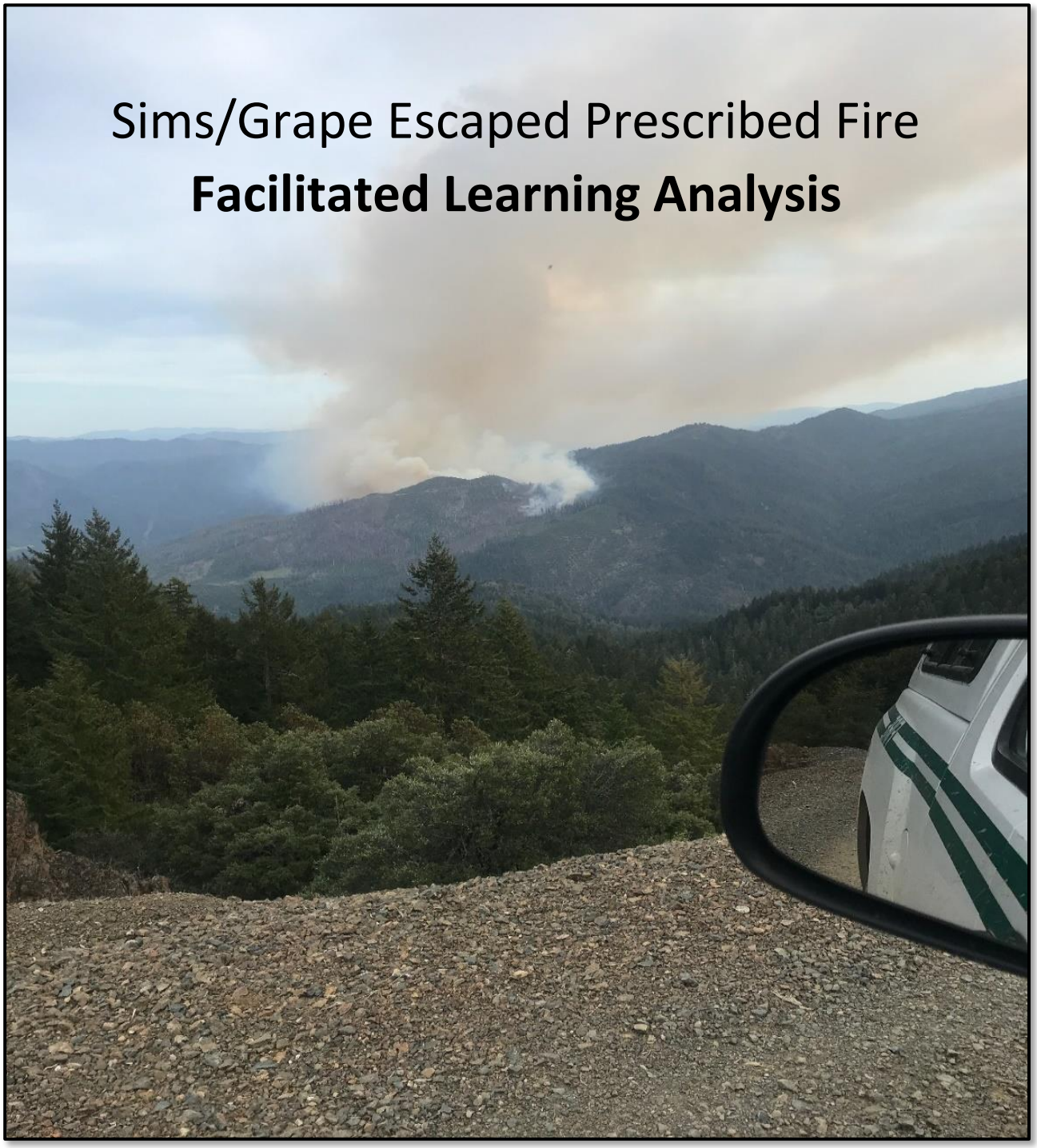
Sims/Grape Escaped Prescribed Fire
Facilitated Learning Analysis



Six Rivers National Forest
Shasta-Trinity National Forest
April 2018

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1. Introduction

This Facilitated Learning Analysis (FLA) report is about a prescribed fire project that was declared a wildfire. The FLA Team was delegated to conduct a declared wildfire outcome review utilizing the Facilitated Learning Analysis approach. To learn and understand from events like this, decisions, actions, and events must be viewed in the context of the complex environment in which they occurred. In any complex environment, error and uncertainty persist despite our best efforts to eliminate them. This review takes into consideration the fundamental character of complex systems and is not a critique of ability or performance.

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Our traditional response to unexpected outcomes is to attempt to discover if errors were made so that we do not repeat them the next time. This approach is limited, mainly because complex systems rarely deliver the same conditions again. Successful complex systems are not fixated on creating an error-free system, but in creating an error-tolerant system. Error-tolerant systems provide room for error and uncertainty to exist without consequence.

Photo shows the fuel bed within Burn Units H1 and H2. Note the large snags intermixed within the fuel matrix.

This FLA report is a tool to help understand the events, decisions, and actions leading up to and during this prescribed fire declaration to a wildfire. The intent of this FLA is to teach and further build upon the Learning Culture.

2. Background

In 2004, sparks from a powerline ignited the 4,000-acre Sims Fire, burning portions of the Shasta-Trinity and Six Rivers national forests, considerably altering vegetative and fuels conditions within the burn perimeter. High fire intensity created large swaths of dead conifer and hardwood trees, which in turn, promoted vigorous shrub and basal sprouting throughout the fire's footprint. Standing snags and wind-blown timber mixed with heavy components of chaparral and hardwoods not only hampered regeneration of native conifers, but also significantly increased surface fuel loading as well as increasing future wildfire hazards to adjacent private property. In 2015, the Saddle Fire burned through southern portions of the Sims Fire area, further altering stand and vegetative conditions.

In 2012, a federal lawsuit between the U.S. Forest Service and the powerline company, including two of its subcontractors, was settled, awarding monies directly to both the Shasta-Trinity and Six Rivers national forests to help fund the extensive restoration efforts required after the Sims Fire. In 2014, these forests, utilizing a Forest Service Enterprise Team, collaboratively began developing the Sims Fire Restoration-Roadside and Landline Reduction Fuels Categorical Exclusion (CE), identifying silvicultural treatments to promote forest restoration in addition to developing hazardous fuels reduction activities. Project design included thinning small diameter trees, pruning, cutting understory brush, machine and hand piling, and mastication, followed by planting trees during spring.

Abundant large snags from the 2004 Sims Fire, coupled with steep slopes, predominate the working environment for both the Sims Prescribed Fire and the Grape wildfire response.

In 2015, the Shasta-Trinity and Six Rivers national forests were given three years to expend the wildfire settlement funds and to work collaboratively to implement the cross-boundary project. The deadline to complete the project and expend the settlement funds was an external pressure felt by both national forests.

In the winter of 2017/2018, over the course of a few months, numerous prescribed fire treatments (pile burning) were conducted to meet the objectives of the Sims Fire Restoration-Roadside and Landline Reduction Fuels CE Project.

In late afternoon on April 24th and approximately one week after the last ignition entry, fire behavior and intensity increased significantly within the burn unit, leading to a declared escaped prescribed fire on April 25th.

A. Environmental Conditions

"Reforestation being done in a snag patch."

Division Chief

In general, the Six Rivers and Shasta-Trinity national forests experienced a relatively normal weather year for winter 2017/2018, although this area has been experiencing near-drought conditions. The U.S. Drought Monitor indicates that the area of the fire was on the edge of being abnormally dry in late March but recovered to being within a normal range by April 10th.

Specific weather conditions for the area based on data recorded by the Underwood Remote Automated Weather Station (RAWS) (located three miles northeast of the fire area) also indicate relatively normal weather patterns for this time of year. These data also help demonstrate the increase in drying trends normally observed this time of year in this area.

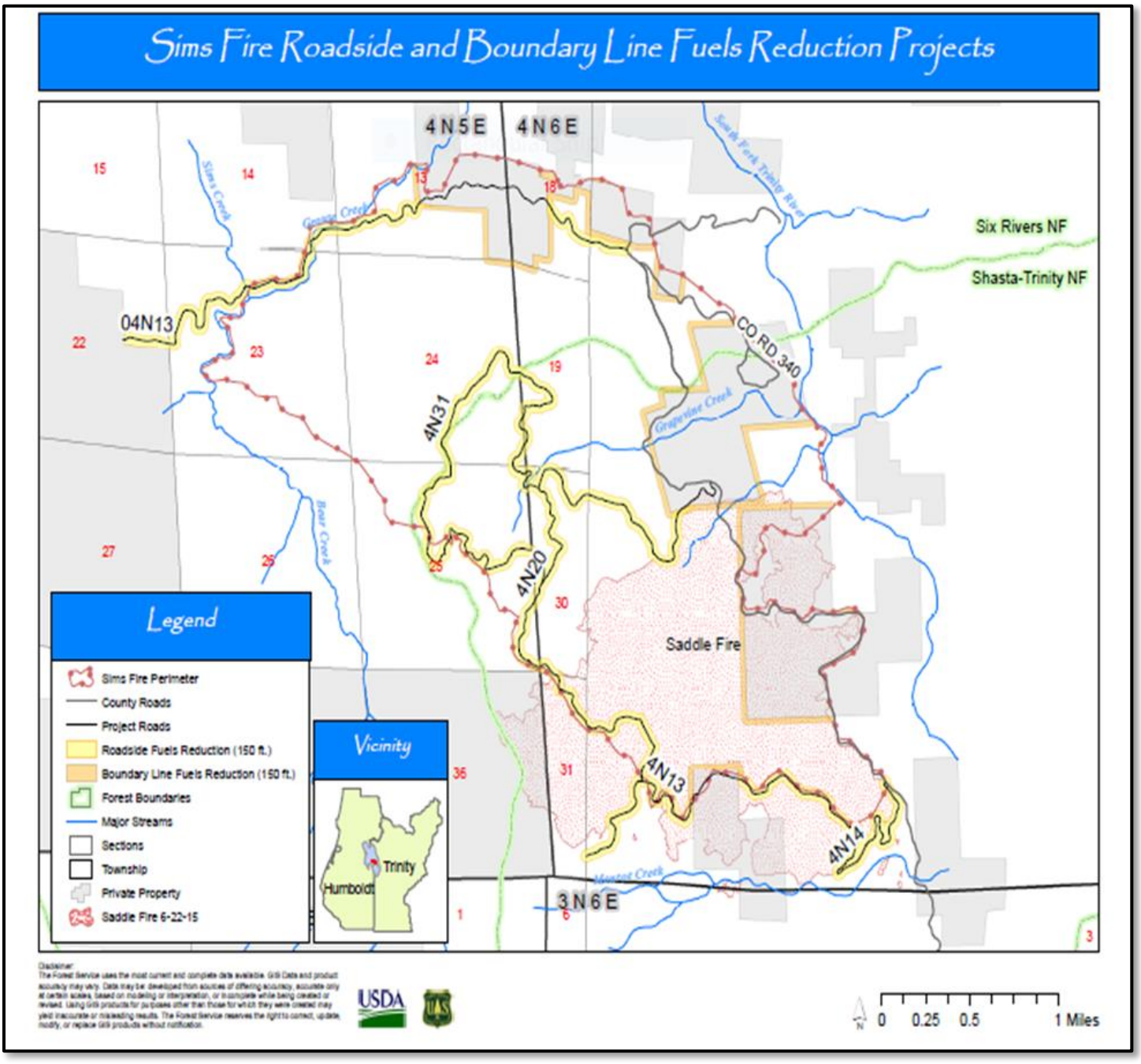
The burn units for the Sims Prescribed Fire are in very steep terrain with abundant continuous complex fuels. Slash fuel loading is continuous with live brush, trees and large snags intermixed.

