



Final Report for Pigeon Forge, Tennessee – October 2018



Prepared By:



Wildfire Planning International



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About the Community Planning Assistance for Wildfire Program

The [Community Planning Assistance for Wildfire](#) (CPAW) program works with communities to reduce wildfire risks through improved land use planning. It is supported through grants from the U.S. Forest Service, the LOR Foundation, and other private foundations. It is a program of Headwaters Economics and Wildfire Planning International.

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Background

Every year wildfires affect communities across the United States. Some of their impacts bring positive ecological benefits, such as improved forest health and habitats. Other wildfires, however, can have devastating consequences to communities' public and first responder safety, homes and businesses, local economies, parks, roads, watersheds, forests, hospitals, and more.

To help communities better plan for wildfires and reduce unwanted impacts, Headwaters Economics and Wildfire Planning International

established the Community Planning Assistance for Wildfire (CPAW) program in 2015. The program is funded by the USDA Forest Service and private foundations.

CPAW's team of professional land use planners, foresters, risk analysts, and researchers has worked with 26 communities to date. Each CPAW project focuses on what is at risk in the "wildland-urban interface" (WUI, pronounced "WOO-EE") and recommends strategies to address wildfire risks through improved land use planning and other activities. Communities voluntarily apply and are competitively selected to participate in the program on an annual basis.

The City of Pigeon Forge, Tennessee was selected to receive technical assistance in 2018. The CPAW team engaged with representatives from the City of Pigeon Forge Fire Department, City of Pigeon Forge planning staff, and the Tennessee Division of Forestry to focus its efforts on three primary activities:

- **Local WUI Context.** CPAW met with stakeholders for an in-person site visit to observe and discuss the local WUI, including fire history and unique planning challenges.
- **Stakeholder Training.** CPAW delivered a half-day professional training to regional stakeholders.
- **Recommendations for Future Planning.** To support the city's next steps, CPAW developed guidance on the local development of a Community Wildfire Protection Plan (CWPP).

This final report summarizes outcomes and key takeaways from the first two activities and provides a set of recommendations for local stakeholders to advance wildfire risk reduction across the city and region.

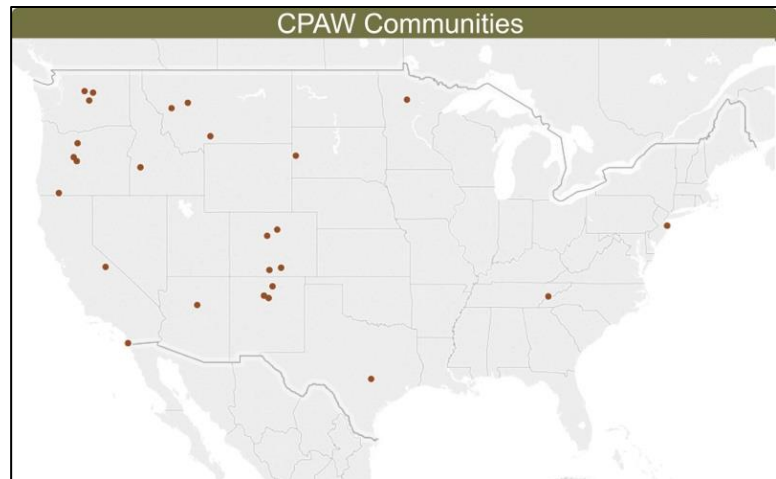


Figure 1. Since its inception in 2015, CPAW has worked with communities of varying sizes, capacities, and locations across the United States.

Local WUI Context

Fire History and Vulnerability

In 2010, the Tennessee Division of Forestry's Southern Wildfire Risk Assessment (SWRA) listed Sevier County as a priority for catastrophic Wildland Urban/Interface fires. The Wildfire Vulnerability Map (Figure 2) from the 2011 Pigeon Forge Multi-Hazard Mitigation Plan shows significant areas of the city with elevated wildfire vulnerability.

