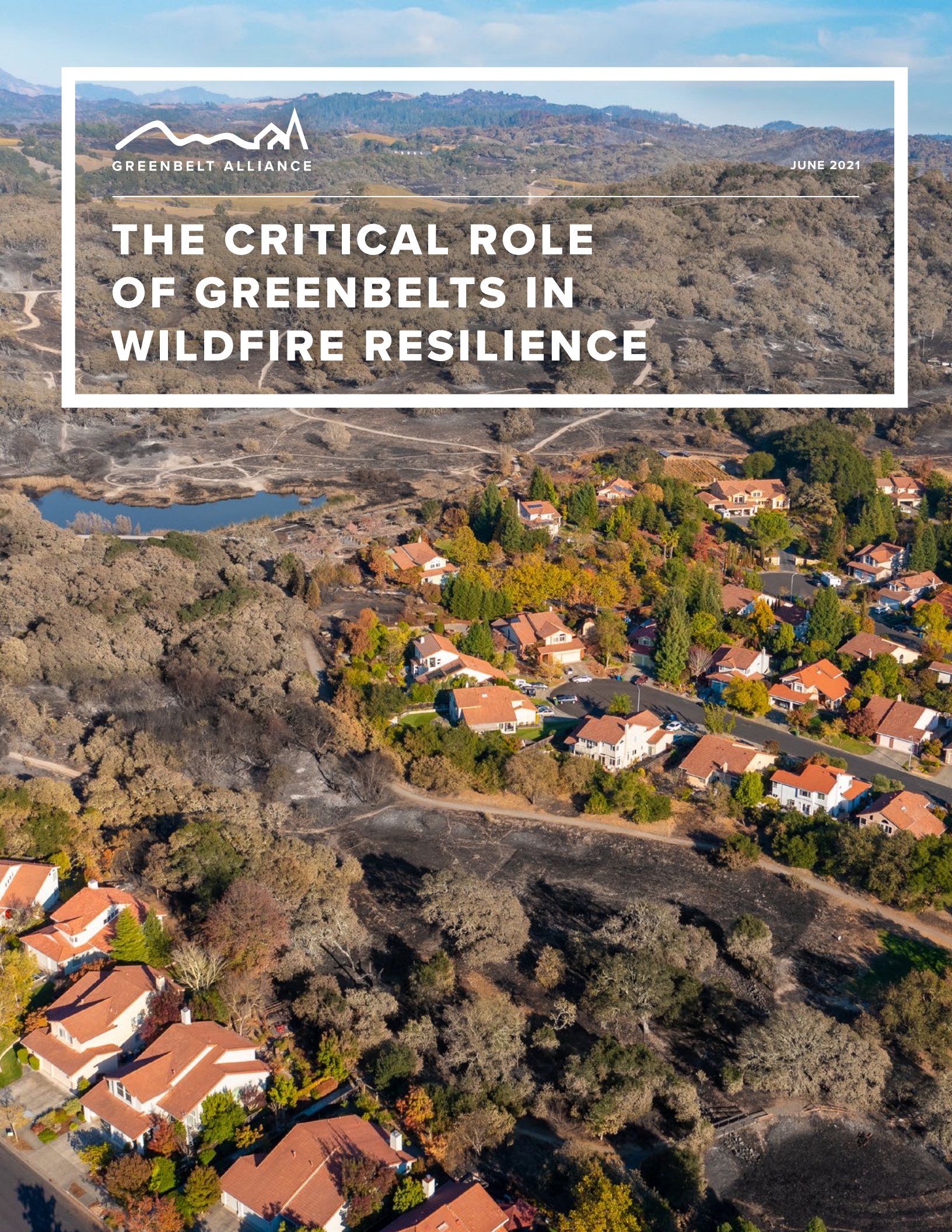


GREENBELT ALLIANCE

JUNE 2021

THE CRITICAL ROLE OF GREENBELTS IN WILDFIRE RESILIENCE





EXECUTIVE SUMMARY

The Bay Area is at a tipping point in its relationship to wildfire. Decision makers, planners, and advocates must work together on urgent solutions that will keep communities safe from wildfires while also addressing the acute housing crisis. There is huge potential for the Bay Area, and other places across the Western US, to accelerate greenbelts as critical land-use tools to bolster wildfire resilience.

Through original research and an assessment of case studies, Greenbelt Alliance has identified four types of greenbelts that play a role in reducing the loss of lives and homes in extreme wildfire events while increasing overall resilience in communities and across landscapes, including:

1. **Open space, parks, and preserves**
2. **Agricultural and working lands such as vineyards, orchards, and farms**
3. **Greenbelt zones strategically planned and placed inside subdivisions and communities**
4. **Recreational greenways such as bike paths, playing fields, and golf courses**

Cover image: Kincade Fire Greenbelt Burn Area at Edge of Windsor, CA by Thomas Rennie. Images this page: (Clockwise from top left) Escaflowne, Bjorn Bakstad, Erin Donalson, f00sion, Bill Oxford

The role these types of greenbelts play in loss prevention and resilience include:

- Serving as strategic locations for wildfire defense
- Acting as natural wildfire buffers to create separation from wildlands
- Increasing overall wildfire resilience through land stewardship
- Conserving biodiversity on fire-adapted lands while reducing risk
- Providing wildfire-resistant green spaces inside and surrounding neighborhoods

In addition to these four core types of greenbelts, new research, emerging concepts, and innovative approaches to greenbelts show promise.

This research makes the case for policymakers to prioritize the protection, expansion, and long-term stewardship of greenbelts in high wildfire risk areas to achieve wildfire defense and risk reduction benefits. It also reiterates the demand for future growth to be channeled within existing cities and towns to address the housing crisis while avoiding new development in the high wildfire risk areas. And it emphasizes the need for enhanced land stewardship of greenbelts to unlock their wildfire-resilience benefits with sustainable funding allocated for permanent protection and long-term management.

POLICY RECOMMENDATIONS

Local, regional, and state policymakers, planners and their consultants, and the advocates and nonprofits working on solutions should put this research into action and deliver on the following recommendations:

Recommendation 1
Prioritize increasing greenbelts as strategic locations for wildfire defense through policy and planning.

Recommendation 2
Enhance stewardship on greenbelts to restore beneficial wildfire regimes and increase overall wildfire resilience of landscapes.

Recommendation 3
Incorporate greenbelts into new developments and calibrate them to maximize wildfire risk reduction.

Recommendation 4
Explore the feasibility of a new Community Wildfire Resilience Zone.

By implementing these recommendations, we can achieve a more climate-resilient Bay Area where we coexist with wildfire by elevating the role of greenbelts. This fresh perspective on the wildfire-resilience benefits of greenbelts is widely applicable beyond the Bay Area to fire-prone communities across California and other western states.

INTRODUCTION

Wildfire is a widespread and increasingly frequent hazard in the San Francisco Bay Area. Over the past 60 years, the region has experienced over 500 wildfires, including fast-moving and devastating blazes.[1] The incredible losses and record-breaking wildfires in the Bay Area and across California, Oregon, and Washington in 2020 represented a tipping point: extreme occurrences are now becoming part of the foreseeable future. Here in the region, the impacts of devastation and loss, unbreathable air quality, and evacuations were widely felt. Driven by drier winters, later rainy seasons, hotter summers, drought, and high winds—and the resulting social, ecological, and economic damages—the increased occurrence of wildfires are on track to continue intensifying with climate change. And the Bay Area is not ready.

As the region recovers and prepares for the next wildfire season, communities and policymakers are grappling with how to forge a path toward a more resilient Bay Area. What steps are needed to ensure the region is prepared, able to respond, and recover more quickly from the next extreme wildfire and other natural disasters? There is no simple solution to reducing the risks. However, the Bay Area's commitment to protecting natural and working lands while promoting climate-smart, city-centered growth may be playing a critical (yet overlooked) role in helping reduce the spread and damages of recent wildfires.

Greenbelt Alliance is deepening our body of research to understand climate risks and pinpoint the innovative solutions that will accelerate the Bay Area's resilience to multiple hazards, including sea-level rise, flooding, drought, and wildfire. As part of this work, we investigated whether greenbelts play a role in reducing the loss of lives and homes during wildfires. We also explored how land-use and climate-smart growth policies contribute to reducing wildfire risk to communities.