The fuels within the 2004 Sims Fire scar are exposed to sun and wind. The exposure of these fuels allows them to dry much more quickly than fuels in the adjacent timbered stands.

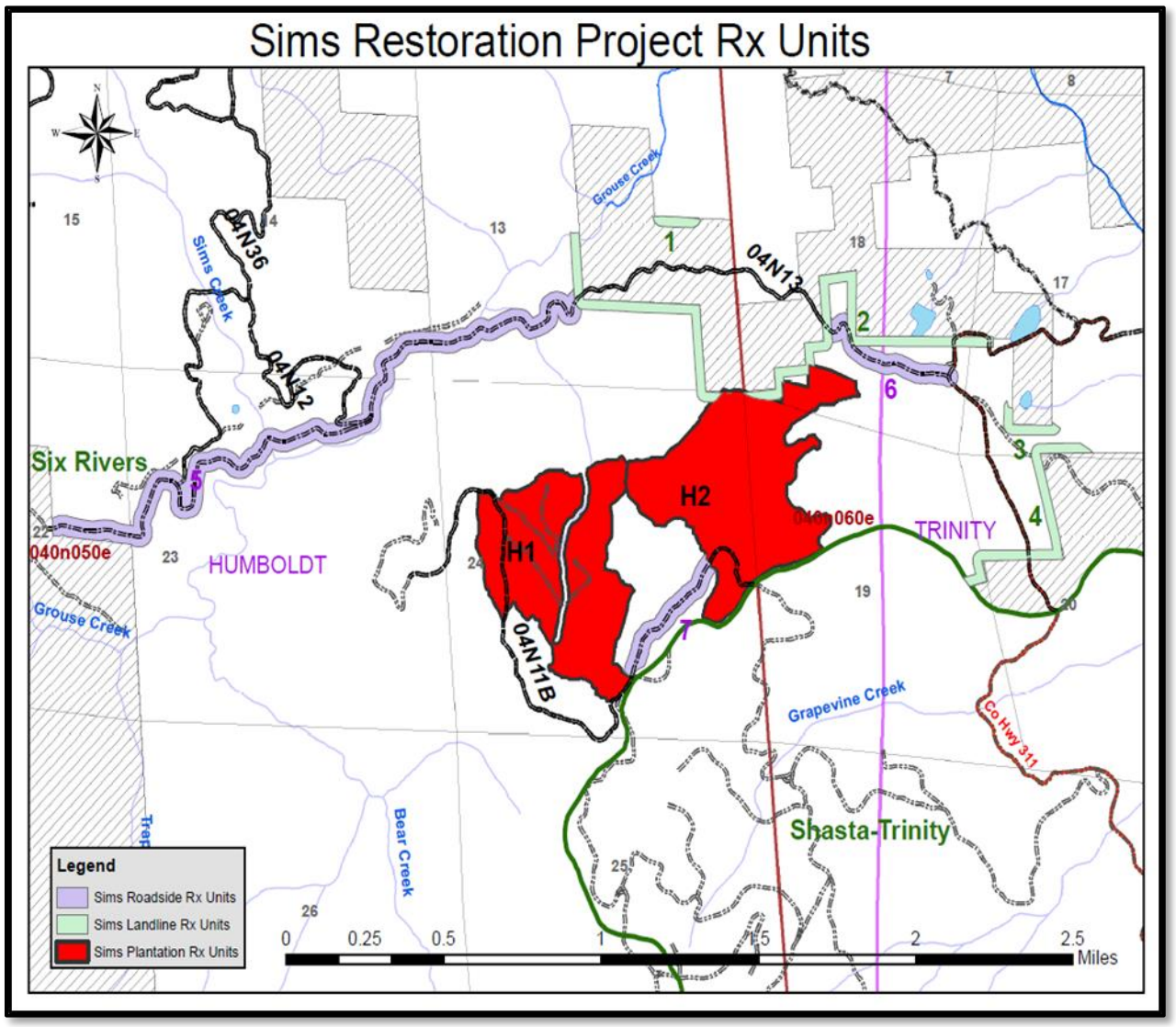
Looking west into Burn Unit H1 from the top of Burn Unit H2. Salvage logging had occurred on the northern portion of H1 as can be seen on the right side of this photograph.

B. Maps

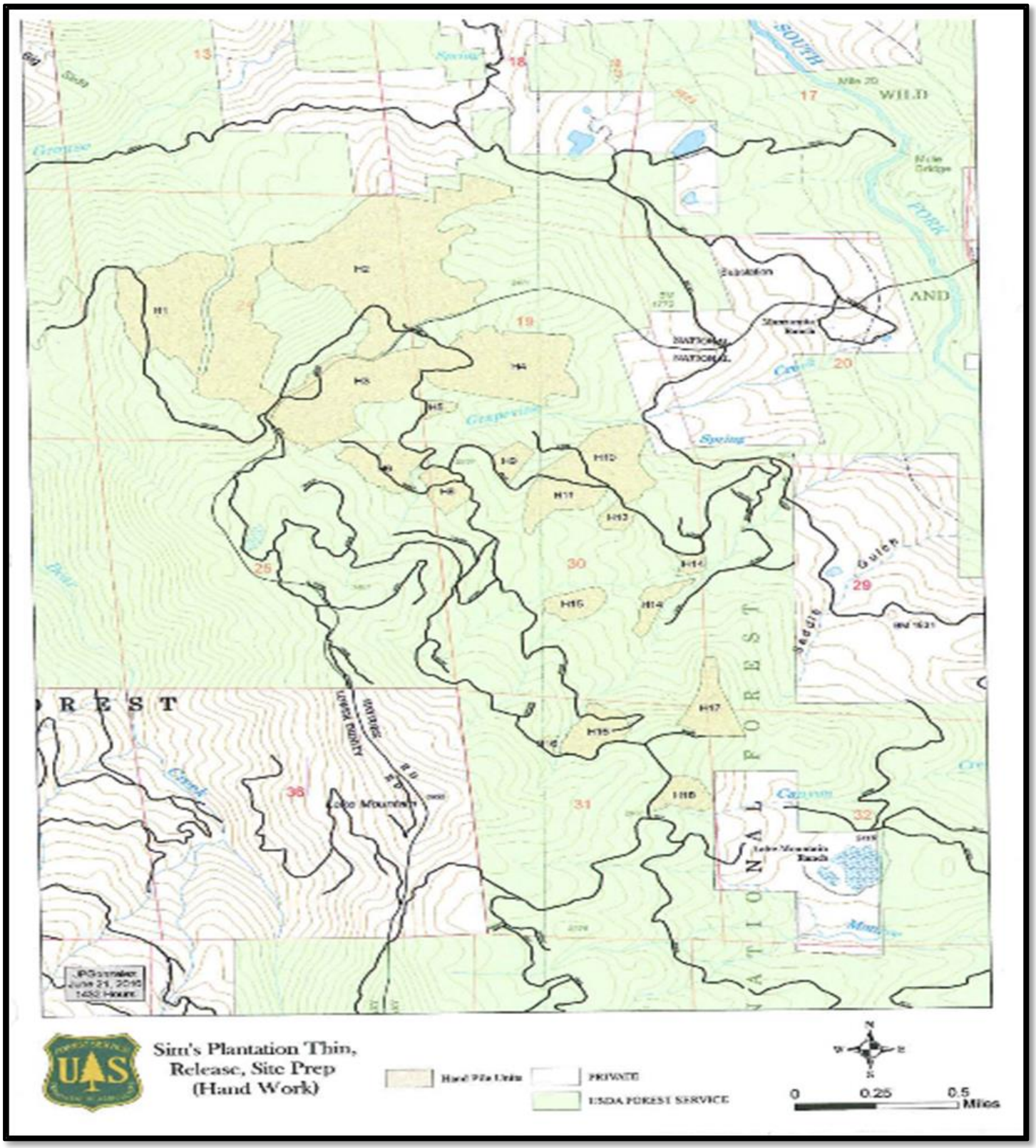
Map – Project Map



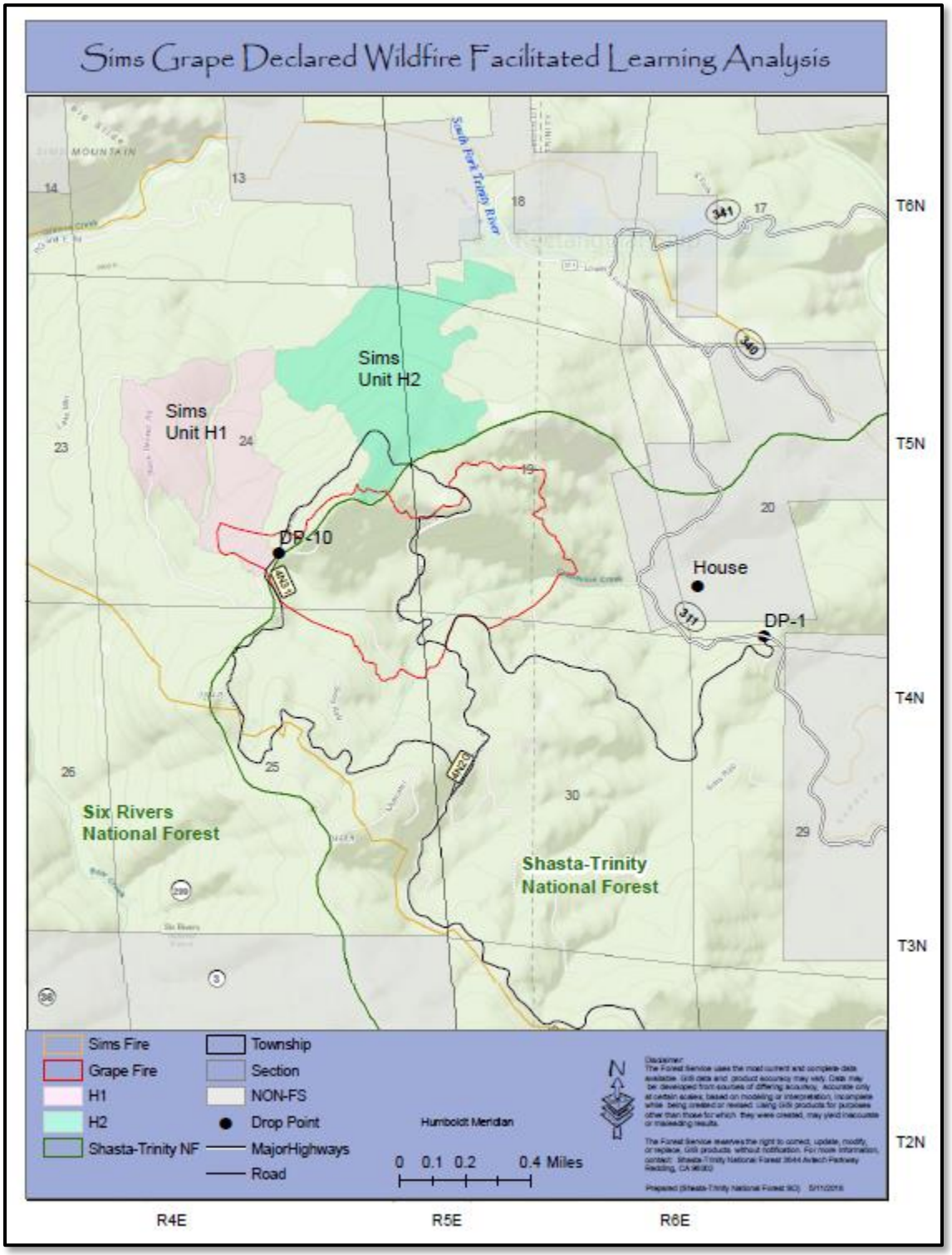
Map – Six River's Prescribed Fire Units



Map – Shasta-Trinity Prescribed Fire Units



Map – Wildfire Incident Map



3. What Was Planned

With the signing of the Sims Restoration CE Project, the forests planned on taking advantage of winter conditions by beginning pile ignitions with snow on the ground and ensuring to expend project funds prior to the three-year availability period ending at the conclusion of the current fiscal year. Both the Hayfork District (Shasta-Trinity NF) and Lower Trinity Ranger Districts (Six Rivers NF) were to ignite their respective piles utilizing each forest's separate prescribed fire plans.

