

An investigation of Santa Clara County's vegetation management practices for wildfire prevention

Key Takeaways

- Local agencies are seeking to improve vegetation management practices in response to strict regulations
- Prescribed burning efforts through the CAL-FIRE Vegetation Management Program (VMP) are decreasing in Santa Clara County although wildfires are increasing in number and size
- Permitting and high costs have been shown to be major barriers for two vegetation management practices – prescribed burning and targeted grazing

Introduction on fire in Santa Clara County

Santa Clara County experienced the worst fire season in modern times this year with over 5,500 acres burned in the single Crews Fire and nearly 400,000 acres burned in the SCU Lightning Complex that affected five Bay Area counties: Santa Clara, Alameda, Contra Costa, San Joaquin and Stanislaus (“Incidents Overview” 2020). The occurrence of wildfires in the west has increased greatly in recent years as climate change continues to worsen and exacerbate the conditions necessary for wildfires to occur. A century of fire suppression by firefighting services has allowed for unnaturally large amounts of vegetative fuel to build up on wildlands, resulting in massively destructive wildfires (Board of Forestry and Fire Protection 2019). These wildfires are a threat to communities located in the wildland-urban interface (WUI), and the risks will increase with urban development into the WUI (Board of Forestry and Fire Protection 2019). For our specific study we are concerned with fire threats to landowners on county rangelands, a likely target for future development and where a portion of the WUI is located (FRAP 2020). Rangelands in WUI areas not only provide amenity value, but also play an important role in water management, carbon storage and the production and transmission of renewable energy (Diaz et al. 2012). Yet these services are threatened by climate change and the build-up of vegetative fuels that intensify wildfires. Santa Clara County is an ideal case-study for peri-urban rangelands management because of Stanford's geographic location within the county and the importance of Stanford engaging with the local community in its research. Through our research into this subject, we hope to engage Stanford University in efforts to improve vegetation management practices in the county and provide information on why vegetation management should be a high priority on rangelands for preventing wildfires.

Thus far, we have identified two regulation-related trends relevant to vegetation management in Santa Clara County. The first trend that we have identified is that local agencies

are increasing their regulation of vegetative fuel removal and thus are placing pressure on land managers to improve management strategies. The second trend we have identified is that permitting is a major barrier for two of the best fuel removal strategies – prescribed fire and grazing. This summer I worked to identify the current vegetation management practices in the county and how they can be improved to combat the threat of wildfires.

What are the current fuel management practices in Santa Clara County (SCC)?

Prescribed fire, or intentional burning of land, is believed to be one of the best forms of wildfire prevention because it reduces biomass that could potentially burn in a future wildfire while also helping to restore fire-adapted ecosystems and build ecological resilience (Kolden 2019). Currently, one of the best fuel management options available in Santa Clara County is the CAL-FIRE Vegetation Management Program (VMP). The VMP is described as “*a cost-sharing program that encourages fuel reduction in State Responsibility Areas (SRA) and focuses on prescribed fire*” (Gillesse et al. 2019). The state responsibility areas are regions of the state that are not under federal control and do not fall within city boundaries, and CAL-FIRE is the primary agency responsible for fire prevention on these lands (FIRESafe Marin). In Santa Clara County, the SRA lands are largely comprised of rangelands - the lands we are concerned with for the study (FRAP 2020). Through fuel removal strategies including prescribed burns, manual treatment, and mechanical treatment, CAL-FIRE aims to treat 250,000 acres of SRA land across California each year with support from the Vegetation Management Program (Board of Forestry and Fire Protection 2019).