We found that greenbelts are indeed serving as critical tools in wildfire protection planning, preparedness, firefighting, and climate resilience on lands and in communities. These findings shape our policy recommendations for actions the Bay Area should take to elevate the role of greenbelts and land-use policies in comprehensive wildfire planning, especially if this region is going to become truly resilient in the face of climate change.

This research, associated findings, and recommendations are particularly relevant now as the Bay Area and California at large are formulating wildfire resilience plans, investments, and legislation on the heels of the largest wildfire season recorded in the state's modern history. Our findings are also applicable to other fire-prone communities as core concepts to elevate when planning and formulating policies to address the threat of future wildfires.

BACKGROUND

In the San Francisco Bay Area, natural and working lands are widely recognized as providing multiple environmental, economic, and public health benefits.[2] After the massive wildfires seen across the West in the past decade, the role of greenbelts is being elevated by wildfire professionals, land managers, policymakers, researchers, and wildfire ecologists as a means for reducing wildfire risk to lands and people.

We think there is huge potential for the Bay Area to accelerate this approach.

WHAT IS A GREENBELT?

We define greenbelts broadly as open space, parks, preserves, and agricultural lands which surround or are adjacent to a city or urbanized area that restricts or prohibits residential, commercial, and industrial development.[3]

For this white paper, we have refined our definition to four general categories, below.

WHAT IS A WILDFIRE?

A wildfire is an unplanned wildland fire that can be ignited by natural triggers such as lightning strikes or by human activities, like escaped prescribed fire projects.[4] People cause nearly 80% of all wildfires nationally,[5] and in California almost all wildfires (95%) are due to human activity.[6]

Fire is a natural occurrence in the landscape across the West. Many of the native plants, bushes, and trees are fire adapted, meaning that natural wildfires are beneficial to their life cycle, and many landscapes need fire to thrive.

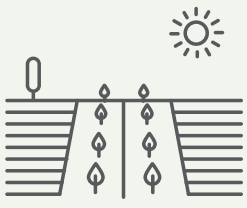
Indigenous people have been practicing controlled, deliberate burns in North America for millennia for land management and for cultural purposes, which has shaped the landscapes over time. While some California tribes never stopped their traditional stewardship practices, others do not have access to their original lands or legal authority or power to continue their

The Four Types of Greenbelt

1

Open space, parks, and preserves

2



Agricultural and working lands such as vineyards, orchards, and farms

3

Greenbelt zones strategically planned and placed inside subdivisions and communities

4

Recreational greenways such as bike paths, playing fields, and golf courses

traditional stewardship practices. Some tribes have seen recent success in restoring this cultural practice, while other non-tribal groups have also demonstrated adopting fire for landscape management.

Wildfires have become more extreme and damaging to communities due to factors including:[7]

- Location of millions of homes in the Wildland-Urban Interface (WUI)
- Decades of wildfire suppression by government agencies
- Commercial logging[8]
- Utility line failure and vulnerable infrastructure
- Hotter, drier weather as a result of climate change

In addition to the threat to public safety and property, wildfires can:[9]

- Release greenhouse gases contributing to further climate change
- Degrade air quality due to wildfire smoke spreading or toxins released when structures, cars, and other materials burn
- Impede water quality in watersheds impacted by wildland fire and smoke
- Damage natural environments, with lasting impacts to slopes and soils, leading to hillside destabilization, erosion, and landslide[10]
- Cause power outages and trigger public safety power shutoffs
- Disrupt transportation systems and patterns, preventing or affecting distribution of necessary goods throughout the region
- Displace residents and increase existing regional housing pressure, impacting low-income residents most severely
- Disrupt economic systems and patterns regionwide
- Increase likelihood of long-term physical health impacts
- Increase likelihood of mental health impacts

WHAT ARE WILDFIRE HAZARDS AND RISKS?

In California, wildfire "hazard" is determined by the California Department of Forestry and Fire Protection (CAL FIRE) based on the physical conditions that give a likelihood that an area will burn over a 30- to 50-year period.[11]

Wildfire "risk" is the potential damage a fire can do to an area under existing conditions considering the susceptibility of what is being protected.[12]

Wildfire is influenced by geography, climate, fuels, weather, and topography.[13] In California, wind is the driving force in the most damaging wildfires that enter communities, as it is almost impossible to control and causes embers to fly far ahead of the wildfire's flames. Diablo wind events in the Bay Area are associated with warm, dry gusts that have been linked to many of the region's most damaging fire events. Home-to-home ignition then spreads the flames. That is why home hardening and defensible space are essential as a starting point for wildfire resilience at the individual property scale, but not sufficient to address wildfire risk. Embers can also fly over greenbelts and cause spot fires, another reason why multiple strategies are needed to create more wildfire-resilient communities and landscapes.

The single biggest risk factor driving loss of lives and homes to wildfires is the location and arrangement of homes in high fire risk lands in the WUI.[14] It is not the shape and steepness of the land, not the types of trees and brush that grow there, not the gaps between a house and trees that the wildfire has to cross, not even how likely a building's materials are to catch fire.[15] It is the placement of homes at medium density scattered on ridges, hillsides, in canyons, and on other rural lands with typically winding, narrow roads far from city centers that put people and property at the highest level of loss to wildfire. That placement alone significantly increases the chances that a home will not survive a wildfire.

One of the reasons for this is that if fire is in or near the WUI, firefighters must focus their attention on protecting homes, which may let the fire become

Smoke from a fire rising over residential areas in south San Jose by Sundry Photography

uncontrolled elsewhere (especially if their efforts have to be spent on evacuations or convincing people to leave their homes). In wildland fires, firefighters can focus efforts more broadly and strategically to prevent large spread of wildfire.

The lowest wildfire risk is in the urban areas of high density and in very-low-density ranch or farm areas with one or two houses surrounded by large acreage. Therefore, city-centered, climate-smart growth inside urban growth boundaries—a boundary that defines where development should and should not happen—combined with protecting agricultural and open spaces outside of these boundaries is a proven land-use policy for reducing wildfire risk.

WHAT IS THE WILDLAND-URBAN INTERFACE?

An area of land where houses (the built environment) meet wildland vegetation (the natural environment) is called the Wildland-Urban Interface (WUI). Growth in the WUI often results in more wildfire ignitions, putting more lives and homes at risk. In short, WUI areas are where wildfire problems are more pronounced.[16]

WUI areas can take different shapes and forms:

- Development that is scattered throughout the wildland vegetation, which is often found in rural or large-lot suburban developments (practitioners call this Intermix WUI)
- Development that is grouped near areas with wildland “fuels” or vegetation, with a clear line separating the development and vegetation. For example, development bordering public lands or when an urban growth boundary[17] is in place (practitioners call this Interface WUI).
- More urban environments right up against an island of wildland fuels, like a community park, open space, greenbelt, or other natural areas[18]

Every single state in the US has a WUI where one-third of all US homes are built. California has the most people living in the WUI with 32% of all housing units in this area. This amounts to 11 million people in California living in the Wildland-Urban Interface. About 3.5 million vulnerable residents live in the WUI in the nine-county Bay Area, about half the population.[19]

FINDINGS AND DISCUSSION BY GREENBELT TYPE

Greenbelt Alliance has found ample evidence that greenbelts of various types can and do play a role in reducing the loss of lives and homes in extreme wildfire events while increasing overall wildfire resilience in communities and across landscapes.

