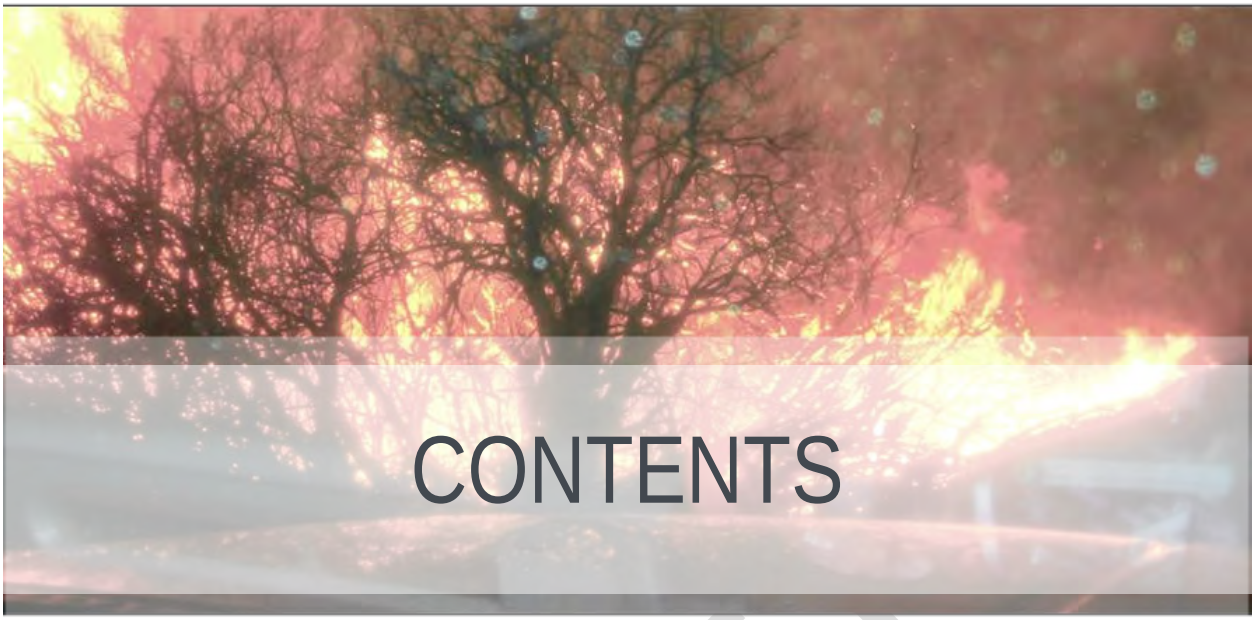
October 2019





Hardin County
Community Wildfire Protection Plan

SWCA
ENVIRONMENTAL CONSULTANTS



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To be completed for Final CWPP

ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
BTU/ft/sec	British thermal units per feet per second
CCC	Civilian Conservation Corps
Cohesive Strategy	National Cohesive Wildland Fire Management Strategy
CRP	Conservation Reserve Program
CVAR	Community Value at Risk
CWMA	Cooperative Weed Management Area
CWPP	Community Wildfire Protection Plan
EOP	Emergency Operations Plan
EQIP	Environmental Quality Incentives Program
FEMA	Federal Emergency Management Agency
FIP	forest improvement plan
FMP	Fire Management Plan
Forest Plan	Shawnee National Forest Land and Resource Management Plan
FR	Fire Regime
FRCC	Fire Regime Condition Class
GIS	geographic information system
gpm	gallons per minute
GPS	global positioning system
HCCWPP	Hardin County Community Wildfire Protection Plan
HFRA	Healthy Forests Restoration Act
HMP	Hazard Mitigation Plan
HIZ	home ignition zone
IBHS	Insurance Institute for Business and Home Safety
ICC	International Code Council
IDNR	Illinois Department of Natural Resources
IFAP	Illinois Forest Action Plan
INAI	Illinois Natural Area Inventory
INPC	Illinois Nature Preserves Commission
ISST	Southern Illinois Invasive Species Strike Team

Lefarge	Lefarge Midwest Inc.
NEPA	National Environmental Policy Act
NERAP	Northeast Regional Action Plan
NFIRS	National Fire Incident Reporting System
NFP	National Fire Plan
NFPA	National Fire Protection Association
NIFC	National Interagency Fire Center
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group
PPE	personal protective equipment
RC&D	Shawnee Resource Conservation and Development Area, Inc.
ROW	right-of-way
SAF	Society for American Foresters
SIPBA	Southern Illinois Prescribed Burn Association
SWCA	SWCA Environmental Consultants
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
VFD	volunteer fire department
WUI	wildland urban interface

CHAPTER 1 – INTRODUCTION

Every year, the U.S. news media report on the tragic impacts of wildfire on local communities. As wildfire severity increases, communities need a plan to help prepare for, reduce the risk of, and adapt to wildland fire events. Community Wildfire Protection Plans (CWPPs) help accomplish these goals. A CWPP provides recommendations that are intended to reduce, but not eliminate, the extreme severity or risk of wildland fire.

This CWPP, entitled the Hardin County CWPP (HCCWPP) is a county-level plan that evaluates wildfire threat to communities and infrastructure, and identifies measures that homeowners, land managers, and fire departments can take to reduce the impact of wildfire to life, property, and other community values at risk (CVARs). The plan provides background information, a risk assessment, and recommendations to reduce or mitigate wildfire risk to communities. Chapter 1 provides an overview of CWPPs and describes the need for a plan; Chapter 2 provides demographic and background information about the communities within Hardin County, Illinois; Chapter 3 gives an overview of the fire environment; Chapter 4 describes the methodology for the risk assessment and the results in detail; Chapter 5 describes the community outreach undertaken to inform the CWPP; Chapter 6 outlines the mitigation strategies that could be implemented to reduce wildfire risk under the umbrella of the National Cohesive Strategy, including action plans that outline priorities and recommendations for reducing fuels, initiating public education and outreach, reducing structural ignitability, and improving fire response capabilities; and Chapter 7 provides suggested approaches to monitoring actions. The HCCWPP does not require implementation of any of the recommendations; however, these recommendations may be used as guidelines for the implementation process if funding opportunities become available. The recommendations for fuels reduction projects are general in nature; site-specific planning that addresses location, access, land ownership, topography, soils, and fuels would need to be employed upon implementation. Also, it is important to note that the recommendations are specific to wildland urban interface (WUI) areas and are expected to reduce the loss of life and property.

Appendices to this CWPP are available in Volume II. Maps are included as Appendix A. The Core Team contact list is shown in Appendix B. A copy of the Illinois Fire Protection District Act is in Appendix C. Appendix D details media outreach. A list of firefighting resources is included as Appendix E. The Wildfire Fire Risk and Hazard Severity Form NFPA 1144 is in Appendix F. Appendix G provides an Example Livestock Evacuation Plan, and Appendix H provides funding opportunities. A homeowner's guide is available in Appendix I, and Appendix J shows the community survey questions.

OVERVIEW OF COMMUNITY WILDFIRE PROTECTION PLANS

In response to a landmark fire season in 2000, the National Fire Plan (NFP) was established to develop a collaborative approach among various governmental agencies to actively respond to severe wildland fires and ensure sufficient firefighting capacity for the future. The NFP was followed by a report in 2001, entitled *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-year Comprehensive Strategy*, which was updated in 2002 to include an implementation plan. This plan was updated once more in 2006, with a similar focus on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels, mitigating risks to communities, providing economic benefits, and improving fire prevention and suppression strategies. The 2006 implementation plan also emphasizes information sharing and monitoring of accomplishments and forest conditions, a long-term commitment to maintaining the essential resources for implementation, a landscape-level vision for restoration of fire-adapted ecosystems, the importance of using fire as a management tool, and continued improvements to collaboration efforts (Forests and Rangelands 2006). Progress reports and lessons learned reports for community fire prevention are provided annually.

In 2003, the U.S. Congress recognized widespread declining forest health by passing the Healthy Forests Restoration Act (HFRA), and President Bush signed the act into law (Public Law 108–148, 2003). The HFRA was revised in 2009 to address changes to funding and provide a renewed focus on wildfire mitigation (H.R. 4233 - Healthy Forest Restoration Amendments Act of 2009). The HFRA expedites the development and implementation of hazardous fuels reduction projects on federal land and emphasizes the need for federal agencies to work collaboratively with communities. A key component of the HFRA is the development of CWPPs, which facilitates the collaboration between federal agencies and communities in order to develop hazardous fuels reduction projects and place priority on treatment areas identified by communities in a CWPP. A CWPP also allows communities to establish their own definition of the WUI, which is used to delineate priority areas for treatment. In addition, priority is placed upon municipal watersheds, critical wildlife habitat, and areas impacted by wind throw, insects, and disease. Communities with an established CWPP are given priority for funding of hazardous fuels reduction projects carried out in accordance with the HFRA.

In 2014 the final stage of the development of a national cohesive strategy for wildfire was developed, entitled *The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy* (Forests and Rangelands 2014). The national strategy takes a holistic approach to the future of wildfire management:

To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.

In order to achieve this vision, the national strategy goals are:

- Restore and maintain landscapes: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
- Fire-adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.
- Wildfire response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions. (Forests and Rangelands 2014:3)

Like the 2014 national strategy, the NFP, state fire plans, the 10-year comprehensive strategy, and the Federal Emergency Management Agency (FEMA) Disaster Mitigation Act of 2000 all mandate community-based planning efforts with full stakeholder participation, coordination, project identification, prioritization, funding review, and multi-agency cooperation. In compliance with Title 1 of the HFRA, a CWPP must be mutually agreed upon by the local government, local fire departments, and the state agency responsible for forest management (Illinois Department of Natural Resources [IDNR], State Forester). As outlined in

HFRA, this CWPP is developed in consultation with interested parties and the U.S. Forest Service (USFS) (the applicable federal agency managing land surrounding the at-risk communities).

NEED FOR A COMMUNITY WILDFIRE PROTECTION PLAN

Fire has been an important component of Illinois natural history for thousands of years, shaping the development of hardwood forest in the region. Tree ring records, pollen studies, General Land Office survey notes, and early explorers and settlers accounts (USFS 2012) have demonstrated that although historically there is a low incidence of lightning-caused fires in the state, wildfire attributed to human caused ignitions were relatively common (Pyne 1982; Ruffner and Groninger 2006). Fire was used by Native Americans for a variety of purposes, as well as by settlers, ranchers, and loggers (Abrams 1992; Pyne 1982). During the nineteenth century, the area saw significant disturbance related to land clearing, row cropping, timber harvest, grazing, and fire (USFS 2012). Fire scar analysis suggests that historically fires occurred every 10 to 20 years in this region, with greater frequency (every 5 years) immediately after the area was settled (USFS 2012). The presence of disturbance-oriented vegetation— oak-hickory, savannas, and prairie—is also an indicator of regular disturbance. In the 1920s suppression efforts were propagated in southern Illinois, supported by the 1924 Clarke-McNary Act, which called for greater forest protection through improved detection and suppression of wildfire. The Civilian Conservation Corp (CCC) strengthened the suppression era in the 1930s as CCC camps were established across southern Illinois (Jackson County CWPP 2010). Associated road construction improved access to forest lands, and accompanied with the building of fire detection towers, acres burned by wildfire fell (Jackson County CWPP 2010). By the 1950s any evidence of fire in southern Illinois forests was sporadic and confined to some isolated events (Jackson County CWPP 2010). The influence and effects of fire have changed as attempts were made to suppress fires, with the consequent accumulation of more continuous and dense wildland fuels as historic burn mosaics were lost. Seventy years of suppression have impacted the structure and species composition of southern Illinois forests, with many oak-hickory stands now reaching maturity (Ruffner and Groninger 2006). Shade-tolerant competitors have been able to infiltrate the midstory, increasing stand density and preventing regeneration of oak species, as sunlight is prevented from penetrating the forest floor (Parker and Ruffner 2004).

Many factors, including both ecological and demographic, have heightened the risk of wildfire in Hardin County. Years of fire suppression, a lack of active forest management, periodic drought, and defoliating insect infestations have altered natural plant succession, species composition, and forest structure, and ultimately increased the fuel load in the area. The combination of increasing development in or near wildlands, the accumulation of wildland fuels, extreme ice and wind events that increase downed trees, and dry fire seasons has resulted in significant wildfire risk to communities located in or near the WUI.

Hardin County is characterized by a scattered population throughout large areas of the county, with population centers in the three main communities: Rosiclare, Elizabethtown, and Cave-In-Rock. Many homes on the outskirts of these communities, as well as homes in the unincorporated areas of the county, are in close proximity to this fire-prone ecosystem.

The Hardin County communities are served by three volunteer fire departments (VFDs) and emergency response staff. Although fire services are well developed in the planning area, these VFDs are stretched thin, particularly during high fire danger years, making the communities more vulnerable to wildfire. A careful balance is needed in these ecosystems between the exclusion of catastrophic fire that threatens life and property and the introduction of low-intensity fire in the form of prescribed burning that maintains these fire-adapted forests.

GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

A CWPP enables local communities to improve their wildfire mitigation capacity and work with government agencies to identify high fire risk areas and prioritize areas for mitigation, fire suppression, and emergency preparedness. The minimum requirements for a CWPP, as stated in the HFRA, are as follows:

1. **Collaboration:** Local and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP (Society of American Foresters [SAF] 2004).
2. **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments; furthermore, the plan must recommend the types and methods of treatment that will protect at-risk communities and their essential infrastructures (SAF 2004).
3. **Treatments of Structural Ignitability:** A CWPP must recommend measures that communities and homeowners can take to reduce the ignitability of structures throughout the area addressed by the plan (SAF 2004).

PLANNING PROCESS

The SAF, in collaboration with the National Association of Counties and the National Association of State Foresters, developed a guide entitled *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (SAF 2004) to provide communities with a clear process to use in developing a CWPP. The guide outlines eight steps for developing a CWPP and has been followed in preparing the HCCWPP:

Step One: Convene Decision-makers. Form a Core Team made up of representatives from the appropriate local governments, local fire authorities, and state agencies responsible for forest management.

Step Two: Involve Federal Agencies. Identify and engage local federal representatives and contact and involve other land management agencies as appropriate.

Step Three: Engage Interested Parties. Contact and encourage active involvement in plan development from a broad range of interested organizations and stakeholders.

Step Four: Establish a Community Base Map. Work with partners to establish a base map(s) defining the community's WUI and showing inhabited areas at risk, wildland areas that contain critical human infrastructure, and wildland areas at risk for large-scale fire disturbance.

Step Five: Develop a Community Risk Assessment. Work with partners to develop a community risk assessment that considers fuel hazards; risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other CVARs; and local preparedness capability. Rate the level of risk for each factor and incorporate this information into the base map as appropriate.

Step Six: Establish Community Priorities and Recommendations. Use the base map and community risk assessment to facilitate a collaborative community discussion that leads to the identification of local priorities for treating fuels, reducing structural ignitability and other issues of interest, such as improving fire response capability. Clearly indicate whether priority projects are directly related to the protection of communities and essential infrastructure or to reducing wildfire risks to other community values.

Step Seven: Develop an Action Plan and Assessment Strategy. Consider developing a detailed implementation strategy to accompany the CWPP as well as a monitoring plan that will ensure its long-term success.

Step Eight: Finalize Community Wildfire Protection Plan. Finalize the CWPP and communicate the results to community and key partners.

CORE TEAM

The first step in the CWPP process was to bring together a broad group of stakeholders representing both agency and private interests to form a Core Team. The CWPP Core Team was originally assembled in May 2019 and is made up of stakeholders who have jurisdictional responsibility related to wildfire suppression and prevention and/or planning for the planning area. Many of the Core Team members had previously served on the Core Team for adjacent Pope County, and as such were familiar with the CWPP planning process. The Core Team contact list can be found in Appendix B. The first Core Team meeting was held on May 16, 2019; a second meeting was held on August 1st, 2019; and the final meeting was held on September 20, 2019. Average attendance at each Core Team meeting was approximately 10 people.

PROJECT AREA

The HCCWPP is a county-level plan that includes the entire Hardin County (Figure 1.1).

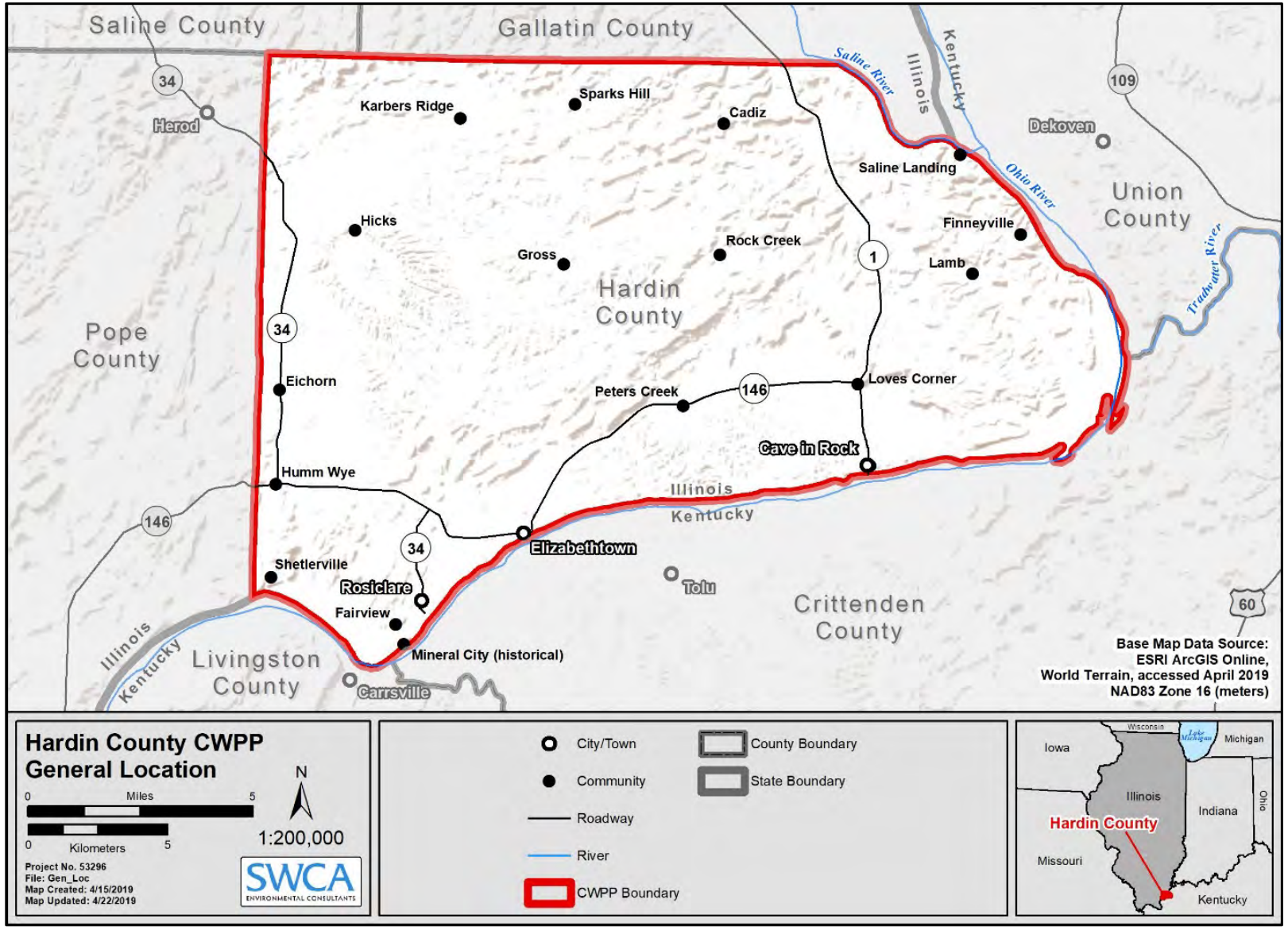

Figure 1.1. Hardin County CWPP general location.

PUBLIC INVOLVEMENT

Engaging interested parties is critical in the CWPP process; substantive input from the public will ensure that the final document reflects the highest priorities of the local community. A key element in the CWPP process is the meaningful discussions it generates among community members regarding their priorities for local fire protection and forest management (SAF 2004).

Public involvement in the CWPP planning process was encouraged through a range of media. A Facebook page was developed for the CWPP (entitled Hardin County CWPP), and the page has received more than 50 "likes." The page included a description of the planning process and included links to an online community survey and other relevant pages for the communities. The page was also used to announce public outreach efforts for the project. The online survey was also distributed to all Core Team representatives and made available at public offices throughout the county.

One public outreach session was held on September 21, 2019, at the Cave-In-Rock Frontier Festival. This festival attracts attendants from all over the county and, as such, was chosen as a forum to reach residents who live in the planning area. SWCA Environmental Consultants (SWCA) (contractor) hosted an informational booth at the meeting and solicited input from the public through community surveys and presentations of WUI maps and other project information. Attendees were informed on how to provide input through the survey and through the project's Facebook page.

The Core Team produced a press release on May 21, 2019, describing the project and inviting the public to get involved. The Independent published the article on May 30, 2019, and the Dollar Saver published a public notice about the project on June 4, which was distributed to all residents in the county. The article and notice highlighted the need for ongoing public involvement in the project and directed residents to the Facebook Page and online survey and the upcoming public outreach opportunity (Appendix D).

The public was invited to review the draft CWPP during a 1-month review period from October 11 to November 8, 2019. The review period was advertised in The Independent.

OUTCOMES OF A COMMUNITY WILDFIRE PROTECTION PLAN

ADHERING TO STATE, NATIONAL, AND REGIONAL FOREST AND WILDFIRE STRATEGIES

The 2018 Illinois Forest Action Plan (IFAP) identifies the decline of oak as a threat to forest biological diversity. The plan calls for forest management practices that mimic natural disturbance on the landscape, such as the use of fire and selective tree removal. Forested lands in Hardin County are identified in the IFAP as high priority forested land. The area is seeing a loss of oak dominance, and as such the IFAP calls for actions to improve the forest composition by favoring oaks in the understory of forested stands. Reintroducing fire to the landscape through prescribed burning is important in maintaining healthy oak dominance. Additionally, prescribed fire would improve the Fire Regime Condition Class (FRCC) and ecological condition, restoring fire-adapted lands and reducing risk of wildfire impacts.

For more information on the IFAP, please visit: https://www.dnr.illinois.gov/conservation/Forestry/Documents/IllinoisForestActionPlan2018.pdf .

NATIONAL COHESIVE WILDLAND FIRE MANAGEMENT STRATEGY

The National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) was initiated in 2010 through a collaboration of federal, state, local, and tribal governments. The Cohesive Strategy recognizes and accepts fire as a natural process necessary for the maintenance of many ecosystems and strives to reduce conflicts between fire-prone landscapes and people (Forest and Rangelands 2014:3).

The primary, national goals identified as necessary to achieving the vision are:

Restore and maintain landscapes: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.

Fire-adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.

Wildfire response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

This HCCWPP is structured to align with these three goals of the Cohesive Strategy (Chapter 6) in order to ensure the goals and recommendations in the CWPP adhere to the national goals, thereby facilitating applications of funding assistance to implement recommendations.

NORTHEAST REGIONAL COHESIVE WILDLAND FIRE MANAGEMENT STRATEGY

The Northeast Regional Action Plan (NERAP) (Forests and Rangelands 2013) was updated in 2015 by the Northeast Regional Strategy Committee. The goals of the NERAP align with the three goals of the Cohesive Strategy as outlined in the table below (Figure 1.2).

Goal 1: Restore & Maintain Landscapes	Goal 2: Fire Adapted Communities	Goal 3: Response to Wildfire
Regional Option 1A - Expand the use of prescribed fire as an integral tool to meet management objectives in the Northeast.	**Regional Option 2A** - Focus on promoting and supporting local adaptation activities to be taken by communities.	**Regional Option 3A** - Improve the organizational efficiency and effectiveness of the wildland fire community.
Regional Option 1B – Maintain and increase where possible, the extent of fire dependent ecosystems and expand the use of fire as a disturbance process.	**Regional Option 2B** - Focus on directing hazardous fuel treatments to the wildland-urban interfaces.	**Regional Option 3B** - Increase the local response capacity for initial attack of wildfires.
Regional Option 1C - Focus on mitigating "event" fuels to reduce potential fire hazard.	**Regional Option 2C** - Focus on promoting and supporting prevention programs and activities.	**Regional Option 3C** - Further develop shared response capacity for extended attack and managing wildfire incidents with long duration fire potential.

Figure 1.2. Goals of the NERAP and Cohesive Strategy.

Source: Forests and Rangelands (2013:7).

In March 2019, the Northeast Regional Cohesive Strategy Committee developed a Northeast Wildfire Preparedness Resource Guide to help property owners become informed and to take an active role in protecting their valuable property from wildfires, well before a fire occurs. The information is tailored to the typical WUI environments that are found in the northeast region, including recommended Firewise actions

that residents can take in the fuel types that are commonly found in the WUI. The document provides a plethora of links for more information on wildfire preparedness and sources of funding.[1]

BUILDING COLLABORATION

The underlying theme of CWPPs is collaboration among the many stakeholders affected by wildfire. Chief among the components of collaboration is public education to provide not only information concerning the risk of wildfire but also to let stakeholders know about opportunities to participate in the management and mitigation of wildfire risk. CWPPs are often referred to as "living documents" because of the importance of revisiting and updating these documents periodically as new issues arise and results from recommendations in the CWPP, such as hazard reduction projects, develop. The value of the CWPP is ultimately to provide a framework for collaboration between the public, governments, agencies, and other entities affected by wildfire, so that they can discuss and jointly develop solutions and strategies for its management and mitigation. Specific CWPP topics requiring a collaborative effort are described in the following subsections.

RISK ASSESSMENT

The purpose of developing the risk assessment model described in this document is to create a unique tool for evaluating the risk of wildland fires to communities within the WUI areas of the planning area. Although many definitions exist for hazard and risk, for the purpose of this document these definitions include:

- Risk = Hazard – Mitigations
- Risk is essentially a measurement of the potential consequences of the hazard occurring, in this case a wildfire burning through the WUI community.
- Hazards are those existing bio-physical factors that, when combined, present a threat.
- Mitigations are actions taken to reduce the hazard or risk in order to reduce the unwanted consequences of the WUI fire.

The risk assessment is twofold and combines a geographic information system (GIS) model of hazard and risk (Composite Risk/Hazard Assessment) and an on-the-ground assessment of community hazards and values at risk.

From these assessments, land use managers, fire officials, planners, and others can begin to prepare strategies and methods for reducing the threat of wildfire, as well as work with community members to educate them about methods for reducing the damaging consequences of fire. The fuels reduction treatments can be implemented on both private and public land, so community members have the opportunity to actively apply the treatments on their properties, as well as recommend treatments on public land and private land that they use or care about.

MITIGATION STRATEGIES

The CWPP process identifies many types of mitigation strategies, including hazardous fuel modification, defensible space, signage, public education prevention messages, improved road access, water supply, and building materials and design. It should be noted that while all mitigation strategies will be useful, some will be a more important factor in preventing destruction of a home.

[1] Northeast Wildfire Preparedness Resource Guide: http://www.northeasternforests.org/app/webroot/uploads/files/NE%20Wildfire%20Preparedness%20Resource%20Guide%20-%20March_2019.pdf

Outreach and Education

The CWPP process is designed to enhance outreach and education on the wildfire situation to the general public, local governments, and agencies that may be unaware of the steps they can take to mitigate the risk of wildfire. The collaborative effort encouraged during the construction, review, and approval of a CWPP continues into the future as lessons learned from activities identified in the HCCWPP are translated into more specific activities at the community level. Outreach increases the number of partners in this work; education promotes a more common understanding of the causes and nature of wildfire risk and increases general knowledge of the best practices to mitigate it.

Structural Ignitability

In some instances due to the size, speed, and intensity of the fire, or the building materials and surrounding vegetation, structures can ignite and potentially be destroyed before emergency responders can arrive. In order for a structure to survive it must be able to avoid ignition.

Structural ignitability, and responsibility of property owners in reducing this risk factor, is discussed in detail by Cohen (2008). Cohen notes that "the continued focus on fire suppression largely to the exclusion of alternatives that address home ignition potential suggests a persistent inappropriate framing of the WUI fire problem in terms of the fire exclusion paradigm."

Reinhardt et al. (2008) state that "destruction (of homes) in the WUI is primarily a result of the flammability of the residential areas themselves, rather than the flammability of the adjacent wildlands." The dwelling's materials and design within 100 feet determine home ignition potential (also referred to as the home ignition zone). Therefore, if large flames are not causing home ignition, then the cause is often relatively low intensity flames contacting the base of the home and/or direct firebrand ignitions. Consequently, Cohen believes that the presence or absence of fuels in the immediate surroundings of the home, and its construction materials, will determine ignition potential. Therefore, the authority and responsibility for reducing structural ignition potential of existing buildings belongs to the property owner. Fire agencies can help educate property owners on the need and methods for reducing structural ignition potential.

Emergency Response and Evacuation

During wildfire events, the routes emergency responders take to the fire are often the same routes being used by residents fleeing from the fire. Other residents may be trying to return to their homes for children or pets. Roads may be too narrow to accommodate two-way traffic of responders and evacuees. Routes may be blocked by fallen trees, spot fires, smoke, downed power lines, or vehicle accidents. Road names and home addresses may be too indistinct to locate, confusing, or missing. Safe areas and evacuation centers may be unknown to residents.

Evacuation may be urgent, confusing, and disorderly, particularly in "No Notice" events during the early part of wildfire response where information about the fire is limited. Law enforcement officers may not be readily available in sufficient numbers, and incident management may be juggling both fire suppression and life safety without enough resources to accomplish both.

The possibility of fatal entrapments exists, and therefore planning for the sudden occurrence of a fire is a vital part of plans developed by local jurisdictions, as well as families. The CWPP will describe many actions that will improve the ability of firefighters to more quickly and efficiently access areas threatened by fire, as well as mobilize law enforcement to assist in providing the public with methods for safer evacuation.

Particular attention must be paid during the development of a CWPP to overgrown evacuation routes where high fuel loading near the road edge may cause a route to be unusable due to intense heat and long flame lengths, falling trees and power poles, or other hazards that an active fire can create and may lead to fatal results (Figure 1.3).

Figure 1.3. Roadside vegetation, which could contribute hazards in the event falling trees block escape routes.

Prioritize Fuel Reduction

CWPPs provide stakeholders not only the opportunity to identify fuel reduction projects but also to assign priorities to them. Communities with an established CWPP are given priority for federal funding of hazardous fuels reduction projects carried out in accordance with the HFRA. The Core Team can develop a list of projects to help facilitate future planning efforts and help tie funding sources to projects. Speaking with one voice will carry more weight in the competitive environment of funding for wildfire hazard and fuel reduction projects.

The purpose of any fuels reduction treatment is to protect life and property by reducing the potential for and outcome of catastrophic wildfire, as well as to restore landscapes to a sustainable and healthy condition. Moderating extreme fire behavior, reducing structural ignitability, creating defensible space, providing safe evacuation routes, and maintaining all roads for firefighting access are methods of fuels reduction likely to be used around communities located in a WUI zone. Use of multiple treatment methods often magnifies the benefits.

It should be noted this CWPP is a countywide-level document. Therefore, fuel reduction projects will be described in general detail; more specific projects will be essentially “legs” to the CWPP, as jurisdictions identify and tailor projects to their specific needs over the coming years and as part of the CWPP update process.

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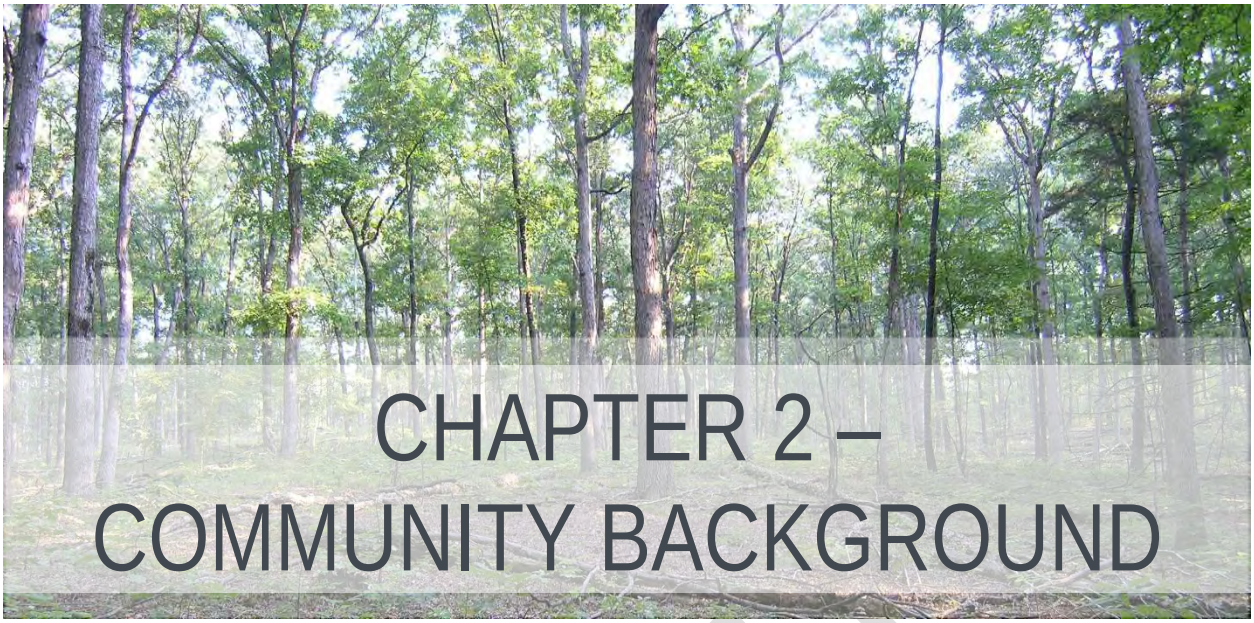


CHAPTER 2 – COMMUNITY BACKGROUND

LOCATION AND GEOGRAPHY

Hardin County is located within the Shawnee Hills Section and the Upper Gulf Plains Section of the Interior Low Plateaus Province. The Shawnee Hills are made up of dissected upland, characterized by deep stream valleys that expose bedrock in the valley walls (IDNR 2005a).

The county is 182 square miles, with 178 square miles being undulating land, made up of agricultural land and large swaths of the Shawnee National Forest. The county is bordered to the west by Pope County, Illinois; to the north by Saline and Gallatin Counties, Illinois; to the east by Union County, Kentucky; and to the south by Crittenden County, Kentucky. The Ohio River marks the state border with Kentucky (Figure 2.1). The Shawnee National Forest is the largest protected federal forest in the state and draws visitors to the area for recreational pursuits, including camping, hiking, horseback riding, and hunting.

Hicks Dome is a geological feature in the county. The county is known for its prolific fluorspar deposits.

Figure 2.1. The Ohio River at Rosiclare.

POPULATION

The county is composed of one city, Rosiclare, and two villages, Elizabethtown and Cave-In-Rock. The County Seat is Elizabethtown. There are several unincorporated communities, including Cadiz, Eichorn, Finneyville, Gross, Hicks, Karbers Ridge, Lamb, Peters Creek, Rock Creek, Shetlerville, and Sparks Hill.

In 2010, the U.S. Census of Hardin County recorded a population of 4,320 people, the least populous county in Illinois. The 2018 estimates of population suggest a 9.6% decline in population to 3,910 people (U.S. Census Bureau 2019) living in 2,480 housing units. In 2010, the population density was 24.3 persons per square mile.

HISTORY AND LAND USE

Hardin County was established by legislative act on March 2, 1839. The county was named for John Hardin, an officer in the Continental Army in the American Revolutionary War (Hardin County Main Street 2019). The county is predominantly forested, with 70% forest land. The Shawnee National Forest accounts for most of the forest distribution in the region. Agricultural land, including pasture and hay fields, make up 22% of the land mass. The decline of agricultural land use began in the 1960s and 1970s due to a declining farm economy and led to a rise in forested land, spurred on by state and national programs in the 1980s that were designed to promote well-managed forests and forest regeneration (IDNR 2010). The Illinois Forestry Development Act of 1983 granted cost-share assistance and favorable tax treatment for timber-producing forested land with a Forest Management Plan. This accelerated the rate of increase of forest area, particularly during the late 1990s and early 2000s.

Hardin County is considered extremely rural, with just under 5% of the county, or 5,461 acres, comprising urban land, although urban land use has been increasing since the mid-1990s.

LAND OWNERSHIP

The majority of forest land in Hardin County is managed by the Shawnee National Forest (Figure 2.2) or held by private landowners or private groups (corporations, associations, etc.).

