Community Wildfire Protection Plan

Forest County
Pennsylvania

Prepared for:

Forest County
Forest County Courthouse
526 Elm St.
Tionesta, Pa 16353

Prepared by:

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Community Wildfire Protection Plan

For

Forest County Pennsylvania

June 25, 2014

Wildland Fire Associates, LLP

Darrell Schulte

Doug Raeburn

Chris House

1. Data and recommendations developed for this project are advisory in nature and are NOT intended to replace specific site assessments. At any given time the ephemeral nature of the vegetation may affect fuel condition present within the study area. Wildland Fire Associates and its agents assume no liability in the event a catastrophic wildland fire damages or destroys public or private property.

Core Team

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Donna Lynn Zofcin – Forest County Conservation & Planning

Dan Glotz – Warren County Planning

Cecile Stelter – DCNR PA Bureau of Forestry

Peter To – Allegheny National Forestry

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Community Wildfire Protection Plan

For

Forest County, Pennsylvania

Submitted by: _____ Date: _____

Project Leader, Wildland Fire Associates

Reviewed by: _____Date:_____

Forest County Conservation & Planning

Reviewed by: _____ Date: _____

DCNR PA Bureau of Forestry

Reviewed by: _____Date:_____

USDA Forest Service, Allegheny National Forest

Accepted by: _____Date:_____

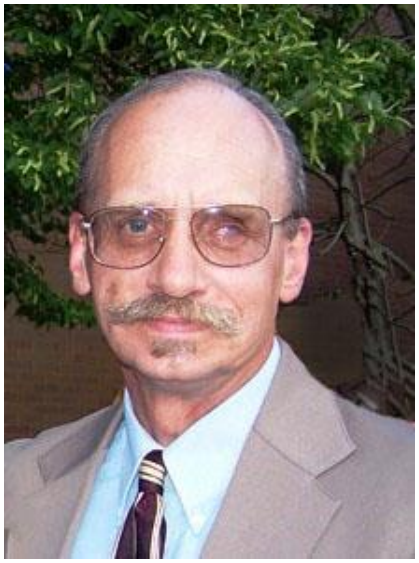
Forest County Conservation & Planning

This plan is dedicated to Doug Carlson who passed away unexpectedly during the planning process**.**

Douglas E. Carlson, 62, of Tionesta, passed away unexpectedly on Tuesday morning, Feb. 4, 2014.

Doug loved Forest County and served to maintain and improve the county as Conservation District Manager and Forest County Planner. As County Planner, Doug, along with Dan Glotz of Warren County, was instrumental in acquiring the funding that enabled Forest County to complete this County Wide Protection Plan.

Doug was born Sept. 6, 1951, in Warren. He was the son of Ronald L. and the late Alice (Kent) Carlson of Sugar Grove.



He was a graduate of Eisenhower High School and Edinboro University.

On June 20, 1988, Doug married Romona Smith at the Tionesta Church of God.

He was an active member of the Tionesta Church of God. He served the Lord diligently, teaching Sunday school, leading the Men's Promise Keepers and serving on the board of trustees.

He was a member of the Masons Lodge 547 in Youngsville, Pa.

Doug cared for his family and could be counted on to help and provide his opinion. His love, wit and humor will be missed by all.

Doug is now truly living the dream.

Wildland Urban Interface Hazards

Firefighters in the wildland urban interface may encounter hazards other than the fire itself, such as hazardous materials, utility lines, and poor access.

Hazardous Materials: Common chemicals used around the home may be a direct hazard to firefighters from flammability, explosion potential and /or vapors or off-gassing. Such chemicals include paint, varnish, and other flammable liquids; fertilizer; pesticides; cleansers; aerosol cans; fireworks; batteries; and ammunition. In addition, some common household products such as plastics may give off very toxic fumes when they burn. Stay OUT of the smoke from burning structures and any unknown sources, such as trash piles.

Illicit Activities: Marijuana plantations and drug production labs may be found in wildland urban interface areas. Extremely hazardous materials such as propane tanks and flammable/toxic chemicals may be encountered as well as booby traps.

Propane Tanks: Both large (household size) and small (gas-grill size) liquefied propane gas (LPG) tanks can present hazards to firefighters, including explosion.

Utility Lines: Utility lines may be located above and below ground and may be cut or damaged by tools or equipment. Don't spray water on utility lines or boxes.

Septic Tanks and Fields: Below-ground structures may not be readily apparent and may not support the weight of engines or other apparatus.

New Construction Materials: Many new construction materials have comparatively low melting points and may "off-gas" extremely hazardous vapors. Plastic decking materials that resemble wood are becoming more common and may begin softening and losing structural strength at 80̊ F, though they normally do not sustain combustion once direct flame is removed. However, if they continue to burn, they exhibit the characteristics of flammable liquids.

Pets and Livestock: Pets and livestock may be left when residents evacuate and will likely be highly stressed, making them more inclined to bite and kick. Firefighters should not put themselves at risk to rescue pets or livestock.

Evacuation Occurring: Firefighters may be taking structural protection actions while evacuations of residents are occurring. Be very cautious of people driving erratically. Distraught residents may refuse to leave their property, and firefighters my need to disengage from fighting fire to contact law enforcement officers for assistance. In most jurisdictions firefighters do not have the authority to force evacuations. Firefighters should not put themselves at risk trying to protect someone who will not evacuate.

Limited Access: Narrow one lane roads with no turnaround room, inadequate or poorly maintained bridges and culverts are frequently found in wildland urban interface areas. Access should be sized up and an evacuation plan for all emergency personnel should be developed.

WILDLAND FIRE ASSOCIATES

Table of Contents

1.0 Executive Summary

Community Wildfire Protection Plans (CWPP) are authorized and defined by Title 1 of the Healthy Forests Restoration Act (HFRA) passed by Congress on November 21, 2003, and signed into law by President Bush on December 3, 2003.

The Healthy Forests Restoration Act (HFRA) places renewed emphasis on community planning by extending a variety of benefits to communities with wildfire protection plans in place. HFRA recognizes community plans and priorities have an important role in shaping management on federal and non-federal lands.

The Mission of the Pennsylvania Firewise Community Advisory Committee is to promote fire safety in the Wildland Urban Interface (WUI) environment within the Commonwealth through prevention mitigation endeavors. The Advisory Committee shall use as its blueprint, Pennsylvania Firewise Community Program Model documents, in concert with the National Firewise Community/USA program, to foster development, planning, and mitigation strategies for the best defense at reducing wildfire threats in our state, woodlands, and residential developments.

The Pennsylvania Bureau of Forestry has conducted an independent wildfire hazard risk assessment for the various municipalities across Forest County. Wildfire hazard is defined based on conditions that affect wildfire ignition and/or behavior such as fuel, topography, and local weather. As defined by the National Park Service fire hazard (or potential) is the difficulty of controlling potential wildfire. It is commonly determined by fire behavior characteristics such as rate-of-spread, intensity, torching, crowning, spotting, and fire persistence, and by resistance-to-control. It may be partitioned into particular components such as crown-fire hazard. Carey and Schumann (2003) document that fire hazard reduction is a continual process that cannot be accomplished by a single prescribed fire, or by analogy, thinning treatment (Brown et al., 2003). Crown fire hazard is a physical situation (fuels, weather, and topography) with potential for causing harm or damage as a result of wildland fire (Scott and Reinhardt, 2001). Based on this assessment, two municipalities within Forest County have a high wildfire hazard potential – Howe and Jenks. Harmony, Tionesta, Tionesta Borough, Green, Kingsley, Hickory, and Barnett are considered to have medium wildfire hazard potential.

Forest and Warren County solicited an independent contractor to prepare a county wide community fire protection plan for each county. An initial meeting on June 27, 2012 was held to bring the stakeholders together and begin the planning process. The core team consisted of Doug Carlson – Forest County Conservation & Planning, Donna Zofcin – Forest County Conservation & Planning, Dan Glotz- Planning Warren County, Cecile Stetler – Pennsylvania Department of Conservation and Natural Resources, and Peter To – Allegheny National Forest. Wildland Fire Associates was hired to conduct the planning process and generate the plans.

Several homeowners in the planning area are actively practicing the fire mitigation measures recommended by FireWise, a tool designed to protect homes and other property from the impacts of a wildfire. However, other homeowners have taken little or no action to protect their properties from wildland fire. **The inconsistent application of FireWise mitigation measures may place their neighbors at increased risk from wildfire.**

2.0 Introduction

Prior to European settlement, over ninety percent (90%) of Pennsylvania's land area was forested. Today, 60% of the state is still forested, but much of this forest is fragmented by non-forest uses such as roads, utility rights-of-way, agriculture, and housing: only 42% is interior forest habitat, and some of the species that depend upon interior forest habitat are in decline (Goodrich et al. 2003). In addition to habitat fragmentation, forest pests, acid precipitation (which causes nutrient leaching and stunted growth), over-browsing by deer, and invasive species also threaten forest ecosystem health.

OVERVIEW OF FOREST COUNTY NATURAL FEATURES

The climate, topography, geology, and soils are key to the biogeography of species, and are particularly important in the development of ecosystems (forests, fields, wetlands) and physical features (streams, rivers, mountains) that occur in a region. Anthropogenic disturbance has been influential in forming and altering many of the ecosystems in the unglaciated Allegheny Plateau region, resulting in the extinction of some species and the introduction of others. These combined factors provide the framework for locating and identifying exemplary natural communities and species of special concern in the county. The following sections provide a brief overview of the natural history of Forest County.

Climate

The climate in Forest County is humid and temperate. Based on temperature and precipitation data recorded at Tionesta, the mean annual temperature for the region is 46o F (7.8◦ C). In winter, the mean temperature is 32.2◦ F (0◦ C), with an average daily minimum temperature of 22o F (-5.6◦ C). In summer, the mean temperature is 60◦ F (15.6◦ C) and the average daily maximum temperature is 72◦ F (22.2◦ C; NCDC [n.d.]). The growing season, calculated as the probable number of days that the daily minimum temperature will be higher than 32◦ F, ranges from approximately 126 to 165 days, depending on aspect and elevation. Precipitation is evenly distributed throughout the year, but is significantly heavier on the windward, west facing slopes than in the valleys. The average annual precipitation is 43in. (109 cm), while the average annual snowfall is 74 in. (188 cm; NCDC [n.d.], Cerutti 1985).

Physiography and Geology

A physiographic province is a geographic region in which all parts are similar in geologic structure and climate and which has a unified geomorphic or surficial history. Physiography relates in part to a region's topography and climate. These two factors, along with bedrock type, significantly influence soil development, hydrology, and land use patterns of an area. Additionally, both physiography and geology are important to the patterns of plant community distribution, which in turn influences animal distribution. Because of the differences in climate, soils, and moisture regimes, certain plant communities would be expected to occur within some provinces and not others.

Forest County lies entirely within the High Plateau Section of the Unglaciated Appalachian Plateau (or Allegheny Plateau) Physiographic Province. Broad, rounded to flat uplands with deep, angular valleys characterize the High Plateau Section. The stream drainage pattern of the Unglaciated Allegheny Plateau is dendritic, resembling the branching of trees.

The bedrock geology in Forest County was formed during the Pennsylvanian, Mississippian, and Devonian Periods of the Paleozoic Era (about 280 million to 405 million years before the present). During that span of time, repeated sea advances and retreats deposited sands, silts, clays, and coals, which in turn formed the sequence of sedimentary rocks that are found in the county today. Minor uplift occurring about 200 million years ago, caused in part by the Allegheny Orogeny (mountain building event), added to the present bedrock structure. Since that time, streams have eroded and dissected the plateau, exposing the younger rock at the higher elevations and the successively older rock of the valley walls and bottoms. The surficial geology of the county is dominated by sandstone, shale, siltstone, and conglomerates, with coal and limestone found in lower, or older strata (Cerutti 1985).

