2222A publication of the
National Wildfire
Coordinating Group

Prescribed Fire Plan

Galena Pile Burn

PMS 484-1 JULY 2017

AGENDA ITEM #8A.3

Prescribed Fire Name: Galena Pile Burn

Contents

Element 1: Signature Page

PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT NAME(S): Western Region

PRESCRIBED FIRE NAME:
Prescribed Fire Unit (Ignition Unit): Galena Pile Burn

PREPARED BY:
Name (print): Chanse Hunwardsen Qualification/Currency: RXB3 / Current

Signature: _____ Date: _____

TECHNICAL REVIEW BY:
Name (print): Katie Sauerbrey Qualification/Currency: RXB2 (Current

Signature: Katie Sauerbrey Date: 11/13/2020

COMPLEXITY RATING: Low

MINIMUM BURN BOSS QUALIFICATION: RXB3

APPROVED BY:

Name – State Fire Management Officer (print): Ron Bollier

Signature – State Fire Management Officer: _____ Date**:** _____

APPROVED BY:

Name – Agency Administrator (print): Kacey KC

Signature – Agency Administrator: _____ Date**:** _____

Element 2A: Agency Administrator Ignition Authorization

Instructions: The Agency Administrator Ignition Authorization must be completed before a prescribed fire can be implemented. If ignition of the prescribed fire is not initiated prior to expiration date determined by the agency administrator, a new authorization will be required.

Prior to signature the agency administrator should discuss the following key items with the fire management officer (FMO) or burn boss. Attach any additional instructions or discussion documentation (optional) to this document.

Key Discussion Items

A.	Has anything changed since the Prescribed Fire Plan was approved or revalidated? *Such as drought or other climate indicators of increased risk, insect activity, new subdivisions/structures, smoke requirements, Complexity Analysis Rating.*
B.	Have compliance requirements and pre-burn considerations been completed? *Such as preparation work, NEPA mitigation requirements, cultural, threatened and endangered species, smoke permits, state burn permits/authorizations.*
C.	Can all of the elements and conditions specified in Prescribed Fire Plan be met? *Such as weather, scheduling, smoke management conditions, suitable prescription window, correct season, staffing and organization, safety considerations, etc.*
D.	Are processes in place to ensure all internal and external notifications and media releases will be completed?
E.	Have key agency staffs been fully briefed about the implementation of this prescribed fire?
F.	Are there circumstances that could affect the successful implementation of the plan? *Such as preparedness level restrictions, resource availability, other prescribed fire or wildfire activity*
G.	Have you communicated your expectations to the Burn Boss and FMO regarding if and when you are to be notified that contingency actions are being taken?
H.	Have you communicated your expectations to the Burn Boss and FMO regarding decisions to declare the prescribed fire a wildfire?

Implementation Recommended by:
Regional FMO Signature:_____ Date:_____

and

Prescribed Fire Burn Boss (Signature):_____ Date:_____
I am authorizing ignition of this prescribed fire between the dates of _____ and _____. It is my expectation that the project will be implemented within this time frame and as discussed and documented and attached to this plan. If the conditions we discussed change during this time frame, it is my expectation you will brief me on the circumstances and an updated authorization will be negotiated if necessary.

Additional Instructions or Discussion Documentation attached (Optional): Yes ☐ No ☐

Ignition Authorized by:
Agency Administrator Signature and Title:_____ Date:_____

Element 2B: Prescribed Fire Go/No-Go Checklist

Preliminary Questions	**Circle YES or NO**
A. Have conditions in or adjacent to the ignition unit changed, (for example: drought conditions or fuel loadings), which were not considered in the prescription development? If **NO** proceed with the Go/NO-GO Checklist below, if **YES** go to item B.	YES NO
B. Has the prescribed fire plan been reviewed and an amendment been approved; or has it been determined that no amendment is necessary? If **YES**, proceed with checklist below. If **NO, STOP: Implementation is not allowed. An amendment is needed.**	YES NO
GO/NO-GO Checklist	**Circle YES or NO**
Have ALL permits and clearances been obtained?	YES NO
Have ALL the required notifications been made?	YES NO
Have ALL the pre-burn considerations and preparation work identified in the prescribed fire plan been completed or addressed and checked?	YES NO
Have ALL required current and projected fire weather forecast been obtained and are they favorable?	YES NO
Are ALL prescription parameters met?	YES NO
Are ALL smoke management specifications met?	YES NO
Are ALL planned operations personnel and equipment on-site, available and operational?	YES NO
Has the availability of contingency resources applicable to today's implementation been checked and are they available?	YES NO
Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?	YES NO

If all the questions were answered "**YES**" proceed with a test fire. Document the current conditions, location and results. If any questions were answered "**NO**", DO NOT proceed with the test fire: Implementation is not allowed.

After evaluating the test fire, in your judgment can the prescribed fire be carried out according to the prescribed fire plan and will it meet the planned objective? **Circle: YES or NO**

Go-No-Go Checklist and Test Fire Documentation will be sent to the State office Admin IV in the morning before continuing ignition on the project.

Burn Boss Signature:_____ Date:_____

Element 3: Complexity Analysis Summary and Final Complexity

NWCG Prescribed Fire Summary and Final Complexity Worksheet (PMS 424-1)
This worksheet is supplemental to the *Prescribed Fire Complexity Rating System Guide* (PMS 424). It is designed to enable effective risk management. The *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (PMS 484) provides further explanation. This becomes Element 3 of the prescribed fire plan.

Galena Pile Burn		Quantity	Significance
Values	On-Site	**Few**	**Low**
	Off-Site	**Multiple**	**Mod**
	Public/Political Interest	**Few**	**Mod**

Element	Preliminary Risk	Post-Plan Risk	Technical Difficulty	Calculated Rating
Safety	Low	Low	Low	Low
Fire Behavior	Low	Low	Low	Low
Resistance to Containment	Low	Low	Low	Low
Ignition Procedures and Methods	Low	Low	Low	Low
Prescribed Fire Duration	Mod	Mod	Low	Mod
Smoke Management	Mod	Mod	Low	Mod
Number and Dependence of Activities	Low	Low	Low	Low
Management Organization	Low	Low	Low	Low
Treatment/Resource Objectives	Low	Low	Low	Low
Constraints	Low	Low	Low	Low
Project Logistics	Mod	Mod	Mod	Mod

Calculated Summary Prescribed Fire Plan Complexity

Final Complexity Determination	Final Complexity Determination Rationale
Low	The project rates low on the final complexity due to the requirement of wet/snowy burn conditions. Burn personnel are well trained and experienced which will help reduce the risk to firefighters and the public. Past fuel reduction treatments of the project area and surrounding landscape will allow prescribed fire objectives to be met safely.

Signatures

Rx Burn Plan Preparer's Name: Chanse Hunwardsen X _____ Date: _____
Preparer

Technical Reviewer's Name: Katie Sauerbrey X Katie Sauerbrey Date: 11/13/2020
Technical Reviewer

Agency Administrator's Name: Kacey KC X _____ Date: _____
Agency Administrator

Element 4: Description of Prescribed Fire Area

A. Physical Description

1. Location: Galena Creek, Reno, Washoe County, NV
   39° 21'34.36" North 119° 50'43.84" West

2. Project Burn Area: 36 acres (2 burn units)

3. Topography: Galena Creek generally runs west to east through the project area. The terrain at the bottom of the eastern flank of Mt. Rose is characterized by a flat flood plain with short moderate slopes leading up to gentle sloping benches on either side of the creek.

   Unit #1:south-southeast aspect and slopes less than 5%.
   Unit #2: southeast to south aspects with slopes up to 15%.

4. Project area: Project area is located in Galena Creek Regional Park (south entrance) to the west of Highway 431 and in Galena Forest Estates off of Joy Lake Rd, to the east of Highway 431. Galena is located at the base of Mt. Rose in the southwest portion of Reno.

5. Ignition units:
   Ignition Unit #1 is located in Galena Creek Regional Park (south entrance) on Washoe County land, upslope of Camp We Ch Me and is 2 acres.
   Ignition Unit #2 is located in Galena Forest Estates along Lower Galena Creek just east of Highway 431 and is bisected by Joy Lake Road and is 34 acres. Property ownership in ignition unit #2 is a mixture of Washoe County open space, Galena Forest Estates Homeowner Association open space, and private property owned by James and Judi Somers

B. Vegetation/Fuels Description:

1. On-site fuels data:
   Jeffrey pine or mixed conifer forest (Jeffrey pine, white fir, aspen, cottonwood) with an understory comprised of forbs and grasses and either a manzanita/ceanothus or a sagebrush/bitterbrush dominated shrub component. The majority of the vegetation is represented by a Timber Understory 1 (TU1) fuel model. Piles are made up of pine, mixed conifer, or willow slash, constructed by hand, and average 6 feet in diameter by 5 feet high.
   Piled slash: 1.7 tons per acre
   Slash piles: 3 - 10 per acre

2. Adjacent fuels data:
   Jeffrey pine or mixed conifer forest (TU1), riparian vegetation including cottonwood, aspen, willow, alder, and woods rose, mountain sagebrush, bitterbrush, manzanita, ceanothus, bunch grasses (SH2). The majority

of the surrounding Jeffrey pine forest has been either hand treated by NDF or mechanically treated by the US Forest Service.

3. Percent of vegetative type and fuels model(s):
   Within the burn units is 100% Jeffrey pine and/or mixed conifer forest (TU1) and Adjacent to the burn units is ~ 70% TU1 and ~ 30 % SH2.

C. Description of Unique Features, Natural Resources, and Values:

Galena Creek Regional Park is a popular park that has both Washoe County and US Forest Service land within the boundary. Outside of the park's boundary are several housing developments to the east, with the rest of the surrounding land owned by the US Forest Service, leading up in elevation to the Mt. Rose Wilderness Area. Many heavily used recreation trails are located within and adjacent to the park. The park also houses multiple facilities including a visitor's center, park headquarters, a historic fishery, a fishing pond, a children's camp, and several day use picnic areas. Galena Creek is a perennial creek that is an important source of water for the city of Reno. Highway 431 is a scenic highway that connects Reno to Lake Tahoe.

D. Maps - Attach in Appendix A

1. Vicinity (Required)
2. Project/Ignition Unit(s) (Required)
3. Values: (Required)
4. Significant or Sensitive Features (Optional): ☐ Included ☒ Not Included
5. Fuels or Fuel Model(s)(Optional) ☐: Included ☒ Not Included
6. Smoke Impact Area (Optional): ☐ Included ☒ Not Included

Element 5: Objectives

A. Resource objectives:

The resource objectives are to reduce fuel loading surrounding Galena Creek, improve forest health, stimulate aspen and Jeffrey pine regeneration, and to improve wildlife habitat. Reducing fuel loading in this drainage will reduce the overall fire hazard rating in this area and improve the chances of preventing a wildfire from moving downslope into a large residential area. Burning the duff under the burn piles will either stimulate aspen suckering or expose bare mineral soil necessary for Jeffrey pine regeneration.

B. Prescribed fire objectives:

(1) Provide for personnel and public safety.
(2) Consume 90% of materials in the burn piles.
(3) Minimize heat damage to residual aspen and conifers.
(4) Minimize smoke impacts to Highway 431 and residential areas.
(5) All piles will be monitored and consolidated if necessary, to achieve the consumption goal listed above. Fire will be allowed to creep beyond burn piles and will be controlled by holding forces as soon as heat from burn pile permits.

