Upper Lake and Covelo/Baseball Escape Prescribed Fire review, Mendocino National Forest

04.22.20

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The Upper Lake and Covelo Pile Burn prescribed fire project was located on the Upper Lake and Covelo Ranger Districts of the Mendocino National Forest (MNF). The project planning area encompassed approximately 4000 acres and was comprised of multiple sub-units including the Baseball prescribed fire project units (Figure 1). The Baseball was originally slated for timber sale operations and fuel reduction activities including thinning, piling and burning (piles and jackpot). A post NEPA decision review was done in 2017 and determined that current conditions did not warrant a new decision. From 2017 to the present, multiple fuels treatments were completed in the project area. The Baseball pile prescribed fire had current NEPA, was fully supported by Forest leadership and piles in units three and six were recently ignited on two separate occasions: January 30th and February 4th, 2020. The operational organization included a Type 3 Burn Boss and a small group of MNF firefighters with overall operational supervision under the Covelo District Fire Management Officer. After initial ignition, the piles were patrolled periodically while a significant drying trend occurred for the remainder of February. The piles subsequently rekindled, escaped out of the initial project area and were declared a wildfire on February 25th, 2020.

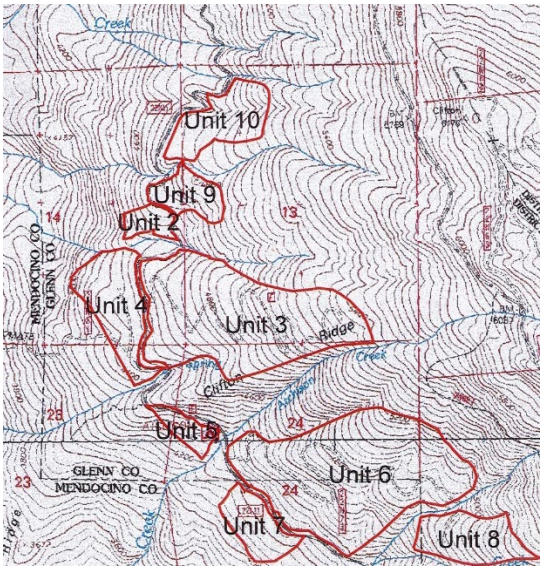


Figure 1: Baseball Pile Burn Prescribed Fire Area

An analysis of the seasonal severity, weather events, and on-site conditions leading up to the wildfire declaration.

Environmental and Site Conditions

Fuels and vegetation in the Baseball pile project and escape area were comprised of inland coastal mixed conifer including white fir, ponderosa pine, black, canyon live and Brewers oak, and madrone with pockets of manzanita and chamise in the understory. Surface fuels also included slash from previous mechanical/fuels treatments. The elevation was between 4000 – 6000' with primarily a west aspect and slopes ranging from 20 – 60%. The estimated fuel loading was 10 – 15 tons/acre. There were patches of drought induced, beetle kill pines with increased fuel loads in some areas. The live fuel moisture was estimated to be over 150%. 1000-hour fuel moisture prior to the escape was likely well over 100% and generally unavailable to burn (actual fuel moistures were not obtained). At the time of the escape, fuels were estimated to be significantly dryer, with 1000-hour fuel moistures at approximately 30 - 40% and 10 hour fuel moistures estimated to be 5 – 10 %.

Seasonal Severity and Fire Danger

The fire danger at the Baseball prescribed fire pile project area was based on National Fire Danger Rating System (NFDRS) Zones 162 (Soda Creek Remote Automated Weather System RAWS) and 165 (Alder Springs RAWS) selected by Forest Fire Staff as being the most representative weather stations for the project area. Overall fire danger was low when the piles were first ignited in late January (Table 1). The majority of the project area was covered by snow and some interviewees indicated that initial access to the project area was actually hindered by snow. Nevertheless, the Forest and the rest of California were generally below average at approximately 40 - 50% of normal precipitation for this time of year.