Greenbelts play a beneficial role in reducing wildfire risk and improving resilience in several ways:

- Serving as strategic locations for wildfire defense
- Acting as natural wildfire buffers to create separation from wildlands
- Increasing overall wildfire resilience through land stewardship
- Conserving biodiversity in fire adapted lands while reducing wildfire risk
- Providing wildfire-resistant green spaces inside and around neighborhoods

Our findings and discussion are grouped by four greenbelt types with case studies and examples of illustrative approaches included to further make the case for greenbelts' role in wildfire resilience. These greenbelt types include:

1. **Open space, parks, and preserves**
2. **Agricultural and working lands such as vineyards and farms**
3. **Greenbelt zones strategically planned and placed inside subdivisions and communities**
4. **Recreational greenways such as bike paths, playing fields, and golf courses**

1 OPEN SPACE, PARKS, AND PRESERVES

Lands adjacent to high wildfire risk communities such as existing parks, open spaces, and preserves can serve multiple functions to reduce wildfire hazards and risk. From our research, these natural greenbelts demonstrated the strongest role and potential for reducing risk to lives and homes from wildfire and increasing wildfire resilience as follows:

- **A Serving as strategic locations for wildfire defense**
- **B Acting as natural wildfire buffers for communities to create separation from wildlands**
- **C Increasing overall wildfire resilience through land stewardship**
- **D Conserving the high biodiversity found on high wildfire risk lands**

While parks tend to be more focused on recreation, open spaces and preserves are more often protected specifically for habitat and ecosystem benefits. All three are typically natural areas. These types of greenbelts are usually publicly owned, permanently protected, and consistently managed. In some cases, such lands are privately owned by nonprofits or landowners through conservation easements or other legal mechanisms.

1A Serving as Strategic Locations for Wildfire Defense

Existing parks, open spaces, and preserves near communities are often used for firefighting and staging areas. These undeveloped lands provide space for

firefighters to create fuel breaks,[20] set backfires[21], and mount a defense to control or contain a wildfire before it reaches nearby homes and neighborhoods. Established trail systems, bike paths, and fire roads in parks have been utilized by firefighters as access points to slow or stop wildfire spread. Water and fire retardant drops by airplanes can be safer and more effective when public lands are available close to a community, as dropping directly into neighborhoods is dangerous to people, animals, and property.

1B Acting as Natural Wildfire Buffers to Create Separation from Wildlands

Open space, parks, and preserves act as natural wildfire buffers by creating distance between approaching wildfires and communities. As demonstrated in the following case studies, large open space areas can help with containment and spread of wildfire depending on the type of habitat and condition of the landscape. The separation provided by open space alone can be beneficial by providing a buffer for the wildfire to burn before reaching homes and neighborhoods. Ultimately, if the wildfire continues to burn through open-space areas towards homes, it can provide more time for people to see it coming and evacuate.

If managed as a greenbelt buffer with appropriate land stewardship to reduce wildfire risk, open space can help slow the speed and reduce the intensity of a wildfire. The size and parameters of community wildfire buffers need to be site specific, but researchers suggest prioritizing lands that are within one-quarter mile of a town or city.[22] Read more below in Community Wildfire Protection Zones on page 21.

1C Increasing Overall Wildfire Resilience through Land Stewardship

Ecologically sound and site-specific land stewardship before and after wildfires in parks, open spaces, and preserves can contribute to the overall climate resilience of lands by restoring ecosystems adapted to beneficial fire regimes. This can reduce the size and number of extreme wildfires that threaten communities and conserve biodiversity.[23]

The parks, open spaces, and preserves that were most functional for reducing wildfire risk benefited from

Sonoma Valley Regional Park by Nels Andereck

Land Restoration After Wildfires

While greenbelts can and do play a role in wildfire defense and resilience, firefighting and the wildfires themselves take a toll on the land. That is why additional consideration, action, and funding must be given toward natural and working lands for restoration.

During the 2017 Sonoma Complex fires, 26.6% of the 87,000 acres burned were public or protected open space lands. Since then, many thousands of acres of other parks and preserves have burned, and several have burned for a second time. In Sugarloaf Ridge State Park, which burned in the 2017 Nunns Fire and then again in the 2020 Glass Fire, large bulldozed lines left behind large swaths of empty ground previously well canopied by oak, madrone, and bay laurel. These firebreaks are slowly being restored with volunteer help and grants. In most cases, the restoration of the lands after a wildfire is not funded. Land managers, nonprofits, and volunteers need to fundraise and do the work themselves. This often takes months and years for progress to be made. The impacts of firefighting and wildfires on the land need to be addressed with funding mechanisms identified.

ongoing land stewardship designed to restore healthy forests and ecosystems by government agency land managers, nonprofit organizations, and volunteers. Natural greenbelt lands adjacent to, near, or surrounding communities that are stewarded for environmental health and ecosystem services, such as clean water and biodiversity, can foster and restore wildfire regimes that are beneficial to the landscape. Enhancing such stewardship is expected to result in healthier fire-prone landscapes and help reduce the number and intensity of extreme events that cause the worst and most expensive damages to nearby communities.

Enhanced stewardship for wildfire resilience may include several options that need to be site-specific. These may include prescribed and cultural burns; targeted removal of dead trees, leaves, and branches, and the creation of shaded fuel breaks, appropriate grazing, and ongoing, adaptive management.

1D Conserving Biodiversity in High Wildfire Lands While Reducing Risk

Protecting lands around communities in high wildfire severity areas has the potential to provide multiple benefits to wildfire risk reduction and biodiversity. Fire ecology scientists found that strategically conserving private lands with high biodiversity that have development potential and are located in high wildfire severity areas is a cost-effective public investment that provides multiple benefits in the long term.[24] Compared to allowing development and performing fuel reduction and vegetation management to reduce wildfire risk, which tend to conflict with biodiversity and the protection of natural resources, strategic land acquisition results in the better outcome of both reduced wildfire risk and protection of biodiversity.

This research was conducted in Southern California primarily around San Diego in high wildfire risk areas that were also rich in biodiversity and under development pressure. In this study, researchers considered wildfire risk reduction strategies such as thinning of vegetation removal, development patterns, and richness of species. They found that strategic land acquisition may be a more effective long-term approach for reducing fire risk and protecting biodiversity in Southern California than vegetation treatments alone.

In other words, there is a higher return on investment in terms of conservation and wildfire risk reduction by protecting lands from development than allowing new homes to be built where they are likely to burn down, even if the landscape is managed to reduce buildup of flammable plants and other materials. The research found that these results likely generalize to any place where high species richness overlaps with hazardous wildland vegetation.

Given that the state of California is considered an international biodiversity hotspot and that the Bay Area is a "hotspot with a hotspot,"[25] there is certainly plenty of reason to consider protecting these greenbelt lands as part of the overall wildfire resilience strategy here and across the state.

CASE STUDIES: NORTHERN CALIFORNIA, SONOMA COUNTY

Between 2017 and 2020, Sonoma County experienced a series of wildfires where many lives and homes were lost. In several situations, Sonoma County parks, open spaces, and preserves around towns were strategically situated for firefighting and served as natural wildfire buffers between the wildlands and communities.

2019 Kincade Fire and Regional Parks Save Town of Windsor

Key Take-away: Regional park adjacent to town in county with longstanding land-use policies that protect open space and prevent sprawl created a wildfire buffer where firefighters were able to pre-position strike teams to stop the wildfire from spreading to neighborhoods and save lives.

Greenbelt Type: Open Space, Parks, and Preserve including Foothill Regional Park and Shiloh Regional Park. A vineyard on the edge of town also served as a greenbelt buffer.

Greenbelt Role: Wildfire defense, wildfire buffer

Community Wildfire Risk: Low (CAL FIRE). Populated areas in Windsor have, on average, greater risk than 30% of communities in California.

Wildland-Urban Interface: Parts of the city and most of the park is in WUI.

Jurisdictions/Agencies: Town of Windsor, County of Sonoma, Sonoma County Regional Parks, Sonoma County Fire District, CAL FIRE

Key Land-Use Policies: Voter-approved city Urban Growth Boundary and county Community Separators

The Story

The most dramatic instance of open-space lands reducing loss of lives and homes occurred during the Kincade Fire in 2019. The wildfire was sparked by failing Pacific Gas & Electric (PG&E) power transmission towers that blew down from The Geysers geothermal field on the flanks of the Mayacamas Mountains in the northeast corner of Sonoma County. The town of Windsor was saved in large part by the regional parks and open space on its boundary where firefighters defended homes from flying embers and flames.[26] There was a clear line where the neighborhood ended due to long-standing voter-approved urban growth boundaries that prevented urban development beyond the boundary. On the other side is where the regional park began.