In Santa Clara County from July 1, 2019 - June 30, 2020 (Fiscal Year 19-20), the Santa Clara CAL-FIRE unit treated 756 acres through combined fuel reduction which includes mechanical and manual treatments like mowing or thinning, but excludes prescribed burns. In comparison, the Santa Clara CAL-FIRE unit treated only 9 acres through prescribed burning (Fuels Reduction Activity Report 2020). The number of acres treated this year through prescribed burning was a large drop from the 70.4 treated acres last year - a decrease of nearly 90%. (Fuels Reduction Activity Report 2020). Overall, the Santa Clara CAL-FIRE unit has seen a significant decrease in the number of acres treated through prescribed burns in recent years. There are many potential explanations for this trend we are seeing, and one possibility is that the decrease in prescribed burns is due to negative public perception of prescribed burns. It could also be that resources for wildfire prevention have been directed towards wildfire suppression as we have seen an increase in wildfires across California in recent years.

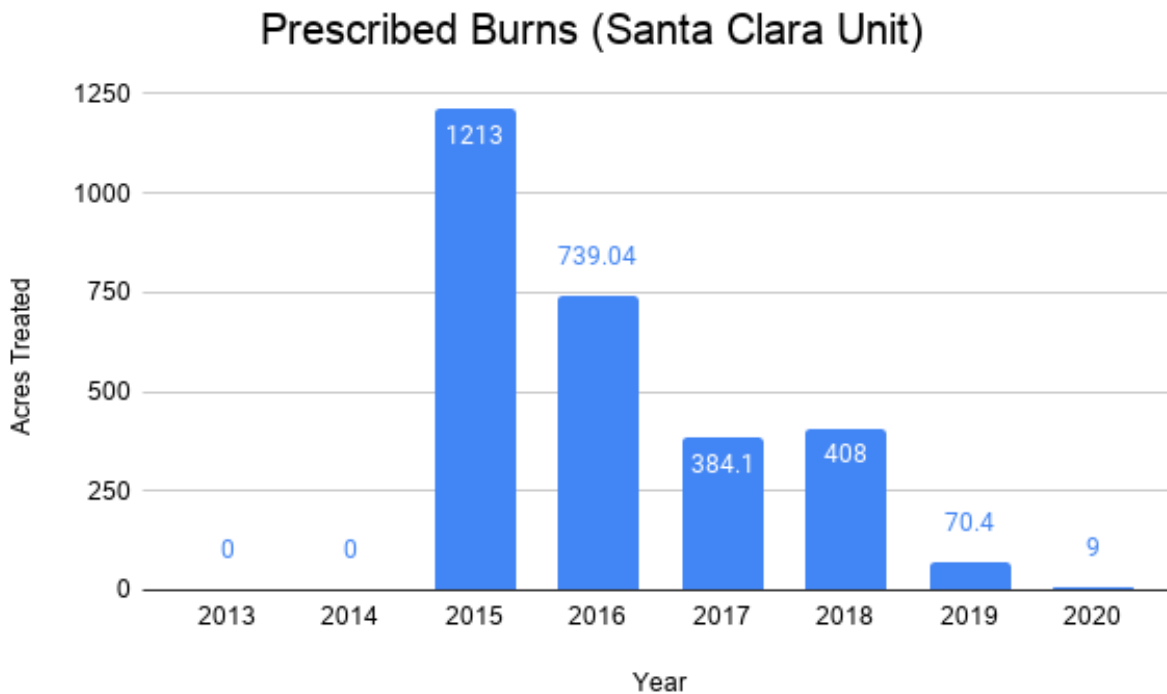


Fig 1. Prescribed burning by the Santa Clara CAL-FIRE unit has decreased greatly in recent years. Data from California Department of Forestry and Fire Protection's Fire and Resource Assessment Program, GIS layer Fire 19_1.

From 2013 to 2020, the Santa Clara CAL-FIRE unit responded to 34 wildfire incidents totaling an estimated 7,490 acres that burned, excluding the large SCU Lightning Complex in 2020 because the wildfire burned a large area outside of Santa Clara County (“Incidents Overview” 2020). There is a clear disconnect in the county’s fire prevention practices as there has been an increase in wildfire incidents, but a decrease in prescribed burns that have the ability to prevent these destructive wildfires.

