

# Prescribed Fire “Escapes” and Impacts

A white paper discussing prescribed fire risks, impacts, and terminology

*Provided for consideration of the Prescribed Fire working group of the California Governor’s Forest Health Taskforce. Reviewed and edited 2021.*

## Prescribed fire in California

As California leadership aims to increase the pace and scale of prescribed fire, numerous barriers remain to getting more intentional fire on the ground.<sup>1</sup> One of these key barriers is the risk (and perceived risk) of negative impacts to ecosystems, infrastructure, and health.<sup>2,3</sup> While regulatory and social policies are in place to limit these impacts, using fire as a tool for restoration and wildfire risk mitigation will never be risk-free. Instead, this paper aims to acknowledge the risks of prescribed fire and suggests ways to reframe this risk with policy and terminology changes.

The process for implementing prescribed fires can differ drastically based on what entity is conducting the burn. Prescribed fire use by private landowners (both large and small) may see an increase in California and can play an important role in restoring fire ecosystems. For the purposes of this paper, the focus will be predominantly on planning and review processes required by state or federal agencies in California.

## Prescribed fire benefits

In many ecosystems of California, prescribed fire—when applied with expertise—can improve ecosystem function, promote resiliency to future disturbances, and reduce the risk of catastrophic wildfire.<sup>4</sup> A successful prescribed fire has a set of clear objectives that are carefully identified, and fire is applied within the designated prescription boundaries to meet those objectives. Most prescribed fires conducted are in this category.<sup>5</sup> While the benefits of prescribed fire are acknowledged for many situations, the struggle for many managers is being able to conduct the burns within the very limited condition and weather windows, especially with the additional constraints of limited resources. This capacity and burn window issue have been found to be a major reason for so many carefully planned prescribed burn plans to not be carried out.<sup>2</sup>

## Prescribed fire risk

There is, and always will be, an inherent risk with using prescribed fire. Internationally and locally, there are worst case scenarios of prescribed fires turning into wildfires that lead to destruction and even death of our ecological and human communities.<sup>6</sup> Because the worst case scenarios of prescribed fire escapes are so severe, there is a high perceived risk of prescribed fire, even though the likelihood of these severe events is extremely low (Perceived risk = Likelihood/probability of event occurring X severity of impacts if event does occur). An additional way to mitigate risk that is already being done is to target areas for prescribed fire that are far removed from human communities and infrastructure, which can limit the perceived and actual risk of severe impacts to people. However, with the amount of acres that need to be treated in our state and nation, allowing for prescribed fire only in remote areas is unlikely to create the large scale solutions we need to become more fire adapted.

The term “escaped” prescribed fire is fraught with fear of undesired consequences but the term itself is ill-defined outside internal agency meanings. According to the GACC (Geographic Area Coordination Center: A national coordination system for fire response), an escaped fire *is any fire which has exceeded or is expected to exceed initial attack capabilities or prescription.*<sup>7</sup> Under this broad definition, an “escaped” prescribed fire could be one with extreme negative consequences, such as destroyed human infrastructure or critical habitat loss for an endangered species. However, an “escaped” prescribed fire could also be one that meets all original objectives but is extinguished using wildfire suppression resources and that has minimal to no negative consequences to ecosystems or infrastructure. A perfect example of this would be the 2020 Cables fire, where the fire was declared an escaped prescribed fire and transitioned to a wildfire to aid with control/suppression efforts. However, this fire had mostly positive ecological effects and burned within agency boundaries (Figure 1). To date, the impacts on vegetation have been minimal and the ecosystems are continuing to be monitored for positive or negative consequences.<sup>8</sup> A major purpose of this briefing paper is to explore how fire agencies can create better definitions or terminology to distinguish a difference between the images of fear we hold from “escaped” fires, to ones that are still being managed for active resource benefit.



