United States Department of Agriculture | **Forest Service** | **Rogue River National Forest Siskiyou National Forest** | **Supervisor's Office 333 W. 8th Street P.O. Box 520 Medford, OR 97501-0209**

File Code: 2500 **Date:** October 16, 2002
Route To:

Subject: Quartz Fire BAER

To: Regional Forester, R6

Attached is the Burned Area Emergency Rehabilitation request (FS-2500-8) for the Quartz Fire on the Rogue River National Forest for year two. Please note that, based upon FY02 field information, costs for winter storm culvert patrol and noxious weed monitoring have been significantly reduced.

There are a number of detailed supporting documents on seeding prescriptions, seed costs, noxious weed populations, fisheries, hydrology, and soils (including the WEPP runs) that are not attached due to their size. If you want to see these documents or have any questions about this report, contact Jon Brazier at 541-858-2271 or via Lotus Notes.

/s/ ***Gregory A. Clevenger*** for
SCOTT D. CONROY
Forest Supervisor
Rogue River and Siskiyou National Forests

cc. B. McCammon
E. Connelly
J. Brazier
L. Robertson
G. Clevenger

USDA-FOREST SERVICE
FS-2500-8 (7/00)

Date829/01

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated WFSU-SULT funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[ ] 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation measures)

[X] 2. Interim Report
[X] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Quartz

B. Fire Number: 71110702

C. State: Oregon

D. County: Jackson

E. Region: Region 6

F. Forest: Rogue River National Forest

G. District: Applegate Ranger District

H. Date Fire Started: 8/9/01

I. Date Fire Controlled: Unknown, *Estimate 9/1/01*

J. Suppression Cost: *Estimate $11,000,000*

K. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline water-barred (miles): 35 (Some cat lines are on roads. All will have drainage restored if not water-barred)
2. Fireline seeded (miles): (None at this time. FS will seed lines later since ODF overhead team would not perform this work.)

3. Other (identify):

L. Watershed Number: 1710030903

M. Total Acres Burned: 6,195
NFS Acres(3489) Other Federal (933) State (75) Private (1,698)

N. Vegetation Types:
Plant communities within the fire area are: Non-native annual grasslands; native perennial grassland, forb land, and meadows; brushfields, oak-pine woodlands, coniferous forests with ponderosa pine, Douglas fir, white fir, Shasta red fir, incense cedar, sugar pine and western white pine.

O. Dominant Soils: Silt loam, silty clay loam, gravelly loam

P. Geologic Types:
Metamorphic volcanic rocks (andesite and tuff), metamorphic sediments (sandstone, shale, and layered tuffs), and granite (diorite, granodiorite, and gabbro). Minor amounts of peridotite and serpentine are found on the highest ridges.

Q. Miles of Stream Channels by Order or Class:

Class 2: 4.0
Class 3: 2.4
Class 4: 22.7

R. Transportation System

Trails: 3.9 miles Roads: 29.7 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 1454 (low) 2201 (moderate) 2540 (high)
➔ Intensity based on field survey on 8/23-24/01

B. Water-Repellent Soil (acres): 500

C. Soil Erosion Hazard Rating (acres):
National Forest & Private: 775 (low) 1926 (moderate) 2366 (high)
BLM: 48 (low) 239 (moderate) 668 (high)
(There are slight ownership acreage differences between the two agencies. The BLM provided the information on erosion hazard rating for their land.)

D. Erosion Potential: 25 tons/acre

E. Sediment Potential: 11 tons/acre (7,040 tons/mi^2)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5

B. Design Chance of Success, (percent): 75

C. Equivalent Design Recurrence Interval, (years): 25

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 4.3

F. Design Flow, (cubic feet / second/ square mile): 124

G. Estimated Reduction in Infiltration, (percent): 10

H. Adjusted Design Flow, (cfs per square mile): 136

PART V - SUMMARY OF ANALYSIS

A. DESCRIBE WATERSHED EMERGENCY

It should be pointed out that fire is a natural part of he ecosystem in SW Oregon, with natural fire frequency intervals within the area ranging from 10 years in the lower elevations to 50 years in the upper areas of the burn. A high percentage of the burned area was characterized by unnaturally dense stands of both trees and brush, the result of years of aggressive fire suppression. Since much of the Quartz fire area burned with high and moderate intensity, there has now been a dramatic shift toward younger age classes of vegetation. This fire will re-set the successional clock in the area, and potentially allow successional processes to operate more within the range of natural variability. From that standpoint, many of the short and long-term effects of the fire will be positive.