Over the past 10 years, Pigeon Forge has experienced 41 wildfires. The city also provides resources to the Tennessee Division of Forestry on an average of 12 times per year. The largest wildfire event to affect the city and Sevier County in recent history was the November 2016 fire complex. During this fire event, 14 civilians lost their lives; 18 homes within city limits were destroyed, and an additional 400 home losses occurred in the immediate county service area. A total of 2,449 structure losses occurred complex-wide. Local fire and planning staff reference this event as a prime example of the ongoing potential of the combined local fire environment and land use patterns that continue to challenge the community's resilience to large wildfires.

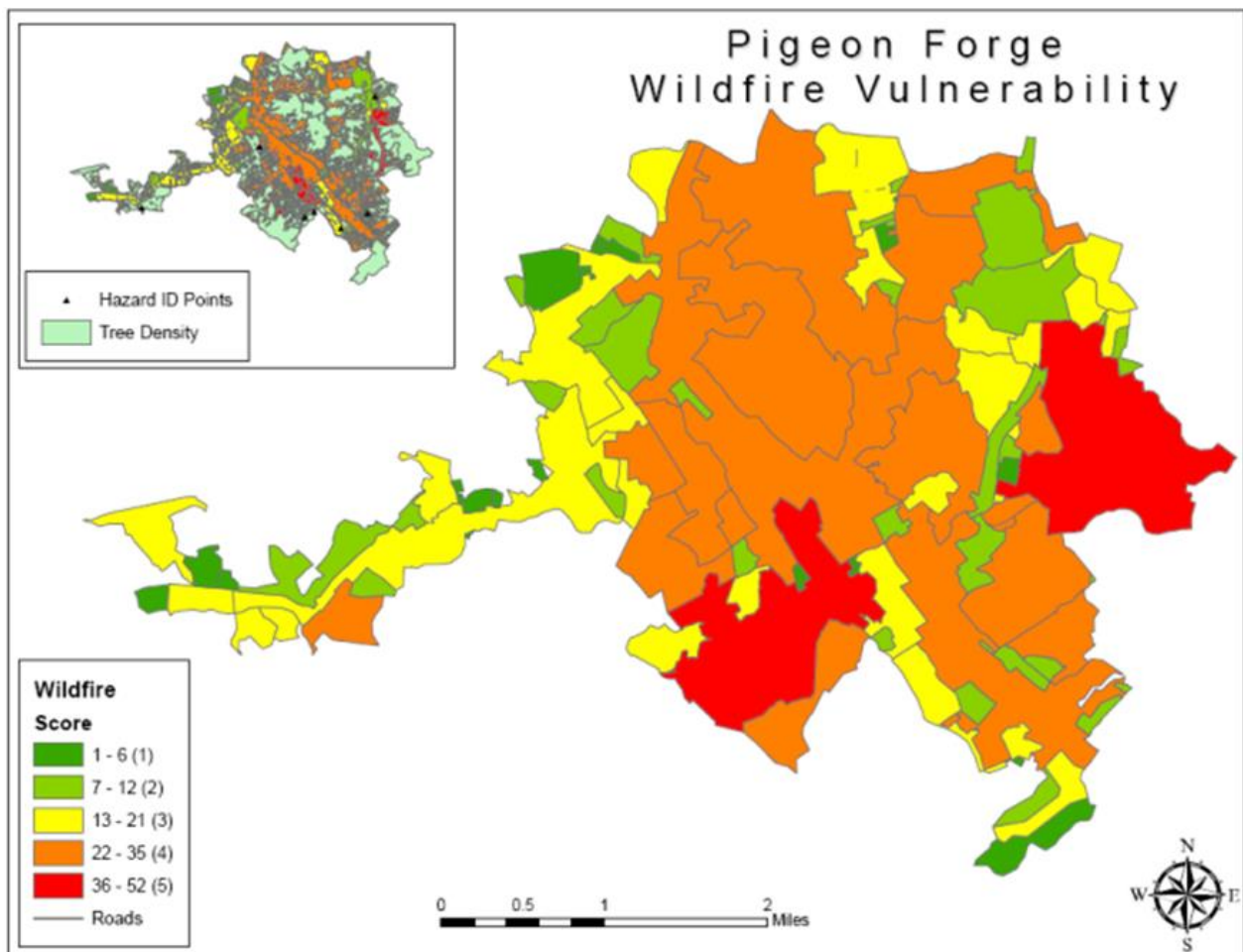


Figure 2. City of Pigeon Forge Wildfire Vulnerability Map from the 2011 Pigeon Forge Multi- Hazard Mitigation Plan (green is the least vulnerable/ red is the most vulnerable).

