

Rapid Lesson Sharing

Event Type: Equipment Loss (ATV) on Rx

Date: May 4, 2026

Location: Tulelake National Wildlife Refuge, California

Overview

On May 4, 2026, personnel from the Tulelake National Wildlife Refuge implemented a 198-acre prescribed burn in a local agricultural area. The primary prescribed fire objective of this operation was to remove residual vegetation prior to agricultural operations. The unit can be best described as a flat, ½ mile by ¼ rectangle-shape drained wetland.

Due to previous fire in this unit, the north and east flank had already burned, creating a non-uniform inactive black edge. The site presented a complex mosaic of both burned and unburned patches, with the principal fuels consisting of isolated pockets of common tule (giant, grass-like bulrush sedge), grass, and dried lakebed vegetation which structure varied in height, densities, and availability.

The intent of the prescribed burn strategy was to ignite the remaining unburned islands within the unit to secure the area and achieve the prescribed fire objectives. Assigned resources included: a Burn Boss, two ignitors, and a Type 3 engine. Two ATVs equipped with a rear-mounted remote ignition torch were chosen to facilitate ignition.

Sequence of Events

Arrival and Operational Briefing

1200: Resources arrived at Unit 353 within the Tulelake National Wildlife Refuge. Upon arrival, personnel conducted a comprehensive operational briefing to prepare for the planned prescribed burn. The briefing covered the spot weather forecast, holding plan, ignition strategy, and specified the responsibilities assigned to each firefighter participating in this operation.

The spot weather forecast called for a slight chance of rain (27 percent chance of wetting rain) and light winds (0-3 mph at eye-level with gusts to 4 mph). All environmental parameters were forecast to be in prescription.

Prior to this briefing, the Burn Boss observed that the soil within the burn unit was still moist—likely because the field had been drained only several weeks prior to ignition. The soil moisture indicated that the relative humidity within the unit would likely be higher than in the surrounding areas. He also observed that several inches of tule “green-up” had occurred within the unit.

The Burn Boss was aware that light precipitation had fallen on the unit the previous day. The Lower Klamath RAWS, which is located 13 miles to the northwest and is the closest representative station, recorded 0.05 inches of precipitation at 1832 on May 2, two days prior to ignition. Thunderstorms had been occurring over the area. Precipitation amounts varied across the landscape.



The seven-foot tall tule behind the burned ATV indicates the density and structure of fuels at the location of this prescribed fire equipment loss incident.

The Burn Boss expected fire behavior to remain within prescription and flame lengths to be generally up to eight feet, with isolated interior pockets burning with flame lengths up to 20-30 feet. In addition, the Burn Boss anticipated that the high soil moisture, recent light precipitation, green-up, and previous fire within the unit could all contribute to moderated fire behavior.

The fire behavior was expected to meet management objectives. Holding was not a large concern because the fields surrounding the ignition unit were devoid of vegetation or contained green, new growth stubble.

Ignition Plan and Group Assignments

The ignition plan was divided into two groups, each tasked with ensuring the effective and safe execution of the burn.

Group One: Blacklining

This first group was responsible for securing the burn unit's southern perimeter. Their approach involved hand firing along the southern flank, beginning at the southeast corner and continuing westward to the southwest corner. This included a Firefighter Type 2 (FFT2) who operated a drip torch, guided by a lead ignitor overseeing the blacklining process and maintaining the integrity of the burn along the southern line.

Group Two: Interior Ignition

The second group focused on igniting interior pockets of unburned vegetation. Their operation started at the south line and proceeded systematically toward the north line. This team consisted of two experienced lighters using ATV-mounted torches and implemented a strip fire method guiding off the black edge with a 1-2 firing pattern staggered at 50 yards. The spacing between ignitors was adjusted as needed to match changing conditions and to optimize fire effects within the unit.