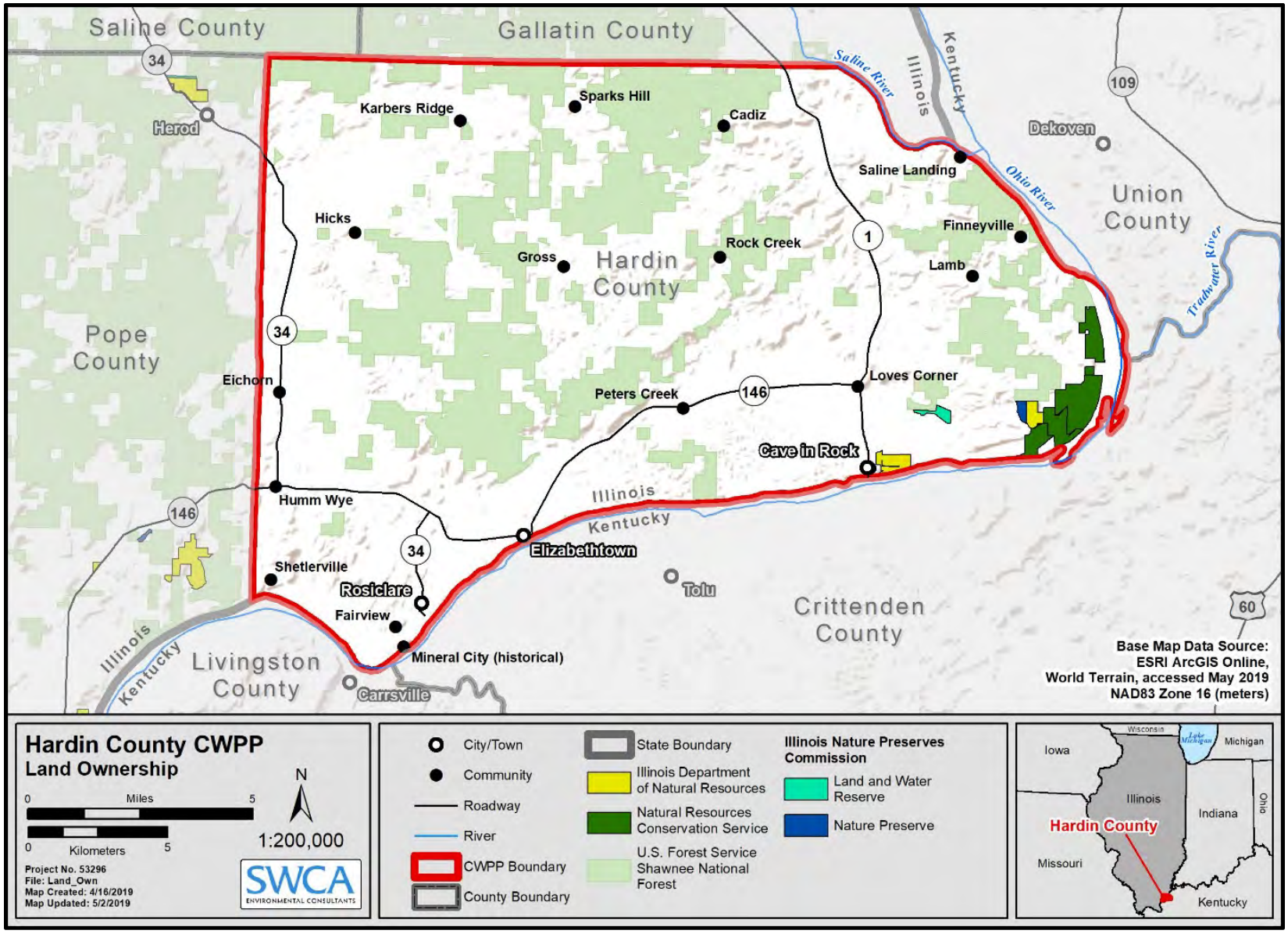


Figure 2.2. Landownership and forest management.

RECREATION

Outdoor recreation is extremely popular in Hardin County, with the Shawnee National Forest, Cave-In-Rock, natural areas, geologic sites, scenery, campsites, fishing, hunting, and equestrian trails drawing most tourists to the area. Camping is very popular on both public and private land (Figure 2.3). There are also equestrian camps that attract visitors and may create evacuation concerns, as well as concerns regarding potential ignition and locations of combustible structures and equipment close to people and animals.

During peak seasons and large events, a significant number of people can congregate in a relatively small space, which constitutes a large population to evacuate. Defensible space is found around many campground structures, but the density of people and animals still creates a hazard.

Figure 2.3. Tower Rock Campground located in southern Hardin County on Shawnee National Forest Land.

PUBLIC LAND

Hardin County comprises extensive public land both federally and state managed, including National Forest land, Illinois nature preserves, Illinois Land and Water Reserves, and Illinois Natural Areas Inventory Sites (IDNR 2005a).

SHAWNEE NATIONAL FOREST

The Shawnee National Forest comprises 285,000 acres of southern Illinois. The Shawnee National Forest is the single largest publicly owned body of land in Illinois. The forest was designated in 1939 and originally comprised largely exhausted farmland that was planted with non-native pine trees to combat heavy erosion and stabilize the soils during the 1930s and 1940s. The Shawnee National Forest is now made up of a diverse combination of hardwood forest vegetation, wildlife, and recreation opportunities. The Shawnee National Forest Land and Resource Management Plan (Forest Plan) (USFS 2006) is the guiding policy document for forest and fire management on the forest. The goal of this plan is to enhance the forest's unique biodiversity. The Shawnee National Forest has an active prescribed fire program (Figure 2.4).

Figure 2.4. Prescribed fire on the Shawnee National Forest. Source: The Southern Illinoisan

Natural Areas

A number of rare natural communities occur within the Shawnee National Forest. The natural area management prescription "provides for the preservation, protection and/or enhancement of the unique scientific, educational or natural values found on about 15,000 acres of research natural areas, national natural landmarks, ecological areas, geological areas, zoological areas and botanical areas" (USFS 2006:76).

Cave-In-Rock State Park

The 55-foot-wide limestone Cave-In-Rock, is located atop high bluffs overlooking the scenic Ohio River. The state park is heavily wooded and contains hiking trails, developed playgrounds, picnic areas, and camp sites. There is a lodge and restaurant located within the park (Figure 2.5). The river can be accessed from the park for fishing, boating, and water sports. The state park attracts large numbers of local and out-of-town recreationists, which could pose a problem in the event of a wildfire or evacuation.

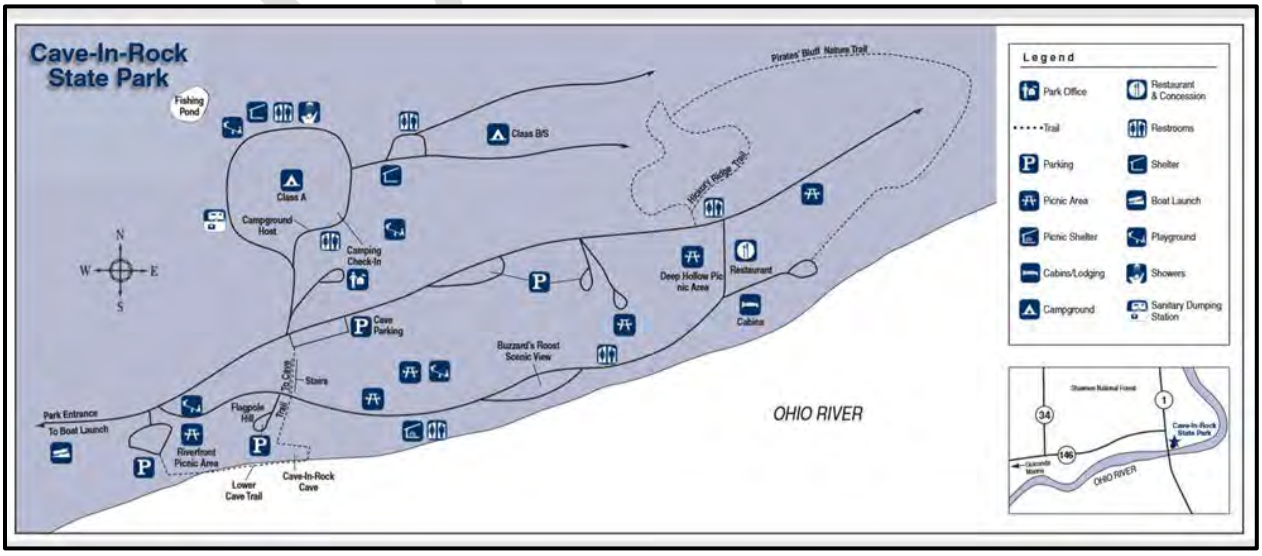


Figure 2.5. Cave-In-Rock Site Map. Source: IDNR

Lafarge Barker Bluff Land and Water Preserve

The Lafarge Barker Bluff Preserve is located in southeast Hardin County, roughly 1 mile east of the town of Cave-in-Rock. The preserve is 77.21 acres total and comprises a large portion (48 acres) of the Barker Bluff Illinois Natural Areas Inventory (INAI) site. The preserve comprises 9.25 acres of Grade A limestone glade, 10.25 acres of Grade B limestone glade/dry upland forest complex, and 28.5 acres of Grade C dry upland forest, in addition to two state-listed endangered plant species and many regionally uncommon plant species. Dry upland forest is characterized by mature second-growth stands composed of oak/hickory species. The remaining 29 acres of the reserve are young second-growth forest.

The reserve is bordered by the USFS to the north. This section of the INAI is designated as a Federal Research Natural Area. Recurring management activities (i.e. prescribed fire, brush cutting, and exotics control) at Barker Bluff Land and Water Preserve (LWP) over recent years have benefitted the natural communities and associated flora that require open light conditions. For example, population estimates of state-endangered ovate catchfly increased from 18 individuals in 1998 to more than 400 individuals in 2014 following prescribed fire. General management goals are to conduct annual surveillance of the endangered and threatened plant species known to occur on or near the reserve to determine presence and estimate population size(s), and to maintain and restore the natural structure and characteristics of the unique natural communities with prescribed fire and selective woody species removal to mimic natural disturbance regimes. Lafarge Midwest Inc. (Lafarge) has been integral in the preservation of the preserve (Illinois Nature Preserves Commission [INPC] 2018).

Collier Limestone Glade Nature Preserve

Collier Limestone Glade Nature Preserve is an IDNR preserve, featuring a very high-quality limestone glade community. The preserve is a 105.65-acre parcel that includes a unique and rare mix of prairie and glade plants, as well as oak and hickory habitat containing remnant dry oak woodlands and limestone glades. Preservation of Collier Limestone Glade will address several action steps in the Illinois Wildlife Action Plan by assisting in forest management and by helping manage removal of exotic and invasive species. Collier Limestone Glade has received extensive management over recent years. Barker Bluff and the Collier Limestone Glade represent what was historically the largest contiguous limestone glade system found in Illinois.

Lafarge Limestone Glade Nature Preserve

The Lafarge Limestone Glade Nature Preserve is a Grade A limestone glade, dry upland forest located in the south eastern corner of the county. The preserve contains many regionally uncommon plant species. Lafarge collaborated with the IDNR and INPC to dedicate Lafarge Limestone Glade as a State of Illinois Nature Preserve. The Preserve is privately owned and managed and not open to the public.

Like the other preserves in the county, the Lafarge Preserve is a site of unique and rare limestone glade vegetation communities, and management activities are focused upon benefitting these historically open ecosystems. The site is burned approximately every other year during spring or fall and is mechanically treated to selectively remove eastern red cedar (*Juniperus virginiana*), sugar maple (*Acer saccharum*), and other mesic species. Without recurring disturbance and management in the form of prescribed fire, brush cutting and invasive species control, the limestone glade community would decline and lose rare flora that are dependent on open areas and high-light conditions.

Spivey's Bluff Natural Heritage Landmark

A private landowner owns a small portion of the Barker Bluff INAI site and is enrolled in an INPC program as Spivey's Bluff Natural Heritage Landmark (Shimp 1997).

CLIMATE AND WEATHER PATTERNS

Average temperatures in Hardin County range from a low of 22 degrees Fahrenheit (°F) in January to a high of 88°F in July (Figure 2.6). Average precipitation ranges from 3.22 inches in August to 5.2 inches in May (see Figure 2.6). The year begins cold and wet with gradual warming into February and March, coinciding with the start of the spring fire season. January and February and August and September are the driest and windiest months. A wetter period begins in late April and early May with some heavy thunderstorms. Hot and humid conditions in May through August prevent ignition and spread of fire. A decline in rain showers and occasional short-term drought occur in August and September. Colder weather triggers some grasses and other plants to enter dormancy, and leaf and needle litter becomes available for combustion. By mid-October, fine fuels are fully cured, and leaf fall contributes to the fine fuel load (Figure 2.7); this marks the start of the fall fire season (Shawnee National Forest 2015). In years with a lingering "Indian Summer," fire danger is enhanced; however, occasional frontal storms mitigate the fire danger in many years. The end of December is associated with the end of fall fire season as days become short and temperatures drop.

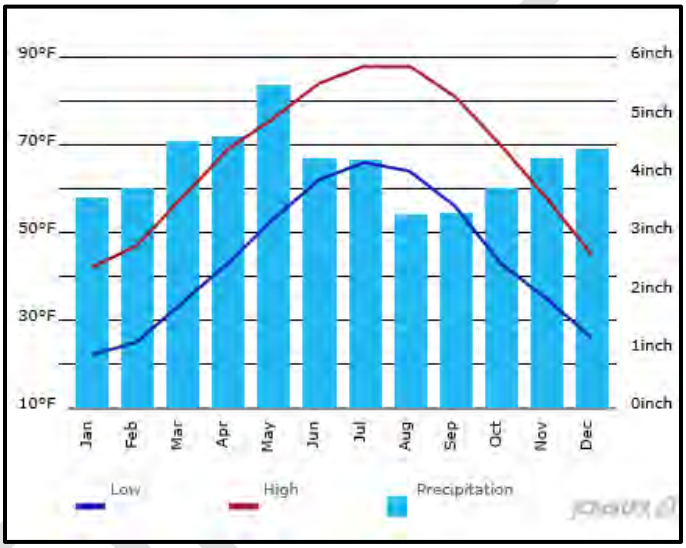


Figure 2.6. Climate graph for Hardin County showing average temperature and precipitation totals. Source: www.usclimatedata.com. Data based on measurements from Rosiclare.

Figure 2.7. Fall leaf fall and dead and downed fuels.

VEGETATION AND LAND COVER

Vegetation and land cover in the project area are shown in Figure 2.8.

FOREST

Hardwood Forest

Illinois forests are composed of a diverse array of tree species (IDNR 2010). The most voluminous species in the state are white oak (*Quercus alba*), black oak (*Q. velutina*), northern red oak (*Q. rubra*), and silver maple (*Acer saccharinum*); however, the most abundant species in terms of total number are American elm (*Ulmus americana*) and sugar maple, along with a host of understory species. These deciduous forests make up almost 60% of the county land area.

Hardin County forest land falls primarily within the Eastern Broadleaf ecological province, which is dominated by a mixture of broadleaf deciduous species (IDNR 2010). Low precipitation in the area favors the drought resistance of the oak-hickory forest type group (Bailey 1995). The dominant species of this ecological province are white oak, red oak, black oak, shagbark hickory (*Carya ovata*), and bitternut hickory (*C. cordiformis*). Other associated species include yellow poplar (*Liriodendron tulipifera*), ash (*Fraxinus* sp.), black cherry (*Prunus serotina*), cottonwood (*Populus* sp.), and black walnut (*Juglans nigra*). The broad range of species and structural diversity associated with the oak-hickory forest type contributes to the huge biological biodiversity and wildlife habitat quality.

Beech-maple forest has increased in the Shawnee National Forest by 19% in the 1.0- to 2.9-inch size class and 79% in the 3.0- to 4.9-inch class since the early 1980s (Shawnee National Forest 2016). These hardwood forests increasingly lack the strong oak and hickory components important to wildlife dependent on hard masts, including nuts and acorns (Thompson 2004). Fire-adapted herbaceous (non-woody) plants are also decreasing in abundance.

Pine Forest

In addition to the broadleaf habitat in Hardin County, non-native pine plantations (comprising loblolly pine [*Pinus taeda*] and shortleaf pine [*P. echinata*]) make up 3% of the county, having been established in the 1930s for erosion control on depleted farmland (Shawnee National Forest 2015). These pine stands are now maturing and suppressing native hardwood species and preventing natural regeneration of oak-hickory. These pines species are more prone to ice storm damage, which increases fuel loading. Pine-

dominated stands have limited understory due to high density and crown cover, and they therefore provide minimal wildlife habitat compared with native hardwoods.

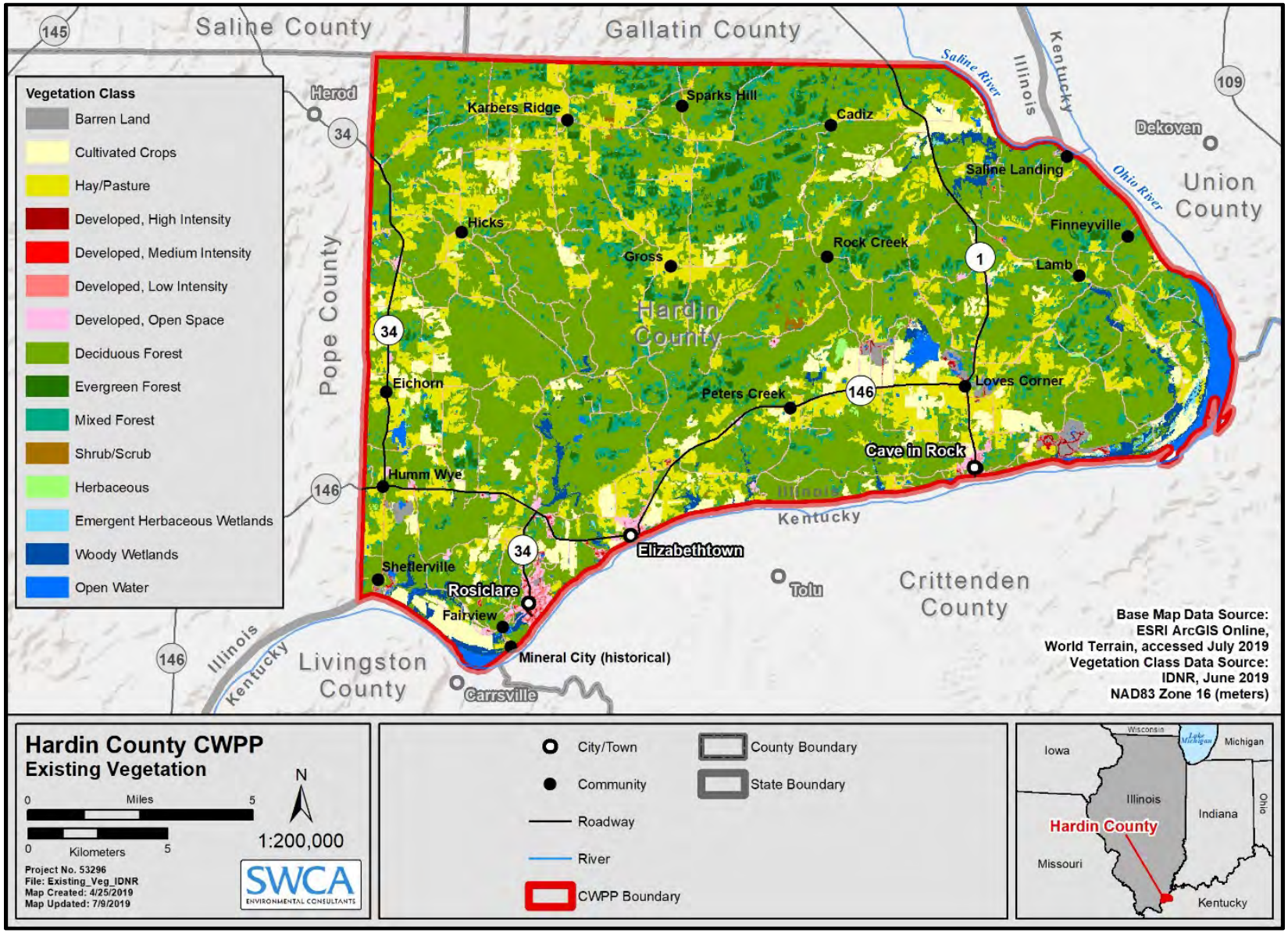


Figure 2.8. Hardin County existing vegetation cover.

Forest Health Considerations

The Illinois Statewide Forest Resource Assessments and Strategies (IDNR 2018) identifies the following factors that threaten Illinois forest health and can be applied to forest resources across Hardin County:

The regeneration of oak forests is poor, with oak seedlings making up only a minor component of the understory. Disturbance associated with ice storms and fire promotes oak regeneration, and where that disturbance is absent as a result of aggressive fire suppression and reduced disturbance, more shade-tolerant species like maple (*Acer* sp.) and beech (*Fagus* sp.) out-compete oak (Parker and Ruffner 2004; Riechman et al. 2014; Tikusis 2009; Zaczek et al. 2002). With understories dominated by non-oak species (such as sugar maple) with relatively few oak saplings, it is likely that there will be a successional change in species dominance (Tikusis 2009). Mesophytic species like beech and maple exhibit rapid leaf decomposition rates when compared with lignin-rich oak leaves, which alters fire behavior and renders oak-hickory forests less likely to burn with desired effects (Abrams 2005; Nowacki and Abrams 2008; Rebertus and Burns 1997; Tikusis 2009). The long-term prospects for oak dominance are poor (Tikusis 2009), and wide-scale intervention is needed to prevent the replacement of oaks by non-oak species (IDNR 2018).

Forest land is prone to continued mortality due to the maturity and senescence of Illinois forests. American elm, black oak, and red maple have the highest rates of mortality. Dutch elm disease is responsible for the high level of mortality of American elm trees. Oak wilt, caused by the fungus *Ceratocystis fagacearum*, is a source of mortality for oak throughout the state. Sudden oak death is also a potential threat to oak species. Oak is a major overstory component, but its decline is likely to result in replacement by maples in the overstory (IDNR 2018).

Forest health is also declining as a result of exotic species invasions, insects, and disease. Common invasive species in the understory include Japanese stiltgrass (*Microstegium vimineum*) (Figure 2.9), autumn olive (*Elaeagnus umbellata*), thorny multiflora rose (*Rosa multiflora*), Amur honeysuckle (*Lonicera maackii*), and Japanese honeysuckle (*Lonicera japonica*); these invasive species replace native plants across a range of sites. Exotic vegetation poses threats to native ecosystems and natural fire regimes (Brooks et al. 2004) by altering decomposition rates (Ashton et al. 2005), fuel loading (Dibble and Rees 2005), fuel continuity, and fire seasonality (Tikusis 2009).

Figure 2.9. Japanese stiltgrass infestation growing along a forest service road.

Harmful exotic insects threaten Illinois forests, including gypsy moth (*Lymantira dispar*), Asian long-horned beetle (*Anoplophora glabripennis*), and emerald ash borer (EAB) (*Agrilus planipennis*). The gypsy moth is isolated to northern areas, and the Asian long-horned beetle is believed to have been eradicated. The

emerald ash borer remains a significant concern for forest land in Hardin County and the entirety of Illinois' ash resource (IDNR 2018).

Illinois has seen a significant decline in state forestry professionals. The state lacks a sufficient number of qualified personnel to meet the forest management needs of its citizens. A large portion of Hardin County is also served by the Shawnee National Forest, but staffing resources, particularly for forest restoration and fire management, are limited.

There has been a decline in forest industry and insufficient market for small-diameter timber. Although there are processing facilities in Illinois, much of the value-added economy is lost as large volumes of timber are sent to other states for processing. The number of sawmills within Illinois has decreased by 72% since 1961 (IDNR 2018).

Storm damage from ice storms in 2008 and 2009 has contributed to dead and down fuel loads throughout the Shawnee National Forest, particularly in the most southerly areas. Some areas have fuel loads that may exceed 40 tons/acre, compared with a mean desired fuel load of 10 to 12 tons/acre (USFS 2016). This damage has yet to be mapped, but the intermingled nature of the damage may prevent this. Although reduced canopy cover from ice storm damage increases opportunity for oak regeneration, in many cases it may benefit shade-tolerant species already present in the understory. Canopy disturbance also provides a site for invasion by Japanese stiltgrass, which is prolific across disturbed areas of the county. Research has shown that reduced canopy cover in combination with prescribed fire may work to increase oak regeneration in these storm-damaged areas and, if properly timed, prescribed burning can also be used to control stiltgrass (Figure 2.10). Research has also suggested that invasion by stiltgrass can intensify fire behavior (Crooked River Cooperative Weed Management Area 2016).

Figure 2.10. Japanese stiltgrass, a non-native species that is prolific in disturbed areas of Hardin County.

Pine plantations on the Shawnee National Forest comprise non-native loblolly pine and shortleaf pine and now occupy 45,000 acres of the forest (not all within Hardin County). As these stands are aging, they will eventually be replaced by more shade-tolerant broadleaf species, but in some areas they are expanding into interior forest habitat and impacting natural biodiversity. The goal of the forest (under the Forest Plan) is to convert non-native pine plantations to native hardwood forests to increase biodiversity (USFS 2006). This goal emphasizes the maintenance and restoration of the oak-hickory forest type that includes production of some timber products as a by-product of vegetation management activities. This supports the need for wood products and uses a renewable forest resource (Figure 2.11).

Figure 2.11. Timber sale area in the Shawnee National Forest.

GRASSLAND

Approximately 15% of Hardin County is composed of grassland habitat, though a large proportion of this is held in pasture (Figure 2.12). Grassland and hayfields are an important habitat component for wildlife and are highly valued throughout the county for providing species diversity and juxtaposition with forested areas (IDNR 2005a) (Figure 2.13). The native prairies in Hardin County were probably more like the barrens of Kentucky than the prairies developed in other parts of Illinois (Stritch 1987). They were very small and dependent on fire for their existence. Warm-season grasses in the area grow during the warm summer months and provide both nesting and winter cover for wildlife. Because of the thick grass bunches and rigid upright stems, grassland birds find good nesting cover in these warm-season grasses. Establishment of native warm season grasses has been encouraged throughout Hardin County as part of the Conservation Reserve Program (CRP), which includes stipulations for grass management that have potential impacts for wildfire hazard, e.g., seasonal restrictions on cutting and mowing. Some cool-season grasses planted for pasture and hay production grow actively during the spring and fall months. Grasslands can exhibit intense fire behavior due to the fast spread rates in this fuel type (Figure 2.14).

Figure 2.12. Grassland area in Hardin County.

Figure 2.13. Grassland juxtaposed with forest land.

Figure 2.14. Grassland habitat managed with prescribed fire. Photographed by Jody Shimp.

Glades

The largest continuous limestone glade system in Illinois once occurred in Hardin County, and several remnants still exist. Glades are dominated by herbaceous flora typically found in prairies, including breathtakingly beautiful wildflowers. These natural openings in woodlands provided favorable light conditions for several species of formerly abundant, but now rare, prairie plants, including hoary puccoon (*Lithospermum canescens*), Culver's root (*Veronicastrum virginicum*), and yellow pimpernel (*Taenidia integerrima*). Exclusion of periodic fire has resulted in the loss of open woodlands, glades, and barrens due to encroachment by red cedar and hardwoods (Figure 2.15).

Figure 2.15. Remnant glade opening at Barker Bluff Research Natural Area in Hardin County. Photographed by Jody Shimp.

BARRENS

Barrens are woodland openings resulting from a set of environmental conditions that limit or retard forest development. These environmental conditions include dry and nutrient-poor soil conditions, exposure typically on south-to-southwest slope aspects, and fire. Reduced fire frequency and fire absence have led to partial closure of many barrens despite harsh environmental conditions. A characteristic of barrens is the presence of many flowering plant species also found in tallgrass prairie and open woodland habitats; however, diversity tends to decline with stand closure.

Hardin County has only isolated areas of barrens: “complex natural communities owing their fragile existence to a delicate balance of natural forces that prevent their succession to a forest community” (USFS 2006:127) (Figure 2.16). The long-term persistence of barrens are threatened as a result of the absence of frequent fire. White (2004) describes the positive effects of prescribed fire on barren communities in the National Forest.

Figure 2.16. Barrens Glade Complex in Hardin County. Photographed by Jody Shimp.

SPRINGS AND SEEPS

Woodland seeps are found in small number in Hardin County. Figure 2.17 is a woodland seep found at Panther Hollow Natural Area. This seep harbored a rare plant that no longer exists because the seep has been invaded by stiltgrass, a highly invasive species.

Figure 2.17. Woodland seep at Panther Hollow Natural Area showing infestation by Japanese stiltgrass. Photographed by Jody Shimp.

RIPARIAN AREAS, LAKES, AND WATERSHEDS

The majority of riparian forest in Hardin County occurs as narrow floodplains and bottomlands less than 0.25 mile wide (IDNR 2010). The most common riparian species are American elm, green ash (*Fraxinus pennsylvanica*), silver maple, hackberry (*Celtis occidentalis*), and boxelder (*Acer negundo*). Riparian forests are prone to high levels of mortality and often species are not fire adapted, making them particularly vulnerable to wildfire.

Hardin County has an extensive array of streams and lakes, with watersheds that drain to the Ohio River. Some of the lakes in the county include Lake Tacumseh, Whoopie Cat Lake, and Humm Lake (Figures 2.18 and 2.19). Lakes are often the sites of campgrounds and cabins, and as such they are an important component of the CWPP because of the inherent fire risk in these more remote and heavily recreated areas. There are also broad bottomland wetlands located along the Ohio River that, due to their more riparian and humid nature, are of lower wildland fire risk but are still important community values for protection. There are extensive streams and creeks that run throughout the county, and the riparian vegetation along these water courses are particularly vulnerable to wildfire due to a lack of fire adaption. These aquatic resources are also important for recreation (fishing, boating, etc.), scenery, and wildlife habitat. There are likely federally or state-listed threatened or endangered aquatic species that utilize these areas, increasing the importance of protecting these resources from the impact of wildfire.

The Ohio River forms the east and south border of the area and is a vital conduit for the region.

Figure 2.18. Lake Tecumseh. Source: USFS.

Figure 2.19. Whoopie Cat Lake. Source: USFS.

WILDLIFE

Closed canopy mid- to late seral habitat currently predominates across Hardin County, and habitat for species that prefer these conditions is abundant (USFS 2016). Conversely, habitat for early seral species and mid- to late seral species that utilize a regenerating forest component have been declining (USFS 2016). As oak-hickory forests are transitioning to mesophytic beech and maple-dominated stands, species richness within avian (Rodewald and Abrams 2002) and herbaceous communities (Fralish 1997) has also been found to decline. There is a greater likelihood of meeting all species requirements when a variety of habitat conditions occurs (USFS 2016). Currently over 90% of the forest habitat within Hardin County is considered mid- to late seral (USFS 2016). However, 70% of all wildlife in an oak or mesophytic forest will utilize a combination of early and mid- to late seral habitat (DeGraaf et al. 1992). Therefore, forest management that maintains a variety of age classes and cover types is an important part of wildlife habitat management in these cover types.

> *Oak is critical to maintaining the ecological structure and functions of Southern Illinois forests, and without them, biological diversity will be greatly reduced (Fralish, 2002; Ozier, Groninger & Ruffner, 2006), affecting amphibians, insects, invertebrates, reptiles, small mammals, songbirds and waterfowl (Dey et al. 2010). (USFS 2016:2)*

Threatened and Endangered Species

Several federally and state-listed threatened and endangered species are known to occur in the area, including gray bat (*Myotis grisescens*), Indiana bat (*M. sodalis*), northern long-eared bat (*M. septentrionalis*), least tern (*Sternula antillarum*), and fat pocketbook mussel (*Potamilus capax*) (U.S. Fish and Wildlife Service 2016). Indiana bats and other bats use the area for summertime foraging. To avoid having adverse effects on Indiana bats, standards and guidelines in the Shawnee National Forest, Forest Plan have burning constraints listed for prescribed fire operations (USFS 2006).

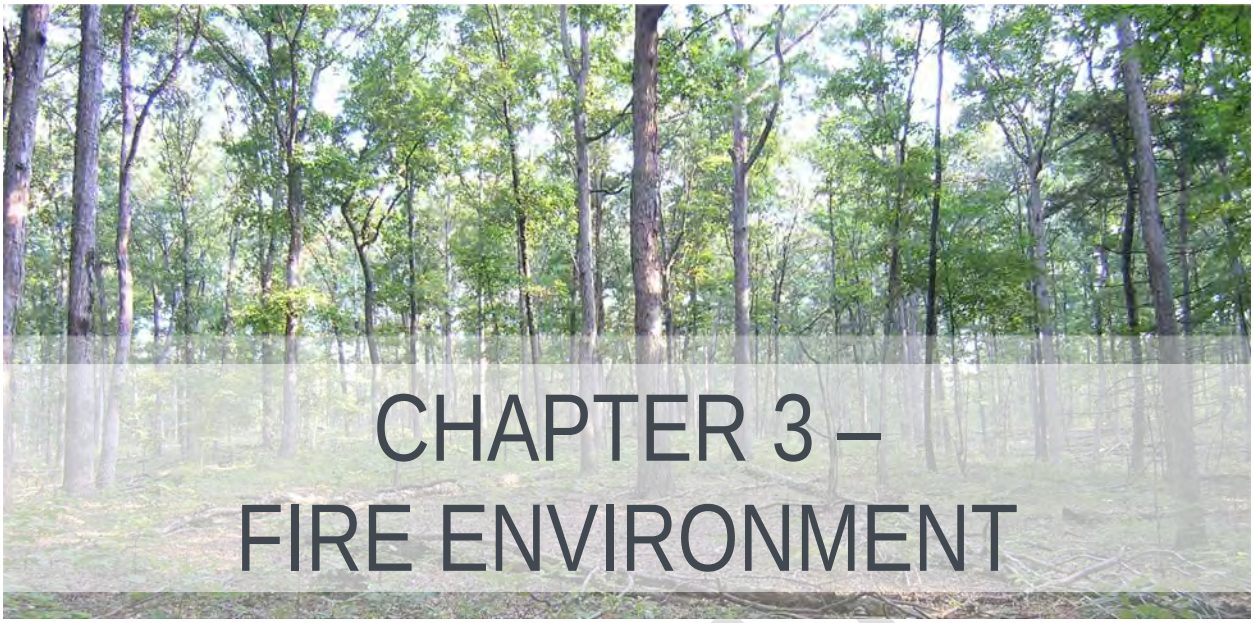
The Illinois Natural Heritage database records 47 species considered critically imperiled (28 classified as endangered, and 19 as threatened) in Hardin County. Additionally, the region hosts a suite of species in greatest need of conservation (IDNR 2005b). Of these rare and declining species, many are dependent upon periodic fire for maintenance of their biological integrity.

ROADS AND TRANSPORTATION

Hardin County is devoid of any major interstate. The main transportation routes throughout the county are Illinois Route 146, which is an east–west highway serving the communities of Rosiclare, Elizabethtown, and Cave-In-Rock; and Illinois Route 1, which is a north–south highway serving Cave-In-Rock and communities along the eastern portion of the county. The county has 493.12 miles of roadways, 35.32 miles of state highways, 228.80 miles of county roads, and 199.91 miles of township roads (Hardin County Emergency Operations Plan 2006).

Many roads throughout the county are unsurfaced rural routes (Figure 2.20) with some sections that receive very little maintenance. Travel in more rural areas of the county could be slowed by the road conditions, especially for large fire response apparatus.

Figure 2.20. Example of unsurfaced county road with vegetated margins.



CHAPTER 3 – FIRE ENVIRONMENT

WILDLAND URBAN INTERFACE

The WUI is composed of both interface and intermix communities and is defined as areas where human habitation and development meet or intermix with wildland fuels (U.S. Department of the Interior [USDI] and U.S. Department of Agriculture [USDA] 2001:752–753). Interface areas include housing developments that meet or are in the vicinity of continuous vegetation and consist of less than 50% vegetation. Intermix areas are those areas where structures are scattered throughout a wildland area of greater than 50% continuous vegetation and fuels and meet or exceed a minimum of one house per 40 acres. Depending on the surrounding fuel conditions, topography, and present structures, wildland areas of up to 1.5 miles from structures may be included in the WUI (Stewart et al. 2007).

The WUI creates an environment in which fire can move readily between structural and vegetative fuels, increasing the potential for wildland fire ignitions and the corresponding potential loss of life and property. Human encroachment upon wildland ecosystems within recent decades is increasing the extent of the WUI throughout the country as a whole, which is having a significant influence on wildland fire management practices. Combined with the collective effects of aggressive suppression policies, resource management practices, land use patterns, climate change, and insect and disease infestations, the expansion of the WUI into areas with high fire risk has created an urgent need to modify fire management practices and policies and to understand and manage fire risk effectively in the WUI (Pyne 2001; Stephens and Ruth 2005). Mitigation techniques for fuels and fire management can be strategically planned and implemented in WUI areas; for example, with the development of defensible space around homes and structures (Figure 3.1).

Figure 3.1. Example of a structures in immediate contact with wildland fuels, which are at high risk from wildfire.

A CWPP offers the opportunity for collaboration of land managers to establish a definition and a boundary for the local WUI; to better understand the unique resources, fuels, topography, and climatic and structural characteristics of the area; and to prioritize and plan fuels treatments to mitigate for fire risks. At least 50% of all funds appropriated for projects under the HFRA must be used within the WUI area.

The Shawnee National Forest recently developed a forest-wide WUI for the region. The Core Team decided to utilize this WUI delineation because it considered population density for the entire county, thereby not skewing the WUI to only account for the three incorporated communities. The WUI designation classifies the county into interface and intermix areas, which are further divided into low-, medium-, and high-density occupation (Figure 3.2).