Vegetation

Forest County lies within the hemlock-white pine-northern hardwood forest region of Braun (1950) and the hemlock-northern hardwood forest and Appalachian oak forest types of Kuchler (1964). Prior to European settlement, the forests of the Unglaciated Allegheny Plateau were dominated by hemlock (Tsuga canadensis) and American beech (Fagus grandifolia) on moister plateaus and stream valleys, and oak-chestnut (Quercus rubra, Q. montana, Castanea dentata) on drier ridges and outcrops (Marquis 1975, Whitney 1990, Abrams and Ruffner 1995).

Prior to 1890, small stands of white pine and hemlock were selectively cut, leaving much of the virgin forest intact. Following the advent of logging railroads and specialized locomotives in the late 1800s, the Allegheny Plateau was almost entirely clear cut. Virtually everything extracted from the forest had economic value: hemlock bark was used in tanning leather; logs were processed for lumber, railroad ties, shingles, barrel staves, lath, furniture, and tool handles; distillation produced acetic acid, wood alcohol and other chemicals; homes were heated and power was generated using slabs, edgings, and sawdust (Marquis 1975). The miles of narrow gauge rail bed running up the tributary valleys remain as evidence of the massive clearings that began over 100 years ago. Fires often followed the cuttings - many ignited by locomotive sparks, some begun intentionally - and for some years, parts of the plateau appeared as a ravaged landscape. The extensive logging that occurred between 1890 and 1930 produced the Allegheny hardwood forest type that now covers much of the region. Dominant tree species of this forest type include black cherry (Prunus serotina), red maple (Acer rubrum), sugar maple (A. saccharum), and yellow birch (Betula lenta) (Marquis 1975, Whitney 1990, Abrams and Ruffner 1995).

2.1 Policy Guidance

Though wildland fires play an integral role in many forest and rangeland ecosystems, decades of effort directed at extinguishing every fire that burned on public lands has disrupted many of the natural fire regimes that once existed. Moreover, as more and more communities develop and grow in areas that are adjacent to fire-prone lands in what is known as the wildland urban interface (WUI), wildland fires pose increasing threats to people and their property (USDI/USDA FS 2000).

The National Fire Plan (NFP) was developed in August 2000, following a landmark wildland fire season, with the intent of actively responding to severe wildland fires and their impacts on communities while ensuring sufficient firefighting capacity for the future. The NFP addresses, five key points: firefighting, rehabilitation, hazardous fuel reduction, community assistance, and accountability (USDI/USDA FS 2000).

The NFP continues to provide invaluable technical, financial, and resource guidance and support for wildland fire management across the United States. The USDA Forest Service and the Department of the Interior are working together to successfully implement the key points outlined in the NFP by taking the following steps:

1. Assuring that necessary firefighting resources and personnel are available to respond to wildland fires that threaten lives and property.
2. Conducting emergency stabilization and rehabilitation activities on landscapes in communities affected by wildland fire.
3. Reducing hazardous fuel (dry brush and trees that have accumulated and increase the likelihood of unusually large fires) in the country's forests and rangelands.
4. Providing assistance to communities that have been or may be threatened by wildland fire.
5. Committing to the Wildland Fire Leadership Council, an interagency team created to set and maintain high standards for wildland fire management on public lands.

Congress, the Administration, states, tribes, local governments, and many others throughout the country recognized that achieving the key points outlined in the NFP was a long-term challenge. A series of strategy documents, the Healthy Forest Initiative, and the Healthy Forests Restoration Act provided the framework necessary to lessen risks to people and restore forest and rangeland health by addressing hazardous fuel buildup on public lands and reducing the threat of wildland fire.

A key principle- coordination- was stressed when the U.S. Department of the Interior and the U.S. Department of Agriculture prepared a joint strategy for addressing hazardous fuel to reduce the risk of catastrophic wildland fires on more than 180 million acres of public forest, woodlands, and rangelands. The 60-page report, *Protecting People and Natural Resources – A Cohesive Fuels Treatment Strategy*, outlines a coordinated approach to fuels treatment adopted by the five major federal land management agencies: Bureau of Indian Affairs, Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, and USDA Forest Service (USDI/USDA FS 2006). It describes practices that have worked since the agencies began collaborating on the strategy and establishes a framework for future priority-setting, accountability, and partnerships to reduce the fuel buildup that contributes to large destructive fires. Four principles guide the strategy:

1. Prioritization: First priority should be given to the wildland urban interface (WUI) and second priority to areas outside the WUI. Priority treatments must concentrate on sites where vegetation is most likely to support catastrophic fires that threaten vital resources or locations of particular value to local communities. In addition, non-WUI treatments must be applied to areas where fuel loads could quickly increase to dangerous levels without active management.
2. Coordination: Coordinating land management activities, including fuels reduction, timber sales, insect and disease eradication, habitat improvement, watershed improvement, and other vegetation management activities, is key to maximizing their combined benefits toward overall fuels management objectives and achieving a well-coordinated fuels management program.
3. Collaboration: Each year's federal program should increasingly reflect the input and priorities of local, tribal, and state interests.
4. Accountability: The strategy builds in accountability through an approved monitoring plan and state-of-the-art geographic information system outputs, assuring continued improvement in the ability of federal land managers to systematically track and support program planning, implementation, and effectiveness.

The strategy outlined in the document provides a strategic and realistic approach for reducing fuels on federal lands by focusing on specific goals that address the multiple factors that influence fuels treatments and by working collaboratively to achieve them. These four key principles are incorporated in this risk/hazard assessment.

The Cohesive Fuels Treatment Strategy aims to lessen risks from catastrophic wildland fires by reducing hazardous fuel buildup in forests and woodlands and by reducing threats from flammable invasive species in rangelands, with an emphasis on protecting communities.

2.2 The Fire Environment

The fire environment is defined as surrounding conditions, influences, and modifying forces that determine wildfire behavior[1]. Firefighters recognize these three components of the fire environment: **weather**, **topography**, and **fuels**. These components affect the likelihood of a fire starting, the speed and direction at which a wildfire will travel, the intensity at which a wildfire burns, and the ability to control and extinguish a wildfire. Although weather and topography cannot be changed, the fuels (or vegetation) can be modified.

Weather – Dry, hot and windy weather increases the likelihood of a major wildfire. These conditions make ignition easier, allow fuels to burn more rapidly, and increase fire intensity.

Topography – Of all the topographic features, steepness of slope most influences fire behavior. As the steepness of the slope increases, the fire spreads more quickly. Other important topographic features

[1] Adapted from US Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indians Affairs, and USDA Forest Service, *Living with Fire*.

include aspect (south and south-west facing slopes usually have more fires) and narrow, steep drainages, which can significantly increase the rate of spread.

Fuel – Fuel is required for any fire to burn. In regard to wildfire, fuels almost always consist of living vegetation (trees, grasses, shrubs, and wildflowers) and dead plant material (dead trees, dried grasses, fallen branches, pine needles, etc.). The amount, size, moisture content, arrangement, and other fuel characteristics influence ease of ignition, rate of fire spread, length of flames produced, and other fire behavior descriptors.

Wildfires can spread in a variety of ways. The three most common ways are by flames generated by burning material heating and burning adjacent fuel, by heat from the fire igniting fuels above the fire from below, and by embers carried by the wind or convection column ahead of the flaming front. Many homes and outbuildings are lost when embers, carried ahead of the main fire, ignite fuels on the roof or are blown into attic crawl spaces or eave vents.

2.3 Wildland Urban Interface

Throughout this plan, the term wildland urban interface will come up again and again. The following explanation was adapted from *USDA Forest Service Gen. Tech. Rep. PSW-109* (1989) and the *Federal Wildland Fire Management Policy and Program Review, Final Report* (1995).

The wildland urban interface (WUI) is defined as the line, area, or zone where structures, and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

There are three types of wildland urban interface, each with its own demographic characteristics and land management problems.

… Mixed Interface or Intermix

… Classic interface

…Occluded interface

The Intermix – The intermix ranges from single homes or other buildings scattered throughout the wildland area to medium-sized subdivisions. Typical are summer homes, recreation homes, and farms in a wildland setting. When a fire starts, the individual homes are very hard to protect because few fire agencies have the resources to provide an engine or two for each house that may be threatened in a large fire.

The Classic Interface – By far, the greatest numbers of people live in (and are currently moving into) what can be called the classic interface. This is the area where homes, especially new subdivisions, press against the wildland. Fires starting in adjacent wildland areas can propagate a massive flame front during a wildfire, and numerous homes are put at risk by a single fire that sometimes overwhelms fire protection forces and water supplies. An example of the classic interface, in Forest County, is the hunting camps.

The Occluded Interface – An occluded interface is characterized by isolated areas of wildland within an urban area. The same demographic trends that influence the classic interface affect this one. As cities grow together to make a super city, islands of undeveloped land are left behind. Sometimes, these are specifically set aside as natural parks. Again, they may be steep, difficult places that are unsuitable as building sites. Frequently, they present a fire threat to adjacent homeowners. Examples in the planning area include undeveloped lots in subdivisions.

The type of intermix is not always obvious. Small towns and villages may contain both classic and intermix areas depending upon how the "downtown" tends to mix with wildland vegetation at the city's fringes.

2.4 Background and History of Accomplishments

Prior to human occupation, fire and climate interacted to determine the vegetation on the landscape. Since then, human activity; fire suppression policies; domestic animals; the combined impacts of drought, insects, and disease; and introduced species (especially invasive plants) have been added to the equation.

Wildfires take place in less developed or completely undeveloped areas, spreading rapidly through vegetative fuels. They can occur any time of the year, but mostly occur during long, dry, hot spells. Any small fire, if not quickly detected and suppressed, can get out of control. Most wildfires are caused by human carelessness, negligence, and ignorance. However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion. Wildfires in Pennsylvania can occur in open fields, grass, dense brush, and forests.

Forest County has a forested area of over 398 square miles which is 93% of the county. Allegheny National Forest, State Game Lands 24, Cornplanter State Forest, and part of Cook Forest State Park make up a majority of the county land. (FCHMP - draft 2014). The Allegheny National Forest alone comprises forty three (43%) percent of the County's land area. The potential geographic extent of wildfires is quite large. In 1990 a 601 acre fire occurred in the County, this illustrates the potential for large fires in Forest County. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. The greatest potential for wildfires is in the spring months of March, April, and May, and the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. In the fall, dried leaves are also fuel for fires. Ninety eight percent of wildfires in Pennsylvania are caused by people, often by debris burns (DCNR, 2009).

Table 1 is a list of past fire occurrences for Forest County by year from 1991 through 2013 (DCNR Bureau of Forestry reportable fires, Stelter).

Year	No. of Fires
1991	7
1992	2
1993	0
1994	3
1995	4
1996	2
1997	2
1998	1
1999	2
2000	4
2001	5
2002	0
2003	1
2004	0
2005	2
2006	1
2007	1
2008	0
2009	1
2010	1
2011	0
2012	0
2013	0

Table 1 Reported Fires, Bureau of Forestry

In addition to the growth factors, the rapid development of oil wells and well infrastructure on federal, state, and private lands has rapidly changed the fuel arrangements throughout the County. The potential impacts of the Hemlock Wooly Adelgid on Eastern Hemlock is also a concern due to its impacts on the County's forested lands.