Table 1: NFDRS Fire Danger Rating on January 30, 2020 at the Commencement of the Project

DATE: 1/30/2020 ACTUAL								DATE: 1/31/2020 PREDICTED						
NFDR	Fuel Model	SL	IC	ERC	BI	Fire Danger	10 Hour Fuels	NFDR	SL	IC	ERC	BI	Fire Danger	10 Hour Fuels
162	G	1	11	0	2	L	12	162	1	14	0	1	L	11
165	G	1	6	12	19	L	13	165	2	15	17	26	L	9
170	B	1	9	12	22	L	11	170	1	9	15	23	L	10

Following initial ignition of the Baseball burn piles, February became *one of the driest months on record in recent history*. NFDRS fire danger when the piles escaped on February 25th was rated moderate at stations 162 and 165 (Table 2) and fire behavior potential on the Forest and throughout California had reached maximum levels for February (Figure 3 and 4).

Table 2: NFDRS Fire Danger Rating on February 25, 2020 When the Escape Occurred

DATE: 2/25/2020 ACTUAL								DATE: 2/26/2020 PREDICTED						
NFDR	Fuel Model	SL	IC	ERC	BI	Fire Danger	10 Hour Fuels	NFDR	SL	IC	ERC	BI	Fire Danger	10 Hour Fuels
162	G	3	28	27	34	M	7	162	3	28	29	35	M	7
165	G	3	36	59	55	M	5	165	3	27	59	50	M	5
170	B	4	58	61	123	V	4	170	3	33	50	71	M	5

Figure 3: Energy Release Component (Seasonal/Long Term Drought Indicator)

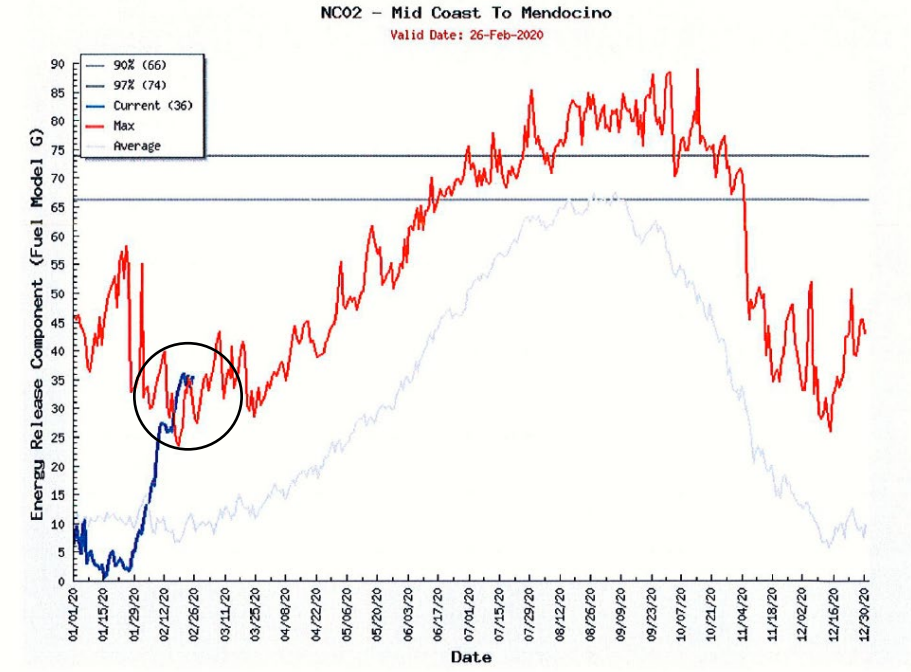
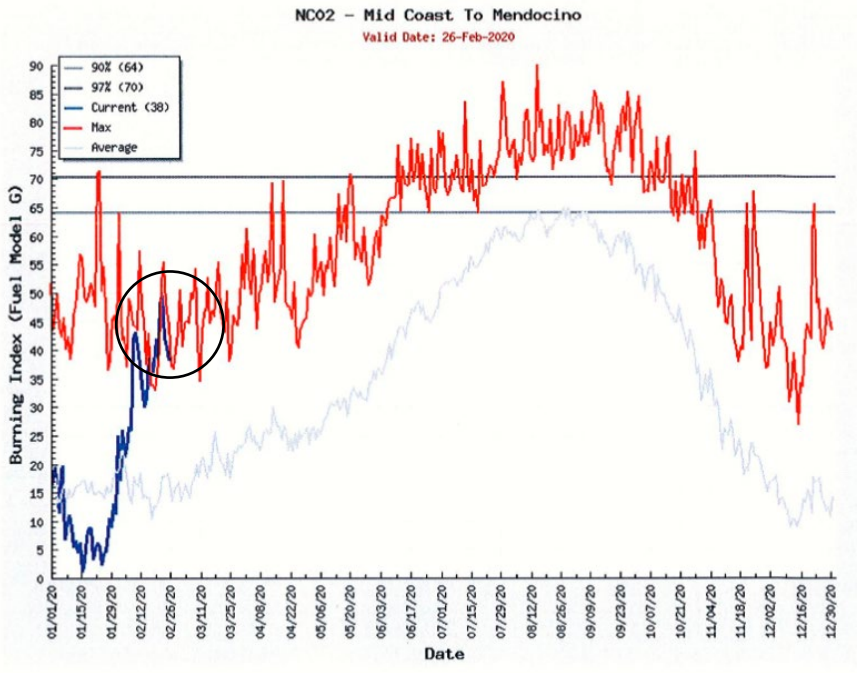


