San Diego, California: A Unique Regulatory Approach To An Expansive Wildland-Urban Interface Challenge

Leaders in Wildfire Adaptation

Introduction

The City of San Diego is intimately familiar with wildfire and its impacts. Located on the southern coast of California and bordering Mexico, this city of nearly 1.4 million people has witnessed firsthand the devastation from the Cedar Fire (2003) and Witch Creek-Guejito Fire (2007), among many others. Although these catastrophic fires have led to important policy, planning, and response improvements, the shrubland landscape, steep canyons, prolonged regional drought, and pockets of open space throughout the city remain an ongoing concern for fast-moving wildfires.

Long and narrow "open space islands" extend throughout the City of San Diego, creating a need for extensive brush management. Photo credit: Molly Mowery, Wildfire Planning International

OVERVIEW

Wildfires across the American West are increasing in frequency, size, and severity. The impacts from climate change and increasing growth within the region's Wildland-Urban Interface (WUI), further exacerbate the risks from wildfires.

Urban areas in the West are increasingly responding to the challenges of wildfire risk management through unique land use planning tools which affect the pace, pattern, and scale of development. San Diego, California is one of five communities profiled by Headwaters Economics in a report identifying some of these innovative land use planning strategies, including:

- A comprehensive brush management policy for any property containing a habitable structure and native vegetation. Homes that do not comply with the multiple zone management requirements and 100 foot defensible space, are billed the amount it costs for a private contractor to thin the property.
- A close partnership with CAL FIRE to pursue mutual mitigation goals, such as open space management, post-fire recovery, defensible space standards, and other wildfire risk reduction measures.

Most of the available land within San Diego's city limits has already been developed and is skirted by a 500 linear mile stretch of Wildland-Urban Interface (WUI). The thousands of structures and flammable brush within the WUI correspondingly makes managing this landscape the primary wildfire challenge. More than 42,000 properties are considered at risk due to their location—particularly where backyards meet dense stands of native or naturalized vegetation in canyons and other open space areas. Further exacerbating wildfire danger to the city, is the present and predicted impacts from climate change. For instance, climate scenarios for San Diego project an increase in average annual temperatures between 3.4-5.9°F by 2090.[1] As such, the city has enforced strict brush management regulations as a way to augment defensible space standards and reduce wildfire risks to properties situated within the WUI.

Although the culture throughout California increasingly favors heightened wildfire awareness, the task to mitigate wildfire impacts to neighborhoods remains a daunting prospect for city fire officials and planners. While San Diego's planning staff and fire personnel work to integrate science and experience with its wildfire risk reduction program, they must additionally factor in other environmental considerations into their decision making efforts, such as habitat preservation for endangered species, hillside erosion, and drought conditions. This requires coordination, communication, and the quest to provide proper guidance for a management framework where there is no "one size fits all" approach.

History of Wildfire in San Diego

San Diego County has experienced three of the top 20 largest wildfires in California history, many of which have also affected the City of San Diego. In 1970, the Laguna Fire burned 175,425 acres, destroyed 382 structures and killed five people. The Cedar Fire that occurred in 2003 in both the City and County of San Diego remains the largest California wildfire to date; the fire burned 273,246 acres, destroyed 2,820 homes and claimed 15 lives. Four years later, the Witch Fire burned 197,990 acres, destroyed 1,640 structures and left two people dead.[2] While these fires are most notable for their size and unfortunate consequences, numerous other wildfires have also affected this wildfire-prone region.

Impacts of Wildfire on the City of San Diego

The varying size and severity of wildfires occurring throughout the city and surrounding areas have resulted in a number of different impacts, including:

SAN DIEGO, CA
Major Wildfires, 2000-2013

The two largest wildfires are described below.