Operations Sequence

1230: Blackline operations commenced in the southeast corner. Upon completion of southern blacklining, the lead lighter from Group One instructed the interior ignitor to begin from the south blackline, advancing north along the cold black edge. To achieve the desired fire effects, the lead interior lighter ignited approximately ten feet off the edge through unburned tules, while the second ignitor maintained a staggered pattern with variable spacing.

Personnel on the burn observed very light winds and fire behavior that was slightly more moderated than expected. Flame lengths averaged 6-7 feet across the unit, with the tallest interior patches of tules burning with flame lengths of approximately 20 feet.

Incident Description

1330: During firing operations, the lead interior lighter encountered an unexpected obstacle while advancing south through dense tules adjacent to the cold black. The ATV was halted by a crescent-shaped berm, approximately four feet high and 60 feet long, composed of compacted tule resulting from wetland water drainage activities. The berm's height, curvature, and surrounding vegetation posed a significant hazard—preventing safe navigation over it.

While attempting to reposition the ATV, the operator immediately backed up approximately 15 feet into his recently lit strip fire to quickly navigate around the berm to the safety zone. While fire intensity near the ATV was low at the time, the operator understood that there was typically a 10-second lag between lighting the strip fire and flames reaching up to



The remnants of the four-foot-high and 60-foot-long tule berm hazard (on left) composed of compacted tule resulting from wetland water drainage activities. This obstacle required the operator to reposition the ATV.

20-feet tall in the densest tules.

Recognizing imminent danger, the operator promptly exited the ATV and moved to the designated safety zone in the clean black, located roughly 15 feet east of the vehicle. While the operator remained unharmed, the ATV was destroyed. The interval between encountering the berm and reaching safety was estimated at six seconds.

The ATV operator later reflected: *“In my head, I had this comfort that I was so close to the black, I would be fine.”*

Weather, Fire Behavior, and Prescription Parameters

The fire behavior observed on this day was generally more moderate than what is common for similar units. The observed 6- to 7-foot average flame lengths were less than the 7.9-foot prescription parameter. This 7.9-foot prescription parameter for flame lengths only applies to blacklining operations. The burn plan does not identify an upper flame length limit for interior firing, but observed flame lengths of up to 20 feet in the dense tule patches was less than what is commonly observed.

Weather observations from the closest representative RAWS (approximately 13 miles NW of the burn unit) that day varied from what was observed on the unit. The burn plan identifies an upper mid-flame wind limit of six miles per hour. The Lower Klamath RAWS recorded a 14 mph 20-foot wind at 1232, which translates to 5.6 mph at mid-flame height. However, on the prescribed fire unit, personnel observed little to no wind.

Overall, the observed fire behavior was within prescription parameters and facilitated meeting the prescribed fire objectives.

Lessons Identified

- Unexpected berms or compacted fuel features can develop within wetland units because of water management activities, even in areas where staff have not previously encountered them.



The burned ATV location in relation to the impacted tule berm. The ATV operator’s escape path and safety zone is located 15 feet to the left of the ATV.



The remnants—post burn—of the tule berm. This photo indicates the berm’s length.

- Proximity to the black does not guarantee a reliable escape route or safety zone in light flashy fuels.
- Tall, continuous vegetation can obscure hazards and limit situational awareness during mobile ignition.

Successes

- The operator demonstrated strong situational awareness and decision making under pressure by prioritizing personal safety and abandoning the ATV at the appropriate time.
- The ATV operator's rapid self-evacuation prevented injury despite rapidly deteriorating flame conditions.

Challenges

- Unexpected terrain modification (compacted tule berm) created a mobility trap.
- The continuous, vertically extensive growth of tule presents operational challenges related to visibility, situational awareness, and fire behavior.

Recommended Actions Moving Forward

- ATV operators will maintain at least one set of tires in the black whenever feasible to preserve rapid access to safety zones.
- Ignition personnel should incorporate potential berms or fuel buildup into pre-burn scouting and briefings, particularly in units where recent water management activities have occurred.
- Reinforce the practice of continually reassessing escape routes during mobile ignition and avoiding assumptions about safety based on proximity to the black in light flashy fuels.

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