The Foothill Estates subdivision of about 150 homes on the edge of the town of Windsor was directly in the wildfire's trajectory. The 211-acre Foothill Regional Park situated immediately adjacent to the subdivision provided firefighters a greenbelt buffer just beyond backyards and fences to position their trucks and equipment, build backfires, and position bulldozers to create fuel breaks. The wildfire was stopped there with no lives lost.[27]

Northeast of town on Arata Drive and Brooks Road, the wildfire was also more easily contained where undeveloped land at the city limits merged into voter-protected community separators and agricultural land used for grazing and vineyards. These 300 acres outside of the Urban Growth Boundary helped save the Elsbree subdivision from the wildfire that was bearing down from the north.

Windsor also benefited from its proximity to Shiloh Regional Park when firefighters used bulldozers to carve fire lines and light backfires through the park to help defend the town and stop the fire's spread.[28]

The important functions of the park and vineyards were coupled with early evacuation of the town and the availability of firefighters and trucks to mobilize in the town of Windsor as there were no nearby wildfires burning at the time.[29]

2020 Glass Fire and State Park in Santa Rosa

Key Take-away: The established hiking and biking trails and existing fire roads in the state park adjacent to a large senior community located on the edge of the city allowed firefighters access to a natural wildfire buffer where they mounted a defense that stopped the wildfire from spreading into the city and beyond, saving lives.

Greenbelt Type: Open Space, Parks, and Preserve including Trione-Annadel State Park

Role: Wildfire defense, wildfire buffer

Community Wildfire Risk: Low to Very High Severity Zone (CAL FIRE). Populated areas in Santa Rosa have, on average, greater risk than 36% of communities in California.

Wildland-Urban Interface: Partially

Jurisdictions/Agencies: City of Santa Rosa, State of California, Santa Rosa Fire Department, Sonoma County Fire District, CAL FIRE

Key Land-Use Policies: Voter-approved city Urban Growth Boundary and county Community Separators

The Story

The Glass Fire tragically burned 600 homes in Sonoma and Napa counties in August 2020. However, the total devastation would have likely been much greater if not

for the firefighters' access to the existing open space and trail networks at 5,000-acre Trione-Annadel State Park. The existing trails and fire roads were instrumental in preventing more extreme loss of life and home. Fortunately, no one died.

The Glass Fire originated in Napa Valley. Strong winds pushed it east across the Valley and over the Mayacamas Range into Santa Rosa and Sonoma Valley. The Glass Fire burned down hundreds of homes as it dropped into residential areas along St. Helena Road, Adobe Canyon, and Los Alamos Roads to the Valley floor.

The wildfire then jumped Highway 12 and started heading toward the large Oakmont community of 5,000 homes on the edge of Santa Rosa, which is adjacent to Trione-Annadel State Park. Fortunately, the winds eased and temperatures lowered as the wildfire approached the state park, allowing firefighters to move into the well-established network of trails and fire roads to start controlled burns, chop down trees and shrubs to create fuel breaks, and position fire trucks and equipment to control and slow the approaching blaze. While the wildfire came within feet of several homes near the park, none were damaged because of the strategic firefighting inside the park's boundaries.[30]

CASE STUDY: SOUTHERN CALIFORNIA

2020 Bobcat Fire and the City of Monrovia's Wilderness Preserve and Park

Key Take-away: The City of Monrovia created an urban-wildland buffer in high wildfire zones through voter-approved funding measures to establish a wilderness preserve and park for conservation and recreation that kept the wildfire at bay and allowed firefighters to stop the wildfire from spreading into town.

Greenbelt Type: Open Space, Parks, and Preserve including Hillside Wilderness Preserve and Canyon Park

Role: Wildfire defense, wildfire buffer

Wildfire Risk: Very High Fire Severity Zone (CAL FIRE). Populated areas in Monrovia have, on average, greater risk than 66% of communities in California.

Wildland-Urban Interface: Yes[31]

Jurisdictions/Agencies: City of Monrovia, Monrovia Fire and Rescue, Angeles National Forest, Los Angeles County Fire Department, CAL FIRE

Key Land-Use Policies: Permanent protection of high wildfire risk open space lands through strategic acquisition via voter-approved funding

The Story

The 2020 Bobcat Fire that started in Los Angeles National Forest burned 115,796 acres and destroyed about 115 homes in towns and cities situated on the urban edge of the Los Angeles Basin. One of the cities that was threatened was Monrovia, which is in the foothills of the San Gabriel Mountains. Evacuation warnings were issued, but the city was spared any loss of life or structure due in part to the 1,416-acre Monrovia Hillside Preserve and 80-acre Monrovia Canyon Park that served as an urban-wildfire buffer.[32]

Monrovia Fire by Nikolay Maslov

The Bobcat Fire burned over 278 acres of the Monrovia Hillside Wilderness Preserve and much of the neighboring 80 acres of Monrovia Canyon Park, but did not cause any loss of life or structure within Monrovia. When the Bobcat Fire entered Monrovia Canyon Park, firefighters used a defensive approach to protect buildings and structures, including the Nature Center, Ranger Station, cabins, and restrooms. The fire suppression tactics, which included controlled burns, burned a significant amount of brush in the park, but all buildings remained standing with only smoke damage.[33]

The City protected the open space and created the urban-wildland buffer by purchasing parcels in high wildfire hazard zones. Because Monrovia's hillside acreage was both publicly and privately owned, the City Council decided to seek voter approval for two measures. The first designated city-owned foothill land was wilderness or recreational space and limited development on the private property. The other was a $10-million bond, the revenues from which would be used to purchase building sites from willing sellers. Both passed by a wide margin. In the end, Monrovia spent $24 million for 1,416 acres, paying off the bonds with parcel taxes and gaining an added benefit: a deeper urban-wildland buffer.[34]

CASE STUDY: COLORADO

2012 A Tale of Two Cities: Boulder and Colorado Springs

Key Take-away: When facing wildfire threats at the same time in similar conditions, the nearby cities of Colorado Springs and Boulder had very different outcomes due to the 100,000-acre greenbelt around the latter.

Greenbelt Type: Open Space, Parks, and Preserve including Boulder Valley

Greenbelt Role: Wildfire buffer, wildfire defense

Wildfire Risk: Lower to High on edge of wildlands. Populated areas in Boulder have, on average, greater risk than 65% of communities in Colorado.[35]

Wildland-Urban Interface: Yes

Jurisdictions/Agencies: City of Boulder, County of Boulder, El Paso County Sheriff's Office, US Forest Service

Key Land-Use Policies: Permanent protection of high-wildfire-risk open space through strategic acquisition via voter-approved funding coupled with appropriate land stewardship and strong building codes and incentives

The Story

One of the most startling examples of how a greenbelt open space buffer can protect a community occurred in 2012 in Colorado.[36] Two wildfires broke out under extreme heat and wind conditions at the same time in two cities not far from each other in Colorado Springs and Boulder. The first city suffered significant loss of lives and homes, while the second was spared primarily due to the city-owned green space around it.

The Waldo Fire that started about 16 miles outside of Colorado Springs swept from a ridge into the town, destroying 350 homes and killing two people. The lost

houses were in a subdivision located on the edge of town in the WUI with no separation from the wildlands.[37]

In Boulder, the Flagstaff Fire (also called the Bison Fire) that started a few miles away at the foot of Flagstaff Mountain triggered evacuations for a subdivision on the edge of the city and warnings for Boulder itself. The wildfire never reached the homes or the city due in large part to the 100,000 acres of protected open space land around it—a combination of publicly-owned land and private lands preserved through conservation easements. The citizens decided to tax themselves so the City could purchase land and protect it forever. The City and County of Boulder now protects almost two-thirds of the Boulder Valley, commonly referred to as the "greenbelt."[38]

"We do have a defensible area, city open space, so houses don't abut next to the tree line," Commander Rick Brough with Boulder County Sheriff's Office told a local TV news crew at the time.[39]

Although reducing wildfire risk was not the original intent for protection of these lands from development, it prevented encroachment into the WUI and served as a greenbelt buffer.[40] Firefighters were able to contain the wildfire in the greenbelt before it spread to the city. Decades of land stewardship to maintain the health of the forest made a noticeable difference. In the end, no lives or homes were lost in Boulder from the Flagstaff Fire, the closest wildfire to the city to date.