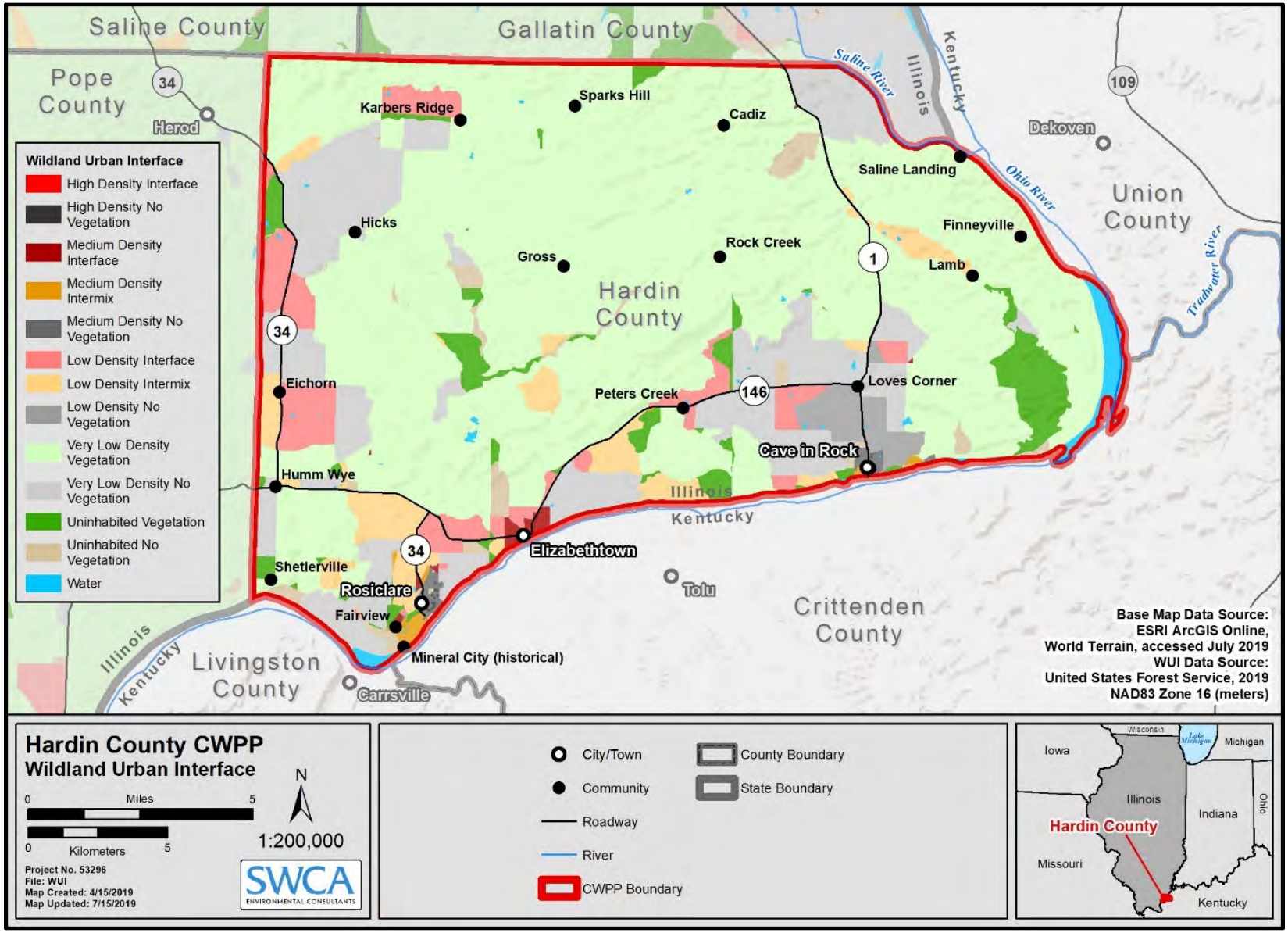


Figure 3.2. WUI delineation for Hardin County.

FIRE HISTORY

Fire has played a prominent role in the history of hardwood forests of the eastern United States (Guyette et al. 2002; Pyne 1982; Williams 1989). Pollen studies, tree-ring records, General Land Office survey notes, and early explorer's and settler's accounts all suggest that the landscape of the area experienced fire much more often than is the case now (USFS 2015).

> *Perpetuated for thousands of years by periodic anthropogenic burning in tandem with natural ignitions (Delcourt et al. 1998), these uplands burned with moderate frequency ranging between 2-25 years creating a landscape mosaic regulated by site conditions and land use practices (Robertson and Heikens 1994, Thompson and Dessecker 1997, Batek et al. 1999). Fire suppression policies implemented in the early 20th century have subsequently disrupted the pervasiveness of fire from the uplands of the Shawnee National Forest (Miller 1920, Parker and Ruffner 2004). (Tikusis 2009:2)*

Native Americans are known to have used fire to manipulate habitat, manage fuels, drive game, and maintain clear sightlines, as well as many other things (USFS 2015). Analysis of fire scars in tree ring data suggests that the frequency of burning in the region was higher immediately after the area was first settled. Studies from southern Indiana give an average fire return interval of 23 years from 1650 to 1820 (USFS 2015), and a study in the Missouri Ozarks by Parker and Ruffner (2004) suggests that forests there burned approximately every 11.96 years (USFS 2015). Pre-settlement fire history records in southern Illinois are limited due to past timber harvesting and rapid decomposition; however, fire is accepted as a common disturbance in the area both pre- and post-settlement (Tikusis 2009). Early pioneers may have adopted native practices regarding burning. The nineteenth century saw significant disturbance as land was cleared for agriculture and timber harvest (Tikusis 2009). The Indiana study shows the average fire return interval decreasing to 5 years during this time, while fire visited the Missouri Ozarks every 3.64 years (USFS 2015). Woodland burning was practiced into the early twentieth century until it was disparaged as "savage custom" (Miller 1920). As fire frequency declined, woodland stands began to undergo "thicketization" (Archer et al. 2004; Breshears 2006) or closure, resulting in conversion of prairies and savannas to woodlands and then forests (Taft 2008).

Modern wildfire frequency on the Shawnee National Forest averages approximately 25 fires per year for 292 acres. An approximately 100-acre fire occurs every 2.3 years across the Shawnee National Forest as a whole. A 400-acre fire is the largest in the region since the 1980s, but that fire occurred in Jackson County.

Figures 3.3, 3.4, and 3.5 show fire occurrence data throughout Hardin County over the period of record (1979–2018). Between 1979 and 2018, there have been 960 fires in the county. Figure 3.3 shows that these fires occur in waves, with some heavy fire years occurring from 1986 to 1988, 1994, 1995, 2000 to 2002, 2007, 2009, and 2010. Figure 3.4 shows that the majority of fires occur in the spring from February through April, peaking in March and then again in October or November. As shown in Figure 3.5, when fires do occur, most are suppressed before they gain size, resulting in limited acres burned. Figure 3.6 maps the wildfire history and shows that wildfires typically cluster in the county, occurring along roads and distributed mostly on USFS land in association with forest and grassland fuels. The data presented in the CWPP are fires that have been reported to the National Fire Incident Reporting System (NFIRS) and have occurred on both public and private land. It is thought that many fires in the county have gone unreported, and therefore, this dataset under-represents the actual fire frequency in the county. The Core Team acknowledged this reporting problem and the fire chief from the three VFDs committed to providing better reporting to NFIRS moving forward. Comprehensive reporting of all fires is critical in developing an accurate assessment of wildfire risk and for obtaining the necessary funds and resources to support the fire departments in responding to wildfires. The fire occurrence history depicted in Figure 3.6 is an important component of the risk assessment discussed in Chapter 4.

Regardless of the underreporting of wildfires, there has been a decline in modern wildfire occurrence compared with fire frequency in the early 1900s (Tikusis 2009). Lack of fire in modern times is listed as one of the major contributors to the successional replacement of oak by mesophytic hardwoods. Prescribed fire

has had to replace wildfire in modern forest management in order to promote oak regeneration where other woody vegetation is hindering the long-term persistence of the species (Day and Fan 2008).

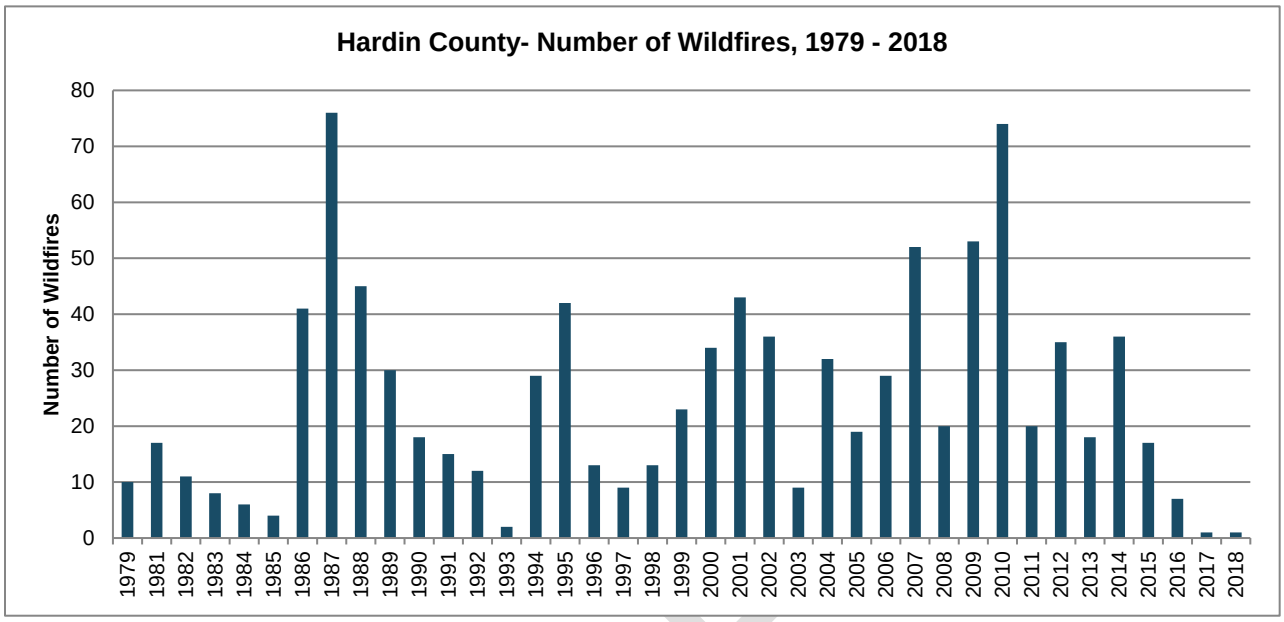


Figure 3.3. Annual wildfire frequency in Hardin County from 1979 to 2018. Source: USFS/IDNR.

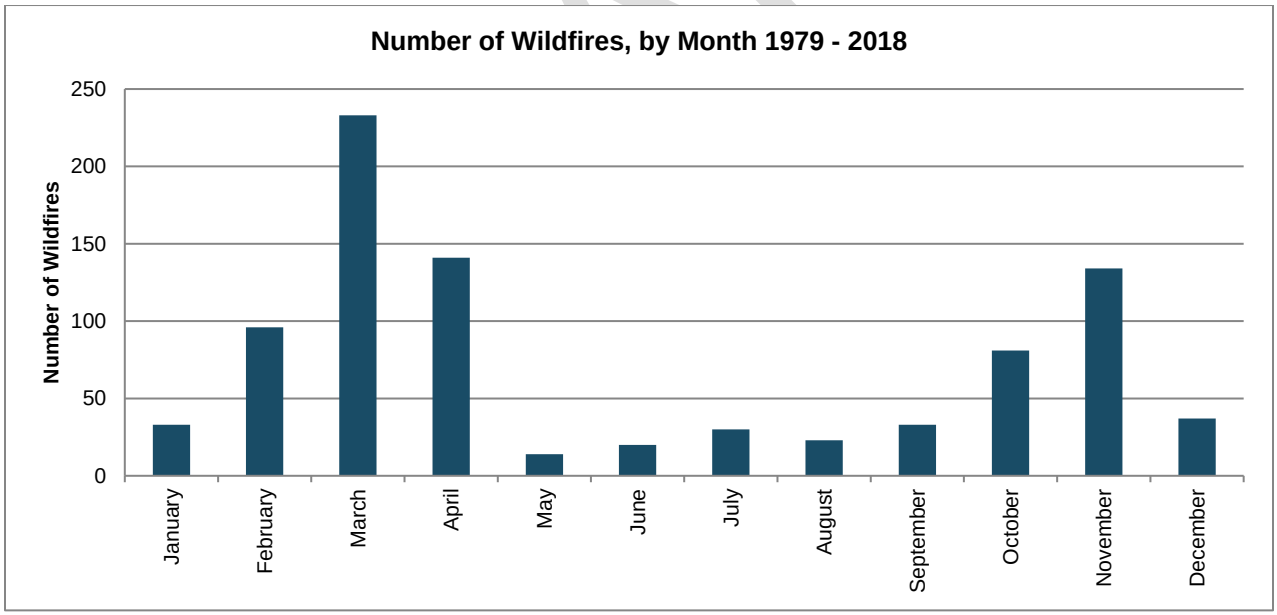


Figure 3.4. Monthly fire frequency in Hardin County, based on data from 1979 to 2018.

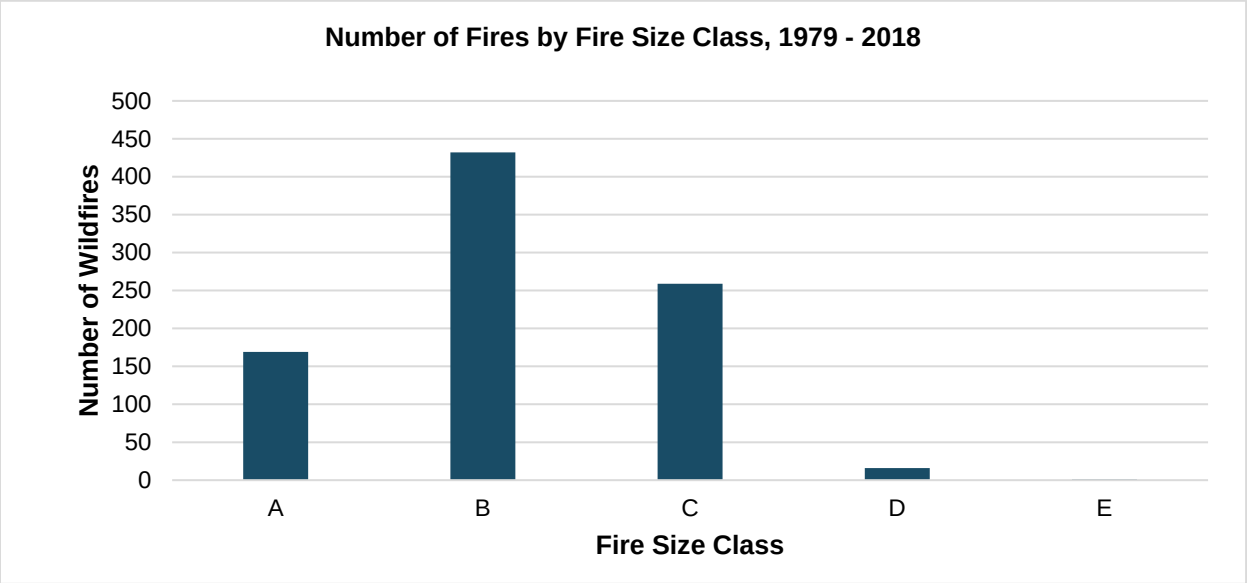


Figure 3.5. Fire size statistics for Hardin County based on fire history data from 1979 to 2018.

Size Class: A = 0.25 acre or less; B = greater than 0.25 to 10 acres; C = 10 to 100 acres; D = 100 to 300 acres; and E = 300 to 1,000 acres.

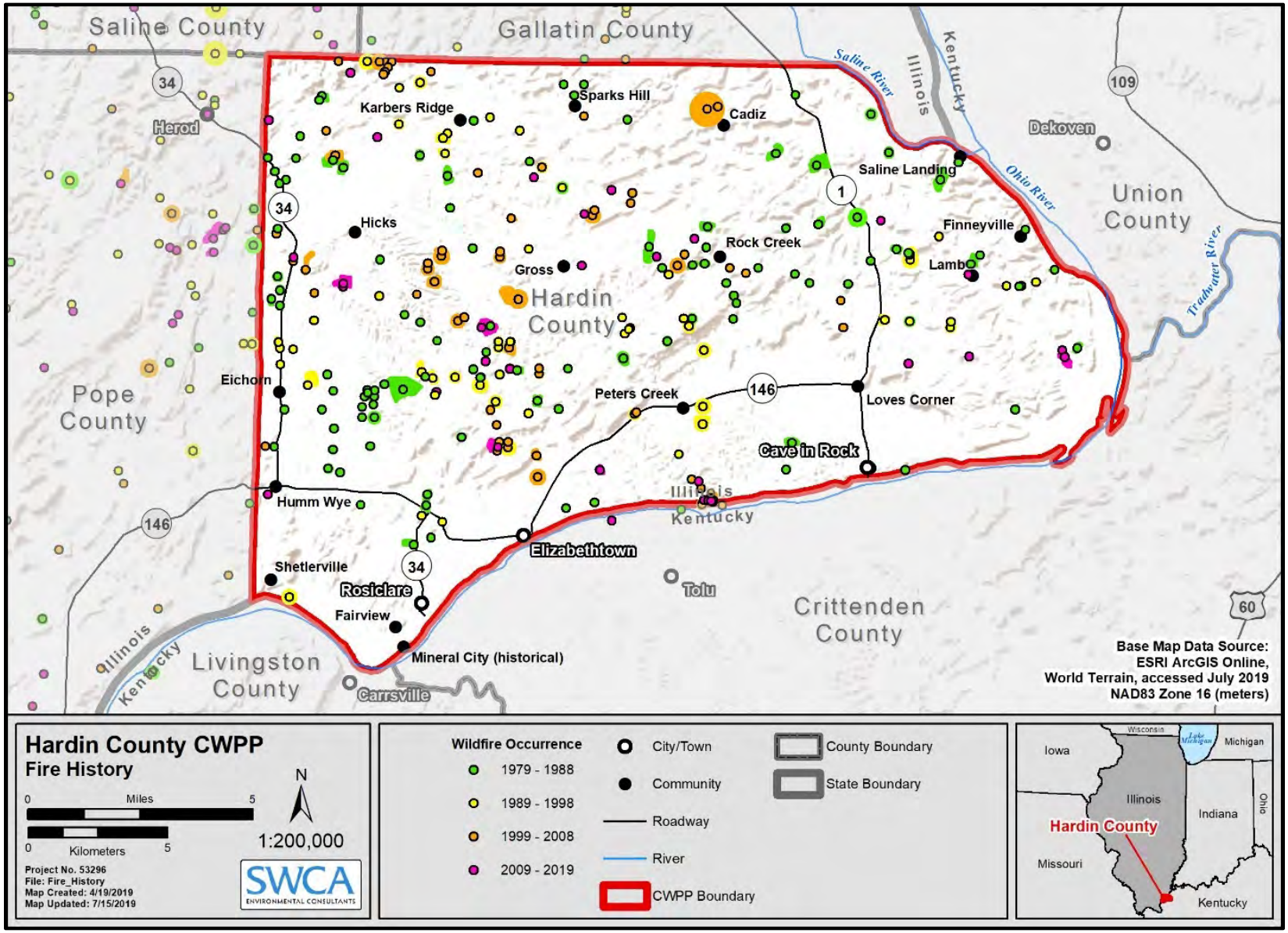


Figure 3.6. Fire history for Hardin County from 1979 to 2019.

IGNITION SOURCES

Natural ignitions in this region occur very rarely; however, they are thought to have been an important element of the pre-settlement fire regime, occurring primarily during the driest months in late summer and early fall (Parker and Ruffner 2004). This time frame is also when the present-day Shawnee National Forest had some of its highest visitor use rates (USFS 2015).

As stated in the Shawnee National Forest Fire Management Plan (FMP) and illustrated by the monthly fire occurrence data in Figure 3.4 above, fire season officially corresponds to the time between snowmelt and "green up" in the spring (USFS 2015). There are limited ignitions during the summer due to frequent rainstorms during that time. A second season begins after fine fuels have cured and leaves have withered and fallen but before winter temperatures and precipitation limit fire activity in the winter. Averages of historical fire activity put these dates as:

Spring Season: February 12–May 5

Fall Season: October 13–December 10

Even though most fires occur during these seasons, when there are exposed, grassy fuels, these dry much quicker than forested areas, allowing fires throughout the year (USFS 2015). There is a slightly higher tendency for summer fires than there was historically, which coincides with a period of increased visitation by recreationists. These fires tend to exhibit the most intense fire behavior.

The majority of fires in Hardin County are human caused, with debris burning being the greatest cause of wildfire, followed by arson. Debris burning fires are not often ticketed, as there is very little enforcement available. Some accidental starts result from discarded cigarettes, vehicles, machinery use, and open burning. Available fire history information does not always provide fire cause, so the exact number of human versus naturally ignited fires is unavailable. The majority of fires are thought to start on private land, and most are detected early and suppressed before they gain acreage; however, given the right conditions, these fires may grow large and become difficult to suppress. This illustrates the importance of working with private landowners to reduce fire occurrence and reduce fuel loads and fire impacts in the WUI (USFS 2015). Raising awareness of the State Fire Protection District Law, which requires landowners to apply for a burn permit prior to burning on lands in Hardin County, would be an important public outreach measure to help reduce the number of wildfires ignited by debris burning.

The USFS, IDNR, and other groups are developing fire prevention, fire safety, and public information programs regarding wildfire in Hardin County.

FIRE REGIMES

In order to classify, prioritize, and plan for fuels treatments across a fire management region, methods have been developed to stratify the landscape based on physiographic and ecological characteristics.

FIRE REGIME CLASSIFICATIONS

A natural, or historical, fire regime is a general classification describing the role fire would play throughout a landscape in the absence of modern human intervention but includes the influence of burning by Native American groups (Agee 1993; Brown 1995; Hann et al. 2008).

Fire regime (FR) classes are based on the average number of years between fires (also known as fire frequency or fire return interval) combined with the severity (i.e., the amount of vegetation replacement) of the fire and its effect on the dominant overstory vegetation (Hann et al. 2008).

The five FR classes are:

FR I: Frequency of 0 to 35 years and low (mostly surface fires) to mixed severity (less than 75% of the dominant overstory vegetation is replaced).

FR II: Frequency of 0 to 35 years and high severity (more than 75% of the dominant overstory vegetation is replaced).

FR III: Frequency of 35 to 200+ years and mixed severity (less than 75% of the dominant overstory vegetation is replaced).

FR IV: Frequency of 35 to 200+ years and high severity (more than 75% of the dominant overstory vegetation is replaced).

FR V: Frequency of 200+ years and high severity (more than 75% of the dominant overstory vegetation is replaced).

FIRE REGIME CONDITION CLASS

Natural fire regime reference conditions have been developed for vegetation-fuel class composition, fire frequency, and fire severity in biophysical settings at a landscape level for most parts of the United States (Hann et al. 2008). The FRCC is a measure of the degree of departure from reference conditions, possibly resulting in changes to key ecosystem components, such as vegetation characteristics (e.g., species composition, structural stage, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances, such as insect and disease mortality, grazing, and drought (Hann et al. 2008). Several factors, such as fire suppression, timber harvesting, livestock overgrazing, introduction and establishment of non-native species, introduced disease and insects, and other management activities are all possible causes of this departure from historical conditions (Hann et al. 2008; Schmidt et al. 2002).

The three FRCC rankings are:

FRCC 1: No or low departure from the central tendency of the reference conditions.

FRCC 2: Moderate departure from the central tendency of the reference conditions.

FRCC 3: Extreme departure from the central tendency of the reference conditions.

The central tendency is a composite estimate of the reference condition vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure includes a 33% deviation from the central tendency (Hann and Bunnell 2001; Hann et al. 2008; Hardy et al. 2001;).

Oak-hickory forests of the Central Hardwood Forest region have been classified as having a natural fire regime of surface burning with low to moderate severity (less than 4-foot flame lengths and spotting distances less than 0.1 mile), at a relatively frequent return interval within the range of 0 to 35 years (Schmidt et al. 2002; Tikusis 2009). As stated previously, anthropogenic burning has been the primary cause of ignition in the region as lightning starts are uncommon (Crist 2009). The frequent low-intensity fire regime of oak-hickory forests maintains favorable conditions for the regeneration of oak and persistence of the xerophytic vegetation in these communities (Abrams 1992). Active fire behavior in these systems is dependent upon the presence of abundant fine fuels and favorable weather conditions (Tikusis 2009).

A study of fire regime and condition class in the Shawnee National Forest in 2009 concluded that widespread deviations from the historic fire regime have taken place since the early twentieth century and FRCC values were found to fall into the FRCC 2 and 3 categories, with no stands representing FRCC 1 (Tikusis 2009).

CHALLENGES FOR FUTURE RESTORATION EFFORTS

In the past few years, fires nationwide have grown to record sizes and are burning earlier, longer, hotter, and more intensely than they have in the past (Westerling et al. 2006). According to the National Interagency Fire Center (NIFC), occurrence of catastrophic wildfires has greatly increased over the last 20 years. The threat of wildfire outside of the western United States is often overlooked with much of the focus being on expansive conflagrations that are more common in western states. Aggressive fire suppression has resulted in a decline in areas burned in the east in recent years making many residents of fire-prone areas complacent regarding fire risk. Westerling et al. (2006) claim that a study of large (>1,000 acres) wildfires throughout the United States for the period 1970 to 2003 saw a pronounced increase in frequency of fire since the mid-1980s (1987–2003 fires were four times more frequent than the 1970–1986 average). The length of the fire season was also observed to increase by 78 days, comparing 1970–1986 to 1987–2003. Within just the last 10 years, a record number of acreages have burned and numbers are continually getting larger (NIFC 2016). In 2018, 58,083 fires were reported nationwide, burning 8,767,492 acres (NIFC 2019). With increased fires comes increased suppression costs, with 2018 beating all previous records with federal firefighting costs hitting $3,143,256,000.

Advanced computer models are now making national-scale simulations of ecosystems, providing predictions of how fire regimes will change in the twenty-first century (Neilson et al. 2004). Summer months are predicted to be hotter and longer contributing to increased fire risk (Neilson et al. 2004). Under greater climatic extremes widely predicted throughout the United States, fire behavior is expected to become more erratic, with larger flame lengths, increased torching and crowning, and more rapid runs and blowups associated with extremely dry conditions (Brown et al. 2004).

Although fire suppression is still aggressively practiced, fire management techniques are continually adapting and improving. Due to extensive human developments (homes and farms) and values (residential and commercial structures, historic and natural values) throughout the WUI, suppression will always have to be a priority. However, it is well accepted that a more dynamic forest mosaic (where oak is restored) means a more resilient forest in the face of climate change (Brandt et al. 2014; Nowacki and Abrams 2015), and therefore combining mechanical treatments with prescribed fire could help re-establish natural fire regimes and reduce the potential for catastrophic wildfires on public lands in the region.

FIRE MANAGEMENT POLICY

The primary responsibility for WUI fire prevention and protection lies with property owners and state and local governments. Property owners must comply with existing state statutes and local regulations. These primary responsibilities should be carried out in partnership with the federal government and private sector areas. The current Federal Fire Policy states that protection priorities are 1) life, 2) property, and 3) natural resources. These priorities often limit flexibility in the decision-making process, especially when a wildland fire occurs within the WUI.

LAWS, ORDINANCES, STANDARDS, AND CODES FOR WILDFIRE PREVENTION

There are currently no ordinances, laws, codes or standards in Hardin County for wildfire prevention, with the exception of the State Fire Protection District Law (Appendix C), which requires that landowners apply for a burn permit prior to the burning. The permit process is administered by IDNR. There are a number of existing models used in other communities in Illinois and in other states with which Hardin County could develop a WUI code if desired. Two national organizations, the International Code Council (ICC) and the National Fire Protection Association (NFPA), have developed model WUI wildfire protection codes as standards for states and local governments to adopt. A core concept in these model codes and the resulting wildfire mitigation ordinances is that of structure protection through the creation of defensible space (Haines et al. 2005).

FIRE PLANNING

There are limited existing documents relating to fire management in Hardin County, the main fire management document being the FMP (USFS 2015), which provides more detailed information regarding operational procedures relating to wildfire on National Forest lands. The current version of the FMP is now housed within the Wildland Fire Decision Support System (WFDSS), which is a system to assist fire managers and analysts in making strategic and tactical decisions for fire incidents. This CWPP is meant to supplement and not replace the FMP or any other existing plans.

EMERGENCY MANAGEMENT PLANNING

Hardin County developed an Emergency Operations Plan (EOP) in 2017. The EOP addresses Hardin County's planned response to extraordinary emergencies associated with natural disasters, technological incidents and human-made disasters. It provides operational concepts relating to the various emergency management organizations and describes protecting life, property, and the overall wellbeing of the population of Hardin County.

Responsibility for the protection of the lives and property of Hardin County residents rests with the various governments in the county. The Hardin County Board Chairperson and the Hardin County Emergency Management Agency (EMA) Coordinator are the only two people who can declare a local disaster within the county. The Hardin County Sheriff, in addition to the EMA Coordinator, may activate the EOP following the occurrence of, or the impending occurrence of a major emergency/disaster situation (Hardin County EOP; IV Concept of Operations, pp 3.).

The EOP outlines the roles and responsibilities of all entities in the event of an emergency. Although the EOP does not address wildfire activities in detail, it does include a Fire Service Annex, which outlines a Concept of Operations and Organization and Assignment of Responsibilities:

- The fire departments of Rosiclare, Elizabethtown, and Cave-In-Rock are responsible for providing fire services within Hardin County.
- The jurisdictional fire chief or his designee will:
    - Coordinate all fire, search, and rescue services from the EOC and/or Incident Command Post.
    - Provide fire control.
    - Provide fire protection (including emergency shelters).
    - Inform the EOC of the hazards associated with hazardous materials and the dangers associated with technological hazards.
    - Support fire codes.
    - Enforce fire codes.
    - Support other public safety operations.
    - Conduct rescue operations.
    - Inform the public of appropriate fire prevention measures both before and during emergency operations.
    - Request assistance when additional manpower and/or equipment is needed from mutual aid departments or organizations and direct their activities upon arrival.

The line of succession for Fire Protection Districts is:

- Jurisdictional Fire Chief
- Jurisdictional Assistant Fire Chief

- Jurisdictional 2nd Assistant Chief/Senior Officer
- Fire Chief's Designee

The EOP includes several annexes, including a communications plan, evacuation plan, and public outreach.

The EOP is due to be updated in 2020. In addition, the county has been discussing the need to develop a Hazard Mitigation Plan (HMP) in order to remain eligible for FEMA funding, including pre-disaster mitigation funding. This CWPP could serve as the wildfire chapter of that HMP.

LAND MANAGEMENT STRATEGIES

Hardin County contains large areas of forest that are identified in the IFAP as high priority forested land. The IFAP identifies the decline of oak as a threat to forest biological diversity and as such it calls for forest management practices that mimic natural disturbance on the landscape, such as the use of fire and selective tree removal. A number of campaigns are also underway as part of the Illinois Wildlife Action Plan to improve habitat in forested and grass/shrub areas. On a national scale, the National Cohesive Wildland Fire Management Strategy calls for the restoration and maintenance of landscapes and creation of fire adapted communities. On a regional scale, the Northeast Regional Cohesive Strategy calls for the restoration and maintenance of fire-adapted landscape in southern Illinois, including the expansion of prescribed fire on private land and fuel reduction and restoration efforts in the WUI.

Forest managers in the region are addressing all these objectives through the use of prescribed fire to promote more resilient forest lands. Private, state, and federal lands are interspersed creating a matrix of land ownership, which is often a hurdle to implementation of landscape level treatments. By working with private landowners, forest managers are enhancing landscape-scale efforts to create more resilient forest communities.

A variety of land management strategies are used in Hardin County to reduce hazardous fuels and carry out forest restoration with the goal of promoting long-term sustainability of oak-hickory forests. The following list summarizes common treatment types that are being used in oak-hickory forests in Hardin County:

- Vegetation treatments in pine and hardwood stands: overstory removal, clearcut, and shelterwood establishment cut.
- Timber stand improvement treatment: removal of small-diameter (<10 inches diameter at breast height) oak competitor hardwood trees to release oak from competition.
- Prescribed fire: landscape burning and activity fuel reduction (burning of logging slash and debris) with repeated burning as needed to promote ecological conditions necessary for oak regeneration. All burns follow agency prescribed burn guidelines and planning.
- Non-native invasive plant treatments: prescribed burning, herbicide application, and integrated approach. Common target species include Amur honeysuckle, Chinese yam (*Dioscorea polystachya*), Japanese stiltgrass, garlic mustard (*Alliaria petiolata*), and kudzu (*Pueraria* sp.).
- Wildlife treatments: management actions specifically designed to meet wildlife habitat components, e.g., creation of range of seral stages.
- Construction of firelines: road reconstruction and construction of new firelines for emergency access and suppression tactics.

Prescribed Fire

Although the focus of wildfire risk mitigation is often on the reduction and removal of vegetation, and the prevention and suppression of wildfire, fire under the right circumstances can be not only a useful tool to reduce hazardous amounts of fuel but also an important factor in wildland ecosystems. Many fire and

resource management agencies at the local, state, and federal levels include the use of fire in their programs.

According to land managers, frequent burning is necessary for the maintenance of eastern oak-dominated forests (Haines et al. 2001; Nowacki and Abrams 2008; Parker and Ruffner 2004; Ruffner 2006). Prescribed fire can achieve many management goals, including controlling forest diseases or insects, maintaining early successional habitats, and reducing excessive build-up of biomass in wildland areas (Riechman et al. 2014). Prescribed fire is often coupled with harvest or mechanical treatments in order to achieve an appropriate level of disturbance needed to initiate oak regeneration (Brose et al. 2013; Riechman et al. 2014).

The use of fire as a land management tool in southern Illinois is a long-standing practice; however, applying fire to the mosaic of land ownership in the region requires exhaustive collaboration between landowners and extensive training of crews. The use of prescribed fire has several requirements to be successful, including the following:

- Planning documents include approval authority, burn objectives, preparation requirements, weather and fuels conditions under which the burn will be performed, operational responsibilities, contingency planning in the event of an escape, and post-burn monitoring to document the attainment of burn objectives and other potential fire effects, such as the occurrence of invasive species.
- Specific attention must to be given to smoke management and weather forecasts concerning smoke direction and atmospheric mixing patterns. Consultation between the agencies involved with the burn and the U.S. Environmental Protection Agency needs to occur early in the planning cycle, especially with regard to identification of suitable weather periods for the burn to be conducted. Conditions suitable for the fire agency may not be suitable from the perspective of the U.S. Environmental Protection Agency. Air permits are held for 1 year; however, the State of Illinois does not control or enforce heavily. If there are known smoke sensitivities in the community, the agencies' outreach to those people and will consider that in the burn plan. During the second Core Team meeting, the Shawnee Fire Management Officer requested that Core Team members, particularly members of the fire departments, report to him any known smoke sensitive individuals in the county, so that the USFS can add them to a map that they use during burn planning.
- Public education and outreach are vital given the frequent concern by the public over smoke, risk of escape, and post-fire appearance of the burn unit. It is unlikely that all of the public will support the prescribed fire program, but outreach conducted through social media and on-site visits to the post-burn areas as they recover can develop a broad base of support, especially if the fire has stimulated the occurrence of desirable species considered to be rare.

The development of prescribed burning associations is now being used to help facilitate the application of fire to these fire-dependent ecosystems in the southern Illinois region (Riechman et al. 2014). The **Southern Illinois Prescribed Burn Association (SIPBA)** has been increasing the use of prescribed fire throughout the region for 10 years. SIPBA helps to empower private landowners to apply fire to their properties to address concerns for deteriorating forest health, insects, and disease. SIPBA works closely with and state and federal partners to collaboratively treat areas throughout Hardin County.

The Shawnee National Forest prepares areas to conduct prescribed burns in various locations. This burning is implemented between October and May of most years.

Prescribed burn objectives may include one or more of the following:

- to stimulate growth of native vegetation that are well-adapted to fire, and impede vegetation that is not;
- to improve wildlife habitat;
- to improve the visual quality of the area; and
- to reduce the likelihood and severity of a wildfire, thereby increasing safety for the public and firefighters in case of a wildfire.

For maps of planned and completed prescribed burns on the Shawnee National Forest, please visit: https://www.fs.usda.gov/main/shawnee/fire.

The IDNR currently implements prescribed fire on state land and works cooperatively with private landowners to implement some prescribed fire of barrens and woodlands, grasslands, fields, and hardwood forests and expects to expand the program in the future (USFS 2016).

Landscape Treatments

It has become well accepted that the most effective way to develop fuel reduction projects to reduce impacts to communities and values at risk is to adopt a landscape-level approach to management. Federal, State and local land managers are moving towards an "All Lands Approach" to forest management in the county that promotes opportunities to use landscape-scale burns to implement restoration of hardwood forests and reduce hazardous fuels. For example the USFS has been promoting the following project elements to forest management:

- Coordination and outreach to landowners adjacent and nearby to projects on National Forest lands; and
- Prescribed burning of private lands in proximity to National Forest lands to reduce hazardous fuel loads and restore ecosystems at the landscape level.

Due to a fragmented ownership pattern in Hardin County, this approach of landscape treatments and collaboration between landowners is thought to be the most effective means to treat fuels across a mosaic of landownership. Numerous partners including IDNR, the USFS, the Natural Resources Conservation Service (NRCS), SIPBA, and the River to River Cooperative Weed Management Area (CWMA) are working to build collaboration through applying for funds to expand communication between landowners and ultimately develop more management agreements in Hardin County for landscape-level treatments.

Desired Condition

The goal of land managers in the region is to restore native fire-dependent ecosystems and move towards a desired condition of the oak-hickory forest type (Figure 3.7 and Figure 3.8), and convert non-native pine plantations to native hardwoods. This aligns with the strategic goals of the IDNR and the USFS (through the Forest Plan). The maintenance of the oak-hickory forest is important for plant diversity and wildlife habitat, but its maintenance will require additional disturbance of the forest canopy in order to encourage the regeneration of oak species and native herbaceous species. Federal and State Partners share a common goal for implementation of landscape-scale prescribed burns; timber harvesting, including shelterwood and clearcutting; timber stand improvement; and other vegetation management activities to interrupt rapid succession to the maple and beech forest type and maintain the oak-hickory forest type within the historic range of variability (USFS 2006).

Specific strategies and guidelines are used in restoration planning to improve habitat for wildlife, including maintaining a variety of age classes of oak-hickory forest through active vegetation management (USFS 2012). Increasing the presence of early age classes (seedlings, saplings, and small diameter stems) promote habitat for some special status species, including American woodcock (*Scolopax minor*), northern

bobwhite (*Colinus virginianus*), and yellow-breasted chat (*Icteria virens*) (USFS 2006:296–297). Vegetation disturbance to promote oak-hickory forest (USFS 2006:13) also helps ensure the long-term sustainability of habitat components such as the availability of acorns that are of critical importance to wildlife (McShea and Healy 2002; USFS 2012).

Figure 3.7. Oak-hickory pretreatment. Photographed by David Allen.

Figure 3.8. Oak-hickory post-prescribed fire treatment. Photographed by David Allen.

