

**NUGGET PRESCRIBED FIRE**  
**Facilitated Learning Analysis**

**CORONADO NF**  
**May 2009**

**Team Members:**      **Travis Dotson, USFS – Team Leader**  
                                 **Don Kearney, USFWS – Team Member**  
                                 **Art Gonzales, NPS – Team Member**

# **NUGGET PRESCRIBED FIRE**

## **Facilitated Learning Analysis**

The Nugget prescribed fire unit located on the Coronado National Forest, Santa Catalina Ranger District, in Pinal County, Arizona was ignited on May 4, 2009. The 1,650 acres burn unit was in mountainous terrain with multiple aspects. Elevations ranged from 4651' to 5620'. Slopes on average were 25%. The steep mountainous terrain posed ingress and egress problems. The road that formed the burn unit boundary was improved prior to ignition but still limited vehicle operations. Grass/shrub was the primary vegetative community within the unit, but three other vegetation types were also present. Objectives were to reduce heavy concentrations of oak, mesquite, manzanita and other chaparral species by 40 to 70% and create a mosaic of burned and unburned area at a ratio of 70-30%. To achieve objectives the burn was scheduled to be "in season" when conditions were hot and dry. Prep work was done to reduce fuels in problem areas along the boundary. A previous attempt to burn the unit had taken place in November of 2008. The cooler conditions were not conducive to meeting objectives.

During ignition operations, several spot fires occurred, one of which grew rapidly. In attempt to contain this spot fire, additional resources were ordered, including air tankers. The prescribed fire was declared an escaped fire and the largest of the spots was contained at 42 acres at the end of the first operational shift (day of ignition). In response to the escaped fire, the Coronado National Forest requested a Facilitated Learning Analysis of the events leading to the wildfire declaration.

### **Facilitated Learning Analysis Process**

In accordance with the Interagency Prescribed Fire Planning and Procedures Guide the Coronado National Forest determined the level of review appropriate for the Nugget Prescribed Fire Escape was the Facilitated Learning Analysis (FLA). This portion of the FLA documents the process used.

- A team of three individuals with appropriate experience and expertise was assembled to conduct the FLA.
- A delegation of authority was provided to the team. The delegation identified four key points:
  - Help our employees develop their own corrective actions where necessary.
  - Highlight and dwell on those practices, decisions, or actions found to be good and/or effective.
  - Encourage open, candid, and safe discussions while maintaining respectful participation.
  - Encourage each individual to seek feedback, and insist on effective and active listening.
- Included in the FLA were all those available and involved with the planning and implementation of the Nugget prescribed fire.
- The FLA began with an overview of the process and intent.

- Intent: Capitalize on the shared experience of those involved to highlight effective practices and identify “weak signals” of error.
- It was identified that the primary focus was the learning of those involved.
- It was identified that the product produced would be a short document including process documentation, chronology of events, and participants’ learning points.
- A sand table was utilized to facilitate discussion and document shared experiences.
- The process identified by the team was for participants to describe and discuss:
  - “Big picture” consisting of the Coronado National Forest structure and planning process related to prescribed fire.
  - Local culture relating to prescribed fire.
  - Nugget RX planning
  - Nugget RX implementation
  - “Zoom out” to capture planning, culture, and big picture revelations.

