

Beyond Flames: Understanding The Economic Consequences of Wildfires Across United States Communities

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ABSTRACT

Wildfires in the United States have increasingly evolved from ecological disturbances into multidimensional socioeconomic crises affecting communities, governments, and economic systems across multiple scales. Historically, wildfire discussions focused primarily on direct losses such as suppression expenditures and property damage. However, emerging evidence suggests that the economic implications of wildfire extend considerably beyond immediate physical destruction. Wildfires generate cascading effects that influence healthcare expenditures, labor productivity, insurance markets, housing affordability, ecosystem services, public infrastructure, and long-term community resilience. Expanding development within fire-prone landscapes, particularly within the wildland–urban interface (WUI), coupled with climate-related changes affecting fire behavior and seasonality, has amplified these consequences across the United States.

Recent estimates indicate that the annual economic burden associated with wildfires in the United States may substantially exceed traditional estimates focused solely on suppression and property damage, reaching hundreds of billions of dollars annually when indirect and long-term effects are incorporated. Economic impacts increasingly affect populations geographically distant from wildfire ignition locations through smoke exposure, market disruptions, and infrastructure interdependencies. Consequently, wildfire management is no longer solely a fire suppression challenge but also an issue of economic planning, public health, infrastructure resilience, and sustainable development.

This article synthesizes current literature and practitioner perspectives to examine the broad economic consequences of wildfires across U.S. communities. Particular attention is given to direct and indirect costs, community-level consequences, impacts on vulnerable populations, and implications for mitigation planning and policy development. The article further explores how investments in proactive mitigation and resilience strategies may reduce future economic losses and support long-term community adaptation.

Keywords: Wildfire economics; community resilience; wildfire mitigation; public health; wildland–urban interface

INTRODUCTION

Wildfires have long functioned as natural ecological processes within many landscapes of the United States, contributing to nutrient cycling, vegetation regeneration, and ecosystem dynamics. In recent decades, however, wildfire patterns have increasingly shifted in ways that create substantial risks for human communities and economic systems. Larger fire events, longer fire seasons, increasing development within fire-prone regions, and climate-related environmental changes have intensified the complexity and consequences of wildfire events. These changes have transformed wildfire from an ecological issue into a broader social and economic challenge.

Traditional evaluations of wildfire impacts frequently emphasize visible losses, including suppression expenditures, burned structures, damaged infrastructure, and fatalities. Although these costs remain substantial, they represent only a portion of the overall economic burden generated by wildfire events. Increasingly, researchers recognize that indirect and long-term consequences, including health impacts from smoke exposure, labor disruptions, insurance market instability, housing pressures, environmental degradation, and community displacement, may exceed direct costs in magnitude (Bayham et al., 2022).

Recent estimates suggest that annual wildfire costs within the United States may reach approximately \$425 billion when considering broader economic damages and ecosystem losses beyond immediate suppression expenditures (Crowley et al., 2022). Further analyses indicate that climate-exacerbated wildfire costs may range between approximately \$394 billion and \$893 billion annually after accounting for health impacts, diminished property values, income losses, ecosystem damages, and related consequences (U.S. Congress Joint Economic Committee Democratic Staff, 2023).

These estimates highlight an important distinction between the *cost of fighting fires* and the *economic cost of living with wildfire risk*. Historically, federal and state agencies have emphasized expenditures associated with suppression activities. However, communities increasingly face downstream consequences extending years beyond fire containment. For example, wildfire smoke exposure can create health burdens affecting populations far removed from fire locations, while burned watersheds may alter water quality and increase long-term infrastructure maintenance requirements (Law et al., 2025).

Another significant driver of increasing wildfire losses is the expansion of development into the wildland–urban interface (WUI), defined as areas where human development and vegetative fuels coexist. Growth within WUI landscapes has increased the number of homes, businesses, utilities, and public assets exposed to wildfire hazards. As communities continue expanding into fire-prone environments, exposure and consequently economic vulnerability continue to increase.

The issue is no longer whether wildfires occur; rather, the challenge increasingly concerns how communities anticipate, absorb, and recover from their consequences. Understanding these broader economic impacts is essential for planners, policymakers, emergency managers, utility providers, and local communities seeking to develop more effective mitigation and resilience strategies.

This article examines wildfire impacts beyond immediate flames and destruction by exploring:

- Direct economic losses associated with wildfire events;
- Indirect and cascading economic consequences affecting communities;
- Long-term impacts on local economies and social systems;
- The role of the WUI in shaping vulnerability;
- Economic implications of proactive mitigation investments; and
- Policy considerations for enhancing community resilience.

Understanding these dimensions may help shift wildfire management from a reactive approach centered on suppression toward a more comprehensive framework emphasizing prevention, adaptation, and long-term resilience.

Evolution of Wildfire Risk in the United States

Historical Trends in Wildfire Activity

Wildfire has historically served as a natural ecological process across many landscapes in the United States. Fire maintained ecosystem function in numerous vegetation communities, including grasslands, shrublands, and fire-adapted forests. Historically, naturally occurring fires and Indigenous fire stewardship practices influenced landscape composition and fuel patterns. However, shifts in land management practices and demographic changes have altered wildfire dynamics considerably over time.

During much of the twentieth century, wildfire management in the United States primarily emphasized aggressive fire suppression. Although these efforts successfully reduced many short-term fire events, long-term suppression frequently contributed to fuel accumulation in many ecosystems. Dense vegetation, dead biomass, and altered forest structures increasingly created conditions favorable for larger and more severe fires.

Recent decades have demonstrated substantial changes in wildfire behavior and occurrence. While annual acreage burned fluctuates between years, fire seasons have become longer and more complex, with larger fire events occurring in areas previously considered less vulnerable. Economic impacts associated with these fires have also increased substantially.