Element 6: Funding

A. Cost:

Total estimated project cost including NDF labor, vehicles and supplies is $31,548 of which $19,560 is covered through grant funding and $11,988 is covered by state funding for permanent staff salaries. Trainee opportunities may exist to help employees initiate/complete task books for RXB3 or CRWB. If trainees and or other NDF additional staff are used, NDF will incur those costs.
The cost of implementing this project is $16,687.20. The conservation crew, fuel mix, and burn plan fees will be paid through grant funding ($10,020) while the Forester III is funded through the state ($6,907.20).

Resource / Supplies	Daily Rate	Vehicle Rate	Vehicle Mileage Rate (70 miles)	Number of Days	Total Cost
Forester III (state funded)	$537.20	$59		16	$9,539.20
Conservation Crew (1 squad)	$800	$173.00	$86.80	16	$16,956.80
Fuel mix for drip torches	$15			16	$240
Washoe County burn plan fee ($138.00 per plan)					$138
Washoe county burn plan fee ($34.00 per unit)					$68
Total					$26,942.00

Trainee opportunities may exist to help initiate and complete task books for RXB3 and possible other positions. If trainees and or other NDF additional staff are used, NDF will incur those costs.

B. Funding source:

This prescribed burn will be paid for by the Galena Hazardous Fuels grant that expires on May 31, 2021.

Element 7: Prescription

A. Prescription Narrative:

1. Describe how fire behavior will meet objectives.
   This project sits at an elevation that experiences heavy winter rains and/or snow. As defined by NWCG a wetting rain is a widespread rain that over an extended period of time significantly reduces fire danger. One-tenth of an inch may be sufficient to reduce fire danger in grass fuel models. One half an inch may be necessary for timber fuels under closed canopies. Snow should be about 60% ground coverage with an average depth of 2 inches in the vicinity of the piles to be ignited for that shift. A combination of increased moisture, cooler temperatures, and increased relative humidity will contribute to low fire behavior that minimizes fire spread and minimizes scorch on residual trees. Cured slash in the burn piles will burn well and easily consumed by the fire. When ignition of piles occur the anticipated flame lengths will be approximately 12' in height. As piles continue to burn flame height will diminish as piles are consumed.

B. Prescription Parameters:

1. Environmental

Mid-Flame Wind Speed	0 – 12 mph
Mid-Flame Wind Direction	0°-359°
20’ Wind Speed	0 – 35 mph
20’ Wind Speed Direction	0°-359°
Transport Winds	0°-359°
Minimum Mixing Height	1,200’ AGL
Relative Humidity	15-100%
Temperature	70° F and below
1-hour Fuels	15% and above
10-hour Fuels	10% and above
Snow Depth (if no wetting rain 48 hours prior)	≥ 2”
Snow Coverage (if no wetting rain 48 hours prior)	≥ 60%
Wetting rain (at least 48 hours prior to ignition)	≥ 0.10” in grass ≥ 0.50” in closed timber

2. Fire Modeling or empirical documentation (or both)

   See appendix E: Behave runs. Behave runs were made for fuels outside of the burn unit for SURFACE, CONTAIN and IGNITE and for inside piles using SURFACE, SPOT and IGNITE.

Element 8: Scheduling

A. Implementation Schedule:

1. Ignition Time Frame and Seasons:
   Fall, winter, or spring, if prescription parameters are met. Ignition may commence once the test fire is complete and may continue throughout the day to maximize fuel consumption.

B. Projected Duration:

The project will take place over multiple years (2020 - 2021) and will take approximately 16 days to complete.

C. Constraints:

Crew availability and weather are the two primary constraints.

Element 9: Pre-burn Considerations and Weather

A. Considerations:

1. On-site - Weather will be taken prior to ignition each day to ensure project is within prescription, using either a Kestrel, a belt weather kit, or data from the Galena RAWS station. Project area will have wetting rain 48 hours prior to ignition or snow on the ground the day of ignition. A spot weather forecast will be obtained prior to ignition.

2. Off-site - Notifications will be made to all required agencies before ignition and Galena Forest Estates Homeowners Association as identified in Element 12, section B. Orange road signs that state "prescribed fire ahead" will be placed on Highway 431 and/or Joy Lake Rd, prior to ignition and for the duration of the project.

B. Method and Frequency for Obtaining Weather and Smoke Management Forecast(s):

Daily spot weather forecasts (which include a smoke forecast) will be obtained from the Reno National Weather Service for the day of and throughout the duration of the burn. Hourly recording of weather will be required during the prescribed burn and will be documented in Appendix I.

C. **Notifications:** See Element 12, section B.

All notifications will be made prior to burning operations.

The following agencies will be notified one day prior to burning by the project manager (Anna Higgins), the Burn Boss, or the Burn Boss trainee: Nevada Division of Forestry (email), Reno National Weather Service (email), Nevada Division of Environmental Protection (phone), Washoe County Parks (phone), Washoe County Health District (phone), Galena Forest Estates Homeowners Association (phone), the Somers (phone).

The following agencies will be notified each day of ignition by either the project manager (Anna Higgins), the Burn Boss, or the Burn Boss trainee: Nevada Division of Forestry (email), Truckee Meadows Fire Protection District (Phone), Sierra Front Dispatch (phone), Nevada Department of Transportation (phone), Nevada Highway Patrol (phone), USFS Carson Ranger District (phone)

Element 10: Briefing

A. Briefing Checklist; including, but not limited to: (additional items may be added)

- ☐ Burn organization and assignments
- ☐ Prescribed Fire objectives and prescription
- ☐ Description of prescribed fire project area
- ☐ Expected weather and fire behavior
- ☐ Communications
- ☐ Ignition plan
- ☐ Holding plan
- ☐ Contingency plan and assignments
- ☐ Wildfire declaration
- ☐ Safety and medical plan
- ☐ Aerial ignition briefing (if aerial ignition devices will be used)

Element 11: Organization and Equipment

A. Positions:

Burn Boss III (RXB3)
Type II Wildland Fire Squad (9-12 person)
Weather Observer
* These positions will or can be filled from within the crews on site.

B. Equipment:

Fire PPE, drip torches, hand tools, chainsaws, first aid kit, kestrel/belt weather kit, radios.

C. Supplies:

Drip torch mix, saw fuel, minimum of two road signs ("Rx Burn Ahead Do Not Report")

Element 12: Communication

A. Radio Frequencies:

1. Command frequency: NDF McClellan Rx 158.8950 Tx 156.0750 Tone 1 (110.9) or
   NDF Snow Valley Rx 158.8950 Tx 156.0750 Tone 3 (131.8)
2. Tactical frequency: NDF Red 1 Rx 159.3450 Tx 159.3450

B. Telephone Numbers:

Name	Telephone Number
State Forester (KC Kacey)	(775) 684-9789
NDF State FMO (Ron Bollier) **	(775) 301-8782
NDF Western Region FMO **	(775) 721-2639
NDF Western Region RMO & Project Manager ** (Anna Higgins)	(775) 600-5798
NDF Western Region Section Chief (Rob Rodgers - acting) **	(775) 721-3061
NDF State Duty Officer**	(775) 684-2506
NDF Western Region Duty Officer**	(775) 684-2545
NDF State Duty Officer	(775) 684-2560
Sierra Front Interagency Dispatch**	(775) 782-1400
Nevada Department of Environmental Protection (NDEP)	(775) 687-9349
Nevada Department of Transportation (NDOT) **	(775) 834-8300
Nevada Highway Patrol**	(775) 687-5300
USFS Carson Ranger District**	(775) 882-2766
Reno Fire Department**	(775) 334-2300
Truckee Meadows Fire Protection District**	(775) 326-6000
Washoe County Health District (Julie Hunter) *	(775) 784-7200
Washoe County Parks (Andy Brown – park ranger) *	(775) 828-6615
Galena Forest Estates Homeowners Association (Valerie Hand – Gaston Wilkerson Association Services) *	(775) 323-4363
Judi and James Somers (landowner – 1155 Joy Lake Rd) *	(775) 750-3400

*** Required notification day prior to project ignition.**

**** Required notification daily before project ignition.**

***** All burn plans will be sent to appropriate Dispatch Centers.**

Element 13: Public and Personnel Safety, Medical

A. Safety Hazards:

- Daily travel to and from project site.
- Public recreational use of adjacent trails
- Smoke inhalation.
- Visibility.
- Fuel handling including burns, spills, and saturated clothing.
- Power lines
- Working in the woods including tripping hazards, poor footing, steep slopes, icy and or/wet conditions, rolling material, and snags.

B. Mitigation: Measures Taken to Reduce the Hazards:

- Complete a job hazard analysis.
- Post "Prescribed Fire Ahead" or "Prescribed Fire Do Not Report" signs along Galena Creek Trail.
- Brief staff on addressing recreationalists questions.
- Always wear personal protective gear.
- Ensure an adequate briefing to all personnel.
- Identify EMTs and/or first responders during briefing.
- Post signs and monitor conditions prior to and during the burn.
- Ensure qualifications and training levels of personnel on fire.
- Rotate personnel out of smoke.
- Adjust driving habits during poor conditions.
- Be alert of residential traffic, pedestrians, and pets.
- Cease ignitions and extinguish piles if necessary if smoke crossing the highway reduces visibility below the Minimum Accepted Visibility (MAV) of 676' for an undivided road with a speed limit of 50.

C. Emergency Medical Procedures:

- Notify Burn Boss of injury (type, severity, location).
- Pre-identified EMT's or First Responders to provide medical assistance.
- Burn Boss to notify Sierra Front Interagency Dispatch Center using Medical Incident Report located in the IRPG.
- If needed, request a separate Tactical Frequency from Dispatch for the medical incident, and ensure personnel are aware.
- At the discretion of the Burn Boss, a separate qualified Incident Commander may take over I.C. responsibilities of the medical incident so that the Burn Boss may retain control of burn operations.
- Ensure patient is transported to the appropriate facility through the appropriate transportation method.

D. **Emergency Evacuation Methods:**

By ground: Truckee Meadows Fire Protection District (775) 326-6000, Reno Fire Department (775) 334-2300
By air: Care Flight (775) 858-5700
Emergency helispots: 39° 21.098' North, 119°51.703' West (Galena Creek Regional Park)
39°21.534' North, 119°50.712' West (Joy Lake Rd)

E. Emergency Facilities:

Facility	Address	Phone Number
Carson Tahoe Regional Medical Center	1600 Medical Parkway, Carson City, NV	(775) 445-8000
Renown Medical Center	1155 Mill Street Reno, NV	(775) 982-4100

UC Davis Medical Center, Burn Unit	2315 Stockton Blvd. Sacramento, CA	(916) 734-3637

Element 14: Test Fire

A. Planned Location:

The test fire will take place at a pile of the RXB3's choice on each day of ignition with Latitude and Longitude recorded on Appendix G in the Burn Plan. This area should be representative of the project area and conditions found on each ignition day.

B. Test Fire Documentation:

1. Weather conditions on site - Document test fire weather observations in Appendix G.
2. Test fire results - Review prescribed fire objectives (element 5) and fire behavior prescription (element 7b). Determine if the results are within the prescription and document in Appendix G. Appendix G and signed Go/No-Go Checklist will be submitted to the State Office after test fire is ignited and assessed, and before further piles in the unit are ignited. If unable to send forms due to lack of cell coverage, staff other than the Burn Boss will relocate to an area with service and send forms before additional piles are ignited.

Element 15: Ignition Plan

A. Firing Methods:

Piles will be ignited in sequence and pattern chosen by the Burn Boss. Multiple piles will be allowed to burn simultaneously under the supervision of the Burn Boss, who will determine the amount of piles that can be burned safely at one time. Brief the individuals that will be igniting so that heat to residual trees is minimized. If the Rx burn becomes out of prescription, all ignitions will cease, and the piles will be allowed to burn down to a reasonable level, mopped up, and put out.