### **CHRONOLOGY OF EVENTS**

- 0700 Briefing held at Triangle Y camp, located 3 miles from Peppersauce Campground, approximately ½ hour drive from briefing location to test fire location
- 0800 Briefing complete, resources en route to test fire location. Firing Boss (FIRB) heads to helibase to brief aerial resources on tactics for the shift and to receive briefing on PSD operations.
- 0900 Burn Boss travels to pre-determined location at the East side of the project area to meet with Agency Administrator and Fire Management Officer to conduct Agency Administrator Go/No-Go checklist. Burn Boss is awaiting broadcast of spot weather forecast from Dispatch to complete checklist. Resources have arrived at test fire site and are awaiting approval to conduct test fire.
- 0915 Dispatch broadcasts spot weather forecast, Burn Boss completes Agency Administrator Go/No-Go checklist, receives approval, and is en route to test fire site. READ and FEMO are at test fire site.
- 0930 Burn Boss radios FIRB and provides approval to ignite test fire. FIRB radios Holding Boss (HOLDB) to pass on approval for test fire ignition. HOLDB confirms approval, via radio, with Burn Boss. Test fire is ignited and Resource Advisor confirms that observed fire behavior and effects will meet burn plan objectives. Burn Boss notifies Dispatch that test fire is successful and ignitions will continue. Ignitions proceed in both directions (east and west) from test fire location.
- 1000 Burn Boss arrives at test fire location. Firing temporarily halted for resources to reconfigure to meet tactical needs of firing and holding in two separate directions. Firing and holding resources headed West are moving very slow in order to minimize heat impacts to the line and to increase depth of blackline. Firing and holding resources headed East are making better progress due to favorable wind conditions
- 1015 Burn Boss moves into firing location with HOLDB, West bound resources still moving extremely slow, the East bound crew making better progress.
- 1030 Task Force Leader (TFLD) moved from scouting “phase 3” (planned to take place later in the day) to tie in with East firing and holding resources. TFLD ties in with HOLDB and will take over supervision of East holding resources.
- 1100 First two spot fires occur. Spots are just over the line (road bed). Spots are not active and are approximately 2 ft. x 2 ft. Spot locations and current conditions

communicated to other resources via radio. East firing group halts ignitions to allow interior to cool down and to allow holding resources to grid the green in vicinity of spot fire. TFLD made the decision to hold ignitions. East resources hold for approximately 20 minutes before resuming ignitions.

- 1230 East firing group reaches intersection of the South end of the interior handline. Resources hold at this location. Resources begin to notice an increase of wind speed.
- 1300 Fire crosses interior handline. This forces resources to continue ignitions to stay ahead of interior fire. Resources are moved across a saddle to tie into last fall's fire edge (next bend in the road) and are instructed to bring fire back along the road towards the main fire.
- 1315 East holding resources detect a third spot fire in the bar ditch adjacent to road. New spot is small in size, 10 in. x 10 in., and is easily dealt with by personnel with hand tools. Immediately after locating the third spot, the same resources notice a fourth spot. A quick response by holding resources allows hose to be deployed around this new spot and is contained at approximately ¼ acre. The Type 6 engine that attacked and secured the third spot exhausts its water supply and needs to rotate with another engine. Another Type 6 engine is moved in from Hobo Saddle to support holding operations. This engine will move past all East resources and turn around in closest pull out. East firing resources continue to fire. West resources are tied in at Helispot and are holding until further notice.
- 1330 Weather broadcasted, Probability of Ignition is at 90%, RH-18%, winds directions are variable and speeds are 7-9 miles per hour with gusts to 20. Ignitions are held up by Burn Boss.
- 1340 Burn Boss reconfirms cease of ignitions, still allows tactical firing to secure perimeter. Lead igniter confirms need for tactical firing to secure perimeter and stay ahead of interior fire.
- 1345 Fifth spot fire detected, Type 6 engine moved in from Hobo saddle has just passed spot location and needs to continue up the road to a suitable turn-around location. Spot fire is well established and spreading quickly before engine can make it back. East holding and firing resource assess new spot and agree fire behavior is not suitable for direct attack. Helicopter 320 is ordered for bucket work on new spot and is overhead within 10-15 minutes.
- 1400 While H 320 is working spot, East resources detect a new, sixth spot approximately 200 yards across the drainage from spot #5.
- 1405 Burn Boss contacts Agency Administrator and Fire Management Officer, who are still located at the East side of the project. Relays information that spot #5 is actively moving uphill.
- 1420 Resources are re-grouping on the road below spot #5 and #6, this includes West firing and holding resources. TFLD develops a plan to utilize a majority of East firing to help FIRB contain spot #6.
- 1430 Lead igniter joins FIRB and both begin working on containing spot #6 which is approximately 1/10 acre. TFLD (T) and remaining holding forces locate a rock scree and begin lining the East flank of spot fire #5. Weather is broadcasted which included observations of ash devils and whirlwinds.
- 1445 FIRB and Burn Boss discuss air tanker availability.
- 1450 Fire Management Officer is checking air tanker availability via cell phone. FMO overhears Burn Boss and FIRB radio conversation which includes, "I don't want to use the E word but I think we're there". Based on this radio transmission, FMO notifies

dispatch that the fire has escaped. No formal broadcast of this development is made to resources on scene.