Looking northwest at the 3 knobs that burned during the escape. Note the abundance of snags and the private inholding just below the road.

Both plans had complexity ratings of "low complexity", prescribing the burns to be managed by a Type 3 Prescribed Burn Boss (RXB3) with minimal resources.

As indicated by the forests' prescribed fire plans, the piles were to be ignited during fall, winter, and spring with weather and wind parameters favorable to allow good consumption of the piles and to reduce smoke impacts to adjacent communities.

In regards to wildfire declaration, the Shasta-Trinity's burn plan identified the Forest Supervisor as responsible for wildfire declaration, whereas the Six River's burn plan identified the District Ranger and/or Forest Supervisor as having this responsibility. Both plans stated that varying levels of upward communication and consultation from the field to the declaring official will be done prior to the official declaration.

4. What Happened?

Late on the morning of April 24th, a two-person fire crew from the Six Rivers NF arrived on the Sims Prescribed Fire project to patrol the unit and report on the fire's status. Upon arrival, the crew observed minimal fire activity, consisting of a few burning stump holes within Burn Unit H1. Later in the early afternoon, upon walking out of the unit for the day, the fire crew came across two snags actively burning.

> ***"We determined the burning snags didn't pose a threat to containment"***
>
> **Burn Boss**

The "C" Faller (most advanced) in the patrol crew, following the agency's "turn down" protocol, decided not to fell these snags due to hazardous felling conditions. This triggered a further assessment of the situation. It was determined that the potential for spotting and potential threats to containment were

not a high concern. At approximately 1500 hours, the fire crew departed the Sims Prescribed Fire for their home base, advising Dispatch to keep the burn in "Patrol Status".

Smoke Reported

On the evening of April 24th, Dispatch notified both forests and North Ops that smoke was reported in the vicinity of the Sims Prescribed Fire Project. Resource mobilization to the reported smoke began to occur shortly afterwards. The Shasta-Trinity NF identified this as the Grape Incident.

After seeing a large smoke column building, Hyampom Volunteer Fire Department personnel along with a Cal Fire representative mobilized, arriving at a staging area in close proximity to the fire. These resources notified Dispatch that the fire *"is skunking around with periodic 5-10 feet flame lengths within a saddle of the old burn".*

These two pictures (above and below) illustrate the steep slopes and abundance of snags that occur within both the burn units and the Grape wildfire response area.

Forest Service personnel arriving on scene initiated limited suppression actions along a portion of a Forest Service road below the prescribed fire area to limit fire spread to private property. They also hoped to create a potential anchor point for future suppression actions.

The fire continued to remain active overnight, burning more snags and blanketing the surrounding area with a thick layer of smoke.

Declare Prescribed Fire a Wildfire?

The Hayfork District Ranger and Division Chiefs from both forests discussed the severity of the situation and agreed that the prescribed fire should be declared a wildfire. They began ordering suppression resources and support personnel to manage the fire.

> ***"The winds always come up in the afternoon in this area."***
>
> **Division Chief**

Consultation upward to the Supervisor's Office of both forests was also being made, indicating the severity of the situation and the need for the wildfire declaration.

On the Six Rivers NF, there was apprehension to declare the prescribed fire a wildfire until better "situational awareness" was gathered once daylight occurred. On the Shasta-Trinity

NF, there was a consensus that the prescribed fire was now a wildfire and should be managed as such. Forest Service personnel remained overnight to monitor the fire.

On the morning of April 25th, District Fire Management personnel on both forests began further coordinating a response to support a Type 3 complexity wildfire with the Shasta-Trinity NF. It was agreed that the Shasta-Trinity NF would accept command of the incident. As the Type 3 IMT was being assembled and resources were gathering at the Hayfork Ranger District, upward communication between the Districts to Forest Leadership about the situation and status of the fire was being further conveyed.

Firefighter checks smokes within the burn unit.

With increasing winds and warmer temperatures, the fire continued to spread across the prescribed fire project area.

Six Rivers Forest Leadership Believes the Escape can be Managed Without a Formal Declaration of Wildfire

In the early evening of April 25th, based on the current situation and future outlook potentially deteriorating, the Six Rivers' Fire and Aviation Management staff were now in agreement with the Shasta-Trinity NF. They also believed the incident should now be declared a wildfire. In contrast to this thought, Forest Leadership on the Six Rivers NF still believed that because it was within the perimeter of the Sims Fire Settlement/Restoration area, it could still be managed without formal declaration of wildfire. Significant rainfall was forecast to arrive within 48 hours.

"The guide says we have 24 hours to catch it before converting to a wildfire."

Multiple Respondents

Later that night, a consultation between the Six Rivers NF and Regional Office staff took place to provide an update on the situation. A deeper understanding was acknowledged regarding the logistics needed to support this effort and the safety concerns related to the area's steep slopes, remote location, and multitude of snags.

Six Rivers NF Supervisor Officially Declares Wildfire

Late on the morning of the April 26th, the fire's spread and behavior was further increasing. Crews were formulating plans to safely access the area and to mitigate the hazards (snags, steep terrain, etc.). Resources continued to gather at the Hayfork Ranger District to manage the incident as a wildfire. At 1100, the prescribed fire was officially declared a wildfire by the Six Rivers Forest Supervisor. This declaration was retroactive to the April 25th, as that represented the 24-hour timeframe from the initial escape.

5. Chronology of Events

A. Project Timeline

YEAR

2004 – Sims Wildfire

2012 – Financial settlement related to Sims Wildfire awarded to Shasta-Trinity NF and Six Rivers NF from regional electrical utility company

2014 – Enterprise NEPA Team develops Sims Fire Restoration-Roadside and Landline Fuels Reduction CE Project

2015 – Saddle Fire

2018

2/27 – Attempted Rx (Prescribed Fire) in Burn Units H1 and H2 on Six Rivers NF (cancelled due to too much snow, units inaccessible)

3/13 – First Rx entry H1 and H2, 5 acres completed

3/14 – Rx in H2, 25 acres completed

3/15 – Rx cancelled due to wet weather and road conditions

3/20 – Rx on H2

3/21 – Rx on H2

3/22 – Rx cancelled

4/2 – Rx in H2, 40 acres completed

4/3 – Rx in H2, 1 acre completed

4/4 – Rx in H1 cancelled due to poor air quality. Crews on scene stayed to conduct holding in H2

4/9 – Unable to burn in H1 due to tree planting. Finished burning in H2, 10-15 piles

4/10 – Rx in H2, 10 piles completed

4/11 – Rx started ignitions, but stopped due to high winds

4/17 – Rx in H1, stopped ignitions due to high winds, piles starting to creep

4/18 – Rx in H1, piles are very active, RH and wind outside parameters, shut down burn

4/19 – Rx in H1, piles burned well, 20 acres completed, no creep. LAST DAY OF IGNITIONS.

4/20 – Unit H1 checked at 1400 hours, very little smoke

4/21 – No smoke showing from I-Rock Lookout in early morning. 6 smokes at 1200. 1 smoke at 1600.

4/22 – Rx unit not checked

4/23 – Rx checked, 1/10 acre slop-over SW of DP-10, mopped-up slop-over, no smokes by end of shift

B. Escaped Prescribed Fire Timeline

Tuesday, April 24

0830 – Two-person patrol checked H1 slop-over. Slop-over was contained. H1 stump holes still burning, still within fire lines. Two snags with fire 50 feet from top of trees. Patrols determined it was unsafe to fall the snags. Patrols left at 1500.

1659 – Trinity County Sherriff's Office (TCSO) reports vegetation fire at Manzanita Ranch/Lower South Fork Road to Redding Dispatch

1707 – Hayfork DFMO calls Redding Dispatch and informs that this fire could be left over from the Sims Prescribed Fire on the Six Rivers National Forest side from last week

1709 – TCSO relays info from VFD that he sees a large smoke column. Estimated 1 acre in size, requesting an engine.

1714 – TCSO calls Redding Dispatch requesting full response

1716 – Full response to **Grape Incident** initiated

1719 – Additional report to Redding Dispatch from private citizen at 311 Road and 4N20 Road

1724 – Redding Dispatch leaves message with Shasta-Trinity FFMO

1738 – Redding Dispatch sends email to Shasta-Trinity Notification Group with location of fire and resources responding to a vegetation fire near Manzanita Ranch. It is 3-5 acres, burning in the 2015 Saddle Fire area.

1759 – Cal Fire calls Redding Dispatch with rough fire size-up: 5 acres with slow rate of spread, dirty burn inside pile area, structures not threatened

1804 – Redding Dispatch updates Shasta-Trinity Notification Group of size-up and incoming resources

1804 – Air Attack calls Redding Dispatch with size-up of 50-75 acres. Moderate rate of spread in burn scar, sheltered from wind, creeping over ridge. North aspect. One resident located a ways from fire not really threatened, provided a new Lat/Long.

1808 – Redding Dispatch emails Notification Group of updated acreage and rates of spread from Air Attack

1815 – Fortuna Dispatch informs Six Rivers Duty Officer AFFMO

1849 – Battalion Chief requests dayshift of substantial size. Orders four crews, one Strike Team of engines, two sets of fallers, two Task Force Leaders, one fire investigator, and miscellaneous overhead. Relays that fire is burning in both H1 and H2 prescribed fire units. Multiple snags fully engulfed.

1904 – Battalion Chief informs Dispatch the fire started on the Six Rivers National Forest and is now burning on the Shasta-Trinity National Forest

Wednesday, April 25th

0737 – IC informs Hayfork DFMO that the fire was active until 0400. They are currently under an inversion and the only structures threatened are 600 yards below the fire.

0730-0800 – Six Rivers National Forest Supervisor contacted by Shasta-Trinity National Acting Forest Supervisor to discuss wildfire response and need to declare the prescribed fire now a wildfire.

0900 – Six Rivers NF Line and Fire Leadership on call with Regional Line and Fire Leadership discussing need to declare the prescribed fire now a wildfire.

1000 – Both forests' Line and Fire Leaders discuss. Six Rivers NF expresses desire to wait on wildfire declaration until more data is obtained.