WUI Development Patterns

The City of Pigeon Forge has a permanent population of over 6,000 people. In addition, the region is a major tourist destination, with several million people visiting the city each year and more than 10 million annual visitors to the nearby Great Smoky Mountains National Park.¹ To accommodate residents and visitors, the city and surrounding Sevier County has built numerous hotels, motels, commercial cabins, residential homes, and condominiums. Development that exists outside of the city's commercial corridor is predominantly suburban and/or rural. Structures are intermixed through a complex arrangement of forested valleys and hillsides with very limited road access.

WUI Challenges

The CPAW team took an all-day field tour with stakeholders on May 30, 2018 to learn about local WUI conditions and areas affected by previous wildfires. Observations and discussions occurred among members of the CPAW team, city planning department, city fire department, and local and state land management agencies. Following the tour, CPAW identified the following challenges as significant issues that should be factored into the city's future WUI planning activities:

- **Ingress and egress:** Many developed areas (both within and outside city limits) have narrow roads, steep and long driveways, and limited access that allows for only one-way in/one-way out. Few roads are wide enough for both an emergency vehicle and standard-sized automobile and would not meet access standards set forth in the International Code Council International Wildland-Urban Interface Code or the National Fire Protection Association's 1141 Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas. Other features, such as location of hydrants, grades, and lack of turnarounds may restrict first responders' ability to safely and easily access structures and properties. Without changes, these challenges will result in significant safety concerns during evacuations for the public and first responders.



Figure 3. A local field tour of the WUI revealed challenges related to access, construction, and structure density.

¹ Pigeon Forge Business Statistics: <http://www.pigeonforgedevelopment.com/>. Accessed September 2018.

- **Density and size of structures:** The city currently allows the development of single-family and multi-family housing units in highly vegetated areas with known fire history, without wildfire mitigation requirements. In some cases, occupancies of more than one hundred persons are allowed per unit. These cabins are dotted throughout the WUI and result in multiple concerns in the event of a wildfire, including:
 - Cabins are often rented to out-of-town guests that will not have familiarity with the local area, including safe evacuation routes.
 - The high concentration of people in areas at risk to wildfire may increase wildfire ignitions as human activities are responsible for more than 90% of ignitions in the southeastern U.S.
 - The proximity of structures to one another poses a threat during structure or wildland fires.
- **Building construction methods and materials:** Many of the structures observed in the WUI are made from combustible materials, which includes attachments such untreated wood decks. These construction methods and materials result in extreme vulnerabilities to radiant heat, convective heat, and embers during a wildfire event.
- **Dense vegetation in proximity to structures:** There are limited instances of communities that have adequate defensible space of 30 feet or more. In addition, many properties are on slopes, which would require additional defensible space to accommodate the slope. Finally, landscaping practices also include bark mulch or pine straw next to combustible siding. Vegetation and combustible materials near structures in the WUI also increases their vulnerability to embers, radiant heat, and convective heat during a wildfire.
- **Presence of other ignition sources:** Within the WUI there are other ignition sources that may pose a threat to structures. These include power lines, firewood piles, outdoor fire pits, and grills.
- **Other values at risk:** In addition to structures and neighborhoods in the WUI, many other values at risk have been or could be threatened during a wildfire. For example, Dollywood is adjacent to a heavily forested area and was significantly threatened during the Great Smoky Mountains Fires. Due to its heavy reliance on tourism, other businesses in or near the WUI should also be considered at risk and take appropriate action to mitigate the threat of wildfire.

Stakeholder Training

As part of its assistance, CPAW delivered a “WUI Wildfire Basics and Planning Tools Training Workshop” to local planners and interested stakeholders (May 31, 2018). The half-day training provided participants with a basic understanding of fuels, fire behavior, the WUI disaster cycle, WUI hazard and risk, and the use of planning tools to mitigate risk. The objective of the training was to provide a greater understanding of land use planning and wildfire linkages, and identify potential opportunities for improving the local planning process.