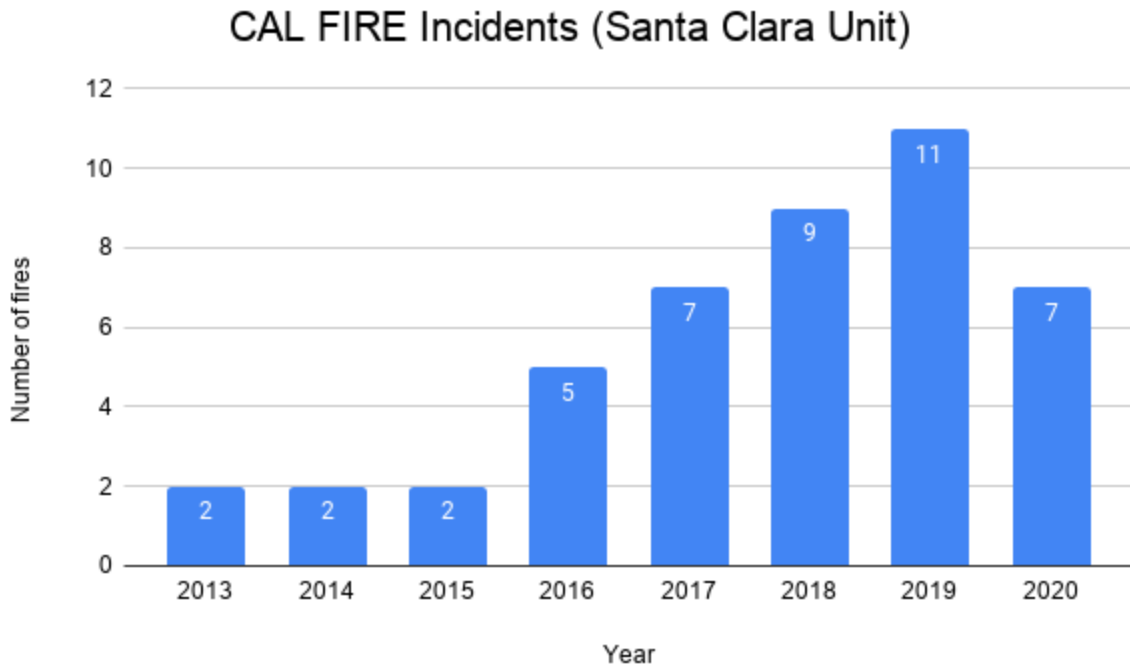


Fig 2. The Santa Clara CAL-FIRE unit has seen an increase in wildfire incidents in recent years. Data from CAL-FIRE Incident Database.