[The Shasta-Trinity NF works throughout the day on Wednesday concerned with pulling back nonfederal resources that can't be funded via prescribed fire project funds. Some resources are ordered and staged, pending the decision to convert the prescribed fire to a wildfire.]

An abundance of large diameter fuels contributed to lingering smokes within the burn unit.

1700 – Six Rivers NF and Shasta-Trinity NF conference call. Decision to maintain as prescribed fire expressed.

Thursday, April 26th

From Wednesday at 1700 to Thursday morning, reconsideration of that decision (to maintain as prescribed fire) occurs. Formal decision to declare a wildfire is made and announced on Thursday morning at 1100. Aircraft orders early Thursday morning were being declined based on the assumption that the incident was still a prescribed fire.

Thursday through Friday, suppression actions continue, rain moves in and effectively ends the active burning.

Thursday, May 3rd

Community meeting held in Hyampom.

6. Findings, Lessons Learned, and Recommendations

A. Human Factors

Crew hiking up a dozer line as part of the Grape wildfire response.

Findings

Dollars equal target accomplishments. Perceptions to *"get 'er done"* on the ground and spend money on the projects that have time constraints can lead to putting pressure on those implementing the projects.

There can be a hesitation to convert a prescribed fire to a wildfire in general, but particularly if there are fiscal and time constraints. It is imperative for all Line Officers to listen to resources and clearly communicate decisions. Cross-boundary prescribed fires that escape onto adjacent units can create a difficult situation between the two units.

Lessons Learned

Commitments can be made to implement project work tied to special funding and have time constraints associated with the work. Perceptions of these commitments can lead to the hesitancy of making decisions—based on the perceived pressure of getting the accomplishments completed.

This pressure—or perceived pressure—can be managed by giving ultimate deference to safety and the need to protect communities. Inter-Forest communication is critical. Prior arrangements can be specifically described in burn plans when the potential for a decision to convert a prescribed fire to a wildfire may need to be made. In a case like this, burn plans could include more detail about who has the authority/responsibility to declare a wildfire.

"Everyone is rusty this time of year. But then everyone shakes the rust off."

Division Chief

B. Communications

Findings

Numerous "actings" in line and leadership can lead to unclear communication responsibilities and unfamiliar working relationships, particularly when a wildfire occurs early in the season.

Assumptions were made all around that adequate information was being relayed to line and forest-level Fire Leadership. Constraints on how to react to the fire were felt by the units as decisions about prescribed fire conversion to wildfire were unclear and not communicated quickly. This resulted in a *"Start and Stop"* and a *"Go! Wait—Go Back!"* feeling by the ground resources.

Lessons Learned

Communication protocols for wildfire occurrence are well established on districts and units. Communication that occurs using methods other than broadcasting across the radio (text, cell phone calls, face-to-face) that contains information that will affect safety, operations, and decisions needs to be relayed to affected resources.

> ***"Leadership decisions have consequences.***
>
> ***Spend quickly, there are timeframes.***
>
> ***Those decisions put burdens on the local levels."***
>
> **District Ranger**

It can be problematic to make assumptions that adequate communications have occurred between Forest Line Officers, between Line Officers on adjacent forests, and between Fire Leadership and line. Following established communication protocol is highly encouraged. This requires a conscious effort, particularly when two units or forests are involved and each is operating somewhat independently of each other for response.

C. Planning

Findings

Adjoining forests received special funding for restoration of previous wildfire areas. Short timelines (three years) were established to plan the work, obligate funding, and implement the work. Each forest utilized their money differently. Each forest was creative in implementing the work of restoration. Cooperative work in prescribed burning across boundaries assisted with the implementation of the accomplishments.

While pressure to complete the work on the adjoining forest was desired and recognized, there were capacity issues of being able to complete the planning work prior to implementation. Leadership on each forest were not in total alignment with their respective staffs. There was not an equal emphasis on priorities for implementing this work to be completed.

Lessons Learned

Good integrated planning of all projects is essential for success when short timelines are established. Successful implementation of prescribed fires must be well planned-out prior to the season beginning, including determining the capacity of available resources. Financial and timeline constraints can lead to the inflexibility with project implementation. This can mean planning a prescribed fire of "low occurrence, yet high risk" on a small amount of acres. Being proactive to develop agreements with state and local partners for implementation and contingency plans before fire season is valuable for successful implementation. Timing of the implementation of prescribed burning needs to take into effect warming and drying conditions.

> ***"This all felt like a 'mock' drill because it was so early in the season."***
>
> **Acting Forest Supervisor**

Be aware that there are other considerations for supplementing the funding of project work—particularly when using outside funding—with specific deadlines. Communication between other resources are key concerning the limitations to certain funding types.

> ***"Transitions are watch-out situations. Make sure you know who is holding the baton."***
>
> **Acting Forest Supervisor**

D. Consistency/Continuity

Findings

The forests have had numerous turnovers of personnel and "actings" during the year. This is a time of transition in the entire agency. This is seen in all levels of the U.S. Forest Service, not just these forests. This leads to several apparent factors, including:

- A high turnover rate in key fire leadership positions on the forests and districts.
- Extended vacancies and barriers, including department delays, human resource delays, and challenges with the reorganization process. All contributed to an inability to fill key fire and Forest Leadership in a timely manner.

These factors are challenging to forest fire and line organizations as individuals assume different roles than they normally would. Some people are put into roles in which they may not fully understand the responsibility of the position. If the proper guidance and mentoring is not available, gaps can be created in the planning and implementation process of burn plans.

Burn Boss "chain of custody" can also be problematic. It's unclear what Burn Boss remains responsible for a fire that has multiple ignitions, over several weeks, and is now in patrol status.

Each forest had different burn plans, with different prescriptions, even though they were for the same project area, and located adjacent to each other.

Despite these long-term vacancies in key leadership positions, the forests have operated successfully. A more consistent leadership environment provides continuity in direction, standard operating procedures, and bridging gaps between program areas.

> ***"Pile burning can still be a complex burn."***
>
> **Prescribed Fire Plan Preparer**

Lessons Learned

Staffing and maintaining key leadership positions in the context of implementation or response in the case of wildfire exposure, risk to values, and the probability of success in strategies and tactics, helps to ensure that these priorities can be consistently managed with appropriate oversight. When there is flux in leadership, additional care and consideration can be given to the management of situations that are otherwise routine or perceived to be low risk.

Clarity needs to be maintained to establish the Burn Boss "chain of custody" for the prescribed fire itself. This clarity of custody would improve the communication of information and responsibility. Consistency between burn plans can add to flexibility in management and reduce confusion about different objectives for the same piece of ground.

E. Current and Predicted Conditions/Situational Awareness

Findings

Weather observations from the burn area indicated high winds on April 11th and again on April 17th. Further observations also consistently indicated high winds traveling through the saddle at Drop Point 10—especially during the afternoon hours.

These winds were not observed by the Underwood RAWS nor by RAWS stations nearby (Friend Mountain and Brush Mountain RAWS).

"A Type 3 wildfire in April?"

District Ranger

"I didn't predict it out this early."

Battalion Chief

The removal of the tree canopy by the 2004 Sims Fire had exposed the area to sun and wind. The exposure of these fuels not only allows them to dry much more quickly than fuels in the adjacent timbered stands, but also exposes the area to higher wind values. This effect is further exacerbated by the deep and complex topography which influences and increases terrain-driven winds.

Lessons Learned

For the purpose of this FLA, "WindNinja" was used to help understand how the steep topography and drainages are affecting winds in the burn area. (WindNinja is a computer program that computes spatially varying wind fields for wildland fire application.) Using a general 3 mph wind (as recorded by the Underwood RAWS on April 24th), the winds near and along the saddle where the Sims Prescribed Fire escaped increase to greater than 12 mph.

Overall, the winds in this area are highly variable and can more than triple the values being recorded by the RAWS along the ridgelines and in saddles. The fuels within the 2004 Sims Fire scar are exposed to sun and wind. The exposure of these fuels allows them to dry much more quickly than fuels in adjacent timbered stands. The available fuels data indicate that fuel moistures were on a drying trend, which is typical for this time of year. Fuels within these burn units can confidently be assumed to have been much dryer due to exposure. This suggests that on-site weather observations are much more reliable, even when RAWS data is available.

"As we got later into spring, the weather started getting a little schizophrenic."

Forest Supervisor

F. Internal Constraints

Findings

Time constraints occurred for: 1) Spending settlement funds and 2) Site preparation (pile burning) ahead of the tree planting contract.

The environmental analyses on both forests was limited to pile burning under a Categorical Exemption (CE) due to the limited timeframe of project funding and other internal constraints related to environmental analyses. In addition, poor project design during environmental analysis resulted in undue risk for the life safety of personnel implementing the project.

The District Fuels Specialist position became vacant and the Six Rivers determined to not backfill this position.

The burn plan development was then delegated to the suppression personnel who have competing priorities and limited experience in fuels management project planning and analyses.

Snags and slopes within the burn unit and Grape wildfire.

Lessons Learned

Cross-boundary coordination during project development and implementation takes longer—even when relationships are in good standing. When developing cross-boundary projects, consider negotiating a lengthened timeline for expending funds due to the extra efforts required for cross-boundary coordination.

These circumstances prompted the FLA Team to ask: *Why were there limitations to only analyzing pile burning as the prescribed treatment under a Categorical Exemption?*

Project planning and design needs to be thoroughly explored, not only from a planning standpoint but also from an implementation standpoint. During the planning process, consult with those who are going to implement the project. Ask them if the project is "*Doable*". Consider the safety of the personnel and the efficiency of the project.

Take the time to develop a burn plan that is right for that piece of ground to be burned, no matter the time constraints and pressures. Pile burning in a remote location of the forest may still be a complex burn.

Seek advice and mentorship from experienced peers or fuels management specialists when developing burn plans and complexity analysis. Consider sending burn plans to other forests for review. Even though the project area is remote, consider increasing the complexity analysis when working in extremely steep terrain with extended travel times to the project area and cross-boundary implementation.

Thoroughly explore the *"What If"* scenario when developing contingency plans, especially when near other jurisdictions.

G. Public Communications

Findings

Employees had frustration in the early stages related to naming of the incident, not knowing whether the fire was a wildfire or a prescribed burn escape. This also created uncertainty with the public.

Community relationships and building trust are important to the forests.

Communication is a process of reaching mutual understanding during which people share thoughts and receive information. Being able to communicate effectively with the public is a big part of our job.

Hyampom public meeting held on May 3, 2018.

Lessons Learned

Early communication to external publics regarding burning needs to be shared much more widely prior to the burn being initiated. There needs to be more communication between the hosting unit of a fire and the incident team in public information.

We need to be forthright and honest as we were, and own it. This will help rebuild or maintain trust with our communities. Engage all of our internal and external publics, partners, managers and cooperators early on. Communicating the situation is key to developing everyone's situational awareness.

We need to streamline our communications if we are going to work across forest boundaries. We need to have "Frequently Asked Questions" developed early on to avoid confusion. The internal audience is not the only one waiting for the decision on wildfire conversion. We need to let everyone know what we intend to do and how we intend to respond when things don't go as planned. We need to make better use of social media to help share this information.

7. Commendations

Cross-District Cooperation

Despite the distress created by a prescribed fire burning from one national forest onto another—and having to be converted to a wildfire—the staff on both the Lower Trinity Ranger District on the Six Rivers National Forest and the South Fork Management Unit on the Shasta-Trinity National Forest demonstrated excellent teamwork and cooperation throughout this incident.