2.5 Core Team

A core decision making team composed of the Forest County Planning Department, Warren County Planning Department, the State of Pennsylvania Department of Conservation and Natural Resources, the Allegheny National Forest, and Wildland Fire Associates was formed.

An initial meeting of the core team was held on June 27, 2012 in Warren, PA. The purpose of the meeting was to identify stakeholders, encourage participation and define the roles they would play in the planning process and in protecting communities from the impacts of wildfire.

2.6 Methodology

The core team began by listing key stakeholders and constituencies whose involvement should be sought. Individual team members were given assignments to gather data and other information needed to complete the plan. The County engaged the services of a contractor, Wildland Fire Associates, LLP to recommend treatment options and to draft and finalize the plan.

As part of the process, communities and townships located in the county were assessed by local fire departments. The assessments were used to determine their vulnerability to a catastrophic wildfire. The results of the assessment were included in the base map and used by the core team to identify areas of concern and make decisions.

The contractor gathered comprehensive data sets that were used to develop a based map of the area and adjacent landscapes of interest. The data was used to make recommendations regarding areas needing protection and for establishing risk-reduction priorities.

The wildland urban interface is defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. A 1.5- mile buffer standard was adopted, regardless of land ownership, to define the Wildland – Urban Interface.

The planning process and resulting recommendations also recognized the importance of the following premises when developing and implementing the CWPP for the county:

- It is important that the communities and stakeholders fully support the plan. To successfully compete for and receive grants, the community must be willing and ready, to the extent necessary, to actively participate in each identified project.
- Actions must be taken by all landowners to improve the safety of firefighters and the public in the event of a wildfire and to reduce the likelihood of a fire escaping initial attack and threatening nearby structures or other lands.
- The plan will identify near-term and intermediate actions, as well as future treatments and follow-up maintenance activities. It is necessary to recognize the importance of attempting to properly sequence treatments on the landscape by working first around and within the communities and subdivisions, and then moving further out in the surrounding landscape.
- It is quite likely, due to availability of funding, that the plan will be implemented in stages and completed based on established priorities.
- Mitigation measures should be cost effective to the extent possible.

The overriding treatment objective is to create a defensible space within a forest canopy that would be less likely to support a crown fire. As a result, a crown fire would revert to a surface fire and spot fires ignited in advance of a crown fire would also remain surface fires that could be more easily attacked by wildland firefighters. This makes it much easier to protect a structure or community against a high-intensity wildland fire. When fully implemented, the treatments will provide for safe and effective fire suppression actions while also considering the aesthetic values important to the local residents and other stakeholders.

2.7 Analysis Process

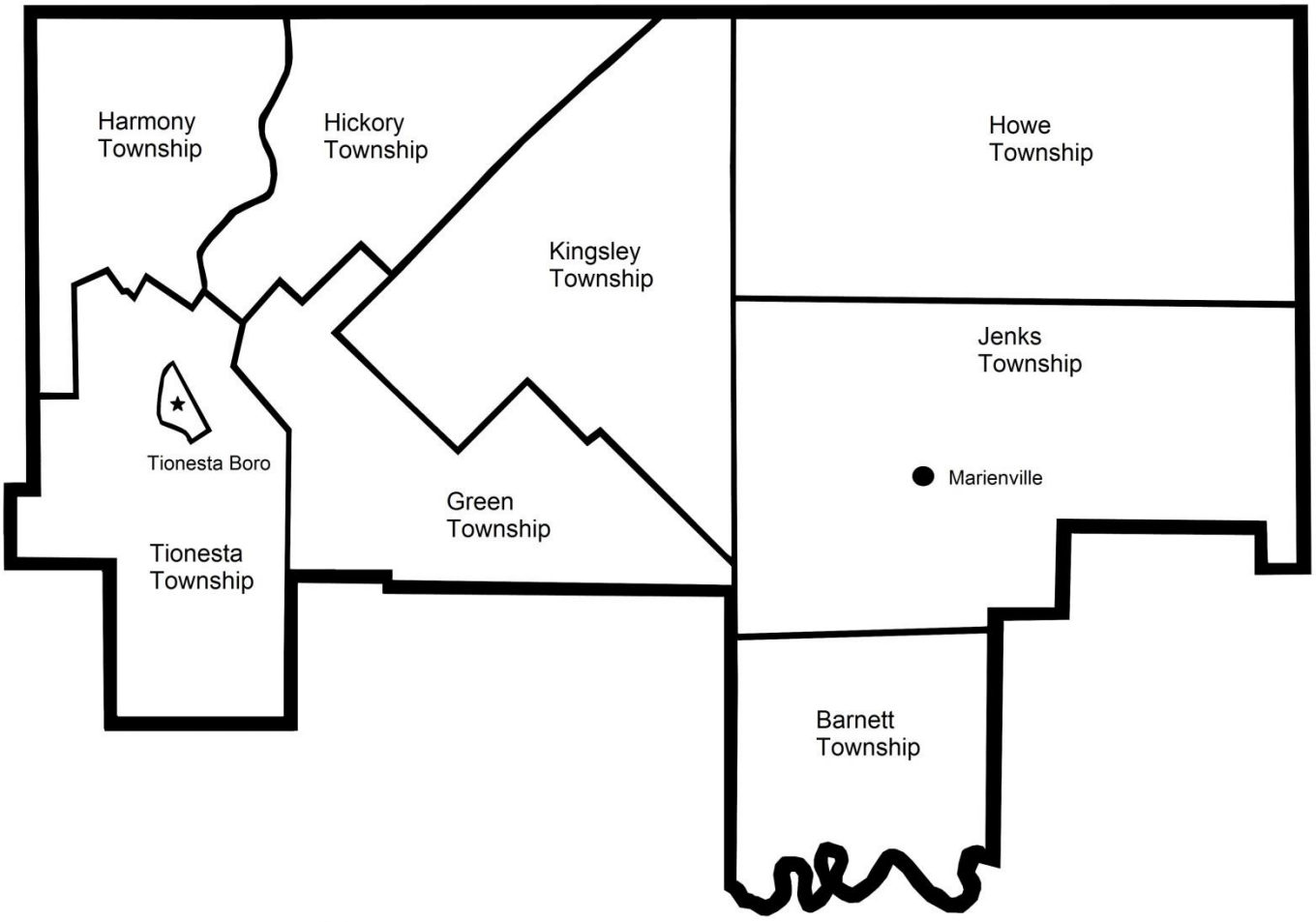
The data analysis completed for this plan is based on the Geographic Information System (GIS) techniques and data. The process used is similar to processes used throughout the United States by federal, state, and local agencies. The process starts with assembling the best available data in two key categories: fuels and values at risk that can be lost or damaged in the event of a wildland fire. The data layers are then ranked according to importance on a qualitative scale, in this case 1-4. This qualitative scale is numerical in nature in order to take advantage of the efficient spatial processing capabilities of GIS.

After the ranking process is completed, the resulting layers of data were reentered into a weighted overlay analysis. Simply put, the data layers are assigned a weight based on relative importance in relation to each other and then added together for a numerical ranking (low to extreme).

3.1 Planning Area Boundaries

Map 1 is an overview of the municipalities and townships that make up Forest County which outlines the planning area boundaries.

Map 1



3.2 Planning Process

The publication *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* was used as a guide to prepare this plan. The steps outlined in the publication were used to identify tasks. The core team and the contractor reviewed the planning requirements, set various key parameters, developed a plan of action, and identified sources to acquire necessary documents and information required for the completion of the plan.

Meetings were held around the county, with core team members, local fire departments, and others to gather information and receive input, obtain recommendations, identify potential projects, make assignments, and set deadlines.

A DVD was produced and provided to all 5 fire departments in Forest County, along with maps with the initial Risk Assessment for each area as well as infrastructure. Hazard analysis forms were provided and the fire departments were encouraged to conduct the assessments and gauge the risk in their response areas.

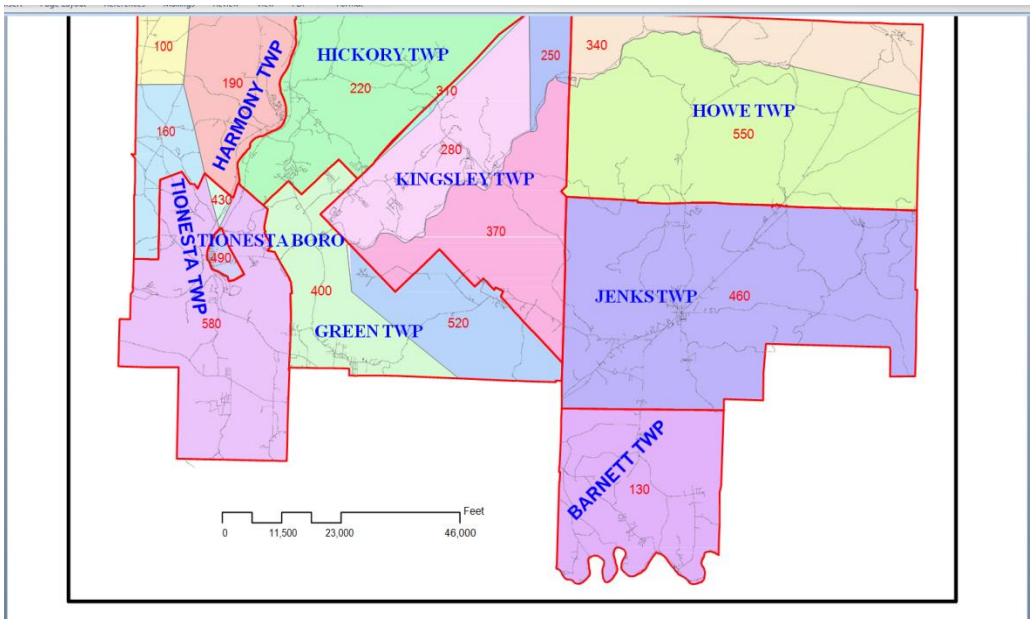
The contractor received necessary information from members of the core team and others.

A final hard copy and an electronic copy of the final draft plan will be presented to the County. Once the plan has been approved by the core team and is approved by Forest County, it will be available for distribution to the stakeholders, including land and property owners; town, county, state and federal officials, agencies, and departments; recreational users; local fire departments, and fire protection districts; business owners; utility companies; other interested parties.

4.0 Wildland Fire Response

Wildland and structural fire suppression services in the County are provided by the township or municipality local fire departments (for a complete list of these departments see Map 2) as well as state and federal firefighters through mutual aid agreements.

Map 2 Forest County Fire Departments and infrastructure.



FOREST COUNTY
EMERGENCY SERVICE ZONES

Zone #	Fire Dept.	Police	Ambulance Service
100	Pleasantville VFD	PSP	Tionesta Ambulance
160	Tionesta VFD	PSP	Tionesta Ambulance
190	West Hickory VFD	PSP	Tionesta Ambulance
220	West Hickory VFD	PSP	Tionesta Ambulance
580	Tionesta VFD	PSP	Tionesta Ambulance
490	Tionesta VFD	PSP	Tionesta Ambulance
400	Tionesta VFD	PSP	Tionesta Ambulance
280	Tionesta VFD	PSP	Tionesta Ambulance
250	Sheffield VFD	PSP	Sheffield Ambulance
340	Sheffield VFD	PSP	Sheffield Ambulance
520	Marienville VFD	PSP	Clarion EMS
370	Marienville VFD	PSP	Clarion EMS
550	Marienville VFD	PSP	Clarion EMS
460	Marienville VFD	PSP	Clarion EMS
130	Marienville VFD	PSP	Clarion EMS

The level of response to an emergency is dependent upon time of day and day of the week as many of the firefighters work in neighboring communities. This factor can impact both response time as well as the number of responders.