To maintain and increase wildfire resilience in the open space greenbelt, in partnership with state and federal land managers, Boulder County conducts various best management stewardship practices, including prescribed burns and removal of overly dense vegetation, and at times allows people to come and cut Christmas trees from the forest. Both the City of Boulder and Boulder County recognize that wildfires are a natural occurrence in forests, and it will never be possible to eliminate them completely. Larger fuel breaks and restoration, and environmentally-sound treatments, are critical to slowing wildfire spread and intensity as it moves from the wildland toward developed areas, providing firefighters an opportunity to more safely attack the fire.

Since the 2012 wildfires, both Boulder and Colorado Springs have adopted new and comprehensive wildfire protection plans, land-use policies, and incentives for homeowners to harden their homes and create defensible space.

2 AGRICULTURAL LANDS

Agricultural lands have played a significant role in lowering wildfire risk and damages to homes and communities during wildfires in Sonoma County and elsewhere in Northern California in recent history as follows:

- **A Serving as strategic locations for wildfire defense**
- **B Acting as natural wildfire buffers to create separation from wildlands**
- **C Increasing overall wildfire resilience through land stewardship**

While agricultural lands can and do burn, they can also serve as a natural fuel break to shield neighboring homes and communities from wildfires that usually originate in nearby wildlands.

However, when wildfire conditions are extreme with strong winds and high temperatures that overwhelm firefighting activities, agricultural lands did not eliminate wildfire risk in those more severe conditions, similar to open space lands.

2A Serving as Strategic Locations for Wildfire Defense

Agricultural lands are utilized for firefighting by providing access to relatively undeveloped open areas outside of communities and on the edge of wildlands to mount a wildfire defense. This allows firefighters to control or contain wildfires before they reach homes or communities by building fuel breaks, setting backfires, or dropping water or fire retardants. The reservoirs that hold water for irrigation can also be utilized by helicopters fighting a fire to douse properties and fields as wildfire approaches.

Fire in Sonoma County. Image by George Rose, courtesy Sonoma County Winegrowers

In some places, frost protection sprinklers in vineyards were turned on to wet down areas to protect structures and lands from wildfire. People and livestock have survived wildfires by taking refuge in vineyards or farm fields when evacuation wasn't possible. Tractors, trucks, and equipment have been moved away from structures that might burn into the middle of a ranch or farm to be spared.

2B Acting as Natural Wildfire Buffers to Create Separation from Wildlands

Farm and ranch lands such as vineyards, orchards, food crops, and other cultivated plants tend to be resistant to wildfire due to their relatively high water content. While farmed lands are often irrigated, grapevines for example, are naturally fire resistant even without irrigation as they contain moisture. As a result, agricultural lands helped slow or even stop wildfire in some cases. In those instances, vineyards and farms reduced or prevented loss of lives, homes, farming equipment, and structures. Researchers have found more generally that irrigated agriculture in a fire zone, relative to non-managed lands, significantly serves to reduce fire risk.[41]

2C Increasing Overall Wildfire Resilience through Land Stewardship

Agricultural lands that use best management practices for regenerative agriculture can serve an important role in increasing overall wildfire and climate resilience. Prescribed burning and appropriate grazing, for example, are tools for reducing wildfire risk on agricultural lands.[42] Grazing won't stop a wildfire, but will slow it down and keep it low, according to UC Cooperative Extension.[43]

Working lands are essential for carbon sequestration, given their capacity to capture carbon from the air through soil management, vegetation and habitat management, and climate-smart habitat restoration. Capturing carbon decreases the net amount present in the atmosphere that is causing the overall warming of the planet and climate change impacts felt worldwide.

CASE STUDIES: NORTHERN CALIFORNIA

Vineyards

Key Take-away: Vineyards can generally play a role in wildfire defense and serve as a greenbelt buffer during wildfires. See Windsor case study on page 10.

Greenbelt Type: Agricultural Lands including Sonoma and Napa vineyards

Greenbelt Role: Wildfire buffer, wildfire defense

Wildfire Risk: Low to Very High Fire Risk Severity Zones

Wildland-Urban Interface: Varies

Jurisdictions/Agencies: Private landowners, County Agricultural Commissioners, CAL FIRE, local fire departments

Key Land-Use Policies: County General Plans and voter-approved initiatives permanently protect vineyards and other agricultural lands in Sonoma and Napa counties

Alexander Valley in Sonoma County after the Kincade Fire by Anne Belden

The Story

The natural resistance that grapevines have to wildfire became most apparent during the tragic and devastating North Bay wildfires in Sonoma and Napa counties in early October 2017. Vineyards served as natural firebreaks across the landscape. Vintners and grape growers saw clear evidence that vineyards saved lives during the 2017 wildfires.[44]

In many places, the wildfire slowed or stopped at the edge of vineyards, sparing homes, wineries, and property. When the wildfire reached the edge of a vineyard, it would burn the first few rows, and then stop. This happened many times, with the vineyards protecting houses, buildings, and other structures in some cases.[45]

In other situations, vineyards in Sonoma and Napa that were established higher on the hillsides, served as firebreaks for oak forests or grasslands. Fire officials said they considered the relatively open space of vineyards, which hold more moisture than oak forests, to be a natural firebreak that allowed their forces to concentrate on protecting populated areas and structures.[46]

Karissa Kruse, President of the Sonoma County Winegrowers, said she saw remarkable contrasts between green vines and charred suburban neighborhoods near Santa Rosa. In news reports, she said that at the ends of the vine rows, you could see the cover crop was burned, but then everything else was just fine.[47] Sonoma County's Agricultural Commissioner at the time said that he witnessed a spectrum of scenarios where vineyards helped and acted like a firebreak, while in other locations the wildfire was so hot, it moved right through.[48]

The layout of vineyards also helps. The typical California vineyard is densely planted and relatively uniform. It is hard for a fire to break through that army of standing water. Being a monocrop may be an advantage when it comes to wildfire, as S. Kaan Kurtural, UC Davis

Professor of Viticulture and Oenology, told the San Francisco Chronicle.[49]

During the 2019 Kincade Fire, vineyards were credited with saving a winery in Alexander Valley. The wildfire burned all the way to the driveway of the deLorimier Winery but stopped when it hit the vineyards. The winery owner gave the vineyards full credit for stopping the advance of the wildfire. However, during the same wildfire, the owner lost his other winery in Alexander Valley, Soda Rock. Firefighting officials told reporters during the 2019 Kincade Fire that vineyards are mostly viable as "micro-breaks, not macro-breaks." [50] They may save individual structures, but they seem unlikely to change the overall course of a large wildfire. And they are helpless to defend when fires jump, which happens when wind carries burning material beyond the main fire, igniting a spot fire.

Farms

Key Take-away: Farms and orchards can generally play a role in wildfire defense and to serve as a buffer during wildfires.

Greenbelt Type: Agricultural Lands including farms and orchards

Greenbelt Role: Wildfire buffer, wildfire defense

Wildfire Risk: Low to Very High Fire Risk Severity Zones

Wildland-Urban Interface: Varies

Jurisdictions/Agencies: Private landowners, County Agricultural Commissioners, CAL FIRE, local fire departments

Key Land-Use Policies: County General Plan policies typically protect farms and orchards from development.

The Story

While farms and orchards have not proven to be as wildfire resistant as some vineyards, there is evidence across the state where food and fruit survived wildfires and were harvested while everything else was burned.

At the 25-acre Oak Hill Farm in Sonoma Valley, farm managers had to flee the 2017 Nunns Fire in the middle of the night, abandoning an expanse of sustainably grown fruits, vegetables, flowers, and herbs.[51] The locally well-known farm backs right up to nearly 1,000 acres of wildlands that are permanently protected from development under longstanding conservation easements. The wildfire came down from the hills, across the farm, and jumped Highway 12 toward Glen Ellen.