Federal wildfire suppression expenditures illustrate this trend. Over the last decade, wildfire suppression activities conducted by the U.S. Department of Agriculture (USDA) and Department of the Interior (DOI) averaged approximately \$2.9 billion annually, and future projections indicate continued increases under changing climate conditions (USDA Forest Service, 2024; USDA Forest Service, 2025).

The National Interagency Fire Center reports that recent annual suppression expenditures frequently exceed several billion dollars, reflecting increasing operational complexity and growing exposure of communities and infrastructure (National Interagency Fire Center, n.d.).

Importantly, suppression costs represent only a fraction of total wildfire economic burden. Costs associated with rebuilding infrastructure, healthcare services, lost economic activity, and environmental degradation frequently extend beyond the duration of the fire event itself.

Climate Influences and Emerging Fire Conditions

Climate-related environmental changes increasingly influence wildfire behavior across the United States. Rising temperatures, prolonged drought periods, altered precipitation patterns, declining snowpack, and changing seasonal weather conditions affect fuel moisture and vegetation conditions that influence wildfire occurrence and intensity.

Climate influences affect wildfires through several mechanisms, such as reduced fuel moisture, which occurs as a result of higher temperatures and drought conditions increasing the drying of vegetation and soils, creating more combustible fuels; extended fire seasons from warmer conditions, which contribute to earlier snowmelt and delayed seasonal precipitation, extending periods of elevated wildfire risk; and extreme weather conditions like high wind events, heat waves, and low humidity conditions, which can accelerate fire spread and increase fire intensity.

These changing conditions affect both ecological systems and socioeconomic systems. Research suggests climate change contributes substantially to wildfire-related health impacts and economic burdens associated with smoke exposure. Climate-related wildfire smoke impacts alone may generate billions of dollars annually in economic consequences (Law et al., 2025).

Increasingly, wildfire risk is becoming a nationwide concern rather than a challenge confined to traditionally fire-prone western states. States outside historically recognized wildfire regions have experienced increasing exposure and vulnerability due to changing climatic conditions and expanding development patterns.

Expansion of the Wildland-Urban Interface and Increasing Exposure

Perhaps one of the most significant drivers of increasing wildfire economic losses is expansion of the Wildland-Urban Interface (WUI), which refers to areas where human development intersects with wildland vegetation.

The WUI has emerged as one of the fastest-growing land-use categories in the United States. Research indicates substantial increases in both WUI area and housing development over recent decades. Between 1990 and 2010, the U.S. WUI experienced rapid growth, increasing from approximately 30.8 million homes to 43.4 million homes nationwide (Radeloff *et al.*, 2018).

Additional analyses found substantial expansion around national forests, including a 38% increase in WUI area and approximately 46% growth in housing development (Mockrin *et al.*, 2022).

The implications of WUI expansion extend beyond increased numbers of exposed homes. Growth within fire-prone landscapes also increases:

- Exposure of transportation infrastructure;
- Utility transmission and distribution systems;
- Water systems;
- Commercial assets;
- Emergency response demands;
- Human-caused ignition opportunities.

Expansion of the WUI creates a feedback cycle in which greater development increases wildfire exposure, while wildfire risk simultaneously increases costs associated with protecting communities.

Research further suggests that development within WUI landscapes has contributed substantially to increasing federal firefighting expenditures over recent decades (Baylis and Boomhower, 2019).

Geographic Shifts in Wildfire Risk

Historically, wildfire risk discussions often focused on western states such as California, Arizona, Colorado, and Oregon. Although these regions remain highly vulnerable, recent evidence suggests that wildfire exposure is becoming geographically broader.

Wildfires increasingly affect suburban and urban communities previously considered relatively insulated from wildfire hazards. Recent studies suggest more than 115 million Americans may live in areas with some degree of wildfire exposure. Expanding ember-driven fire behavior and continued WUI growth are contributing factors in this trend (Canon, 2025).

Furthermore, communities in states such as Texas, Florida, and portions of the Southeast increasingly face wildfire-related risks due to changing climate conditions, land-use patterns, and expanding development.

These geographic shifts carry important implications for economic planning because many regions possess limited historical experience with wildfire mitigation, evacuation planning, or fire-resilient development standards.

Implications for Practitioners and Decision-Makers

From a practitioner perspective, increasing wildfire risk requires movement beyond traditional suppression-centered approaches toward proactive risk reduction and resilience planning.

Communities increasingly face questions such as:

- How should development be managed within wildfire-prone landscapes?
- How should infrastructure be designed for future fire conditions?
- Which mitigation investments provide the greatest economic return?
- How can agencies balance suppression expenditures with prevention investments?

For planners, utilities, emergency managers, and policymakers, understanding wildfire as both an ecological and economic issue becomes increasingly important.

Economic impacts associated with wildfire are not solely determined by the occurrence of fire itself; they are strongly shaped by where people live, how communities develop, and how preparedness investments are prioritized.

Direct Economic Costs of Wildfires

Rising Costs of Wildfire Suppression

One of the most visible economic consequences of wildfires in the United States is the increasing financial burden associated with suppression activities. Historically, wildfire suppression represented a relatively small portion of federal land management expenditures; however, over recent decades suppression costs have increased dramatically as wildfire events have become larger, more frequent, and operationally complex. While suppression costs are often used as a primary indicator of wildfire burden, these expenditures reflect only a fraction of the total economic consequences associated with wildfire events (Thomas et al., 2017).