Figure 4: Burn Index (Potential Flame Length)



Weather

National Weather Service (NWS) Spot Weather Forecast on Wednesday, January 29 for ignitions on January 30, 2020:

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SPOT FORECAST for Baseball PCT...USFS
National Weather Service SACRAMENTO CA
602 PM PST Wed Jan 29 2020

Forecast is based on ignition time of 0900 PST on January 30.
If conditions become unrepresentative...contact the National Weather
Service.

.DISCUSSION...
High pressure the next couple of days will bring above normal
temperatures and dry conditions to the location.

.THURSDAY...

Sky/weather.....Mostly sunny.
Max temperature.....50-55.
Min humidity.....62-67 percent.
Wind (20 ft).....
 Slope/valley.....North winds 7 to 13 mph.
 Ridgetop.....Northwest around 9 mph.
Mixing height.....100-2000 ft AGL.
Transport winds.....Northwest around 9 mph.
CWR.....0 percent.
LAL.....1.
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Onsite test fire weather, fire behavior and notes on 01/30/20, by the Burn Boss:

- Temp: 41° min, 56° max
- RH: 53% min, 99% max
- Wind: SW 1 mph, G5
- Fire behavior: 6-10’ flame lengths, occasional single small tree torching
- Rate of spread: 0, confined to piles
- 25 acres completed

NWS Spot Weather Forecast on Monday February 3 for ignitions on February 4, 2020:

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SPOT FORECAST for Baseball RX...USDA Forest Service
National Weather Service SACRAMENTO CA
611 PM PST Mon Feb 3 2020

Forecast is based on ignition time of 1000 PST on February 04.
If conditions become unrepresentative...contact the National Weather
Service.

.DISCUSSION...
Northerly flow will continue into Wednesday. Moderate humidity recovery
is expected each of the next two nights. Warmer the next couple of days
after cold morning starts.

.TUESDAY...

Sky/weather.....Sunny.
Max temperature.....44-49.
Min humidity.....16-21 percent.
Wind (20 ft).....
 Slope/valley.....Northeast winds up to 8 mph.
 Ridgetop.....North around 12 mph.
Mixing height.....1100-2000 ft AGL.
Transport winds.....North around 12 mph.
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Onsite test fire weather, fire behavior and notes on February 4, 2020 by the Burn Boss:

- Temp: 32° min, 46° max
- RH: 27% min, 54% max
- Wind: E/Upslope 3-5 mph, G10
- Fire behavior: 4-6' flame lengths, moderate intensity
- Rate of spread: 'crept in the understory needlecast'
- Planned 5 ac. but accomplished 25 due to, 'very rapid consumption of piles…some spreading did happen, all within unit and was only top layer of needlecast.'