- 1455 Air tanker ordered and is approximately 45 minutes en route.
- 1515 After cell phone conversation with FMO regarding the status of the fire, Burn Boss relays to resources, via radio, that he will be assuming role as IC.
- 1520 Burn Boss and TFLD discuss and organize a list of resource needs.
- 1630 Weather is broadcasted and moderated weather conditions are noted.
- 1800 Last air tanker drop
- 1900 H 320 finishes last bucket drop.
- 2030 Spot #5 incorporates spot #6 and is lined at approximately 42 acres.

## **PARTICIPANT LEARNING POINTS**

### **“Big Picture” Planning**

- The Coronado National Forest’s fuels program is overseen by the Forest Restoration staff. The fuels and fire programs collaborate to identify, prioritize, and implement vegetation management projects. Participants collectively agree this process is working.
- Interagency communications occur routinely to meet operational prescribed fire needs.
- Participants recognized the need to secure additional resources during critical burn windows to implement more RX projects.
- An established interagency partnership with the DOD increases competition for resources during “in-season” burn windows.
- The Forest will examine recent recommendation to utilize RX fire manager, incident management team, or outside resources to support multiple RX projects.
- Participants expressed a need for consistency in the definition used of WUI and Non-WUI for fuels project planning (CNF prioritization process).
- There is a need to provide true cost-per-acre to avoid planning and implementation deficiencies.
- Participants recognize the need to plan for “what-ifs” under worst case scenario rather than what will hopefully happen.
- In-season burning requires resources to conduct both prescribed fire and wildfire operations simultaneously. (CNF experiences initial attack during in-season burn windows). There remains a perception that the fire community and its culture has bias toward committing resources to wildfire suppression rather than prescribed fire. (It is easier to secure resources for wildfires than it is for prescribed fire.) There exists a desire for the fire culture to demonstrate equality in its commitment and support between RX fire and wildfire; a “fire is fire” attitude is desired.

### **Culture**

- Participants acknowledged a historical culture of “Every district for itself.”
- Participants recognize progress and a noticeable difference in cohesiveness, communications, and collaboration among districts in recent years.
- Participants acknowledged challenges of continuing their RX program following the Aspen and Bullock wildfires. Following these events funding and work priorities focus on rehab. Local communities comfort with fire was shaken.

- There is a desire for new planners to have access to fire reports, historical records, and monitoring data for use as a learning tool for future prescription development.
- Participants believe the current culture is focused on burning to achieve objectives. Program is not target-driven and receives no pressure from management to move too fast
- Current culture is shifting to support in-season landscape scale projects.
- Participants feel the RX program has line officer support.
- A lack of recent RX history creates opportunity for CNF to build their desired Rx culture.
- Participants have become so familiar and comfortable with what others from outside the unit view as a complex burning environment. The participants realize this has potential to compromise true situational awareness, “Everything we light is hard to hold.”
- The organization supports training (FUTA, TFM, etc.). Participants believe there is a need for more operational training opportunities for Forest and district personnel. (RXB2, FIRB, etc.).
- The CNF mentors employee’s and provides opportunities to assist in developing burn plans.
- Participants recognize the positive influence of line officer involvement (At briefing and on line when possible).
- The CNF recognizes and wishes to explore the potential benefit of having employees shadow other organizations that have successful RX projects in similar fuel types and situation. However, determining the appropriate shadow organization with experience in similar fuel types is difficult.
- Regardless of ability to find similar fuel types, participants find value in shadowing other organizations with active Rx burn programs.
- Participants recognize that some planning has been based on availability of resources rather than actual needs (dates driven by timing of helicopter contract, identifying what you can get vs. what you need).
- Some participants believe there is a loss of burn opportunities by exclusion of night operations.
- The organization is adaptive and has incorporated lessons learned from the last RX project

### **Nugget Planning**

- Information gathered at RT300 (Burn Boss refresher) class was incorporated into the planning for Nugget.
- Information gathered during site visits was incorporated into the burn design demonstrating good communication between resources staff and fire operations
- A public meeting with town of Oracle was well attended and positive in nature.
- Participants agreed that prep work done to road was adequate considering topographical features
- Fuel models used in the burn plan were not representative of fire behavior, planners will revisit the intent of fuel models
- Participants feel that brainstorming amongst RX implementers could be used to help determine resource needs, operational challenges
- Participants identified need for continued support and clarification on agreements to use State of Arizona resources

### **Nugget Briefing**

- The briefing structure/format caused some confusion.