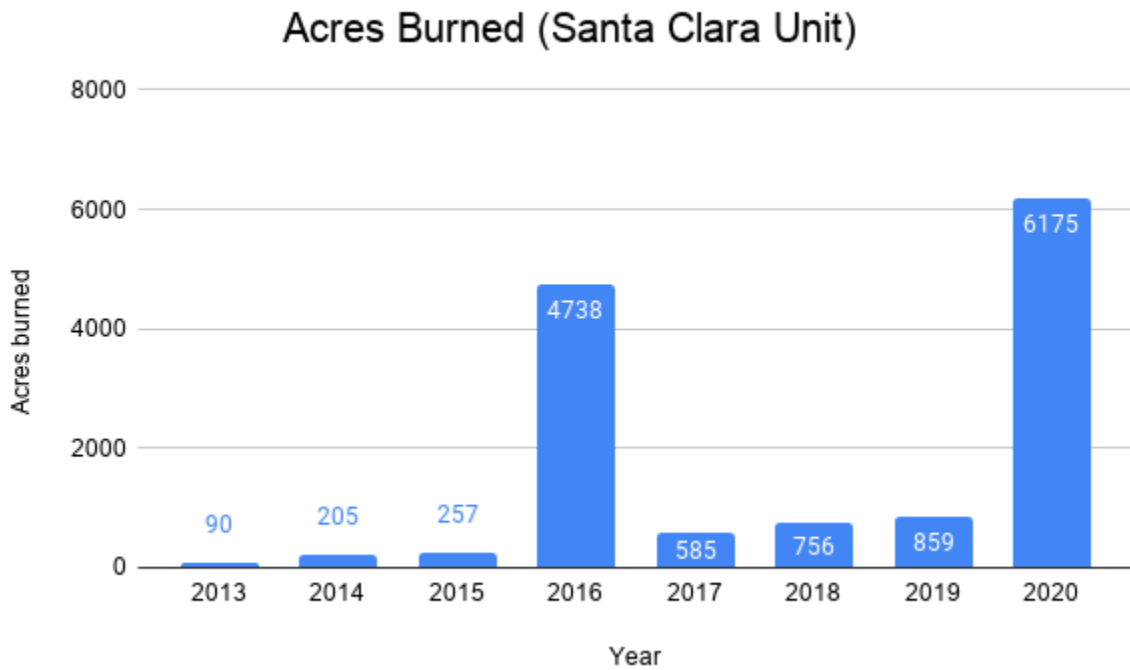


Fig 3. The number of acres that have burned in wildfires in recent years, excluding the SCU Lightning Complex in 2020. Data from CAL-FIRE Incidents Database.

In addition to prescribed fire management, Santa Clara County has also seen efforts of grazing goats for fuel management. We spoke to two different organizations that have utilized goats to graze land, primarily for weed abatement and to reduce dry fuels. One organization was the Santa Clara Valley Water District (Valley Water), which is responsible for water supply and flood protection within the county. Our research team interviewed Marion Blair, Vegetation Program Specialist at Valley Water, to understand the benefits and challenges of Valley Water's goat grazing project. We learned from Blair that Valley Water contracts with a Redding-based contractor and goat-herder who brings 400 goats to the county to remove weeds and fuels on roughly 23 acres each year. This project began about 4 years ago after the district could not spray maintenance roads with herbicide due to compliance with state and regulatory agencies, so they experimented with goats (Adriano 2017). The program proved to be successful with good reception from the general public. The main goal for this program is fuel and weed abatement of invasive plants like stinkwort and star-thistle using goats to graze and create fuel breaks (30 ft from edge of property). Because grazing is less intensive than mechanical treatments like mowing, environmental planners tend to support goat grazing over other mechanical treatments. Grazing might be a better option than mowing from a conservation standpoint, with one meta-analysis finding that grazing has a more positive affect on conservation value for semi-natural grasslands in comparison to mowing (Tälle et al. 2016). If grazing is a better option than mowing, then grazing with goats in the county can be a suitable option for complying with the Santa Clara Valley Habitat Conservation Plan.