Holzmueller et al. (2014) describe an experimental study of oak-hickory regeneration in southern Illinois using plots that received a prescribed fire only treatment, a prescribed fire and thinning treatment, a thinning alone treatment, and a no treatment (control). Ten years after treatment, the study indicated that oak and hickory seedlings had a greater height and diameter in the thinning and burning treatment compared to control and that this treatment may help facilitate desirable regeneration in mature oak.

FIRE AND RESPONSE CAPABILITIES

RESPONSIBLE WILDFIRE AGENCIES (FEDERAL, STATE, COUNTY, AND CITIES)

Wildfires in Hardin County are responded to by the Shawnee National Forest (federal), the IDNR (state), the three municipal fire departments (Elizabethtown, Rosiclare and Cave-In-Rock). Hardin County Sheriff's Department provides dispatch services. Emergency radio repeaters and cell towers are located in neighboring Pope County near the community of Herod. Vegetation treatment is carried out around those tower sites to protect them from falling trees and wildfire.

Shawnee National Forest

The Shawnee National Forest has the following assets available for fire suppression in this portion of the forest:

- three Type 6 4 × 4 wildland fire engines (Figure 3.9);
- 15 firefighters; and
- one Type 3 tractor plow unit.

These resources are subject to change.

Figure 3.9. Shawnee National Forest Wildland Fire Engine.

Illinois Department of Natural Resources

The IDNR has limited fire suppression resources available in Hardin County. The IDNR has three individual firefighters, one Type 6 engine, and three utility task vehicles (Figure 3.10).

Figure 3.10. IDNR Fire Program.

Fire Departments in Hardin County

There are three fire departments that have district jurisdiction within the planning area: the Rosiclare, Elizabethtown and Cave-In-Rock Fire Departments, all of which are volunteer. There is no unified Hardin County fire department, and during Core Team discussions, it became clear that fire response to the unincorporated areas of the county was limited, especially for areas at some distance from their designated response station. In addition, there were no defined fire district boundaries for the three departments, which was causing confusion and sometimes delay for dispatching to fires and other emergency incidents. The Core Team rectified this issue during the planning process as part of a special Fire Responder meeting that was convened to discuss fire response issues in the county. The district boundaries were delineated collaboratively by all three departments and digitized on for the CWPP (Map 7, Appendix A). All three departments are run by volunteers.

Elizabethtown Fire Department

[Awaiting data]

Rosiclare Fire Department

The Rosiclare Fire Department has approximately 15 volunteers on the roster. Fire Department apparatus include:

- 2013 Pierce Engine with 1,000-gallon tank, 1,500-gallon per minute (gpm) pump (Figure 3.12).
- 1973 Chevrolet Engine with 750-gallon tank, 750-gpm pump.
- 1982 Pierce Engine with 750-gallon tank, 1,500-gpm pump.
- 1989 GMC Rescue Squad with 250-gallon tank.
- 1997 Chevrolet Rescue Squad.
- 1983 International Tanker with 1,800-gallon tank, 250-gpm pump.

Figure 3.11. Elizabethtown Fire Department participating in the Cave-In-Rock Frontier Days.

Figure 3.12. Rosiclare Fire Department Engine.

Cave-In-Rock

The Cave-In-Rock Fire Department has approximately 23 volunteers on the roster. Fire Department apparatus include:

- 2006 Pete Tanker/Pumper with 2,200-gallon tank, 1,750-gpm pump (Figure 3.13).
- 1982 Ford Tanker/Pumper with 1,800-gallon tank, 400-gpm pump.
- 1982 Ford Truck with 1,200-gallon tank, 1,250-gpm pump.

Figure 3.13. Cave-In-Rock Fire Department participating in the Cave-In-Rock Frontier Festival.

MUTUAL AID

The wildland fire community is well known for its development of mutual aid agreements at the federal, state, and local levels. Such automatic aid agreements allow for closest forces to respond to an incident as quickly as possible regardless of jurisdiction. Such agreements may also describe how reimbursement will be conducted; state resources responding to wildfires on federal land may have their associated costs reimbursed by the responsible federal agency, and the reverse is true for federal resources suppressing a wildfire on state land.

During the development of the CWPP, the Core Team discussed the need to revise some existing agreements that had expired. The USFS and the fire departments coordinated that effort. The Shawnee National Forest has cooperating agreements with each Fire Department, and a statewide master cooperative agreement exists between the Shawnee National Forest and the IDNR. The agreements with the Shawnee National Forest include wildfire response, prescribed fire support, fire prevention coordination, training, and mobilization/dispatching done by the Illinois Interagency Coordination Center.

Mutual aid agreements also exist between adjacent counties through the Coal Belt Association.

EVACUATION RESOURCES

The Hardin County EOP Evacuation Annex (Hardin County 2010) outlines the procedure for evacuation in the event of an incident (including fire) in the county.

Road Systems

Much of Hardin County is accessible via surfaced roads and highways; however, some communities are accessed only via unsurfaced roads, which are often narrow and windy (Figure 3.14). These routes may prove hazardous during emergency evacuation, especially where they are adjacent to forested land with vegetation close to or overhanging the road. Fuel treatment may be needed along some roads where vegetation is overhanging and could prevent safe evacuation of residents or safe access by emergency responders. Some rural roads also have narrow bridges with weight limits (Figure 3.15) that may impact access with large emergency apparatus.

Figure 3.14. Narrow and windy road with thick vegetation in unincorporated Hardin County.

Figure 3.15. Bridge close to the Iron Furnace with weight limit.

Horses, Livestock, and Animals

Many rural homes also have horses and other large animals and livestock, and pets are common in homes throughout the county. In the event of a wildfire, it is important that residents and fire responders have a plan for evacuation of pets and livestock. Evacuation planning often neglects to describe how animals will be evacuated and where they will be taken. The loading of horses, for example, during a fire and smoke situation, and transport of stock vehicles down narrow roads under stressful situations, can be very difficult. Public education could emphasize the need to practice loading horses quickly, for example.

There is also a need to pre-identify where animals can be taken, such as county fairgrounds, for large animal shelter. Similarly, locations where small animals such as dogs and cats picked up in the fire area should also be pre-identified, as well as the lead agencies, such as humane societies, coordinating this work.

Appendix G provides an example of a livestock evacuation plan that could be implemented in Hardin County, as well as actions that pet and livestock owners should take to prepare for evacuation of their animals.

WATER AVAILABILITY AND SUPPLY

Water supply is variable around the county and may be provided by hydrants, wells, cisterns, and reservoirs. A new system of hydrants has been installed in the incorporated communities; however, the locations of these hydrants have not been mapped. Although there is a good network of hydrants that are accessible to most communities, water pressure problems in unincorporated areas, as well as some water rights issues, result in the fire departments resorting to the use of known (good operating) hydrants to fill their tanks and engines and transporting water. This could delay response time if responders have to deviate from their route to access alternative hydrants.

Ponds and rivers could also provide alternative sources for suppression (Figure 3.16); however, many fire stations are ill-equipped with drafting devices to use this resource, so up-to-date drafting has not been practiced. Compatibility of cistern connections to fire apparatuses and vegetation clearance to allow fire apparatuses to access cisterns are other common water supply issues.

Dry hydrants were installed throughout the county using a grant obtained by the Shawnee Resource Conservation and Development area several years ago. Although these dry hydrants could serve as a water source for suppression activities, the whereabouts of the hydrants are not well known by fire responders. Mapping of dry hydrants and tests of the functionality of each hydrant is necessary to fully utilize this resource.

Figure 3.16. One of numerous ponds across the county that may be used for drafting for fire suppression.

PUBLIC EDUCATION AND OUTREACH PROGRAMS

Public education and outreach programs are a common factor in virtually every agency and organization involved with the wildfire issue.

Local and State Programs

Shawnee National Forest Learning Center

The Shawnee National Forest works to educate the local population and visitors on natural resources and management. In addition to other educational topics, the Shawnee National Forest also provides education resources and programs for wildfire prevention through the Smokey Bear program and other avenues. For more information visit: http://www.fs.usda.gov/main/shawnee/learning

Illinois Department of Natural Resources

The IDNR provides fire prevention information through its Forest Protection Program. The program provides notices to the public on wildfire prevention actions during the fire season. For example:

- Burn in protected areas only with no combustible materials within 10 feet around for small fires and 50 feet for larger fires.
- Prior to burning, check the national weather service's fire weather forecast for expected conditions.
- Avoid welding and grinding in areas with dry vegetation, and make sure that machinery is in good working order (bearings greased, avoid dragging chains and parts).
- For vehicles, especially those with catalytic convertors, avoid parking in areas with tall vegetation.
- Campfires should be small, in protected areas, and burned during night-time hours within fire grates or fire rings.
- Be careful to safely dispose of lit cigarettes, cigars, or other smoking material.
- Have a bucket of water and shovel on hand and be sure to thoroughly drown out the fire prior to leaving the area.

Southeastern Illinois Prescribed Fire Association

SIPBA was incorporated in southeastern Illinois as a not-for-profit organization in 2006. SIPBA is an example of a partnership that empowers landowners, conservation groups, and agencies to apply prescribed burning as a management tool across the southern Illinois region. SIPBA received initial funding from an IDNR C2000 grant and a State Wildlife Grant in 2008. SIPBA also received funds from the National Wild Turkey Federation and an extension of the original State Wildlife Grant until 2014, when a state and private forestry grant from the USFS funded SIPBA's expansion to the southern 11 counties of Illinois and a new partnership with the River to River CWMA.

SIPBA members enjoy many valuable and long-lasting benefits from their involvement:

- professional guidance and assistance with burn preparation;
- quality training in every aspect of prescribed fire management;
- access to specialized prescribed burn equipment; and
- assistance on burns from experienced and well-trained crews.

For more information, please visit the SIPBA website: www.sipba.org.

Shawnee Resource Conservation and Development Area Inc.

The Shawnee Resource Conservation and Development Area, Inc. (RC&D) is a 501(c)(3) not-for-profit organization serving the southern 16 counties of Illinois. The mission of the RC&D is to provide local leadership with the framework required to develop and carry out a plan of action for the conservation, development, and wise use of the resources within the RC&D area. The focus of the group's work has been conservation and economic development related to the natural resource base. A key program administered by the RD&C is the Let the Sun Shine In campaign, currently funded through a state and private Forestry Landscape Scale Restoration Competitive grant. This campaign seeks to develop a landscape-scale approach to forest management.

National Programs

Ready, Set, Go!

The Ready, Set, Go! Program, which is managed by the International Association of Fire Chiefs, was launched in 2011 at the WUI Conference. The program seeks to develop and improve the dialogue between fire departments and residents, providing teaching tools for residents who live in high-risk wildfire areas—and the WUI—on how to best prepare themselves and their properties against fire threats (Ready, Set, Go! 2016).

The tenets of Ready, Set, Go! as included on the website (http://www.wildlandfirersg.org) are:

> **Ready –** Take personal responsibility and prepare long before the threat of a wildland fire so your home is ready in case of a fire. Create defensible space by clearing brush away from your home. Use fire-resistant landscaping and harden your home with fire-safe construction measures. Assemble emergency supplies and belongings in a safe place. Plan escape routes and make sure all those residing within the home know the plan of action.
>
> **Set –** Pack your emergency items. Stay aware of the latest news and information on the fire from local media, your local fire department, and public safety.
>
> **Go –** Follow your personal wildland fire action plan. Doing so will not only support your safety but will allow firefighters to best maneuver resources to combat the fire.

National Fire Protection Association

The NFPA is a global non-profit organization devoted to eliminating death, injury, property, and economic loss due to fire, electrical, and related hazards. Its 300 codes and standards are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service, and installation around the world.

The NFPA develops easy-to-use educational programs, tools, and resources for all ages and audiences, including Fire Prevention Week, an annual campaign that addresses a specific fire safety theme. The NFPA's Firewise Communities program (www.firewise.org) encourages local solutions for wildfire safety by involving homeowners, community leaders, planners, developers, firefighters, and others in the effort to protect people and property from wildfire risks.

The NFPA is a premier resource for fire data analysis, research, and analysis. The Fire Analysis and Research division conducts investigations of fire incidents and produces a wide range of annual reports and special studies on all aspects of the nation's fire problem.

Insurance Institute for Business and Home Safety

The Insurance Institute for Business and Home Safety (IBHS) is an independent, non-profit, scientific research and communications organization supported solely by property insurers and reinsurers. The IBHS's building safety research leads to real-world solutions for home and business owners, helping to

create more resilient communities. Its mission is to conduct objective, scientific research to identify and promote the most effective ways to strengthen homes, businesses, and communities against natural disasters and other causes of loss.

The IBHS conducts laboratory and field experiments in structural ignitability and has helped develop new guidelines for defensible space zones to emphasize ember resistance and a “home ignition zone” (Figure 3.17).

Figure 3.17. Defensible space standards from the IBHS.

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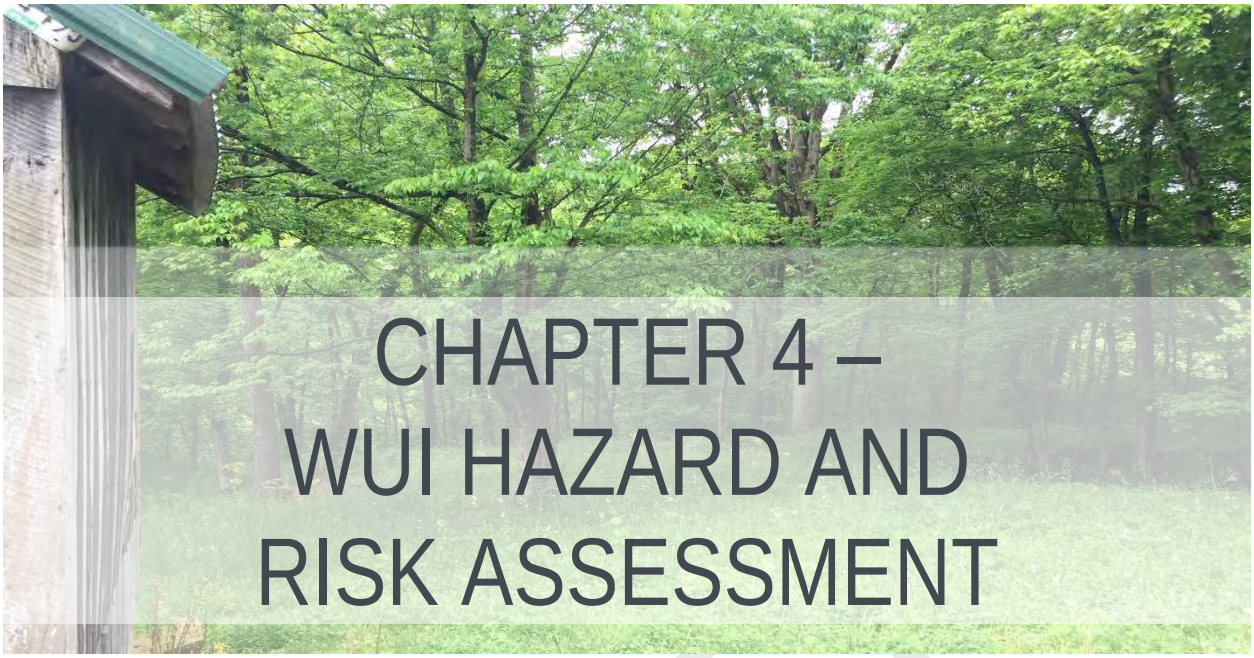


CHAPTER 4 – WUI HAZARD AND RISK ASSESSMENT

PURPOSE

The purpose of developing the risk assessment model described here is to create a unique tool for evaluating the risk of wildland fires to communities within the WUI areas of Hardin County. Although many definitions exist for hazard and risk, for the purpose of this document these definitions follow those used by the firefighting community:

> ***Hazard*** is a fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.
>
> ***Risk*** is defined as the chance of a fire starting as determined by the presence and activity of causative agents (National Wildfire Coordinating Group [NWCG] 1998).

The risk assessment is twofold and combines a GIS model of hazard based on fire behavior and fuels modeling technology (Composite Risk/Hazard Assessment) and a field assessment of community hazards and values at risk (Community Risk/Hazard Assessment).

From these assessments, land use managers, fire officials, planners, and others can begin to prepare strategies and methods for reducing the threat of wildfire, as well as work with community members to educate them about methods for reducing the damaging consequences of fire. The fuels reduction treatments can be implemented on both private and public land, so community members have the opportunity to actively apply the treatments on their properties, as well as recommend treatments on public land that they use or care about.

FIRE BEHAVIOR MODEL

OVERVIEW

The wildland fire environment consists of three factors that influence the spread of wildfire: fuels, topography, and weather. Understanding how these factors interact to produce a range of fire behavior is fundamental to determining treatment strategies and priorities in the WUI. In the wildland environment,

vegetation is synonymous with fuels. When sufficient fuels for continued combustion are present, the level of risk for those residing in the WUI is heightened. Fire spreads in three ways: 1) surface fire spread—the flaming front remains on the ground surface (in grasses, shrubs, small trees, etc.) and resistance to control is comparatively low; 2) crown fire—the surface fire "ladders" up into the upper levels of the forest canopy and spreads through the tops (or crowns) independent of or along with the surface fire, and when sustained is often beyond the capabilities of suppression resources; and 3) spotting—embers are lifted and carried with the wind ahead of the main fire and ignite in receptive fuels; if embers are plentiful and/or long range (>0.5 mile), resistance to control can be very high. Crown fire and spotting activity is typically minimal in these fuel types and therefore not a significant concern for fire managers unless fire occurs under extreme weather conditions. In areas where homes are situated close to timber fuels and/or denser shrubs and trees, potential spotting from woody fuels to adjacent fuels should always be acknowledged.

Treating fuels in the WUI can lessen the risk of intense or extreme fire behavior. Studies and observations of fires burning in areas where fuel treatments have occurred have shown that the fire either remains on or drops to the surface, thus avoiding destructive crown fire. Also, treating fuels decreases spotting potential and increases the ability to detect and suppress any spot fires that do occur. Fuel mitigation efforts therefore should be focused specifically where these critical conditions could develop in or near communities at risk.

FIRE BEHAVIOR MODEL COMPONENTS

For this plan, an assessment of fire behavior has been carried out using well-established fire behavior models: FARSITE, FlamMap, BehavePlus, and FireFamily Plus housed within the Interagency Fuel Treatment Decision Support System (IFTDSS), as well as ArcGIS Desktop Spatial Analyst tools. Data used in the Composite Risk/Hazard Assessment is largely obtained from LANDFIRE.

LANDFIRE

LANDFIRE is a national remote sensing project that provides land managers a data source for all inputs needed for FARSITE, FlamMap, and other fire behavior models. The database is managed by the USFS and the USDI and is widely used throughout the United States for land management planning. More information can be obtained from http://www.landfire.gov.

FARSITE

FARSITE is a computer model based on Rothermel's spread equations (Rothermel 1983); the model also incorporates crown fire models. FARSITE uses spatial data on fuels, canopy cover, crown bulk density, canopy base height, canopy height, aspect, slope, elevation, wind, and weather to model fire behavior across a landscape. In essence, FARSITE is a spatial and temporal fire behavior model. FARSITE is used to generate fuel moisture and landscape files as inputs for FlamMap. Information on fire behavior models can be obtained from http://www.fire.org.

FlamMap

Like FARSITE, FlamMap uses a spatial component for its inputs but only provides fire behavior predictions for a single set of weather inputs. In essence, FlamMap gives fire behavior predictions across a landscape for a snapshot of time; however, FlamMap does not predict fire spread across the landscape. FlamMap has been used for the HCCWPP to predict fire behavior across the landscape under extreme (worst case) weather scenarios.

BehavePlus

Also using Rothermel's (1983) equations, BehavePlus is a multifaceted fire behavior model and has been used to determine fuel moisture in this process.

FIRE BEHAVIOR MODEL INPUTS

Fuels

The fuels in the planning area are classified using Scott and Burgan's (2005) Standard Fire Behavior Fuel Model classification system. This classification system is based on the Rothermel surface fire spread equations, and each vegetation and litter type is broken down into 40 fuel models.

The general classification of fuels is by fire-carrying fuel type (Scott and Burgan 2005):

(NB) Non-burnable
(GR) Grass
(GS) Grass-Shrub
(SH) Shrub
(TU) Timber-Understory
(TL) Timber Litter
(SB) Slash-Blowdown

Table 1 provides a description of each fuel type.

Table 1. Fuel Model Classification for HCCWPP Planning Area

1.	**Nearly pure grass and/or forb type (Grass)**
i.	**GR1:** Grass is short, patchy, and possibly heavily grazed. Spread rate is moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load 0.40 (ton/acre).
ii.	**GR2:** Moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load 1.10 (tons/acre).
iii.	**GR5:** Dense coarse grass, average depth 1–2 feet. Spread rate very high (50–150 chains/hour); flame length moderate (4–8 feet).
iv.	**GR6:** Dryland grass, average depth 1–2 feet. Spread rate very high (50–150 chains/hour); flame length very high (12–25 feet).
2.	**Mixture of grass and shrub, up to about 50% shrub cover (Grass-Shrub)**
i.	**GS1:** Shrubs are about 1 foot high, low grass load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load 1.35 (tons/acre).
ii.	**GS2:** Shrubs are 1–3 feet high, moderate grass load. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load 2.1 (tons/acre).
3.	**Shrubs cover at least 50% of the site; grass sparse to non-existent (Shrub)**
i.	**SH2:** Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuels present. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load 5.2 (tons/acre).
ii.	**SH3:** Moderate shrub load, possibly with pine overstory or herbaceous fuel. Fuel bed depth 2–3 feet. Spread rate low (2–5 chains/hour), flame length low (1–4 feet).
iii.	**SH7:** Very heavy shrub load, possibly with pine overstory. Fuel bed depth 4-6 feet. Spread rate high (20–50 chains/hour); flame length very high (12–25 feet).
4.	**Grass or shrubs mixed with litter from forest canopy (Timber-Understory)**
i.	**TU1:** Fuelbed is low load of grass and/or shrub with litter. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load 1.3 (tons/acre).

5.	**Dead and downed woody fuel (litter) beneath a forest canopy (Timber Litter)**
i.	**TL2:** Low load, compact. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
ii.	**TL3:** Moderate load. Spread rate very slow (0–2 chains/hour); flame length low (1–4 foot); fine fuel load 0.5 (ton/acre).
iii.	**TL8:** Long needle litter; long needle fuel. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
iv.	**TL6:** Moderate load, less compact. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
6.	**Insufficient wildland fuel to carry wildland fire under any condition (Nonburnable)**
i.	**NB1:** Urban or suburban development; insufficient wildland fuel to carry wildland fire.
ii.	**NB3:** Agricultural field, maintained in nonburnable condition.
iii.	**NB8:** Open water.

Notes: Based on Scott and Burgan's (2005) 40 Fuel Model System.

Map 1 in Appendix A illustrates the fuels classification throughout the planning area, Table 2 shows the acreage within each fuel class for Hardin County (classes with less than 10 acres were removed). The original LANDFIRE fuel data set for the planning area accurately represented most fuels found within the county. Grass fuel model GR3 is known to underestimate fire behavior in this region so a correction was applied to reclassify these areas to a GR6 fuel model.

Table 2. Fuel Model Breakdown in Order of Acres

FBFM40	Acres
GR1	13,183.37
GR2	9,444.76
GR3	2,767.08
GR5	104.76
GR6	12.90
GS1	4,591.69
GS2	100.09
NB1	3,810.54
NB3	6,971.35
NB8	2,658.41
NB9	634.49
SH1	12.90
SH2	1,852.24
SH3	8.23
SH7	1,454.46
TL1	13.34
TL2	1,7322.06

FBFM40	Acres
TL3	116.99
TL5	40.70
TL6	5,1036.38
TL9	3.56
TU1	41.73

Hardwood Forest

Oak-Hickory Forest – Fuel Model TL6

Oak-hickory is classified as a TL6 fuel model with moderate rates of spread and low flame lengths (1–4 feet). This fuel type is dominant in the county, making up 45% of the land cover. Compared with beech-maple litter, the litter load for oak-hickory tends to be less compact due to the slow decomposition of the leaf litter and curling of the leaves during curing. This creates a porous structure that is more conducive to combustion and thereby increases fire spread. Drought and windy conditions that commonly occur during the fall season increase the spread rates in this fuel type.

Beech-Maple Forest – Fuel Model TL2

Beech-maple dominated forest is classified as a TL2 fuel model and makes up 15% of the land cover. This fuel type exhibits slow burning ground fires, with slow rates of spread and lower flame lengths than the TL6 model unless heavy pockets of fuel are encountered. Beech-maple stands are less combustible than oak-hickory, and therefore these fuels generally pose low fire risk to communities, except under extreme drought and high wind conditions. Unlike the oak-hickory type, beech-maple forests are not adapted to fire and reduce potential fire behavior through shedding a more easily decomposed leaf litter that forms a compact and less combustible fuel load that impedes fire spread.

Pine Plantations

Pine plantations comprise shortleaf pine and white pine (*Pinus strobus*), which are both modelled as a TL3, and loblolly, which is modelled as a TL8. For the first year or two after a burn, all stands are considered TL1, depending on the consumption and coverage. Loblolly re-accumulates fuel the fastest, followed by shortleaf pine, then white pine.

Blow Down and Ice Storm Damaged Stands

Isolated pockets of heavier fuel accumulation may be found associated with storm damage and blow down. These areas are modeled as a logging slash/blow down model, which accounts for heavy accumulation of downed timber either as a result of logging or natural disturbance. This fuel model type is not picked up in the fuel model classification used in this project, which is possibly due to remote sensing shortfalls or the resolution of the data (30-meter resolution); however, the occurrence of these pockets of mortality is an important component of land management because fire behavior in these fuels is typically elevated relative to standing fuels. Fire behavior in these heavy fuel load areas exhibits low rate of spread and low flame lengths.

Grassland Fuels

Short Grass Fuels – GR1 and GR2

Grassland fuels GR1 and GR2 comprise 11% and 8% of the land cover in the county, respectively. Spread rates in these fuel types are generally slow with low flame lengths; these would be most typical of grazed areas with low fuel bed depth.

Tall Grass Fuels – GR5 and GR6

GR6 and GR5 fuels make up less than 0.1% of the land cover but are dotted throughout the county. The GR6 and GR5 fuels represent the taller grasses with greater rates of spread and flame length. These taller grasses are the warm season grasses that typify CRP land, which are of concern to fire managers because of the restrictions placed on the landowner regarding mowing. These tall grasses carry fire at high rates of spread when left unmanaged.

Shrub Fuels

Shrub – Moderate Fuel Load – SH2

Approximately 1.6% of the land cover is classified as moderate fuel load shrub with low spread rate and flame length. Typical vegetation classified in this way include autumn olive, which has low combustibility and is also difficult to build firelines through, as well as smaller stands of sumac (*Rhus* sp.) and dogwood (*Cornus* sp.).

Shrub – Very Heavy Fuel Load – SH7

Approximately 1% of the land cover is classified as very heavy fuel load shrub, with a high spread rate and flame length. Typical vegetation classified in this way include red cedar, which can be prone to torching.

Topography

Topography is important in determining fire behavior. Steepness of slope, aspect (direction the slope faces), elevation, and landscape features can all affect fuels, local weather (by channeling winds and affecting local temperatures), and rate of spread of wildfire. Slopes in Hardin County are generally even to gently rolling.

Weather

Of the three fire behavior components, weather is the most likely to fluctuate. Accurately predicting fire weather remains a challenge for forecasters, particularly during the fall and spring when the area is in transition between summer and winter patterns and there are frequent frontal boundaries crossing the area. As winds and rising temperatures dry fuels in late January–early February, conditions can deteriorate rapidly, creating an environment that is susceptible to wildland fire. Fine fuels (grass and leaf litter) can cure rapidly, making them highly flammable in as little as 1 hour following light precipitation. Low live fuel moistures of shrubs and trees can significantly contribute to fire behavior in the form of crowning and torching. With a high wind, grass fires can spread rapidly, engulfing communities, often with limited warning for evacuation. The creation of defensible space is of vital importance in protecting communities from this type of fire. For instance, a carefully constructed fuel break placed in an appropriate location could protect homes or possibly an entire community from fire. This type of defensible space can also provide safer conditions for firefighters, improving their ability to suppress fire and protect life and property.

One of the critical inputs for FlamMap is fuel moisture files. For this purpose weather data have been obtained from FAMWEB (NWCG 2012), a fire weather database maintained by the NWCG. A remote automated weather station was selected (Dixon Springs 119501) and data were downloaded from the website.

Using an additional fire program (FireFamily Plus) with the remote automated weather station data, weather files that included prevailing wind direction and 20-foot wind speed were created. Fuel moisture files were then developed for downed (1-hour, 10-hour, and 100-hour) and live herbaceous and live woody fuels. These files represent weather inputs in FlamMap; 95 to 100 percentile weather is used to predict the most extreme scenarios for fire behavior.

FIRE BEHAVIOR MODEL OUTPUTS

The following is a discussion of the fire behavior outputs from FlamMap.

Flame Length

Map 2 in Appendix A illustrates the flame length classifications for the planning area. Flame lengths are determined by fuels, weather, and topography. Flame length is a particularly important component of the risk assessment because it relates to potential crown fire (particularly important in timber areas) and suppression tactics. Direct attack by hand lines is usually limited to flame lengths less than 4 feet. In excess of 4 feet, indirect suppression is the dominant tactic. Suppression using engines and heavy equipment will move from direct to indirect with flame lengths in excess of 8 feet.

Flame lengths across the planning area primarily fall into the less than 4-foot flame length category. The highest flame lengths (greater than 11 feet) are associated with the tall grass (GR6) and heavy shrub (SH7) fuels, which make up only a small portion of the planning area.

Fireline Intensity

Map 3 in Appendix A illustrates the predicted fireline intensity throughout the planning area. Fireline intensity describes the rate of energy released by the flaming front and is measured in British thermal units per foot, per second (Btu/ft/sec). This is a good measure of intensity and is used for planning suppression activities. The expected fireline intensity throughout the planning area is similar in pattern to predicted flame length, as fireline intensity is a function of flame length. The pattern for fireline intensity is similar to flame length in that intensities are primarily low (less than 100 Btu/ft/sec) or moderate (100–500 Btu/ft/sec) with very small areas of extreme intensity (greater than 1,000 Btu/ft/sec), which tend to be associated with areas dominated by tall grass and heavy shrub loads.

Rate of Spread

Map 4 in Appendix A illustrates the rate of spread classifications for the planning area. The rates of spread are a little more diverse than flame length and fireline intensity with rates in the low, moderate, and high category, and some small patches in the extreme category. Low rates of spread are associated with the beech-maple dominated areas (TL2) while the oak-hickory dominated areas, modeled as TL6 exhibit moderate spread rates. Low spread rates are also associated with short grass areas and moderate load shrub areas. The highest rates of spread are associated with tall grass areas. Agricultural areas are clearly delineated in this model by their low rate of spread; however, these fuel types can also pose a severe hazard during certain times of the year (prior to harvest or following harvest when residual materials remain) and are often areas of ignition through human activity such as agricultural burning practices.

Crown Fire Potential

Map 5 in Appendix A illustrates the lack of passive or active crown fire in Hardin County, with most fuels predicted to burn through surface fire only.

Fire Occurrence/Density of Starts

Map 6 in Appendix A illustrates the fire occurrence density for the planning area. Fire occurrence density has been determined by performing a density analysis on fire start locations with ArcGIS Desktop Spatial Analyst. These locations have been provided by the USFS, the IDNR, and the fire departments in Hardin County, and when combined the points show the location of fire starts within the planning area from 1979 to 2018. The density analysis has been performed as a kernel density, using a 2,500-meter search radius. The density of previous fire starts is used to determine the risk of ignition of a fire. Map 6 in Appendix A reveals a cluster pattern of fires located close to recreation areas and USFS land. Some fire occurrence clusters at intersections and along highways. High fire density is observed at the Tower Rock Camp and Picnic Area on the southern boundary of the county between Elizabethtown and Cave-In-Rock; on USFS land close to Lake Tacumseh and Whoopie-Cat Lake; on USFS land west of Rock Creek; and on USFS land north of Karbers Ridge.

The fire occurrence maps are used to provide information on areas where human-ignited fires are prevalent and hence could be more prone to fire in the future.

COMPOSITE RISK/HAZARD ASSESSMENT

All data used in the risk assessment have been processed using ESRI ArcGIS Desktop and the ESRI Spatial Analyst Extension. Information on these programs can be found at http://www.esri.com. Data have been gathered from all relevant agencies, and the most current data have been used.

All fire parameter datasets have been converted to a raster format (a common GIS data format comprising a grid of cells or pixels, with each pixel containing a single value). The cell size for the data is 30 × 30 meters (98 × 98 feet). Each of the original cell values have been reclassified with a new value between 1 and 4, based on the significance of the data (1 = lowest, 4 = highest). Prior to running the models on the reclassified datasets, each of the input parameters have been weighted; that is, they are assigned a percentage value reflecting that parameter's importance in the model. The parameters were then placed into a Weighted Sum Model, which "stacks" each geographically aligned dataset and evaluates an output value derived from each cell value of the overlaid dataset in combination with the weighted assessment. In a Weighted Sum Model, the weighted values of each pixel from each parameter dataset are added together so that the resulting dataset contains pixels with summed values of all the parameters. This method ensures that the model resolution is maintained in the results and thus provides finer detail and range of values for denoting fire risk. Figure 4.1 illustrates the individual datasets and the relative weights assigned within the modeling framework.

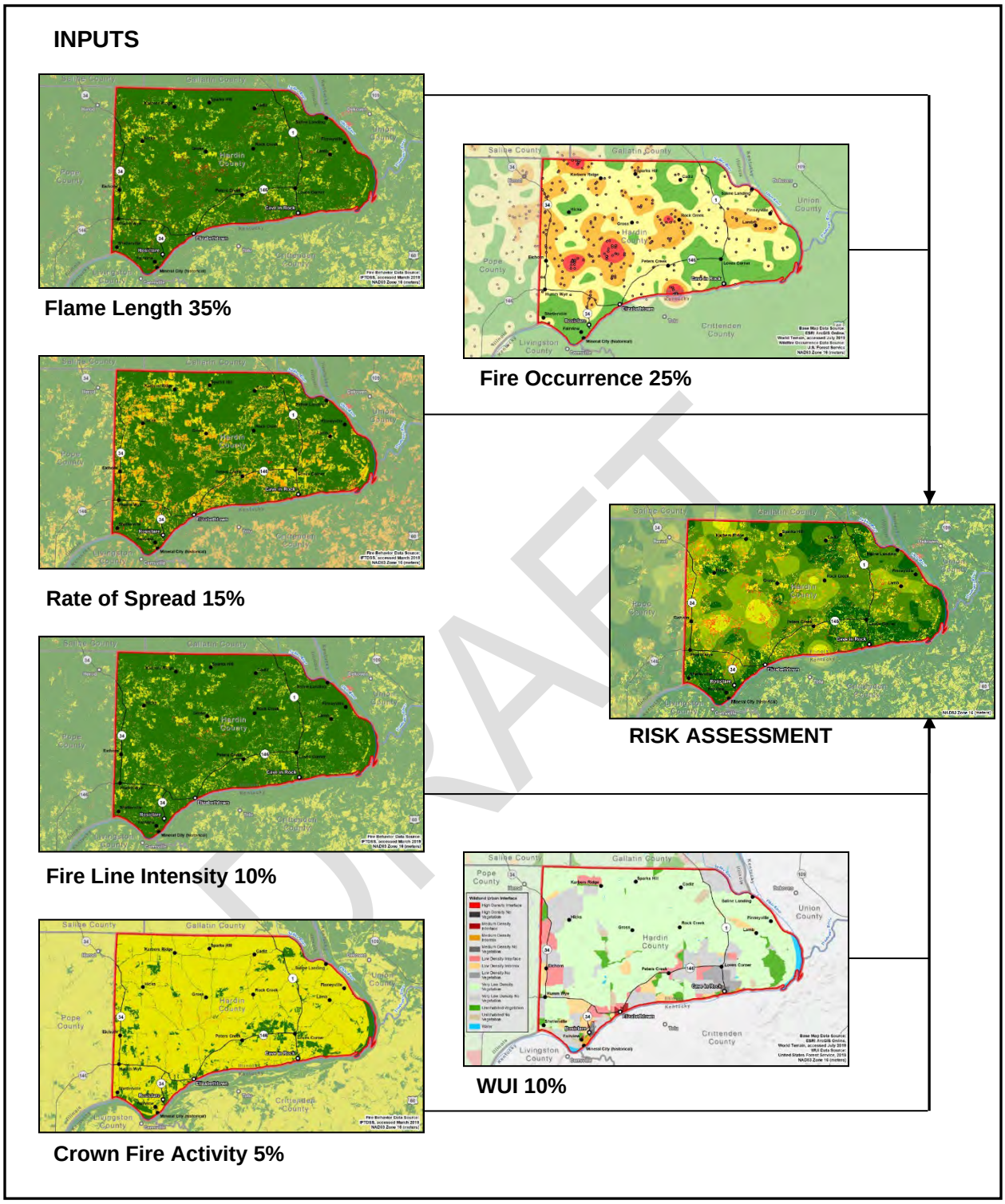


Figure 4.1. Composite risk/hazard overlay process.

Figure 4.2 is the risk assessment for the planning area; it combines all the fire behavior parameters described above. The risk assessment classifies the planning area into low, moderate, high, and extreme risk categories.