B. Devices: Drip torches, fussees

C. Minimum Ignition Staffing: One ignitor

Element 16: Holding Plan

A. General Procedures for Holding:

The Burn Boss will review critical holding points and actions (Element 16B) and deploy resources as needed during the prescribed burn.

B. Critical Holding Points and Actions:

The Burn Boss will have holders patrol the downwind side of the burn unit to ensure there are no spot fires present. If a spot fire is reported, all ignition will cease and efforts to control the spot fire will be coordinated. Burning of piles is planned to be completed in the winter when fuel moistures are higher, and when snow is likely to be on the ground.

C. Minimum Organization or Capabilities Needed:

Type II wildland fire squad (9-12 person)

D. Mop-Up:

Burning material in piles should be pushed inwards continually throughout the burn period to facilitate consumption. If the Burn Boss decides that piles must be extinguished by the end of shift then hand tools in conjunction with dirt, snow, bladder bags, and/or a portable pump with hose should be used to extinguish all fuels.

An IR detector will be used to declare that the fire is out.

E. Patrol:

The Burn Boss may allow smoldering piles to burn for multiple days to achieve prescribed fire objectives. Piles will be monitored by a minimum of two firefighters until they are declared out by the Burn Boss. If piles are allowed to smolder overnight the Burn Boss will designate at least two firefighters for night patrol to stay on-site and monitor at a determined location until relieved at the start of the following day shift. If night patrol determines the need for additional resources during patrol, the highest qualified firefighter on-site will notify the Burn Boss and the Regional Duty Officer. Before piles are turned over to night patrol, adjacent landowners and dispatch will be given the Burn Boss and/or night patrols phone number(s) to call after-hours regarding the piles.

Element 17: Contingency Plan

Management Action Points or Limits:

Management Action Point - Documentation Element	**Management Action Point Narrative**
Designator and Description:	RXB3 Burn Boss
Condition:	Slop overs or spot fires
Management Intent:	Prevent fire from spreading
Recommended Actions to Consider:	Cease all ignitions, begin suppression activities
Recommended Resources:	Utilize resources on site, deploy contingency resources if necessary
Time Frame:	Determine if spot fire or slop over can be contained with resources on site, or contingency resources. Travel time is 1 hour for contingency resources.
Describe the consequences of not taking the recommended actions:	Property damage or loss. Injury to public or fire personnel. Short- and/or long-term natural resource damage.
Responsibility:	Burn Boss
Date Each Action is Initiated (Optional):	
Management Action Point - Documentation Element	**Management Action Point Narrative**
Designator and Description:	RXB3 Burn Boss
Condition:	Escape fire
Management Intent:	Stop the growth of the spot fire or slop over.
Recommended Actions to Consider:	Order local resources while engaging in full suppression activities.
Recommended Resources:	One Type II Squad (9-12 person)
Time Frame:	1 Hour for resource arrival
Describe the consequences of not taking the recommended actions:	Wildfire may escape onto adjacent lands threatening private residences and infrastructure. Wildfire may impact highway traffic.
Responsibility:	RXB3 declares wildfire. Order the appropriate type of IC base on wildfire complexity.
Date Each Action is Initiated (Optional):	

A. Actions Needed:

When a spot fire occurs all ignitions will cease and suppression will be initiated with on-site resources. If the Rx fire threatens to, or exceeds the capabilities of on-site resources, the Burn Boss will notify the Sierra Front Interagency Dispatch Center and request the contingency resource.

B. Minimum Contingency Resource and Maximum Response Time:

One Type II Squad (9-12 person) or one Type 6 or greater wildland engine, one hour.

Element 18: Wildfire Declaration

A. Wildfire Declared By:

Upon consultation with the Regional FMO and/or the Regional Duty Officer, the Burn Boss will declare the

prescribed fire a wildfire once it is determined the contingency actions have failed or are likely to fail and cannot be mitigated. Notification shall be provided by the Regional FMO and/or Regional Duty Officer to the State Forester, the State FMO, and the State Duty Officer.

B. IC Assignment:

The regional FMO, in consultation with the Burn Boss, will assign ICS positions as needed and according to currency standards for the positions. All resources assigned to the declared wildfire must meet NWCG standards for fire suppression, including aircraft. All supervisory personnel will document their actions on a unit log.

C. Notifications:

State Forester (Kacey KC)	(775) 684-9789
NDF State FMO (Ron Bollier)	(775) 301-8782
NDF Regional FMO	(775) 721-2639
Sierra Front Interagency Dispatch Center	(775) 782-1400
NDF Western Region Duty Officer	(775) 684-2545
NDF State Duty Officer	(775)-684-2560

D. Extended Attack Actions and Opportunities to Aid in Fire Suppression (Optional):

The IC and the Regional FMO will develop a response for extended attack, and will create an IAP if warranted through a complexity analysis. If the complexity analysis identifies the need for a type 1, 2, or 3 IMT, the State Forester and the State FMO will be notified immediately.

Element 19: Smoke Management and Air Quality

A. Compliance:

NDF requires that smoke modeling be performed for areas where a smoke-sensitive receptor may be affected. Mixing heights and transport winds will be obtained from the National Weather Service. Transport winds will be factored to reduce smoke management problems on public lands.

B. Permits to be obtained:

A prescribed burn permit issued through Washoe County Air Quality Management Division, will be obtained prior to ignition. The Washoe County Air Quality Management Division will be notified at least one working day prior to each burn.

C. Smoke-Sensitive Receptors:

Highway 431 and the residents of Galena Forest Estates, Montreux, and St. James are the primary smoke-sensitive receptors in the area. According to BlueSky smoke modeling, emissions of PM 2.5 and PM 10 will be around 0.05 tons per pile. BlueSky was unable to generate significant plume data due to the low concentrations of emissions generated by this pile burn.

D. Potential Impacted Areas:

Highway 431 and the housing developments of Galena Forest Estates, Montreux, and St. James could see some potential smoke impacts. During the burn window the smoke should lift up and over the highway and homes, however as cold air and smoke settle at night there may be some smoke impact to the residential areas downwind of the piles, especially in the drainages.

E. Mitigation Strategies and Techniques to Reduce Smoke Impacts:

Wind direction will be monitored and the ignition pattern adjusted according to the smoke hazard. Burn Boss should consider ceasing ignition by 1400 to have time to consolidate piles and reduce nighttime smoke impacts. Smoke complaints received by the Burn Boss will be forwarded to the Regional FMO and/or the Regional Duty Officer for review. The Burn Boss, in consultation with the Regional FMO and/or the Regional Duty Officer, will determine the need and extent of mop-up operations to reduce smoke emissions. If a complaint is received, the Burn Boss should obtain the following information: Date/time of complaint, name, phone number and physical address of individual, and the nature of the complaint. Notification of smoke complaints shall be provided by the Regional FMO and/or the Regional Duty Officer to the State FMO and the State Duty Officer.

Element 20: Monitoring

A. Fuels Information Required and Procedures:

Fuel moistures will be obtained by the project manager or Burn Boss prior to and during the prescribed burn. Fuel moistures (10 Hour) may be obtained onsite with a digital fuel moisture meter or fuel sticks.

B. Weather Monitoring (Forecasted and Observed) required and Procedures:

Weather observations will be collected on-site prior to ignition and collected throughout the day on an hourly basis in an area representative of the burn. The Burn Boss will determine who is responsible for collecting weather observations. Weather observations will be taken either by a belt weather kit, a kestrel, or using data from the Galena RAWS and include: time of observation, temperature, relative humidity, wind speed, wind direction, and cloud cover. Weather observations will be recorded in Appendix I and relayed over the tactical frequency every hour for all burn personnel. A spot weather forecast will be obtained from the Reno National Weather Service for each day of the burn. At least three weather readings from the project site will be submitted to the weather service to obtain a spot weather forecast.

C. Fire Behavior Monitoring Required and Procedures:

Flame lengths will be visually estimated by Burn Boss or their designee and recorded in Appendix I.

D. Monitoring Required to Ensure that Prescribed Fire Plan Objectives are met:

The degree of consumption will be visually monitored by the project manager or Burn Boss or Burn Boss Trainee to ensure an appropriate amount of consumption is taking place based on objectives developed in Element 5B.2 and recorded in Appendix H.

E. Smoke Dispersal Monitoring Required and Procedures:

Smoke dispersion will be visually monitored on-site by the Burn Boss or their designee to determine if there is a favorable smoke transport. Ignition patterns will be adjusted to minimize smoke impacts to Highway 431 and/or Joy Lake Rd. Test Fire Documentation: All test fires will be documented by the Burn Boss or Burn Boss Trainee in Appendix G.

F. Prescribed Fire Monitoring and Reporting Required:
The prescribed fire monitoring and reporting will be documented in Appendix H by the Burn Boss or Burn Boss Trainee.

Element 21: Post-burn Activities

A. Post-Burn Activities that must be completed:

- The Go/No-Go Checklist (Element 2B) and the Test Fire Documentation (Appendix G) will be completed and signed after the test fire is ignited and sent to the State Office prior to the ignition of additional piles. If unable to send forms due to lack of cell coverage, contact regional FMO to confirm Go/No-Go and the Test Fire Documentation are complete. Regional FMO will contact the State Office to confirm documentation is complete.
- The Prescribed Fire Monitoring and Reporting (Appendix H) and the Daily Weather, Fuels, Fire, and Smoke Behavior Documentation (Appendix I) must be completed by the Burn Boss or Burn Boss trainee. Both forms must be sent to the NDF State Office at the end of each day.
- The Burn Boss or Burn Boss trainee will use Appendix H to declare the prescribed fire completely out and make the necessary notifications.
- The project manager will ensure all the required documentation is placed in the prescribed fire folder at the NDF State Office within one week of the prescribed burn being declared out

Prescribed Fire Plan Appendices

Appendix A: Maps: Vicinity, Project or Ignition Units (or both), Optional: Significant or Sensitive Features, Fuels or Fuel Model, Smoke Impact Areas