When farm manager David Cooper returned days later, his home was gone, but most of the crops had survived. So had the historic old White Barn and the main home on the property. While no one knows for sure, it was evident that the farmed fields were spared the brunt of the wildfire and perhaps prevented other structures on the site from burning as the flames were slowed. With the help of other farmers and organizations such as Community Alliance with Family Farmers, the crops were harvested and sent to market.[52]

In other parts of California, farmers found themselves in similar situations.[53] On Paradise Ridge in the Sierra Nevada foothills, the Noble family had been growing apples since 1921. But on November 8, 2018, the fast-moving Camp Fire that destroyed the town of Paradise swept through and destroyed 11 buildings on the property. They evacuated, but when they returned home, they discovered 12 acres of apple orchards had survived. As at Oak Hill Farm, they harvested the crop and sent it to market.

3 GREENBELT BUFFER ZONES

Integrating intentional and strategically situated greenbelt buffer zones into community design within neighborhoods and subdivisions can increase wildfire resilience. Establishing greenbelt buffer zones with fire-resistant landscaping in between clustered homes can serve as defensible space for both firefighting and reducing the chances that embers from an approaching wildfire will land on homes. It can also reduce home-to-home

Petaluma Valley Greenbelt Zones by Scott Hess

ignition between blocks of homes, as that is often the main cause of destruction of neighborhoods, not the wildfire flames. The width of these greenbelt buffer zones needs to be determined at the site-specific level in coordination with local fire authorities.

Such greenbelt features can also slow or stop wildfires or cause them to change directions. In some cases, they can provide refuge for residents who need to evacuate. Project design is an important determinant of wildfire ignition risk and the scale of wildfire spread in greenbelt buffer zones.

Greenbelt zones are differentiated from landscape-scale open-space buffers and large fuel breaks where massive amounts of trees and bushes are cleared. In contrast, these are carefully landscaped areas *inside* part of the community or development, not surrounding it.

CASE STUDY: SOUTHERN CALIFORNIA

Rancho Mission Viejo, Orange County

Key Take-away: Greenbelt buffer zones inside neighborhoods and subdivisions are an emerging tool for increasing wildfire resilience in communities located in high wildfire severity areas. Rancho Mission Viejo is on the forefront of incorporating these zones into comprehensive wildfire mitigation strategies.

Greenbelt Type: Greenbelt zone including Rancho Mission Viejo, Orange County, CA

Greenbelt Role: Wildfire prevention and defense

Wildfire Risk: Very High Fire Risk Severity Zone

Wildland-Urban Interface: Yes

Jurisdictions/Agencies: Private landowners and

developers, Orange County Fire Authority, CAL FIRE

Key Land-Use Policies: Extensive wildfire mitigation requirements inside development and surrounding wildlands preservation areas

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The Story

Greenbelt buffer zones designed to reduce wildfire risk are already being strategically planned and placed in the planned community of Rancho Mission Viejo[54], in Orange County, CA. The community on a former cattle ranch was among the first planned communities in California to incorporate fuel-modification greenbelt buffers into its design long before it was ever built.[55] The growing community is located on the urban edge of San Juan Capistrano close to wildland where historical wildfires have occurred in an area classified by CAL FIRE as moderate, high, and very high severity zones on the landscape.[56] Rancho Mission Viejo is a privately owned ranch in the foothills of the Santa Ana Mountains.

Land stewardship is a priority within the +/-23,000-acre planned community area; Rancho Mission Viejo's developers worked closely with wildfire experts and professionals including the Orange County Fire Authority to create a comprehensive ranch management plan.[57] Eventually 75% of the Rancho Mission Viejo community will be set aside as permanent open space surrounding each of the development areas (villages). This open space area (the Reserve at Rancho Mission Viejo) is covered by a Habitat Conservation Plan for Southern Orange County that requires ongoing monitoring and protection of the land to ensure ecosystem health and resistance to wildfire.

The Rancho Mission Viejo community took about a decade to plan prior to any construction, overcoming several environmental and development challenges. About 10,000 residents now live in 4,000 homes in the existing villages of Sendero and Esencia. The site is approved for 14,000 homes and 5 million square feet of retail and other non-residential community uses.

The development boundary of each of the Rancho Mission Viejo villages must include at least a surrounding 110-foot-wide fuel-modification zone that serves as a greenbelt buffer—a strip of land where combustible vegetation has been replaced with fire-resistant plants. In some locations, as determined by fire behavior modeling of the potential maximum height of a wall of flame, and doubling that for safety, this fuel-modification zone must be as wide as 170-feet. These fuel-modification zones are typically landscape areas maintained by the homeowners association, but may also include roadways, according to Jay Bullock, Vice President, Planning & Entitlement. All structures within the community are required to be built with fire resistant materials and ember resistant designs. In addition, the community's covenants, codes, and restrictions (CC&Rs) require all property owners to maintain defensible space by restricting the installation of landscaping susceptible to wind-driven embers from a wildfire.

Fortunately, while other WUI areas within Orange County have experienced recent wildfires, thus far the Rancho Mission Viejo community's wildfire resistance approach has not been tested by a wildfire in the immediate vicinity.

4 RECREATIONAL GREENWAYS

Greenways such as recreational playing fields, golf courses, and bike and walking paths in and around communities can also play an important role in preventing wildfire spread into communities and serve to aid in firefighting. If placed strategically in and around neighborhoods, the water and moisture contained in irrigated recreational lands can serve to slow or prevent wildfires from entering communities and provide areas for firefighters to defend homes and properties.

With high, gusty wind fires, embers can fly long distances, even miles, causing new and separate fires "downstream" from the main fire front. In instances of a very large green buffer, it can lessen

the likelihood that an ember would land in a subdivision.

Van Butsic, a researcher at UC Berkeley, recommends that new subdivisions located in the WUI include greenbelts as a risk defense strategy. His recent paper recommends clustering homes, putting roads on external perimeters, and including irrigated land features such as agricultural lands or parks as strategies for designing fire-safe suburban communities in the WUI. Additionally, research conducted in the San Diego area found that using fire-resistant landscaping in open areas around homes was more effective in reducing wildfire risk than the thinning or removal of trees and bushes.[58] This may suggest that greenways could serve as a better mechanism to reduce fire risk than defensible space alone.

In other places around the state, structures have been saved because of the firebreaks created by large turf areas and landscaping techniques that minimize the spread of fires to homes. There are many examples indicating that healthy, well-watered golf courses and large turf areas have played an important role in stopping wildfires and protecting property.[59]

Planning and designing more wildfire-safe communities should also include clustering of homes, placing roads on outside perimeters of neighborhoods and, importantly, home hardening and defensible space.[60]

Biking to Boulder by Bill Dickinson

CASE STUDY: NORTHERN CALIFORNIA

Golf Courses as Fuel Breaks

Key Take-away: Strategically placed recreational greenways such as golf courses can help make communities more wildfire safe when the conditions are right, as seen during the devastating Tubbs Fire in Santa Rosa.

The Story

At the Mayacamas Golf Course above the Larkfield-Wikiup neighborhood outside Santa Rosa, which experienced tragic losses during the Tubbs Fire, the wildfire burned up to the golf course where it stopped and then took a different path. In this case, the golfing greens served as a fuel break that helped save several homes in the devastated community.

Several other golf courses also survived the wildfires, though structures on the golf courses and many homes around them did not. The green expanses served primarily as fuel breaks where firefighters were able to take strategic actions as part of the overall firefighting effort. In some cases, much of the land between holes were blackened, but the fairways and greens survived largely intact; moisture apparently helped prevent the grass from igniting. [61]

Since then, Sonoma County Regional Parks has expedited grazing and thinning projects to reduce fuel loads. They are also collaborating with the Mayacamas Golf Club Homeowners Association on a fuel break along the park's boundary with several vulnerable homes. In addition, Regional Parks is pursuing funding to allow improvements to grazing infrastructure, retrofitting to improve fire protection of facilities and emergency access, and the addition of fire management in the stewardship plans for each park. The golf course and associated subdivisions are adjacent to Shiloh Regional Park.[62]

Innovative Greenbelt Approaches for Wildfire Resilience

Recent tragic wildfire seasons have prompted research and planning that introduces new visions for how greenbelts can serve to reduce wildfire risk and build wildfire resilience. The following three examples have not yet been adopted; nevertheless, they serve as innovative concepts and inspiration worth further developing.