The weather after initial ignition on 01/30/20 and 02/4/20 leading up to the escape was derived from National Wildfire Coordinating Group (NWCG) Weather Incident Management System (WIMS) and NWS Spot weather forecast data. It was indicated by numerous interviewees that there were significant winds on the project area the day and/or night prior to the escape. Per WIMS and representative Mendocino Pass RAWS on February 25th:

ID	Station Name	Obs Date	Obs Tm	Obs Typ	S W	Dry Tmp	RH M	HC Rsk	Wnd Dir	Wnd Sp	10 Hr	Tmp Max	Tmp Min	RH% Max	RH% Min	Dur	Amt Y L	FHC Rsk	W F	RD	SR%	Snow Flag
041018	MENDOCINO PASS	25-Feb-20	23	R		50	15	0	72	0		66	42	44	15	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	22	R		50	16	0	68	2		66	42	44	15	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	21	R		52	15	0	69	9		66	42	44	15	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	20	R		51	17	0	70	8		66	42	44	15	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	19	R		52	18	0	81	13		66	42	44	15	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	18	R		52	19	0	71	8		66	42	44	15	0	0	0	N	35		N
041018	MENDOCINO PASS	25-Feb-20	17	R		59	17	0	48	5		66	42	44	15	0	0	0	N	258		N
041018	MENDOCINO PASS	25-Feb-20	16	R		62	16	0	66	6		66	42	44	15	0	0	0	N	432		N
041018	MENDOCINO PASS	25-Feb-20	15	R		66	15	0	10	7		66	42	44	15	0	0	0	N	627		N
041018	MENDOCINO PASS	25-Feb-20	14	R		65	19	0	8	5		65	42	44	18	0	0	0	N	701		N
041018	MENDOCINO PASS	25-Feb-20	13	O	1	65	18	0	42	6		65	42	44	18	0	0	0	N	717	80	N
041018	MENDOCINO PASS	25-Feb-20	12	R		62	20	0	91	9		62	42	44	18	0	0	0	N	713		N
041018	MENDOCINO PASS	25-Feb-20	11	R		59	26	0	70	6		59	42	44	15	0	0	0	N	583		N
041018	MENDOCINO PASS	25-Feb-20	10	R		55	29	0	94	17		57	42	44	13	0	0	0	N	472		N
041018	MENDOCINO PASS	25-Feb-20	9	R		52	32	0	83	0		57	42	44	13	0	0	0	N	282		N
041018	MENDOCINO PASS	25-Feb-20	8	R		47	37	0	62	0		57	42	44	13	0	0	0	N	53		N
041018	MENDOCINO PASS	25-Feb-20	7	R		42	43	0	80	0		57	42	44	9	0	0	0	N	2		N
041018	MENDOCINO PASS	25-Feb-20	6	R		43	43	0	75	0		57	43	44	3	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	5	R		43	44	0	82	0		57	43	44	1	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	4	R		43	44	0	85	0		57	43	44	1	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	3	R		44	43	0	84	0		57	43	44	1	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	2	R		43	44	0	79	0		57	43	44	1	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	1	R		43	44	0	81	0		57	42	44	1	0	0	0	N	0		N
041018	MENDOCINO PASS	25-Feb-20	0	R		44	43	0	86	0		57	42	43	1	0	0	0	N	0		N

- Maximum temperature, 66°
- Minimum relative humidity, 13%
- Maximum windspeed, 17 mph

Spot Weather Forecast from Sacramento, CA NWS @ 1418 hours on February 25, 2020:

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SPOT FORECAST for BASEBALL...USFS
National Weather Service SACRAMENTO CA
218 PM PST Tue Feb 25 2020

Forecast is based on forecast start time of 1500 PST on February 25.
If conditions become unrepresentative...contact the National Weather
Service.

.DISCUSSION...
High pressure over the region will bring dry conditions and light
north to northwest winds to the fire site into tonight. Light
southwest winds will develop Wednesday.

.REST OF TODAY...

Sky/weather.........Mostly sunny.
Max temperature.... 58-63.
Min humidity........17-22 percent.
Wind (20 ft)........
 Slope/valley.......North winds 5 to 10 mph.
 Ridgetop...........North 4 to 9 mph.
Mixing height.......3500 ft AGL.
Transport winds.....North around 9 mph.
CWR.................0 percent.
LAL.................. 1.
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Spot Weather Forecast for the night of February 25th:

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SPOT FORECAST for BASEBALL...USFS
National Weather Service SACRAMENTO CA
810 PM PST Tue Feb 25 2020

Forecast is based on forecast start time of 0600 PST on February 26.
If conditions become unrepresentative...contact the National Weather
Service.