Federal wildfire suppression spending has experienced substantial growth over time. According to the National Interagency Fire Center (NIFC), annual suppression expenditures in the United States now frequently reach several billion dollars, with considerable variation among years depending on weather conditions, fire occurrence patterns, and resource demands (National Interagency Fire Center, n.d.). Rising costs are influenced by multiple interacting factors, including increasing fire severity, expansion of development into fire-prone landscapes, and changing climatic conditions that contribute to prolonged fire seasons (Bayham et al., 2022).

The increasing complexity of suppression operations partly explains these escalating expenditures. Modern wildfire response frequently requires mobilization of large numbers of firefighters, specialized incident management teams, aviation resources, heavy equipment, emergency communication systems, and temporary operational infrastructure. Major incidents often involve coordination across federal, state, local, tribal, and private organizations, creating substantial logistical demands (Thomas et al., 2017). In many cases, suppression efforts continue for weeks or months, particularly when fires threaten densely populated communities or critical infrastructure.

Expansion of the wildland–urban interface has further intensified suppression expenditures. Fires occurring in remote forest landscapes may historically have been managed differently than fires threatening residential communities and public infrastructure. Today, however, increasing numbers of fires occur in areas where homes, businesses, roads, utilities, and other assets intersect with flammable vegetation. Under such conditions, suppression priorities frequently shift from limiting ecological damage toward protecting human life and property (Radeloff et al., 2018). Consequently, resource deployment often becomes more intensive and expensive.

Researchers have also identified important budgetary implications associated with rising suppression expenditures. Increasing portions of federal land management budgets are now directed toward emergency fire response activities, potentially reducing resources available for proactive land management strategies such as prescribed burning, fuel reduction treatments, ecological restoration, and community preparedness programs. This dynamic has created concerns regarding a cycle in which increasing suppression expenditures may inadvertently limit investments intended to reduce future wildfire risk (Bayham et al., 2022).

From a practitioner perspective, the rise in suppression costs raises important questions regarding the long-term sustainability of predominantly reactive wildfire management approaches. Although suppression remains essential for protecting communities and critical infrastructure, continued growth in expenditures suggests increasing need for strategies emphasizing prevention and resilience rather than exclusive reliance on emergency response.

Property Damage and Structural Losses

Destruction of residential and commercial structures represents another major category of direct wildfire-related economic loss. Unlike suppression expenditures, which primarily affect governmental agencies, property losses directly affect households, businesses, insurance systems, and local economies (Thomas et al., 2017). The destruction of homes and buildings frequently represents the most visible consequence of wildfire disasters and often produces long-term economic effects extending well beyond the duration of the event itself.

Recent wildfire disasters demonstrate the scale of structural losses that can occur when wildfire intersects with developed communities. The 2018 Camp Fire in California destroyed more than 18,000 structures and became one of the most destructive wildfires in modern U.S. history (Rafferty, 2025). Beyond the immediate physical destruction, the event generated extensive economic disruption through displacement of residents, interruption of local business activity, and long-term reconstruction demands. Similar patterns have emerged during other recent wildfire events, including the Marshall Fire in Colorado, which highlighted the vulnerability of suburban communities previously perceived as relatively insulated from wildfire risk (Stein 2024).

The economic implications of structural destruction extend beyond rebuilding costs alone. Loss of housing stock frequently creates secondary pressures on regional housing markets, particularly in communities already experiencing limited housing availability. Following major wildfire events, displaced populations often compete for temporary accommodation and rental properties, contributing to increased housing prices and affordability challenges (Thomas et al., 2017). In some cases, population displacement persists for years, altering community demographics and economic activity patterns.

Commercial property losses may create additional economic disruption. Businesses directly affected by wildfire frequently experience damage to facilities, inventory losses, interrupted operations, and declines in customer activity. Small businesses are particularly vulnerable because prolonged closures may reduce revenue streams beyond recovery capacity. Even businesses outside burned areas may experience economic losses resulting from evacuation orders, transportation disruptions, reduced tourism activity, and smoke-related declines in consumer behavior (Barrett 2018).

Insurance systems have also experienced increasing pressures associated with escalating wildfire losses. Rising claims costs have contributed to changes in insurance availability and affordability in several wildfire-prone regions. Some insurers have responded by increasing premiums, modifying coverage conditions, or withdrawing from high-risk markets altogether. Consequently, wildfire impacts increasingly extend beyond directly affected households and influence broader financial systems (Bayham et al., 2022).

From a community resilience angle, structural losses represent more than isolated economic events; they frequently influence long-term recovery trajectories and community stability. Recovery outcomes often depend not only on the magnitude of physical destruction but also on pre-existing economic conditions, housing availability, and institutional capacity to support rebuilding efforts.

Indirect Economic Costs of Wildfires

Beyond the Burned Landscape: Understanding Indirect Economic Losses

While suppression expenditures and property destruction often dominate public attention following major wildfire events, they represent only a portion of the overall economic burden imposed by wildfires. Increasingly, researchers recognize that the indirect costs of wildfire frequently exceed direct losses because they extend across multiple sectors of the economy and persist long after flames have been extinguished. These costs are less visible than burned structures or firefighting expenses but often have broader and more enduring consequences for households, businesses, governments, and regional economies.

Indirect economic losses arise from disruptions that occur because of the wildfire rather than from the physical fire itself. For example, a wildfire may destroy several hundred homes, but the resulting displacement of residents can reduce local consumer spending, interrupt school attendance, increase demand for temporary housing, strain public health systems, and decrease municipal tax revenues. Likewise, smoke generated by fires may reduce labor productivity hundreds of miles away from the fire perimeter, forcing businesses to modify operations or temporarily suspend outdoor activities. These cascading effects illustrate that wildfire impacts frequently extend well beyond the communities directly affected by fire.