CEDAR FIRE, 2003
288,369 Acres

Total Cost	$33M	Structures Threatened	21,500
Total Personnel	5,203	Structures Damaged	2,883
Firefighters Injured	39	Evacuations Caused	Yes

The Cedar fire was largest in California history. Fifteen people died, entire communities were destroyed, and air traffic control for San Diego and Los Angeles was evacuated -disrupting air traffic across the U.S.

WITCH FIRE, 2007
245,582 Acres

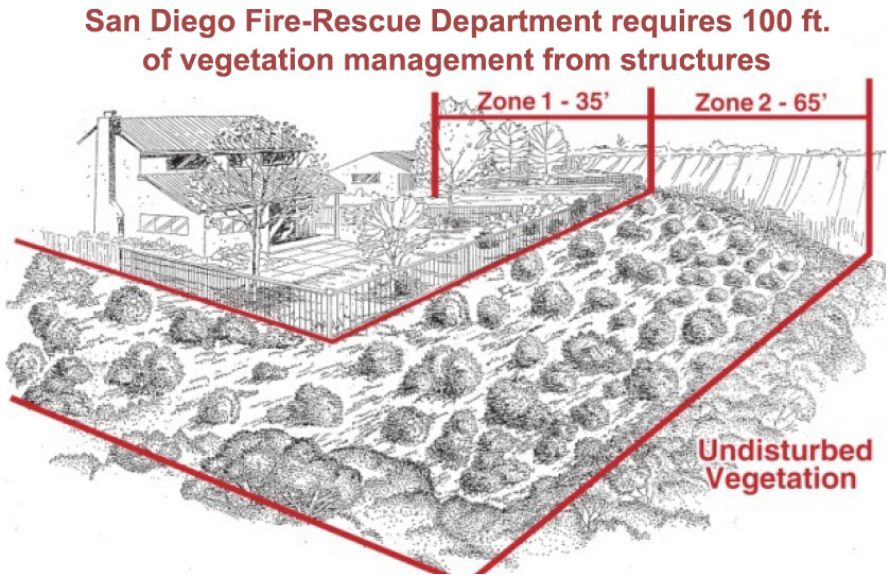
Total Cost	$20M	Structures Threatened	6,800
Total Personnel	2,807	Structures Damaged	1,025
Firefighters Injured	35	Evacuations Caused	Yes

The Witch fire led to two civilian fatalities and evacuations of hundreds of thousands of residents of coastal communities and Indian reservations. High schools, fairgrounds, and Qualcomm Stadium were used as shelters. Major roads including I-15 closed.

• **Community-scale devestation.** Many of San Diego's catastrophic wildfires have heavily impacted entire neighborhoods. The losses that occurred during the Cedar Fire and Witch Creek Fire, for example, destroyed hundreds of homes in relatively small geographic areas of the city. This led to communities such as Scripps Ranch, Tierrasanta, and Rancho Bernardo bearing the brunt of devastation and requiring long-term rebuilding efforts.

• **Death, injuries, and displacement.** Due to the widespread chaparral landscape, wildfires in the San Diego region spread quickly and residents can easily become trapped. While several of San Diego's wildfire incidents have resulted in death, mass evacuations are more common. For instance, during the Witch Creek Fire, more than 500,000 people were evacuated; 200,000 of them within the city. [3] More recently, the 2014 wildfires in San Diego County resulted in a number of evacuations and school district closures. In addition, injuries and illnesses associated with fire and smoke (e.g., burns, asthma, and respiratory distress) are difficult to quantify, but can have real and long-lasting effects on victims.

