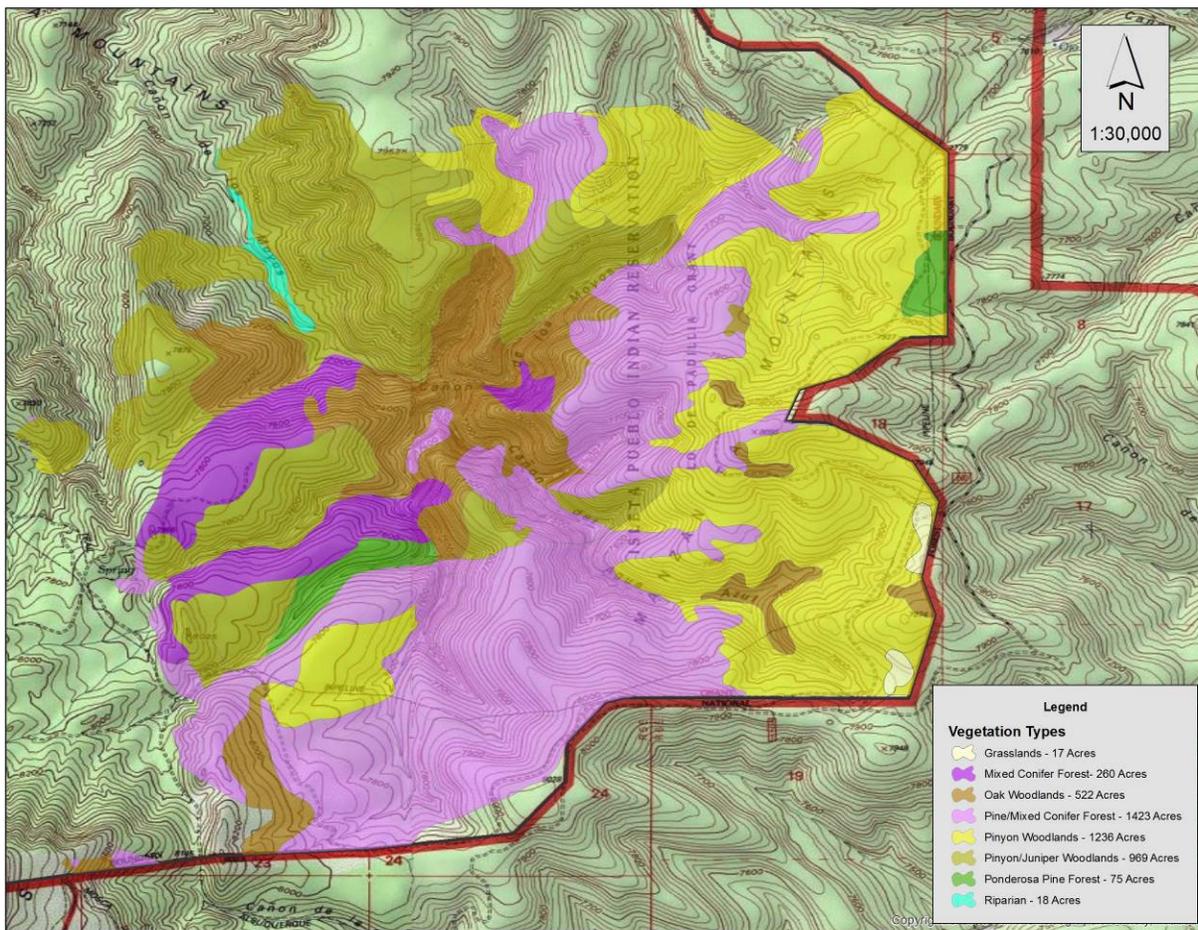
Avoided Emergency Stabilization Costs

The extent of potential damage to natural resources including soils, watersheds and wildlife habitat can be approximated by the associated cost of post-fire ecosystem stabilization. Emergency stabilization costs for National Forest Lands within the Dog Head Fire are around \$157,000. The cost per acre is: $\$157,000 / 6,600 \text{ National Forest acres} = \$24/\text{acre}$. Applying this figure to the projected area that could have burned on the Pueblo yields approximately $\mathbf{\$108,000}$ of potential emergency stabilization cost savings.

Avoided Timber Value Loss

According to the NTFB projection an estimated additional 2,994 acres of Pueblo commercial forest could have been burned. The 1994 Pueblo of Isleta Forest Inventory Analysis indicates a growing stock volume of 2.9 thousand board feet (MBF) per acre in regulated commercial timberland. Applying this figure to the 2,994 acres of commercial timber in the projected burn area yields a total of 8.6 million board feet (MMBF) of timber that could have been affected by the fire. Assuming the projected burn area would have experienced burn severities similar to the actual burn area, it is estimated roughly half of the standing commercial timber, or 4.3 MMBF could have been killed or seriously damaged if the fire had spread further onto the Pueblo. At an average stumpage value of \$20/MBF this equates to avoidance of approximately **\$86,000** of potential timber value loss.

Vegetation Types Affected by Projected Fire Spread onto Pueblo Lands



Avoided Non-Monetary Impacts

In addition to monetary values, the avoidance of impacts to prehistoric, historic and contemporary cultural resources should be exemplified. In the absence of the fuelbreak, a wide array of cultural, traditional, recreational and aesthetic resource values could have been lost, resulting in long term negative impacts to the Pueblo of Isleta's traditional way of life. These include religious cultural resource sites, traditional hunting

areas, specific travel ways, and highly important cultural areas used for collecting sensitive vegetative materials for traditional and medicinal purposes.

In Conclusion

The impacts of the Dog Head Fire were devastating in terms of property losses and damage to natural resources on private and National Forest lands. Fortunately for the Isleta Pueblo, tribal land experienced only negligible effects. This can be attributed, in part, to the Isleta East Boundary Fuelbreak. If the fuelbreak had not been in place the fire could have affected an estimated additional 4,520 acres of Pueblo land. This would have resulted in serious consequences for tribal cultural values, as well as direct economic impacts approaching \$3 million. From a fire management investment perspective, if the total of all avoided costs (\$2,951,000) are considered in relation to the present value of fuelbreak construction costs (\$129,000) the resulting benefit/cost ratio is nearly **23:1**.

Sign Placed by Local Residents



Photo courtesy of Dog Head Fire Facebook page