The importance of accounting for indirect costs has become increasingly recognized within the disaster economics literature. Thomas et al. (2017), in a comprehensive assessment prepared for the National Institute of Standards and Technology, argued that focusing exclusively on suppression expenditures and physical damages substantially underestimates the true economic burden of wildfire because many social and economic losses remain unaccounted for. Similarly, Bayham et al. (2022) noted that wildfire impacts should be viewed as economy-wide disruptions affecting public health, labor markets, infrastructure, ecosystem services, and community well-being rather than isolated emergency events. An analysis of the 2018 California wildfire season estimated total economic losses of approximately \$148.5 billion, of which indirect losses accounted for nearly 60% of the overall economic burden. Notably, more than half of these indirect losses occurred outside California, demonstrating how modern supply chains, labor markets, and interstate economic linkages allow wildfire impacts to spread far beyond the area burned. These findings challenge the traditional perception that wildfire damages are primarily local events and instead position wildfire as a national economic concern requiring coordinated mitigation and resilience strategies.

Understanding these indirect impacts is particularly important for practitioners engaged in community wildfire protection planning, hazard mitigation, infrastructure investment, and land-use planning. Decisions regarding fuel treatments, defensible space, evacuation planning, watershed protection, and infrastructure resilience should be informed not only by estimates of property damage but also by the broader economic consequences that communities may experience over months or even years following a wildfire.

Public Health Costs Associated with Wildfire Smoke

Among the most significant indirect economic consequences of wildfires are the health impacts associated with smoke exposure. Unlike direct wildfire damages, which are generally confined to the fire perimeter, wildfire smoke can travel hundreds or even thousands of miles, exposing millions of people to elevated concentrations of fine particulate matter (PM_{2.5}) and other pollutants. Consequently, populations with no immediate proximity to wildfire events may nevertheless experience substantial health and economic impacts.

Wildfire smoke has been associated with increased emergency department visits, hospital admissions, respiratory illnesses, cardiovascular complications, asthma exacerbations, and premature mortality. Vulnerable populations, including older adults, young children, pregnant women, individuals with preexisting respiratory or cardiovascular disease, and outdoor workers, are particularly susceptible to these adverse health outcomes. As wildfire activity increases across the United States, smoke exposure has become one of the most widespread pathways through which wildfire affects public health.

The economic implications of these health outcomes are substantial. Increased healthcare utilization places additional demands on hospitals, emergency medical services, insurers, and public health agencies while simultaneously increasing out-of-pocket expenditures for affected households. Lost workdays resulting from illness further reduce labor productivity and household income. At the population level, these combined effects generate significant economic costs that are frequently omitted from traditional wildfire accounting frameworks.

Kochi et al. (2010) argued that the health-related economic consequences of wildfire smoke should be considered an integral component of wildfire management because smoke-related morbidity and mortality impose substantial societal costs beyond suppression and property losses. More recently, Dittrich and McCallum (2020) concluded that studies across North America consistently estimate wildfire smoke health impacts in the millions or billions of dollars annually, with mortality-related costs accounting for a large proportion of total economic losses.

These findings have important implications for preparedness and mitigation. Investments in smoke forecasting systems, public communication, clean-air shelters, indoor air filtration programs, and protection of vulnerable populations should be viewed not solely as public health interventions but also as economically beneficial investments capable of reducing downstream healthcare expenditures and productivity losses.

Labor Productivity and Workforce Disruptions

Wildfires impose substantial economic costs through disruptions to labor markets and workforce productivity, many of which are not immediately apparent during or immediately after a fire event. While direct damages such as destroyed buildings and burned infrastructure are readily quantified, reductions in workforce productivity often remain largely invisible despite their significant contribution to overall economic losses. These disruptions affect employees, employers, and regional economies through reduced working hours, business closures, evacuation orders, smoke exposure, transportation interruptions, and prolonged recovery efforts.

The effects of wildfire on labor productivity extend well beyond communities directly impacted by flames. During active wildfire events, mandatory evacuation orders, road closures, utility outages, and hazardous air quality frequently prevent employees from reporting to work or performing their normal duties. Businesses may be forced to suspend operations entirely, reduce operating hours, or transition to remote work where feasible. However, many industries, including construction, agriculture, forestry, utilities, transportation, emergency services, tourism, and outdoor recreation, cannot easily shift operations away from affected areas, making them particularly vulnerable to wildfire-related disruptions (Thomas et al., 2017).

Smoke exposure represents another significant driver of productivity losses. Wildfire smoke contains high concentrations of fine particulate matter (PM_{2.5}), carbon monoxide, and other pollutants that can impair physical

performance, cognitive function, and overall worker health. Outdoor workers, including firefighters, utility crews, construction workers, agricultural laborers, and transportation personnel, often face prolonged exposure to degraded air quality, increasing the likelihood of respiratory illness, fatigue, reduced physical endurance, and lost work time. Even indoor workplaces may experience reduced productivity when smoke infiltrates buildings or when poor outdoor air quality limits commuting and routine business operations (Reid et al., 2016).

Beyond immediate health effects, wildfire-related disruptions frequently create broader labor market challenges. Businesses affected by major wildfire events may experience temporary layoffs, reduced production capacity, or permanent closure if recovery costs become unsustainable. Employees displaced by housing loss may relocate to other communities, resulting in labor shortages that slow local economic recovery. In sectors already experiencing workforce constraints, such as healthcare, emergency response, and skilled construction trades, these disruptions may persist for months or years following a major wildfire.