.DISCUSSION...
High pressure will continue over the region with warm dry weather
the next several days. Winds will generally be downslope/downvalley at night
and early morning shifting light upslope/upvalley during the day.

.WEDNESDAY...

Sky/weather........ Sunny.
Max temperature.... 65-70.
Min humidity........20-25 percent.
Wind (20 ft)........
 Slope/valley.......Variable less than 5 mph becoming west up to 5
                    mph in the afternoon.
 Ridgetop...........West around 5 mph.
Mixing height.......100-1500 ft AGL increasing to 4100-4600 ft AGL
                    in the afternoon.
Transport winds.....West around 5 mph.
CWR.................0 percent.
LAL.................. 1.
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Findings:

- Environmental, fire danger and fire behavior conditions significantly changed - becoming much warmer and drier with higher fire potential between initial ignitions on January 30th/February 4th and the subsequent escape on February 25th. Numerous interviewees indicated there was some degree of complacency about the worsening fire danger conditions.
- Initially the piles were confined to their footprint due to the unavailability of adjacent fuels. The piles had begun to spread with low to moderate fire behavior as early as February 4th when the second ignitions occurred. By the time of the escape, significant fire spread was likely occurring.
- In spite of the escape, the overall fire effects both during initial ignitions and during the escape were positive with mostly low to moderate fire behavior.
- Initial fire behavior was creeping between piles and mostly low to moderate. During the escape, fire behavior increased to moderate with headfire flame lengths of 1–3' and maximum rates of spread of 2–4 chains/hour with isolated single tree and brush torching.

An analysis of the prescribed fire Plan for consistency with agency policy and guidance related to prescribed fire Planning and implementation.

The Upper Lake & Covelo Pile Burn Plan was utilized for the implementation of this pile burn project. The following was determined to be within current USFS prescribed fire guidelines and standards:

- ***Element 1, Signature Page***: The burn Plan was signed by the preparer on September 17, 2019, the technical review was conducted and signed on September 24, 2019 and the agency administrator signed the element on September 25, 2019.

PREPARED BY:
Name (print): Hinda Darner Qualification/Currency: RXB2
Signature: Hinda D Date: 9/17/19

TECHNICAL REVIEW BY:
Name (print): Terry Nickerson Qualification/Currency: RXB2
Signature: Date: 9.24.19

- ***Element 2A, Agency Administrator Ignition Authorization***: The authorization was signed on September 25, 2019 with an authorization window of September 25, 2019 to September 24, 2020.

Implementation Recommended by:
FMO or Burn Boss Signature: Date: 9/17/19

- ***Element 2B, Prescribed fire Go/No-Go Checklist***: The checklist was completed on January 30, 2020 and signed by the Burn Boss and his trainee. The checklist was also completed on February 4, 2020 and signed by the Burn Boss. The Agency Administrator indicated that he deferred pile burn go/no-go and ignition authorization decisions to his District Fire Management Officer.
- ***Element 3, Complexity Analysis and Final Complexity***: The final complexity analysis was signed on September 17, 2019 by the preparer, September 24, 2019 by the technical reviewer, and September 25, 2019 by the Agency Administrator.

Findings:

- Element 1, Signature Page:
  - The Burn Plan preparer was a Type 2 Prescribed Fire Burn Boss at the time of signing which made her qualified to sign a Type 3 Prescribed Fire Burn Plan.
  - The Burn Plan technical reviewer was qualified as a Type 2 Prescribed Fire Burn Boss at the time of signing.
- Element 2A, Agency Administrator Ignition Authorization:
  - There is no indication that the *Key Discussion Items* were addressed.

An analysis of prescribed fire implementation for consistency with the prescription, actions, and procedures in the prescribed fire Plan.

Upon examination of the Upper Lake & Covelo Prescribed Fire Plan and interviews with MNF's fire and Line personnel including the Forest FMO, District Ranger, Covelo District FMO, Battalion Chief, Burn Boss, and Fuels Specialist, the review team identified the following areas to consider for further discussion, clarification and/or improvement:

Element 3: Complexity and Risk Rating

- The overall risk and complexity rating was Low. Multiple, duplicate but differing Risk Rating Descriptors were provided. One for example for Appendix C, Complexity Analysis Element 2, Fire Behavior, indicated, "Fire behavior is confined to piles with sparse vegetation in the area."