COMMUNITY WILDFIRE PROTECTION ZONES

Establishing well-managed greenbelt buffers around cities and towns could go a long way toward addressing the loss of lives and homes to devastating wildfires, particularly those in rural communities on the edge of public forest lands. Several researchers have proposed creating community wildfire protection zones around high wildfire risk communities.[63] The vision is to create zones where development is limited, open space is conserved, public recreation is allowed, and maintenance is paramount for reducing wildfire risk. In recent public hearing testimony to state and federal legislative committees, Dr. Michael Medler of the University of Western Washington provided a vision for such community wildfire protection zones.

Medler points out that according to the US Forest Service, about 400 million acres of forests and wildlands across the western United States need active stewardship to restore ecosystem health to reduce extreme wildfire. This total area requiring attention is too vast and the currently designated stewardship resources still too scarce to address this issue. Of that total, 200 million acres are in the WUI. Within that area, 11.7 million acres are within one-quarter mile of communities or significant developments.

The vision that Medler asserts, which would be far more feasible and effective, is to prioritize the care and stewardship of the 11.7 million acres of lands within that quarter mile, essentially creating a quarter-mile buffer around wildfire prone communities in the WUI across the West. Not only would this approach make communities far more resilient to wildfire, but it would create new career opportunities in land management.

In a similar version of this concept, the Center for Biological Diversity in California called for “community protection zones” around homes and neighborhoods beyond defensible space in the WUI.[64] Author Brian Nowicki recommended an area of 300 feet to a quarter-mile wide adjacent to communities where trees and other plants are carefully managed to reduce the potential for wildfire and fire spread based on the size and number of trees in the area.

These community wildfire protection zones are not the same as fuel breaks that are used primarily in firefighting to clear wide swaths of land from all vegetation *during* a wildfire. Fuel breaks for firefighting are valuable. At the same time, science has shown that on their own, fuel breaks do not stop or slow wildfires.[65]

Establishing community wildfire protection zones around development in high wildfire risk areas to focus wildfire prevention and land stewardship resources is likely to be more effective, cost-efficient, and resilient than spreading limited resources across vast public lands.

WILDFIRE RISK REDUCTION BUFFERS

In the town of Paradise, California, the recovery plan from the 2018 Camp Fire that destroyed most of the town includes the potential for a newly created greenbelt buffer. The Nature Conservancy (TNC) worked with community leaders to explore the potential for creating new Wildfire Risk Reduction Buffers (WRRBs) around the town.[66] TNC collaborated with the Conservation Biology Institute and Paradise Recreation and Parks District to analyze the benefits of identifying and then buying out parcels to create a protective zone that would be less likely to allow a wildfire to enter the city.

This project sought to establish whether there is a scientific justification for a "defensible space" zone around a community—one that can provide both a boundary for urban growth to reduce habitat fragmentation and impacts while also enabling safer communities for people. The team used Paradise as a case study to develop a model. The research team conducted a deep, parcel-by-parcel analysis of lands in each of the multiple watersheds and habitats. They considered impacts from the Camp Fire, wildfire risk, and fire behavior as well as potential conservation and recreation co-benefits. They also looked at private and public ownership and other factors such as cost, feasibility, and public support.

The resulting Paradise Nature-Based Fire Resilience Project Final Report[67] published in June 2020 supported the hypothesis that reducing flammability of land cover in the region between the wildland area and urban area in Wildfire Risk Reduction Buffers reduces risk of ignition in the urban area. The project also determined that the models and the conversations with the Paradise Technical Advisory Committee on the wildfire rebuild supported the concept that lands managed for fire risk-reduction could also provide additional benefits such as open space for recreation, refuge for people in times of emergencies, staging areas for firefighting, and habitat and refuge for wildlife species.

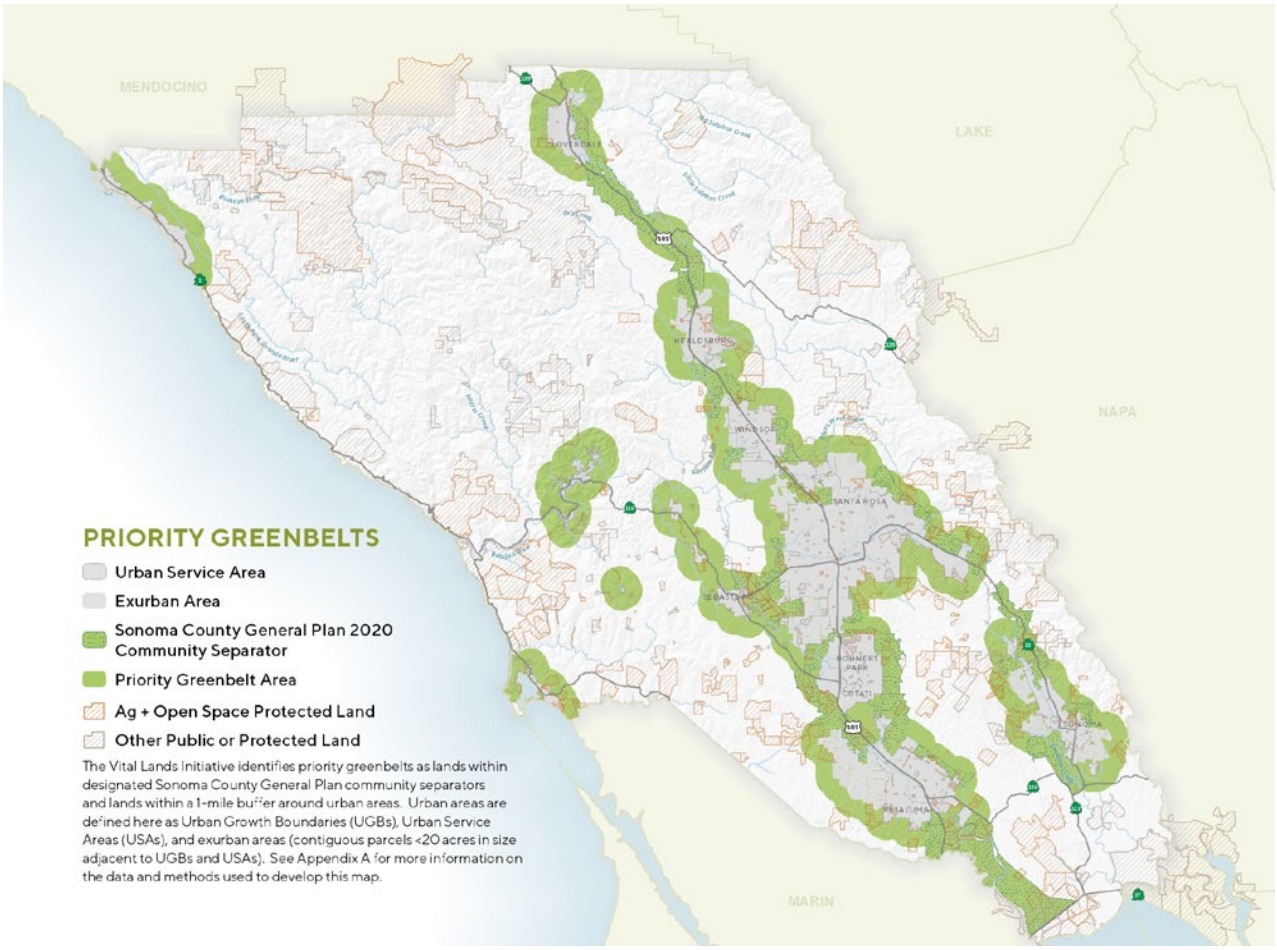
The researchers also recognized that there are many scientific uncertainties and data gaps that underlie basic assumptions of risk reduction in their model, such as the relationship between buffer width, vegetation characteristics, and urban ignition risk reduction. So, while much more needs to be done, the promise of greenbelts reducing wildfire risk to lives and homes continues to emerge as a potential tool for communities in high fire severity areas.