The economic consequences of reduced labor productivity extend beyond individual businesses. Lower workforce participation decreases household income, consumer spending, and local tax revenues while simultaneously increasing demand for unemployment assistance and other public support programs. Input-output economic models have demonstrated that these indirect effects can ripple through regional economies, affecting industries with no direct exposure to wildfire. For example, disruptions to transportation networks or manufacturing facilities may delay supply chains, reduce production in downstream industries, and increase costs for businesses operating far from the fire itself (Thomas et al., 2017).

Recent economic assessments have emphasized that productivity losses constitute a significant proportion of total indirect wildfire costs. Bayham et al. (2022) argue that many conventional estimates of wildfire damages underestimate economic losses because they fail to adequately account for labor market disruptions and reductions in economic output. As wildfire seasons become longer and smoke events become more widespread across North America, these productivity-related losses are expected to increase, particularly in regions experiencing repeated smoke exposure or expanding wildfire risk.

Recognizing workforce disruption as an economic consequence of wildfire has important implications for resilience planning. Employers can reduce economic losses by implementing business continuity plans, flexible work arrangements, indoor air quality improvements, and occupational health protections during smoke events. Similarly, local governments and emergency managers can strengthen economic resilience by incorporating workforce continuity into hazard mitigation plans, ensuring that essential services remain operational while protecting worker health. These proactive measures not only safeguard employees but also reduce the broader economic impacts associated with prolonged business interruption and declining labor productivity.

Business Interruption and Supply Chain Disruptions

Wildfires impose substantial indirect economic costs by disrupting business operations and supply chains, often extending far beyond the areas directly affected by fire. Businesses may experience temporary or prolonged closures due to evacuation orders, road closures, power outages, poor air quality, damaged infrastructure, and workforce displacement. Even when commercial properties remain undamaged, these disruptions can reduce productivity, interrupt service delivery, and result in significant revenue losses. Thomas et al. (2017) note that such business interruption costs are frequently underestimated because traditional wildfire damage assessments primarily emphasize suppression expenditures and physical losses.

The interconnected nature of modern economies further amplifies these impacts. Wildfires that disrupt transportation corridors, utility infrastructure, or production facilities can delay the movement of goods and services, increase operating costs, and affect businesses across regional and national supply chains. Small and medium-sized enterprises (SMEs) are particularly vulnerable, as they often have limited financial reserves and reduced capacity to withstand prolonged interruptions. In tourism-dependent communities, wildfire and smoke

can lead to sustained declines in visitor numbers, affecting hotels, restaurants, retail businesses, and outdoor recreation providers long after fires have been contained (Headwaters Economics, 2018).

Beyond the private sector, business disruptions have broader economic implications. Reduced commercial activity lowers employment, household income, consumer spending, and local tax revenues while increasing demand for public recovery assistance. Bayham et al. (2022) emphasize that these cascading effects are rarely captured in conventional wildfire loss estimates, despite their significant influence on long-term community recovery and regional economic resilience.

From a practitioner perspective, minimizing business interruption requires integrating economic resilience into wildfire planning. Business continuity planning, resilient infrastructure, diversified transportation networks, and coordinated recovery strategies can reduce economic disruption and support faster recovery following future wildfire events.

Tourism and Recreation Losses

Tourism and outdoor recreation are major economic drivers for many wildfire-prone regions in the United States, making them particularly vulnerable to wildfire impacts. Wildfires can reduce visitor numbers by damaging natural attractions, restricting access to public lands, degrading air quality, and creating public safety concerns. As a result, hotels, restaurants, retail businesses, campgrounds, guiding services, and other recreation-dependent enterprises often experience significant declines in revenue during and after wildfire events (Thomas et al., 2017).

The economic impacts frequently extend beyond the active fire period. Burned landscapes, damaged recreational infrastructure, and post-fire hazards may delay the reopening of parks, trails, and campgrounds, reducing visitor spending and slowing economic recovery in gateway communities. Studies have shown that wildfire can significantly reduce recreational visitation and associated economic benefits, particularly in communities that rely heavily on seasonal tourism (Loomis et al., 2001).

Integrating wildfire mitigation into tourism and recreation planning can help reduce economic losses. Fuel management around recreational facilities, timely restoration of damaged infrastructure, and effective public communication regarding reopened areas can support faster recovery and strengthen the resilience of tourism-dependent communities.

Insurance Market Impacts

Wildfires have increasingly affected insurance markets, particularly in high-risk regions where repeated wildfire losses have led insurers to raise premiums, reduce coverage, or withdraw from vulnerable areas. These changes increase financial burdens for homeowners and businesses while reducing insurance availability in many wildfire-prone communities (Bayham et al., 2022).

The effects extend beyond property owners. Higher insurance costs and limited coverage can lower property values, delay rebuilding efforts, and influence future development in the wildland–urban interface. As wildfire risk continues to increase, integrating mitigation measures such as home hardening, defensible space, and fuel reduction into community planning can help reduce risk and improve long-term insurability.

4.7 Ecosystem Service Losses

Wildfires can substantially reduce the economic value of ecosystem services by degrading forests, watersheds, wildlife habitat, and other natural systems that support human well-being and economic activity. High-severity fires may impair water quality through increased erosion and sedimentation, reduce timber productivity, alter carbon storage, diminish biodiversity, and disrupt recreational opportunities. Although these losses are often

difficult to quantify, they can generate long-term economic consequences for downstream communities, public utilities, agriculture, and natural resource-dependent industries (Bayham et al., 2022).

The degradation of ecosystem services frequently extends well beyond the burned area. Damaged watersheds may require costly restoration and increase drinking water treatment expenses, while reduced forest productivity and habitat quality can affect timber markets, wildlife populations, and outdoor recreation. Recognizing the economic value of these services underscores the importance of proactive forest management, watershed protection, and ecological restoration as investments that reduce long-term wildfire costs and strengthen community resilience.