• **Far-reaching economic impacts.** Following the Cedar Fire, Otay Fire, and other wildfires in 2003, San Diego State University conducted a study to highlight the actual economic costs of wildfire. The researchers concluded that the 2003 fires cost approximately $2.45 billion in suppression and recovery costs. Estimates included lost business economic activity, watershed restoration, Federal Emergency Management Agency (FEMA) assistance, property loss, medical costs, and fire suppression costs.[4]



To help property owners better understand brush management regulations and landscape standards, the San Diego Fire-Rescue Department worked with planning staff to issue an in-depth policy guide. This guide clarifies existing requirements and includes descriptive illustrations such as the one above. Image source: City of San Diego FBP Policy B-08-1

How San Diego Is Addressing Wildfire Risk Through Land Use Planning and Regulations

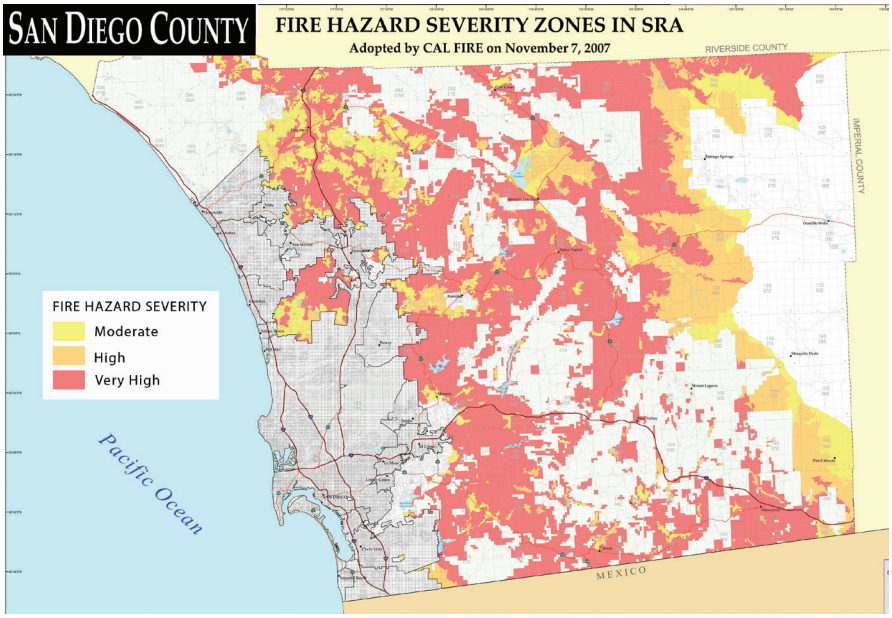
The State of California is known for its robust wildfire protection requirements, as primarily addressed in the California Fire Code and Building Code. San Diego has not only adopted both of these codes into their Municipal Code, but made them more stringent due to local environmental concerns and decades of wildfire incidents. Brush management regulations are chief among their wildfire mitigation approaches.

Brush Management Regulations

San Diego Municipal Code's Landscape Regulations seek to fulfill multiple objectives: minimize erosion of slopes and disturbed lands; conserve energy by shading streets and other paved surfaces; improve appearances of the built environment; and reduce the risk of fire through site design and the management of flammable vegetation.[5]

The city's comprehensive brush management regulations apply to any property containing a habitable structure and native or naturalized vegetation. These properties are required to follow a two-zone approach, where activities such as weed control, vegetation thinning, and tree removal occur according to each zone.

The San Diego Fire Marshal's office inspects properties to ensure they are in compliance with brush management requirements. If an inspection reveals that the property does not meet the requirements, the legal due process can take up to a total of 70 days for compliance. If the property owner still fails to comply, the city will hire a private contractor and send the bill to the property owner. Failure to pay may result in a lien (special assessment tax) being placed on the property.



CAL FIRE maintains state and local responsibility area maps that show fire hazard severity zones, as required by state law. The City of San Diego is currently designated as being within a Very High Fire Hazard Severity Zone, and therefore their upcoming General Plan Safety Element update will require a more comprehensive set of review and policy recommendations to incorporate wildfire. Image Source: CAL FIRE (fire.ca.gov)

Evolving Standards and Alternative Means

San Diego's brush management requirements are complicated by a host of factors. For example, the city's Land Development Code requirements related to brush management originated in 1989, and have already been modified eight times. The definition of zones has changed over time, from using three zones and a total length exceeding 100 feet of brush management to a modern adoption of two zones totaling 100 feet or less. This means that older established communities have been grandfathered in to comply with one code while newer, post-1989 homes fall under a different set of code requirements.