**Figure 1.** Caples Creek Watershed, post-fire, April 2020. Example of a prescribed fire that “escaped” as additional fire suppression resources were needed but resulted in predominantly positive ecological benefits and minimal to no negative impacts.<sup>9</sup>

### Redefining terminology: language matters

The term “escaped” prescribed fire is typically used by federal agencies when the decision is made to change the status of a prescribed fire to a wildfire. When an incident is being managed as a prescribed fire, the capacity and management options are more limited than with a wildfire. For example,

*“It was suggested to have a Regional (possible National) discussion regarding the perceived/real impacts of an ordering process that differentiates between a “Wildfire System and Prescribed Fire implementation”*

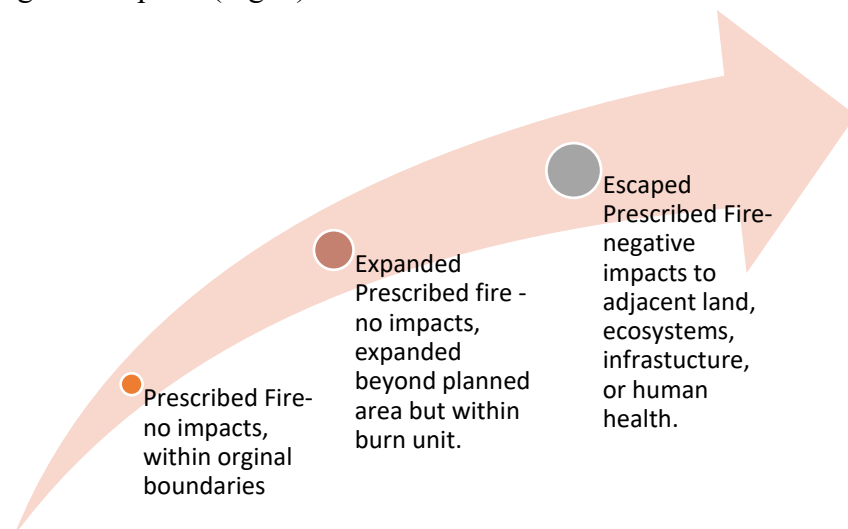
management decisions on when and how to burn must still meet the burn plan prescription (including smoke management) and must stay within the defined local budget. Additionally, resources (including personnel) are often not prioritized for prescribed fire, meaning staff or containment resources can be sent to wildfires that are being suppressed rather than staying with the prescribed fire. When an incident is declared a wildfire, all these limitations are greatly reduced or removed but this change comes with the concern of having an ‘escaped’ term applied to the incident. Now, in place of capacity concerns, the risk is instead centered around the clear social consequences of having been part of an “escaped” fire. These concerns can include impacts to a managers’ career, to the level of trust the public has in an agency, potential liability issues, and to the future ability to use prescribed fire.<sup>10</sup>

Other potential terms to avoid in public reports are the terms like “creepy piles” or “slop over.” As trust is often built on a belief in the competency for an agency to complete management actions,<sup>11</sup> using a term that does not connect with a sloppy action or decision is preferable.

Given the negative connotations of escaped prescribed fire, this paper offers some potential changes in terminology and policy that better illustrate the nuisances of prescribed fire. While within agencies, previous definitions of escaped fire may be more difficult to change, utilizing a new system for outside communication (especially with the media and public) could present a better framework for increased understanding of prescribed fire and its risks.

### Suggestions for new terminology around prescribed fire

- 1.) Ideally, removing the terminology of ‘escaped’ from agency and outreach communications in all or most circumstances, especially to gain additional resources for control and when there are not severe impacts.
- 2.) Create tiered boundaries for acceptable prescribed fire implementation based on geographic boundaries: Primary burn boundary, secondary, tertiary, outside boundary, and escaped.
- 3.) Create levels for prescribed fire escapes based on impacts/objectives: Less than intended impact, intended impact achieved, intended impact with exception of <insert exception>, unintended impacts.
- 4.) Create a simple midway point of “expanded” prescribed fire to capture the most common type of escape- where the prescribed fire burns outside the intended boundaries or timeline but does not have any major negative impacts (Fig. 2).



**Figure 2.** Example of midway definition created to capture the majority of “escaped” prescribed fires that have little to no negative impacts but are outside the original burn plan boundaries or prescriptions.