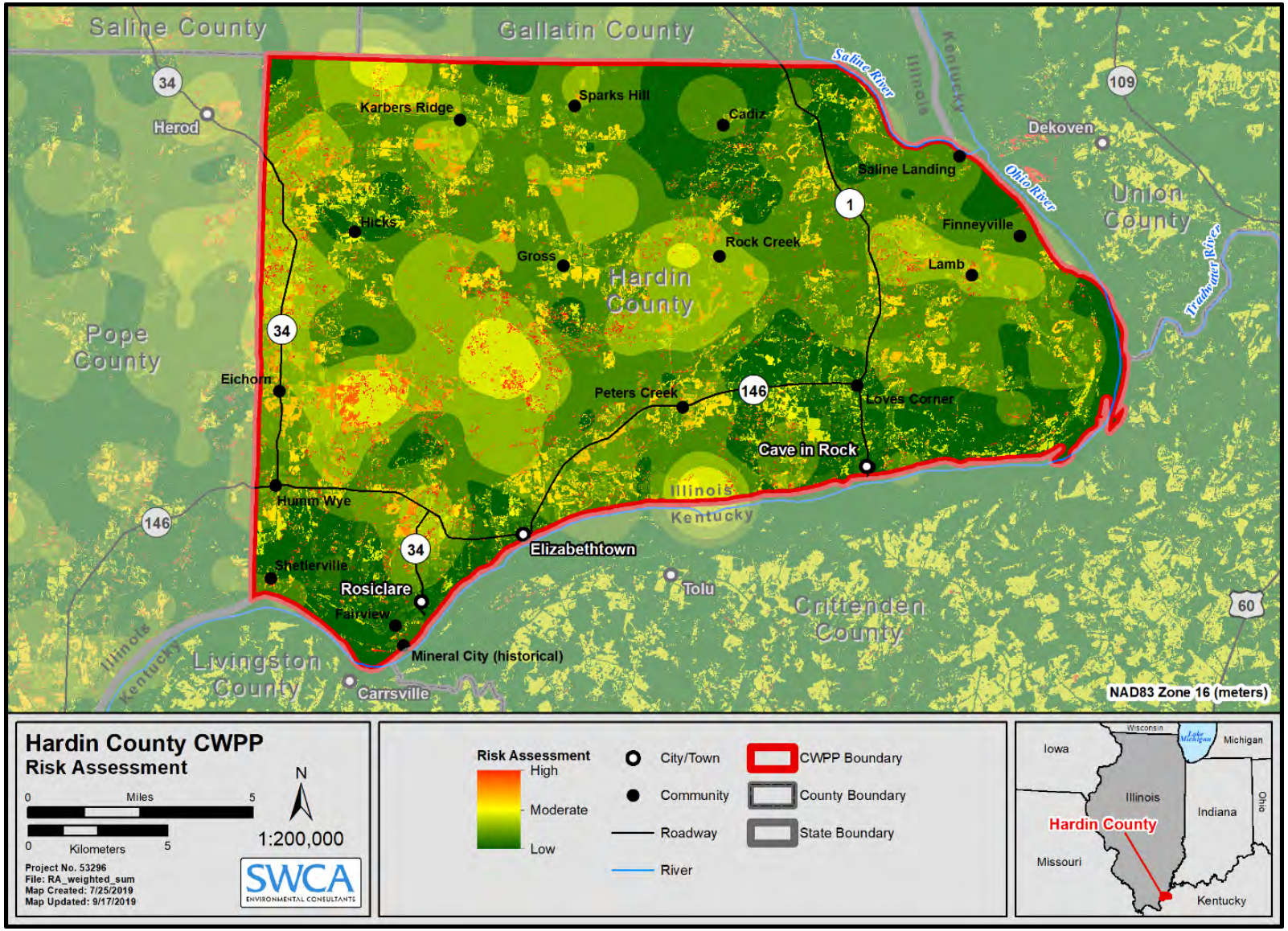


Figure 4.2. Composite risk/hazard assessment overlay.

COMMUNITY HAZARD ASSESSMENTS

As part of the planning process, the Core Team identified several areas within Hardin County that are considered at the greatest risk from wildfire. In order to properly assess the hazards in and around these communities, a field day was implemented to carry out community assessments.

The assessment was conducted in May 2019 with assistance from USFS staff. The community assessment was carried out using the NFPA Wildland Fire Risk and Hazard Severity Form 1144 (Appendix F). This form is based on the NFPA Standard for Reducing Structure Ignition Hazards from Wildland Fire 2013 Edition, which was in turn developed by the Technical Committee on Forest and Rural Fire Protection and originally issued by the Standards Council on June 4, 2007. The NFPA standard focuses on individual structure hazards and requires a spatial approach to assessing and mitigating wildfire hazards around existing structures. It also includes ignition-resistant requirements for new construction and is used by planners and developers in areas that are threatened by wildfire and is commonly applied in the development of Firewise Communities (for more information, see www.firewise.org).

Each area was rated based on conditions within the community and immediately surrounding structures, including access, adjacent vegetation (fuels), defensible space, adjacent topography, roof and building characteristics, available fire protection, and placement of utilities. Where a range of conditions was less easily parsed out, a range of values was assigned on a single assessment form. Each score was given a corresponding adjective rating of low, moderate, high, or extreme. An example of the assessment form used in this plan is in Appendix F. The purpose of the community WUI assessment and subsequent hazard ratings is to identify fire hazard and risks and prioritize areas requiring mitigation and more detailed planning. These assessments should not be seen as tactical pre-suppression or triage plans. The community assessment helps to drive the recommendations for mitigation of structural ignitability, community preparedness, and public education. The assessment also helps to prioritize areas for fuels treatment based on the hazard rating.

The hazard ratings from the community assessment and the GIS hazard/risk assessment are provided in Table 4.1. This table also includes a summary of the positive and negative attributes of a community as they relate to wildfire risk.

Table 4.1. Community Assessment Summary

Community	NFPA 1144 Risk Rating	GIS Risk Rating	Positive	Negative
Rosiclare	57 Moderate	Low	• Access: easily accessed via Highway 1 and Highway 146. • Structural characteristics: urban, maintained buildings, roofs, and yards. • Water: hydrants. • Fire response: fast; station in the community.	• Fuels: forested land close to margins, but with agricultural land interspersed. • Structural characteristics: combustible siding and decking. • CVARs: historic properties, commercial buildings, Hardin County General Hospital. • Aboveground utilities.
Elizabethtown	53 Moderate	Low	• Fuels: compact community with agricultural interface. • Access: easily accessed via Highway 146. • Fire response: fast; station in the community. • Water: hydrants. • Structural characteristics: urban, maintained buildings, roofs, and yards.	• CVARs: Historic properties, commercial buildings. • Structural characteristics: combustible siding and decking. • Aboveground utilities.
Cave-In-Rock	54 Moderate	Low	• Access: easily accessed via Illinois Route 1. • Fire response: fast; station in the community. • Water: hydrants. • Structural characteristics: urban, maintained buildings, roofs, and yards.	• Fuels: forested land close to margins but with agricultural land interspersed. • Structural characteristics: combustible siding and decking. • CVARs: historic properties, commercial buildings, Cave-In-Rock State Park. • Aboveground utilities.
Eichorn	66 Moderate	Moderate–High	• Access: easily accessed via Highway 34. • Fuels: some forest patches, interspersed with agricultural land. large residential lots with grass. • Water: ponds for potential drafting. • Structural characteristics: maintained buildings, roofs, and yards.	• Fire response: served by the Rosiclare Fire Department; response time approx. 11 min* (7.8 miles). • Water- transport by fire department only. • CVAR: Henderson Airport. • Some homes located in forest patches. • High fire occurrence. • Structural characteristics: combustible siding and decking.

Community	NFPA 1144 Risk Rating	GIS Risk Rating	Positive	Negative
Hicks	74 High	Moderate	• Access: accessed via 1000 N and 945 N. • Fuels: homes typically surrounded by grass and agricultural land. • Structural characteristics: maintained buildings, roofs, and yards. • Low fire occurrence.	• Access: ingress and egress from the community would require transport through forested areas. • Fuels: community surrounded by forest land, with agricultural land in the interface. • Water: transport by fire department only. • Fire Response: served by the Rosiclare Fire Department; response time approx. 22 min* (14 miles). • Structural characteristics: combustible siding and decking.
Karbers Ridge	74 High	Moderate–High	• Access: accessed via Highway 9 and Highway 10. • Fuels: blocky forest and agricultural lots, limited fuel continuity. • Low population density distributed along highway with good separation. • Structural characteristics: maintained buildings, roofs, and yards.	• Water: Some hydrants. Transport by fire department probably necessary. • Fire Response: served by the Rosiclare Fire Department; response time approx. 22 min* (18 miles). • Topographic concerns. • High fire occurrence. • Structural characteristics: combustible siding and decking.
Shelterville	69 Moderate	Moderate–High	• CVAR: few to no permanent residential structures. • Water: adjacent to Ohio River. • Structural characteristics: minimal number of residential properties, community dominated by shrine site, with good maintenance and defensible space.	• Fuels: Located within forested section • Minimal defensible space • Poor ingress-egress • CVAR: Only access route for Job Corp location and San Damiano Shrine (located in adjacent Pope County). • Fire Response: served by the Rosiclare Fire Department; response time approx.11 min* (7.8 miles). • Structural characteristics: combustible siding and decking.

Community	NFPA 1144 Risk Rating	GIS Risk Rating	Positive	Negative
Gross	63 Moderate	Moderate–High	• Access: accessed via 475E • CVAR: sparsely populated • Fuels: agricultural lands in immediate interface. • Good defensible space. • Structural characteristics: maintained buildings roofs and yards. Good separation between structures. • Water: ponds for drafting.	• Fuels: beyond WUI are larger swaths of forested land. • Fire Response: served by the Elizabethtown Fire Department; response time approx. 12 min* (7.0 miles). • Water: no hydrants, if drafting not available, water transport will be needed. • Structural characteristics: combustible siding and decking.
Cadiz	79 High	Moderate	• Access: accessed via Route 1 and 1000 E. • Defensible space: variable, some homes surrounded by grass yards. • Structural characteristics: maintained buildings roofs and yards. Good separation between structures. • Water: ponds for drafting.	• Fuels: Large continuous swaths of forested lands make up WUI. • CVAR: transmission line ROW through forested lands- potential ignition source. • Defensible space: some homes situated within forested setting with limited defensible space. • Water: no hydrants, if drafting not available, water transport will be needed. • Fire Response: served by Elizabethtown Fire Department; response time approx. 21 min* (18 miles). • Structural characteristics: combustible siding and decking.
Sparks Hill	84 High	Moderate–High	• Access: accessed via Highway 9 and 690 E. • CVAR: sparsely populated • Structural characteristics: good separation between structures.	• Fuels: Large continuous swaths of forested land, interspersed by agricultural land. • Defensible space: some poor clearance around homes in forested settings. • Water: no hydrants, if drafting not available, water transport will be needed. • Fire Response: served by Elizabethtown Fire Department; response time approx. 22 min* (13 miles). • High fire occurrence density. • Structural characteristics: combustible siding and decking.

Community	NFPA 1144 Risk Rating	GIS Risk Rating	Positive	Negative
Peters Creek	63 Moderate	Moderate–High	• Access: accessed via Highway 146 and several other county roads. • Fuels: Forested patches are interspersed with agricultural land. • CVAR: sparsely populated • Structural characteristics: maintained buildings roofs and yards. Good separation between structures. • Water: ponds for drafting. • Fire Response: fast, served by Cave-In-Rock Fire Department; response time approx. 8 min* (5.9 miles).	• Fuels: Forested swaths north and south of community. • Water: no hydrants, if drafting not available, water transport will be needed. • Structural characteristics: combustible siding and decking.
Rock Creek	79 High	Moderate–High	• Access: accessed via 965 E and 845 N. • Defensible space: variable, some homes surrounded by grass yards. • Structural characteristics: maintained buildings roofs and yards. Good separation between structures. • Water: ponds for drafting.	• Fuels: Large continuous swaths of forested land make up WUI. • CVAR: transmission line right-of-way through forested lands; potential ignition source. • Defensible space: some homes situated within forested setting with limited defensible space. • Water: no hydrants, if drafting not available, water transport will be needed. • Fire Response: served by Cave-In-Rock Fire Department; response time approx. 13 min* (7.6 miles). • High fire occurrence density. • Structural characteristics: combustible siding and decking.

Community	NFPA 1144 Risk Rating	GIS Risk Rating	Positive	Negative
Finneyville	74 High	Low–Moderate	• CVAR: year-round population density low. • Adjacent to Ohio River for drafting. • Structural characteristics: good separation between structures. • Water: ponds and river for drafting.	• CVAR: Hog Rock Ranch and Campground; potential ingress and egress issues during high visitor use and concerts. • Fuels: heavy forested land west of Hog Rock area. • Ingress–egress: one way in and out. • Water: no hydrants, if drafting not available, water transport will be needed. • Fire Response: served by Cave-In-Rock Fire Department; response time approx. 20 min* (8.1 miles). • Structural characteristics: combustible siding and decking.
Lamb	74 High	Moderate–High	• Access: accessed via 1550 E, 840 N, and 820 N. • Water: ponds for drafting.	• Fuels: Large swaths of forested land make up WUI, with some interspersed agricultural land. • Fire Response: served by Cave-In-Rock Fire Department; response time approx. 12 min* (6.3 miles). • Water: no hydrants, if drafting not available, water transport will be needed. • Structural characteristics: combustible siding, some close proximity of structures. Limited defensible space.
Loves Corner	59 Moderate	Low–Moderate	• Access: easily accessed via Illinois Route 1 and 146. • Fuels: agricultural land interspersed with small forest patches. • Fire Response: fast; served by Cave-In-Rock Fire Department, response time approx. 4 min* (2.0 miles). • Water: hydrants. • Structural characteristics: urban, maintained buildings roofs and yards.	• Structural characteristics: combustible siding and decking. • CVARs: golf course, quarry.

* Response time based on distance from fire department by road. Each fire department is staffed by volunteers, so response times may vary.

COMMUNITIES AT RISK DESCRIPTIONS

ROSICLARE

Rosiclare is the only city in the county and has a total area of 2.121 square miles. It is bordered to the southeast by the Ohio River, which forms the state boundary with Kentucky (Figure 4.3). Rosiclare grew in the early 1800s to be a center for the mining of fluorspar, a mineral used for lapidary and optics (Cronk 1930). In recent years, the population has been declining, with a 2018 population estimate of 1,040 people living within 467 housing units (U.S. Census Bureau 2019a), down from a population of 1,213 in 2000 (U.S. Census Bureau 2019a). Population density for the community is 490 people per square mile. Illinois Route 34 terminates in Rosiclare at the river and leads north 30 miles (48 km) to Harrisburg.

Figure 4.3. Rosiclare and vicinity, showing location relative to Elizabethtown and the Ohio River. Source: Google Earth.

Fuels: Rosiclare has a larger population than the other communities in the county, but the population is centered densely within the city. Forested land is found close to the margins of the city and in some places is in direct contact with residential areas; some agricultural land is located further to the east and west, breaking up the fuel continuity (see Figure 4.3). The Ohio River borders the community to the south. Cultivated crops and hay/pasture make up much of the agricultural fuel type, while deciduous forest with small veins of evergreen comprise the forest land. Most lots within the city are small and manicured, but some homes have trees located close to the property.

Access: The community is easily accessed via paved highway (Highway 1- Main Street and Highway 146). Fairview Road exits the city to the west and connects with Highway 146 east of Humm Wye. A number of homes are scattered along this road. Some have long and narrow driveways, with some overhanging vegetation that may impede ingress/egress.

Fire Response: The community is served by the Rosiclare Fire Department (Figure 4.4), located in the center of the city on Pell Street and 5th. The department is entirely staffed by volunteers but has good access to the community.

Figure 4.4. Location of the Rosiclare Fire Department in the center of Rosiclare. Source: Google Earth.

Water Supply: Hydrants are located throughout the community.

Structural Characteristics: Much of the community is relatively urban. Homes on the edge of the community are at the greatest risk from wildfire, especially those that back to the forested areas north and west of Pine Street, Elm Street, and Ferry Road (Figure 4.5). Construction types vary throughout the community; many homes have wooden siding, decks and fencing, but many have metal or composite roofs. Compared to the rest of the county, lot sizes in the town are smaller, reducing structure separation.

CVARs: Rosiclare is a historic town with many older homes and structures, as well as the center of most commercial/industrial commerce in the county. The Hardin County General Hospital is located in the city and is also surrounded on three sides by forest (Figure 4.5). The hospital does have defensible space and is situated close to the Rosiclare Fire Department.

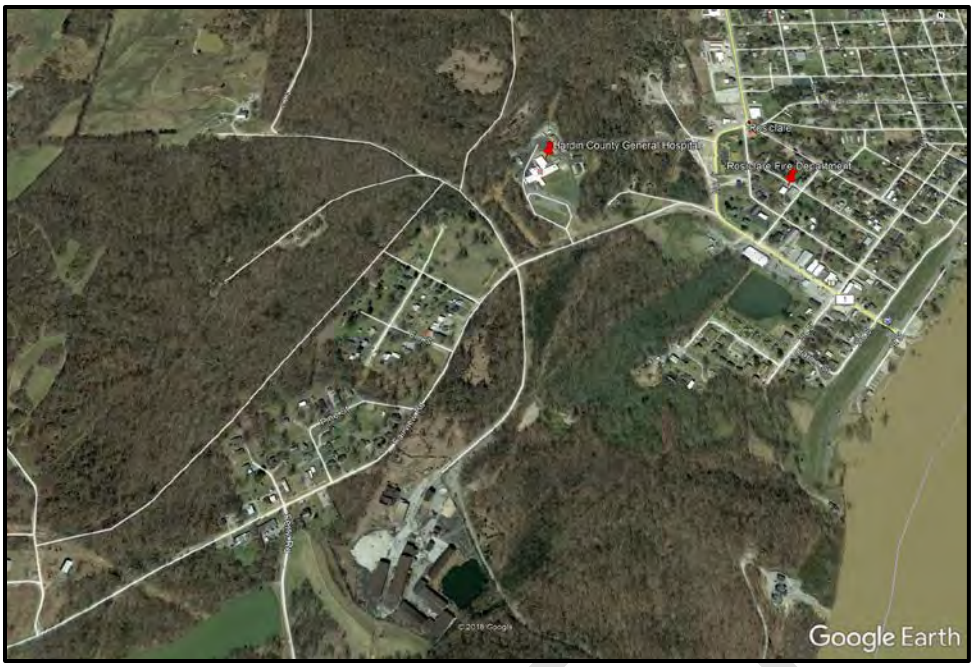


Figure 4.5. Image showing the interface between homes in Rosiclare and adjacent forest land. Note the forest stringers that come into direct contact with homes. Also pictured is the Hardin County General Hospital surrounded by forest land. Source: Google Earth.

ELIZABETHTOWN

Elizabethtown is the county seat and is located in southern Hardin County along the Ohio River. The 2018 population estimate for Elizabethtown is 281 people living within 183 housing units (U.S. Census Bureau 2019b); the population has declined since 2000 when it was 348 people. Illinois Route 146 passes through the village, leading southwest (downriver) 15 miles (24 km) to Golconda and east 9 miles (14 km) to Illinois Route 1 north of Cave-In-Rock. Elizabethtown has a total area of 0.715 square mile, resulting in a population density of 393 people per square mile. The town is home to the Rose Hotel (Figure 4.6), built in 1812, which was the oldest continuously run hotel in the state until it closed in 1960. It is now a state historic site and operated as a bed and breakfast (Farrar 1971).

Fuels: Elizabethtown is a relatively compact community that is surrounded by some developed land at the interface with a mixture of agricultural and forest land to the north, east, and west. It is bounded on the south by the Ohio River (Figure 4.7). Cultivated crops and hay/pasture make up much of the agricultural fuel type, while deciduous forest with small veins of evergreen comprise the forest land. Most homes have sparsely vegetated lawns, but some homes have trees located close to the property.

Figure 4.6 The Rose Hotel, a state historic site, listed on the U.S. National Register of Historic Places.

Figure 4.7. Elizabethtown's location along the Ohio River, showing the surrounding rural areas and the Elizabethtown Fire Department. Source: Google Earth.

Access: The community is easily accessed via paved highway (Highway 146). Several other smaller roads exit the community to the north (Locust Street, Watson Lane, and 3 Miles Creek), providing access to a scattering of homes on larger lots; these roads dead-end into forested areas (or transition to unsurfaced forest roads) to the north.

Fire Response: The community is served by the Elizabethtown Fire Department, located in the northeast corner of the town on Watson Street and Highway 146. The department is entirely staffed by volunteers but has good access to the community.

Water Supply: Hydrants are located throughout the community.

Structural Characteristics: Much of the community is relatively urban. Homes on the edge of the community are at the greatest risk from wildfire; however the agricultural patch work of surrounding vegetation means that fuel continuity is low. Agricultural land during some periods of the year can still pose a risk to WUI areas, however, because of agricultural burning and cured crops or residual vegetation following harvest that could still carry fire. Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Compared with those of the rest of the county, lot sizes in the town are small, reducing structure separation.

CVARs: Elizabethtown is home to a number of historical properties, including the Rose Hotel, a state historic building. The Hardin County Courthouse is also located in the town. The Hardin County School is east of the community and served by the Elizabethtown Fire Department (Figure 4.8).

Figure 4.8. Hardin County School located east of Elizabethtown.

CAVE-IN-ROCK

Cave-in-Rock is a village located along the southern boundary of Hardin County bordered by the Ohio River. It is named for its principal feature and tourist attraction, Cave-in-Rock, an Illinois state park, which features a 55-foot-wide riverside cave (Figure 4.9). The 2018 population estimate for Cave-in-Rock was 286 people living within 163 housing units (U.S. Census Bureau 2019c). This is a decline from the 2000 Census, which recorded 318 people. The town is home to the Cave-in-Rock ferry, which transports people across the Ohio River to Crittenden County, Kentucky. The community is accessed via Illinois Route 1, which terminates there. The community has a total area of 0.422 square mile (Figure 4.10).

A number of homes are located east of Cave-in-Rock (Boyd's Addition) along the Ohio River and accessed via County Road 1435E. These homes have small lots and limited separation.

Figure 4.9. Cave-in-Rock.

Figure 4.10. Cave-in-Rock and vicinity showing the location of the fire department and adjacent Lafarge quarry. Source: Google Earth.

Fuels: Cave-in-Rock is bordered to the east and west by patchy forested land and to the north by largely agricultural plots. It is bounded on the south by the Ohio River. Cultivated crops and hay/pasture make up much of the agricultural fuel type. The forest composition is patchy, comprising both deciduous and evergreen forest. Most homes have sparsely vegetated lawns, but some homes have trees located close to the property. Homes on the east and west ends of town interface closely with forest patches; however, the fuel continuity is broken up by the clumpy nature of the patches (see Figure 4.10).

Access: The community is easily accessed via paved highway (Illinois Route 1). Several other smaller roads exit the community (Cave-in-Rock Road, Fords Ferry Road, Simpson Road), providing access to a scattering of homes on larger lots. Most of these roads connect back with Highway 146 and Route 1.

Fire Response: The community is served by the Cave-in-Rock Fire Department, located in the center of the village on Main Street. The department is entirely staffed by volunteers but has good access to the community.

Water Supply: Hydrants are located throughout the community.

Structural Characteristics: Much of the community is relatively urban. Homes on the edge of the community are at the greatest risk from wildfire; however, the patchy forests and agricultural intermix means that fuel continuity is low. Agricultural land during some periods of the year can still pose a risk to WUI areas, however, because of agricultural burning and cured crops or residual vegetation following harvest that could still carry fire. Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Similar to the other incorporated communities in the county, lot sizes in the town are small, reducing structure separation.

CVARs: Cave-in-Rock is home to the Cave-in-Rock State Park with the famous cave and other tourist facilities including picnic ground, restaurant, and cabins (Figure 4.11). There are a number of historical properties within the community. The community also has a golf course and some active fluorspar mining.

Figure 4.11. Cave-In-Rock cabin.

EICHORN

Eichorn is an unincorporated community on the west side of the county. The community is rated as moderate (66) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment (Figure 4.12).

Fuels: Eichorn is made up of scattered homes in an agricultural setting. Although some forested land surrounds the community, fuel continuity is broken up by agricultural land. Most residential lots are large and comprise manicured grass fuels. Most homes have good defensible space.

Access: The community is accessed via paved Highway 34. Most homes are situated at the ends of short driveways. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is served by the Rosiclare Fire Department, located in the center of the city on Pell Street and 5th. Based on road distance (7.8 miles), the fire response time to the community is

11 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: No hydrants are located throughout the community, but there are ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good. Individuals with homes located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area has agricultural resources and infrastructure at risk. The Henderson Airport is located southeast of the community.

Figure 4.12. Eichorn and vicinity. Source: Google Earth.

HICKS

Hicks is an unincorporated community on the west side of the county. The community is rated as high (74) under the NFPA 1144 assessment criteria and moderate based on the GIS assessment (Figure 4.13).

Fuels: Hicks is made up of scattered homes in an agricultural setting. There are more extensive and continuous forest fuels in a ring to the south, east, and west of the community. Topography in the area is variable, which may contribute to more extreme fire behavior. Lots range in size. Residents living on smaller lots should ensure that there is good separation and defensible space around structures to prevent fire spread between residences. Some homes have manicured grass fuels, but there are several properties with derelict structures, vehicles, and equipment in yards that could contribute to fuel loading.

Access: The community is accessed via 1000 N, 900 N, 225 E, and 945 N, which are primarily unsurfaced roads. In the event of a fire, ingress and egress may require travel through forested areas on unsurfaced and narrow roads (Figure 4.14). Steep grades may impede or slow response times. Right-of-way (ROW)

clearance will be important for the community. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is served by the Rosiclare Fire Department, located in the center of the city on Pell Street and 5th. Based on road distance (14 miles), the fire response time to the community is 22 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: No hydrants are located throughout the community. The fire department will need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Individuals with homes located in or close to forest interface should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area has residential and agricultural resources and infrastructure at risk.

Figure 4.13. Hicks and vicinity. Source: Google Earth.

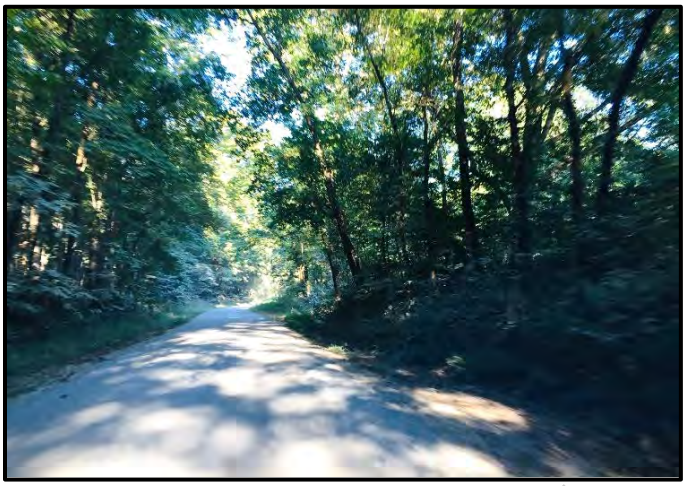


Figure 4.14. Gravel road in the Hicks area, with steep grade and forested margins.

KARBER'S RIDGE

Karber's Ridge is an unincorporated community in the northwest portion of the county (Figure 4.15). The community is rated as high (74) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Karber's Ridge is made up of homes situated along the ridge and highway in an agricultural and forested land mosaic. Fuel continuity is broken up by agricultural land. Most residential lots are large and comprise manicured grass fuels (Figure 4.16). Most homes have good defensible space. Topography in the area is varied, and steeper slopes may elevate fire behavior. The area has a history of more frequent wildfire occurrence, relative to the rest of the county.

Access: The community is accessed via paved Highway 9 and Highway 10. Most homes are situated at the ends of short driveways. Homeowners with long and steep driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles. The community of High Knob (half of which is located within adjacent Gallatin County) is located off of Karber's Ridge and accessed via Highway 2.

Fire Response: The community is served by the Rosiclare Fire Department, located in the center of the City on Pell Street and 5th. Based on road distance (18 miles), the fire response time to the community is 22 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability. Response from Rosiclare to High Knob in Gallatin County may be long due to the distance. The Core Team has discussed the need for a new station in the Karber's Ridge area that could serve the unincorporated areas in the northern portion of the county.

Water Supply: Some hydrants are located throughout the community. If water availability or distance to a hydrant limit water use, the fire department may need to transport water to the area.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good. Residents with homes located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area has residential and agricultural resources and infrastructure at risk. Numerous tourist and seasonal cabins are located within the community. There is a horse camp located at High Knob.

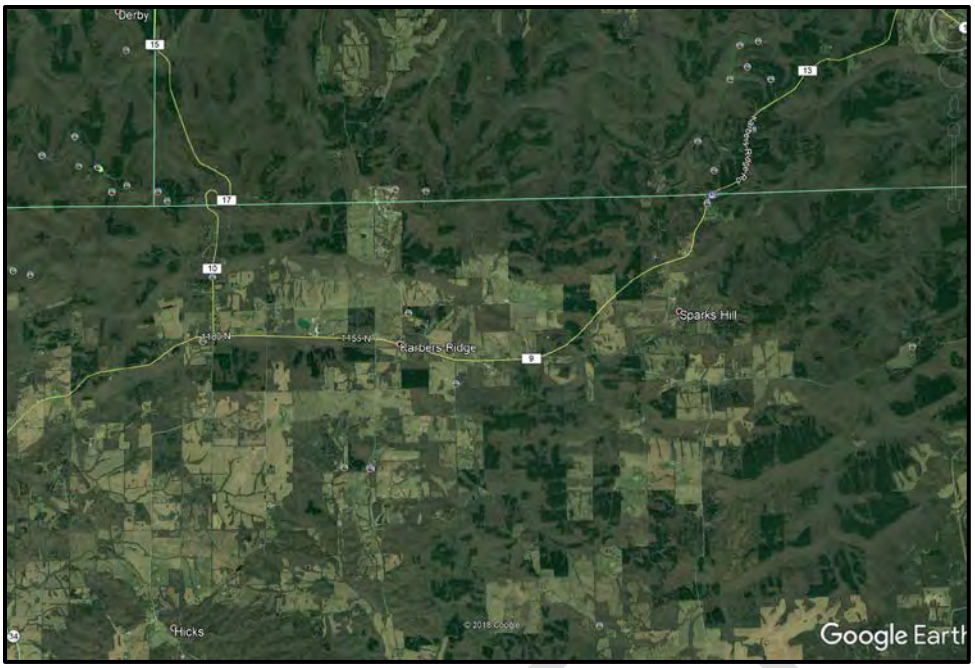


Figure 4.15. Karber's Ridge and vicinity. Source: Google Earth.

Figure 4.16. Example of the many homes and structures adjacent to forested land with well-manicured plots.

SHETLERVILLE

Shetlerville is an unincorporated community in the southwest corner of the county (Figure 4.17). The community is rated as moderate (69) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Shetlerville is surrounded by forested land in a thick and continuous arrangement.

Access: The community is accessed via paved Highway 34. There are very few homes in the community, and those that do exist are situated at the ends of short driveways.

Fire Response: The community is served by the Rosiclare Fire Department, located in the center of the City on Pell Street and 5th. Based on road distance (7.8 miles), the fire response time to the community is 11 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: Hydrants are located at the Job Corp facility and the San Damiano Retreat Center, and many of the larger buildings at Job Corp have sprinklers. Although there are no hydrants throughout the rest of the community, there are ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structures at the Job Corp facility are primarily painted wood siding, with some newer brick and metal buildings. Structure separation is good. Structures in close proximity to forest patches, including those on the Job Corp facility and San Damiano, should be protected against fire spread by implementing Firewise actions and defensible space.

CVARs: The area has agricultural resources and infrastructure at risk. The community includes the San Damiano Retreat Center, located in adjacent Pope County. The retreat center buildings have good defensible space and stucco and tile construction. To the west of the retreat center is the Job Corp site (unoccupied as of the writing of this CWPP). The Job Corp site is located in Pope County but is included in this CWPP because it is accessed via Hardin County. The site comprises several large buildings, including dormitories, gym, workshops, etc. Some of the buildings on the south side are located in close proximity to forest vegetation (Figure 4.18)

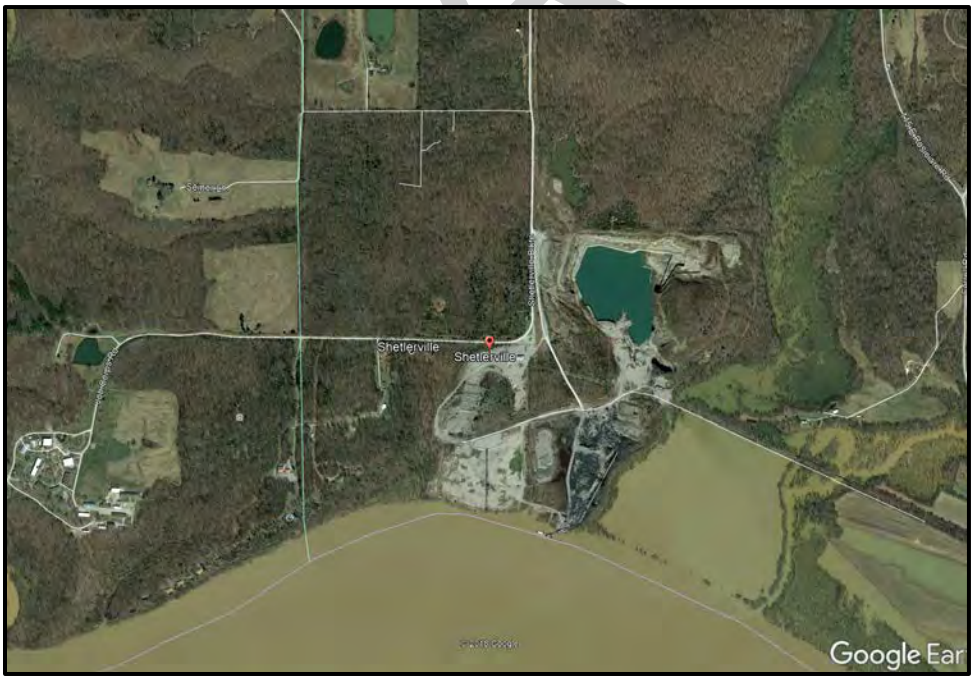


Figure 4.17. Shetlerville and vicinity, including the Job Corp facility and San Damiano Retreat Center. Source: Google Earth.

Figure 4.18. Job Corp facility (situated within Pope County but accessed via Hardin County). Source: Google Earth.

GROSS

Gross is an unincorporated community in the center of the county (Figure 4.19). The community is rated as moderate (63) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Gross is surrounded by agricultural land and smaller patches of forest.

Access: The community is accessed via paved 475 East, 700 E (gravel) (Figure 4.20) or Highway 3 (paved). Most homes are situated at the ends of short driveways. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is served by the Elizabethtown Fire Department, located in the northeast corner of the town on Watson Street and Highway 146. Based on road distance (7.0 miles), the fire response time to the community is 12 minutes. The department is staffed entirely all volunteers, so response times depend upon resource availability.

Water Supply: Hydrants are not located throughout the community, but there are ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good. Homes located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area has agricultural resources and infrastructure at risk.

Figure 4.19. Gross and vicinity. Source: Google Earth.

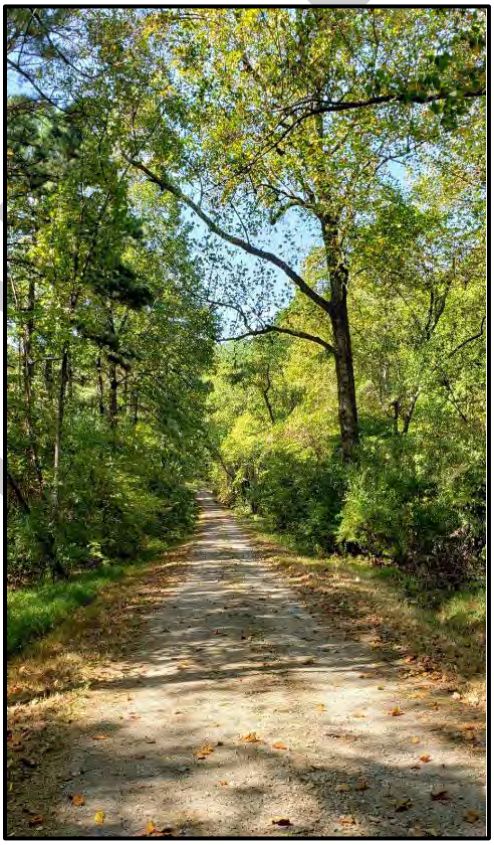


Figure 4.20. 700 E, an example of a narrow and unsurfaced (gravel)

access road to the Gross community. Photographed by Paul Conn.

CADIZ

Cadiz is an unincorporated community in the southeast portion of the county (Figure 4.21). The community is rated as high (79) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Cadiz is surrounded by some large swaths of forest fuels to the north and west, with agricultural land and smaller forest patches to the east.

Access: The community is accessed via paved Route 1, 1000 E, and 3. Many homes are situated at the ends of long driveways. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is served by the Elizabethtown Fire Department, located in the northeast corner of the town on Watson Street and Highway 146. Based on road distance (18 miles), the fire response time to the community is 21 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: Hydrants are not located throughout the community, but there are ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good. Homes located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area has agricultural resources and infrastructure at risk, including a transmission line southeast of the community. The transmission line passes through forested land, but the ROW is cleared around the line (Figure 4.22). Camp Cadiz is located on USFS land to the west of the community (Figure 4.23).

Figure 4.21. Cadiz and vicinity. Source: Google Earth.

Figure 4.22. Transmission line ROW. Source: Google Earth.

Figure 4.23. Camp Cadiz.

SPARKS HILL

Sparks Hill is an unincorporated community in the north-central portion of the county (Figure 4.24). The community is rated as high (84) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Sparks Hill is surrounded by large swaths of forest fuels to the northeast, with agricultural land and smaller forest patches to the west. The community is situated in an area with variable topography that may elevate fire behavior under extreme conditions. The area has a history of more frequent wildfires relative to the rest of the county.

Access: The community is accessed via unsurfaced Sparks Hill Road (Figure 4.25) from Karbers Ridge Road and from Camp Cadiz Road. Some homes are situated on short driveways. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is served by the Elizabethtown Fire Department, located in the northeast corner of the town on Watson Street and Highway 146. Based on road distance (13 miles), the fire response time to the community is 22 minutes. The Department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: Hydrants are not located throughout the community, but there are ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good, and most homes have manicured lawns and good defensible space. Some homes are located close to forested patches, and there are some derelict properties. These homeowners should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area has agricultural resources and infrastructure at risk. A number of cabins are located in the vicinity.