Requirements are also detailed and strict—brush management must be done in a manner that both reduces the local fire hazard and minimizes impacts to undisturbed vegetation to protect sensitive biological resources. Property owners that "over clear" (i.e., remove too much vegetation, even with the best of intentions) may be fined thousands of dollars to repair environmental damage to these sensitive landscapes.

Property owners who do not comply with the 100 foot brush management standards are the billed the amount it costs to hire a private contractor to thin the property's vegetation. Failure to pay may result in a lien on the property.

Finally, some homeowners simply may not have enough property to satisfy the required 100 total feet of brush management. In this case, the fire department must sign off on the "alternative means" allowed during the development application process—that is, property owners may still develop in wildfire-prone areas if they incorporate additional structural hardening features (e.g., sprinklers, highest rated ember-protective vents, and heat-resistant windows).

Equally important, fire officials see education as part of the solution. "Defensible space compliance is driven by codes and public education," emphasizes Eddie Villavicencio, Supervising Deputy Fire Marshal for San Diego Fire-Rescue Department. City fire officials believe that the best defense against wildfire is through brush management and in doing so, actively engage in ongoing efforts to meet with homeowners' associations, attend workshops, and educate property owners about the importance of wildfire safety through defensible space.

New Effects from CAL FIRE Further Promote Land Use Planning

Every county and city in California is required to adopt a General Plan, which is a comprehensive planning document that provides a blueprint for a community's long term future growth. General Plans must address land use, conservation, safety, circulation, noise, open space, housing, and other applicable issues. The California State Board of Forestry and Fire Protection recently rolled out a new initiative to ensure that communities are adequately addressing wildfire as part of each community's General Plan.[6] Through this process,

Expanding development within San Diego's WUI and an extensive surrounding chaparral landscape requires a compreshensive approach towards vegetation thinning and management. Photo source: Molly Mowery, Wildfire Planning International.

California's Department of Forestry and Fire Protection (CAL FIRE)—which oversees wildfire prevention, education, and mitigation programs across the state—works with local planning and fire departments to ensure that the Safety Element of a General Plan includes specific goals, policies, and references related to land use planning and protection against wildfire. Specific topics may include development codes, conservation and open space, circulation and access, defensible space, emergency services, and post-fire safety recovery and maintenance. Counties and cities will have different requirements depending on their fire hazard severity zone rating assigned by the state. Including this information in the General Plan helps prioritize wildfire as a planning directive for the local community and also offers the opportunity for the local agencies to mutually engage with state agencies about transboundary wildfire hazards and community protection.

San Diego Prepares for Wildfire Risks and the Impacts of Climate Change

The State of California maintains "Cal-Adapt," a website providing climate data and information from the scientific and research community to help users understand how climate change might affect California at the local level. For instance, a local climate snapshot provided by Cal-Adapt suggests that future temperature ranges for San Diego will significantly increase, as much as 6˚F by 2090, and precipitation patterns will become increasingly unpredictable.[7] Future wildfire risk is additionally expected to increase in terms of area burned, particularly for the eastern part of the city where wildfires are already a threat from neighboring county lands.

The City of San Diego, along with other communities throughout southern California, has also been experiencing prolonged drought and other changes in precipitation patterns. Due to the severity of the drought, the city has been mandated by the state to cut its collective water use by 16 percent between June 1, 2015 and February 13, 2016.[8] As mandatory water use restrictions have taken effect, fire officials have reviewed and updated relevant brush management practices to ensure all recommendations are compatible with both wildfire risk reduction and water conservation. It is, however, an ongoing concern that will continue to be evaluated and updated accordingly.