Neighboring fire districts and the cooperators listed above have routinely supported each other during wildland fire suppression activities in the form of mutual aide – both within and outside of the wildland urban interface. The overarching goal has been the timely suppression of wildland fires in order to protect life and property.

4.1 Safety

A variety of safety issues are present in the planning area.

Oil and Gas infrastructure presents a variety of problems for local fire departments. Access is limited or restricted,

Figure 1 narrow access road

Often these sites are on one way, in-out roads, which limits safe egress in the event of a large wildland fire in the area.

Figure 2 gated access road

Pipelines, both above ground pipelines and buried pipelines are a concern

Figure 3 above ground pipeline

Figure 4 Buried pipeline

As are the tanks and pumping sites,

Figure 5 tank battery and pumping station

Figure 6 tank battery

and debris around these sites.

Figure 7 well site debris

Hunting camps and isolated homes are located on narrow, one way, in-out roads across the County. Some hunting camps are located across flowing creeks with no bridges to access the sites.

Figure 8 Hunting camp with leaves on roof

Many of these roads and associated power lines need brush clearing or canopy reduction work to allow easy access to emergency vehicles. Many County and private roads, which provide access to farms and scattered home sites, are very narrow and are sometimes located in narrow valleys or on hillsides with heavy vegetation.

Figure 9 Power line in trees

First responders and incident commanders must size up the situation and develop their plan of attack accordingly.

Figure 10 Power line

5.0 Community Description

Forest County was created on April 11, 1848, from part of Jefferson County. The county was enlarged on October 31, 1866, when part of Venango County was incorporated into Forest County. Forest County is a rural eighth-class county in western Pennsylvania. The county seat is Tionesta Borough. According to the U.S. Census Bureau, the county has a total area of 431 square miles. 428 square miles are land and 3 square miles are water. The 2010 population was 7,716 people. Of this population, more than 2,500 are incarcerated in the state correctional institute located north of Marienville known as SCI Forest and an additional 128 are located at the Abraxas Foundation northwest of Marienville. Forest County is composed of 1 borough and 8 townships.

Seasonal recreation's impacts vary in the County. With the spring, hunting and fishing season opens, and more visitors are camping and using their recreational homes. As summer progresses and more visitors are hiking, picnicking, etc., the risk of a human-caused fire increases as the fuels and vegetation reach maturity and begin to cure or dry. Fall hunting seasons, with the leaf fall, increase the risk of fire as hunters and campers light warming fires, sometimes abandoning them with the belief that the fire will "go out". In the fall, clean up and seasonal debris burning begins bringing with it an increased risk of fire.

5.1 Population and Demographics

Forest County is classified politically as an eighth class county. The 2010 population was 7,716 people. Forest County is composed of 1 borough and 8 townships. The populations per municipality are identified in table 2.3-1 below. Howe Township has 405 people but 128 are located at the Abraxas Foundation and Jenks Township has 3,629 people but 2,500 are located at SCI Forest. Population density is 18 people per square mile.

Table 2.3-1: Forest County Municipality Populations

Municipality	Population	Municipality	Population
Barnett Township	361	Jenks Township	3629
Green Township	522	Kingsley Township	363
Harmony Township	666	Tionesta Borough	483
Hickory Township	558	Tionesta Township	729
Howe Township	405		

Source: 2010 Census Bureau

Table 2 Screen capture of the 2010 Forest county Hazard Mitigation Plan, p 15

There were 2,511 households in 2010. 11.3% were married couples with children, 38.6% were married couples with no children, 4.3% were single parent households, 36.2% were single person households and 9.6% were other types of households. The average household size is 2.08 and the average family size is 2.67. Forest County has a median household income of $36,006.00 with a median per capita income of $14,306.00.

In Forest County 957 residents are under the age of 18, 5,341 are age 18-64 and 1,418 are age 65 or older. The median age is 43.0 within the county. In accordance with the 2010 census, 5,937 were white, 1,389 were black/African American, and 390 were other race (FCHMP 2013).

5.2 Topography

Forest County lies entirely within the High Plateau Section of the Unglaciated Appalachian Plateau (or Allegheny Plateau) Physiographic Province. Broad, rounded to flat uplands with deep, angular valleys characterize the High Plateau Section. The stream drainage pattern of the Unglaciated Allegheny Plateau is dendritic, resembling the branching of trees.

The bedrock geology in Forest County was formed during the Pennsylvanian, Mississippian, and Devonian Periods of the Paleozoic Era (about 280 million to 405 million years before the present). During that span of time, repeated sea advances and retreats deposited sands, silts, clays, and coals, which in turn formed the sequence of sedimentary rocks that are found in the county today. Minor uplift occurring about 200 million years ago, caused in part by the Allegheny Orogeny (mountain building event), added to the present bedrock structure.

Since that time, streams have eroded and dissected the plateau, exposing the younger rock at the higher elevations and the successively older rock of the valley walls and bottoms. The surficial geology of the county is dominated by sandstone, shale, siltstone, and conglomerates, with coal and limestone found in lower, or older strata (Cerutti 1985).

Forest County has a forest area of over 398 square miles which is 93% of the county.

Allegheny National Forest, State Game Lands 24, Cornplanter State Forest and part of Cook Forest State Park make up a majority of the county land. The Allegheny National Forest alone occupies forty three (43%) percent of the County. These areas include facilities for boating, camping, fishing, hunting, mountain biking, ATV trails, snowmobile trails and swimming.

Forest County has a forest type of Allegheny hardwoods, characterized by black cherry (Prunus serotina) and red maple (Acer rubrum), with smaller amounts of sugar maple (Acer sacchaarum), hemlock, American beech, ash (Fraxinus spp.), and birch (Betula spp.) (Whitney 1990). This forest type makes up more than half of Forest County's forests, while oak-hickory forest makes up approximately a fifth of the total forest (FIA 2009).

The southeastern part of the county holds the largest contiguous blocks of forest, comprised mostly of second and third growth forest stands; there are only a few known areas of old-growth forest in the county. The extent of remaining forest within the broad valleys of northern Forest County is very small.

Rich, alluvial soils deposited from streams and deep colluvial soils from erosion of the lower slopes of the ridges have made the valleys in the county prime agricultural and grazing areas.

Slopes over 25% have been identified as Steep slopes in Forest County by analysis of the USGS data and the Digital Elevation model created from this data. Steep slopes are generally unstable with potential erosion and sedimentation problems. Most notable are the steep slopes along the Allegheny River.

5.3 Weather

The climate in Forest County is humid and temperate. Based on temperature and precipitation data recorded at Tionesta, the mean annual temperature for the region is 46◦ F (7.8◦ C). In winter, the mean temperature is 32.2◦ F (0◦ C), with an average daily minimum temperature of 22◦ F (-5.6◦ C). In summer, the mean temperature is 60◦ F (15.6◦ C) and the average daily maximum temperature is 72◦ F (22.2◦ C; NCDC [n.d.]). The growing season, calculated as the probable number of days that the daily minimum temperature will be higher than 32◦ F, ranges from approximately 126 to 165 days, depending on aspect and elevation. Precipitation is evenly distributed throughout the year, but is significantly heavier on the windward, west facing slopes than in the valleys. The average annual precipitation is 43in. (109 cm), while the average annual snowfall is 74 in. (188 cm; NCDC [n.d.], Cerutti 1985).

The climate of the County is quite consistent season to season, with most moisture received through the winter/early spring and late spring/summer. The County experiences a bi-modal fire season: SPRING (mid March through late May and green up/leaf out) and FALL (late September through late November, senescence to leaf fall). During the remaining periods of the year the County experiences routine episodic precipitation events. These precipitation events provide the County with 40 – 50 inches of precipitation (average range) and an additional 50 – 100 inches of snow annually. If annual accumulated precipitation falls in this range, fire season severity is strongly influenced by the frequency pattern of precipitation events and the occurrence/association of wind events. The absence of snow pack on the forest has a direct influence on fire potential and severity/persistence.

6.0 Resource Management Considerations

6.1 Fire Regime Condition Classes (FRCC)

Schmidt, et al. (2002) examined land conditions in the United States with regard to the degree of departure of fire regimes from historical fire cycles due to fire exclusion and other influences. They characterized the landscape by 5 Fire Regime Groups and 3 Condition Classes. Appendix C of *Protecting People and Natural Resources – A Cohesive Fuels Treatment Strategy* (USDI/USDA FS 2006) provides guidance for the identification of the various fire regime groups and fire condition classes.

The predominant fire regime condition class in Forest County appears to be a Group V followed by a Group III in more populated areas. Group V represents areas which have a greater than 200 year fire return interval. Group III represents areas which have a 35 – 200 year fire return interval with Low and Mixed Severity fires. Table 3 gives a summary of the grouping used on the FRCC analysis

Group	Frequency	Severity	Severity description
I	0 – 35 years	Low / mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory
II	0 – 35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35 – 200 years	Mixed / low	Generally mixed-severity; can also include low-severity fires
IV	35 – 200 years	Replacement	High-severity fires
V	200+ years	Replacement / any severity	Generally replacement-severity; can include any severity type in this frequency range

Table 3 FRCC descriptions

Figure 11 displays the Fire Regimes identified for Forest County by Landfire.