Figure 4.24. Sparks Hill and vicinity. Source: Google Earth.

Figure 4.25. Sparks Hill Road.

PETERS CREEK

Peters Creek is an unincorporated community in the south-central portion of the county (Figure 4.26). The community is rated as moderate (63) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Peters Creek is situated with agricultural land in immediate proximity to homes and with large forest swaths to the north and south. The community is situated in an area with variable topography that may elevate fire behavior under extreme conditions.

Access: The community is accessed via paved Highway 146. Some homes are situated on short driveways. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is on the boundary of the Elizabethtown and Cave-In-Rock Fire Departments, so could be responded to by either department. Based on road distance, the Elizabethtown Fire Department is the closest station at 6 minutes (5 miles). The Cave-In-Rock Department is located 5.9 miles away, with a response time of 8 minutes. Both departments are staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: Some hydrants are located throughout the community, but they are sporadic. There are also some ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good, and most homes have manicured lawns and good defensible space. Residents with homes located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area is sparsely populated, with residential homes, churches, agricultural resources, and infrastructure at risk.

Figure 4.26. Peters Creek and vicinity. Source: Google Earth.

ROCK CREEK

Rock Creek is an unincorporated community in the south-central portion of the county (Figure 4.27). The community is rated as high (79) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Rock Creek is surrounded by large swaths of forested land with some smaller open grassland areas in immediate proximity to homes. The community is situated in an area with variable topography that may elevate fire behavior under extreme conditions. Some homes have good defensible space, but other homes

are located very close to forest fuels with insufficient defensible space. The area has a history of more frequent wildfires relative to the rest of the county.

Access: The community is accessed via 965 E and 845 N. These unsurfaced roads are narrow in places and may impede wildfire response. Some homes are situated on short driveways. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is served by the Cave-In-Rock Fire Department, located in the center of the village on Main Street. Based on road distance (7.6 miles), the fire response time to the community is 13 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: There are no hydrants located throughout the community, but there are ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the community; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good. Some homes have manicured lawns and good defensible space, while other homes have insufficient clearance relative to forest fuels. Residents with homes located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area is sparsely populated, with residential homes, agricultural resources, and infrastructure at risk. Adams Cemetery is located east of the community.

Figure 4.27. Rock Creek and vicinity. Source: Google Earth.

FINNEYVILLE

Finneyville is a sparsely populated unincorporated community in the eastern portion of the county (Figure 4.28). The area is home to the Hog Rock Campground. The community is rated as high (74) under the NFPA 1144 assessment criteria and low to moderate based on the GIS assessment.

Fuels: Finneyville is surrounded by a large swath of continuous forested land to the west and is adjacent to the Ohio River to the east. Most structures have good defensible space, but some are located very close to forest fuels with insufficient defensible space.

Access: Finneyville is accessed via 840 N (unsurfaced) (Figure 4.29). Hog Rock Road is paved (Figure 4.30) and provides access to the campground, with alternative access along more narrow unsurfaced roads. Ingress and egress may be a concern during Hog Rock events, particularly if the area needs to be evacuated expeditiously. Contracted emergency responders are present during events. Access roads are located within thick forest, raising risk levels.

Fire Response: The community is served by the Cave-In-Rock Fire Department, located in the center of the village on Main Street. Based on road distance (8.1 miles), the fire response time to the community is 20 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: Hydrants are not located throughout the community, but ponds and the close proximity of the Ohio River may facilitate drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the area; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good, except where buildings are closely situated within the Hog Rock Campground. Residents with homes and structures located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area is sparsely populated through much of the year, but the Hog Rock Campground attracts large numbers during events, which raises concern for potential increased human ignitions and evacuation.

Figure 4.28. Finneyville and vicinity, including the Hog Rock Campground. Source: Google Earth.

Figure 4.29. Finneyville Road (840 N) is unsurfaced and very narrow. Photographed by Paul Conn

Figure 4.30. Hog Rock Road is surfaced and provides access to the campground. Photographed by Paul Conn.

LAMB

Lamb is a sparsely populated unincorporated community in the eastern portion of the county (Figure 4.31). The community is rated as high (74) under the NFPA 1144 assessment criteria and moderate to high based on the GIS assessment.

Fuels: Lamb is surrounded by swaths of forested land interspersed with agricultural and open grassland areas. Most homes and structures have good defensible space, but some are located very close to forest fuels with insufficient defensible space. The area has a history of more frequent wildfires relative to the rest of the county.

Access: The community is accessed via 1550 E (paved in portions)(Figure 4.32), 700 N (gravel), 840 N (gravel), and 820 N (paved). Some homes are situated on short driveways. Homeowners with longer driveways should ensure they have sufficient clearance and turnaround space for emergency vehicles.

Fire Response: The community is served by the Cave-In-Rock Fire Department, located in the center of the village on Main Street. Based on road distance (6.3 miles), the fire response time to the community is 12 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: There are no hydrants located throughout the community, but there are ponds that may be available for drafting. The fire department may need to transport water if drafting is not available.

Structural Characteristics: Construction types vary throughout the area; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good. Residents with homes and structures located in or close to forest patches should carry out Firewise mitigations to reduce potential for structural ignitability.

CVARs: The area is sparsely populated, with residential, agricultural, and infrastructure values at risk.

Figure 4.31. Lamb and vicinity. Source: Google Earth.

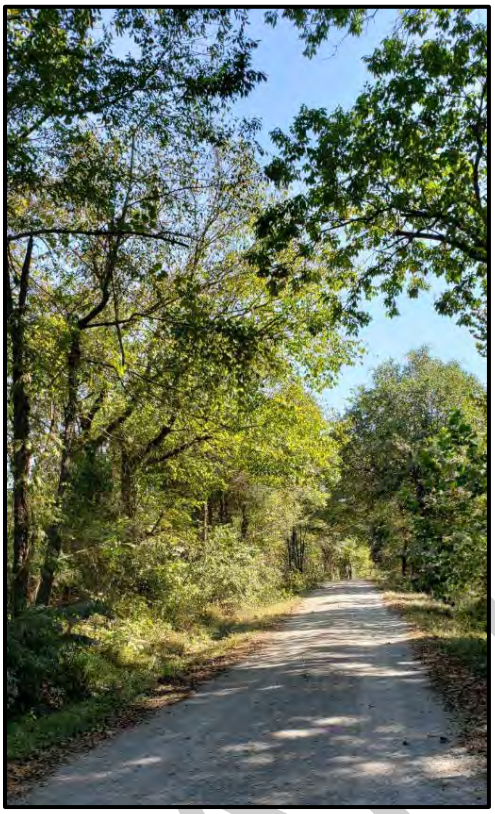


Figure 4.32. Access to the community via 1550 E, which is paved in portions but has some areas of dense vegetation on the margins. Photographed by Paul Conn.

LOVES CORNER

Loves Corner is a sparsely populated unincorporated community in the southeastern portion of the county (Figure 4.33). The community is rated as moderate (59) under the NFPA 1144 assessment criteria and low to moderate based on the GIS assessment.

Fuels: Loves Corner is located in a predominantly agricultural setting. Most homes and structures have good defensible space and manicured lawns.

Access: The community is accessed via surfaced Illinois Route 1 and Highway 146.

Fire Response: The community is served by the Cave-In-Rock Fire Department, located in the center of the village on Main Street. Based on road distance (2.0 miles), the fire response time to the community is 4 minutes. The department is staffed entirely by volunteers, so response times depend upon resource availability.

Water Supply: Hydrants are not located throughout the community, but there are ponds that may be available for drafting. Given the close proximity, the fire department can easily transport water.

Structural Characteristics: Construction types vary throughout the area; many homes have wooden siding, decks, and fencing, but many have metal or composite roofs. Structure separation is good.

CVARs: The area has residential, agricultural, commercial (golf course and quarry), and infrastructure values at risk.

Figure 4.33. Loves Corner and vicinity. Source: Google Earth.

COMMUNITY VALUES AT RISK

Earlier compilation of the critical infrastructure in the planning area, coupled with the community assessments, public outreach, and Core Team input, has helped in the development of a list of CVARs from wildland fire. The public was encouraged to provide additional CVAR during the public outreach effort.

In addition to critical infrastructure, CVARs can also include natural, social, and cultural resources (see Map 8, Appendix A). It is important to note that although an identification of CVARs can inform treatment recommendations, a number of factors must be considered in order to fully prioritize areas for treatment; these factors include appropriateness of treatment, land ownership constraints, locations of ongoing projects, available resources, and other physical, social, or ecological barriers to treatment.

The scope of this CWPP does not allow determination of the absolute natural, socioeconomic, and cultural values that could be impacted by wildfire in the planning area. In terms of socioeconomic values, the impact due to wildfire would cross many scales and sectors of the economy and call upon resources locally, regionally, and nationally.

NATURAL CVARS

The CWPP planning area has a variety of natural resources of particular concern to land managers, such as rare habitats and listed plant and wildlife species. The public outreach has emphasized the importance of natural/ecological values to the general public. Examples of natural values identified by the public and the Core Team include:

- Wildlife habitat
- Woodlands
- Natural areas
- Native species
- Threatened and endangered species
- Agricultural land (Figure 4.34)
- Cave-In-Rock State Park

Figure 4.34. Agricultural land and natural areas highly valued by the Hardin County community.

SOCIOECONOMIC CVARS

Social values include population, recreation, infrastructure, agriculture, and the built environment. Much of the built environment in the planning area falls within the WUI zones. Examples include the following:

- Commercial properties
- Campgrounds
- Cabins (Figure 4.35)
- Shawnee National Forest Trails
- Timberlands
- Signage
- Utility lines, infrastructure, etc.
- Hardin County School
- Fire departments
- Highways
- Churches
- Care homes, senior housing, day care, and other group homes
- Water storage

Figure 4.35. Rim Rock Dogwood Cabins, one of a many tourist cabin companies throughout the county.

CULTURAL CVARS

Many historical landmarks are scattered throughout Hardin County. Particular CVARs that have been identified by the Core Team and the public in the CWPP planning area are:

- Churches
- Barns
- Historic houses (Figure 4.36)
- Iron Furnace (Figure 4.37)
- Agricultural infrastructure

Historic barns and homes are commonplace throughout Hardin County and are valued by the community for the heritage that they represent.

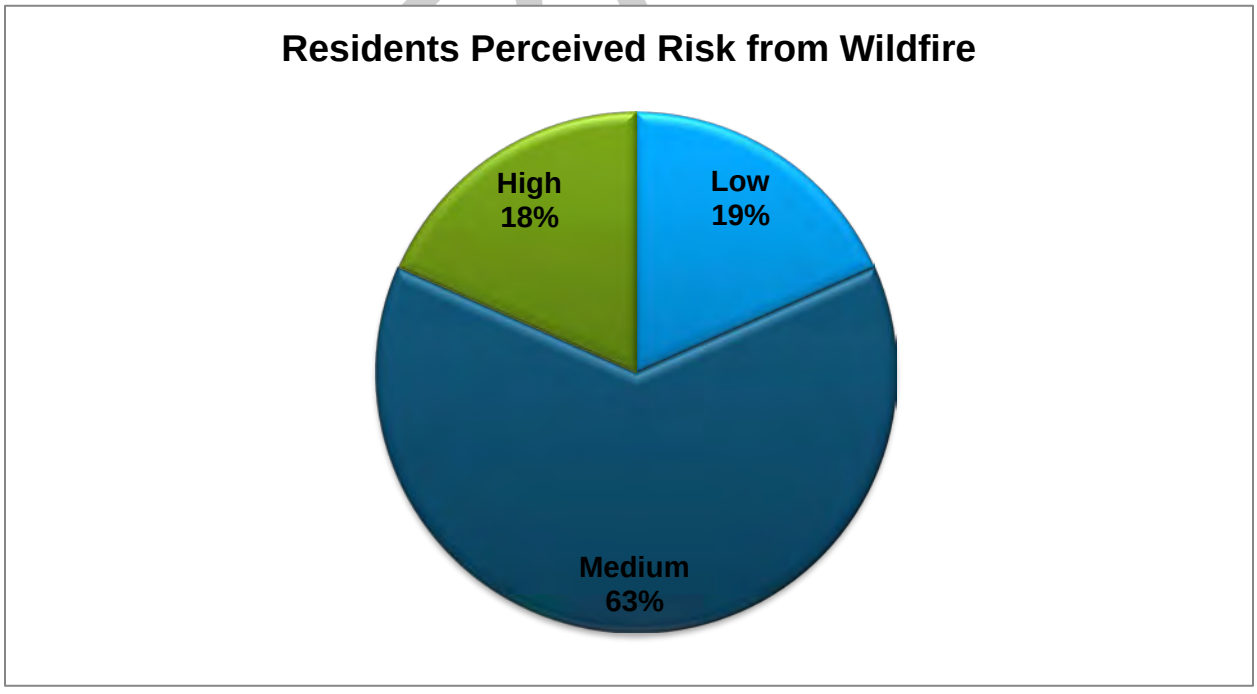
Figure 4.36. Frailey Mansion located between Hog Rock and Cave-In-Rock.

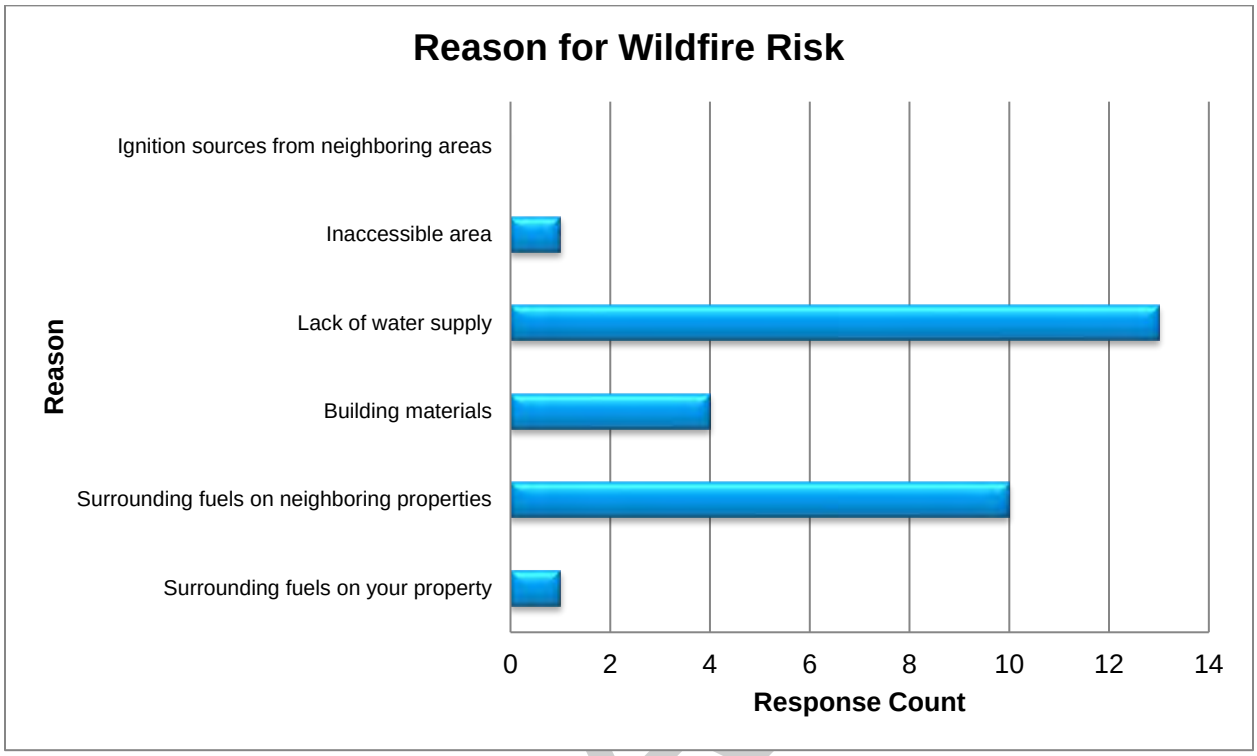
Figure 4.37. The Iron Furnace.

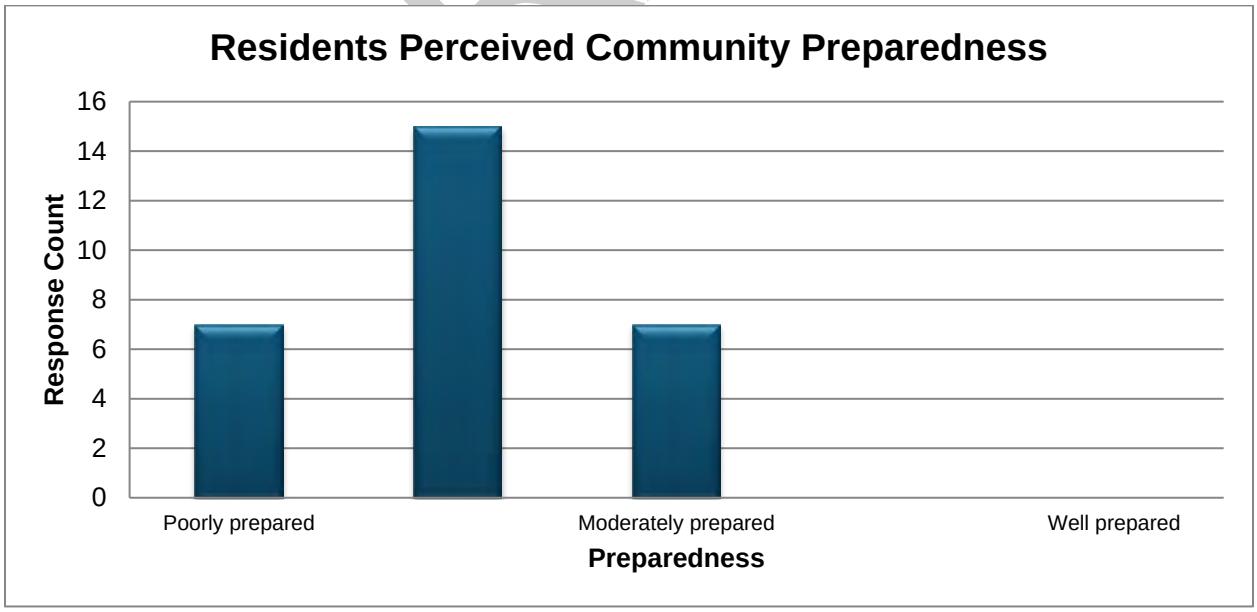
CHAPTER 5 – COMMUNITY OUTREACH AND COMMENT

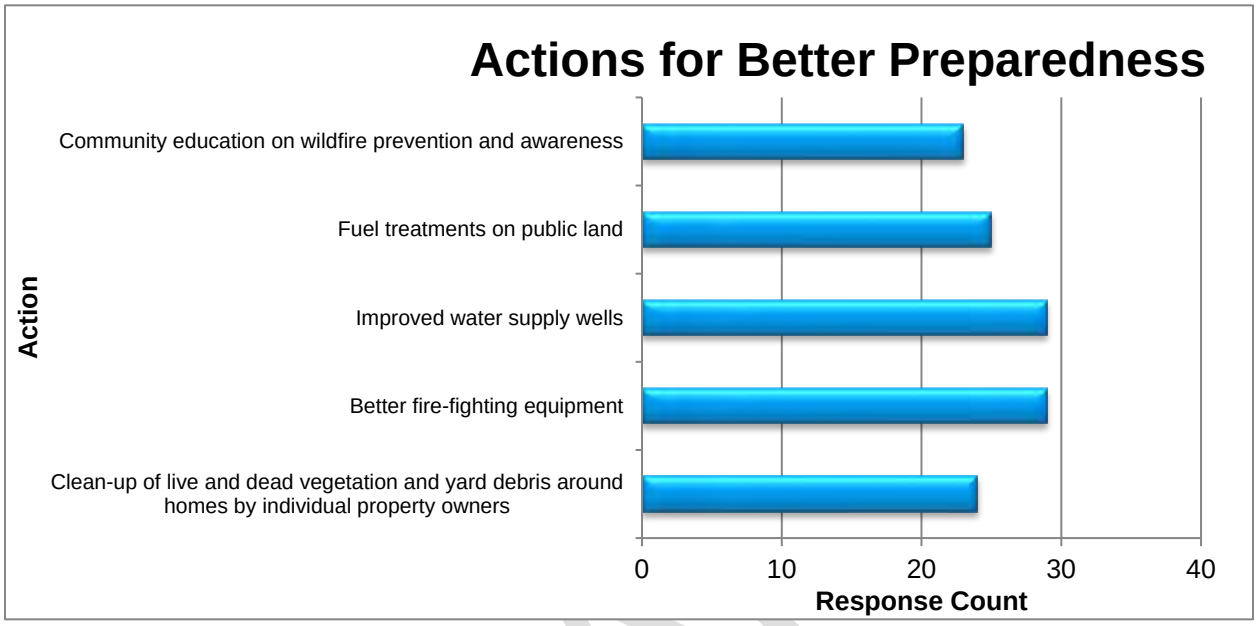
COMMUNITY SURVEY

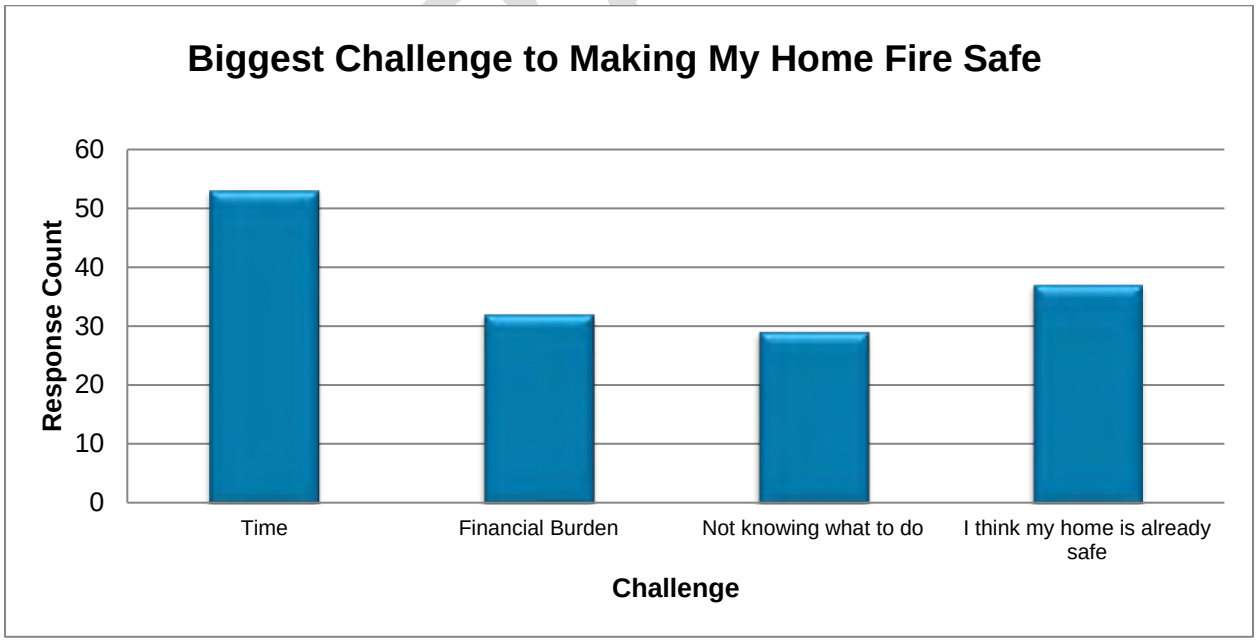
An online survey was developed for this project in order to gather feedback from the community regarding wildfire concerns and assistance that the community needs to reduce wildfire risk and barriers to action. The following is a summary of the results of the community survey. Seventy-four residents responded to the survey, providing the following information. The full survey questions are included in Appendix J.

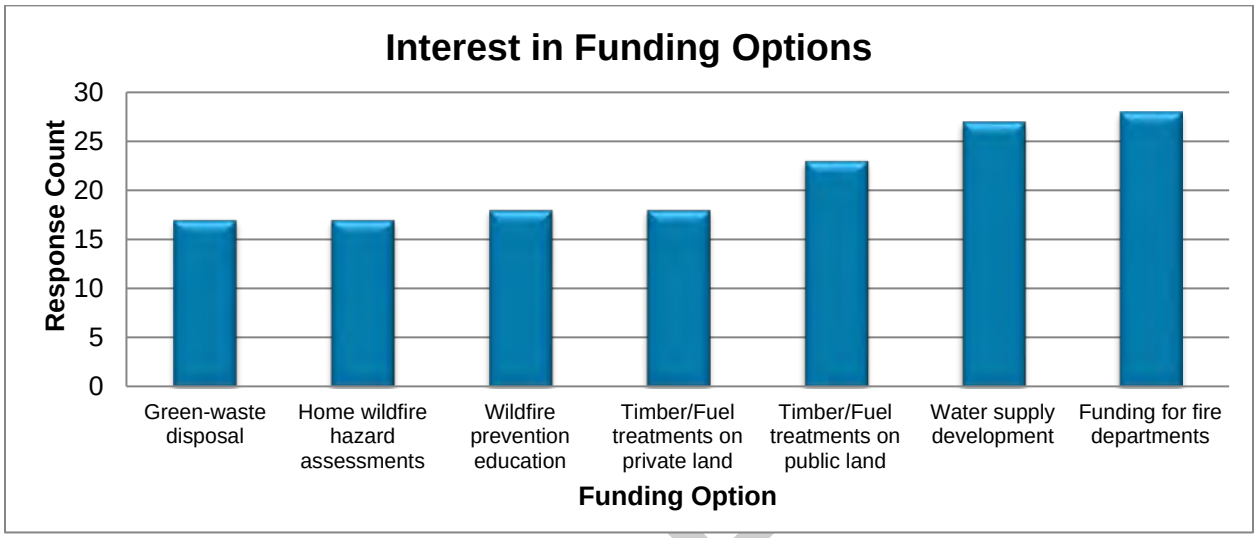


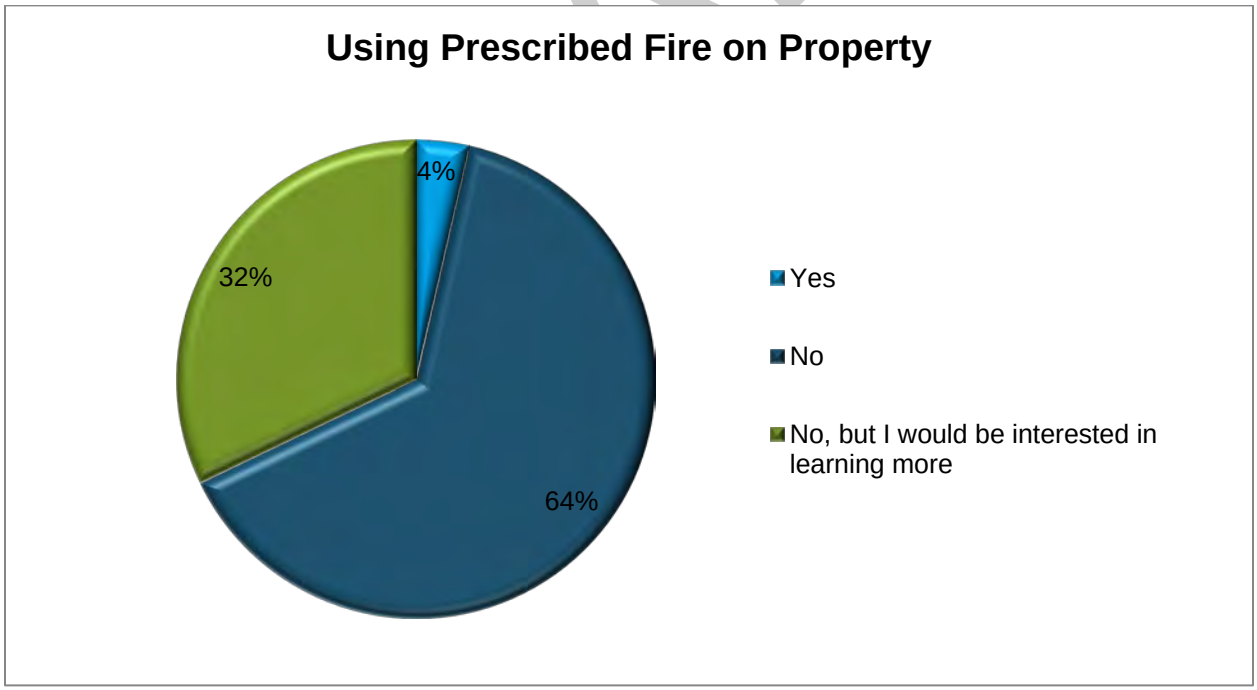

Reason for Wildfire Risk
Ignition sources from neighboring areas
Inaccessible area
Lack of water supply
Building materials
Surrounding fuels on neighboring properties
Surrounding fuels on your property
Reason
0
2
4
6
8
10
12
14
Response Count


Residents Perceived Community Preparedness
16
14
12
10
8
6
4
2
0
Response Count
Poorly prepared
Moderately prepared
Well prepared
Preparedness


Actions for Better Preparedness
Community education on wildfire prevention and awareness
Fuel treatments on public land
Improved water supply wells
Better fire-fighting equipment
Clean-up of live and dead vegetation and yard debris around homes by individual property owners
Action
0
10
20
30
40
Response Count


Biggest Challenge to Making My Home Fire Safe
60
50
40
30
20
10
0
Response Count
Time
Financial Burden
Not knowing what to do
I think my home is already safe
Challenge


Interest in Funding Options
Response Count
30
25
20
15
10
5
0
Green-waste disposal
Home wildfire hazard assessments
Wildfire prevention education
Timber/Fuel treatments on private land
Timber/Fuel treatments on public land
Water supply development
Funding for fire departments
Funding Option


Using Prescribed Fire on Property
4%
32%
64%
Yes
No
No, but I would be interested in learning more

SOCIAL MEDIA

A Facebook page was developed for the project in order to provide an alternative forum through which to reach community members. The page provided a link to the online survey and a place to post announcements about the project and other relevant fire preparedness information. The profile page can be found at https://www.facebook.com/Hardin County CWPP/.

FALL FESTIVAL PUBLIC OUTREACH EVENT

The CWPP contractor (SWCA) manned an informational booth at the Cave-In-Rock Frontier Festival on September 21, 2019, in order to discuss the CWPP with the public and solicit feedback. During that event, the public was asked to review the risk assessment map, answer the community survey, and provide additional comments regarding concerns for wildfire risk and hazard in Hardin County. The booth was shared with the Shawnee National Forest, and the public was provided fire prevention literature. Smokey Bear interacted with families during the event (Figures 5.1–5.4).

Figure 5.1. Wildfire outreach to families during the Cave-In-Rock Frontier Festival.

Figure 5.2. Shawnee National Forest outreach to Hardin County families.

Figure 5.3. Smokey Bear at the Frontier Festival.

Figure 5.4. Smokey Bear engaging families at the Frontier Festival.

FINDINGS OF PUBLIC OUTREACH

The community survey, social media page, and the Cave-In-Rock Frontier Festival outreach event provided a wealth of information that can be used to develop recommendations for fire prevention and preparedness in the county.

Interpretation of Survey Results

The majority of the Hardin County community perceive their wildfire risk to be moderate.

Many community members attribute wildfire risk to surrounding fuels on public land and a lack of water supply in their community. Since many responses were received from unincorporated areas of the county, this is an accurate perception of the hazards, because many communities do not have access to hydrants.

Few residents considered their community to be well prepared for wildfire, with the majority feeling they are poorly or moderately prepared.

When asked what factors residents felt could help better prepare them for wildfire, answers were mixed, but slightly more people would like to see better firefighting equipment followed by improved water supply. Many residents may not understand the equipment available to their fire departments; however, this does show that residents are dependent (at least in theory) on response by their fire departments.

Time is considered the greatest hurdle by residents in making their home more fire safe, followed by the financial burden of maintaining clearances and structure maintenance. At least a quarter of respondents felt that their home is already fire safe.

When asked what residents would like to see funded for reducing wildfire hazard, funding for fire departments was the most popular response, followed by water supply development and green waste disposal. Funding to treat fuels on public and private land was also highly rated. These patterns suggest residents consider firefighting response and fuel reduction as the most important factors in the wildfire risk equation, which shows that although the residents seem to depend on external fire response to protect their life and property, they understand that preventative measures associated with reducing hazardous fuels are also a key part of the wildfire preparedness process.

In order to determine how frequently or widespread prescribed fire is practiced, the survey asked who currently is using prescribed fire on their property. Only 3.5% of respondants said they were using prescribed fire. However, over 32% would like to learn more about the use of prescribed fire. This is encouraging as it shows the public are interested in increasing the use prescribed fire for fuel reduction or forest restoration and this could increase opportunities being sought by state and federal partners to increase landscape level treatments.

Open-ended Questions in the Community Survey Provided the Following Input:

Hardin County, in general, if a wildfire would break out in the Shawnee National Forest as in out-west, the whole county would be gone.
I would like to see more management of the forest on public lands.
I would like to see management in the forest in response to the number of dead trees.
We need to be proactive in providing resources to prevent a major wildfire. Most money needs to be spent actually on the work. Some could be spent on awareness, but if someone is mean enough to start it, all the education prevention won't help (as in the case of Gatlinburg, TN.)

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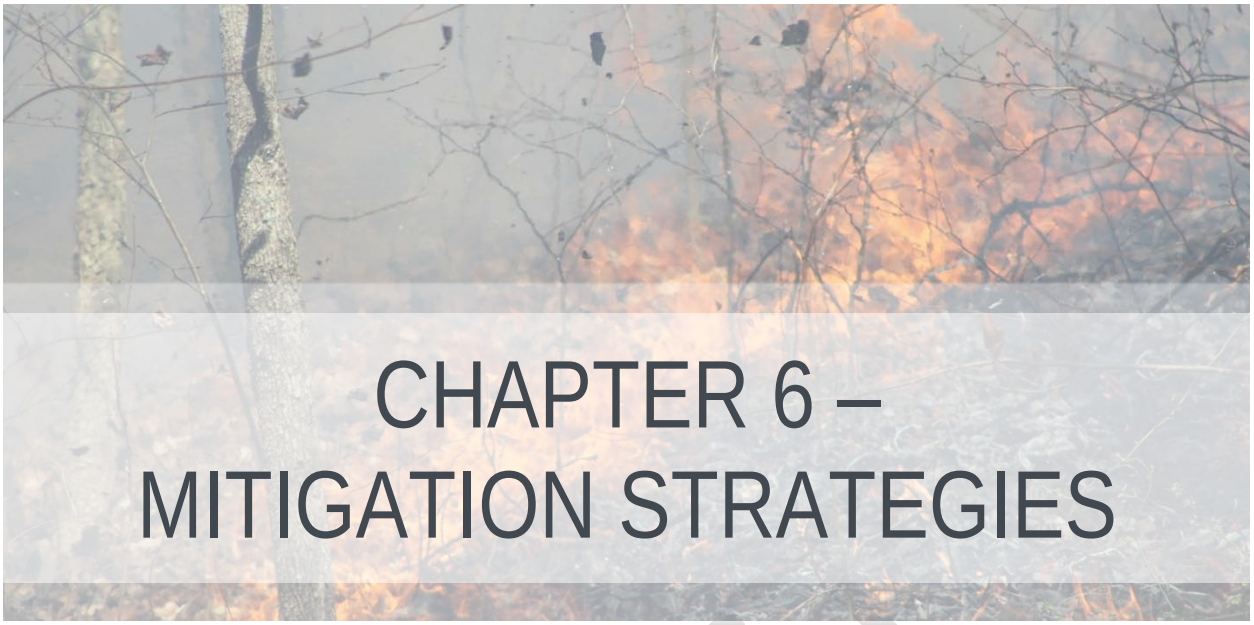

CHAPTER 6 – MITIGATION STRATEGIES

This plan has been aligned with the Cohesive Strategy and its NERAP[2] by adhering to the nation-wide goal "*to safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.*" (National Strategy 2014:3).

In order to do this, the CWPP recommendations have been structured around the three main goals of the Cohesive Strategy: Restoring and Maintaining Landscapes, Fire-adapted Communities, and Wildfire Response.

This chapter provides guidance for implementing recommendations under each Cohesive Strategy goal. Many of these community-specific recommendations can be implemented at the homeowner or community level. Projects requiring large-scale support can be prioritized based on the Community Hazard/Risk Assessments and Composite Risk Assessments.

COHESIVE STRATEGY GOAL 1: RESTORE AND MAINTAIN LANDSCAPES

Goal 1 of the Cohesive Strategy and the NERAP is **Restore and Maintain Landscapes**: **Landscapes across all jurisdictions are resilient to fire and other disturbances in accordance with management objectives.**

This goal under NERAP is broken down into:

Regional Option 1A: Expand the use of prescribed fire as an integral tool to meet management objectives in the Northeast.

Regional Option 1B: Maintain and increase where possible the extent of fire-dependent ecosystems and expand the use of fire as a disturbance process.

Regional Option 1C: Focus on mitigating "event" fuels to reduce potential fire hazard.

[2] NERAP- https://www.forestsandrangelands.gov/strategy/documents/rsc/northeast/NERAP_Final2013April.pdf

In this CWPP, recommendations to restore and maintain landscapes focus on vegetation management and hazardous fuel reduction.

RECOMMENDATIONS FOR HAZARDOUS FUEL REDUCTION

Fuels management of public and private land in the WUI is key to the survival of homes during a wildfire event, as well as the means to meet the criteria of Goal 1. The importance of fuels management is reflected in forest policy at the federal level, with the HFRA requiring that federal land management agencies spend at least 50% of their fuels reduction funds on projects in the WUI.