Distribution of Wildfire Economic Costs Across Stakeholders

Households and Individual Property Owners

Although governments often bear the costs of wildfire suppression and emergency response, households experience many of the most immediate and long-lasting economic consequences. Property damage, temporary displacement, increased insurance premiums, uninsured losses, and rising rebuilding costs can impose significant financial hardship on affected families. Even households that do not experience direct property damage may incur costs associated with evacuation, temporary housing, lost wages, healthcare expenses from smoke exposure, and declining property values. These financial burdens can persist for years, particularly in communities where housing shortages and construction delays prolong recovery (Thomas et al., 2017).

The impacts are often disproportionately experienced by lower-income households, older adults, renters, and socially vulnerable populations who may have fewer financial resources to prepare for, respond to, or recover from wildfire events. Consequently, wildfire can exacerbate existing socioeconomic inequalities and reduce long-term community resilience.

Businesses and the Private Sector

Private businesses bear significant wildfire-related costs through property damage, interrupted operations, declining consumer demand, workforce disruptions, and increased insurance expenses. Small businesses are particularly vulnerable because prolonged closures and reduced cash flow may threaten long-term viability. In addition, industries that depend on natural resources, tourism, outdoor recreation, agriculture, and forestry often experience prolonged economic impacts that continue after wildfire suppression activities have ended (Bayham et al., 2022).

Businesses increasingly recognize wildfire resilience as a component of long-term risk management. Investments in business continuity planning, resilient infrastructure, and emergency preparedness can reduce operational disruptions and improve recovery following future wildfire events.

Government and Public Agencies

Federal, state, tribal, and local governments incur substantial costs before, during, and after wildfire events. These expenditures include wildfire suppression, emergency response, evacuation support, debris removal, infrastructure reconstruction, watershed rehabilitation, disaster assistance, and long-term recovery programs. Increasing wildfire expenditures have placed growing pressure on public budgets, often reducing funding available for forest restoration, community development, and other public services (Bayham et al., 2022).

At the local level, declining tax revenues resulting from business closures, property losses, and population displacement may further constrain the ability of governments to finance recovery efforts. These fiscal pressures highlight the importance of proactive investments in wildfire mitigation and resilience planning.

Society and Future Generations

Many wildfire costs are not borne solely by directly affected communities but are distributed across society through increased insurance costs, federal disaster expenditures, healthcare spending, environmental degradation, and climate-related impacts. Future generations may also inherit reduced ecosystem services, degraded natural resources, and increasing financial obligations associated with repeated wildfire disasters. These intergenerational impacts reinforce the importance of shifting wildfire policy from reactive disaster response toward long-term investments in resilience, sustainable land management, and risk reduction.

The Economic Value of Wildfire Mitigation and Resilience Investments

From Reactive Response to Proactive Investment

As wildfire losses continue to increase, there is growing recognition that reactive suppression alone cannot sustainably reduce long-term economic impacts. Although emergency response remains essential for protecting lives and property, increasing suppression expenditures have not prevented escalating wildfire damages. Consequently, researchers and policymakers increasingly advocate for proactive mitigation strategies that reduce wildfire risk before disasters occur (Bayham et al., 2022).

Mitigation measures including hazardous fuel reduction, prescribed burning, home hardening, defensible space, risk-informed land-use planning, and public education can reduce future suppression costs, property damage, and recovery expenditures. While these strategies require upfront investment, they often generate substantial long-term economic benefits by enhancing community resilience and reducing disaster-related losses (Thomas et al., 2017). Integrating these measures through Community Wildfire Protection Plans (CWPPs), Hazard Mitigation Plans (HMPs), and other local planning initiatives enables communities to prioritize risk reduction and maximize the return on mitigation investments. Table 1 provides a summary comparison of these strategies and their associated economic outcomes.

Table 1. Economic Benefits of Major Wildfire Mitigation Strategies

Mitigation Strategy	Primary Benefit	Economic Outcome
Fuel reduction	Lower fire intensity	Reduced suppression and damage costs
Home hardening	Reduced structure ignition	Lower insurance claims and rebuilding costs
Defensible space	Improved structure survivability	Reduced property losses
CWPPs	Coordinated planning	More efficient allocation of mitigation funding
Prescribed fire	Reduced fuel accumulation	Lower future wildfire severity

Economic Benefits of Hazardous Fuel Reduction and Prescribed Fire

Hazardous fuel reduction and prescribed fire are among the most effective strategies for reducing wildfire risk and associated economic losses. By lowering fuel loads and modifying fire behavior, these treatments can decrease wildfire intensity, improve suppression effectiveness, and reduce damage to communities and critical infrastructure (North et al., 2015). Although they require upfront investment, fuel treatments are often more cost-effective than the long-term expenses associated with wildfire suppression, property damage, and post-fire recovery (Bayham et al., 2022).

The greatest economic benefits are achieved when treatments are strategically implemented near communities, critical infrastructure, and other high-value assets. Integrating fuel reduction with land-use planning and CWPP implementation can further improve community resilience while maximizing the effectiveness of mitigation investments. Despite challenges related to funding, workforce capacity, and public acceptance, expanding proactive fuel management remains a critical strategy for reducing future wildfire losses.

Economic Benefits of Home Hardening and Defensible Space

Home hardening and defensible space are among the most cost-effective measures for reducing structure loss during wildfires. Home hardening involves modifying buildings with fire-resistant materials and design features such as fire-resistant roofing, ember-resistant vents, tempered glass windows, and noncombustible siding to reduce vulnerability to ember intrusion and radiant heat. Defensible space complements these measures by managing vegetation and combustible materials around structures to reduce fire intensity and improve firefighter access. Together, these strategies increase the likelihood that homes will survive wildfire events while reducing suppression demands and post-fire recovery costs (Cohen, 2000; Bayham et al., 2022).