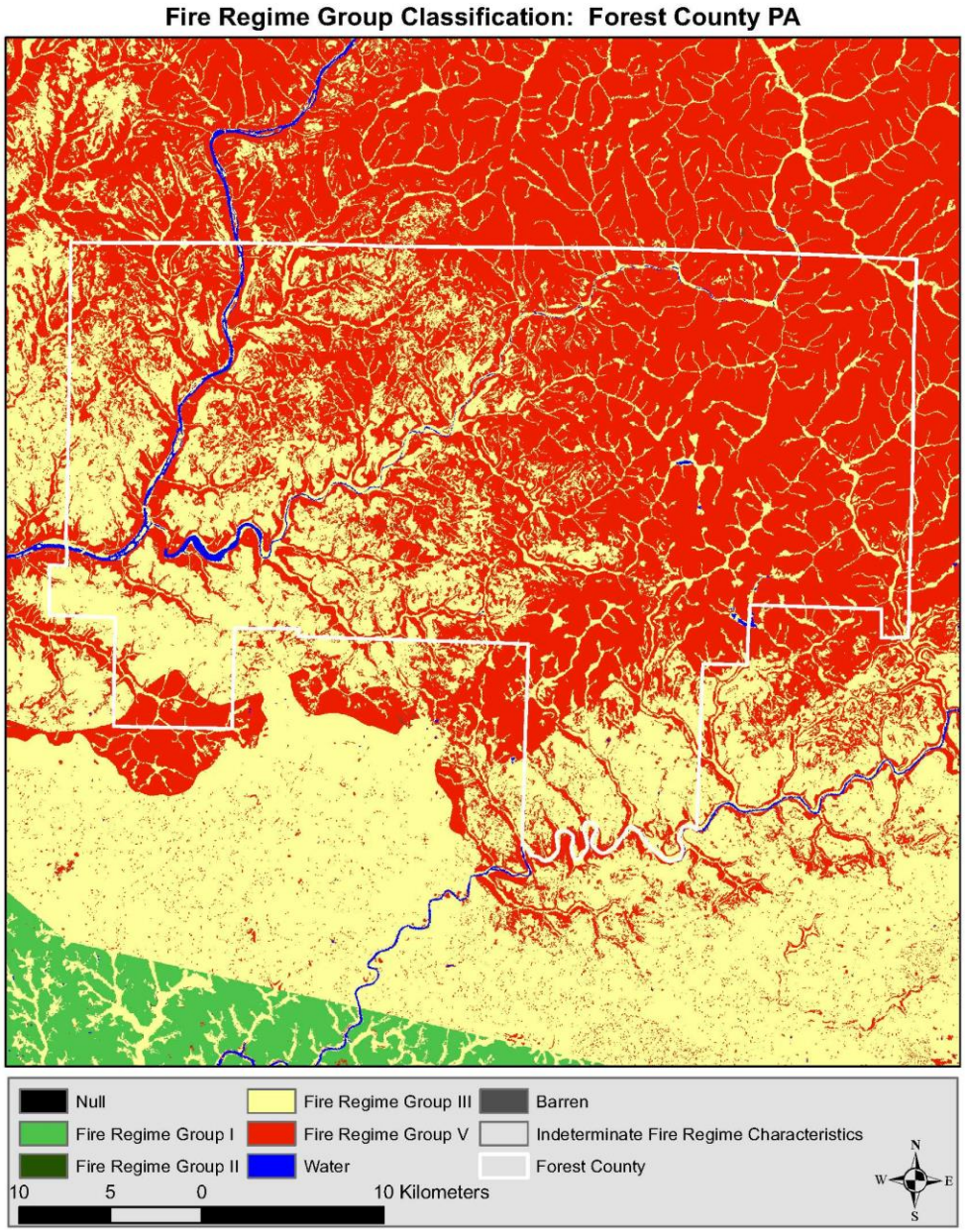


Figure 11 Fire Regimes of Forest County

Using Landfire's Regional maps, see Figure 12, Forest County has predominantly Condition Class 2 or Moderate Vegetation Departure from its natural fire regime.

Fire regimes are used as a tool describing fire's role in wildland ecosystems. Simply put, FRCC assessments determine how similar a landscape is to its natural or historical state. Fire regime condition classes are broken down into three categories: 1, 2, and 3. Landscapes that fall within the Category of FRCC 1 contain vegetation patterns and disturbance regime characteristic of the natural regime. FRCC 2 landscapes are those that are moderately departed from the natural regime, and FRCC 3 landscapes reflect vegetation and disturbances that are uncharacteristic of the natural regime. So essentially, an FRCC 1 has key ecosystem components intact, such as large old trees and soil characteristics that would naturally be found on that site. A landscape with an FRCC rating of 3 indicates that the land is very different from its natural regime in terms of its vegetation or disturbances or both. An FRCC 3 landscape has lost key ecosystem components. An example could be the loss of characteristic large trees due to uncharacteristic wildfires that occurred in uncharacteristic fuels.

FRCC summarizes land health, and is useful in planning and designing treatment alternatives for fuel modifications such as treating the WUI to modify expected fire behavior from wildland fire.

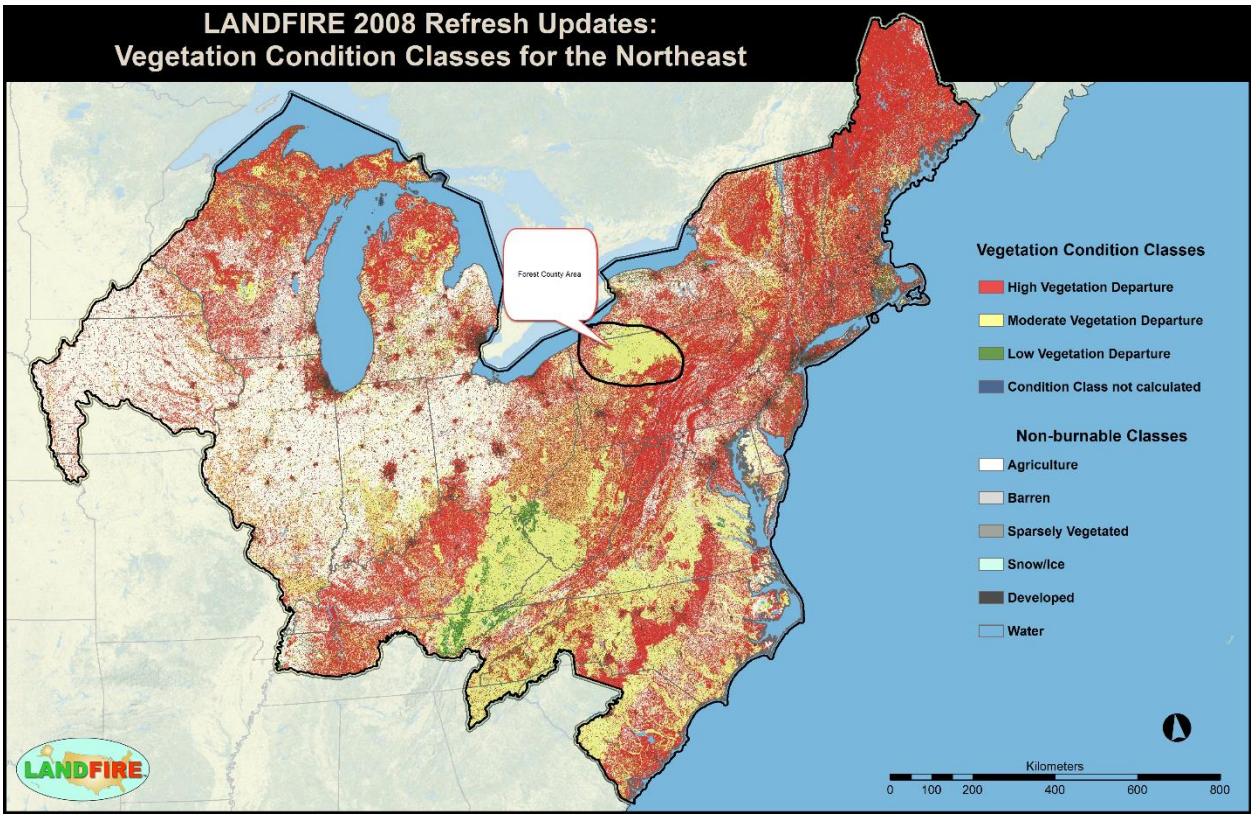


Figure 12 Fire Regime Condition Class

6.2 Invasive (Nonnative) Species Management Considerations

Forest County is host to several forest insects and diseases that could have a significant impact on the health and subsequent fire behavior of its forests.

The Hemlock Wooly Adelgid (Adelges tsugae) has been identified in Forest county in 2013 (see Figure 13). The Hemlock Wooly adelgid nymphs feed at the base of hemlock needles; the loss of fluid from the needles accelerates needle drop and branch dieback. The loss of fluid also stresses the tree and can result in a grayish-green appearance of the trees needles. Trees that are stressed in this manner are more susceptible to fire and the needles can act as more readily available fuel resulting in potentially more torching and crowning of hemlock during a wildland fire. Also, dead trees (snags) are a significant hazard to wildland fire fighters due to an increased possibility of tree fall during wind events and fires.

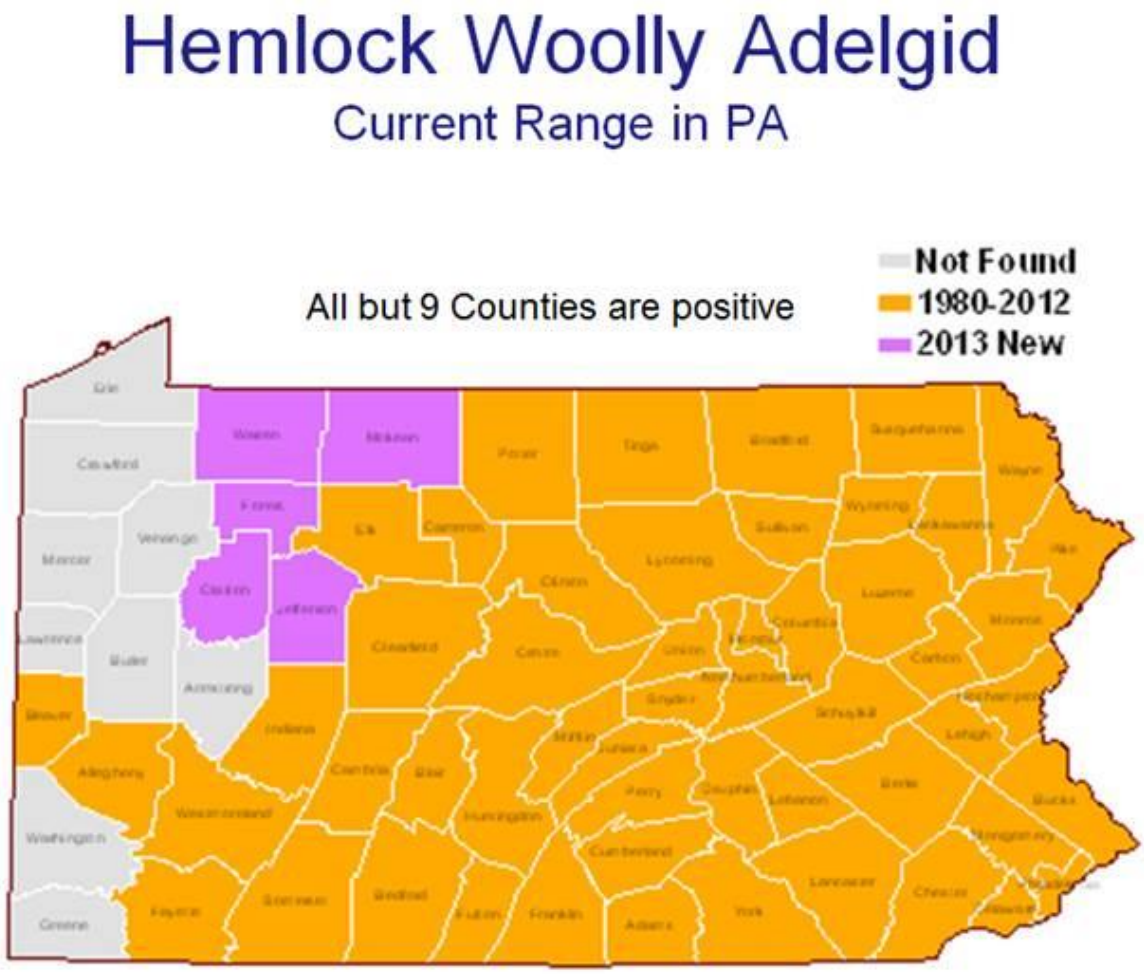


Figure 13 Hemlock Wooly Adelgid in Pennsylvania

The Emerald Ash Borer (Agrilus planipennis), is another introduced beetle that feeds on ash trees and is causing wide spread tree decline and mortality in the northeastern United States. Figure 14 illustrates the Emerald Ash Borers distribution in Pennsylvania as of 2013.