### Applied example using 2019 Cables fire: <sup>8</sup>

#### *Changes in pre-burn planning definitions:*

Unit A: primary burn boundary (listed in initial burn plan)

Unit A<sub>2</sub>: Secondary burn boundary (The whole USFS unit planned for eventual burning)

Unit A<sub>0</sub>: Outside unit, if burn into this area could have severe negative impact to (endangered species, unwilling private landowner, human structure , etc.)

#### *After action review:*

This fire would have burned through Unit A<sub>2</sub> with little to no severe impacts to ecosystem, human infrastructure, or outside property owners. This would not be classified as an escaped fire but rather a prescribed fire with active suppression tactics or an expanded prescribed fire. This would require a federal institutional policy change where prescribed fires could be declared as something other than a wildfire but still gain access to needed resources and be prioritized.

### Prescribed fire escape rates and reports

Given that past managers often classified any prescribed fire that burned beyond the plan as escaped, the number of escaped prescribed fires likely includes many instances with little to no negative consequences. Even with this in mind, the national estimation of prescribed fire escapes is less than 1%.<sup>5</sup> This percent is an estimate because the number of successful prescribed fires is not well documented, with even less measurements and documentation for positive benefits achieved. Currently, acres treated is the main measure for prescribed fire success, where a simple maintenance burn with little vegetation change over a large area is more desirable than a complex, small, first-entry burn that drastically could improve the ecosystem resilience or achieve other difficult objectives. Efforts to create tracking and recording systems for prescribed fire implementation with a national or state standard are underway and would go a long way in providing additional information. A standardized report system could confirm this estimate of prescribed fire escapes and add more success stories to the small number currently available that are often overlooked.

For federal agencies, when a prescribed fire is designated as a wildfire, a formal investigation or After-Action Review is initiated. Reports on these are freely available on the Wildfire Lessons Learned site.<sup>13</sup> Of the 13 reports for California (earliest fire report from 1998), 7 had minimal negative impacts and did not burn outside the operating agencies boundaries (see Appendix for Summary Table 1).

- 3 had extreme negative consequences resulting in
  - A) thousands of acres of private land burned or
  - B) private residences and structures lost
    - When residences were lost, both reports indicated that there were questions of competency for leadership and/or that the burn plan and prescription were not followed.
- 3 had moderately negative consequences resulting in
  - A) powerlines burned resulting in a short-term power outage and smoke on the Interstate highway.

- B) agency resources like newly planted trees killed or inoperable vehicle and an outbuilding being destroyed.
- Extreme or unpredicted weather conditions (especially winds, heat, and drought) were reported as major reasons for why the prescribed fires behaved outside of prescribed intention.
- Only 1 report found the managers were not competent with an additional 4 reports that had some competency concerns.
- In many cases, poor planning post-fire (mop-up, containment, or check-up schedule) were listed as areas for improvement.
- Resource availability for burns was often limited due to operational issues or competition with other events, especially wildfire incidents.

### Works cited

1. California Forest Management Task Force. (2020) California Department of Forestry - <https://fmtf.fire.ca.gov/>
2. Schultz, C.A., Moseley, C. (2019). Collaborations and capacities to transform US fire management. *Science* 366 (6461): 38-40. 10.1126/science.aay3727
3. McCaffrey, S., Toman, E., Stidham, M., & Shindler, B. (2013). Social Science Research Related to Wildfire Management: An Overview of Recent Findings and Future Research Needs. *International Journal of Wildland Fire*. 22: 15-24. 10.1071/WF11115.
4. Agee, J. K., & Skinner, C. N. (2005). Basic principles of forest fuel reduction treatments. *Forest ecology and management*, 211(1-2), 83-96.
5. Dether, D. (2005). Prescribed Fire Lessons Learned Escape Prescribed Fire Reviews and Near Miss Incidents Initial Impression Report.
6. Alexander, M. E., & Thomas, D. A. (2006). Prescribed fire case studies, decision aids, and planning guides. *Fire management today*. 66: 5-20.
7. National Geographic Area Coordination Center Website Portal.(2020) <https://gacc.nifc.gov/>
8. Dailey, S., Reiner, A., Ewell, C. (2019). 2019 Caples Fire: Fire Behavior Assessment Team. Eldorado National Forest, Pacific Southwest Region (R5).
9. Caples Escaped Prescribed Pile Burn: Facilitated Learning Analysis. (2019). Eldorado National Forest, Pacific Southwest Region (R5).
10. Brunson, M.W., Evans, J. (2005) Badly Burned? Effects of an Escaped Prescribed Burn on Social Acceptability of Wildland Fuels Treatments, *Journal of Forestry*, 103(3):134–138. <https://doi.org/10.1093/jof/103.3.134>.
11. McCaffrey, S. M. (2006). Prescribed fire: What influences public approval. In *Fire in eastern oak forests: Delivering science to land managers, proceedings of a conference*. 192-196.