- There was confusion surrounding the term Lead Igniter. The intent and responsibility of this position was unclear. There was a Firing Boss as well as a “lead igniter”. The lead igniter was also serving as supervisor of the hand crew.
- Cell phones were answered during operational briefing (by those conducting the briefing) which was distracting and hampered continuity.
- Participants felt all resources need to be at the morning briefing including helitack.
- Participants recognized the benefit of IAPs and good maps.
- The pros and cons of on-site vs. off-site briefings was discussed. (this briefing was off-site)
- Participants recognized the potential benefits of using logistical and/or planning support to reduce Burn Boss workload
- Participants recommended functional break-outs following briefing.
- Resources once on-site, reorganized to meet operational needs due to ignitions taking place on both east and west flanks simultaneously.
- Some participants felt the organization was overhead heavy, suggested simplifying organization and better defining roles.
- Some participants suggested utilizing standard ICS positions (Division Supervisors).

### **Nugget Test Fire/Ignitions**

- RXB and FIRB were not on scene for the test fire – the process for mitigating this was not communicated to all resources
- Participants recognized that the test fire was an accurate site to measure fire effects and the meeting of resource objectives, but not representative of potential rates of spread and resistance to control.
- Resources immediately halted ignitions to reorganize/regroup to remove confusion amongst holding and firing
- Participants noted that at the morning briefing the validity of trigger points likely to be exceeded mid-way through operations was discussed. (POI @ 11:30 80%)
- Through the FLA, participants identified what could be seen as weak signals during the operation (early spotting, POI trigger point, relying on engines to hold with long turn-around time, poor ingress and egress, limited holding resources)
- Resources realized that tactical firing was still necessary even after ignition was halted
- Situational leadership arose to meet the needs of escalating operations

### **Zoom Out**

- Participants realized the need for more holding resources. “...We get one chance to do this right, why not have what we need?...”
- The use of dedicated FEMOs was a benefit to the operations
- Dispatch and helispot were hard to contact via radio. Communications dead spots could be identified/mitigated during area familiarization trips
- Participants suggested bringing resources in one day prior to implementation to visit the project site to increase situational awareness and identify potential operational concerns (communications, egress/ingress, turn around times, logistics). This would also facilitate earlier briefing on the day of the implementation.
- Through the FLA process, participants clarified for themselves the chain of events and those involved in declaring an escape.
- Some participants identified potential for a situational awareness tool to aid in identifying weak signals and escalating complexities (Maybe a local framework for multiple

individuals to utilize under duress to compare perspectives and create a unified understanding.)

- Participants realized that prescribed fire can use ICS organizational model depending on need (planning, logistics, and operations positions, etc.).
- Participants suggested briefing all resources on chain of command and operational procedures in the event of an incident within an incident (large slop).
- Participants discussed identifying the next realistic holding feature outside of the unit and the willingness to use them rather than defaulting to direct attack.
- There was discussion about the need to consider all options for Rx windows that will meet objectives (seasonality, time of day, swing shifts, pause in operations).
- Participants felt it important to recognize the reality that due to terrain/topography and fuels, aerial recourses may be the most appropriate contingency resources.
- The FLA process has developed and/or strengthened participants' understanding of the entire Rx process, from planning through implementation.