Appendix B: Technical Reviewer Checklist

Appendix C: Complexity Analysis

Appendix D: Agency-Specific Job Hazard Analysis or Risk Assessment

Appendix E: Fire Behavior Modeling Documentation or Empirical Documentation

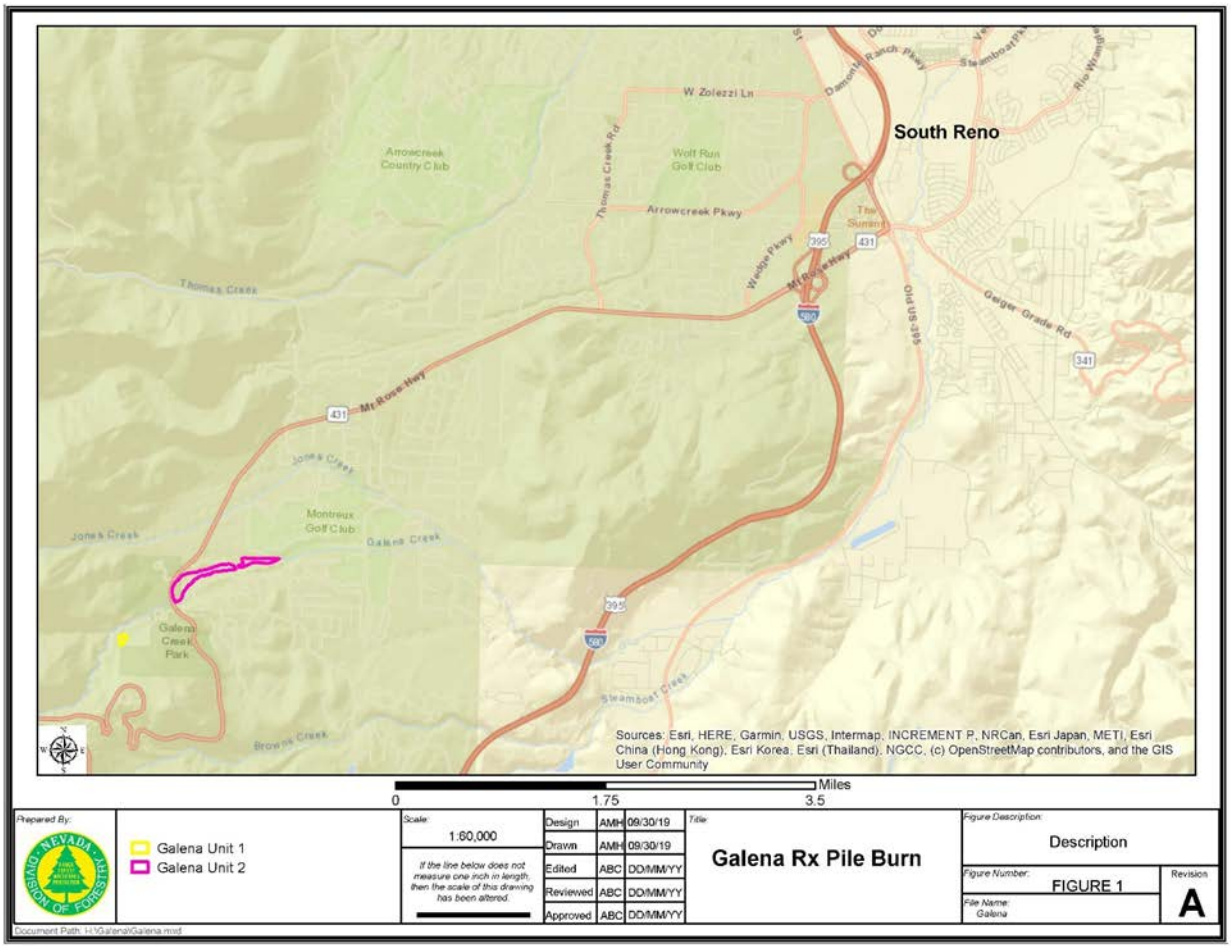
Appendix F: Smoke Management Plan and Smoke Modeling Documentation (Optional)

Appendix G: Test Fire Documentation

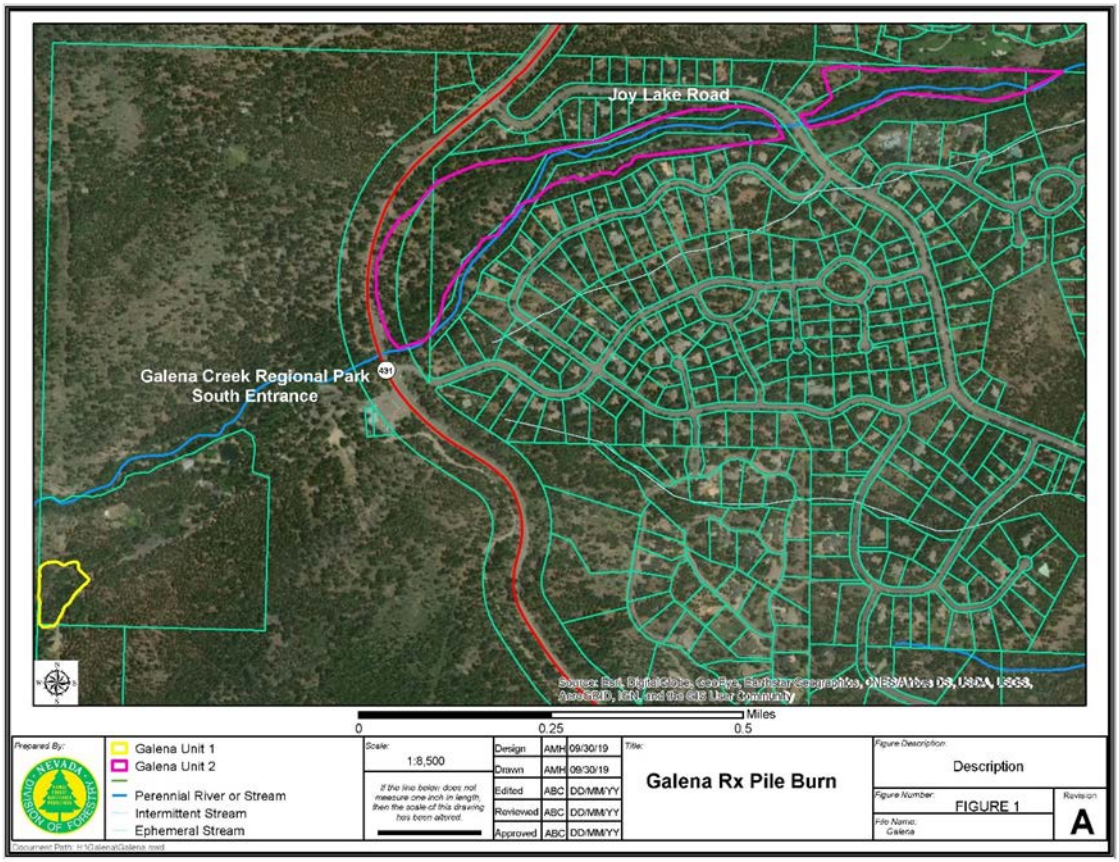
Appendix H: Prescribed Fire Monitoring and Reporting

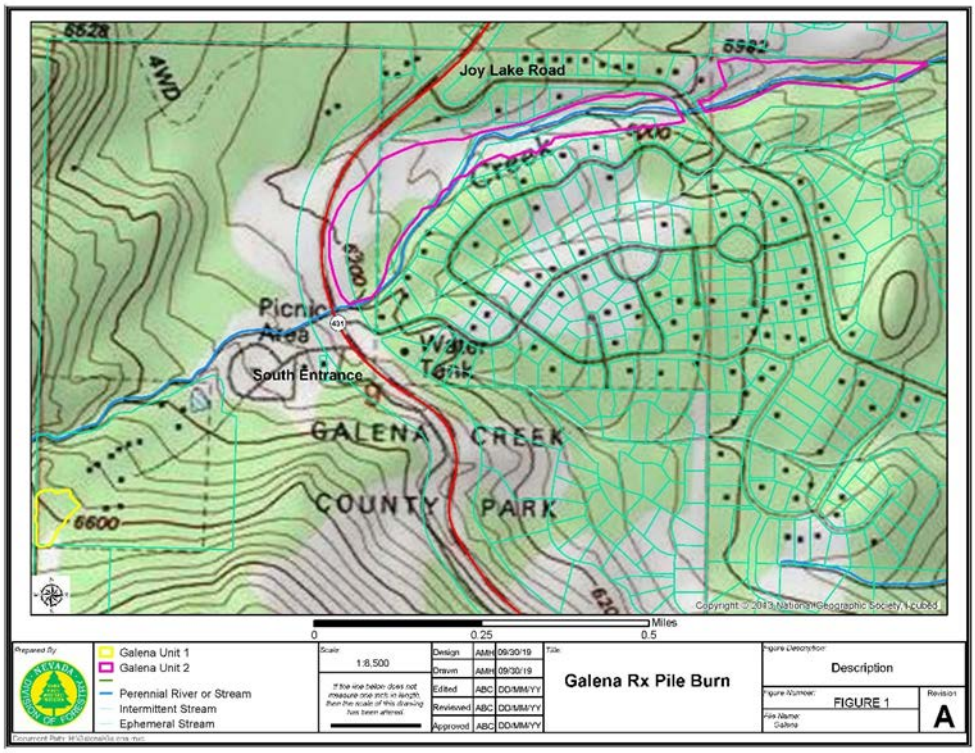
Appendix I: Daily Weather, Fuels, Fire, and Smoke Behavior Documentation