Multiple people on both districts stated: *"Our relationships were great before this incident and have only become stronger."*

The FLA Team was impressed with how all interviewees were eager to share and interested in learning.

Looking northeast at the saddle at Drop Point 10 where the Sims Prescribed Fire escaped. The steep slope on the left is part of the H1 Burn Unit.

Wildfire Response

When the Shasta-Trinity National Forest Dispatch Center received notification of a wildfire from the local Hyampom fire volunteers, they sprang into appropriate and timely action.

Multiple staff from both forests described the response as exactly what needed to be done, given the conditions as they were observed on the ground, and given the risks and sensitivities related to nearby private property.

Openness and Candor by All Staff throughout the FLA Process

The FLA Team was impressed with how all interviewees were eager to share and interested in learning.

Employees from both forests showed overwhelming willingness to discuss perceived let-downs and describe their lessons learned, despite the inherent tendency to feel bad about an escaped prescribed fire.

No one let their pride or ego get in the way of acknowledging areas where improvements can be made.

8. Appendices

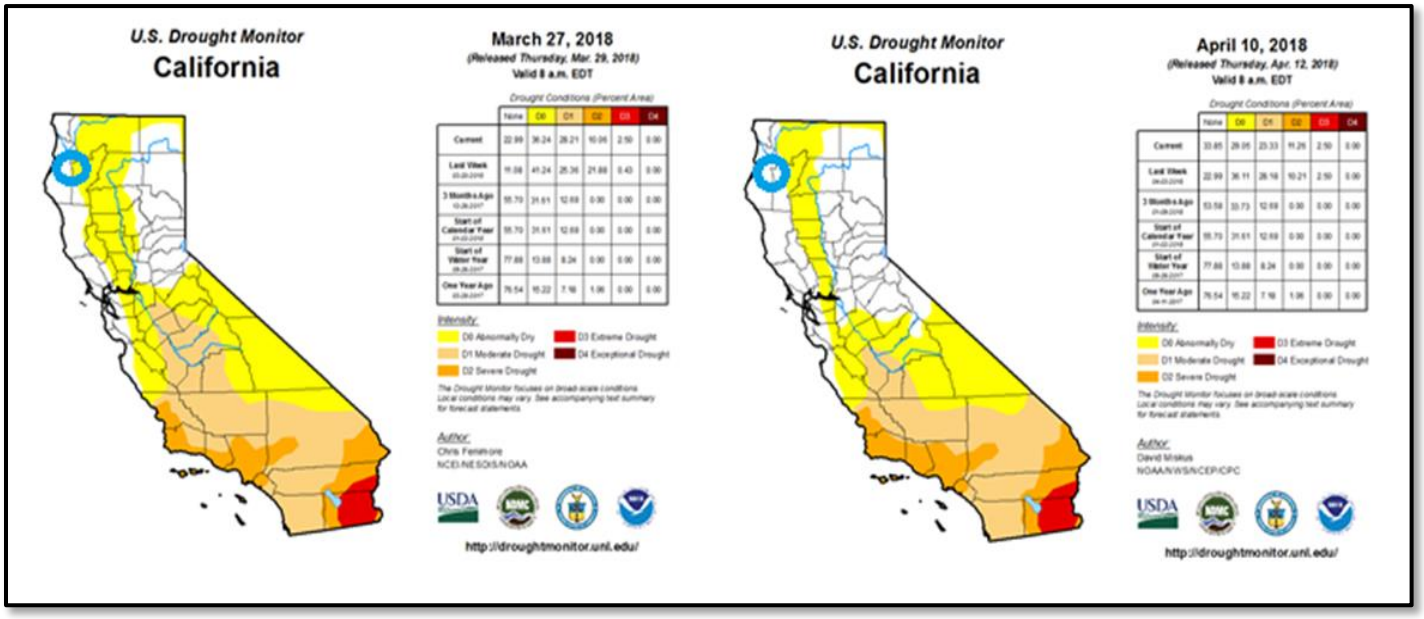
A. Appendix 1 – The Prescribed Fire Analysis Review

From the "Interagency Prescribed Fire Planning and Implementation Procedures Guide", the need to review the following five topics was necessitated.

1. An analysis of the seasonal severity, weather events and onsite conditions leading up to the wildfire declaration:

Seasonal Severity – In general, the Six Rivers and Shasta-Trinity national forests experienced a relatively normal weather year, although the area has been on the edge of experiencing drought conditions. The U.S. Drought Monitor indicates that the area of the fire was on the edge of being abnormally dry in late March but recovered to being within a normal range by the April 10th (Figure 1).

Figure 1 – The U.S. Drought Monitor for California indicates abnormally dry conditions until April.



The same is evident when looking at the percent of normal precipitation maps. The analysis from October 2017 through the end of April show the area of the fire having 70 to 80 percent of normal precipitation but recovers to having above 100 percent of normal precipitation for the March to May 2018 period (Figure 2).

Figure 2 -- These maps depict the percent of average precipitation for the October through April period and the March through May period. The area of the Sims Prescribed Fire project area has improved from being at 70 percent of precipitation to above 100 percent of average precipitation.

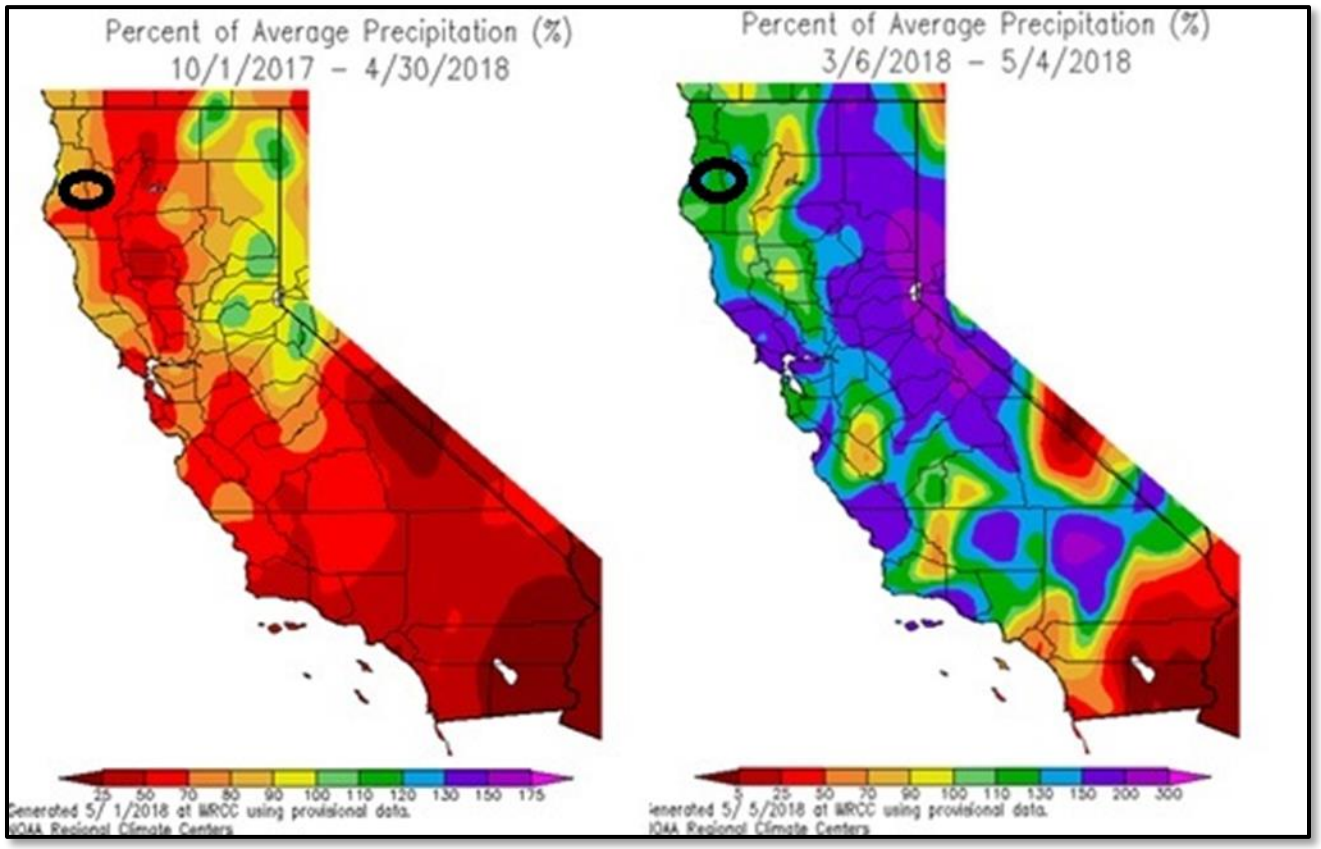
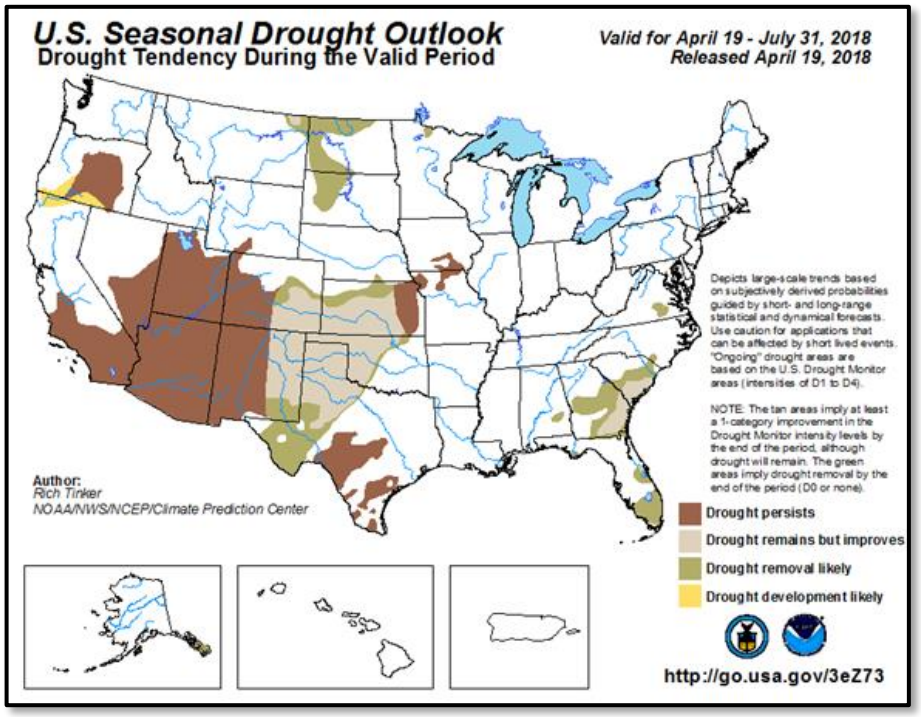


Figure 3 – The U.S. Seasonal Drought Outlook for April 19th to July 31st does not show any drought for the Sims Prescribed Fire project area.