Findings:

- Multiple Risk Rating Descriptors made it confusing to determine what the actual complexity, risk and project objectives were. Risk factors must be consolidated and consistent.

Element 4: Description of Prescribed Fire Area, B. Vegetation/Fuels Description:

- Onsite fuels in this section are described as fuel model 13, with adjacent fuels as fuel models 9 and 10.
- Element 7, Prescription, B. 2. Prescription Parameters, "Fire Modeling or empirical documentation (or both), Fire Behavior for Fuels Within the Project Boundary" indicates fuel models 8 and 9. Further on in Behavior Parameter Outputs, fuel models listed are 2, 8 and 9.

Findings:

- There were inconsistent fuels/vegetation descriptions or fuel models indicated both in and outside the project area.

Element 5: Objectives, B. Prescribed Fire Objectives

- Objective: "Consume a minimum of 90% of slash within piles."

Findings:

- Numerous interviewees indicated 'spread' was an accepted practice on MNF under the Pile Burn Plan and did occur prior to the pile escape. This was not indicated as a prescribed fire objective nor adequately addressed in the Burn Plan.
- If the objective is to allow fire spread between piles, this should be stated as an objective and adequately addressed in the Plan.

Element 7: Prescription

- See above regarding inconsistent fuels descriptions.
- The "Fire Behavior Characteristics Needed to Meet Resources Management Objectives" section indicates optimal fire behavior outputs, ie. forward/backing rates of spread, flame height and scorch height. The Plan states that, "Predicted fire behavior for burning of piles was modeled on fuel model 13, 8, 9 and 2", and to "See attached BEHAVE runs in APPENDIX E."

  Findings:
  - There were no fire modeling or BEHAVE runs provided to support the fire behavior characteristics desired to meet plan objectives.
  - If modeling or BEHAVE runs exist for fire spread (between piles), they need to be presented to support the Burn Plan and determine adequate holding resources needed to catch an escape and patrol the unit until it is declared out by the Burn Boss or Duty Officer.
  - Consider a statement indicating specific environmental and fuel conditions when the piles can be ignited and when they will be mopped up, extinguished and/or patrolled until out.

Element 9: Pre-burn Considerations and Weather, B. Method and Frequency for Obtaining Weather
- Forecasts, Forecast Center (spot weather): NWS Eureka, CA

  Findings:
  - Spot weather forecasts were obtained from NWS Sacramento, not Eureka.

Element 11: Organization and Equipment, A. Ignition, B. Holding, and C. Mop-Up and Patrol Phases
- The Plan affords maximum flexibility with minimal required resources.
- Required resources are at the discretion of the Burn Boss.
- The Plan indicates that from November 1st through April 15th , "*machine* pile units will be patrolled daily if a drying trend of 7 days occurs. These patrols will occur daily until precipitation occurs or the unit is declared out."
- Multiple interviewees indicated that the piles were made by hand and allowed to 'creep' (or spread from their footprints).

  Findings:
  - While the piles were hand-made and the Plan did not require daily patrols until out, due to significant drying and increased potential for fire behavior and spread, it is recommended that the plan be adjusted to require daily patrols for both hand and machine piles until declared out.
  - If fire spread between piles is desired and/or allowed, the Plan does not address adequate holding and patrol resources required to catch an escape at the hot end of the prescription; or mop-up, patrol and/or extinguishment until the fire is declared out. Consider writing a separate plan that addresses fire spread between piles.
  - Based on the interviews, mop-up was considered the responsibility of the Burn Boss. While mop-up and patrol occurred, it was sporadic and not reported to dispatch.

Element 16: Holding Plan, C. Minimum Organization or Capabilities Needed and D. Post Ignition Staffing Requirements and Patrol Standards
- Required holding resources are at the discretion of the Burn Boss (per Element 11).

- The Plan states that, "Patrol assignments will be the responsibility of the Burn Boss or Duty Officer. The Burn Boss is responsible to check the burn units or delegate that responsibility to qualified personnel. Patrols will be required until the burn is declared out… Patrols will be documented by MNF ECC through Wild-Cad."