Appendix A: Vicinity Map

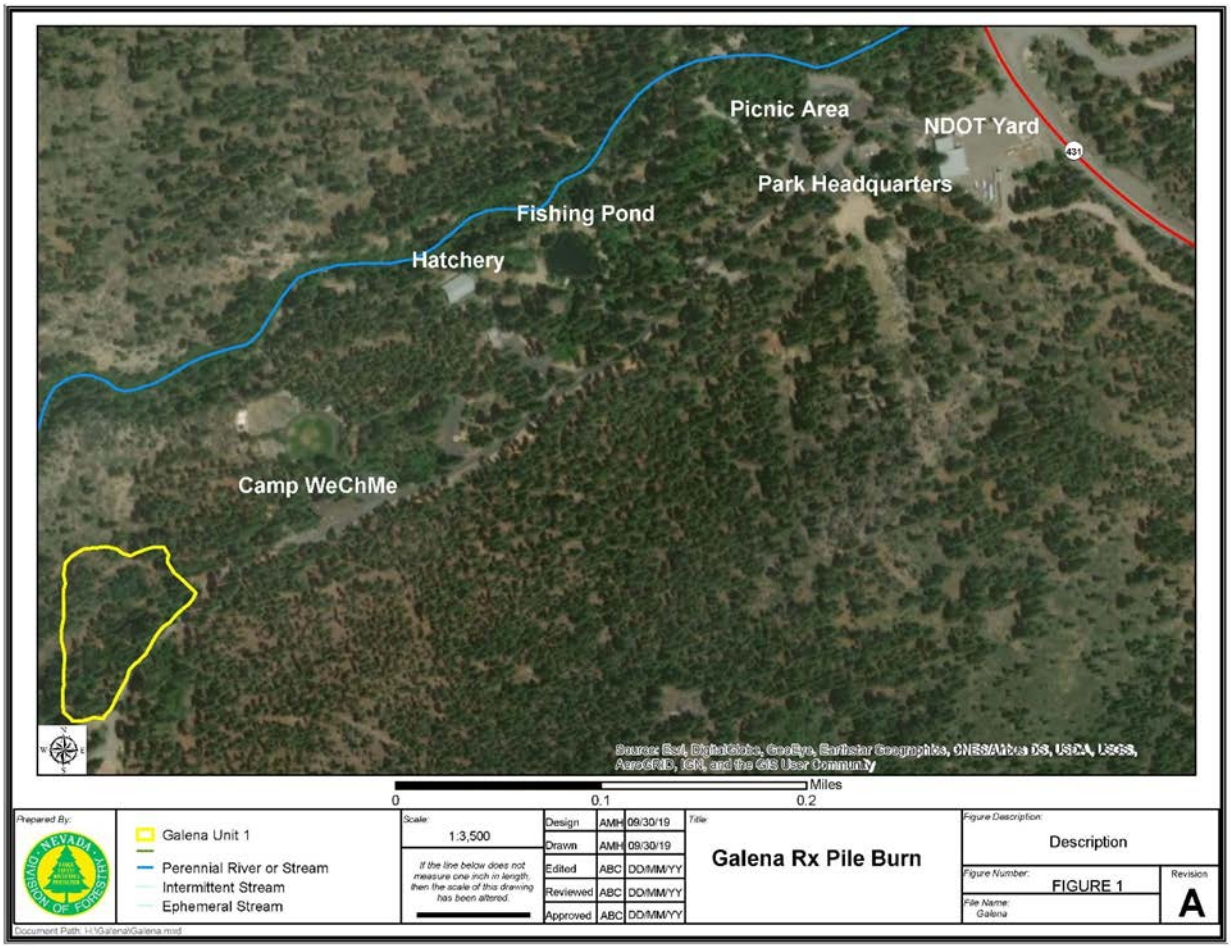


Appendix A: Project (Ignition Units) Maps

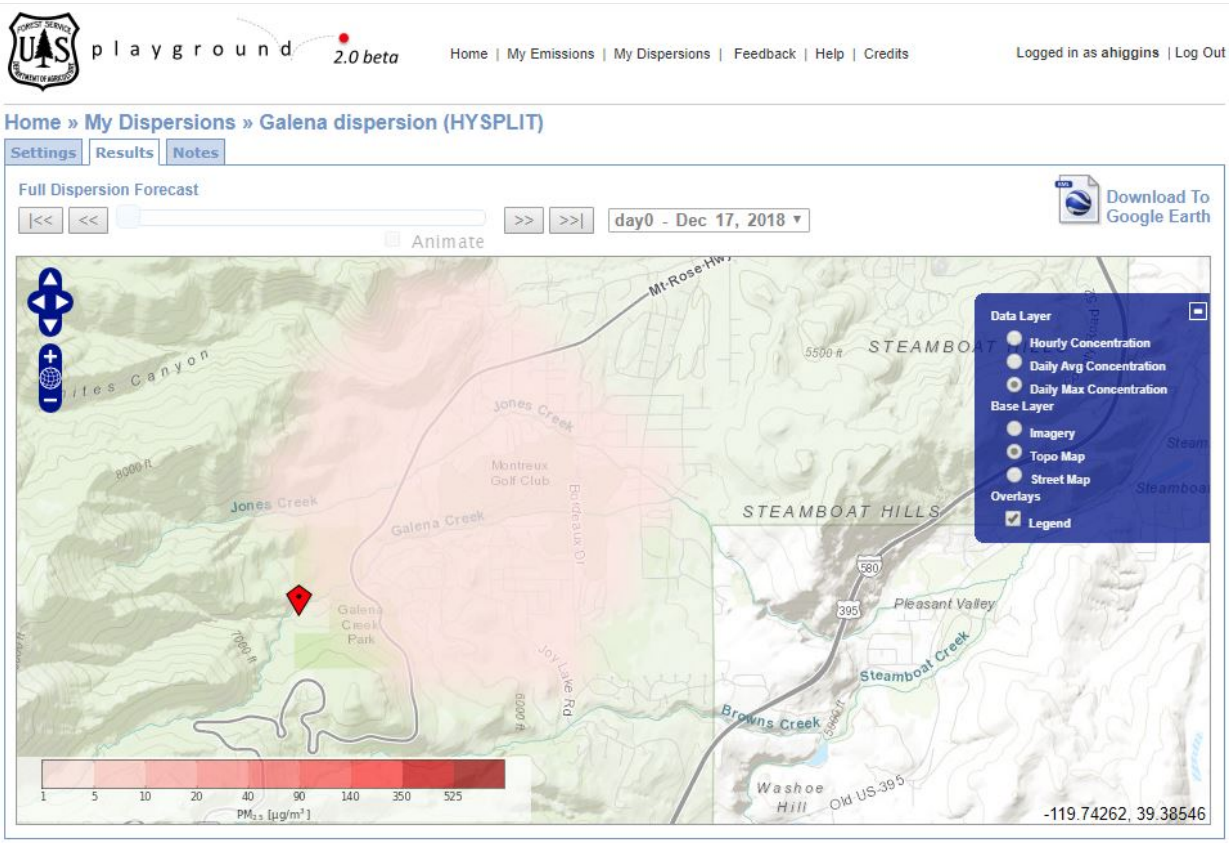




Appendix A: Values, Significant or Sensitive Features: Maps



Appendix A: Smoke Impact Areas: Maps



Daily Maximum Concentration

Appendix B: Technical Reviewer Checklist

Fill out this checklist based on the guidance provided in the Technical Review section in the *Interagency Prescribed Fire Planning and Implementation Procedures Guide*, PMS 484.
Rate each element in the following table with an "S" for Satisfactory or "U" for Unsatisfactory. Use Comment field as needed to support the element rating.

PRESCRIBED FIRE PLAN ELEMENTS	RATING	COMMENTS
1. Signature page	S	
2. A. Agency Administrator Ignition Authorization	S	
2. B. Prescribed Fire GO/NO-GO Checklist	S	
3. Complexity Analysis Summary	S	
4. Description of Prescribed Fire Area	S	
5. Objectives	S	
6. Funding	S	
7. Prescription: Prescription Narrative and Prescription Parameters	S	
8. Scheduling	S	
9. Pre-Burn Considerations and Weather	S	
10. Briefing	S	
11. Organization and Equipment	S	
12. Communication	S	
13. Public and Personnel Safety, Medical	S	
14. Test Fire	S	
15. Ignition Plan	S	
16. Holding Plan	S	
17. Contingency Plan	S	
18. Wildfire Declaration	S	
19. Smoke Management and Air Quality	S	
20. Monitoring	S	
21. Post-Burn Activities	s	
Appendix A: Maps	S	
Appendix C: Complexity Analysis	S	
Appendix D: Agency-Specific Job Hazard Analysis or Risk Assessment	S	
Appendix E: Fire Behavior Modeling Documentation or Empirical Documentation	s	
Appendix F: Smoke Management Plan and Smoke Modeling Documentation (Optional)	S	
Appendix G: Test Fire Documentation	S	
Appendix H: Prescribed Fire Monitoring and Reporting Documentation	s	

☒ **Approval is recommended** subject to the completion of all requirements listed in the comments section, or on the Prescribed Fire Plan.

☐ **Recommendation for approval is not granted**. Prescribed fire plan should be re-submitted for technical review subject to the completion of all requirements listed in the comments section, or on the Prescribed Fire Plan.

Technical Reviewer Signature: Katie Dawkins
Qualification and Currency: RXB2 (Current)
Date Signed: 11/13/2020

Appendix C: Complexity Analysis

Galena Pile Burn		Quantity	Significance	Values Description: Describe the identified off-site, on-site and political values
Values	On-Site	**Few**	**Low**	On-site values include residual conifers, a year-round creek, and a popular hiking trail.
	Off-Site	**Multiple**	**Mod**	Off-site values associated with the project include numerous structures and infrastructure associated with the county park, Highway 431, and the multiple residences, roads, and powerlines in the Galena Forest Estates.
	Public/Political Interest	**Few**	**Mod**	Public interest is likely to be moderate due to the visibility of smoke associated with the project, the large number of high-end residences in the area, public concerns about prescribed fire locally, and the large volume of traffic that goes through the project area.

Element	Preliminary Risk	Risk Rating Descriptors	Agency Administrator/ Preparer Discussion Completed
Safety	Low	• Safety issues and hazards are easily identifiable, addressed in briefings, and managed. • Minimal organization produces little exposure of personnel to hazards. • Adverse impacts to public health and safety are unlikely. • Activities are high frequency/low risk. • Fatigue and exposure to hazards are limited. • Standard safety briefings and attention to Lookouts, Communications, Escape Routes, and Safety Zones (LCES) are sufficient. Safety concerns are standard issues associated with live fire and wet or snowy footing issues. Additional safety concerns are winter driving conditions and aerial hazards associated with working near trees.	Yes
Fire Behavior	Low	• Terrain is mostly flat or the slope and aspect are uniform, leading to a relatively unvarying fire. • Winds, fuel moisture, microclimate, and other fire conditions are relatively uniform and are not conducive to active fire spread. • Fire behavior is highly predictable. • Fire spread beyond the immediate ignition area(s) is not likely to occur or contribute to any control problems. Project is intended to be conducted during the winter or following wetting rain/snow so minimal fire behavior is expected. Burn unit 2 follows a year round creek that may be utilized with a pump and hose lay. Burn unit 1 has a pond that may be utilized with a pump and hose lay.	Yes
Resistance to Containment	Low	• Ranges from no potential to a likelihood of few mechanisms such as spot fires, slopovers or fire creeping, each comprising small areas that are readily detected, accessed, and controlled by holding resources available on the prescribed fire. • No ladder fuels or concentrations are near critical holding points. • Ignition procedures do not create intense fire behavior. • Probability of ignition in fuels outside the unit is low. • Local drought and or fire danger indices are expected to be low to moderate. Stand density has been reduced through fuels reduction activities. Pile burning allows for greater control of overall fire intensity. Winter or wet burning conditions greatly reduce the potential for spot fires.	Yes
Ignition Procedures and Methods	Low	• An unexpected or adverse event is unlikely and coordination of firing sequence, patterns and timing is not critical to meet project objectives. • Specific fire intensities or rate of spread (ROS) are not critical for meeting resource objectives. Ignition of piles can easily and quickly be stopped and ignition patterns are easily adjusted during the burn period.	Yes
Prescribed Fire Duration	Mod	• Active ignition, fire spread, and patrol is expected to occur for several operational periods. • Some residual burning (heavy fuel smoldering, stump holes, etc.) is expected to occur for several days after the primary burn out of the unit. • Mop-up and patrol is typical with minimal resource and equipment needs. • Primary holding phase is expected to be completed within reasonably predictable local weather forecasts.	Yes

		Due to the presence of 1,000 and 10,000 hour fuels piles may smolder through multiple burn periods. Ignitions usually are completed before the afternoon and mop-up will be minimal due to the cured piles and expected complete combustion.	
Smoke Management	Mod	• Noticeable smoke will be produced creating at least some public concern. • Short-term health or safety concerns related to smoke exposure may occur if actual weather deviates from forecasted. • Nearby communities are highly conscious of smoke from wildland fire. • Some possibility for a NAAQS exceedance violation. • The prescription or ignition portions of the plan need to consider smoke management.	Yes
		Cured piles produce less smoke and ignition patterns/techniques can be easily modified.	
Number and Dependence of Activities	Low	• Activities are mostly independent from each other. • Coordination of activities is simple and straightforward. • The project does not involve another land management agency or jurisdiction.	Yes
		Small staffing and few landowners makes coordination relatively simple.	
Management Organization	Low	• A small number of qualified people are required to implement the prescribed fire. • A single level of supervision is all that is needed (i.e. Burn Boss plus lighters and holders).	Yes
		One squad and overhead keeps span of control reasonable.	
Treatment/Resource Objectives	Low	• Few if any issues are present that hamper meeting treatment resource objectives. • Few or no adverse impacts are expected if resource objectives are not met. • No critical holding points.	Yes
		Straightforward resource objectives with no critical holding points. Winter or wet burning conditions will reduce impacts.	
Constraints	Low	• Constraints exist with little impact on implementing the prescribed fire or achieving objectives.	Yes
		Crews are readily available outside of normal fire season. Close proximity to roads. Complaints from homeowners could be an issue.	
Project Logistics	Mod	• Some phases of the prescribed fire may require logistical support in order to safely meet project objectives. • Limited amount of special equipment or communication equipment requiring more intensive logistical support may be needed to complete the project.	Yes
		Night patrol will need to be coordinated for burn to proceed.	