Fuels should be modified with a strategic approach across Hardin County to reduce the threat that high-intensity wildfires pose to lives, property, and other values. Pursuant to these objectives, recommendations have been developed in the context of existing and planned fuels management projects. These recommendations initially focus on areas adjacent to structures (defensible space), then near community boundaries (fuel breaks, cleanup of adjacent open spaces), and finally in the wildlands beyond community boundaries (larger-scale forest health and restoration treatments).

While not necessarily at odds with one another, the emphasis of each of these treatment types is different. Proximate to structures, the recommendations focus on reducing fire intensity consistent with Firewise and International Fire Code standards. Further into open space areas, treatments will tend to emphasize the restoration of historic conditions and general forest health. Cooperators in fuels management should include federal, state, and local agencies as well as interested members of the public.

Table 6.1 summarizes the types of treatments recommended throughout the planning area. The majority of the treatments are focused on higher risk areas, as defined by the Composite Risk/Hazard Assessment, Core Team collaboration, and public input. Many of these treatment recommendations are general across the communities because similar conditions and concerns were raised for all communities that border wildland areas. Table 6.1 also addresses the requirement for an action plan and assessment strategy by providing monitoring guidelines and a timeline for implementation. This timeline is obviously dependent on available funding and resources, as well as National Environmental Policy Act (NEPA) protocols for treatments on public land.

The treatment list is by no means exhaustive and should be considered purely a sample of required projects for the future management of the planning area. Many projects may be eligible for grant funds available from federal and/or state sources. A key source of funding for implementing hazardous fuel reduction are funds available through NERAP, which is the reason this CWPP tiers to those goals. For an additional list of funding sources, please refer to Appendix H.

Each land management agency has a different set of policies governing the planning and implementation of fuels reduction projects; for example, treatments on federal land require intensive NEPA analysis, and many treatments may be carried out with wildlife habitat objectives as a primary goal. Because of the complex nature of large treatments on public land, it is the responsibility of local governments, with input from affected stakeholders, to determine which method(s) will safely accomplish the fuels management objectives for a given area. A thorough assessment of current fuel loading is an important prerequisite for any fuels prescription, and all treatment recommendations should be based on the best possible science. When possible, simultaneously planning for the management of multiple resources while reducing fuels will ensure that the land remains viable for multiple uses in the long term. The effectiveness of any fuels reduction treatment depends on the degree of maintenance and monitoring that is employed. Monitoring will also ensure that objectives are being met in a cost-effective manner.

Fire management cannot be a one-size-fits-all endeavor; this plan is designed to be flexible. Treatment approaches and methods will be site-specific and should be adapted to best meet the needs of the landowner and the resources available. Moreover, each treatment recommendation should address protection of CVARs, particularly the protection of threatened and endangered species. It is the intent of this plan to be an evolving document that will incorporate additional areas of the HCCWPP planning area as they change in risk category over time.

Table 6.1. Fuel Treatment Recommendations

Project Description	Location	Land Ownership	Method and Goal	Timeline	Resources/Funding	Priority
Roadside thinning along access roads and evacuation routes with scheduled maintenance to improve sustainability.	All communities where appropriate. Priority areas: Highway 34, Hicks, Karbers Ridge, Cadiz, Sparks Hill, Rock Creek, Finneyville, Lamb.	Private and USFS land.	• Reduce fuel loading along roadways in order to mitigate potential ignitions from the highway, but also provide safe clearance to facilitate evacuation and emergency access. • Mechanical treatment: tree removal, mowing. • Herbicide treatment as needed or appropriate. • Design maintenance schedule depending upon vegetation type. Goal is to maintain clearance during both spring and fall fire season.	High priority due to already overgrown routes. Implement within 2 years and maintain annually or as outlined in maintenance schedule.	• National Fire Plan Rural Fire Assistance • FEMA Hazard Mitigation Grant funding • FEMA Pre-disaster Mitigation funding • USFS Hazard Fuels grants • Northeastern Area State and Private Forestry Cohesive Fire Strategy funds	High
Develop action plan for landscape treatment of invasive species to reduce impacts of infestation on fire hazard. Target species:Japanese stiltgrass (*Microstegium vimineum*), Japanese honeysuckle (*Lonicera japonica*), oriental bittersweet (*Celastrus orbiculatus*), phragmites, tree of heaven (*Ailanthus altissima*).	Countywide. Priority areas: Acid-seeps; for example, Panther Hollow Natural Area, Natural areas WUI areas, with primary focus on western edge of communities.	All jurisdictions. Encourage landscape-level treatments on private land through NRCS, River to River CWMA, and SIPBA outreach. Utilize existing networks created through the Southern Illinois Invasive Species Strike Team and CWMA.	• Work closely with the River to River CWMA and Southern Illinois Invasive Species Strike Team to develop action plan for control of Japanese stiltgrass and Japanese honeysuckle on a landscape scale and/or watershed scale throughout the county. • Consider pretreatment of areas scheduled for timber stand improvement and prescribed burning. • Coordinate with Shawnee National Forest regarding ongoing invasive species NEPA. • Review and consider potential categorical exclusions to facilitate treatments. • Seek funding to expand treatments beyond natural areas.	High priority in order to address existing and potential future threats.	• IDNR Urban and Community Forestry Program • IDNR Forest Protection and Health Management • IDNR Rural Forest Landowner Assistance: https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf • IDNR Special Wildlife Funds Grant Program: https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx • RC&D: http://www.shawneercd.org/currently-funded-grants	High

Project Description	Location	Land Ownership	Method and Goal	Timeline	Resources/Funding	Priority
					• CWMA education and public awareness, early detection, prevention, control, and management	
Promote increased use of prescribed fire on private forest land to promote landscape-scale restoration of oak-hickory forest. Include planning for treatment monitoring and maintenance.	Countywide. Priority areas: as delineated in the IFAP.	All jurisdictions	• Continue the existing collaboration between SIPBA, USFS, IDNR, CWMA, RC&D, and others to build better cross-border collaboration for landscape-level prescribed fire treatments. • Build on enthusiasm of residents to increase private partners in the SIPBA network. • Seek additional funding to support SIPBA's work with private landowners. • Pursue additional grants that would allow continued monitoring and maintenance burns. • Maintenance cycles for treatments: o Repeat treatment 2–5 years for prescribed fire. o Invasive species treatment: annual return to start and then maintenance. o 2–4 entries and then back off (timber). o Grassland and shrubs: 2-year cycle. o Thinning treatments follow up with fire every 2–5 years; 10–15 years thinning again.	High priority given the continued decline of forest health in the county and succession to beech and maple forests. Ongoing.	• NRCS Regional Conservation Partnership Program- https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/ • IDNR Rural Forest Landowner Assistance: https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf • IDNR Special Wildlife Funds Grant Program: https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx • RC&D: http://www.shawneercd.org/	High
Build additional landscape-level treatments (mechanical and prescribed fire) to support IFAP goal of	Countywide	All jurisdictions	• Develop an interagency working group (or similar) to provide detailed action plan and strategy for landscape treatment on all jurisdictions. Continue current initiatives with IDNR, USFS,	High priority due to goals of the IFAP. Quarterly meeting of working group.	• IDNR Urban and Community Forestry Program • IDNR Forest Protection and Health Management	High

Project Description	Location	Land Ownership	Method and Goal	Timeline	Resources/Funding	Priority
oak-hickory forest restoration.			and SIPBA to increase collaboration across boundaries. • Appoint a chair and a representative responsible for seeking grant opportunities. • Utilize the risk assessment to help locate priority areas within the WUI. • Encourage cooperation by private landowners to expand prescribed fire on private land. • Review potential to expand treatments into conceptual treatment areas identified in Figure 6.1. • Build upon existing monitoring efforts on USFS lands and expand monitoring to all jurisdictions (including private land) in order to contribute to adaptive management. • Consider the use of a citizen science program to engage the Hardin County School and/or interested citizens in monitoring of forest treatments.		• IDNR Rural Forest Landowner Assistance: https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf • RC&D: http://www.shawneercd.org/currently-funded-grants • Northeastern Area State and Private Forestry Cohesive Fire Strategy funds	
Increase small-diameter wood utilization.	Countywide	All jurisdictions	• Develop wood product related industry for small diameter timber. • Focus on pine removal in areas impacted by southern pine bark beetle.	Long-term goal-over the next decade.	• USFS Wood Innovations Program: http://www.na.fs.fed.us/werc/wip/2017-rfp.shtm • IDNR Forest Products Industry Assistance	Low
Improve promotion to the public of forest improvement plans (FIPs) or forest stewardship plans and seek additional funds to implement.	Countywide	All jurisdictions	• Lack of funding is preventing implementation of existing FIPs. • Develop public outreach campaign to promote adoption of FIPs and stewardship plans. • Form a task force to identify grant funding for FIP implementation.	High priority. Ongoing.	• IDNR Rural Forest Landowner Assistance: https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf • IDNR Special Wildlife Funds Grant Program:	High

Project Description	Location	Land Ownership	Method and Goal	Timeline	Resources/Funding	Priority
			• Utilize SIPBA networking if appropriate to gain traction with landowners already active in forest management. • Further existing work being undertaken by the Shawnee National Forest and RC&D through the "Let the Sun Shine In" outreach campaign. • Support the National and Northeast Regional Cohesive Wildland Fire Management Strategy by creating a more fire resilient landscape.		https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx • USFS Participating Agreements • USFS Hazardous Fuels grants • State and Private Forestry Landscape Scale Restoration grant • RC&D: http://www.shawneercd.org/. • Northeastern Area State and Private Forestry Cohesive Fire Strategy funds	
Secure a Nature Conservancy Task Force to operate in the county to assist with vegetation management programs.	Countywide	All jurisdictions	• Pursue funding and advocate for Task Force. • Task Force could be used to design and implement vegetation management on public and private lands to target invasive species or promote forest health and hazardous fuels reduction.	High priority.	• TNC	High

Figure 6.1. illustrates past, present, and future conceptual fuel treatments on land in Hardin County. Note that future conceptual treatments included in this document have not been field verified for viability and in some cases would have to undergo the NEPA process to assess their impacts on natural and cultural resources. These conceptual areas represent land identified as moderate to high risk for wildfire in the CWPP risk assessment and are delineated based upon vegetation type, land ownership, and potential to expand existing treatments to a landscape scale, to meet the goal of restoring and maintaining landscapes. The best type of fuels treatment for each conceptual treatment area would need to be determined during future planning by the relevant agencies responsible for land management in that area. These future processes would require thorough public scoping and analysis of current conditions and potential impacts to natural and cultural resources, as well as consideration of socio-economic factors.

NOTE: Although fuel treatments are designed to help to mitigate high-intensity fire behavior and allow firefighters access for suppression efforts, no fuel treatments suggested here can be 100% guaranteed to protect life and property, particularly when environmental conditions are primed to create catastrophic fire behavior.

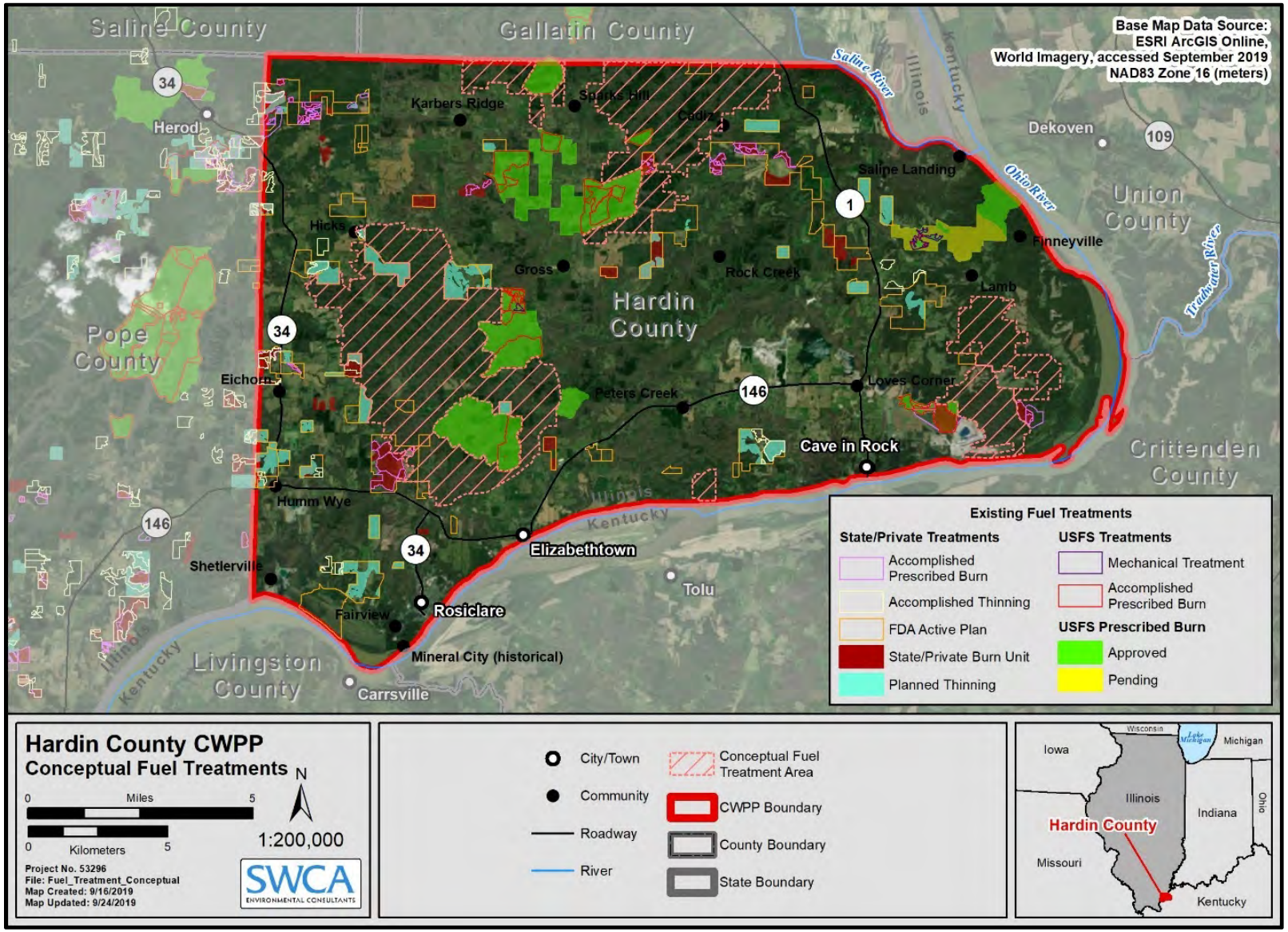

Figure 6.1. Existing fuel treatments across all jurisdictions and conceptual treatment areas identified by the Core Team as potential areas requiring additional vegetation management for hazardous fuel reduction.

Fuels Treatment Scales

Defensible Space

Defensible space is perhaps the fastest, most cost-effective, and most efficacious means of reducing the risk of loss of life and property. Although fire agencies can be valuable in providing guidance and assistance, creating defensible space is the responsibility of the individual homeowner (Figure 6.2).

Figure 6.2. Defensible space providing clearance between a structure and adjacent woodland or forest fuels.

The IDNR provides information on wildfire preparedness through its website. For example news articles during periods of dry and hot weather:
https://www.dnr.illinois.gov/news/Pages/IDNRUrgesCautiontoPreventWildfires.aspx

Effective defensible space consists of creating an essentially fire-free zone adjacent to the home, a treated secondary zone that is thinned and cleaned of surface fuels, and (if the parcel is large enough) a transitional third zone that is basically a managed forest area. These components work together in a proven and predictable manner. Zone 1 keeps fire from burning directly to the home; Zone 2 reduces the adjacent fire intensity and the likelihood of torching, crown fire, and ember production; and Zone 3 does the same at a broader scale, keeping the fire intensity lower by maintaining a more natural, historic condition (Figure 6.3).

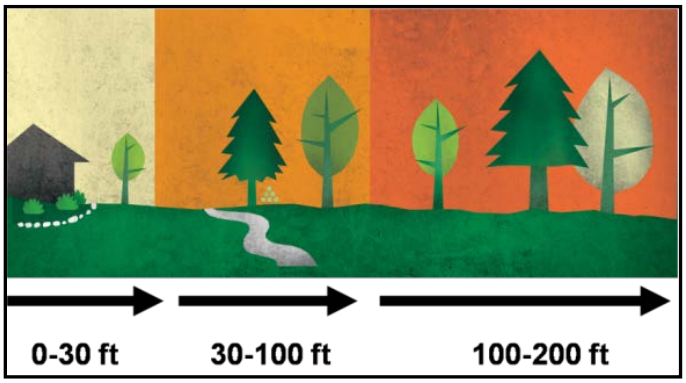

Figure 6.3. Defensible space zones. Source: www.firewise.org.

It should be emphasized that defensible space is just that—an area that allows firefighters to work effectively and with some degree of safety to defend structures. While defensible space may increase a home's chance of surviving a fire on its own, a structure's survival is not guaranteed, with or without firefighter protection. Nevertheless, when these principles are consistently applied across a neighborhood, everybody benefits.

Specific recommendations should be based on the particular hazards adjacent to a structure such as slope steepness and fuel type. Local fire authorities or a state forester should be contacted if a professional assessment seems warranted. Adjacent Pope County successfully obtained funding to carry out home hazard assessments in WUI areas. Homeowners can invite fire department and agency staff to carryout an assessment on their home to provide specific actions they can take for wildfire mitigation (Figure 6.4). Firewise guidelines, the Northeast Wildfire Preparedness Resource Guide[3] and the Homeowners Guide (Appendix I) are excellent resources, but creating defensible space does not have to be an overwhelming process. Assisting neighbors may be essential in many cases. Homeowners should consider assisting the elderly, sharing ladders for gutter cleaning, and assisting neighbors with large thinning needs. Adopting a phased approach can make the process more manageable and encourage maintenance (Table 6.2).

Figure 6.4. USFS and local fire department staff provide free home hazard assessments to residents in adjacent Pope County. This model could be utilized in Hardin County WUI areas.

Table 6.2. Example of a Phased Approach to Mitigating Home Ignitability

Year	Project	Actions
1	Basic yard cleanup (annual)	Dispose of clutter in the yard and under porches. Remove dead branches from yard. Mow and rake. Clean off roofs and gutters. Remove combustible vegetation near structures. Coordinate disposal as a neighborhood or community. Post 4-inch reflective address numbers visible from road.
2	Understory thinning near structures	Repeat basic yard cleanup. Limb trees up to 6–10 feet. Trim branches back 15 feet from chimneys. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
3	Understory thinning on private property along roads and drainages	Limb trees up to 6–10 feet. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
4	Overstory treatments on private property	Evaluate the need to thin mature or diseased trees. Prioritize and coordinate tree removal within neighborhoods to increase cost effectiveness.
5	Restart defensible space treatment cycle	Continue the annual basic yard cleanup. Evaluate need to revisit past efforts or catch those that were bypassed.

Fuel Breaks and Open Space Cleanup

The next location priority for fuels treatments should be where the community meets the wildland. This may be the outer margins of a town or an area adjacent to occluded open spaces such as a park. Fuel breaks (also known as shaded fuel breaks) are strips of land where fuel (for example living trees and brush, and dead branches, leaves or downed logs) has been modified or reduced to limit the fires ability to spread rapidly. Fuel breaks should not be confused with firebreaks which are areas where vegetation and organic matter is removed down to mineral soil. Shaded fuel breaks may be created to provide options for suppression resources or to provide opportunities to introduce prescribed fire. In many cases, shaded fuel breaks may be created by thinning along roads. This provides access for mitigation resources and firefighters, as well as enhancing the safety of evacuation routes.

Some areas adjacent to communities require fuel reduction to mitigate a hazardous condition, although are not suitable for fuel breaks.

Larger-scale Treatments

Farther away from WUI communities, the emphasis of treatments often becomes broader. While reducing the buildup of hazardous fuels remains important, other objectives are often included, such as restoration of historic conditions and forest health. Wildfires frequently burn across jurisdictional boundaries, sometimes on landscape scales. As such, these larger treatments need to be coordinated on a strategic level. This requires coordination between projects and jurisdictions, as is currently occurring. Land managers have carried out numerous forest restoration projects across Hardin County and the Shawnee region and have ongoing projects planned on public land that are designed to reduce hazardous fuels to

protect communities and resources, while restoring the declining oak-hickory forest community (see Figure 6.1).

Fuel Treatment Methods

Since specifics of the treatments are not provided in detail in Table 6.1, different fuels reduction methods are outlined in the following narrative.

Several treatment methods are commonly used, including manual treatments, mechanized treatments, and prescribed fire (Table 6.3). This brief synopsis of treatment options is provided for general knowledge; specific projects will require further planning. The appropriate treatment method and cost will vary depending on factors such as the following:

- Diameter of materials
- Proximity to structures
- Acreage of project
- Fuel costs
- Steepness of slope
- Area accessibility
- Density of fuels
- Project objectives

It is imperative that long-term monitoring and maintenance of all treatments is implemented. Post-treatment rehabilitation such as seeding with native plants and erosion control may be necessary.

Table. 6.3. Summary of Fuels Treatment Methods

Treatment	Comments
Machine mowing	Appropriate for large, flat, grassy areas on relatively flat terrain.
Prescribed fire	Can be very cost effective. Ecologically beneficial. Can be used as training opportunities for firefighters. May require manual or mechanical pretreatment. Carries risk of escape, which may be unacceptable in some WUI areas. Unreliable scheduling due to weather and smoke management constraints.
Brush mastication	Brush species tend to re-sprout vigorously after mechanical treatment. Frequent maintenance of treatments are typically necessary. Mastication tends to be less expensive than manual (chainsaw) treatment and eliminates disposal issues.
Timber mastication	Materials up to 10 inches in diameter and slopes up to 30% can be treated. Eliminates disposal issues. Environmental impact of residue being left on site is still being studied.
Manual treatment with chipping or pile burning	Requires chipping, hauling, pile burning of slash in cases where lop and scatter is inappropriate. Pile burning must comply with smoke management policy.
Feller buncher	Mechanical treatment on slopes more than 30% or of materials more than 10 inches in diameter may require a feller buncher rather than a masticator. Costs tend to be considerably higher than masticator.

Manual Treatment

Manual treatment refers to crew-implemented cutting with chainsaws. Although it can be more expensive than mechanized treatment, crews can access many areas that are too steep or otherwise inaccessible with machines. Treatments can often be implemented with more precision than prescribed fire or mechanized methods allow. Merchantable materials and firewood can be removed while non-merchantable materials are often lopped and scattered, chipped, or piled and burned on site. Care should be exercised to not increase the fire hazard by failing to remove or treat discarded material in a site-appropriate manner.

Strategic timing and placement of fuels treatments is critical for effective fuels management practices and should be prescribed based on the conditions of each particular treatment area. Some examples of this would be to place fuel breaks in areas where the fuels are heavier and in the path of prevailing winds and to mow grasses just before they cure and become flammable. Also, burning during the hotter end of the prescription is important since hotter fires are typically more effective at reducing heavy fuels and shrub growth. In areas where the vegetation is sparse and not continuous, fuels treatments may not be necessary to create a defensible area where firefighters can work. In this situation, where the amount of fuel to carry a fire is minimal, it is best to leave the site in its current condition to avoid the introduction of exotic species.

Mechanized Treatments

Mechanized treatments include mowing, mastication (ground-up timber into small pieces) (Figure 6.4), and whole tree felling. These treatments allow for more precision than prescribed fire and are often more cost-effective than manual treatment.

Figure 6.4. Masticated fuel treatment.

Mowing, including ATV and tractor-pulled mower decks, can effectively reduce grass fuels adjacent to structures and along highway rights-of-way and fence lines (Figure 6.5). For heavier fuels, a number of different masticating machines can be used, including drum- or blade-type masticating heads mounted on machines and ranging in size from a small skid-steer to large front-end loaders. Some masticators are capable of grinding standing timber up to 10 inches in diameter. Other masticators are more effective for use in brush or surface fuels. Mowing and mastication do not actually reduce the amount of on-site biomass but alter the fuel arrangement to a less combustible profile.

Figure 6.5. Mowed ROWs like this one in the northern portion of the county, reduce the potential for vehicle ignitions.

In existing fuel break areas maintenance is crucial especially in areas of encroaching shrubs or trees. In extreme risk areas more intensive fuels treatments may be necessary to keep the fire on the ground surface and reduce flame lengths. Within the fuel break, shrubs should be removed, and the branches of trees should be pruned from the ground surface to a height of 4 to 8 feet, depending on the height of the fuel below the canopy, and thinned with a spacing of at least two to three times the height of the trees to avoid movement of an active fire into the canopy.

Mechanical shears mounted on feller bunchers are used for whole tree removal. The stems are typically hauled offsite for utilization while the limbs are discarded. The discarded material may be masticated, chipped, or burned in order to reduce the wildfire hazard and to speed the recycling of nutrients.

Prescribed Burning

Prescribed burning is also a useful tool to reduce the threat of extreme fire behavior by removing excessive standing plant material (Figure 6.6), litter, and woody debris while limiting the encroachment of shrubby vegetation. Where possible, prescribed fire could occur on public lands since fire is ecologically beneficial to this fire-adapted vegetation community and wildlife habitat. As outlined in fire management planning documents for agencies with jurisdiction in the area, the purpose of prescribed burning in this vegetation type is to 1) reducing available fuel, 2) maintain fire-dependent communities such as oak-hickory stands and warm season grasses, and 3) reduce or eliminate exotic vegetation. The USFS, IDNR, and SIPBA are already cooperating to implement prescribed burning in Hardin County (Figure 6.7 and Figures 6.8).

Figure 6.6. Heavy understory vegetation in a pretreated stand.

Figure 6.7. Post-burn treatment area showing open understory.

Figure 6.8. Prescribed fires are routinely used on public and private lands to clear leaf litter, open the canopy and stimulate growth of native oak-hickory woodlands.

Prescribed burning in the county is considered moderate in complexity because of the landownership mosaic and would only be implemented by properly qualified personnel. All prescribed fire operations will be conducted in accordance with federal and state laws and regulations. Public safety would be the primary consideration in the design of any prescribed burn plan so as to not negatively impact the WUI. The areas to be burned would occur within fuel breaks or appropriate fire lines (USFS 2015). Agency use of prescribed fire on public lands would be carried out within the confines of the agency's fire management planning documents and would require individual prescribed burn plans that are developed for specific burn units and consider smoke management concerns and sensitive receptors within the WUI. Smoke monitors could be placed in areas where smoke concerns have been raised in the past.

Following any type of fuels reduction treatment, post-treatment monitoring should continue to ensure that management actions continue to be effective throughout the fire season. The vegetation within this ecosystem can change rapidly in response to drought or moisture from year to year and during the course of the season, so fuels treatments should be adjusted accordingly.

Several re-entries may be needed to meet full resource management objectives in this vegetation type, so a solid maintenance plan and is needed to ensure success.

Impacts of Prescribed Fire on Communities

Managing smoke from prescribed fires is becoming an important part of planning for prescribed burning. The State of Illinois has smoke management guidelines that must be followed by landowners planning to use prescribed burning on their properties. The Illinois Pollution Control Board and the Illinois Environmental Protection Agency regulate open burning in the state. Land managers must complete an open burn permit application that outlines standard conditions for open burning. Please see the following for more information on burn permitting: http://www.epa.illinois.gov/topics/forms/air-permits/open-burning/index.

Prescribed fires can have impacts on air quality that may impact local communities. Impacts on a regional scale are typically only acute when many acres are burned on the same day, which is rare in this region. Local problems are occasionally acute due to the large quantities of smoke that can be produced in a given area during a short period of time. Residents with respiratory problems may be impacted during these burning periods since smoke consists of small particles of ash, partly consumed fuel, and liquid droplets that are considered air pollutants. Other combustion products include visible gases such as carbon monoxide, carbon dioxide, hydrocarbons, and small quantities of nitrogen oxides. Oxides of nitrogen are usually produced at temperatures only reached in piled or windrowed slash or in very intense wildfires that are uncommon in the region. In general, prescribed fires produce inconsequential amounts of these gases.

Effects of smoke can be managed by burning on days when smoke will blow away from smoke-sensitive areas. Precautions are taken when burning near populated areas, highways, airports, and other smoke-sensitive areas. Any smoke impact downwind is considered before lighting a fire. Smoke management is a significant component of all prescribed burn plans. Other mitigating actions include alerting the public of upcoming burning activities, including the purpose, best conditions for ensuring good smoke dispersal, duration, size, and location of projects. Local radio, newspapers, social media, and TV can provide broad coverage for alerts. Land management agencies in the project area consistently work with concerned citizens regarding smoke management and attempt to provide solutions such as the placement of smoke monitors at sensitive sites. As part of the CWPP planning process, agency staff outreached to stakeholders to inventory and map the locations of all smoke sensitive receptors in the county.

Burning across Borders

Due the complex landownership in Hardin County, the Shawnee National Forest has, for the last 12 years, been using Participating Agreements, under the Wyden Authority, to enlarge burn units onto non-federal lands to expand the benefits of prescribed fire to those lands, capitalize on the economy of scale, and use existing features as control lines to speed or improve burn preparation and implementation. Building a network of private landowners and collaborating and informing those landowners has required development of an extensive network of organizations, including the IDNR, SIPBA, the River to River CWMA, and the RC&D.

Thinning and Prescribed Fire Combined

Combining thinning and prescribed fire can be the most effective treatment (Graham et al. 2004). In forests where fire exclusion or disease has created a buildup of hazardous fuels, prescribed fire cannot be safely applied and pre-burn thinning is required. The subsequent use of fire can further reduce residual fuels and reintroduce this ecologically imperative process.

Management of Non-native Plants

The USDA maintains a list of noxious weeds rated from A to C based on the current degree of infestation of the species and the potential for eradication (USDA 2010). Fuel treatment approaches should always consider the potential for introduction or proliferation of invasive non-native species as a result of management actions.

The River to River CWMA is a partnership between 13 federal and state agencies, organizations, and universities aimed at coordinating efforts and programs for addressing the threat of invasive plants in Southern Illinois (River to River CWMA 2016). The River to River CWMA is an active stakeholder in the CWPP planning process.

The Nature Conservancy, in partnership with the IDNR, and the USFS Northeast Area State and Private Forestry Program developed the Southern Illinois Invasive Species Strike Team (ISST) (formally known as the Southern Illinois Exotic Plant Strike Team) to control exotic plants in state parks, state nature preserves, and adjacent private lands that serve as pathways onto these properties (ISST 2015).

Both the River to River CWMA and ISST are active partners in land management in Hardin County and should continue to play a significant role in planning and implementing invasive species control. Priority target species are stiltgrass and Japanese honeysuckle. Both the River to River CWMA and ISST treat lands using chemical treatment, manual treatment, and prescribed fire, with the methodology depending on the land ownership, resource issues, target species, and project objectives.

Fuel Breaks

Fire behavior in the CWPP planning area has been modeled using FlamMap. This assessment provides estimates of flame length and rate of spread; the information should be used by land managers when prescribing treatments. Land managers are cautioned, however, that fuel breaks will not always stop a fire under extreme fire behavior or strong winds; these should only be seen as a mitigating measure and not a fail-safe method for fire containment. Furthermore, fuel break utility is contingent upon regular maintenance, as regrowth in a fuel break can quickly reduce its effectiveness and vegetation in this ecosystem is known to quickly re-sprout and reestablish. Input provided during public outreach activities identified a need for maintenance of existing fuel breaks as well as sustained maintenance of access roads that have become overgrown (Figure 6.9). Maintenance of existing breaks could be more cost efficient than installation of new features.

Because of the dominant wind patterns in Hardin County (i.e., out of the west-southwest), fuel breaks are recommended on the west sides of communities.

Figure 6.9. Heavy roadside vegetation.

It is not possible to provide a standard treatment prescription for the entire landscape because fuel break dimensions should be based on the local fuel conditions and prevailing weather patterns. For example, in some areas, clearing an area too wide could open the landscape to strong winds that could generate more intense fire behavior and/or create wind throw.

Strategic placement of fuel breaks is critical to prevent fire from moving from wildland fuels into adjacent neighborhoods. For effective management of most fuels, fuel breaks should be prescribed based on the conditions in each particular treatment area. Some examples of this would be to place fuel breaks in areas where fuels are heavier or in areas with easy access for fire crews. In areas where the vegetation is discontinuous, fuel treatments may not be necessary. In this situation it is best to leave the site in its current condition to avoid the introduction of more flammable, exotic species which may respond readily following disturbance.

Well-managed fuels reduction projects often result in ecological benefits to wildlife and watershed health. Simultaneously, planning and resource management efforts should occur when possible while reducing fuels to ensure that the land remains viable for multiple uses in the long term. The effectiveness of any fuels reduction treatment will increase over time with a maintenance and monitoring plan. Monitoring will also ensure that objectives are being met in a cost-effective manner.

COHESIVE STRATEGY GOAL 2: FIRE-ADAPTED COMMUNITIES

Goal 2 of the Cohesive Strategy/NERAP is **Fire-Adapted Communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.**

This goal under NERAP is broken down into:

Regional Option 2A: Focus on promoting and supporting local adaptation activities to be taken by communities.

Regional Option 2B: Focus on directing hazardous fuel treatments to the WUI.

Regional Option 2C: Focus on promoting and supporting prevention programs and activities.

In this CWPP update, recommendations for fire-adapted communities include public education and outreach actions and actions to reduce structural ignitability.

RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

Just as environmental hazards need to be mitigated to reduce the risk of fire loss, so do the human hazards. Lack of knowledge, lack of positive actions, and negative actions all contribute to increased risk of loss in the WUI.

Many Hardin County residents perceive themselves to be at low or medium risk of wildfire because of the low incidence of wildfire starts over the last several decades. However, it is important to continually raise awareness of fire risk and improve fire education particularly since the county is composed of such a vast area of forested public land that historically would have undergone more frequent wildfire (Winter and Fried 2000; McCaffrey 2004). Table 6.4 lists recommendations for improving public education and outreach.

Many residents could benefit from greater exposure to the Firewise Communities[4], Fire Adapted Communities[5] and Ready, Set, Go! Programs. Workshops demonstrating and explaining Firewise Communities principles have been suggested to increase homeowner understanding of home protection from wildfire. Information about the programs are available at http://www.firewise.org/usa/index.htm and http://www.wildlandfirersg.org/. Greater participation in these programs could improve local understanding of wildfire and, in turn, improve protection and preparedness.

Other methods to improve public education could include increasing awareness about fire department response and fire department resource needs; providing workshops at demonstration sites showing

[4] Firewise Communities- A Model of Local Initiative and Cooperation: www.firewise.org

[5] Fire Adapted Communities Coalition: http://www.fireadapted.org/resources/meet-the-coalition.aspx

Firewise Communities landscaping techniques or fuels treatment projects; organizing community cleanups to remove green waste; publicizing availability of government funds for thinning and prescribed burning; and, most importantly, improving communication between homeowners and local land management agencies to improve and build trust, particularly since the implementation of fuel treatments and better maintenance of existing treatments needs to occur in the interface between public and private lands.

Table 6.4 lists public education and outreach projects recommended for implementation in the county.