Beyond protecting individual properties, widespread adoption of home hardening and defensible space can generate community-wide economic benefits. Reducing structure ignition lowers insurance claims, preserves housing stock, limits displacement, and decreases the financial burden on public recovery programs. These measures can also improve community insurability and reduce long-term wildfire risk, particularly when implemented alongside local building codes, public education initiatives, and incentive programs. Consequently, investments in property-level mitigation should be viewed as an essential component of broader wildfire resilience strategies rather than solely as homeowner responsibilities.

Economic Benefits of Community Wildfire Protection Plans and Collaborative Planning

Community Wildfire Protection Plans (CWPPs) have become a cornerstone of wildfire risk reduction in the United States by providing a collaborative framework for identifying wildfire hazards, prioritizing mitigation activities, and coordinating investments among federal, state, tribal, and local partners. Beyond improving wildfire preparedness, CWPPs contribute to economic resilience by directing limited resources toward the areas of greatest risk, reducing duplication of efforts, and supporting informed decision-making regarding fuel treatments, infrastructure protection, evacuation planning, and public education (Healthy Forests Restoration Act [HFRA], 2003).

The collaborative nature of CWPPs also enhances the efficiency of wildfire mitigation investments. By engaging land management agencies, emergency responders, utilities, community organizations, and residents, these plans promote coordinated implementation of mitigation projects that can reduce future suppression costs, protect critical infrastructure, and minimize property losses. In addition, an approved CWPP can improve a community's competitiveness for federal and state mitigation funding, enabling local governments to secure financial resources for wildfire preparedness and resilience projects (Federal Emergency Management Agency [FEMA], 2023).

Although the economic benefits of CWPPs are often realized indirectly, they play a critical role in reducing long-term wildfire losses by supporting risk-informed planning and strengthening collaboration across jurisdictions. As wildfire risk continues to expand, integrating CWPPs with comprehensive land-use planning, hazard mitigation planning, and community development strategies can improve the effectiveness of mitigation investments while enhancing long-term community resilience. In practice, the effectiveness of a CWPP depends not only on the quality of the risk assessment but also on sustained stakeholder engagement, implementation capacity, and periodic plan updates that reflect changing wildfire conditions and community priorities.

Policy Recommendations and Future Directions

Strengthening Economic Resilience Through Integrated Wildfire Management

The growing economic burden of wildfires underscores the need for a shift from reactive disaster response to proactive, integrated wildfire management. As demonstrated throughout this review, wildfire impacts extend far beyond suppression expenditures and property losses, affecting public health, labor productivity, housing, insurance markets, ecosystem services, and long-term community development. Addressing these interconnected challenges requires coordinated policies that integrate wildfire mitigation into land-use planning, infrastructure investment, public health, and economic development.

Future wildfire policies should emphasize sustained investment in mitigation rather than episodic funding following major disasters. Expanding hazardous fuel reduction, prescribed fire, home hardening, and community preparedness programs can reduce long-term economic losses while strengthening community resilience. Equally important is the integration of wildfire risk into local comprehensive plans, building codes, transportation planning, and utility management to reduce future exposure and improve adaptive capacity.

Because wildfire impacts cross jurisdictional and sectoral boundaries, collaboration among federal, state, tribal, and local governments, private landowners, utilities, insurers, researchers, and community organizations will remain essential. Strengthening these partnerships through Community Wildfire Protection Plans, hazard mitigation planning, and regional coordination can improve the effectiveness of mitigation investments while ensuring that limited financial resources are directed toward the areas of greatest risk.

Continued research is also needed to improve the valuation of indirect and long-term wildfire costs, particularly those associated with ecosystem services, mental health, social vulnerability, and climate change. Developing more comprehensive economic assessment methods will enable policymakers to better evaluate the benefits of mitigation and make more informed investment decisions.

Ultimately, wildfire should be viewed not only as an environmental hazard but also as a significant economic and societal challenge. Recognizing the full economic consequences of wildfire and investing in proactive risk reduction will be essential to building more resilient communities capable of adapting to an increasingly fire-prone future.

CONCLUSION

Wildfires have become one of the most significant and costly natural hazards in the United States, with economic impacts extending far beyond suppression expenditures and property losses. As this review demonstrates, wildfires impose substantial direct, indirect, and long-term costs on households, businesses, governments, and ecosystems through disruptions to public health, labor productivity, housing, insurance markets, tourism, infrastructure, and ecosystem services. These interconnected impacts underscore the need to evaluate wildfire not only as an environmental challenge but also as a complex socioeconomic issue requiring coordinated and sustained action.

Evidence from the literature consistently shows that proactive mitigation measures—including hazardous fuel reduction, prescribed fire, home hardening, defensible space, and collaborative planning through Community Wildfire Protection Plans (CWPPs) can substantially reduce future wildfire losses while strengthening community resilience. Investing in these strategies before disasters occur is likely to be more cost-effective than relying primarily on suppression and post-fire recovery.

As wildfire risk continues to increase because of climate change, expanding development within the wildland–urban interface, and accumulated fuel loads, integrating wildfire resilience into land-use planning, infrastructure investment, and public policy will become increasingly important. Continued research to better quantify indirect and long-term economic impacts will further support evidence-based decision-making and improve the allocation of mitigation resources. Ultimately, reducing the economic burden of wildfires will require a sustained commitment to proactive risk reduction, cross-sector collaboration, and long-term resilience planning.