There potentially are, however, some short term (estimated 1-3 years) effects of this fire that need to be mitigated to reduce the probability of unacceptable impacts to NF and downstream private lands. The effects of the actual area of the Quartz fire that burned on NF system lands, and the potentially impacted areas downstream on private lands were both considered in determining the proposed course of action. The following summary describes the conditions that warrant emergency rehab actions.

1. Loss of Site Productivity

Geology/Soils Narrative

Geologic Setting

The fire area is underlain by metamorphic and igneous rocks of the Western Paleozoic and Triassic Belt, northeast trending bands of metamorphic rocks that have been accreted to the

continental plate. Rock types consist of metamorphosed sedimentary and volcanic rocks, with intrusions of serpentine and granitic rock. Two of the geomorphic units are of concern for erosion and sedimentation following the Quartz Fire.

The tectonic processes that welded these widely different rock types together subjected the rocks to deformation, shearing and fractures. This has altered the strength of the bedrock by decreasing resistance to erosion and weathering, and can alter permeability and groundwater distribution within these weakened zones. Within the fire area, stream courses of Glade Creek and Shump Gulch are fault controlled.

Landform Types

Glaciated Headwaters: Rock type coupled with tectonic uplift, glaciation and erosion have created distinctive landscapes. In the headwaters of Glade Creek, glaciers have sculpted granitic, amphibolite and serpentine bedrock into gently convex cirques above smooth, uniform slopes. Soils are typically shallow, very gravelly to cobbly loams.

The Glade Creek drainage is fault controlled and subsequently glaciated. The broad, U-shaped and low gradient reach of Glade Creek is aggraded by moraine deposits and by sediment delivered by landslides from the upper slopes.

Fire Effects: Organic matter is an integral part of the shallow, granular soils developed on this landtype. Organics in the soil often store nutrients and moisture, and provide cohesion. High intensity fire will reduce the amount of organic matter present, thus decreasing soil productivity and increasing surface erosion rates. Rehabilitation efforts where high intensity fire has damaged these sensitive soils include seeding and straw wattles used as check dams in swales and draws.

The poorly cohesive soils found in this landtype are prone to shallow debris slides that can initiate debris flows that scour channels to bedrock. High intensity fire can accelerate the natural rate of debris slides and debris flows by decreasing the cohesion of the material, increasing the amount of available ground water, and concentrating surface water flow. Revegetation and channel protection by straw wattles may reduce the probability of debris flows on the eastern half of the headwaters.

The western half of the headwaters is crossed by an older ‘stacked’ road system with large fills in deeply incised draws and sidecast construction. Debris slides in the draws or below ditch relief culverts could initiate debris flows that scour channels, destroy road crossings down slope, and deposit sediment directly into Glade Creek. Proposed fire rehabilitation protection for slopes within or below areas of high intensity fire where increased runoff and/or debris is expected to occur include:

- Culvert inlet protection using straw or log check dams
- Rebar trash racks
- Culvert outlet protection with rock aprons
- Road maintenance patrols after rain storms to clean culverts and ditches
- Seeding slopes and riparian areas with native grasses

Subdued Metavolcanic Landforms: Highly weathered and fractured metavolcanic rocks underlie the upper slopes of Shump, Quartz, and Mule Gulches. In contrast to the rugged, steep landforms often seen in the Klamath geological province, topography in this area is more subdued, with more gentle, uniform slopes, and numerous broad swales and draws in the uplands, with dramatic slope breaks into steeply incised drainages. This is interpreted to be a result of tectonic uplift on a mature landscape.

Soils developed from the metavolcanic bedrock are typically shallow to moderate silt loam over a silty clay loam and clay loam subsoil. The soils are characterized by poor productivity, very high bulk densities, low organic matter, and low infiltration rates. Duff layer is one inch or less. A shallow crusting was noted on the surface of the soils, possibly from raindrop displacement and sheet erosion of clay and silt-sized particles into void spaces. Infiltration rates are naturally low in the crusted areas.

Erosional processes are primarily those of surface erosion, including sheet erosion and soil creep, rather than mass wasting. Gully formation is common where water is concentrated, such as areas below culvert outlets. Headward erosion from piping (possibly along the silt loam/clay loam interface) occurs in draws at steep slope breaks.