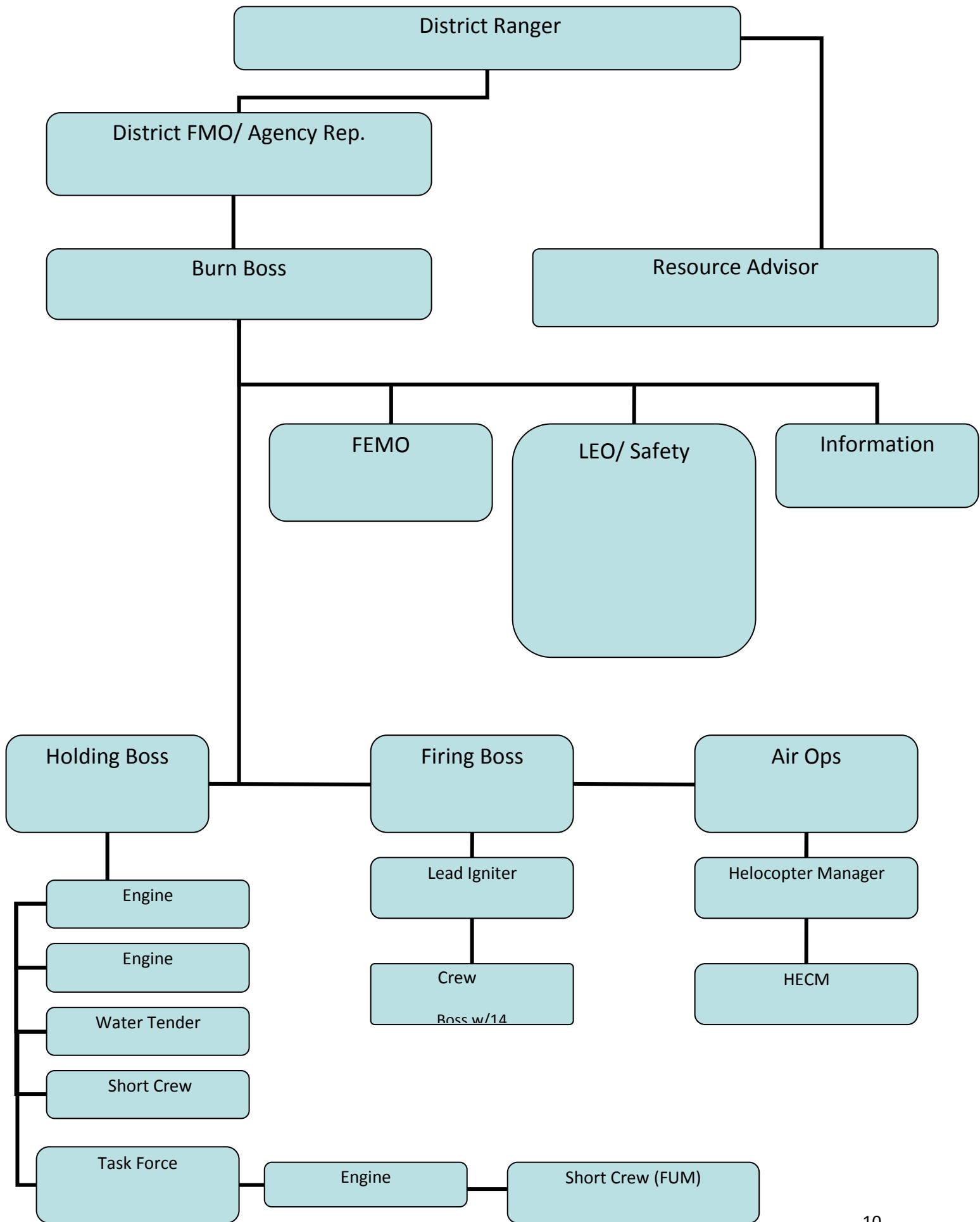
### **Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide for Escaped Fire Reviews**

1. An analysis of seasonal severity, weather events, and on-site conditions leading up to the wildfire declaration.
  - Seasonal severity, weather events, and on-site conditions were monitored, communicated, and mitigated throughout planning and implementation.
2. An analysis of the actions taken leading up to the wildfire declaration for consistency with policy
  - See Chronology of events. Through the FLA process, participants clarified for themselves the process of conversion to a wildfire.
3. An analysis of the Prescribed Fire Plan for consistency with policy
  - The Prescribed Fire Plan was consistent with policy.
4. An analysis of the prescribed fire prescription and associated environmental parameters.
  - The prescription and associated environmental parameters were properly developed, monitored, and mitigated throughout planning and implementation. Participants recognized the need to revisit fuel model selection to more adequately reflect fire behavior.
5. A review of the approving line officer's qualifications, experience, and involvement.
  - Line officer's qualifications, experience, and involvement met all requirements.
6. A review of the qualifications and experience of key personnel involved.
  - Qualifications and experience of key personnel involved met all requirements.
7. A Summary of causal agents contributing to the wildfire declaration.