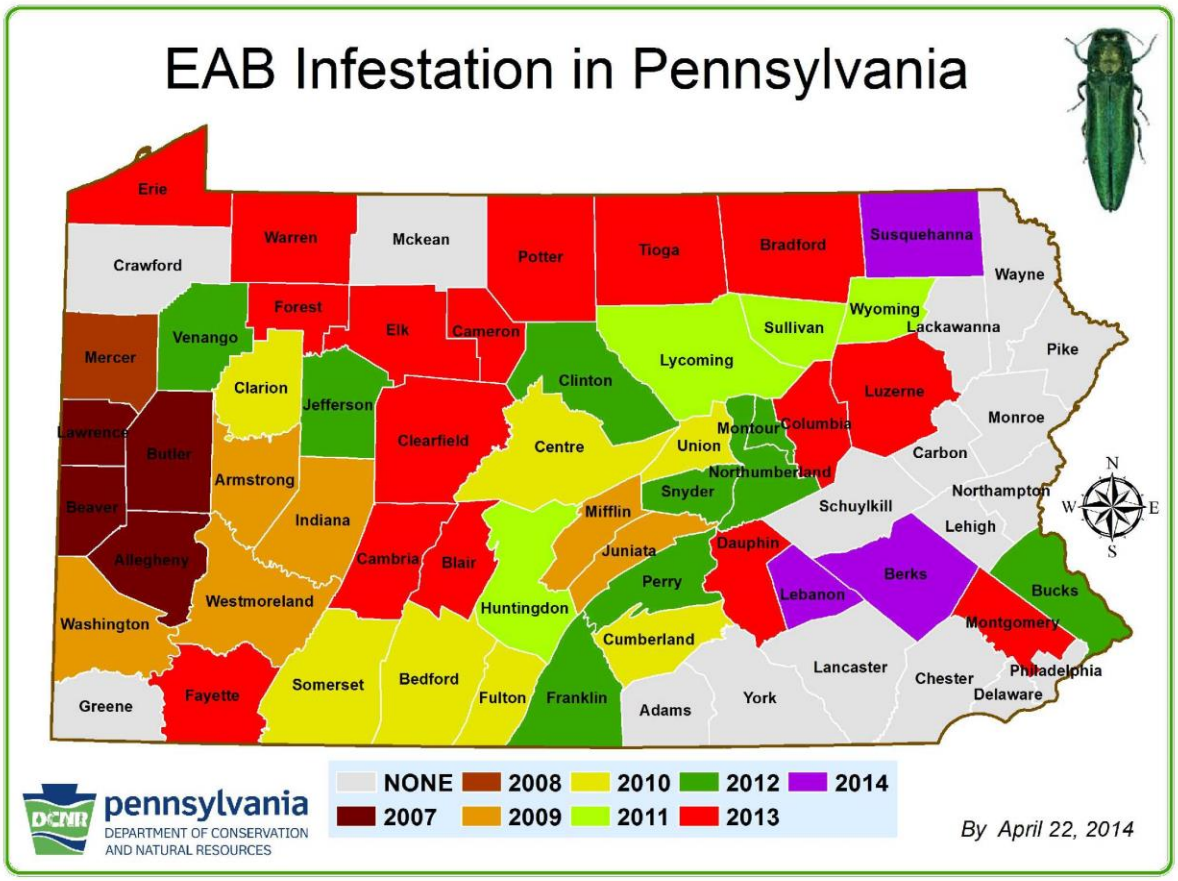


Figure 14 Emerald Ash Borer infestation in Pennsylvania.

Larval feeding in the bark and sapwood disrupts the flow of nutrients and water to the tree eventually killing the tree. These dead trees are more susceptible to wildfire and as snags are an increased hazard to fire fighters and recreational users of Pennsylvania's forests.

Beech Bark disease (Figure 15) represents a unique relationship between the beech scale insect (Cryptococcus fagisuga Lindinger) and the fungal pathogen Nectria coccinea var. faginata. Beech bark disease is a canker disease caused by the Nectria fungus. Feeding by the beech scale insect facilitates entry of the fungal pathogen. The scale insect and pathogen work in combination to kill patches of the inner bark. Cankers can expand and join to girdle and kill the tree. These stressed trees are again more susceptible to fire and drought and the dead trees can contribute to the overall intensity and difficulty of control for wild fires occurring in affected stands of beech.

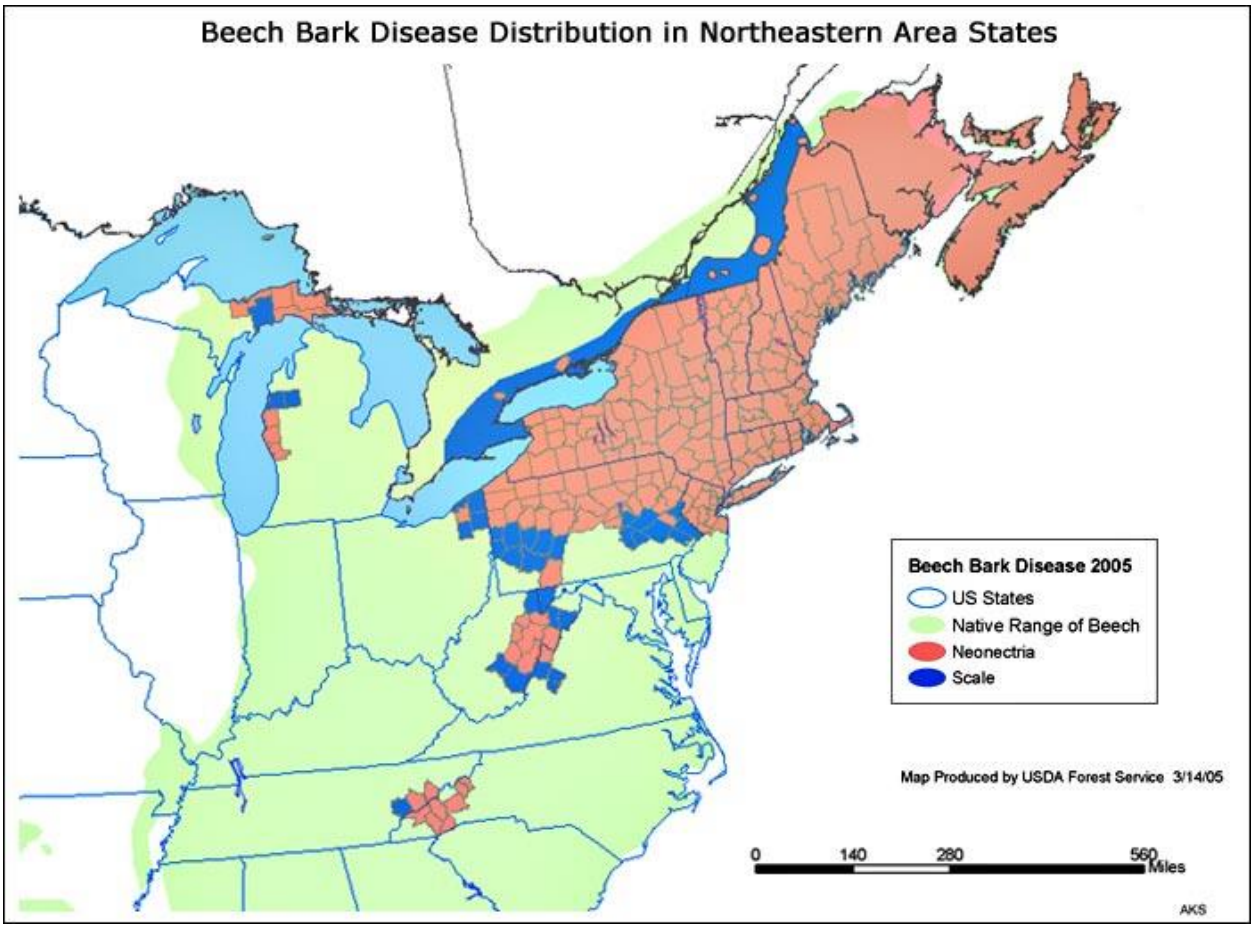


Figure 15 Beech bark disease in the north east as of 2005.

Other forest insects that have been monitored, such as the Gypsy moth, Asian longhorned beetle, sudden oak death, etc. have been reported in Pennsylvania and in Forest County. But at this time the impacts are not as significant as those mentioned previously in this section.

Individually or in combination these forest insects and disease are a building threat to Forest County's forests. The stressed trees are much more susceptible to fire, and the killed trees contribute significantly to the forest's fuel loading and the difficulty, or resistance to control, of fighting wildfires in affected areas. Not to mention the increased risk of snags falling, either from burning through at the stump during a wildfire or from a wind event. Falling snags have resulting in numerous fatalities of both recreationists and wildland fire fighters in the U.S.

7.0 Community Risk Assessment

7.1 Environmental Factors

An observed phenomenon that may become more of a factor in the near future is the gradual warming of the environment. Whether or not "climate change" or "global warming" is a human-caused phenomenon, warmer and drier climatic conditions during the last decade have come on the heels of wetter and cooler conditions that had favored increases in fuel accumulation. Whatever its cause, a warm climatic cycle can contribute in any year to earlier snowmelt, drought, and heavy, isolated rainstorms. The early loss of snow cover, patchy rainfall, and low soil water absorption during intense rainstorms may contribute to lower live and dead fuel moisture during the summer months.

Understanding and predicting the consequences of natural disturbance effects on landscapes is difficult. All of the natural disturbance factors – fire, insects, pathogens, wind, drought, etc. – are capable of affecting forest landscapes on various scales and may act individually or in combination.

7.2 Risk of Fire Occurrence

There have been 39 fires reported in the County since 1991 (Bureau of Forestry, Stelter, 2014). The Pennsylvania Department of Conservation of Natural Resources, Bureau of Forestry estimates that these reported events may only be approximately 15 percent of the total number of events that have actually occurred over that time. Information on wildfire events on private land is not available.

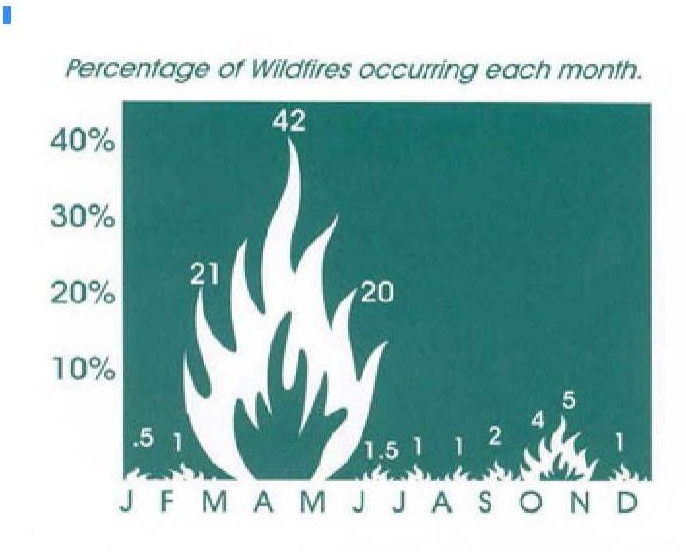


Figure 16 Wildfire per month DCNR

Figure 16 represents wildfire occurrence by month in Pennsylvania. The figure shows that the highest percentage of wildfires occurs from March through June as the spring burning season begins and the first of the States fire seasons occurs. This first season is more severe due to the plants still being relatively dry and just beginning to enter their green up phase. As the fire and burning season progresses through May, plants are greening up and new leaves and needles are at their highest live fuel moisture levels. The summer rains begin in May and June and fire season wanes. As the summer progresses and rainfall ends in September, the fall fire season begins as live fuels again enter full maturity/dormancy and are more available as fuel for wildfires.

7.3 Fire Behavior

Fine fuels comprised of hardwood leaf litter, cured grasses and brush are a significant factor in fire spread and intensity. A low relative live fuel moisture condition combined with a continuous fuel bed with available fine fuels elevates the potential for large fire growth.