Fire effects: The conditions that are characteristic of these highly sensitive soils are expected to expand in size and severity in areas of high intensity burns where bare soil is exposed to raindrop impact, sheet erosion, and gully incision. An immediate effect of fire on these soils was noted in the draws that experienced high intensity fire. All organic matter on the forest floor was consumed over large areas, exposing the crusted soil layer. Hydrophobic layers appeared to form as bands that followed slope contour slightly above the bottom of the swales and draws. This phenomenon may have occurred as volatile gasses released by the burning of organic material within the draws condensed on adjacent slopes.

Numerous draws and swales are crossed by roads, often with stacked road systems, with culverts at each crossing. The smaller diameter culverts may be inadequate to carry increased flow and debris from high intensity burn areas, and will not be able to handle the anticipated material from gully erosion. Some larger road fills have undersized culverts with inadequate inlet protection handle the anticipated organic debris and debris slides from the high intensity burn areas. If fill failures, increased gully erosion, and head-cutting occur, increased sediment would be delivered to Glade Creek and to Shump, Mule, and Quartz Gulches.

Within this landtype is private land that has experienced high intensity fire. Draws and road systems located on National Forest lands below these areas of private land will be subject to detrimental fire effects, even though the immediate area may not have experienced a high intensity fire. These areas were also reviewed for rehabilitation or increased protection from fire effects.

Rehabilitation proposals were evaluated by criteria that included soil sensitivity, burn intensity, topography, road systems within or below areas of high intensity burns, and effects to perennial or fish-bearing streams. These proposals include:

Culvert inlet protection using straw or log check dams
Rebar trash racks
Culvert outlet protection with rock aprons
Replacing an undersized culvert
Installing an overflow culvert and downspout on a large fill
Road maintenance patrols after rain storms to clean culverts and ditches
Willow planting in perennial streams
Seeding slopes and riparian areas with native grasses
Contour falling of logs on slopes above draws and swales
Straw wattles on slopes where natural material is unavailable

Noxious Weeds

There has been an exponential increase in the amount of bare ground as a result of the fire. In the first two years, non-native annual grasses are expected to increase dramatically on the warm lower-elevation open slopes that were subjected to high intensity fire. In a few of these areas, without intervention, the non-native annual grasses may totally preclude the re-establishment of native grasses. Some non-native forbs are also expected to increase in abundance in the fire area. Native forbs, grasses, resprouting shrubs, and seedlings of shrubs and trees will dominate many areas where they were only a minor component under a conifer canopy before the fire. No native species are expected to entirely disappear from the Quartz fire area.

A significant concern is the potential further spread of noxious weeds within the burned area. There were 11 known infestations before the fire. They are**:**

Star thistle in section 11 (2 sites), section 1 (multiple small sites), section 7, and section 31 (2 sites); Scotch broom in section 14, section 13, and section 11 (2 sites); Spotted knapweed in section 11. Those sites have been hand-pulled in the past, so population densities were not high before the fire. All of these sites burned during the Quartz fire, most of them at high or moderate intensity. The likelihood of increases in population area and density following the fire is high.

New occurrences of noxious weeds are also likely in the fire area because of all the new bare ground ready for colonization and because a lot of humans and vehicles (vectors) have been using the area during the suppression effort, which significantly increases the potential for spread of noxious weeds.

2. <u>Loss of Water Quality</u>

Water quality in the Yale Creek and Glade Creek subwatersheds, and the Little Applegate River to which they are tributary, is critical for many uses, including domestic, agricultural, aquatic habitat for resident and anadromous species (chinook salmon, ESA-listed coho salmon, and steelhead), and recreation use. All of these streams, including the burn area, have been nearly denuded of large wood either through clearing of streamside habitat for agricultural uses, or from

extensive logging of source areas. Habitat effectiveness for resident and anadromous fish has thus been reduced, and sediment storage reservoirs removed.

Yale Creek contains anadromous fish populations of Klamath Mountain Province steelhead trout (Oncoryhncous mykiss) and Glade Creek contains resident rainbow and Southern Oregon/California Coastal cutthroat trout (O. clarki clarki). Critical habitat for Southern Oregon/Northern California coho salmon, listed as a threatened species under the Endangered Species Act, exists at confluences of both Glade Creek and Yale Creek with Little Applegate River. A more detailed description of the fisheries is on file in the Rogue River NF Supervisor's Office.