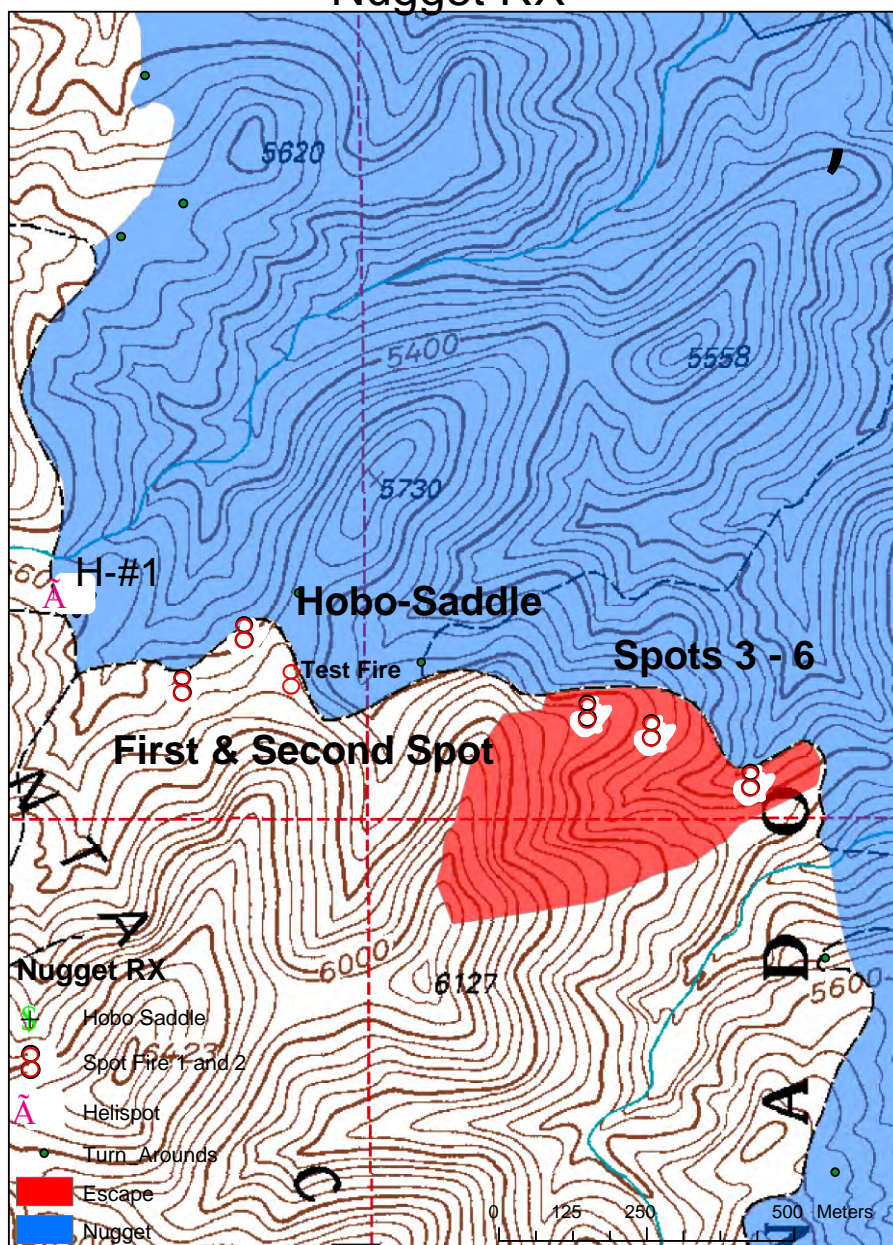


- Participants identified confusion surrounding the process for wildfire declaration. This became evident during the operation and was discussed at length during the FLA
- There existed a perception the flexibility exists to utilize any available resources to bring the fire back into prescription by the end of the next burning period without declaring an escape.
- There also existed a perception that the utilization of resources not identified in the contingency plan demands an escape be declared.
- The Interagency Prescribed Fire Planning and Procedures Guide states the following:  
 “A prescribed fire must be declared a wildfire by those identified in the plan when that person(s) determines that the contingency actions have failed or are likely to fail and cannot be mitigated by the end of the next burning period. A prescribed fire must be declared a wildfire when the fire has spread outside the project boundary, or is likely to do so, and cannot be contained by the end of the next burning period.”