Element	Preliminary Risk	Post-Plan Risk	Risk Rating Descriptors	Elements and Actions in the RX Fire Plan that Address Risk Mitigation
Safety	Low	Low	• Safety issues and hazards are easily identifiable, addressed in briefings, and managed. • Minimal organization produces little exposure of personnel to hazards. • Adverse impacts to public health and safety are unlikely. • Activities are high frequency/low risk. • Fatigue and exposure to hazards are limited. • Standard safety briefings and attention to Lookouts, Communications, Escape Routes, and Safety Zones (LCES) are sufficient.	Elements 7,10,12, and 13 All safety concerns will be addressed at a pre-ignition briefing. LCES will be followed.
			Crews will be briefed, sign a job hazard analysis, and are familiar with working in these types of conditions. The amount of smoke produced will be minimal and not amount to a public health risk.	
Fire Behavior	Low	Low	• Terrain is mostly flat or the slope and aspect are uniform, leading to a relatively unvarying fire.	Elements 2B,5,7,and 14 Winter time burn conditions greatly reduce extreme fire behavior.
			Cured piles will be easily ignited, burn well, and fire is unlikely to spread due to snow on the ground.	
Resistance to Containment	Low	Low	• Ranges from no potential to a likelihood of few mechanisms such as spot fires, slopovers or fire creeping, each comprising small areas that are readily detected, accessed, and controlled by holding resources available on the prescribed fire. • No ladder fuels or concentrations are near critical holding points. • Ignition procedures do not create intense fire behavior. • Probability of ignition in fuels outside the unit is low. • Local drought and or fire danger indices are expected to be low to moderate.	Elements 7, 15, and 16 Saturated and/or snow cover on the surface greatly reduce the risk of spot fires. Multiple natural and human made fuel breaks surround the project.

			Winter or wet conditions will minimize the risk of spot fires. The close proximity to multiple water sources and roads will aid in holding capabilities.	
Ignition Procedures and Methods	Low	Low	• An unexpected or adverse event is unlikely and coordination of firing sequence, patterns and timing is not critical to meet project objectives. • Specific fire intensities or rate of spread (ROS) are not critical for meeting resource objectives. No complex patterns are required. Ignition patterns can be modified pile to pile as necessary.	Element 15 Resource objectives are easily met with 1-4 ignitors, lending to flexibility in ignition sequence and patterns.
Prescribed Fire Duration	Mod	Mod	• No complex patterns are required. Ignition patterns can be modified pile to pile as necessary. • Active ignition, fire spread, and patrol is expected to occur for several operational periods. • Some residual burning (heavy fuel smoldering, stump holes, etc.) is expected to occur for several days after the primary burn out of the unit. • Mop-up and patrol is typical with minimal resource and equipment needs. Due to heavy fuels in the piles, smoldering may occur over several burn periods. Night patrol may be required. Mop-up should be minimal due to the extent of curing of the fuels.	Elements 4, 15, and 16 Ignition can be halted at any time to give ample time for complete mop-up by end of each shift.
Smoke Management	Mod	Mod	• Noticeable smoke will be produced creating at least some public concern. • Short-term health or safety concerns related to smoke exposure may occur if actual weather deviates from forecasted. • Nearby communities are highly conscious of smoke from wildland fire. • Some possibility for a NAAQS exceedance violation. • The prescription or ignition portions of the plan need to consider smoke management. If smoke becomes a concern, piles can be easily extinguished.	Element 19 Cured piles will produce less smoke. Ignition pattern and techniques can be adapted quickly to respond to smoke management issues.
Number and Dependence of Activities	Low	Low	• Activities are mostly independent from each other. • Coordination of activities is simple and straightforward. • The project does not involve another land management agency or jurisdiction. Number of activities is minimal.	Elements 11, 15, and 16 Project area is under one landowner. Small number of personnel needed to accomplish resource goals.
Management Organization	Low	Low	• A small number of qualified people are required to implement the prescribed fire. • A single level of supervision is all that is needed (i.e. Burn Boss plus lighters and holders). One burn boss and one squad is minimal organization and easily managed.	elements 11, 15, and 16 One squad with a qualified RXB3 is all that is required to meet resource goals.
Treatment/ Resource Objectives	Low	Low	• Few if any issues are present that hamper meeting treatment resource objectives. • Few or no adverse impacts are expected if resource objectives are not met. • No critical holding points. Cured piles will lead to near full consumption, easily allowing resource objectives to be met.	elements 5 and 8 Resource goals are easily met if burn parameters are followed.
Constraints	Low	Low	• Constraints exist with little impact on implementing the prescribed fire or achieving objectives. The residents of Galena have a high fear of wildland fire as their area is one of the last remaining forested areas at that elevation in the Sierra Front that has not been lost to wildfire. Heavy residential and tourist traffic will make the	elements 7, 8, and 9 Once prescription parameters are met, implementation is straight forward.
Project Logistics	Mod	Mod	• Some phases of the prescribed fire may require logistical support in order to safely meet project objectives. • Limited amount of special equipment or communication equipment requiring more intensive logistical support may be needed to complete the project. Night patrol needs to be coordinated if piles are left smoldering overnight.	elements 11 and 12 Fuel mix and crew availability are the only logistical needs.

Element	Post-Plan Risk	Technical Difficulty	Rating Descriptors
Safety	Low	Low	• No special actions are required to mitigate potential minor accidents or injuries identified in the risk assessment/Job Hazard Analysis (JHA). • Safety concerns can be easily mitigated through LCES. • No preparation work or special project design features are required.
			Span of control is under normal operating conditions. Small number of crew required limits exposure.
Fire Behavior	Low	Low	• Standard fire safety precautions are adequate to ensure personnel safety. • No fire behavior variations are expected and numerous barriers to fire spread exist. • The number, size or likelihood of spot fires and slopovers is minimal and do not require additional suppression resources. • Fire behavior is such that holding forces can easily control possible spot fires and slopovers using direct attack tactics. • No on-site operational fire behavior specialists are required.
			Pile burning allows for greater control of fire intensity. Good access to water sources. Fuels continuity has been reduced through pile building and snow or wetting rain on the ground will limit fire spread.
Resistance to Containment	Low	Low	• Minimal holding resources are involved in the holding operation. • The burn unit and project area is easily accessible to the holding resources identified in the plan. • Minimal line width required to contain expected fire spread. • Minimal site prep is required.
			Winter or wet conditions, such as higher precipitation and lower temps, reduce the risk of spot fires.
Ignition Procedures and Methods	Low	Low	• There is no need for special firing equipment, techniques, or patterns. • Firing procedures are simple and ignition team is small. • Use of only one type of ignition device is planned. • The ignition pattern requires minimal supervision of the lighters to achieve project objectives and manage safety concerns. • Communications are easily maintained with a single tactical frequency. • The entire project area is readily visible to the Firing/Burn Boss.
			Special equipment or techniques are not required. Small number of ignitors allows for greater control.
Prescribed Fire Duration	Mod	Low	• Ignition and mop-up operations are usually completed in 1 to 2 operational periods. • Mop-up and patrol is typical with minimal resource and equipment needs. • Standard press release is sufficient for public notification.
			Due to the amount of heavy fuels in the piles, piles may be allowed to smolder for multiple burn periods. Overnight patrol may be needed with minimal resources.
Smoke Management	Mod	Low	• ERTs and SMTs are simple, routine and straightforward to achieve and will provide desirable smoke management outcomes. • Some limitations may be present in the plan. • Wind and dispersion parameters are not constrained. • No sensitive receptors exist. • Minimal coordination with air quality officials is required.
			Typical afternoon winds allow for smoke dispersal. Ignition can be modified quickly to adapt to smoke conditions or issues. In the event smoke is not dispersed during the day some smoke settling may occur in residential areas.
Number and Dependence of Activities	Low	Low	• Minimal difficulty in coordinating the required activities. • Holding and lighting are loosely dependent on each other. • Coordination problems or communication failures or issues will not affect the completion of the project. • No to very few pre-burn considerations are required.
			One burn boss is all that is required to coordinate the burn operation.
Management Organization	Low	Low	• All team members are available within the local unit and are familiar with local factors affecting project implementation. • Several qualified personnel are available. • The operation is carried out employing a small burn crew. • There is no special pre-burn preparation organization is required.
			Crews are local, organized units that are familiar with the local conditions.
Treatment/ Resource Objectives	Low	Low	• There are few resource objectives to meet. • Measures to achieve the objectives are easy to complete and there are few or no restrictions on techniques. • There are few or no restrictions on techniques and prescription parameters. • Basic monitoring of fire behavior and weather is needed to determine if prescribed fire objectives are being met. • Many other opportunities will exist to meet objectives in a given year. • Pre-burn site preparation is not required to meet resource objectives.

			Objectives are simple and straightforward. If objectives are not being met, it would not be difficult to shut down burn operations.
Constraints	Low	Low	• Constraints are easily accommodated and do not increase the difficulty of completing the project or achieving objectives. • Required weather and fuel conditions are locally very common.
			The only constraints are weather conditions and crew availability.
Project Logistics	Mod	Mod	• Project implementation requires a small logistical support operation. • Logistical support may be combined with other functions. • Obtaining some personnel may require additional contacts and advanced scheduling. • Additional support may be needed for out-of-area personnel.
			No special equipment or staffing is required.

Appendix D: Agency-Specific Job Hazard Analysis or Risk Assessment

Nevada Division of Forestry

JOB HAZARD ANALYSIS

PRESCRIBED FIRE

Activity	Hazards	Action to Eliminate Hazard
1. Driving to and from work site	Traffic volume	Defensive driving techniques, follow all laws and wear seatbelts. Headlights on. Use radios to communicate conditions. Use Maps – follow directions, travel as a team, and be familiar with project site.
	Steep, narrow, windy, dusty, and icy roads. Potential for vehicle to roll.	Drive cautiously to ensure less than half the usual stopping distance, watch for rough areas. Headlights on, radio communication. Low range, low gear going downhill. Traffic control will be in place within project area. Be aware of road shoulder, serious rollover potential.
	Hauling flammable substances.	Use appropriate containers for hauling slash fuel or gasoline. Secure containers properly. Defensive driving.
	Loading, transporting sharp tools	Use guards, cages, boxes or tool mounts, tie downs, and check loads prior to departure.
	Loading vehicles	Use proper lifting techniques, tie down properly, check load.
	Heavy Load – Loss of Brakes.	Low range, low gear on steep downgrades-do not overload brakes.
	Convoy travel hazards and passing may cause accidents.	Minimum 100 yards between vehicles to allow other vehicles passing room. Use 2-way communications at all times. Drive defensively and be courteous.
2. Driving at or near work site	Backing or turning around in small areas.	Use spotters. Face the hazard while turning around. Avoid tight turn around if possible. Only turn around in designated locations.
	Heavy truck traffic between units and water source.	Maintain radio communications and alert other drivers in the area. Do not speed. Headights on and warning lights when appropriate.
	Smoke, poor visibility.	Place a guide on foot ahead of the vehicle, maintain radio communications. Wait until smoke is less dense. Lights on. Use light bars and/or warning lights.
	Vehicle rolling out of control.	Use chock-blocks. Tie bright flagging on chock block as a reminder of being placed. Tie flagging on steering wheel as a reminder to pick up chock block.
	Parking near a prescribed burn.	Use parking brake. Leave keys in ignition; avoid leaving exposed flammables in bed of vehicle. Close

		all windows.
	Public safety	Post signs and/or use roadblocks if needed.
3. ATV/UTV vehicle operation	ATVs: Steep and uneven terrain with narrow trails can cause an accident.	Operated by trained and licensed drivers only. Wear hard hat with chin strap secure. Lights on. Stay on road and designated trails.
	Improper hauling equipment/supplies.	Do not overload, properly tie down, personnel in seat only.
	Inexperienced operator/accidents	Designated operators only
	May cause damage to environment.	Follow environmental guidelines on off-road travel
4. Handling flammable material	Exposure to sparks, spills, vapors, burns may cause injury to personnel or damage to the environment.	Transport fuels in proper containers. Properly mark all containers, move away from hot areas, and haul less than 119 g / vehicle. Carry a spill kit to handle any spills and notify supervisor in case of spill. Properly dispose of any contaminated soils or absorbent. Do not carry fuel inside cab, clean torches. Carry a Class B fire extinguisher or foam on vehicle. No smoking.
5. Equipment set-up	Muscle or back strain lifting heavy objects	Use proper lifting techniques; get help if too heavy.
	Operating pumps and mechanized equipment exhaust burns, loose clothing.	Tuck in shirt tails, remove scarves and jewelry. Wear Appropriate PPE.
	Application of slippery retardant, poor footing	Wear eight-inch lug-soled, lace-up boots. Avoid slick areas if possible.
	Crew people working uphill from each other (rolling debris)	Post lookout. Shout warnings.
	Operating high pressure nozzles.	Maintain visual contact with pump operator and other crew members. Use backup person behind nozzle man. Use goggles.
	Traversing rocky terrain	Wear eight-inch lug-soled boots. Move slowly, cautiously.
	Noise from pumps and saws	Use hearing protection (ear plugs or muffs).
6. Firing (hand ignition)	Rolling debris	Use handheld radios, close supervision, lookouts. Be alert for rolling rock/debris.
	Proximity to intense heat and erratic fire behavior	Use handheld radios, close supervision, lookouts. Use PPE.
	Smoke, sparks and cinders	Avoid very dense smoke; wear PPE; rotate personnel out of worst areas.