REFERENCES

1. Barrett, K. (2018). Full community costs of wildfire. *Headwaters Economics*. <https://headwaterseconomics.org/natural-hazards/wildfire/homes-risk/full-community-costs-of-wildfire/>
2. Bayham, J., Yoder, J. K., Champ, P. A., Calkin, D. E. (2022). The Economics of Wildfire in the United States. *Annual Review Resource Economics*. 14:379-401. <https://doi.org/10.1146/annurev-resource-111920-014804>
3. Baylis, P., & Boomhower, J. (2019). Moral hazard, wildfires, and the economic incidence of natural disasters (NBER Working Paper No. 26550). National Bureau of Economic Research. <https://doi.org/10.3386/w26550>
4. Canon, G. (2025). Millions of Americans believe they're safe from wildfires in their cities. New research shows they're not. *The Guardian*. <https://www.theguardian.com/us-news/2025/apr/05/us-wildfires-cities-dangers>
5. Cohen, J. D. (2000). Preventing disaster: Home ignitability in the wildland–urban interface. *Journal of Forestry*, 98(3), 15–21. <https://research.fs.usda.gov/download/treesearch/4688.pdf>
6. Crowley, C., A. Miller, R. Richardson, and J. Malcom. (2022). Increasing damages from wildfires warrant investment in wildland fire management. Department of the Interior Office of Policy Analysis Report R-2023-01. <https://doi.org/10.13140/RG.2.2.27598.23361>
7. Dittrich, R., & McCallum, H. (2020). *How to measure the economic health cost of wildfires*. *International Journal of Wildland Fire*.
8. Federal Emergency Management Agency. (2023). *Hazard Mitigation Assistance Guidance*. <https://www.fema.gov/grants/mitigation>.
9. Headwaters Economics. (2018). *The full community costs of wildfire*. <https://headwaterseconomics.org/natural-hazards/wildfire/full-community-costs-of-wildfire/>
10. Healthy Forests Restoration Act of 2003, Pub. L. No. 108-148, 117 Stat. 1887. <https://www.congress.gov/108/plaws/publ148/PLAW-108publ148.pdf>
11. Kochi, I., et al. (2010). *The economic cost of adverse health effects from wildfire-smoke exposure*. *International Journal of Wildland Fire*.
12. Law, B. E., Abatzoglou, J. T., Schwalm, C. R., Byrne, D., Fann, N., Nassikas, N. J. (2025). Anthropogenic climate change contributes to wildfire particulate matter and related mortality in the United States. *Commun Earth Environ*;6(1):336. <https://pubmed.ncbi.nlm.nih.gov/40321670/>
13. Loomis, J., González-Cabán, A., & Englin, J. (2001). Testing for differential effects of forest fires on hiking and mountain biking demand and benefits. *Journal of Agricultural and Resource Economics*, 26(2), 508–522.
14. Mockrin, M. H., Helmers, D., Martinuzzi, S., Hawbaker, T. J., Radeloff, V. C. (2022). Growth of the wildland-urban interface within and around U.S. National Forests and Grasslands, 1990–2010. *Landscape*

- and Urban Planning, Volume 218, 2022, 104283, ISSN 0169-2046, <https://doi.org/10.1016/j.landurbplan.2021.104283>.
15. National Interagency Fire Center. (n.d.). *Suppression costs*. <https://www.nifc.gov/fire-information/statistics/suppression-costs>
 16. North, M. P., Stephens, S. L., Collins, B. M., Agee, J. K., Aplet, G. H., Franklin, J. F., & Fulé, P. Z. (2015). Reform forest fire management. *Science*, 349(6254), 1280–1281. <https://doi.org/10.1126/science.aab2356>
 17. Radeloff, V. C., Helmers, D., Kramer, H. A., Stewart, S. I. (2018). Rapid growth of the U.S. wildland-urban interface raises wildfire risk. *Proceedings of the National Academy of Sciences*, <https://doi.org/10.1073/pnas.1718850115>.
 18. Rafferty, J.P. (2025). Camp Fire of 2018. *Encyclopedia Britannica*. <https://www.britannica.com/event/Camp-Fire-of-2018>
 19. Reid, C. E., Brauer, M., Johnston, F. H., Jerrett, M., Balmes, J. R., & Elliott, C. T. (2016). *Critical Review of Health Impacts of Wildfire Smoke Exposure*. *Environmental Health Perspectives*, 124(9), 1334–1343.
 20. Stein, T. (2024). *Looking back at Colorado's Marshall Fire*. NOAA Research. <https://research.noaa.gov/looking-back-at-colorados-marshall-fire/>
 21. Thomas, D. S., Butry, D. T., Gilbert, S. W., et al. (2017). *The Costs and Losses of Wildfires: A Literature Survey*. *NIST Special Publication 1215*.
 22. U.S. Congress Joint Economic Committee Democratic Staff. (2023). *Climate-exacerbated wildfires cost the U.S. between \$394 to \$893 billion each year in economic costs and damages*. U.S. Congress Joint Economic Committee. https://www.jec.senate.gov/public/_cache/files/9220abde-7b60-4d05-ba0a-8cc20df44c7d/jec-report-on-total-costs-of-wildfires.pdf
 23. U.S. Department of Agriculture (USDA) Forest Service. (2024). Economic risks: Forest Service estimates costs of fighting wildfires in a hotter future. U.S. Forest Service. <https://research.fs.usda.gov/srs/articles/economic-risks-forest-service-estimates-costs-fighting-wildfires-hotter-future>
 24. USDA Forest Service. (2025). Government spending on wildfire suppression rises with climate change U.S. Forest Service. <https://research.fs.usda.gov/srs/articles/government-spending-wildfire-suppression-rises-climate-change>