Training Outcomes

The training workshop introduced participants to the following WUI concepts:

- Wildland-urban interface (WUI) definition
- Wildland and WUI fire behavior

- Community vulnerabilities to wildfire
- Wildfire hazard and risk assessment
- Wildfire risk relationship to planning
- Land use planning tools and strategies to address the WUI

CPAW training facilitators used local examples from the WUI field tour to illustrate key concepts during the presentation. Participant discussions focused on local challenges associated with evacuation, public safety, and construction materials.

Participants were from local, state, and federal agencies and organizations, and included the Pigeon Forge Fire Department, Pigeon Forge Department of Community Development, Pigeon Forge Planning Commission Sevier County, Gatlinburg Fire Department, Tennessee Division of Forestry, National Park Service, Dollywood, and local development and professional groups. All attendees received a certificate of attendance.

Recommendations for Future Planning

In response to local WUI concerns, Pigeon Forge Fire Department staff developed a Firewise Action Plan in 2017. The goal of the plan was to “identify the short and long-term actions that will make the City of Pigeon Forge safer from wildfire” through the following objectives:

1. Reduce the amount of flammable vegetation (also referred to as “hazard”) around structures and other community infrastructure thereby creating defensible space.
2. Decrease the likelihood that structures can be ignited by embers and surface fires.
3. Continue to promote a community prevention and preparedness education program.
4. Reassess how wildland fire is planned for in city planning documents.
5. Integrate city wildfire evacuation plan with that of the county.

The action plan also provided several specific actions—including the development of a CWPP by the fall of 2018. The city developed a draft CWPP framework based on the Tennessee Division of Forestry template.

CPAW also recommends that stakeholders develop a local CWPP to serve as an important engagement and planning tool for the community. The following recommendations provide guidance on how Pigeon Forge can incorporate changes into its CWPP to integrate land use planning and strengthen its comprehensive wildfire framework.

1. Establish a Collaborative Wildfire Community Working Group

CWPPs are often delegated to one stakeholder group, such as the local fire department. As a best practice, however, the most successful CWPP outcomes are typically produced by a multi-disciplinary stakeholder group. A multi-disciplinary approach encourages the participation and incorporation of different perspectives to support mutually beneficial and lasting wildfire risk reduction goals. Engaging many stakeholders in the CWPP development process also promotes local knowledge exchange across diverse areas of expertise. Suggested participants include representation from the following agencies and organizations (or equivalent):

- Fire Department
- Emergency Management Department

- Community Development/Planning Department
- Building Department
- Code Enforcement Department
- Public Works Department
- Parks and Recreation Department
- Geographic Information System (GIS) Department
- Elected Officials
- Local, State, and Federal Land Management Agencies
- Professional Trade and Industry Associations
- Community Groups and Public (Homeowner Associations, Firewise Communities)

It may be desirable to engage with individual stakeholders, or groups of stakeholders at different levels of involvement and different stages of the CWPP development. It will be appropriate for some to be heavily involved throughout the entire process, while it may be desirable to have others only be involved at key stages of the process. For this purpose, stakeholders can be categorized based on their level of involvement. The resulting categories can be used to schedule meetings, draft reviews and engagement on different portions of the project. Table 1 offers an example of one possible approach.

TABLE 1: STAKEHOLDER LEVELS OF ENGAGEMENT CATEGORIES EXAMPLE		
Stakeholder	Engagement Level	Summary of Involvement
Pigeon Forge Fire Department Pigeon Forge Community Development Department	HIGH	<ul style="list-style-type: none"> • Participate in all meetings and phone calls • Primary author of document • Review, discussion and comment on all drafts
Professional Trade and Industry Associations	MEDIUM	<ul style="list-style-type: none"> • Initial notification of project • Review and comment on drafts • Review of final draft
Community Groups and Public	LOW	<ul style="list-style-type: none"> • Initial notification of project • Public review and comment of final draft document

Once a multi-stakeholder group is formed, the lead entity should conduct regular planning meetings during the development phase of the CWPP. Following completion of the CWPP, this group should continue its engagement to support plan implementation.

2. Incorporate Additional Content into the Community Wildfire Protection Plan

The current Tennessee Division of Forestry CWPP template provides useful direction for the development of a local CWPP (primarily for implementation at the neighborhood scale). To further support the city’s development of their CWPP, the CPAW team identified additional topic and content changes to strengthen the plan’s outcomes (Table 2).