	Poor footing, steep slopes, heavy fuels	Constant awareness; learn to identify hazard areas; slow down.
	Noise of fire obscures verbal warnings	Hand held radios for all lighting personnel.
	Burning fuel dripping from torches. Burns from drip torches	Lighters stay alert to location of torch flame. Close air vent when not actually lighting. Wear proper PPE.
	Misguided igniter lighting wrong area.	Know location of others. Radios for all personnel. Close supervision.
7. Ignition devices	Risks associated with firing projectiles or flares	Follow basic firearm safety rules; separate ammo by type and size, limit launcher access to trained personnel or those undergoing training.
	Activity outside project boundaries due to inadvertent firing over/under shot	Post lookouts. Notify Ignitor and Holding Boss. Holding crews extinguish spot subsequent to further ignition.
8. Vehicles	Vehicle maintenance	Thoroughly inspect vehicles and document.
	Proximity to fire, intense heat, erratic fire behavior	Same as in 5; know escape routes.
	Rough terrain, heavy ground fuels, side hills and slopes	Scout and locate accessible routes; walk out the route before you commit a vehicle, use experienced operator or supervised trainee.
	Noise of engine and fire obscures verbal warnings	Handheld radios required of all ignition personnel. Hard hats instead of helmets to facilitate communications.
	Backing vehicle or poor vision	Pre-plan egress; use backer, establish hand signals
9. Holding (including all of item 4)	Carrying sharp tools	Keep tool guards on while traveling; remove only while in use.
	Tool use	Proper crew training, with close supervision by crew boss.
	Snag falling	Snags have been cut. If hazard tree exists, notify safety and get approval to cut it and notify all personnel.
	Burned off snags or widow-makers	Avoid entering burned-over areas. Post lookout; flag. Obtain professional faller if needed.
	Burns from radiant heat and hot ember	NFPA 1977 PPE: Nomex clothing, hard hats, eye protection, and gloves required.
	Rolling debris	Post lookouts. Brief crew on potential hazard areas.
	Erratic fire behavior	To be covered by Burn Boss in pre-burn briefing.

		Know escape routes.
10. Mop-up (including all hazards in items 4, 5, 6)	Slippery, steep, wet surfaces	All PPE required; lug-soled, lace-up boots.
	Smoke inhalation	Rotate crews in and out of dense smoke.
	Fatigue, long hours of work	Duty shifts shall not exceed 12 hours, except in emergencies. Crews will work no longer than seven days on with one day off or 14 on with two off. Work in pairs; have rested drivers available.
11.Cutting fire line and pre-burn prep	Sharp tools causing injuries	Keep proper spacing of 10+ feet during work or hiking. Check tools for proper conditions. Work as a TEAM. Keep full PPE on and use good communications.
12. Felling of trees and snags with chain saws	Improper operation may cause injury or heath to sawyer or others. May cause damage to environment.	Only certified sawyers at appropriate levels may use chain saws. Use a swamper and all safety steps when felling operations are taking place. LCES before cutting any tree, get approval from project manager.
13. Pre-treatment operation	Failures to follow safety regulations may cause injury or death to drivers and/or assistant during spraying of water, foam or retardant. Power lines are located at various locations on the property. Spraying water, foam or retardant on lines may cause electrocution. Foam and retardant may cause slick road conditions.	If spraying under the high-power lines or around any power lines use extreme caution and keep the spray low and under control at all times. When necessary, strap the monitor tip down in a manner that will not allow the angle to pass above level spray. Proper to any pre-treatment under the line, engine and water crews will hold a safety meeting as to the safe methods to be used. Use horizontal spray only from tenders and engines. Make sure that all foam and retardant is washed off any road surfaces.
14. Holding operations	If not done by an experienced person, may cause escape which may cause injuries to personnel or damage to the environment and private property.	A Holding Boss will be in direct communications with the Burn Boss and the Ignitor along with crews/engines on all lines, dozer and the WT operators. Holding procedures will follow the Burn Plan. If additional resources are need, contact the Burn Boss. Only patrol in designated areas. Observe all areas around the burn for spot fires. Report the location, rate of spread, type of fuel, scope potential, and other information to your supervisor. Report any hazards to your supervisor and flag the area, or post a look put until the hazard has been mitigated.
15. Slop-over/ Spot fires	Fire may cause injuries to personnel, harm to the environment.	If the spot fire is outside the burn perimeter, use all standard safety procedures on direct attack. Notify your supervisor.
16. Medical problems and care	Medical problem; Heat stress or exhaustion, cut, scraps, sprains, broken bones, head injuries, foot problems, burns smoke inhalation and all other	Drink water through the day. Notify your supervisor and get help from EMT or First Responder as soon as possible. Medical kit, will be located in engine and/or crew buggies. Stay out of smoke or in for short duration and monitor each other. Notify your supervisor for any medical attention. Check Burn

	medical problems. If not taken care of properly, may cause additional injury or loss of work.	Plan for more information on radio frequencies and location of medics unit, hospitals, routes and phone numbers. Ensure patient is transported to nearest medical facility.
17. Patrol Operations	If not conducted properly, may cause escape and damage to the environment or injuries to personnel. Steep terrains in some areas need caution when driving. Interest public or protesters may cause traffic congestion in some areas.	Follow the Burn Plan and any Burn Boss changes to that Plan. A qualified person will be in charge of holding operations. Follow the JHA plans for safety. Install water bars where needed on lines. Repair damaged water bars on any back roads. Stay on designated roads. Drive safe and slow follow all posted speeds, use flashers and amber flashing light when on public roads and streets. Obey all local vehicle laws. Stay within your designated area. Report any possible problems to your supervisor, including problems concerning the public and attempt to cause problems with the project.

Appendix E: Fire Behavior Modeling Documentation or Empirical Documentation

G

BehavePlus 5.0.5 (Build 307)
alena Contain SH2
Fri, Oct 04, 2019 at 16:39:29

Inputs: SURFACE, CONTAIN, IGNITE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh2
Fuel Moisture		
1-h Moisture	%	15
10-h Moisture	%	10
100-h Moisture	%	10
Live Herbaceous Moisture	%	
Live Woody Moisture	%	60
Weather		
Midflame Wind Speed (upslope)	mi/h	0, 3, 6, 9, 12, 15
Air Temperature	oF	70
Fuel Shading from the Sun	%	65
Terrain		
Slope Steepness	%	20
Fire		
Fire Size at Report	ac	.1
Suppression		
Suppression Tactic		Head
Line Construction Offset	ch	0
Resource Line Production Rate	ch/h	8
Resource Arrival Time	h	0.1
Resource Duration	h	6

Notes

Results

Wind	Midflame Speed	ROS (max)	Flame Length	Contain Status	Time Report	Contain Area	Fireline Constructed	Firebrand Ignition
	mi/h	ch/h	ft		h	ac	ch	%
	0	0.1	0.1	Contained	0.6	0.1	3.6	13
	3	0.2	0.2	Contained	0.6	0.1	3.8	13
	6	0.2	0.2	Contained	0.6	0.1	3.8	13
	9	0.2	0.2	Contained	0.6	0.1	3.8	13
	12	0.2	0.2	Contained	0.6	0.1	3.8	13
	15	0.2	0.2	Contained	0.6	0.1	3.8	13

G

BehavePlus 5.0.5 (Build 307)
alena Contain TU1
Thu, Mar 05, 2020 at 14:06:44

Inputs: SURFACE, CONTAIN, IGNITE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		tu1
Fuel Moisture		
1-h Moisture	%	15
10-h Moisture	%	10
100-h Moisture	%	10
Live Herbaceous Moisture	%	60
Live Woody Moisture	%	60
Weather		
Midflame Wind Speed (upslope)	mi/h	0, 3, 6, 9, 12, 15
Air Temperature	oF	70
Fuel Shading from the Sun	%	65
Terrain		
Slope Steepness	%	20
Fire		
Fire Size at Report	ac	.1
Suppression		
Suppression Tactic		Head
Line Construction Offset	ch	0
Resource Line Production Rate	ch/h	8
Resource Arrival Time	h	.1
Resource Duration	h	6
Notes		

Results

Wind

Midflame Speed	ROS (max)	Flame Length	Contain Status	Time Report	Contain Area	Fireline Constructed	Firebrand Ignition
mi/h	ch/h	ft		h	ac	ch	%
0	0.3	0.4	Contained	0.6	0.1	3.8	13
3	1.1	0.9	Contained	0.7	0.1	4.5	13
6	2.5	1.2	Contained	0.8	0.2	5.4	13
9	3.8	1.5	Contained	0.9	0.2	6.3	13
12	3.8	1.5	Contained	0.9	0.2	6.3	13
15	3.8	1.5	Contained	0.9	0.2	6.3	13