Summer water temperatures are generally not a significant concern, as the Quartz Fire did not intensively burn and thus remove significant portions of shade-producing vegetation adjacent to perennial streams. Except for very short reaches near Glade Creek, upper Dog Fork, and some very small headwater perennials, the fire intensities adjacent to perennial streams were low to moderate and the streamside shade is largely intact. Therefore, water temperatures are not expected to noticeably increase as a result of this fire.

The water quality parameter that has the highest potential to be significantly affected by this fire is sediment. Stream sediment in several 7th Field drainages including Quartz Gulch, Shump Gulch, Dog Fork, and Mule Gulch is expected to increase in the short term (up to three years), until natural recovery and restoration efforts have had time to establish an effective ground cover. Most of the increase in sediments will likely be the finer textured sands and gravels owing to the generally small (headwater) subwatersheds that were intensively burned (thus lower stream energies), as well as the inherent makeup of the channel strata. Due to lack of large wood in these and downstream areas (Yale Creek and lower Glade Creek), most of the sediment will be conveyed into the lower Little Applegate River and the Applegate River.

3. **Threats to Human Life and Property**

Potential values at risk include homes, bridges, irrigation diversion structures, domestic and irrigation intake structures and diversions, and roads. Most all of these developments are already in existing flood plains, and consequently have been, currently are, and will continue to be at some level of risk from flood damage because of their location.

Flooding in this area is primarily related to rain on snow events during the winter months. Even though there will be higher run-off rates as the result of the fire, this is not expected to contribute to downstream flood events unless there is a significant hydrologic event, such as rain on snow, or prolonged higher than average rainfall. The potential for the burned area to contribute to these events will decrease significantly over the next 2-5 years as vegetation becomes re-established on the area.

There is the likelihood of large woody material moving outside the fire area. Streams are currently largely devoid of large wood. Large wood that may be recruited as fire-killed trees fall is generally too large to be moved by the peak flows experienced in the Class 3 and 4 streams within the burn. These logs will ultimately provide excellent storage sites for sediment.

However, some of the trees along Glade Creek that were felled during suppression activities, as well as some of the trees that will fall because they were burned, are likely to move down Glade Creek during high flows. The actual amount of wood moving downstream as a result of the Quartz fire will be determined to a large extent by the nature of flows. Some of this wood will likely move on to private land. However, large wood is a natural component of these aquatic systems and the addition of wood from this fire will contribute to the long-term stability of the channel.

B. EMERGENCY TREATMENT OBJECTIVES

The main objectives of treatments are to mitigate short term adverse effects of the Quartz fire while providing for long-term recovery of the burned area. BAER treatments are designed to meet these objectives with a variety of structural and non-structural land treatments. Structural treatments on the slopes within the burned area are designed to minimize on-site erosion and downstream sedimentation. Non structural treatments will help maintain site conditions and minimize invasion or spread of noxious weeds into the burned area.

Structural road treatments are designed to reduce erosion and protect the road infrastructure. Road failures would add sediment to streams that are habitat for anadromous fish and provide water for domestic and irrigation purposes downstream

C. Probability of Completing Treatment Prior to First Major Damage-Producing Storm:

Land **80** % Channel **100** % Roads **100** % Other ___ %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	90	90
Channel	75	85	85
Roads	80	90	90
Other			

E. Cost of No-Action (Including Loss): **$1,060,000**

F. Cost of Selected Alternative (Including Loss): **$595,000**

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology	[x] Soils	[x] Geology	[ ] Range	[ ]
[ ] Forestry	[x] Wildlife	[ ] Fire Mgmt.	[x] Engineering	[ ]
[ ] Contracting	[ ] Ecology	[x] Botany	[x] Archaeology	[ ]
[x] Fisheries	[ ] Research	[ ] Landscape Arch	[x] GIS	

Team Leader: Jon Brazier

Email: jbrazier@fs.fed.us Phone: 541-858-2271 FAX: 541-858-2220

H. **Treatment Narrative:**

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities.

Treatments: ***Road storm patrols***

Patrolling the burned area during storms for preventative maintenance. Specific activities proposed are:

- ➔ Increased drainage and culvert cleaning patrols during the winter. This preventative measure will allocate one crew to the burned area this fall and winter to keep up with increased erosion and debris which would block culverts and possibly lead to road failures. Year two of Storm Patrols.