  Findings:
  - See findings for Element 11 above.
  - Since fire spread was allowed between piles, fire modelling should have been used to determine adequate holding resources in the event of an escape at the hot end of the prescription. This would have likely required additional resources.
  - Interviews determined that the Burn Boss was responsible for patrolling the piles.
  - Interviews determined that patrols were intermittent while conditions continued to dry out, a contributing factor leading to the escape.
  - Recommend requiring daily patrols when adjacent fuels are available to burn and/or is declared out for *both* hand and machine-made piles.

Element 17: Contingency Plan, A. Management Action Points or Limits, B. Actions Needed and C. Minimum Contingency Resources and Maximum Response Time(s)

- The Plan states that contingency resources "…shall be within a 2-hour response time from the project site…based on the predictions from weather forecasts..." and "…must consider local, current, and predicted fire danger."
- The Plan states "Contingency resources will be tracked on an incident log, but not through the dispatch system unless notified by the Burn Boss." Later in the same section it states, "MNF ECC *will* be informed of the identity and location of contingency resources…"
- The Plan states what *types* of resources are required based on Probability of Ignition, Mid-flame windspeed.

  Findings:
  - Interviewees determined that attention was not adequately paid to increasing fire danger and escape potential and provided comments such as, "We became complacent..." and "It snuck up on us."
  - The Plan is inconsistent with regard to contingency resource reporting tracking.
  - The plan did not state what specific, non-Federal contingency resources would be needed to catch an escape. Interviews determined that some of the closest potential contingency resources were State - CAL FIRE Mendocino Unit (MEU) - with whom the Forest did not have a local agreement to utilize as a contingency prescribed fire resource.
  - The Plan does not adequately address what contingency resources are required if fire danger increases causing fuels to dry out and/or the piles spread from their footprint.
  - Interviews determined that local/MNF and adjacent Forest resources were inadequate and/or significantly delayed for many reasons, including competing regional and local priorities, training, annual leave, and concurrent fuels projects and other work on the Forest.

The approving Agency Administrator's qualifications, experience, and involvement.

- The Agency Administrator (AA) was delegated prescribed fire authority by the Forest Supervisor for Type 2 and 3 burns and valid from November 23, 2018 through October 31, 2019. Another delegation was issued and signed by the Forest Supervisor on March 9, 2020 with no expiration indicated.
- The AA was certified at the "Journey" level.
- The AA was qualified as an AADM in June 2015 (per IQCS).

Findings:

- The AA was qualified and had a current delegation at the time the Burn Plan was signed.
- Objectives of the 2001 Baseball NEPA EA were primarily timber focused, however, objectives were also to "…reduce concentrations of fuels through piling and burning...and utilize underburning to reduce fuel loading." There was a change to the Proposed Action in 2016 to allow understory burning; however, the area the fire escaped into was not covered in this revised NEPA.
- The AA's background was in resources and hydrology, but he immersed and educated himself as much as possible in wildland and prescribed fire. The AA attend the Prescribed Fire Training Center as a requirement of becoming a prescribed fire AA. To hone his wildland fire skills the AA, "…tried to get on the ground of as many wildland and prescribed fires as possible."
- The AA indicated he had a positive working relationship with and trusted his DFMO to manage the Baseball prescribed fire. He did not indicate he had any direct communication with the Burn Boss.
- The AA acknowledged that communication could have been better between the Public Affairs Officer regarding the lack of a project specific press release.
- The AA acknowledged that there was complacency about the drying conditions and potential fire danger leading up to the escape.
- The AA acknowledged that there should have been daily patrols of both hand and machine-made piles unless there is sufficient moisture to prevent fire spread and/or until they are declared out.
- The AA acknowledged and shared prescribed fire operational and risk decisions both upward to the Forest Supervisor and down to the firefighters on the ground. Further, he demonstrated support for fuels and prescribed fire treatments and to his employees that implement them.

The qualifications and experience of key personnel involved

See section "*An analysis of the prescribed fire Plan for consistency with agency policy and guidance related to prescribed fire Planning and implementation"* and findings above.

Findings:

- The Forest Supervisor (Ann Carlson) and District Ranger (Frank Aebly) were qualified as an AADM's at the 'Journey' level and had extensive previous prescribed fire experience (per interviews, R5 AA Certification Letter and IQCS).