G

BehavePlus 5.0.5 (Build 307)
alena Spot TU1
Fri, Oct 04, 2019 at 16:36:57

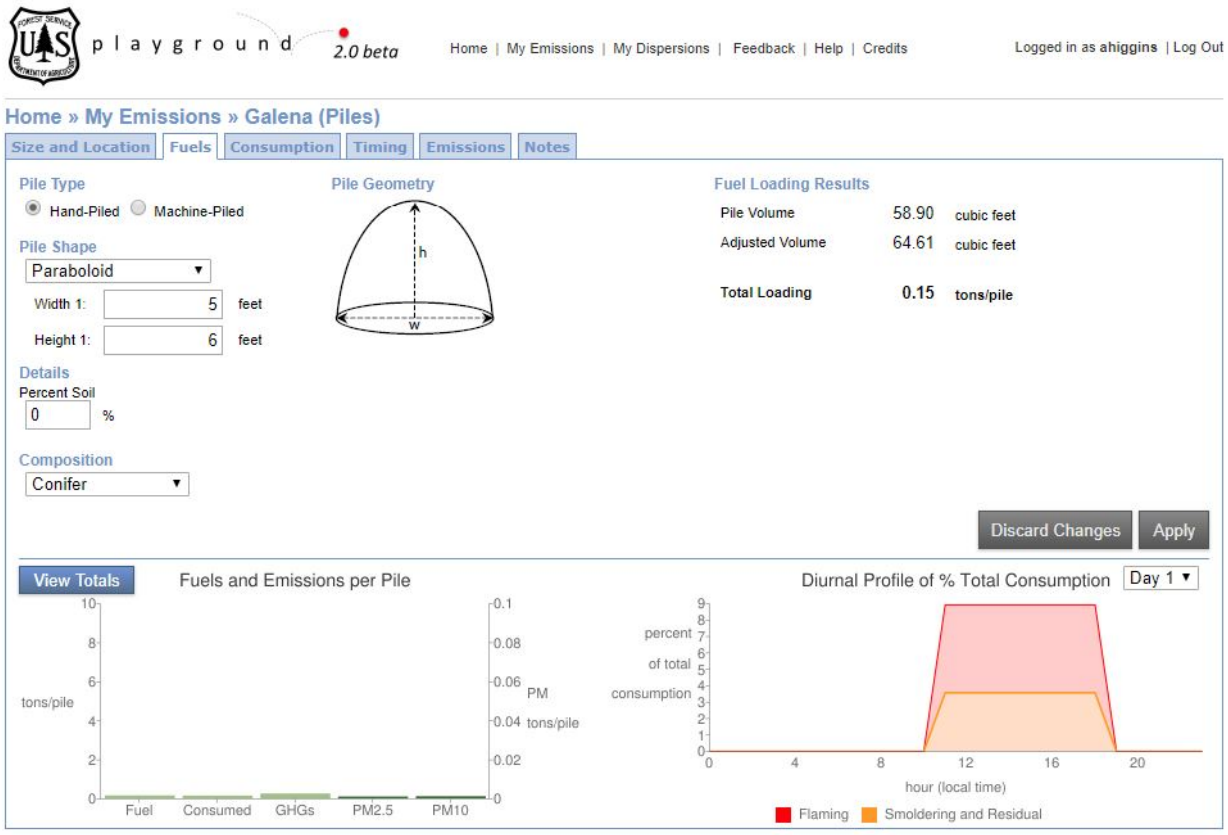
Inputs: SURFACE, SPOT, IGNITE

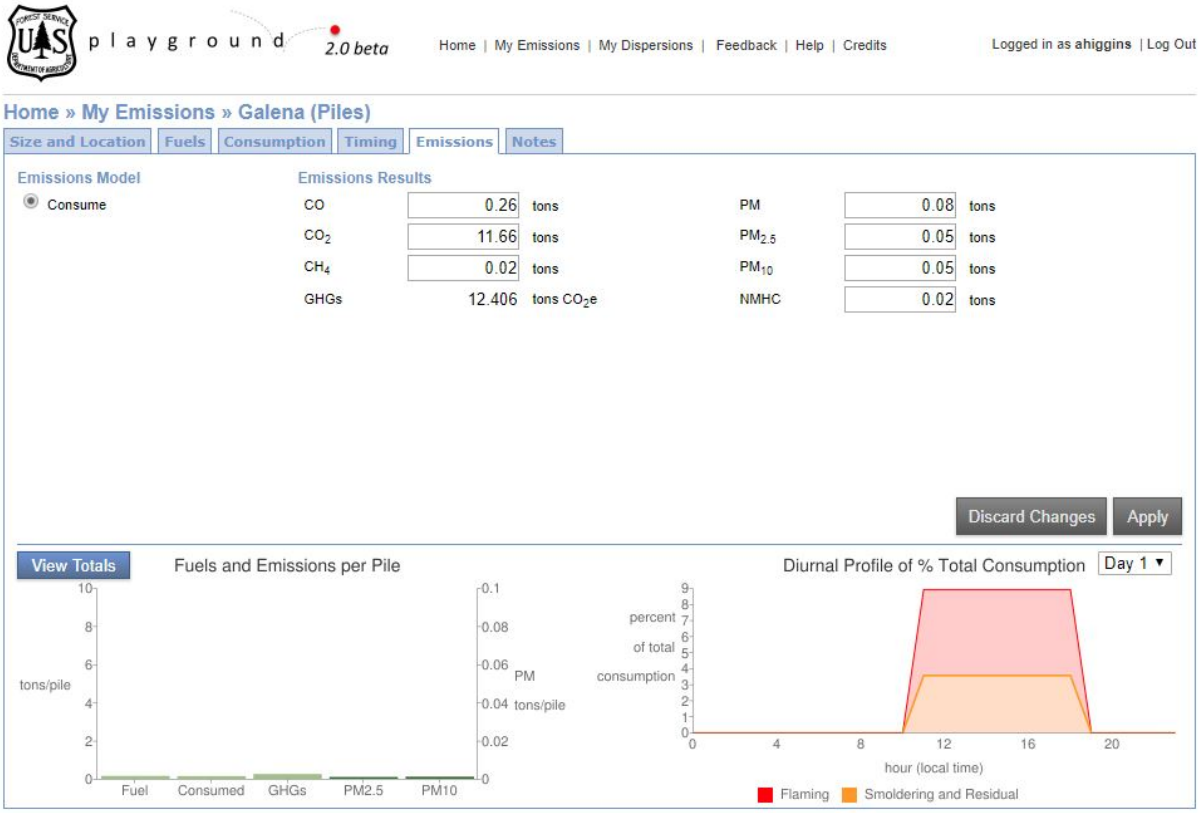
Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		tu1
Fuel/Vegetation, Overstory		
Canopy Cover	%	65
Canopy Height	ft	80
Downwind Canopy Height	ft	80
Torching Tree Height	ft	80
Crown Ratio	fraction	.5
Spot Tree Species		PINPON
D.B.H.	in	24
Fuel Moisture		
1-h Moisture	%	15
10-h Moisture	%	10
100-h Moisture	%	10
Live Herbaceous Moisture	%	60
Live Woody Moisture	%	60
Weather		
20-ft Wind Speed (upslope)	mi/h	0, 5, 10, 15, 20, 25, 30, 35
Air Temperature	oF	70
Fuel Shading from the Sun	%	65
Terrain		
Slope Steepness	%	20
Ridge-to-Valley Elevation Difference	ft	1000
Ridge-to-Valley Horizontal Distance	mi	.5

Results

20-ft Wind	ROS (max)	Flame Length	Torch Tree Spot Dist	Firebrand Ignition
mi/h	ch/h	ft	mi	%
0	0.3	0.4	0.0	13
5	0.4	0.5	0.1	13
10	0.5	0.6	0.2	13
15	0.7	0.7	0.3	13
20	0.9	0.8	0.4	13
25	1.2	0.9	0.5	13
30	1.4	1.0	0.6	13
35	1.7	1.0	0.7	13

Appendix F: Smoke Management Plan and Smoke Modeling Documentation





Appendix G: Prescribed Fire – Test Fire Documentation

Prescribed Fire Name: _____ **Date:**_____

Burn Unit: Name: _____ GPS Coordinates, Degrees, Decimal Minutes Format: _____N_____W

Before Lighting Test Fire……

Photo Documentation: Required pre-Ignition photos taken**:** ☐ Yes

Fuel: Pile or Broadcast; 1-hr Fuel Moisture _____; 10-hr Fuel Moisture_____;_____
(Circle one)

Weather Conditions: Ambient Temp (°F)_____; Forecasted Wind Speed (20 ft) mph_____; Wind Speed (MFWS) mph_____; Wind Direction_____; RH (%)_____; Forecasted Mixing Height_____

Observations:_____
_____

Light Test Fire Now……

Target fuel consumed at prescribed amounts? ☐ Yes ☐ No

Observations:_____
_____

Smoke Dispersal: Not likely to adversely impact sensitive receptors ☐ Yes ☐ No

All smoke attributes meet prescribed parameters? ☐ Yes ☐ No

Other Observations:

_____
_____
_____
_____

Refer to and answer the test fire summary question at the bottom of the Go/No-Go Checklist Form before transitioning to full implementation.

Appendix H - Prescribed Fire Monitoring and Reporting

Prescribed Fire Name: _____ Date:_____

Burn Organization
Burn Boss: _____Holding Boss: _____Firing Boss: _____
Ignitor(s): _____; Ignition time: Start: _____ Finish: _____
Other Resources/Duties: _____

Weather Summary _____
_____

Fuel Summary 1-hour fuel moisture: _____; 10-hour fuel moisture: _____; 100-hour fuel moisture: ____;
% consumption achieved: _____

Fire Behavior Summary _____
_____

Smoke Dispersal Summary: Describe vertical lift, dispersion, settlement, etc.:
_____
_____

Resource Objectives Summary: Were they met *(Element 5)*? ☐ Yes ☐ No - If not why?
_____
_____

Fire Objectives Summary: Were they met *(Element 5)*? ☐ Yes ☐ No - If not why?
_____
_____

End of Day Checklist

☐ Mop-up completed as described in burn plan
☐ Night patrol assigned, if needed (Night patroller(s): _____)
☐ Day shift assigned for days following burn, if needed
☐ Notifications of completed burn
☐ Reported to dispatch and NDF State Office: # of piles burned: _____ Acres treated: _____

Burn Completed and Declaration of Rx Fire Out

Is the fire completely extinguished? Yes ☐ If yes, method used: IR detector ☐ Cold trail ☐ Other *(Foam etc.)*
_____
_____

☐ Notifications performed to communicate fire out to all on notification list.
☐ All daily weather forecasts, monitoring sheets, and photos filed in the monitoring and reporting file.
Are hand lines rehabbed to prevent erosion of slopes, unauthorized vehicle use and/or sediment into streams? Yes ☐
Are new snags present which could pose a hazard to infrastructure (eg. roads, trails, buildings, etc.) or human life?
No ☐ Yes ☐ If yes, were mitigation measures taken, what were they and why?
_____
_____

Prepared by *(print)*:_____ *(sign)*:_____Date:_____

Appendix I - Prescribed Fire – Daily Weather, Fuels and Fire Behavior Documentation

Prescribed fire name: _____ Date: _____

Time												
Site												
Location												
Elevation												
Aspect												
Weather (Observed by: _____)												
Dry bulb temp												
Wet bulb temp												
% RH												
Wind speed (mph)												
Wind gusts (mph)												
Wind direction												
% Cloud cover												
Fuels (Observed by: _____)												
Scorch Height												
Fine dead fuel moisture (exposed)												
Fine dead fuel moisture (shaded)												
Fire (Observed by: _____)												
Probability of Ignition												
Flame Length												
Rate of Spread												
Spread Direction												
Creep Amount *(Across control point, away from pile)*												
Smoke (Observed by: _____)												
Visibility *(Ground Level)*												
Direction												
Venting Height												
Smoke Impact to Sensitive Receptor												
Photos (Taken by: _____)												
Photos***												

***Read over radio: Location description, dry bulb temperature, relative humidity, wind speed, wind direction, and wind gusts.*
****Photos will be taken during fire operations and then filed with the monitoring report.*

Public complaints/impacts/actions taken:

_____
_____
_____

The *Prescribed Fire Plan* is developed and maintained by the Fire Use Subcommittee, under the direction of the Fuels Management Committee, an entity of the National Wildfire Coordinating Group (NWCG).

Previous editions: 2014.

While they may still contain current or useful information, previous editions are obsolete. The user of this information is responsible for confirming that they have the most up-to-date version. NWCG is the sole source for the publication.

This publication is available electronically at: https://www.nwcg.gov/publications/484-1.

Comments or questions regarding the guide should be directed to the appropriate agency representative on the Fire Use Subcommittee. The roster is available at: https://www.nwcg.gov/committees/fire-use-subcommittee/roster.