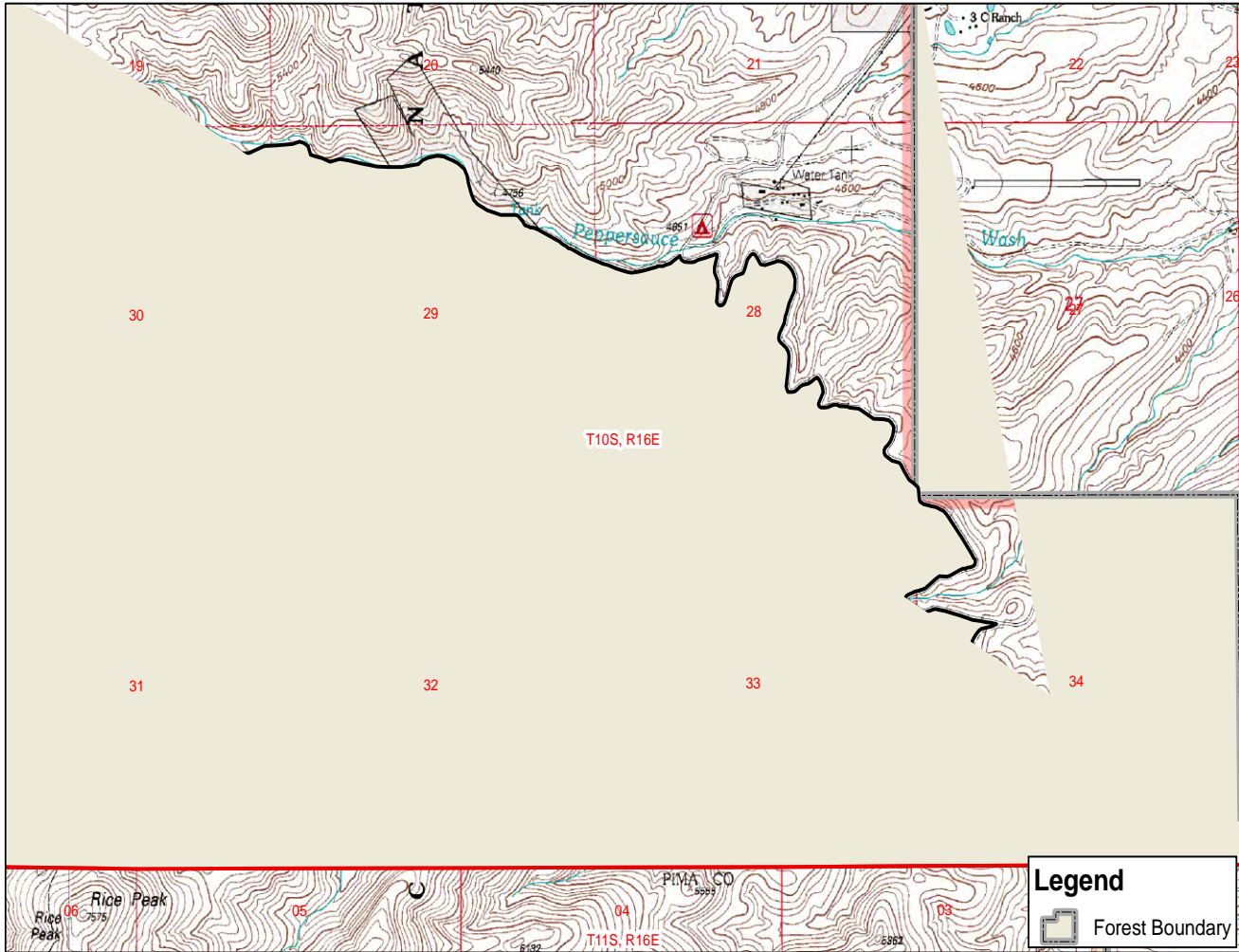
These questions dictated by policy in the Interagency Prescribed Fire Planning and Procedures Guide were included in the Delegation of Authority provided to the FLA team. Discussion occurred surrounding these questions and their fit in the Facilitated Learning Analysis. There was some feeling that these questions represent the culture of fault finding and blame placing; we as a fire community, are trying to break free of such a culture. It was noted that the intent of the review is adequately provided, yet the existence of a “checklist” of specific questions detracts from progress towards a true learning organization. Objectives laid forth in the Guide provide adequate intent and will inherently lead to the answers sought by the “checklist”.



# Nugget RX



# Nugget Rx (1653 acres) Coronado NF/ Santa Catalina RD



The Forest Service makes no expressed or implied warranty with respect to the character, function, or capabilities of the data or their appropriateness for any user's purposes; represented features may not be in an accurate geographic location. The Forest Service reserves the right to correct, update, modify, or replace this geospatial information without notification. Map prepared by Chris Stetson, 07/25/07.

0 0.25 0.5 1 Miles

1:24,000