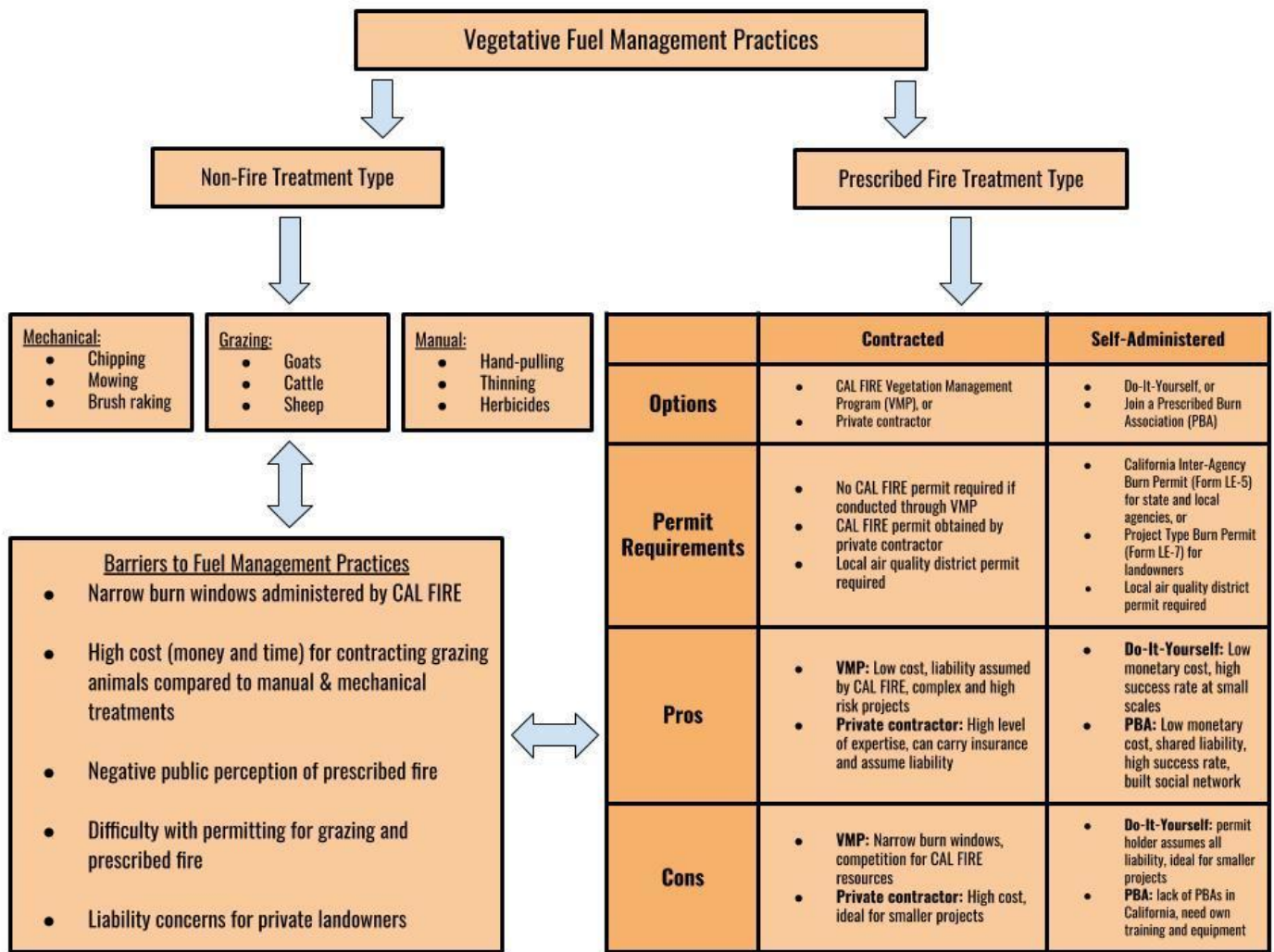
Photo from Marion Blair, Valley Water Vegetation Program Specialist

Despite the many benefits of goat grazing as a fire management practice, it is not likely that grazing will be a scalable approach to fuel management on public lands because of high costs and strict permitting. Blair informed us that it costs roughly \$35,000 for the 23 acres that were grazed, which is nearly three times the price of mowing the same area of land. It is simply much cheaper and faster to contractor laborers who mow the land compared to contracting with a goat grazer. Additionally, we have not identified substantial evidence that proves that grazing is better than mowing for ecosystem health. Other challenges with grazing can arise from difficulties with permitting due to potential water quality and endangered species concerns, and in some cases, the grazing treatment is prevented because of permitting challenges. Blair told us that the water district is regulated by 9 different federal and state agencies, so the permitting challenge is likely exacerbated by dealing with different regulations and regulators who may all have their own sets of rules.