- The Burn Boss (Everett Freeman) was a qualified RXB3 for the duration of the project and had 3 previous assignments as a qualified RXB3 (per IQCS). The RXB3 Trainee (Marcus Spivey) was issued a task book in May of 2018 and this was his first trainee assignment (per IQCS).
- The District Fire Management Officer (Terry Nickerson) met R5 Duty Officer requirements as a qualified ICT3 and DIVS (per IQCS).
- The District Initial Attack IC and District Battalion Chief were qualified to perform their duties.

Summary of Findings and Recommendations

- MNF felt pressure to meet increased fuels targets and had many concurrent, competing activities occurring including training, annual leave and other fuels treatments on the Forest.
  Recommendation: Be realistic about the Forest's ability to maintain fire preparedness/readiness and meet increased fuels targets in light of shrinking budgets and staffing and increasing numbers, sizes and intensities of catastrophic wildfires.
- While many interviewees seemed aware of drying conditions, none specifically referred to NFDRS fire danger indices including the Energy Release Component and fire behavior potential. MNF and most of California was setting records for dryness in February, a significant contributing factor to the escape. There was a general sense of complacency with many interviewees indicating they were taken by surprise by the escape.
  Recommendation: Track fire danger more closely and share implications and mitigation measures with firefighters and those responsible for monitoring patrolling prescribed fire projects.
- Patrols were sporadic, not reported to dispatch and considered the responsibility of the Burn Boss. Additionally, the Burn Plan did not require daily patrols of handmade piles until declared out or receiving enough precipitation to preclude fire spread.
  Recommendation: Rewrite Burn Plan to require daily patrols of *any* type of piles until declared out or when adjacent vegetation is dry enough to permit fire spread. The burn boss should remain more diligent with patrols, call patrols into dispatch each time they occur and/or delegate patrol responsibility back to the duty officer.
- There was not a press release specific to the Baseball prescribed fire project, and a general casual approach to pile burn specific press releases. Additionally, interviewees indicated 'favorable' and 'beneficial' fire behavior and effects from the escape. This creates an awkward position for the Forest in the public eye.
  Recommendation: Conduct pile burn specific press releases.
- At all levels, MNF accepted fire spread away from pile footprints under the Pile Rx Plan. The pile plan does not adequately address this in terms as patrol requirements and adequate holding resources required to catch an escape at the hot end of the prescription.
  Recommendation: Write a separate pile burn plan that addresses fire spread.
- There were limited contingency resources available at the onset of the escape. Also, there was no agreement or MOU in place to utilize the closest, State/CAL FIRE Mendocino Unit resources which, if in place, may have been used to keep the Baseball prescribed fire from becoming a wildfire.

***Recommendation**:* Until fire is declared out and/or adjacent fuels are not available to burn, ensure adequate contingency resources are available in the event of an escape. Utilize the California Master Assistance Agreement (CFMA) or write a standalone Interagency Prescribed Fire agreement between MNF and CAL FIRE MDU to use the nearest State resources.

- MNF would have liked to allow the fire to spread into the adjacent area it escaped into without a wildfire declaration. However, while there was a revision to the Proposed Action in 2016 to allow broadcast burning, it was not adequate for the area the fire escaped into nor was the existing Burn Plan adequate for this (see above).
  Recommendation: Write new NEPA and a new burn plan to address this in the future.

Commendations

- MNF is to be commended for their proactive and progressive approach to vegetation, fuels, and timber management.
- MNF interviewees appeared forthright, open and honest with supporting documentation and information related to the escape.
- Interviewees demonstrated a high degree of respect for one another and the review team.
- MNF demonstrates shared risk decision making and operational and decision-making support from the Forest Supervisor down to the District to the firefighters on the ground and back up.
- MNF recognizes and acknowledges beneficial wildland fire behavior and effects on the landscape regardless of the specific category, type or label of fire.
- The review team thanks MNF for their cooperation and participation in this review.

Note: This LR was conducted virtually by the team. This is the first time this effort has been conducted in this forum in R5. Some of the challenges presented with virtual review included inability to visit the site, engage in face to face conversations which is important to maintain trust and have open conversations.

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