TABLE 2: RECOMMENDED TOPICS TO ADD TO THE COMMUNITY WILDFIRE PROTECTION PLAN

Front Matter/ Introduction	
ADD: Executive Summary	<p>Add an executive summary to the document to provide an overview of the plan to readers who may not read the entire document. Specifically, the Executive Summary should contain:</p> <ul style="list-style-type: none"> • An overview of the CWPP’s approach that align with national planning priorities and “living with fire” themes; • Confirmation of CWPP requirements that meet the Healthy Forest Restoration Act; • A summary of key topics and takeaways (e.g., priority actions, highest risk areas; notable achievements from past mitigation projects).
1) Community Background and Existing Situation	
ADD: Area Description of the City and County	<p>Provide additional information in the general description to help readers understand broad influences on the planning area, including:</p> <ul style="list-style-type: none"> • narrative description of geographic location (e.g., size of community); • topographical features; • climate conditions (e.g., seasonal weather patterns, average temperatures and precipitation patterns); • environment (e.g., vegetation types, local habitat); • key demographics in addition to population (e.g., median age, rental/homeownership rates, seasonal changes in population, primary economic drivers, and other unique factors that may need to be considered when planning for local/vulnerable populations).
CHANGE: Number of lots, acres, structures, and development status	<p>This information may be impractical to obtain if the CWPP is prepared at a scale larger than a subdivision or neighborhood. Consider requesting alternative information for submission, such as anticipated areas of development, historical building permit trends, or other potential indicators of the planning area size that would affect WUI growth.</p>
ADD: Fire History & Fire Behavior	<p>Provide more details in general summary of the community’s wildfire history and fire behavior (e.g., number of fires, significant fire occurrences, fire losses). The SWRA outputs are a good resource for this information.</p>
ADD: Risk Assessment	<p>Expand this assessment by including the SWRA outputs to describe the potential wildfire risk, and explain these outputs with interpretations and general implications for the city. This should include the definition/delineation of the Wildland-Urban Interface areas based on the SILVIS Labs methodology and Federal Register definitions.</p>

2) Community Base Map and Other Visuals	
CHANGE: Embed maps and visuals within relevant sections and provide online resources	Embed maps and visuals within the relevant sections throughout the plan for ease of reference by the reader. Consider providing spatial files of the maps as an online resource so readers can review the maps in detail. The development of an integrated CWPP story map and website can be used as an extremely effective public coeducation tool.
3) Objectives and Goals	
CHANGE: Link goals and objectives to relevant sections	Develop and identify specific goals and objectives within each section (see part 4, below) and clearly link the goals and objectives with each CWPP mitigation priority.
REFERENCE: Clearly define goals from objectives	<p>Include definitions of goals and objectives to inform the plan development process:</p> <ul style="list-style-type: none"> • Goals are broad statements that provide a long-term vision and serve as the foundation of the plan. • Objectives are more specific statements of purpose that identify desired outcomes.
4) Prioritized Mitigation Recommendations	
CHANGE: Cohesive Strategy Approach	Consider realigning mitigation priority subsections (Community Hazard Reduction, Structural Ignitability Reduction, Education and Outreach) with the three goals of the National Cohesive Wildland Fire Management Strategy (“Cohesive Strategy”): resilient landscapes, fire adapted communities, improved response capability. Change Section title to “Prioritized Mitigation Recommendations for a Cohesive Strategy Approach” or something similar.
CHANGE: Creating Resilient Landscapes	<p>As part of aligning projects with a cohesive strategy approach, change the subsections to “Creating Resilient Landscapes” by including:</p> <ul style="list-style-type: none"> • Overview of resilient landscapes, local fire ecology and ecosystems, habitat types, watersheds; synthesizes risk assessment outputs for landscapes; • Overview of <i>primary</i> stakeholder roles: federal, state, and local land management agencies, large landowners; • Fire Management and Mitigation topics which synthesize risk assessment outputs, discuss opportunities and challenges, and identify prioritized recommendations for mitigation: <ul style="list-style-type: none"> ○ Ecology/Ecosystem-based fire management ○ Fuel treatments for landscapes (public and private) ○ Role of prescribed fire and smoke management ○ Post-fire effects and recovery ○ Land management planning (state, national forest) • Relationship to other plans.