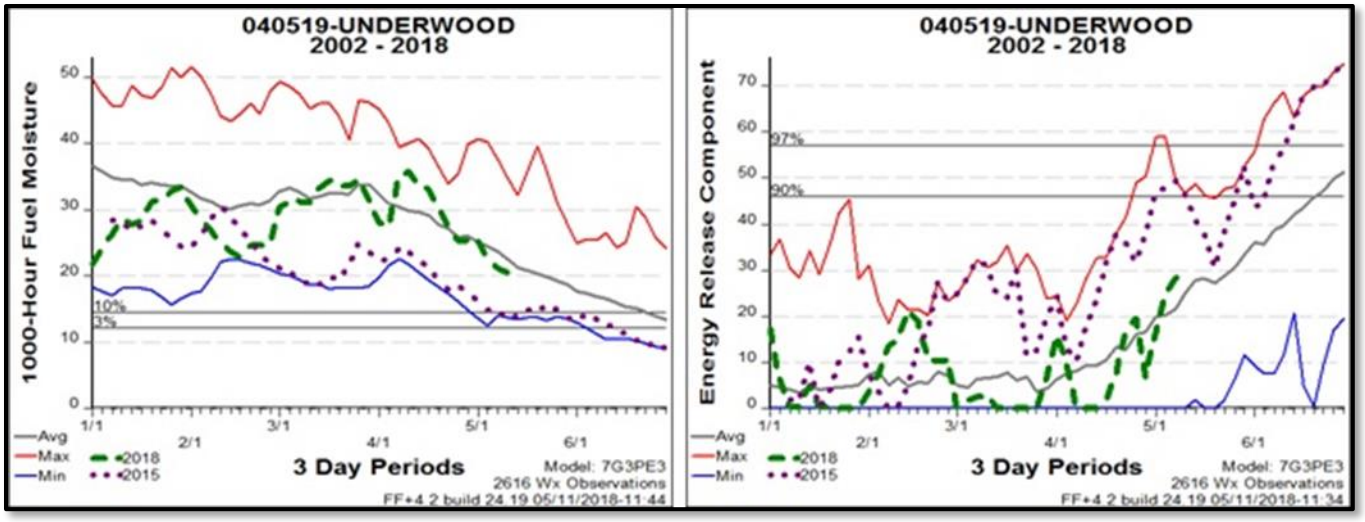


The U.S. Seasonal Drought Outlook for April 19th through July 31st does not identify a current drought nor does it indicate it to persist into the next few months (Figure 3).

Specific weather conditions for the area based on data recorded by the Underwood Remote Automated Weather Station (RAWS) (located three miles northeast of fire area) also indicate relatively normal weather for this time of year. These data also help demonstrate the increase in drying trends normally observed this time of year in this area.

As a reference, the following graphs include data from 2015, which was a much dryer year and included significant fires in the area near the Sims Restoration Project Area. These graphs show the average 1,000 fuel moisture dropping and the Energy Release Component (ERC) (a measure of the amount of energy available to a fire with higher numbers being a higher risk for elevated fire behavior) increasing toward the end of April and beginning of May. This would indicate that this time of year starts to see drying conditions, making fuels more available to support more and more significant fire behavior as the season progresses (Figure 4).

Figure 4 – 1,000 hour fuel moisture and ERC graphs from January 1 through the end of June for the past 16 years. These graphs help show the trends for drying conditions typical for this time of year. Included on the graphs are the observations from this year and those from 2015. 2015 was a significant fire year for the Sims Prescribed Fire Project Area and relatively much dryer than average and the current 2018 weather.



Weather Specific to the Area

As typical for this time of year in this area, weather conditions can be highly variable. Prescribed fire operations within this area started and halted as weather condition windows opened and closed throughout the months of March and April. The graph on the next page (Figure 5) shows moisture events coming into the area April 15th and 16th but conditions rapidly drying out just a few days later.

The last day of ignitions was on April 19th. The following days show decreasing relative humidity values and increasing temperatures with the lowest recorded RH values on April 24th, the day of the escape.

As predicted, another moisture event impacts the area starting on April 28th. The black bar across the graph helps identify the 25 percent RH line. The burn plan states that conditions should be above 25 percent RH for active ignitions to continue. The last day of active ignitions was the April 19th (Figure 5).

Figure 5 – Underwood RAWS weather observations for the weeks preceding and immediately after the Grape Incident was declared.

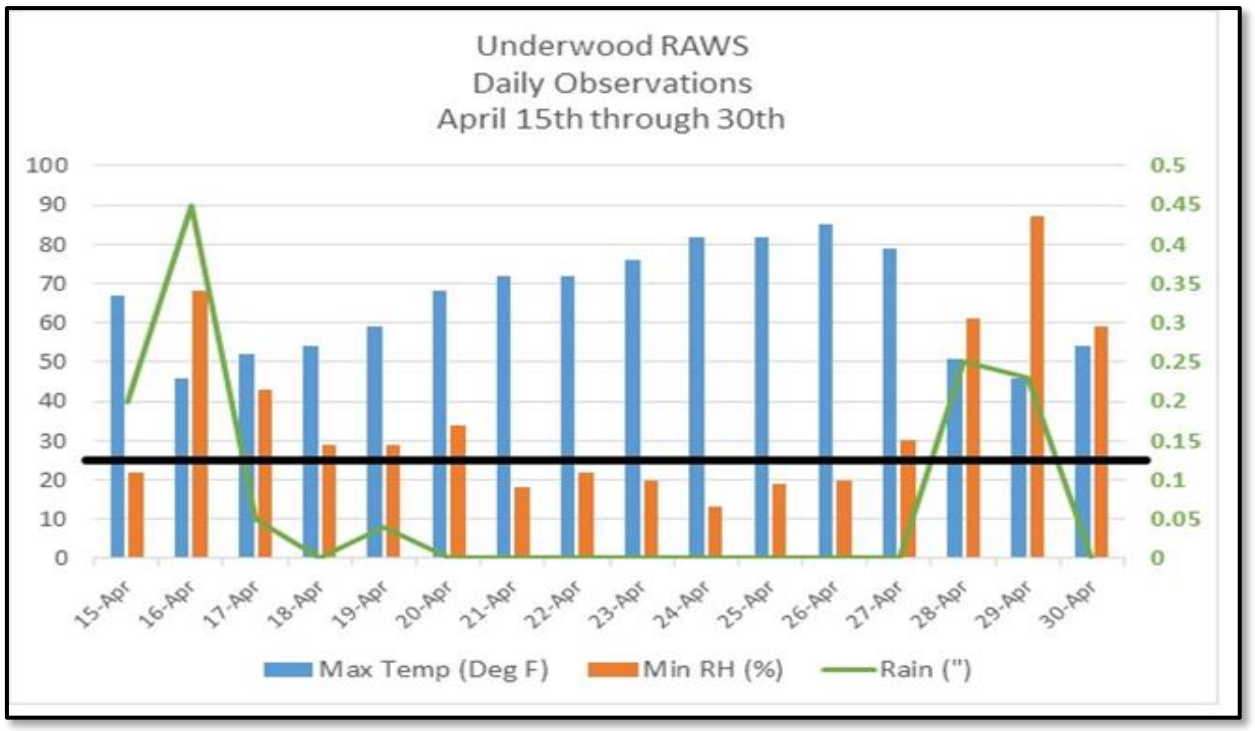
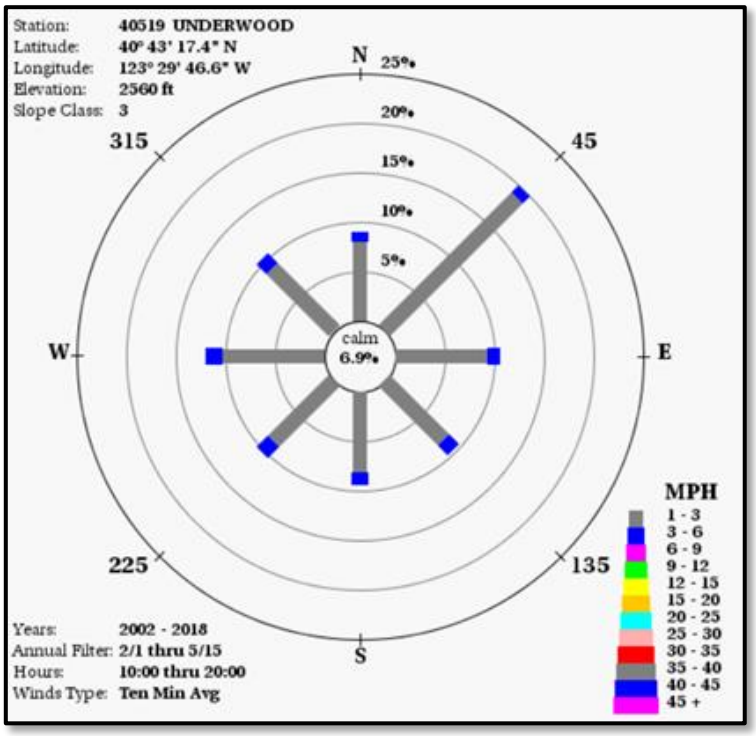


Figure 6 – This is a "wind rose" from the Underwood RAWS for 10 minute average winds. This "rose" helps demonstrate how little wind is recorded by this weather station.



Winds

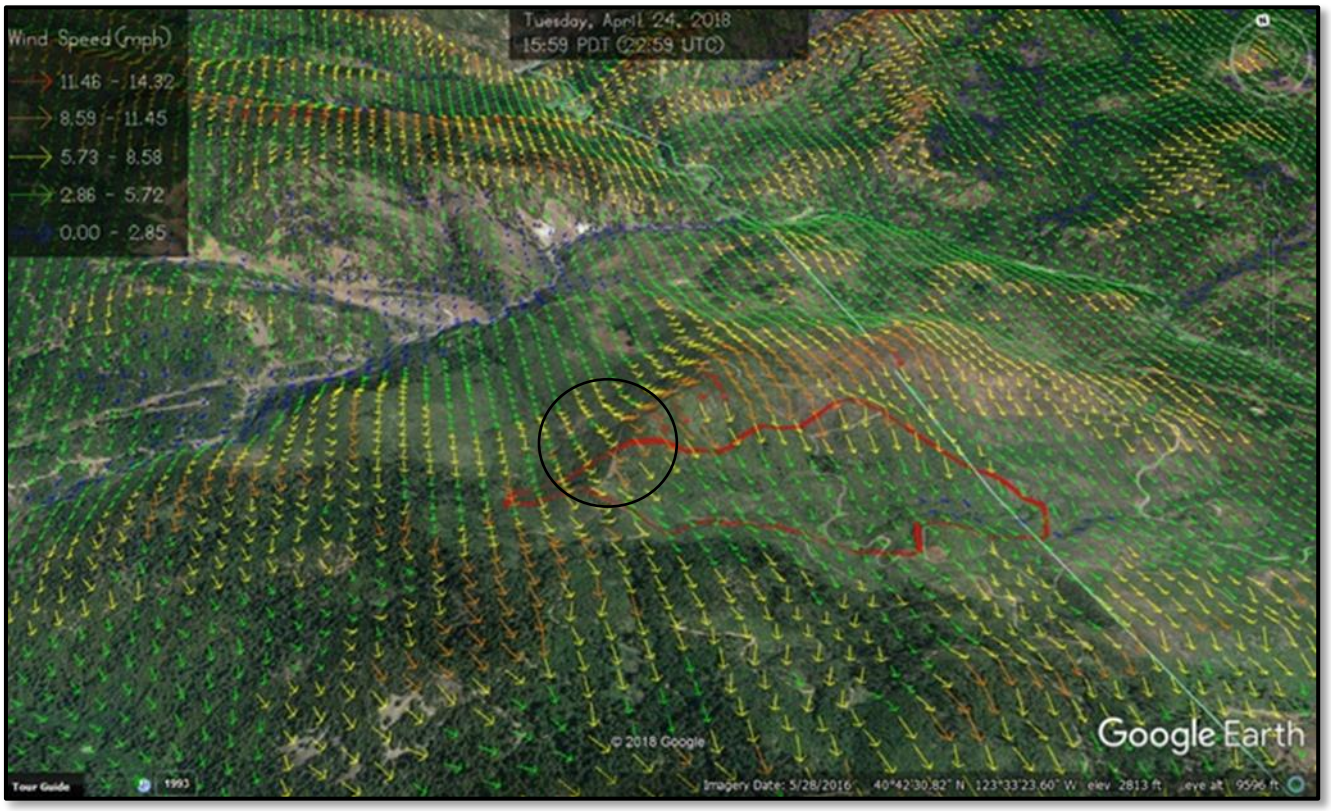
Weather observations from the burn area indicate high winds on April 11th and again on April 17th. Further observations also consistently indicate high winds traveling through the saddle at Drop Point 10—especially during the afternoon hours. These winds are not observed by the Underwood RAWS station nor by other RAWS stations nearby (Friend Mountain and Brush Mountain RAWS) (Figure 6). Coastal flow and the "Marine Influence" factored into creating the local wind conditions in this area.