I. Monitoring Narrative:

Noxious weed surveys and monitoring

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

Quartz Fire			NFS Lands				Other Lands			All
Rogue River NF		Unit	# of	WFSU	Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT $	$	units	$	Units	$	$
A. Land Treatments										
Subtotal Land Treatments										
B. Channel Treatments										
Subtotal Channel Treat.										
C. Road and Trails										
Drainage patrol - 1 crews	year		1	$15,000			$0		$0	$15,000
Subtotal Road & Trails										
D. Structures										
Subtotal Structures										
E. BAER Evaluation										
F.BAER Survey										
G. Monitoring Cost										
Noxious weed surveys	survey	2700	1	$2700			$0		$0	$2700
Subtotal Monitoring										
H. Totals										

Total $17,700.00 $17,700.00

PART VII - APPROVALS

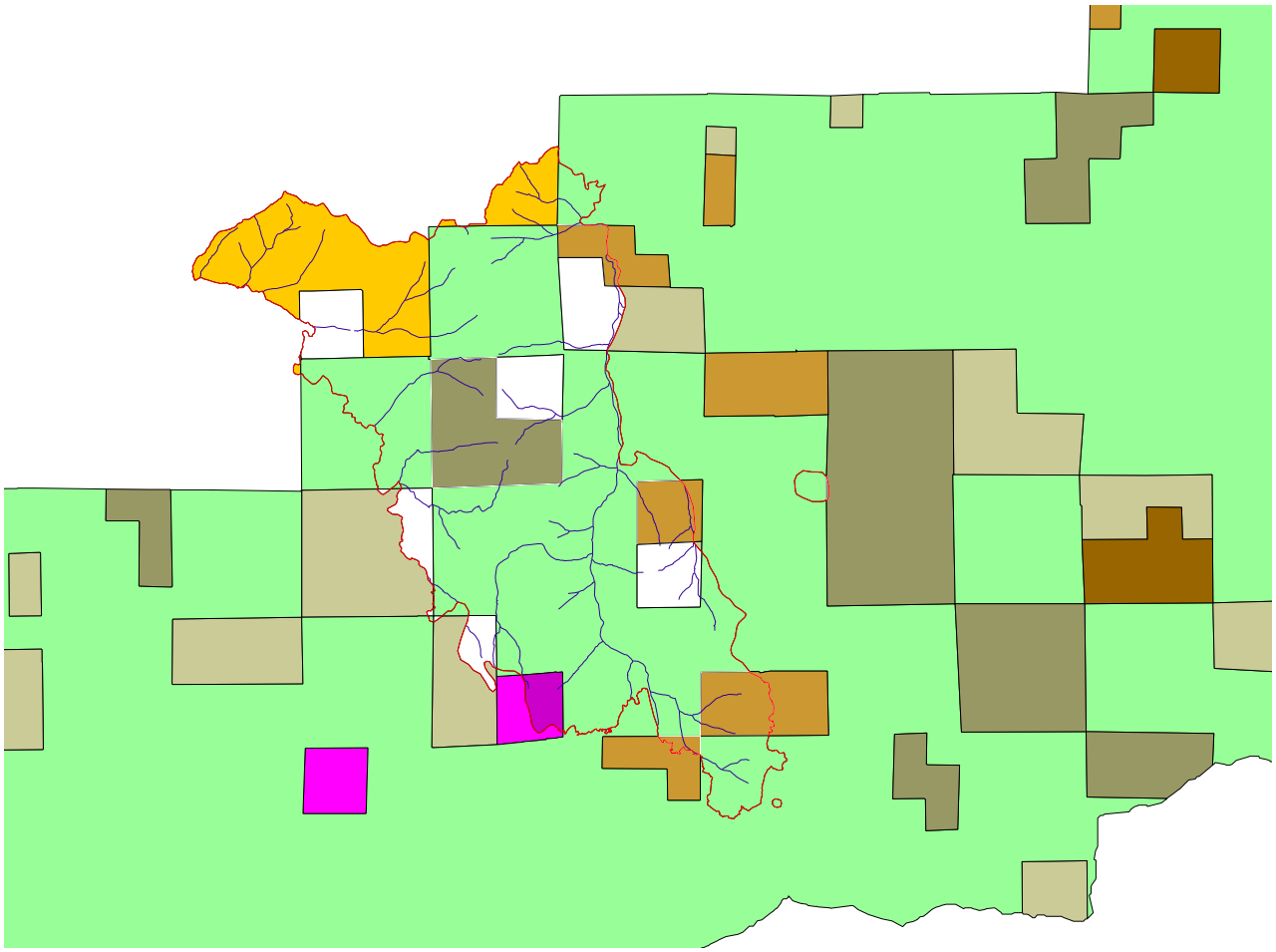
1./s/ ***Gregory A. Clevenger*** for Scott D. Conroy 10/16/02