HIGH WILDFIRE RISK PARCELS PROTECTED BY OPEN SPACE

Conservation easements and acquisition efforts by Sonoma County Agricultural Preservation and Open Space District since the 2017 fires include burned parcels within the WUI that have appropriate ecosystem and fire hazard reduction benefits.[68] Just over 1,000 acres in the Mark West Creek Watershed that was devastated in the 2017 Tubbs Fire was protected through easements and acquisitions for a future regional park. The land was assembled from multiple parcels and landowners, as well as development rights being removed or restricted. Several property owners decided not to rebuild after the wildfires, but to allow for conservation and transfer to the Open Space District for a future park. The area includes natural resources found along a two-mile length of Mark West Creek and its associated riparian area, grassland, and woodland. Wildfire risk will be reduced with the decrease of homes and people living there, while allowing the land to be managed in a more natural state where wildfires may still occur but with less destruction in the long term.

Sonoma County's Open Space District is also proposing a one-mile priority greenbelt buffer around all nine cities and several unincorporated communities to provide multiple benefits including wildfire risk reduction.[69] The priority greenbelts were mapped in the Vital Lands Initiative adopted in early 2021. The next step is to further analyze the lands at the parcel level to determine ownership, zoning, and existing conditions.

Vital Lands Initiative: Priority Greenbelts Courtesy of Sonoma County Agricultural Preservation and Open Space District



RECOMMENDATIONS

Greenbelts and Wildfire Land-Use Planning and Policy Recommendations for the San Francisco Bay Area

Eleven million people live in the Wildland-Urban Interface across California.[70] We must leverage natural solutions like greenbelts in various forms to protect these people and our communities from wildfire and build a climate-resilient future.

To achieve this, policymakers must prioritize the protection, expansion, and long-term stewardship of open spaces and parks, agricultural lands, and other greenbelts in and around communities in high wildfire risk areas. Simultaneously, future growth must be channeled within existing cities and towns to address the acute housing crisis and must avoid adding new development in the WUI's high wildfire risk areas that puts more people in harm's way.

This paper documents how greenbelts in various forms can play a beneficial role in reducing wildfire risk and improving resilience in several ways:

1. **Serving as strategic locations for wildfire defense**
2. **Acting as natural wildfire buffers to create separation from wildlands**
3. **Increasing overall wildfire resilience through land stewardship**
4. **Conserving biodiversity on fire-adapted lands while reducing risk**
5. **Providing wildfire-resistant green spaces inside and surrounding neighborhoods**

To leverage these findings to increase the benefits of greenbelts in building wildfire resilience across the Bay Area we set forth the recommendations below.

For all of these recommendations, Tribal Governments must be consulted at every step in identifying and stewarding greenbelts for wildfire defense and resilience. Traditional knowledge needs to be considered and incorporated. Indigenous peoples have the right to the lands, territories, and resources which they have traditionally owned, occupied, or otherwise used or acquired. Land rights, recognition, and repatriation should be considered in direct and specific engagement with Tribal Governments through a formal engagement process and alignment with Tribal Government priorities and decisions when identifying greenbelt lands for permanent protection, particularly when public funds are at play. California is home to Indian Tribal Governments composed of 109 federally recognized Indian tribes and several non-federally recognized tribes petitioning for federal recognition through the Bureau of Indian Affairs.[71] According to the United Nations Declaration on the Rights of Indigenous Peoples, the State and other parties should consult and cooperate in good faith with Tribal Governments concerned through their own representative institutions in order to obtain their free, prior, and informed consent before adopting and implementing legislative or administrative measures that may affect them.[72]

Policy Recommendations

RECOMMENDATION 1

Prioritize Increasing Greenbelts as Strategic Locations for Wildfire Defense through Policy and Planning

Wildfire defense is currently an ancillary benefit of existing greenbelts. Policymakers and jurisdictions should proactively plan to permanently protect greenbelts in strategic locations for wildfire defense as part of wildfire planning at regional, county, city, and community levels. This creates defensible space to fight fires, creates natural wildfire buffers, and preserves the rich biodiversity in wildfire-prone areas.

To make this happen, next steps are:

- Identify existing greenbelts in the Bay Area and the best locations for new greenbelts for wildfire defense and risk reduction.
- Incorporate these locations into comprehensive wildfire planning at regional, county, city, and community levels and in all Municipal Service Reviews.
- Adopt (or renew) local policies that maintain space between cities including urban growth boundaries (UGBs), urban limit lines (ULLs), and community separators—preferably voter approved—to contain growth, prevent sprawl, and reduce wildfire risk by recognizing fire science research showing that city-centered growth is the most wildfire safe.
- Meet the State's goal of conserving 30% of lands by 2030 by establishing, protecting, and stewarding greenbelts on high wildfire risk lands with a target of one-third of all the conserved lands serving to permanently protect greenbelts.

Who should take action: Regional, county, and city planning officials, and Local Agency Formation Commissions, in consultation with firefighting professionals, land stewards and managers, Tribal Governments, and fire ecology experts to analyze wildfire behavior in recent wildfires.

RECOMMENDATION 2

Enhance Stewardship on Greenbelts to Return Beneficial Wildfire Regimes and Increase Overall Wildfire Resilience of the Landscapes

Maintaining and stewarding land to return to beneficial wildfire regimes and increase overall wildfire resilience of the landscapes is crucial to leverage our existing natural resources to reduce risk.

To make this happen, next steps are:

- Best Management Practices for natural and working lands need to be established by region and habitat type.
- Management plans should take a balanced approach including prescribed burning, selective harvest, non-commercial thinning, and traditional forest treatment as practiced by tribes.
- Agricultural easements should have standards for Best Management Practices and prioritize conservation of agricultural properties that use or agree to implement regenerative agriculture practices.

Who should take action: County and state parks, open space, agricultural, and resource conservation districts as well as land trusts, in consultation with state agencies, Tribal Governments, and the agricultural community.

RECOMMENDATION 3

Incorporate Greenbelts into New Developments Calibrated to Maximize Wildfire Risk Reduction

Communities and new developments can be more wildfire resistant by incorporating greenbelt zones and recreational zones into the design and placement of homes in a way designed specifically to reduce wildfire risk.

To make this happen, next steps are:

- Create zoning overlays to require communities to be more wildfire resistant by establishing greenbelt zones for carefully landscaped areas inside and around neighborhoods and subdivisions, different from landscape-scale open-space buffers and large fuel breaks.
- Locate greenways, golf courses, and bike paths in and around communities to increase wildfire resilience.
- Cluster homes on the inside of road perimeters with greenbelt zones on external edges of planned developments.

Who should take action: Local planning departments in consultation with housing advocates and housing developers.

RECOMMENDATION 4

Explore Feasibility of a New Community Wildfire Resilience Zone

In many communities, open space around cities is currently a patchwork of public and private land, including areas at high risk for sprawl development. With the significant benefits these lands confer to reduce wildfire risk within cities, policymakers should analyze the feasibility of establishing new Bay Area-wide Community Wildfire Resilience Zones. These zones—such as a one-quarter-mile-wide perimeter surrounding a town or city in a high fire severity zone—could provide more permanent and consistent risk reduction and focus wildfire resources.

To make this happen, next steps are:

- Map one-quarter-mile areas around communities in high fire zones.
- Assess current and future land use and land ownership.
- Determine the type of land stewardship and activities appropriate to create specific criteria for siting Community Wildfire Resilience Zones in the Bay Area.
- Explore local, regional, and/or state funding measures that could support acquisition and stewardship in these areas.

Who should take action: Regional planners in consultation with land managers, local governments, and state agencies.

Wildfires in the Bay Area and beyond are likely to get more extreme and damaging due to decades of wildfire suppression, development in the WUI, drought, hotter summers, and longer wildfire seasons exacerbated by climate change.

Greenbelts in the form of open space, agricultural lands, greenbelt zones, and recreational greenways can help the Bay Area better prepare, respond, and recover from wildfires. They should be recognized as wildfire risk reduction strategies. Wildfire planning and land-use decisions should immediately start to elevate the protection and long-term stewardship of greenbelts.

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Greenbelt Alliance is a 501(c)3 nonprofit organization with a mission to educate, advocate, and collaborate to ensure the Bay Area's lands and communities are resilient to a changing climate. We envision a Bay Area of healthy, thriving, resilient communities made up of lands and people that are safe during climate disasters and recover quickly from wildfire, floods, and drought, where everyone is living with nature in new and powerful ways for generations to come.

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Wendy Krupnick, Community Alliance for Family Farmers

Karissa Kruse, President, Sonoma County Winegrowers

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Endnotes

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