The computer program "WindNinja" was used to help understand how the steep topography and drainages are affecting winds in the burn area. Using a general 3 mph wind (as

recorded by the Underwood RAWS on April 24th) the winds near and along the saddle where the Sims Prescribed Fire escaped increase to greater than 12 mph. Overall, the winds in this area are highly variable and can more than triple the values being recorded by the RAWS along the ridgelines.

The map below (Figure 7) shows the WindNinja outputs. The yellow to red arrows indicate higher speed winds (6 to 14mph). The red polygon is the Grape Fire perimeter as of April 30th. The western portion of the perimeter is still within the H1 Burn Unit and shows how the fire moved through the saddle where the wind vector arrows are orange (9 to 11mph) (Figure 7).

Figure 7 – Outputs from WindNinja overlaid on Google Earth with the Grape Fire perimeter show increased wind speeds along the ridgeline and through the saddle. A 3 mph wind was used as the input for this analysis as recorded by the Underwood RAWS on April 24th. The outputs clearly demonstrate the increase in wind speeds across the ridge and saddle. The black circle indicates the saddle often referenced as the location where the fire escaped.

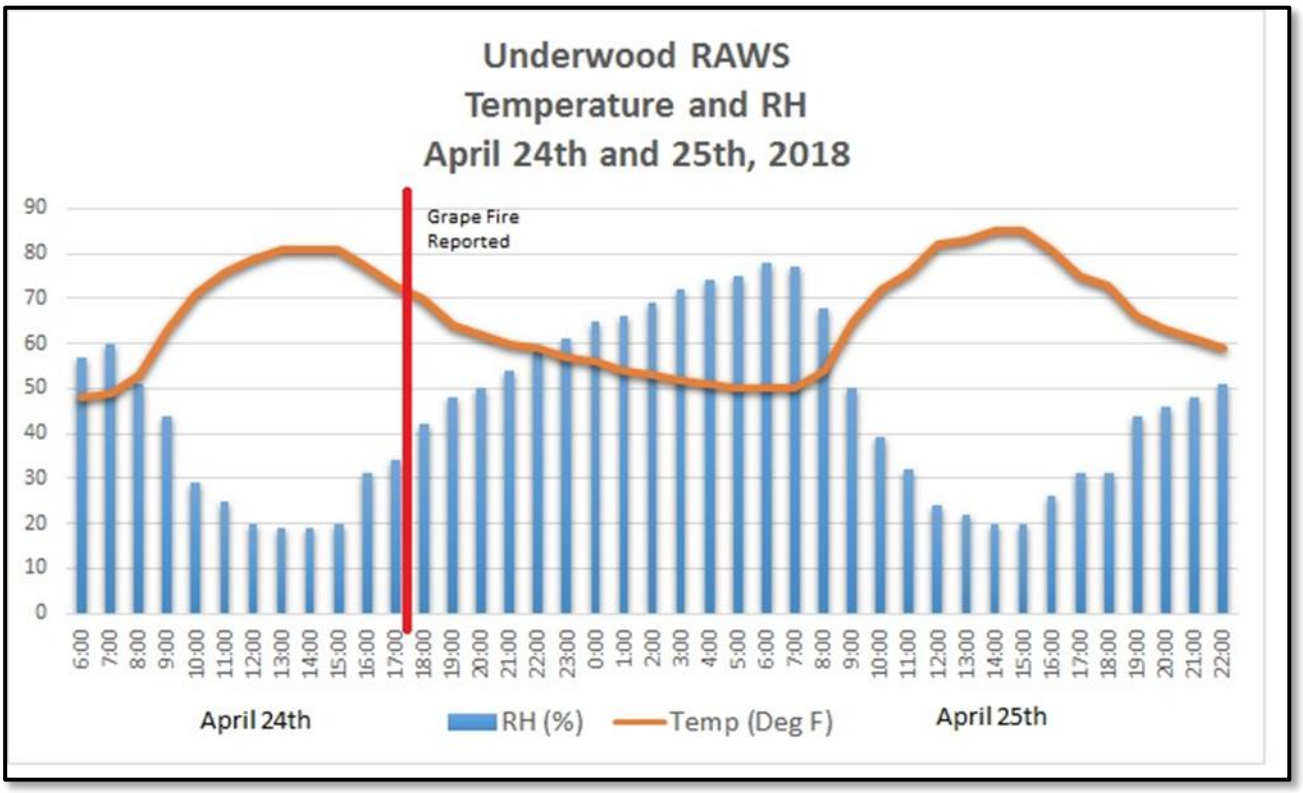


Temperature and Relative Humidity

Recorded weather on April 24th and 25th indicate low RH values and high temperatures. The graph on next page (Figure 8) shows the recorded weather at the Underwood RAWS with the red line indicating the time of the reported smoke to Dispatch.

While RH values increased throughout the evening and night of April 24th the temperature never dropped below 50 degrees. Observations indicate that the fire stayed active until approximately 5 a.m. on April 25th (Figure 8).

Figure 8 – Hourly weather observations from the Underwood RAWS for April 24th and 25th.



Fuels and Topography

The burn units for the Sims Prescribed Fire area are located in very steep terrain with abundant continuous fuels. Slash fuel loading is continuous, intermixed with slash piles, shrubs, small trees, and large snags.

The fuels within the 2004 Sims Fire scar are exposed to sun and wind. The exposure of these fuels causes them to dry much more quickly than fuels in the adjacent timbered stands.

The available fuels data indicates that fuel moistures were on a drying trend, and reached low levels on April 24th through April 27th. Fuels within these burn units can confidently be assumed to have been even dryer than these recorded values due to the increased exposure to sun and wind from the removed over-story (Figure 9).

Figure 9 – Fuel moisture percent from April 15th through the 30th. The red star indicates April 24th when the Sims Prescribed Fire escaped. Prescribed fire ignitions ceased after April 19th.

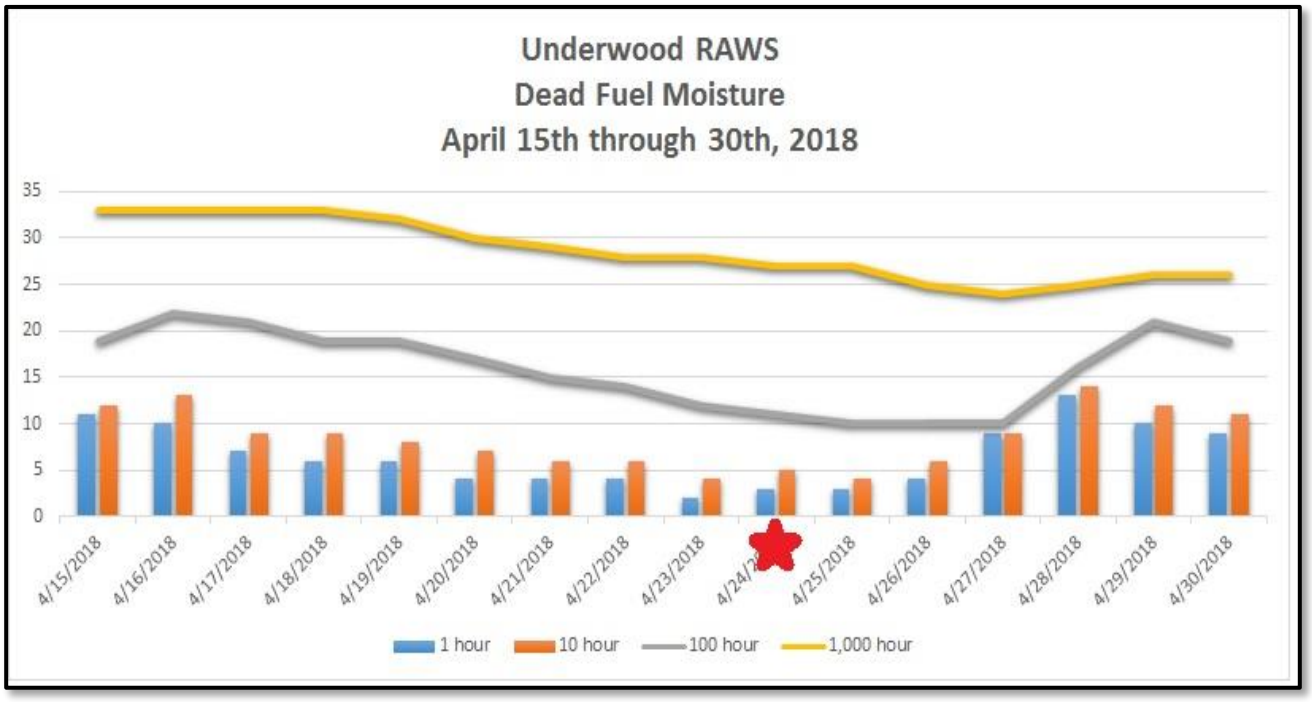


Figure 10 – Photo taken facing east-southeast looking toward Burn Unit H1 and the saddle at Drop Point 10. The slop and snags are described in this FLA's chronology of events.

Figure 11 – Representative fuels within the burn units for the Sims Prescribed Fire project area. Not pictured here are the large snags also present in this fuel matrix. The red arrows help identify a few of the many fuel piles in this photo. This fuel matrix is not easily captured with fuel models. The burn plan used Fuel Model 11 for the piles, Fuel Model 8 for the fuels between piles, and Fuel Model SH3 for the adjacent fuels.

Figure 12 – This picture is taken from Drop Point 10 in the saddle looking northwest toward Burn Unit H1, just above the snags from April 24th. The slopes in this area measure 60% to 100% (30 to 45 degrees).

2. An analysis of the prescribed fire plan for consistency with agency policy and guidance related to prescribe fire planning and implementation:

A review of the Sims Restoration Prescribed Fire Burn Plan was conducted and found that all elements were consistent with agency policy and guidance as outlined in the Interagency Prescribed Fire Planning and Implementation Procedures (July 2017).

The Burn Plan was signed by the preparer on February 23, 2018; the technical reviewer on February 23, 2018; and the Agency Administrator on February 26, 2018.

The Burn Plan template used for the preparation of the Sims Burn Plan is the current national template. The Burn Plan also had the current Agency Administrator Pre-ignition Approval Checklist and Agency Administrator Ignition Authorization.