Fuel loadings across the County have increased as a result of past fire suppression.

Fuel build-up is also caused by tree mortality from insect infestations and disease. Beech bark disease and the Hemlock Wooly adelgid are examples. The County has a history of frequent wind events (tornadoes, straight line winds) and ice damage, which contribute significantly to fuel accumulations. These disturbance events contribute to fuel bed development of larger fuels that will support wildland fire events. In the past 20 years, fuels generated by these types of events have been the sites of problematic wildland fire incidents.

Further adding to potentially significant fire behavior is the increased activity surrounding oil, gas, and mining developments. Well pads, electric lines, gas lines, and tank batteries are examples of the types of facilities that may influence fire size, intensity, behavior, and resistance to control.

Observed fire characteristics, such as flame length and rates of spread, provide wildland fire fighters with an understanding of the expected fire behavior and resistance to control. Terrain features and changes in fuel types can alter the observed fire behavior – flame length and rate of spread – but fire behavior will always dictate the most effective means necessary to control the fire.

7.4 Risk Assessment

When the key GIS layers – vegetation, improvements, sensitive environmental factors, and fuel condition class – were analyzed, four levels of risk were established: Low, Moderate, High, and Extreme. The various levels of risk to the values at risk are shown in Figure 17 and in Appendices.

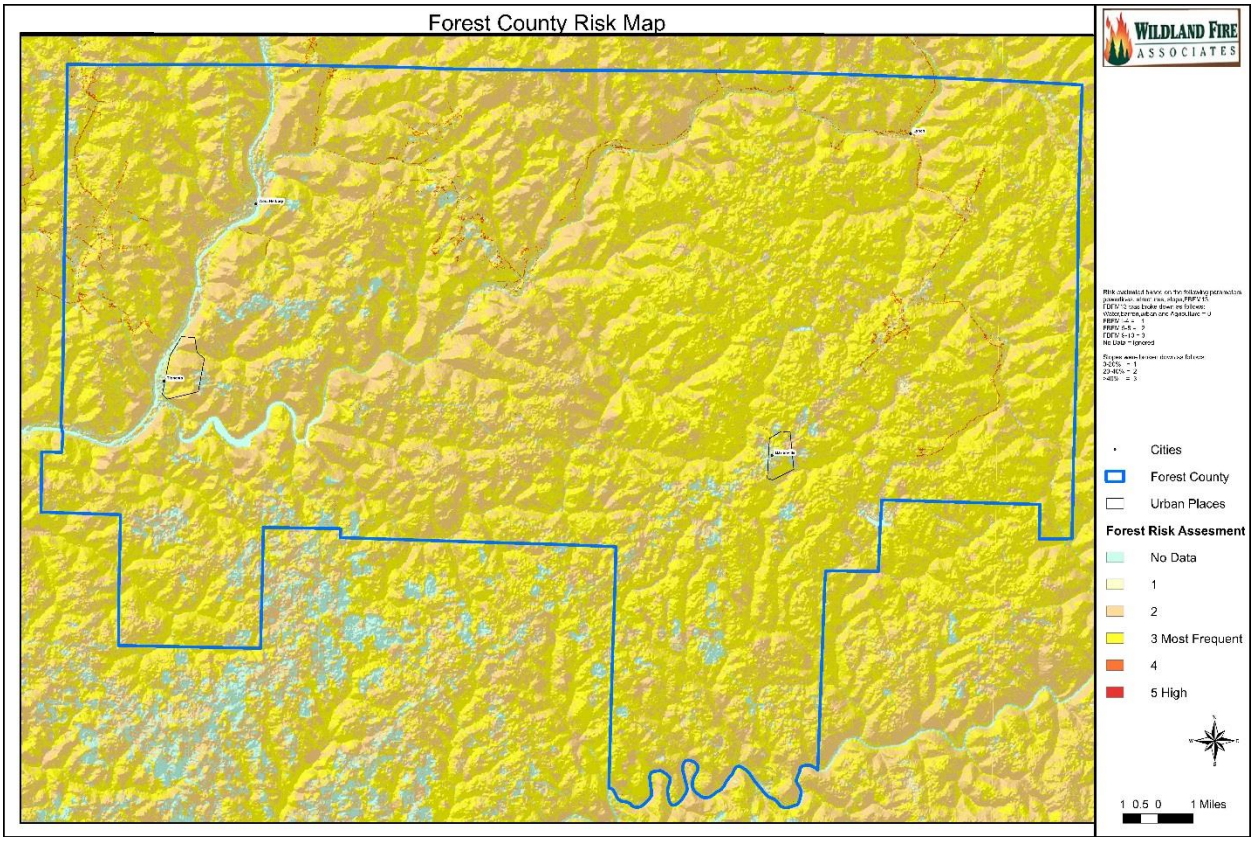


Figure 17 Risk Map for Forest County

Most of the County is designated as being at Moderate Risk, depending upon fuel type. Based on past experience, the contractor noted that factors such as heavy, often continuous concentrations of fuel and steep terrain could combine under adverse weather conditions or during periods of drought and contribute to an intense, rapidly moving wildfire that would be difficult to control. Individual risk maps, for each township, municipality, or city assessed are included in Appendices.

Individual infrastructure maps for each township, municipality, or city assessed are included in Appendices.

8.0 Recommendations for Reducing Fire Hazards

8.1 Purpose

The purpose of this section is to provide stakeholders and those living in the planning area with an overview of existing wildland fuel conditions and recommend a possible course of action that will reduce the impacts of a wildland fire to those living in the planning area.

8.2 Reduce Structural Ignitability

During our assessment, the principal recommendation for individual home owners is to reduce structural ignitability. Especially the hunting camps that were inspected and are discussed in more detail in 8.3.

When strong winds and hot, dry days lead to wildfires, it cannot be expected that fire engines park in front of homes to protect your family and possessions. As desirable as it may be, there simply aren't enough fire fighters or equipment to defend every home. In a matter of minutes, a wildfire can jump from a burning hillside, race through subdivisions, and destroy homes and neighborhoods.

Defensible space, the area between a house and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat, should be created to provide an opportunity for firefighters to effectively defend the house. In the event that firefighters are not available, defensible space also improves the likelihood of a home surviving without assistance. The goal of defensible space is to reduce the chances of a wildfire spreading onto a homeowner's property and igniting homes and other structures and to reduce the risk of loss from a wildfire. Immediately dispose of cleared vegetation when implanting defensible space treatments and maintain defensible space annually. For additional information about creating defensible space and fire safe practices, the Pennsylvania Department of Conservation and Natural Resources has a Firewise site at http://www.dcnr.state.pa.us/foresty/wildlandfire/firewise/index.htm .

To protect homes, families, and possessions, follow the steps outlined below – and make property "FireWise". To be FireWise carry out certain fire protection measures before a fire even starts. By following these simple fire safety steps to create defensible space, homes will have a chance to survive while firefighters work to bring the wildfire under control. The key elements are summarized below.

Access – Proper identification of your home is essential. During a major wildfire, firefighters from throughout the state (or even the nation) will arrive to assist local firefighters. They will rely on clear street signs and addresses to find your home.

Even if your street and house are clearly identified for firefighters, precious time can be lost if firefighters have difficulty getting to your house. Narrow roads, dead-end streets, steep driveways, and weak bridges can delay firefighters or prevent them from arriving at all; firefighting equipment is much larger and heavier than your family car or truck. Single lane roads or driveways should have turnouts at regular intervals with enough space to allow emergency vehicles and cars to pass. Road and street systems must be designed to provide safe emergency evacuation and fire department access. A minimum of two primary access roads should be designed into every subdivision and development. All

private and public streets should be constructed to provide two traffic lanes, each a minimum of ten feet wide. This is just enough space for a fire engine and car to pass each other. Curves and intersections should be wide enough to allow large fire equipment to easily pass and turn. Streets and driveways must not be too steep or have sharp curves - this can prevent emergency equipment from gaining access to your home. Roads, driveways, and bridges should be built to carry at least 40,000 pounds, the average weight of a fire engine. Dead-end streets and long driveways should have turn around areas designed as either a "T" or a circle large enough to allow fire equipment to turn around. Each of these steps will give firefighters a chance to find and protect your home. A few minutes delay can make a difference in saving your home.

Water Supply – Establish your Emergency Water Supply. Water supply is vital for a fire department to protect a threatened house or extinguish a burning one. Even a FireWise house may not be able to survive a wildfire without an emergency water supply. A minimum water storage supply of 2,500 gallons is recommended for use in emergencies. Once you have established an emergency water supply, you must make sure firefighters can get to it. If your water comes from a well, it is recommended that you have a gasoline-powered generator so firefighters can operate your pump during a power failure. For any emergency water supply, the outlet valve must be easily seen and visibly signed from the nearest road. You can obtain specific outlet, valve design, and thread requirements by contacting your local fire department.

Defensible Space – Your first defense against wildfire is to create and maintain a defensible space around our home. This does not mean your landscape must be barren. A defensible space is an area, either man-made or natural, where the vegetation is modified to slow the rate and intensity of an advancing wildfire. It also creates an area where fire suppression operations can occur and helps protect the forest from a structure fire.

Wildfire hazards can be effectively reduced by following these defensible space guidelines developed by the Pennsylvania Bureau of Forestry.

- The dimensions of a defensible space are subjective and depend on site characteristics, but typically a defensible space, on flat ground, extends a minimum of 75 feet around a home. This distance should be extended if the structure is located on a slope.
- Thin out continuous tree and brush cover around structures. The initial 15 feet around a structure should consist of an area in which all flammable vegetation is removed. Beyond the initial 15 feet, trees should be thinned to 10-12 foot crown spacing. Occasionally, clumps of 2 or 3 trees are acceptable for a more natural appearance if additional space surrounds them.
- Mow dry grass and weeds to a height of 6 inches or less for a distance of 30 feet from all structures.
- Prune tree branches within the defensible space up to a height of 10 feet above the ground. Dispose of all slash and debris left from thinning by either chipping and hauling them away or by piling and burning.
- Trim branches that extend over roof eaves. Remove branches within 150 feet of chimneys.
- Maintain the defensible space annually by removing debris, shrubs, and other vegetation that has accumulated during the year.
- Remove shrubs and small trees, or other potential ladder fuels from beneath large trees. Left in place, these fuels can carry a ground fire into the tree crowns.

- Stack firewood and wood piles at least 30 feet from any structure. Clear away flammable vegetation with 10 feet of these wood piles.
- Place liquefied petroleum gas (LPG) tanks and fuel storage containers at least 30 feet from structures. Clear flammable vegetation from within 10feet of all such tanks.
- Clean pine needles, leaves, and other debris from roofs and gutters. This will eliminate an ignition source for firebrands, especially during hot, dry weather.

Remember, after you have established your FireWise environment, you must maintain it regularly.

Trees and Brush – Many naturally occurring plants in our area are highly flammable during the summer and can fuel a wildfire, causing it to spread rapidly. Removing flammable native vegetation and replacing it with low-growing, fire-resistive plants is one of the easiest and most effective ways to create a defensible space. Select landscape vegetation based on fire resistance and ease of maintenance, as well as visual enhancement of your property. In general, fire-resistive plants grow close to the ground; have a low sap or resin content; grow without accumulating dead branches, needles, leaves, or other debris; are easily maintained and pruned; and are drought tolerant in some cases. If fire resistive plants are not available, vary the height of your landscape plants, and give them adequate spacing. The taller the plants, the more widely they should be spaced.