## Appendix:

Table 1. Summary table of Lessons Learned from Escaped Prescribed Fires in California. Red highlights were fires that resulted in higher impacts, yellow are moderate impacts, and white are low impacts.

| Escaped fire                              | Year | Month       | Duration of burn                                | Location/Agency                      | Fire Type and complexity                      |
|---|------|-------------|---|--------------------------------------|---|
| North Shasta Wildlife Burn Escape         | 2006 | February    | 3 days as prescribed fire, 1 day as wildfire    | North Shasta Trinity NF              | Prescribed fire of brush: moderate complexity |
| North Main Divide /Sierra Fire            | 2006 | February    | 3 days as prescribed fire, 6 days as wildfire   | Cleveland NF                         | Prescribed fire: moderate complexity rating   |
| Lowden Ranch Escaped Prescribed Fire      | 1999 | July        | < 7 days  | Lowden Ranch                         | Prescribed fire                               |
| Sims Grape                                | 2018 | April       | 4 days as prescribed fire, 2 days as wildfire   | Six Rivers/Shasta Trinity NF         | Mostly pile burns: low complexity             |
| Santa Cruz Island Escaped Prescribed Fire | 2018 | March       | 8 days as prescribed fire, 2 days as wildfire   | Channel Islands National Park        | Pile burns                                    |
| Tract 17                                  | 2014 | September   | 1 day   | Sacramento National Wildlife Refuge  | Prescribed: moderate complexity               |
| Cables Escaped Fire                       | 2019 | October     | 11 days as prescribed fire, 15 days as wildfire | EIDorado NF                          | Pile burns: low complexity when ignited       |
| Ponderosa Pile Escape                     | 2017 | December    | 15 days as wildfire                             | Sierra NF                            | Pile burns                                    |
| Figueroa                                  | 2010 | November    | 1 day   | Los Padres NF                        | Prescribed fire of masticated materials       |
| Red Rock Prescribed Fire                  | 2009 | June-August | 24 days as prescribed fire, 1 day as wildfire   | Klamath NF                           | Prescribed fire                               |
| Big Meadow Prescribed Fire                | 2009 | August      | 1 day   | Big Meadow - Yosemite National Park  | Prescribed fire: moderate complexity          |
| Greenthin                                 | 2008 | October     | 1 day as prescribed fire, 1 day as wildfire     | Klamath NF                           | Prescribed fire with some piles               |
| Banner Queen El Centro Resource           | 1998 | July        | Unavailable                                     | BLM El Centro Resource Area (desert) | Prescribed fire in mature chaparral           |

| Escaped fire (cont.)                      | Impacts to agency land  | Impacts to adjacent ownership   |
|---|---|---|
| North Shasta Wildlife Burn Escape         | Burned on both sides of Highways 97   | Mandatory evacuation of Mt. Shasta Vista subdivision, properties and vehicles destroyed |
| North Main Divide /Sierra Fire            | Unavailable   | 8,616 private land burned, no structures lost   |
| Lowden Ranch Escaped Prescribed Fire      | Unavailable   | Destroyed 23 residences   |
| Sims Grape                                | Burned in fire scar and destroyed newly replanted trees                     | None  |
| Santa Cruz Island Escaped Prescribed Fire | Destroyed a storage shed, and 3 inoperable vehicles                         | None  |
| Tract 17                                  | Visitor center evacuated, all structures protected                          | Damage to power lines and railroad ties burned; smoke on Interstate Highway             |
| Cables Escaped Fire                       | Additional acres burned at predominantly ecologically beneficial levels     | None  |
| Ponderosa Pile Escape                     | Burned 61 acres outside of unit boundary, stayed within Forest Service land | None  |
| Figueroa                                  | Burned mostly within project parameters of the Figueroa Mountain Project    | Burned 6.5 acres outside of the project area  |
| Red Rock Prescribed Fire                  | only USFS acres burned  | None  |
| Big Meadow Prescribed Fire                | Only NPS land burned  | None  |
| Greenthin                                 | Unavailable   | Burned across CA border to OR   |
| Banner Queen El Centro Resource           | Unavailable   | Unavailable   |