In addition to Santa Clara Valley Water District, we also interviewed Steven Gomez (Operations Manager) and Jonathan Segal (Docent) at Stanford University's Jasper Ridge Biological Preserve. Jasper Ridge staff and students have experimented with goats as a fire management strategy since 2018, following an order to use non-mowing options for vegetation management by the Woodside Fire Marshall after contractors started a 20+ acre fire while mowing lands at Jasper Ridge. Goat grazing proved to be safer than traditional late-season mowing in the grasslands. However, Gomez gave us a similar outlook as Blair on the possibilities of scaling up grazing strategies, explaining that the cost of grazing was significantly greater than mowing, costing roughly \$1600 per acre (compared to \$400 per acre for mowing). Additionally, we were informed that regulatory agencies have gotten more aggressive in the last five years about enforcing fire prevention practices. To add to the challenges with regulations, Jasper Ridge faces a unique problem of having to abide by additional federal regulations which prevent activity during Golden Eagle nesting season (Feb-July), resulting in the goats arriving too late to graze for reducing invasive plants. With such high costs for grazing and intense regulations, the grazing management strategy will likely not be a sustainable option for fire management especially with increasing pressure from regulatory agencies.

What are the barriers in permitting/regulations that slow down fuel management practices?

There are a number of permitting and regulation obstacles that can slow down or prevent certain management practices. With regard to conducting prescribed burns in California, one of the biggest obstacles that burners face is the narrow burn window that is regulated by CAL-FIRE and local air districts. Miller et al (2020) explain that prescribed burning can be restricted by changing weather conditions and long environmental review processes mandated by the National Environmental Protection Act or the California Environmental Quality Act if the project receives state or federal funds. Additionally, if you are a private landowner that wishes to conduct a prescribed burn by yourself, you will also have to assume liability, finance the project, and obtain the necessary permits from CAL-FIRE (Stackhouse and Quinn-Davidson 2019).



With regard to grazing for fuel management, the biggest obstacle will likely be the high costs associated with bringing grazing animals to a local region. Grazing can cost roughly three to four times as much as conventional mechanical or manual treatment methods. Similar to the challenges of prescribed burning, permitting can be another barrier associated with grazing and can even prevent grazing from happening in certain circumstances. As the pressures from climate change and regulatory agencies increases, grazing for fuel removal will likely become more complicated because of water quality concerns and conservation concerns with threatened and endangered species.

In what ways can current fuel management practices be improved on SCC rangelands?

Wildfire prevalence in Santa Clara County is increasing, and communities located in the WUI face higher risks each year. Prescribed burning is a necessary vegetation removal practice to reduce the unnatural buildup of dry fuels and prevent destructive wildfires. The Santa Clara CAL FIRE unit must not continue decreasing their prescribed burn efforts, but instead needs to rapidly increase the number of acres treated each year through prescribed fire. This means that Santa Clara CAL FIRE must begin partnering more with landowners in the rangelands to conduct prescribed burns and reduce the threat of wildfires. Grazing for fuel removal is not likely to be scaled up to the level that prescribed burning can treat lands, but restrictions on grazing need to be re-evaluated to increase local grazing efforts. Additional funding for grazing will allow land managers like Marion Blair and Steve Gomez to utilize grazing in a more cost-efficient manner as pressure increases from local regulatory agencies.

The challenge for range landowners is that they are managing for multiple distinct goals like wildfire risk or wildlife habitat (e.g. water quality), and there are tradeoffs. A solution could be to figure out ways to achieve multiple management goals at once. For example, how can grazing for fuels management be done in a way that protects water quality and avoids nesting areas to protect threatened and endangered species? And how can landowners find ways to conduct prescribed burns without going through a complicated process that may discourage or prevent burn efforts? Private landowners can join or start prescribed burn associations to create a local community of individuals interested in conducting prescribed burns. These associations are an effective way to collaborate with a network of people, share tools and equipment, and assume shared liability for prescribed burn projects (Toledo et al. 2014). However, according to the website calpba.org which lists all of California's prescribed burn associations, there is no prescribed burn association in Santa Clara County. There are only a total of 14 prescribed burn associations across California, and the closest one to Santa Clara County is the Central Coast Prescribed Burn Association which serves San Benito, Santa Cruz, and Monterey counties (California PBA). As we continue this research, we will investigate what type of landowners own rangelands in Santa Clara County to further our understanding of how range landowners are managing vegetation to prevent fires.

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