There were no amendments to the Burn Plan.

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

Pre-Burn Considerations and Weather

In Element 9 under "On-Site Considerations", it appears as though the very large snags, which are also very tall, that are both in and out of the burn unit could be a safety issue for personnel igniting the piles and for holding and patrolling.

Under the "Off-Site Considerations", there are some days in which there were no weather observations recorded in the Burn Boss package. There was no documentation of the weather tracking two days prior to the escape. During a few burn days throughout the project, documentation shows the forest had stopped ignitions due to prescription elements, but on which elements they were "out" were not documented.

Monitoring on-site weather with a forecast is challenging without a RAWS. This would mean someone would need to travel out to the burn units to take weather observations each day until declared out.

Burn notices in local newspapers and social media were not documented in the Burn Boss package.

Prescription

In Element 7, all active ignitions were within the weather prescriptions as defined in Element 7 of the burn plan. Ignitions were halted and/or not initiated on several days when weather conditions were outside of the prescription. Burn Boss documentation includes notes that weather was outside prescriptions but does not include those values (RH or MPH etc.).

Action

Overall actions on the Sims Restoration Prescribed Fire unit were consistent with what the burn plan had outlined. In Element 14, documentation shows test fires were started each day to ensure that objectives would be met.

Under Element 15, Ignitions Operations, it appeared that most techniques were followed except where it stated that if creep was more than the heat influence of the pile or more than three feet outside of pile diameter, then ignitions would cease. It appears that on multiple days of burning there were times when the prescribed fire creeped throughout the unit. This was perpetuated due to the large amount of fuels between piles that made it impossible to put a scrape line around each pile. Ignition personnel were adequate for implementation and met burn plan requirements for each day burning activities were conducted.

In Element 16, Holding Plan, actions taken are in accordance with the burn plan. Conditions that activated mop-up were followed when safe to do so. Conditions that led to the fire escaping were perpetuated by environmental conditions that may not have been sufficiently mitigated in the burn plan, but led to initial actions of mop-up being very difficult.

Procedures

Procedurally, the overall intent of the burn plan was followed. The district is to be commended as there were 16 attempts to burn piles within the unit between February 27th and April 19th. Out of these 16 days, there were four days that they could not burn due to weather or road conditions. Out of the 12

days that burns occurred, there were three days that burning operations were ceased due to being out of prescription.

Overall, the elements within the burn plan were adhered to and everything was in prescription.

4. An analysis of the prescribed fire plan for consistency with implementation was conducted and resulted in the following findings:

After reviewing the Burn Plan and reviewing the prescribed burning operations, it was determined that, overall, the elements within the Burn Plan were adhered to. The burn unit was properly staffed. The pre-burn work was completed. The contingency resources were identified and available if needed.

Under Element 16, "Holding Plan, A. General Procedures for Holding", it states that holding resources may be used to limit creep to diameter of heat influence of pile at full involvement or 3 feet of pile diameter. There seemed to be several times that pile creep was present within the burn unit and fire was allowed to move around unimpeded.

Recommendations

- Place "Limit creep to diameter of heat influence of pile at full involvement or 3 feet of pile diameter" under the Conditions that may activate mop-up to clearly identify the action as a high priority. Clearly identify how much creep within the burn unit is acceptable. Environmental conditions within the burn unit severely limited mop-up procedures and exposed firefighters to unnecessary risks.

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

The qualifications and experience of all key personnel involved:

All key fire personnel were qualified in the positions for which they were assigned according to current IQCS records. All other assigned personnel also appeared to have been qualified in their respective positions.

B. Appendix 2 – The Prescribed Fire Burn Plan Technical Review

Sims Prescribed Fire Plan

Six Rivers, Lower Trinity R.D.

Technical Review

May 12, 2018

Element 1 **Signature Page:** Good.

Element 2A **Agency Administrator Ignition Authorization:** Good.

Element 2B **Prescribed Fire Go/No-Go Checklist:** Good.

Element 3 **Complexity Analysis Summary:** The Complexity Analysis spreadsheet has a slightly higher overall rating than the Element 3 in the burn plan.

Element 4 **Description of Prescribed Fire Area:** Good job on the physical description (A. 1-4). Vegetation/Fuels Description (B), On-Site Fuels Data (1.) was good and clearly describes the fuel conditions. However, paragraph two and Table 4B identifies a Fuel Model 8 and Fuel Model 11 which does not adequately represent what was described in the first paragraph or what was shown to the FLA Team as being representative of the on-site fuels in units H1 and H2 prior to burning. It also does not align with Element 7 which used Fuel Model SH3 for the environmental prescription and fire behavior outputs. Description of Unique Features, Natural Resource Values (C): suggest identifying that County Road 311 and residences reside in the Shasta-Trinity National Forest.

Element 5 **Objectives:** The resource objectives are in line with the two decision memos. For the Prescribed Fire Objectives, there was an attempt to develop "SMART" objectives, but could go further in making them specific, measurable, attainable, realistic, and time sensitive. For example, tree mortality less than 10%. Does this include all live trees?

Element 6 **Funding:** This is the first mention of Shasta-Trinity National Forest being a part of this project.

Element 7 **Prescription:** The environmental prescription and fire behavior outputs was modeled using Fuel Model SH3, which is not the identified fuel model for on-site values in Element 4.

Element 8 **Scheduling:** Good.

Element 9 **Pre-Burn Considerations and Weather:** Good. The weather exemption for pile burning below snow level could be simplified. It contains a lot of "and/or" statements. Notification table is listed two times.

Element 10 **Briefing:** Good.

Element 11 **Organization and Equipment:** Good.

Element 12 **Communications:** Good.

Element 13 **Public and Personnel Safety, Medical:** Good.

Element 14 **Test Fire:** Good.

Element 15 **Ignition Plan:** Good.

Element 16 **Holding Plan:** Good.

Element 17 **Contingency:** Good.

Element 18 **Wildfire Declaration:** It is not clear who is designated to declare wildfires. (Section "A. Wildfire Declared By" says a coordination between District and/or Forest Duty Officer with District Ranger and/or Forest Supervisor. Then section "C. Notifications" says the Forest Duty Officer will declare.) Because this burn plan was written as a low Type 3 complexity, consider the experience of the Burn Bosses before stating that the Burn Boss will become the Incident Commander. Not all Prescribed Burn Boss Type 3s (RXB3s) are qualified to become the Incident Commanders at the level to which the incident requires.

Element 19 **Smoke Management and Air Quality:** Good.

Element 20 **Monitoring:** Good.

Element 21 **Post-burn Activities:** Good.

C. Appendix 3 – Public Communications Activities

Grape Fire Public Meeting – Hyampom – May 3, 2018 4 p.m.

Shasta-Trinity National Forest

Issues Identified/Questions Asked by Public in Attendance:

1. When did last ignition occur? Where/in what unit?
2. Why did monitoring crews leave at 3 p.m. on April 24, when up slope/up canyon winds are known to occur in late afternoon?
3. Who approves/signs burn plans?
4. Concerned that issues raised during Fire Safe Council meetings about prescribed burning weren't heard by the Forest Service.
5. Have you considered shifting schedule to allow those firefighters who are monitoring fires to stay through the late afternoon? Especially when forecast is for warm, dry and windy conditions?
6. Monitoring parameters need to be reevaluated as a part of a burn plan.
7. Need to make sure incoming IMTs have local input and knowledge about weather and burn history.
8. Need to prevent erosion on steep slopes within Grape Fire area. It doesn't sound like the acreage is enough for this incident to qualify for BAER, but slope stabilization work needs to be done regardless.
9. Did burn plan take into account survivability of newly planted baby trees?
10. What were the spaces between burn piles? Size of burn piles? Ignition plan of burn piles?
11. When will we try and replant this area again?
12. 4N13 (Route 6) was damaged in last rainy period with increased Grape Fire truck traffic. This is an important route for residents commuting to the coast and as an evacuation route. This road also needs to be brushed.
13. Can you host a public field trip to the fire area?
14. What is the cost of mastication vs. burning? Can we do more mastication along property lines instead of burning?

15. Color of Grape Fire smoke was black, almost like a house fire. What was causing this color smoke on the Grape Fire?

16. Do crews that are monitoring prescribed fires also monitor the weather? Did they take into account the National Weather Service (NWS) forecast the day of the 24th?

17. Do you intend to light any backfires on this incident?

PIO Activities Log for Grape Fire

By Joe Orosz, Public Affairs Specialist
Shasta-Trinity National Forest

April 24th

- Wildfire alert received from Redding Dispatch at 1740.
- Initiated social media effort (Twitter). All subsequent social media efforts used hashtag #GrapeFire.

April 25th

- Received word from the Duty Officer that the Six Rivers NF was going to manage the fire as a prescribed fire that became active but was still within prescription.
- Unable to reach Six Rivers NF acting PAO until late afternoon.
- Shasta-Trinity NF PAO initiated both Facebook and InciWeb after getting guidance from Stanton Florea, R5 Fire PAO, who said they were good products to produce even if the fire wasn't managed by the Shasta-Trinity NF.
- Shasta-Trinity NF PAO wrote a draft statement on why the fire was responded to as a wildfire but was later determined to be a prescribed fire still within prescription and sent statement to the Six Rivers NF Acting PAO. Six Rivers NF Acting PAO said they would work on a press release and Facebook post, but they were never released.
- The Incident onboarded PIOs: One PIO2 (AD) Debbie Carlisi; One local PIOF (T) Corinne Corson; and PIO2(T) Tom Stokesberry came on later that night of April 26th.
- Delegation letter sent to PIO2(T) Stokesberry after notification that the fire was ours to manage around noon.
- Worked with IMT PIOs to draft and release initial press release issued by Shasta-Trinity NF PAO.
- Social media and Inciweb updates made by Shasta-Trinity NF PAO as information was made aware.

April 27

- Worked with Grape Fire PIOs to draft and release daily update by Shasta-Trinity NF PAO.
- Social media and Inciweb updates made by Shasta-Trinity NF PAO as information was made aware.
- Six Rivers NF began to re-share social media updates for the fire on their accounts.

April 28th

- PIOF(T) Orosz worked with PIO staff at incident to gain experience and help manage flow of information.
- Shasta-Trinity NF work with PIOs to draft and release daily updates.
- Social Media and InciWeb updated as information became available.

April 29th

- Shasta-Trinity NF PAO work with PIOs to draft and release daily updates.
- Social media and InciWeb updated as information became available.

This daily routine was the same for the most part from April 29 to the day of the community meeting on Thursday May 3. This daily routine consisted of: 1. Draft and release fire update and 2. Social media and InciWeb updates.

There was daily communication between the PIOs on the Grape Fire incident and the Shasta-Trinity NF PAO office to coordinate information outreach to the public.

Media inquiries were received from the Trinity Journal, KRCR TV, KMUD radio, and Kym Kemp who has a blog titled “Redheaded Blackbelt”.

Redding and Eureka media coverage consisted mostly of press release excerpts. Both the Trinity Journal and Mt. Shasta News ran front page news about the Grape Fire being an escaped wildfire and also pointing out the confusion that seemed to exist on the designation and cause. Trinity Journal continued to run articles in this vein for several weeks afterwards.

Several social media comments were received regarding the prescribed fire escaping and becoming a wildfire.

InciWeb continues to be updated by Shasta-Trinity NF PAO as fire information becomes available https://inciweb.nwcg.gov/incident/5761/.