| Escaped fire (cont.)                 | Reported competency   | Weather  | Planning and issues   |
|--------------------------------------|---|--|---|
| North Shasta Wildlife Burn Escape    | Somewhat; all fire personnel had the proper experience except for the trainee Burn Boss | High wind gusts reported                                     | Daily weather forecasts were not requested for the day the fire escaped, Burn Boss not identified for the shift the day before it escaped |
| North Main Divide /Sierra Fire       | Yes   | Drought, high temps, & Santa Ana winds reported              | Mop-up should have been longer.   |
| Lowden Ranch Escaped Prescribed Fire | No, while they were qualified, they did   | Wind gusts reported and lower fuel moistures present than in | No test fire, did not consider weather or fire behavior, did not conduct burn in  |

|   |   |   |  |
|---|---|---|--|
|   | not provide proper oversight, had poor communication, and did not follow the burn plan.     | prescribed fire burn plan   | accordance to burn plan, did not account for steep slopes  |
| Sims Grape                                | Yes   | Exposure of fuels in burn scar of fire and localized wind patterns reported | Steep terrain, no overstory (from recent fire) meant ground was exposed to more heat and wind than plan predicted.   |
| Santa Cruz Island Escaped Prescribed Fire | Yes   | Hot, dry , windy, drought conditions  | Prescribed burn plan did not adhere to standards but was not credited with the cause of the wildfire, no mop-up plan or patrol plan was main issue.  |
| Tract 17                                  | Somewhat  | High wind and extended drought reported                                     | Burn plan wasn't site and vegetation specific enough, burn boss had to adapt last minute to change in permit (ignited at different point). Was on the high end of the burn limit and no additional contingency were made. Water tanks ran out of water.  |
| Cables Escaped Fire                       | Yes, high support from leaders  | Extreme wind event (unpredicted) and local power shutdown                   | High degree of pre-work and planning, transitioned to wildfire due to (unpredicted) high winds and need for immediate support to contain from widespread.  |
| Ponderosa Pile Escape                     | Yes; contract crew  | Dry conditions and localized Mono wind reported                             | More resources needed, recommended to have been burned in block formation instead of individual piles  |
| Figueroa                                  | Somewhat; the burn boss was new and no one on the burn had experience with masticated fuels | Unpredicted east winds reported that were not a part of the spot forecast   | Layout of the burn allowed for the fire to escape more easily due to factors like unburned fuels upslope from the burn site; staffing was chosen based on overtime payment concerns  |
| Red Rock Prescribed Fire                  | Yes   | Hot, dry weather  | Burn plan was transferred into a new format without many changes or review, no one knew the exact boundaries of the burn   |
| Big Meadow Prescribed Fire                | Yes   | Building high pressure system, downslope winds reported                     | Prescription did not address large number of standing snags and heavy fuel loads which led to spotfires, delayed use of bulldozer because the burn boss could not contact someone with the power to authorize its use  |
| Greenthin                                 | Somewhat; no experience with understory growth  | Winds from an incoming cold front reported                                  | Issues such as lack of knowledge of water sources were discussed on crew levels but never discussed with overhead, no patrol overnight, resources were directed to 3 other incidents on burn day   |
| Banner Queen El Centro Resource           | Yes; private contract crew  | El Nino year created more dead grass/fine fuel than in original plan        | Cured grass was not accounted for in the models and plan and thus was a surprise when ignited (El Nino year meant more grass than old fire plan had). Chamise flowering during so high moisture content and had a hard time getting started in years past. Malfunction of helicopter water tank. |