Other FireWise precautions – After you have created defensible space around your home, additional FireWise precautions may be necessary. Work with neighbors to clear common areas between houses and prune areas of heavy vegetation that may pose a threat to everyone. Avoid planting trees under or near electrical lines (they may eventually grow into or touch the lines in high winds, thus causing a fire). If part of your property extends outside the newly created defensible space and is heavily forested, thin trees to decrease fire hazard and improve forest health. Remove dead, weak, or diseased trees and trees that are obviously leaning – leaving a healthy mixture of older and younger trees.

Construction Design Materials – Your house may be vulnerable to a wildfire because of its design, construction, and/or location. When preparing to build, buy or remodel, know what to look for in a FireWise home. A few modifications to your construction plans can reduce the chance of your house catching fire or help it resist further damage if it does catch fire. Don't let your house become more fuel for a wildfire. If you are building a new house, evaluate your building site. Choose a site away from heavily vegetated areas. Set your structure a minimum of 30 feet back from ridges of cliffs; increase the distance if the home will be higher than one story.

Building Materials – Use fire resistive or non-combustible construction materials, combined with design techniques to prevent or slow the penetration of fire beyond your home's exterior. Whenever possible, use brick, rock, or stucco – they resist fire much better than wood. If you decide on a wood exterior, it is especially important that you follow FireWise practices.

Roof – Your roof has the largest surface area of your structure and is the most vulnerable part of your house. It can easily catch fire from a wildfire's wind-blown sparks. Use class A or B roofing materials, such as asphalt shingles, slate or clay tile, or metal.

Siding and Walls – Use fire resistive or non-combustible construction materials whenever possible. Use a minimum of Class III flame spread-rated siding material – stone, brick, and stucco are best. Walls should be constructed of fire-resistive materials from the ground to the roof overhang.

Other Considerations – Build on the most level portion of the property. Avoid ridge tops, canyons, and areas between high points on a ridge. These are extremely hazardous locations for houses and firefighters because they become natural chimneys, increasing the intensity of the fire. Roof eaves extending beyond exterior walls are also susceptible to flame exposure. Limit them in length and box or enclose them with fire-resistive materials. Windows are often overlooked as fire hazards but can be serious risks. The heat from a wildfire may be enough to ignite the furnishings inside your house through the windows. Minimize the size and number of windows on the downhill side of the house or the side that would most likely be exposed to a wildfire. Consider both size and materials for windows and sliding glass doors. Multi-paned glass provides insulation from trapped air and gives more protection from radiant heat than single-paned glass. It also reduces breakage potential from wind-blown debris. To prevent sparks from entering your home through vents, cover exterior attic, soffit, and under floor vents with metal wire mesh (no larger than 1/8 of an inch). Install eave and soffit vents closer to the roof line than the walls. Design decks so that they are not located at the top of a hill directly in the line of a fire moving upslope. Enclose the undersides of balconies and decks on slopes with fire resistive materials. If not enclosed these areas can trap flames and burning embers that can ignite your home. Use weed barrier fabric under deck and balcony areas to keep them free of vegetation. Cover chimneys and stove pipes with a non-flammable screen (mesh no larger than ½ inch).

8.3 Area Specific Recommendations

Area specific inspections and evaluations are designed to be carried out by the respective fire departments in each municipality or township. Of the 5 fire departments functioning in Forest County a total of 4 returned responses to the county planner and the contractor. Of these 5 departments, 2 departments returned evaluations and risk assessments as well as maps annotated with risk ratings, bridges, etc.

Based on this sampling the following results that would be applicable to the degree that the rest of the County conforms to the sample.

Generically, the majority of the hunting “camps” inspected and reported on had similar issues of:

- One way in-out roads
- Vegetation within 30 feet of the structures
- Flammable building materials were used in the construction of the dwellings
- Flammable structures were attached or adjacent to the building
- No water immediately available such as hydrants (dry or wet)
- A much longer response time from local fire departments due to the remoteness of the camps and road conditions getting to the camps
- Radio communications and cell phone coverage was limited in many of the hunting camp areas that were visited and inspected.

Individual homes that were inspected had very similar issues to the hunting camps:

- Narrow width roads
- Overhanging vegetation on narrow roads which could limit access of emergency vehicles
- Flammable construction materials on either the home and/or attached decks
- Flammable vegetation within 75 feet of the home site
- Areas that had poor cell phone or radio coverage
- A lengthened response time from the local fire departments

Implementing the FireWise practices outlined in 8.2 would greatly increase the likelihood of these homes and hunting camps surviving a wildfire event.

8.4 Fuel Treatment Projects

8.4.1 Introduction

Managing vegetation can be challenging due to soils, existing vegetation, rainfall patterns, and other weather phenomena. What may work on one site may not work on another, or a method may work under one set of conditions but may not work under different conditions at the same site. Therefore, it may be necessary to consider a variety of treatment options in order to find the one best suited for a specific project.

Other more subtle factors can come into play as well. For example, removing brush to create a fuel break, without addressing invasive species can be trading one problem for another. Soil disturbance should be kept to a minimum.

Projects and treatment options on federal lands must be consistent with the goals and objectives outlined in the appropriate land use plan, other planning documents covering the area to be treated, and the 2001 Federal Fire Policy. It must also be viable within the limitations of federal budgets.

An important factor to consider is that many of the projects, especially those involving light fuels, will require treatment in out-years. There is no guarantee that managers can receive funding for out-year treatment as part of the original project funding. It is often easier to receive funding for new projects than to receive funding to maintain past projects, especially if the existing project lowers wildfire risk from extreme to moderate. Therefore, it is important to include strong justification with a funding request for out-year treatment project funding. Current efforts to inform lawmakers and members of their staff about the importance of funding follow-up maintenance should be continued.

8.4.2 Current and Proposed Large-Scale Treatment Projects

At this time there are no known large scale treatment projects planned or in the planning process for Forest County. Additional planning and involvement of the local fire departments, private landowners, state and federal agencies will be necessary to begin this planning process.

Considerations for future projects should center on treating insect and disease outbreaks within the County – any mitigation of these outbreaks will result in a lessened threat to local communities. State, federal and county planners will be the best source of maps, and locations of such outbreaks.

8.5 Other Recommendations

During our analysis of Forest County and its wildland urban interface there were some common themes found within the emergency services for the County. Below are our recommendations for increasing the efficiency of Forest County EMS.

Forest County Coordinating Group

One of the themes that appeared was a lack of coordination between the various emergency services entities in Forest County. Our first recommendation would be to implement a board or panel that will serve as a coordinating group for EMS in Forest County. This will enable the County to develop a more common response to emergencies by insuring that all departments involved meet and work together. This will foster a common approach to incident communications, incident command protocols, and present a unified presence for EMS in the County. This group could also serve as the liaison between County EMS entities and state and federal partners. This partnership can increase the confidence and acceptance of the various entities among partners.

Planning Outreach

Another recommendation is to enlist the oil companies in the Wildland Urban Interface planning debate. This could bring to their attention the seriousness of the wildland urban interface situation with the county and potentially improve the coordination of their facilities and growth with the County and its partners.

Education and Outreach

- Issue press releases in the spring and fall to be carried in the local papers informing their readers about the importance of making their properties fire safe and/or promoting FireWise.
- Send direct mailings to all residents in Forest County including information about FireWise in the mailings, as well as the fire season outlooks.
- As part of the Fire Prevention Week activities in schools, distribute FireWise promotional materials to school-aged kids. This activity could take on an interagency flavor and involve the Pennsylvania State Forest Service, USDA Forest Service, and other local fire protection districts.

Drafting Point Signs – Drafting points (water sources for engines and pumpers) should be marked. The sign could be as simple as an 18 inch by 18 inch square sign, painted white, with DP painted in black. A white sign would be visible at night.

IpadTM – An Ipad or other similar electronic device capable of displaying maps, GPS locations of water sources, and pre-attack plans, for example, should be purchased and mounted in response vehicles, as determined by the fire chief.

8.6 Plan Update Process

This plan is designed as a dynamic document. Keep the core team alive to facilitate updates. It will be necessary to update as conditions change, new projects are added, or as projects identified in the plan are completed. The core team should meet annually in the early spring to review and update the plan to reflect these changes. Copies of the plan should be placed in 3-ring binders so that it can be easily updated in the future.

9.0 Summary and Conclusions

Building consensus will continue to be important within the core team and the communities and municipalities in the planning area. Regular meetings must be held to make the plan available to local residents and to solicit input and support the process. The plan must be updated to reflect the changes to the various communities and municipalities as new development takes place and initial projects are completed. Identifying and developing future projects should involve receiving input and comments from the communities and municipalities in the planning area. The core team must work cooperatively to achieve larger goals.

The members of the core team must be proactive when seeking additional funds to complete future projects. There will be ever-increasing pressure to cutback funding for future wildland urban interface projects in light of increasing federal deficits. Creative financing will be the order of the day.

Areas that have been treated will need to receive follow-up treatment. The open nature of fuel breaks lend themselves well to the regeneration of certain tree species, grass, brush, and other fuels that could impact the ability of firefighters to manage a wildland fire. If ignored, defensible space created around dwellings and along roads can soon be lost to new plants filling the void.

Agencies, local residents, and other stakeholders must work together to proactively prepare for future wildland fires and changes in forest health. In the case of fire, the best offense is a good defense.

WILDLAND URBAN INTERFACE WATCHOUTS

The primary consideration is to first assure firefighter and public safety. It is a must to assess potential fire behavior, ingress/egress routes, nature of the threat, hazardous materials, and available water supplies before engaging in the protection of any structures. The first step in conducting a safe

operation is to assess whether the firefighting operations can be conducted safely. Consider the "Wildland Urban Interface Watchouts" in completing a risk analysis for the urban interface area to be protected. Remember there are three categories of structures:

- Those that are not threatened.
- Those that are threatened.
- Those that have already been lost or are too dangerous to protect.

Wildland Urban Interface Watchouts:

Poor access and narrow, one-way roads: A rapidly spreading fire could trap apparatus and personnel before they can turn around or move away from the flames and smoke.

Observe bridge limits: Exceeding bridge limits could lead to bridge failure with a resultant blocking of ingress/egress routes that could result in the loss of an escape route or loss of equipment.

Inadequate water supply: Without a reserve supply of water, the fire can overtake an area before the fuels can be cleared away.

Natural fuels are located 30 feet or closer to structures on level ground: Remember structures on slopes require greater clearance. Structures are located on canyon slopes or "chimneys" on slopes of 30% or more with continuous, flashy fuels. The resulting rate of spread of any fire in this terrain can quickly extend beyond control.

Extreme fire behavior: Situations involving crowning, large flame heights and erratic fire behavior can extend in an unpredictable manner beyond the control of any number of personnel. Strong winds of 25+ MPH: Winds increase the chance of spotting over the heads of firefighters and trapping them between both fire areas. Winds also cause greater preheating of fuels in the path of a fire front.

The need to evacuate the public, livestock, pets, and/or animals: This critical activity can pull personnel from the firefighting activity and can distract attention from fire behavior at a time when the greatest alertness is needed.

Propane and aboveground fuel tanks that are next to wooden structures or close to vegetation.

Power lines and poles: What is their location in relation to the structures that are being protected? Watch for both overhead and downed power lines.

Local citizens are attempting suppression activities: Lack of knowledge in fire suppression may lead to unsafe tactics.

Airtanker retardant drops and helicopter bucket operations: Establish communications and keep fire personnel out of the drop zone.

Source: *Incident Response Pocket Guide* pg11.