Key Takeaways

Implementing and enforcing regulations can result in measurable risk reduction. Significant wildfire tragedies have shaped San Diego's past while resulting in sophisticated brush management regulations and other proactive approaches to improve wildfire response and public safety. The city's detailed mitigation approach considers many diverse factors, such as reducing flammable vegetation while protecting sensitive habitat, conserving water, and controlling for erosion. It also achieves something rare: the ability to regulate and enforce fire risk reduction on all properties threatened, not just those that may be undergoing development. Tracking more than 42,000 homes at risk is no small feat, but staff are successfully implementing and enforcing regulations across the city. The ability to implement a comprehensive set of landscaping requirements may be a formidable responsibility to consider for less regulatory-friendly communities.

However, San Diego provides a successful example of what can be achieved when regulations are part of the community wildfire reduction approach.

Incorporating wildfire education as part of the risk reduction process. Even as the city has boosted its ability to respond to and reduce the likelihood of large wildfires throughout its WUI, it still faces a number of small but high-risk open space pockets throughout its jurisdiction. These areas leave a number of neighborhoods vulnerable to fast-moving brush fires. As fire officials have emphasized, regulations are only part of the overall approach to risk reduction. Efforts also must include public education to counteract apathy resulting from fewer recent wildfire losses on a local scale. As part of this education, extensive outreach is involved, including engaging with the public at workshops, forums, door-to-door site visits, and through educational handouts. Together, the holistic mitigation strategy of fuel management, outreach, regulations, and enforcement is helping San Diego become an increasingly fire-adapted community.

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Key Resources

Development Services Department	http://www.sandiego.gov/development-services/index.shtml
Fire-Rescue Department	http://www.sandiego.gov/fire/
Water (Public Utilities)	http://www.sandiego.gov/water/
Documents	
Brush Management Guide	http://www.sandiego.gov/fire/pdf/brushpdf.pdf
San Diego Municipal Code, Chapter 14: General Regulations, Article 2: General Development Regulations, Division, 4: Landscape Regulations	http://docs.sandiego.gov/municode/MuniCodeChapter14/Ch14Art02Division04.pdf#page=25
The City of San Diego, Clarification of Brush Management Policy and Landscape Standards	http://www.sandiego.gov/fire/pdf/brushpolicy.pdf
Other Resources	
Brush Management and Weed Abatement, Very High Fire Hazard Severity Zones, Very High Fire Hazard Severity Zone Map	http://www.sandiego.gov/fire/services/brush/severity-zones.shtml
cal-adapt, Exploring California's Climate Change Research	http://cal-adapt.org/
CAL FIRE	http://www.fire.ca.gov/
California Office of the State Fire Marshal	http://osfm.fire.ca.gov/

References

1. Temperature range depends on a low versus high emissions scenario. Additional details and information available online: http://cal-adapt.org/.

2. Source: CALFire, Top 20 Largest California Wildfires, published 9/11/2015. Available online: http://www.fire.ca.gov/communications/downloads/fact_sheets/20LACRES.pdf.

3. As described under the San Diego Fire-Rescue Department website, Major Fires and Incidents. Available online: http://www.sandiego.gov/fire/about/majorfires/index.shtml.

4. Diaz, John M. Southern Fire Exchange, Economic Impacts of Wildfire (SFE Fact Sheet 2012-7). Available online: http://www.southernfireexchange.org/SFE_Publications/factsheets/2012-7.pdf.

5. San Diego Municipal Code, Chapter 14 General Regulations, Article 2: General Development Regulations, Division 4: Landscape Regulations.

6. In accordance with California Government Code Section 65302.5.

7. Temperature range depends on a low versus high emissions scenario. Additional details and information available online: http://cal-adapt.org/.

8. Source: City of San Diego Public Utilities, Drought Information and Resources. Available online: http://www.sandiego.gov/water/conservation/drought/.