<p>CHANGE: Promoting Fire Adapted Communities</p>	<p>As part of aligning projects with a cohesive strategy approach, change the subsections to “Promoting Fire Adapted Communities” by including:</p> <ul style="list-style-type: none"> • Introduction/overview of topic, including recent development trends and anticipated future growth in the WUI; • Overview of <i>primary</i> stakeholder roles: residents, community development and planning staff, industry professionals, elected officials; • Fire Adaptation and Mitigation topics which synthesize risk assessment outputs, discuss opportunities and challenges, and identify prioritized recommendations for mitigation: <ul style="list-style-type: none"> ○ WUI communities; Structure Ignition Zone—structural ignitability, property management and maintenance ○ Additional community values at risk (critical infrastructure, water supplies, cultural/tribal/historical sites, open space/recreation) ○ Public education/outreach programs (Firewise, Ready, Set, Go!) ○ Local government land use planning tools (policies, regulations, codes) • Relationship to other plans.
<p>ADD: Improving Response & Suppression Capabilities (move from current Section 6)</p>	<p>Include (move) the current Wildfire-Prep Suppression Plan section into the Cohesive Strategy Approach and rename subsection to Improving Response & Suppression Capabilities. Include additional information:</p> <ul style="list-style-type: none"> • Introduction/overview of topic; • Overview of <i>primary</i> stakeholder roles: Fire Departments and response areas; additional responding agencies (TDF, USFS); • Fire Response topics: • Each topic below synthesizes risk assessment outputs, discusses opportunities, challenges and makes applicable recommendations: <ul style="list-style-type: none"> ○ Current response and suppression capabilities ○ Current limitations in Pigeon Forge and Sevier County (fire flow, ingress/egress) ○ Emergency management/evacuation planning ○ Interagency cooperation ○ Addressing coverage gaps • Relationship to other plans.
<p>5) Action Plan</p>	
<p>KEEP: excellent format</p>	<p>The current action plan template incorporates S.M.A.R.T. principles for successful actions:</p> <ul style="list-style-type: none"> • Specific • Measurable • Achievable • Results focused • Time bound
<p>ADD: Plan Maintenance</p>	<p>Add a section on plan maintenance to address:</p> <ul style="list-style-type: none"> • Future tracking of the action plan

	<ul style="list-style-type: none"> • Anticipated timeframe for future updates • Organization responsible for plan maintenance
6) Wildfire Pre-Suppression Plan	
MOVE: To Cohesive Strategy Approach	Move suppression planning section to the newly proposed Cohesive Strategy subsection <i>Improving Response & Suppression Capabilities</i> (see section 4, above).

3. Link the CWPP to Other Local Plans

Development of CWPP goals, objectives, and mitigation actions should reference other local plans and regulations, where applicable. For example, the CWPP working group should align with the development of the new hazard mitigation plan for Sevier County, which includes the Pigeon Forge, Gatlinburg, and Sevierville. This is an opportunity to reinforce mutually compatible goals across the community and cross-reference hazard information to avoid duplication.

4. Work with Tennessee Division of Forestry to update CWPP template

Following the update of its local CWPP, Pigeon Forge may seek to provide input to the Tennessee Division of Forestry CWPP template. Local feedback could help inform future versions of the state’s template that would be beneficial to other communities in Tennessee seeking to develop a comprehensive CWPP framework.

Additional Resources

General Planning Guidance

- Community Planning Assistance for Wildfire: [WUI and Wildfire Hazard Resources](#). (2018)
- Federal Emergency Management Agency: [Public Assistance Program and Policy Guide](#) (2018)

Community Wildfire Protection Plan

- International Association of Fire Chiefs: [CWPP Leader’s Guide \(2017\)](#)
- Fire Adapted Communities Learning Network: [FAC Self-Assessment Tool \(2016\)](#)

Specific Guidance for Mitigation and Recovery for Historic Properties

- Federal Emergency Management Agency: [Integrating Historic Property and Cultural Resource Considerations in Hazard Mitigation Planning](#). (2005)