Forest Supervisor (signature) Date

2. _____ _____

Regional Forester (signature) Date

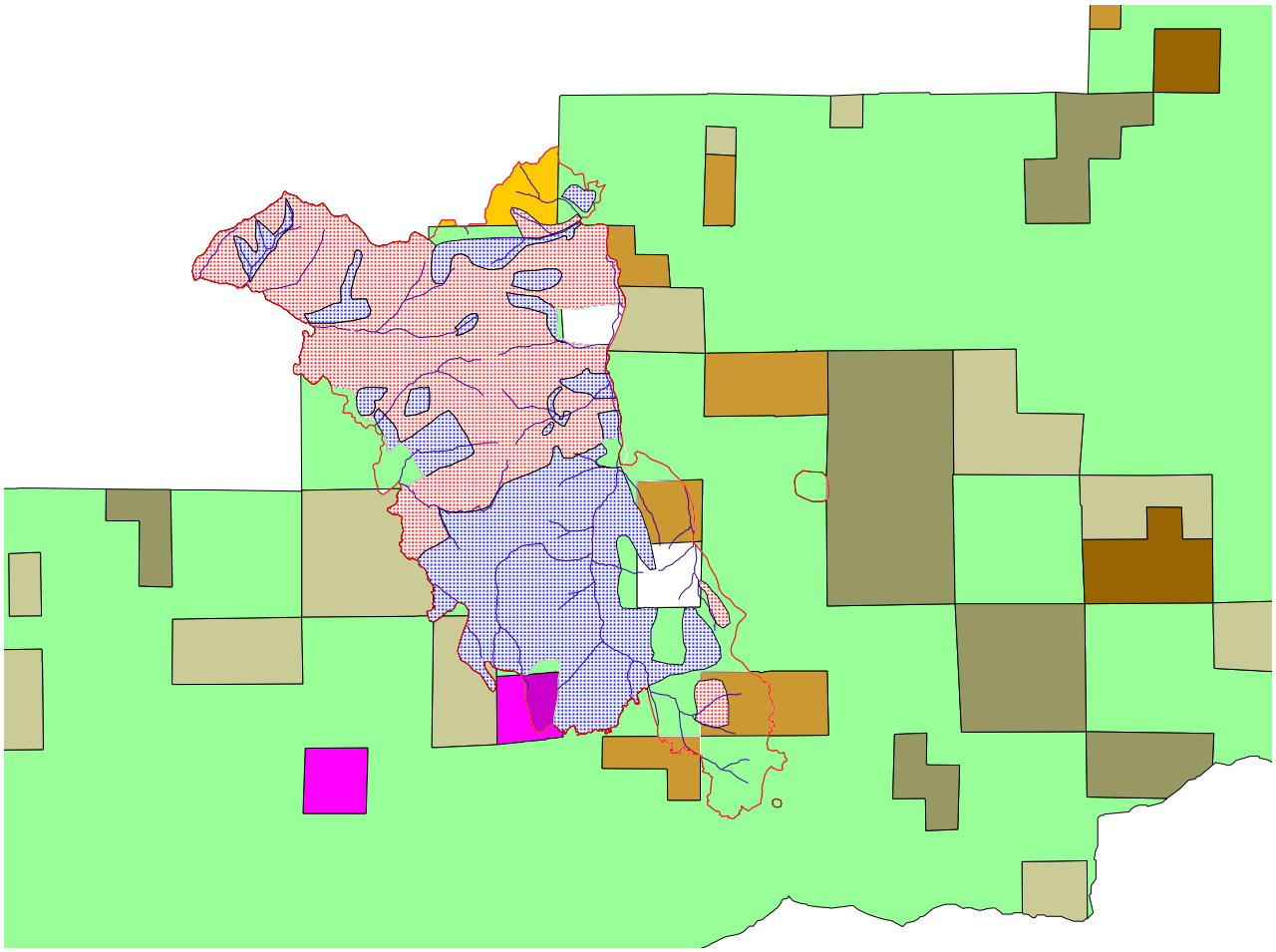
Quartz Fire



Perimeter
Ownership Within Fire Perimeter
BLM
FS
Pvt
State

N
W
E
S

Quartz Fire with Burn Intensity



Perimeter
Burn Intensity
HIGH
MED
Ownership Within Fire Perimeter
BLM
FS
Pvt
State

N
W
E
S