Table 6.4. Public Outreach and Education Recommendations

Project	Description	Presented By	Target Date	Resources Needed	Serves to…	Priority
Public Awareness Campaign for recreational use areas.	Increase awareness of fire potential in recreation areas, including campsites, trails and areas used for events: • Hog Rock • Eclipse Event (2024) April- during fire season. • High Knob area • Garden of Gods	• USFS • IDNR	Summer/ Fall 2020	• Update and expand existing signage and posting sites. • Replace, or augment any existing Smokey Bear signs with electronic Fire Danger Warning Signs that are solar powered, LED displays (visible day and night), and accessible and programmable through an internet website. • Utilize local media.	• Protect communities and infrastructure by raising awareness of local citizens and those traveling in the area about actions that can prevent fire.	High
Improve relevance of wildfire literature for public consumption	• Tailor the national wildfire curriculum including Firewise materials to better serve the Shawnee Region. • Seek funding to develop a “Living with Fire”/ Homeowner Guide type brochure for Shawnee NF neighbors.	• USFS • IDNR	Summer/ Fall 2020	• Utilize the 2019 Northeast Wildfire Preparedness Resource Guide as a source for relevant and updated information. http://www.northeasternforests.org/app/webroot/uploads/files/NE%20Wildfire%20Preparedness%20Resource%20Guide%20-%20March_2019.pdf • Distribute materials via USFS offices and land management partners. • Make literature available to local fire departments and seek funding to distribute. • Flyers could be sent out with utility bills or other community mailings. • Utilize the Shawnee National Forest Learning Center: http://www.fs.usda.gov/main/shawnee/learning	• Educate and inform local residents of real actions that they can apply for protection of their homes that are specifically tailored to the fuel types in the region.	High

Project	Description	Presented By	Target Date	Resources Needed	Serves to…	Priority
Utilize social media to provide a consistent message and outlet for wildfire education.	Develop a Shawnee Regional Facebook Page with consistent messaging for Hardin County and surrounding counties.	• SIRPDC	Summer/ Fall 2020	• Staff time for hosting and updating the Facebook page.	• Educate and inform local residents across the Shawnee region of ongoing activities related to wildfire risk and fire prevention, as well as engage local residents in mitigating wildfire risk and working with land managers and fire responders.	High
Integrate CWPP with a Countywide Hazard Mitigation Plan	• Utilize the CWPP as the fire chapter of the HMP for the county. • Ensure the county is eligible for FEMA funding for pre-disaster hazardous fuels projects or post-fire rehabilitation. • Engage the public in the development of the HMP.	• SIRPDC • EMA	Summer 2020	• FEMA HMP funding: https://www.fema.gov/hazard-mitigation-grant-program	• Integrate wildfire hazard into a larger hazard assessment so that the county can be eligible to apply for pre-disaster mitigation grant funding under FEMA to implement hazardous fuels projects and emergency response projects.	High
Emergency preparedness meetings	• Use American Red Cross volunteers and other preparedness experts. • Attend community functions and hold special meetings to provide guidance for creating household emergency plans.	• EMA • American Red Cross • Town, county, state personnel • VFDs.	Ongoing	• Written materials.	• Improve preparedness by facilitating the communication between family members and neighbors about what procedures to follow in the event of a wildfire.	High

Project	Description	Presented By	Target Date	Resources Needed	Serves to…	Priority
Fire departments open invitation days	• Raise awareness of the municipal fire departments within Hardin County through open house and tours of equipment. • Recruitment drive for volunteers.	• Hardin County • SIRPDC	Annually; pre-fire season would be advised.	• Advertising. • Refreshments. • Handouts.	• Protect communities and infrastructure by potentially increasing recruitment and financial support for the fire service.	Moderate
Neighbors for defensible space	• Organize a community group made up of residents and agency personnel to develop materials and communicate relevant defensible space messages. Could coordinate with fire departments or USFS. • Possibility to coordinate actual implementation of defensible space and slash clear-up with community groups/churches/the school.	• Fire departments • County	Spring 2021	• Funding to help cover costs of materials (green waste removal or chipper) and participation. • People trained in defensible space practices.	• Engage diverse stakeholders in reaching out to community members and encourage defensible space practices. • Empower homeowners to make affordable and effective changes to reduce the vulnerability of individual homes.	Moderate
Media involvement	• Develop a local newspaper column that provides fire safety information, promotional information for VFDs, fire announcements, and emergency planning.	• Agency Public Information Officers. • County EMA	Monthly column year-round	• Columns • Information, and articles to be provided by fire departments, towns, county, agency representatives.	Protect communities and infrastructure through increasing public awareness and providing a channel for information regarding emergency fire response.	Moderate

Project	Description	Presented By	Target Date	Resources Needed	Serves to…	Priority
Promote and Increase the use of prescribed burning as a fuel's reduction method	• Gain public support for using prescribed burns to reduce fuel loads and to improve ecosystem health through a pilot burn project and demonstration site. • Utilize SIPBA for pilot burn site. • Consider developing informational material for distribution at natural areas or via email distribution lists.	• SIPBA • NRCS • USFS • County • IDNR	Spring 2020	• Prescribed burn prescription • Type 6 engines • Hand crews • Equipment • Research and costs of producing, printing, and distributing paper informational flyer.	Protect communities and infrastructure by reducing fuel loads.	Moderate
Raise awareness of fire prevention at a young age	• Introduce wildfire prevention into school curriculum. Work with fire departments, school board and Public Information Officers to organize "kid-focused" travelling workshops.	• School District • County • VFDs • Municipalities	Spring 2020	• Firewise materials. • Smokey Bear literature. • Presenters.	Protect communities and infrastructure through increased awareness.	Moderate

RECOMMENDATIONS FOR REDUCING STRUCTURAL IGNITABILITY

Table 6.5 provides a list of community-based recommendations to reduce structural ignitability that should be implemented throughout the HCCWPP planning area. Reduction of structural ignitability depends largely on public education that provides homeowners the information they need to take responsibility for protecting their own properties. A list of action items that individual homeowners can follow can be found below. Carrying out fuels reduction treatments on public land may only be effective in reducing fire risk to some communities; however, if homeowners have failed to provide mitigation efforts on their own land, the risk of home ignition remains high and firefighter lives are put at risk when they carry out structural defense. Preparing for wildland fire by creating defensible space around the home is an effective strategy for reducing structural ignitability. Studies have shown that burning vegetation beyond 120 feet of a structure is unlikely to ignite that property through radiant heat (Cohen and Butler 1996), but fire brands that travel independently of the flaming front have been known to destroy houses that had not been impacted by direct flame impingement. Education about managing the landscape around a structure, such as removing weeds and debris within a 30-foot radius and keeping the roof and gutters of a home clean, are two methods for creating defensible space. Educating people about the benefits of the proper maintenance of their property that includes pruning and trimming trees and shrubs and, where warranted, the removal of trees and other vegetation, and using Firewise Communities landscaping methods on their property is also essential for successful household protection.

It is important to note that no two properties are the same. Homeowners and communities are encouraged to research which treatments would have the most effect for their properties. Owners of properties on steep slopes, for example, should be aware that when constructing defensible space they have to factor in slope and topography, which would require extensions to the conventional 30-foot recommendations. A number of educational programs are now available to homeowners through programs like Ready, Set, Go! (http://www.wildlandfirersg.org), Firewise (www.firewise.org) and the Northeast Wildfire Preparedness Resource Guide (Northeast Regional Cohesive Strategy Committee 2019). More detailed information on reducing structural ignitability can also be found in Appendix I (Homeowner's Guide).

Some structural ignitability hazards are related to homes being in disrepair, vacant or abandoned lots, and minimal yard maintenance. In order to influence change in homeowner behavior, county ordinances may be needed.

Table 6.5. Recommendations for Reducing Structural Ignitability

Project	Private Lands/Homeowners	Programs Available	Description	Resources/Funding	Timeline	Priority
Offer fire protection workshops.	• All residents would be encouraged to participate. • Led by fire departments in conjunction with the USFS and RD&C.	• Agency outreach personnel • Firewise • Ready, Set, Go!	Offer hands-on workshops to highlight individual home vulnerabilities and teach how-to techniques to reduce ignitability of common structural elements. Examples include: • Installing metal flashing between houses and fences or decks, • Installing wire mesh over eaves, vents, and under decks.	• www.firewise.org, www.nfpa.org, www.wildlandfirersg.org. • https://www.fema.gov/hazard-mitigation-grant-program.	Summer 2020	High
Individual home-hazard assessments.	• All residents would be encouraged to participate. • Follow funding model used by Pope County. • Fire department in cooperation with RD&C.	• Firewise Assessing Hazards in the Home Ignition Zone. • NFPA 1144 structural assessment.	• Develop or train a team of citizens that could perform home assessments. • Seek funding to pay volunteers.	• www.firewise.org, www.nfpa.org, www.wildlandfirersg.org. • https://www.fema.gov/hazard-mitigation-grant-program.	Summer 2020	High
Implement spring community yard clean-up days and provide chipper and/or other green waste disposal opportunities to residents.	All residents would be encouraged to participate in each community.	• IDNR • RC&D	• A community-led day of yard clean-up with fire mitigation in mind would encourage large numbers within the community to carry-out mitigation measures and implementation of defensible space. • The event could be promoted by Hardin County, the RC&D and waste pick-up coordinated with the event. • Residents could assist elderly or infirm neighbors.	• Hardin County • Municipalities	Fall 2020	High
Assess and improve accessibility to property	All residents would be encouraged to participate.	All fire departments	Weekend program to inform homeowners about the importance of keeping driveways accessible to fire trucks and emergency responders.	• EMA • Fire departments	Fall 2020	Moderate

Project	Private Lands/Homeowners	Programs Available	Description	Resources/Funding	Timeline	Priority
Provide printed list of mitigation measures to homeowners with different scales of actions.	All residents would be encouraged to participate.	• Fire departments • Firewise Communities • Academic and peer-reviewed literature	List of action items broken down by cost: • Low or no cost – ensure house numbers are easily viewed from the street. • Medium cost – annual clearance and thinning of trees and shrubs along driveways to facilitate save access by emergency vehicles.	RC&D	Fall 2020	Moderate

Action Items for Homeowners to Reduce Structural Ignitability

Low or No Cost Investment (<$50)	Regularly check fire extinguishers and have a 100-foot hose available to wet perimeter.
	Maintain defensible space for 30 feet around home. Work with neighbors to provide adequate fuels mitigation in the event of overlapping property boundaries.
	Make every effort to keep lawn mowed and green during fire season.
	Screen vents with non-combustible meshing with mesh opening not to exceed nominal ¼-inch size.
	Ensure that house numbers are easily viewed from the street.
	Keep wooden fence perimeters free of dry leaves and combustible materials. If possible, non-combustible material should link the house and the fence.
	Keep gutters free of vegetative litter. Gutters can act as collecting points for fire brands and ashes.
	Store combustible materials (firewood, propane tanks, grills) away from the house; in shed, if available.
	Clear out materials from under decks and/or stacked against the structure. Stack firewood at least 30 feet from the home, if possible.
	Reduce your workload by considering local weather patterns. Because prevailing winds in the area are often from the west-southwest, consider mitigating hazards on the west corner of your property first, then work around to cover the entire area.
	Seal up any gaps in roofing material and enclose gaps that could allow fire brands to enter under the roof tiles or shingles.
	Remove flammable materials from around propane tanks.

Minimal Investment (<$250)	When landscaping in the Home Ignition Zone (HIZ) (approximately 30 feet around the property), select non-combustible plants, lawn furniture, and landscaping material. Combustible plant material like junipers and ornamental conifers should be pruned and kept away from siding. If possible, trees should be planted in islands and no closer than 10 feet to the house. Tree crowns should have a spacing of at least 18 feet when within the HIZ. Vegetation at the greatest distance from the structure and closest to wildland fuels should be carefully trimmed and pruned to reduce ladder fuels, and density should be reduced with approximately 6-foot spacing between trees crowns.
	Box in eaves, attic ventilation, and crawl spaces with non-combustible material.
	Work on mitigating hazards on adjoining structures. Sheds, garages, barns, etc., can act as ignition points to your home.
	Enclose open space underneath permanently located manufactured homes using non-combustible skirting.
	Clear and thin vegetation along driveways and access roads so they can act as a safe evacuation route and allow emergency responders to access the home.
	Purchase or use a National Oceanic and Atmospheric Administration weather alert radio to hear fire weather announcements.
Moderate to High Investment (>$250)	Construct a non-combustible wall or barrier between your property and wildland fuels. This could be particularly effective at mitigating the effect of radiant heat and fire spread where 30 feet of defensible space is not available around the structure.
	Construct or retrofit overhanging projections with heavy timber that is less combustible.
	Replace exterior windows and skylights with tempered glass or multilayered glazed panels.
	Invest in updating your roof to non-combustible construction. Look for materials that have been treated and given a fire-resistant roof classification of Class A. Wood materials are highly combustible unless they have gone through a pressure-impregnation fire-retardant process.
	Construct a gravel turnaround in your driveway to improve access and mobilization of fire responders.
	Treat construction materials with fire-retardant chemicals.
	Install a roof irrigation system.
	Replace wood or vinyl siding with nonflammable materials.
	Relocate propane tanks underground.

COHESIVE STRATEGY GOAL 3: WILDFIRE RESPONSE

Goal 3 of the Cohesive Strategy/NERAP is **Wildfire Response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions**:

This goal under NERAP is broken down into:

Regional Option 3A: Improve the organizational efficiency and effectiveness of the wildland fire community.

Regional Option 3B: Increase the local response capacity for initial attack of wildfires.

Regional Option 3C: Further develop shared response capacity for extended attack and managing wildfire incidents with long duration fire potential.

This chapter describes fire response capabilities throughout the county and provides recommended actions that jurisdictions could undertake to improve wildfire response.

RECOMMENDATIONS FOR IMPROVING FIRE RESPONSE CAPABILITIES

Educating the public so they can reduce its dependence on fire departments is essential because these resources are often stretched thin due to limited personnel.

Table 6.6 provides recommendations for improving firefighting capabilities. Many of these recommendations are general in nature.

Table 6.6. Fire Response Capability Recommendations

Project	Fire Department	Description	Timeline	Contact	Priority
Provide minimum wildland personal protective equipment (PPE) for all firefighters in Hardin County.	All fire departments	• Seek grant money to be spent on acquisition of PPE. • Task a member of each department to inventory PPE and investigate grant sources. • Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	• Monthly review of grant opportunities • Annual audit of PPE	• Review NFPA Standard 1977 • Responsibility of Fire Chief • FEMA Assistance to Firefighters Grant Program, Fire Prevention and Safety. • Federal Excess Program	Very high
Increase the number of "red-carded" individuals in the fire departments.	All fire departments	• Offer NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to VFDs every Fall with an option to attend on weekends. Possible incentives needed to encourage attendance. • Work with federal agencies to develop evening and weekend courses for volunteers. • Pursue online training programs and have trainees work with an in-house trained mentor to complete training. • Facilitate Annual refresher participation by having in-house refreshers available or convene agencies to have a Hardin County wide refresher.	Annually, or following recruitment drives	• USFS • IDNR • SIPBA	Very high
Carry out detailed pre-incident planning for remote communities that may be subject to slow response times. Priority areas: Hicks, Karber's Ridge, Cadiz, Sparks Hill, Rock Creek, Finneyville, Lamb, Ohio River communities in event road access not available.	All fire departments EMA	• The CWPP identifies areas of high risk and hazard that is largely due to their remote location and slow response times. Pre-planning in these areas may help identify actions that could be taken to mitigate response times or better prepare the community. • Work with private landowners to identify and document available water supply for drafting. • Develop a plan for fire response in areas along the Ohio River. Determine suitable equipment for a river based response when road access is limited.	Annually during winter months	• EMA • All fire departments • Coal-belt Association • Cave-In-Rock Ferry • Spivey's boats	Very high

Project	Fire Department	Description	Timeline	Contact	Priority
Increase VFD recruitment (diversify age classes).	All fire departments	Target fire education at school to encourage younger generations to become interested in firefighting. Carry out recruitment drives through open house and mailings. Provide training incentives for VFD firefighters.	Annually	• School • All fire Departments	High
Increase funds for VFDs.	All fire departments	• Maintain contact with State Division of Fire Safety and regularly seek grant money. • Implement regular evaluations of resource needs for each VFD and make available to public to raise awareness of shortages. • Maintain updated list of district fires and provide to IDNR/USFS. • Use local media to inform public of fire resources situation. Work with local newspaper editor to have a year-round column that documents fire department activities. • Apply for rural fire assistance program grants. • Improve International Standards Organization ratings.	Monthly review of grant opportunities	• State and county • FEMA Assistance to Firefighters Grant Program, Fire Prevention and Safety. • Rural Fire Assistance • SAFER • VFD assistance	High
Improved communication between agencies, fire departments, and dispatch.	• All fire departments • FS • IDNR	• Convening pre-fire planning meetings with all partners to determine roles and responsibilities and revisit mutual aid agreements. • Institute an annual meeting of cooperators to review status of MOU's and review previous fire season "lessons learned". • Convene the CWPP Core Team twice annually to review the CWPP project list and build coordination.	Spring 2020 and then annual	• All fire departments • FS • IDNR	High
Map restricted bridges and roads	Dispatch • All fire departments • County Engineer	• The ongoing small structure study (5 counties) should provide this data. • This data could be added to dispatch computer data (computer aided dispatch system) to facilitate fire response. • Dispatchers could direct the responders based on apparatus and weight limits.	Spring 2020	• County Engineer	High

Project	Fire Department	Description	Timeline	Contact	Priority
Map and test hydrants and dry hydrant systems. Improve visibility of existing hydrants.	• All fire departments • RC&D	• Locate existing dry hydrants and map locations. • Test functionality. • Provide to fire departments and/or install new dry hydrants in areas with minimal water supply for suppression. • This data could be added to dispatch computer data (computer aided dispatch system) to facilitate fire response. • Add hydrant markers to reduce obscurity by vegetation.	Spring 2020	• NRCS • Environmental Quality Incentives Program (EQIP) • USFS • IDNR	High
New fire station for unincorporated communities in northern Hardin County.	County	• Unincorporated communities, including Karber's Ridge, Cadiz, etc. have been identified as having excessively long response times due to their remote location. The Core Team has identified as a priority the need for a new station to serve these communities. • Would also need to recruit volunteers to service these stations. • Consider a Hardin County Fire Department under which the municipal stations and the new "rural" station would fall.	Spring 2020	• Hardin County • EMA • Department of Homeland Security Funding: Pre-Disaster Mitigation and Assistance to Firefighters Grant Program. • FEMA pre-disaster mitigation grant.	Very High
Greater enforcement of burn permitting.	County Sheriff's Department	• Although burn permitting is required by State Law for all burning, there is very little enforcement. Since most wildfires are human caused (resulting from debris burning) then better enforcement of burning is necessary to reduce unintended wildfires and better awareness of the burn permit process is needed. • IDNR administer the permit. For more information see Appendix C.	Spring 2020	• County	Moderate
Mandatory house numbering.	County	• The County has 911 addressing ongoing. • Residents would be required to post reflective house markers. • House markers would be provided by the county.	Summer 2021	• County	Moderate
Installation of fire boxes at all recreation areas.	Depends on agency managing land	• Installation of fire boxes to house fire equipment at recreation areas like Whoopie Cat Lake, Tower Rock Campground etc.	Fall 2020	• County • USFS • IDNR	Moderate

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CHAPTER 7 – MONITORING AND EVALUATION STRATEGY

Developing an action plan and an assessment strategy that identifies roles and responsibilities, funding needs, and timetables for completing highest-priority projects is an important step in organizing the implementation of the HCCWPP. Table 6.1 in the previous section identifies tentative timelines and monitoring protocols for fuels reduction treatments, the details of which are outlined below.

All stakeholders and signatories to this CWPP desire worthwhile outcomes. We also know that risk reduction work on the ground, for the most part, is often not attainable in a few months—or even years. The amount of money and effort invested in implementing a plan such as this requires that there be a means to describe, quantitatively or qualitatively, if the goals and objectives expressed in this plan are being accomplished according to expectations.

This section will present a suite of recommended CWPP monitoring strategies intended to help track progress, evaluate work accomplished, and assist planners in adaptive management.

Strategies outlined in this section take into account several variables:

- Do the priorities identified for treatment reflect the goals stated in the plan? Monitoring protocols can help address this question.
- Can there be ecological consequences associated with fuels work? We may be concerned about soil movement and/or invasive species encroachment post-treatment. Relatively cost-effective monitoring may help clarify changes.
- Vegetation will grow back. Thus fuel break maintenance and fuels modification in both the home ignition zone and at the landscape scale require periodic assessment. Monitoring these changes can help decision-makers identify appropriate treatment intervals.

As the CWPP evolves over time, there may be a need to track changes in policy, requirements, stakeholder changes, and levels of preparedness. These can be significant for any future revisions and/or addendums to the CWPP.

Table 7.1 identifies recommended monitoring strategies, both quantifiable and non-quantifiable, for assessing the progress of the CWPP. It must be emphasized that these strategies are 1) not exhaustive

(new strategies and protocols can evolve with new CWPP action items) and 2) dependent on available funds and personnel to implement them.

Table 7.1. Recommended Monitoring Strategies

Strategy	Task/Tool	Lead	Remarks
Photographic record (documents pre- and post-fuels reduction work, evacuation routes, workshops, classes, field trips, changes in open space, treatment type, etc.)	Establish field global positioning system (GPS) location; photo points of cardinal directions; keep photos protected in archival location	Core Team member	Relatively low cost; repeatable over time; used for programs, and tracking objectives
Number of acres treated (by fuel type, treatment method)	GPS/GIS/fire behavior prediction system	Core Team member	Evaluating costs, potential fire behavior
Number of home ignition zones/defensible space treated to reduce structural ignitability	GPS	Homeowner	Structure protection
Number of residents/citizens participating in any CWPP projects and events	Meetings, media interviews, articles	Core Team member	Evaluate culture change objective
Number of homeowner contacts (brochures, flyers, posters, etc.)	Visits, phone	Agency representative	Evaluate objective
Number of jobs created	Contracts and grants	Core Team member	Evaluate local job growth
Education outreach: number, kinds of involvement	Workshops, classes, field trips, signage	Core Team member	Evaluate objectives
Emergency management: changes in agency response capacity	Collaboration	Agency representative	Evaluate mutual aid
Codes and policy changes affecting CWPP	Qualitative	Core Team	CWPP changes
Number of stakeholders	Added or dropped	Core Team	CWPP changes
Wildfire acres burned, human injuries/fatalities, infrastructure loss, environmental damage, suppression and rehabilitation costs	Wildfire records	Core Team	Compare with 5- or 10-year average

An often overlooked but critical component of fuel treatment is monitoring. It is important to evaluate whether fuel treatments have accomplished their defined objectives and whether any unexpected outcomes have occurred. In addition to monitoring mechanical treatments, it is important to carry out comprehensive monitoring of burned areas to establish the success of fuels reduction treatments on fire behavior, as well as monitoring for ecological impacts, repercussions of burning on wildlife, and effects on soil chemistry and physics. Adaptive management is a term that refers to adjusting future management based on the effects of past management. Monitoring is required to gather the information necessary to inform future management decisions. Economic and legal questions may also be addressed through monitoring. In addition, monitoring activities can provide valuable educational opportunities for students.

The monitoring of each fuels reduction project would be site-specific, and decisions regarding the timeline for monitoring and the type of monitoring to be used would be determined by project. Monitoring and reporting contribute to the long-term evaluation of changes in ecosystems, as well as the knowledge base about how natural resource management decisions affect both the environment and the people who live in it.

The most important part of choosing a monitoring program is selecting a method appropriate to the people, place, and available time. Several levels of monitoring activities meet different objectives, have different levels of time intensity, and are appropriate for different groups of people. They include the following:

Minimum—Level 1: Pre- and Post-project Photographs

Appropriate for many individual homeowners who conduct fuels reduction projects on their properties.

Moderate—Level 2: Multiple Permanent Photo Points

Permanent photo locations are established using rebar or wood posts, global positioning system (GPS)-recorded locations, and photographs taken on a regular basis. Ideally, this process would continue over several years. This approach might be appropriate for more enthusiastic homeowners or for agencies conducting small-scale, general treatments.

High—Level 3: Basic Vegetation Plots

A series of plots can allow monitors to evaluate vegetation characteristics such as species composition, percentage of cover, and frequency. Monitors then can record site characteristics such as slope, aspect, and elevation. Parameters would be assessed pre- and post-treatment. The monitoring agency should establish plot protocols based on the types of vegetation present and the level of detail needed to analyze the management objectives.

Intense—Level 4: Basic Vegetation Plus Dead and Downed Fuels Inventory

The protocol for this level would include the vegetation plots described above but would add more details regarding fuel loading. Crown height or canopy closure might be included for live fuels. Dead and downed fuels could be assessed using other methods, such as Brown's transects (Brown 1974), an appropriate photo series (Ottmar et al. 2000), or fire monitoring (Fire Effects Monitoring and Inventory System [FIREMON]) plots.

IDENTIFY TIMELINE FOR UPDATING THE CWPP

The HFRA allows for maximum flexibility in the CWPP planning process, permitting the Core Team to determine the timeframe for updating the CWPP; it is suggested that a formal revision be made on the fifth anniversary of signing and every 5 years following. The Core Team members are encouraged to meet on an annual basis to review the project list, discuss project successes, and strategize regarding project implementation funding.

IMPLEMENTATION

The HCCWPP makes recommendations for prioritized fuels reduction projects and measures to reduce structural ignitability and carry out public education and outreach. Implementation of fuels reduction projects need to be tailored to the specific project and will be unique to the location depending on available resources and regulations. On-the-ground implementation of the recommendations in the HCCWPP planning area will require development of an action plan and assessment strategy for completing each project. This step will identify the roles and responsibilities of the people and agencies involved, as well as funding needs and timetables for completing the highest-priority projects (SAF 2004). Information pertaining to funding is provided in Appendix H.

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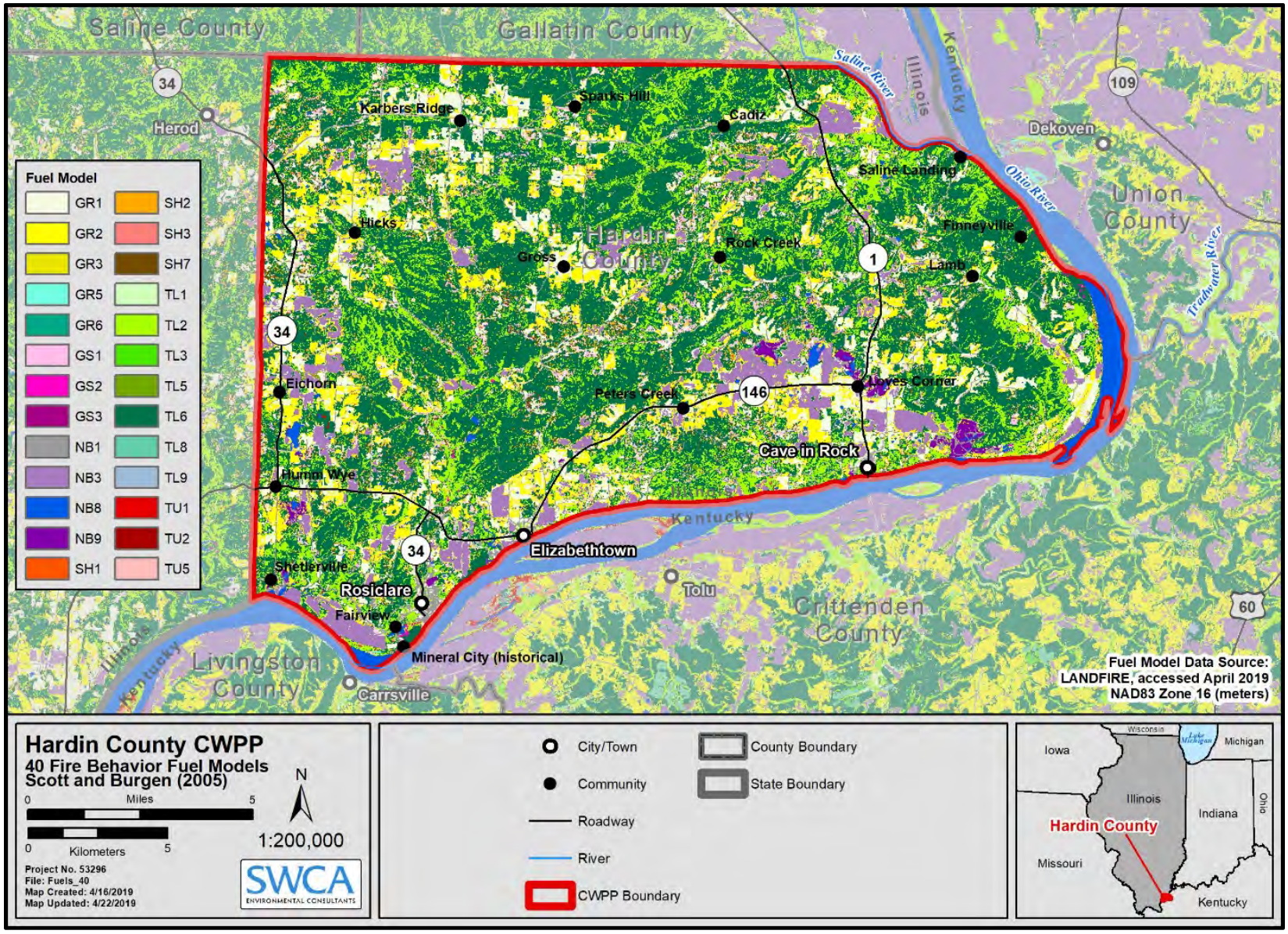
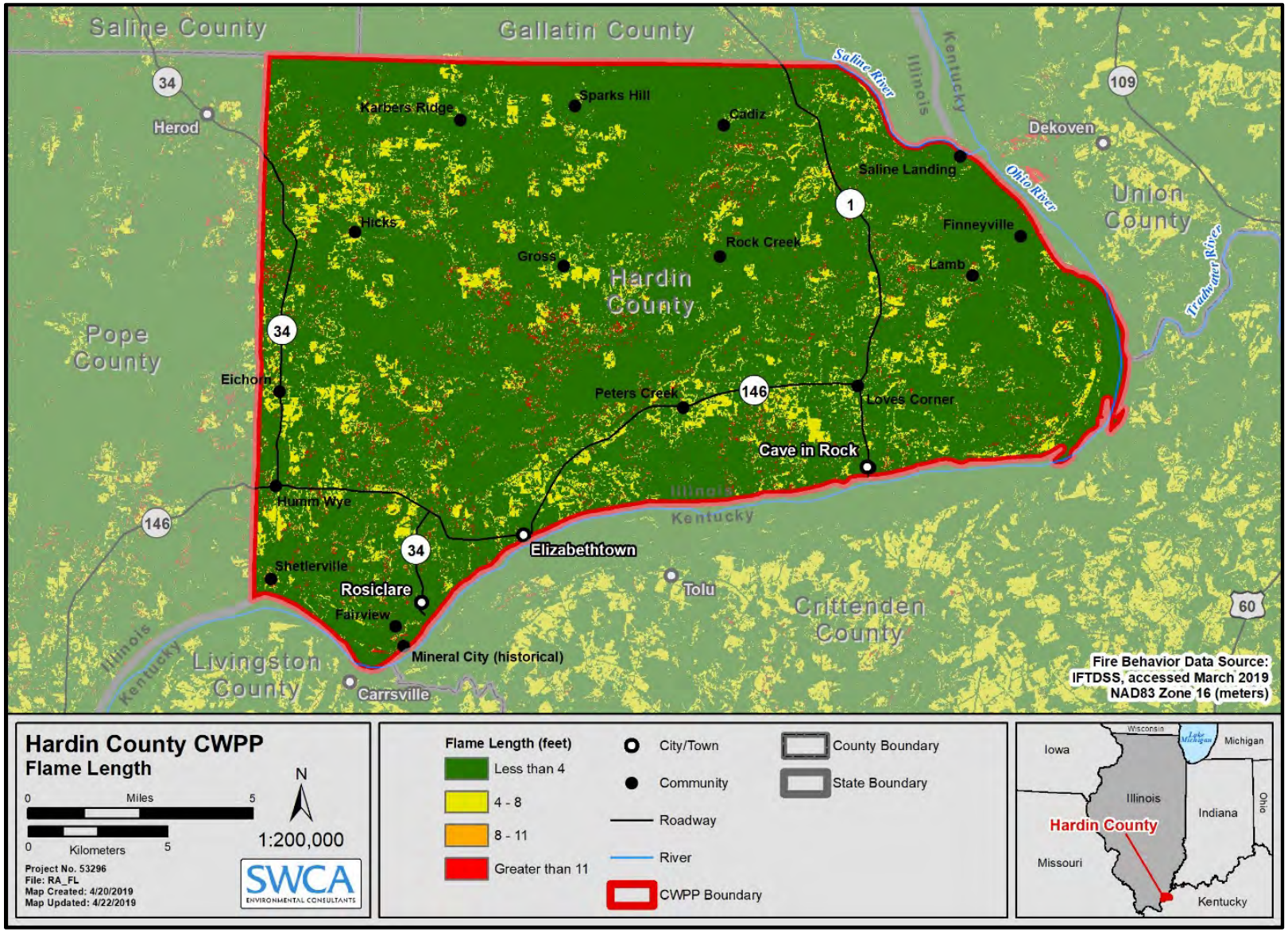
APPENDIX A:

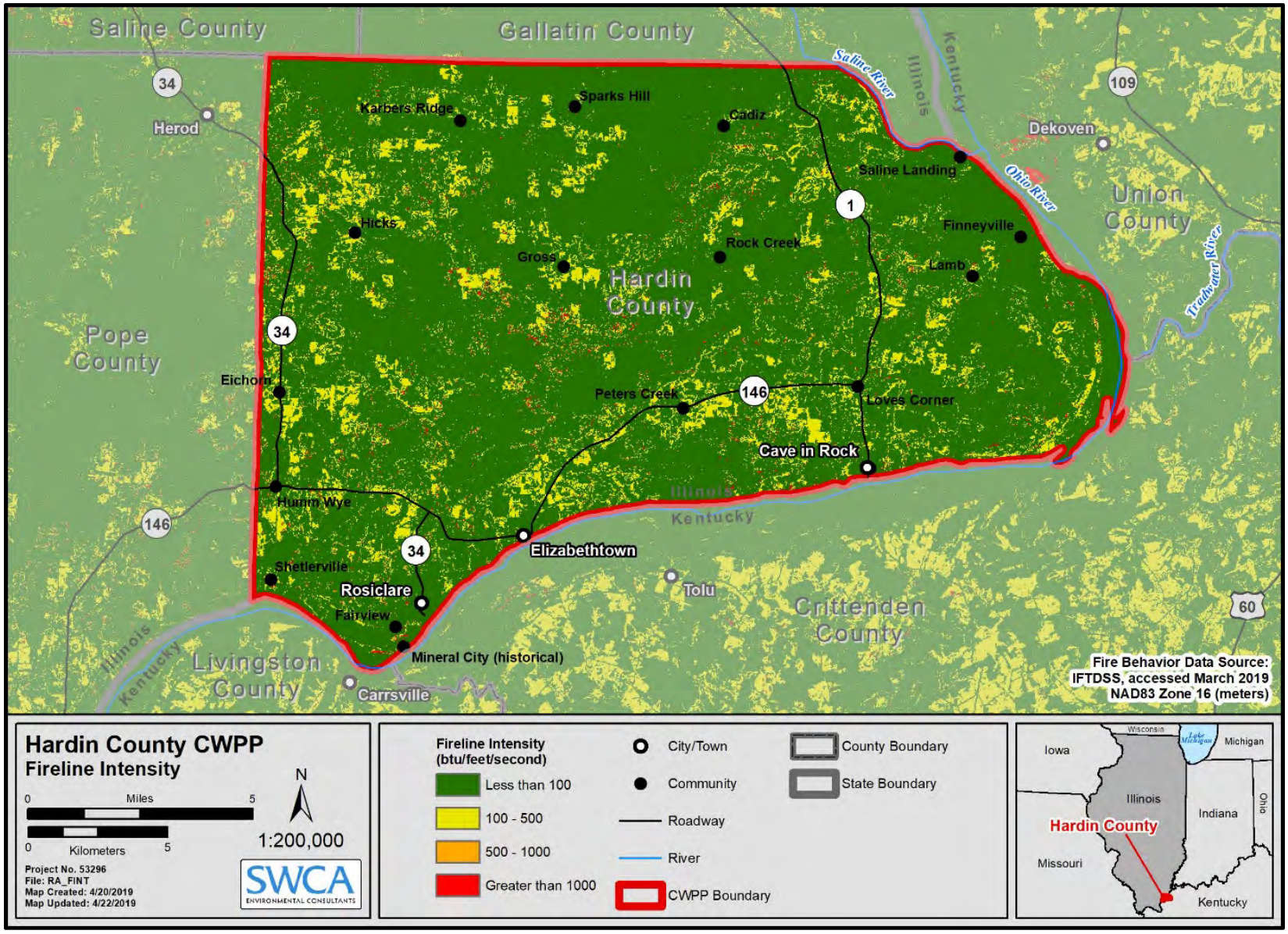
Maps



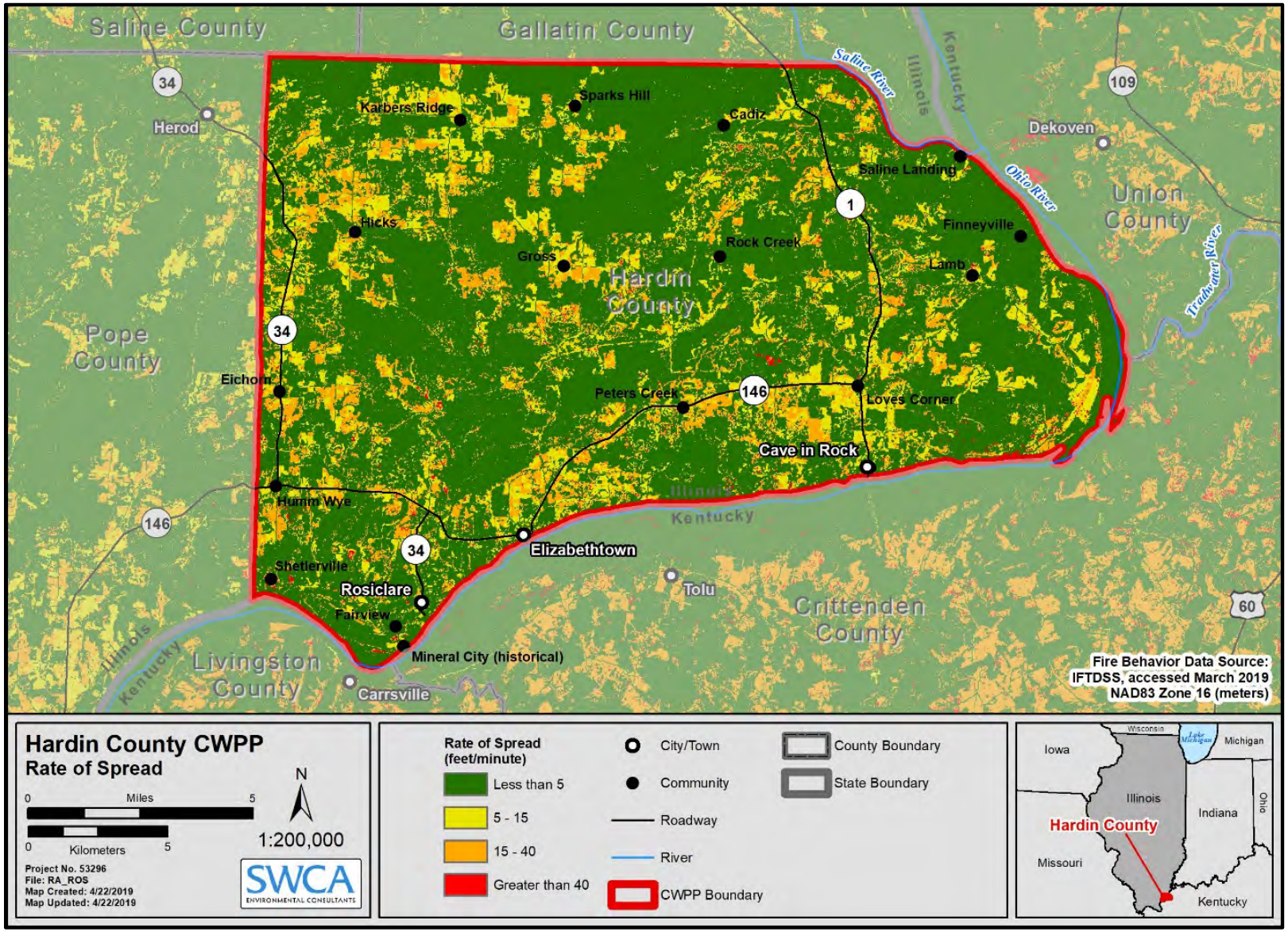
Map 1. Scott and Burgan 40 Fire Behavior Fuel Models.



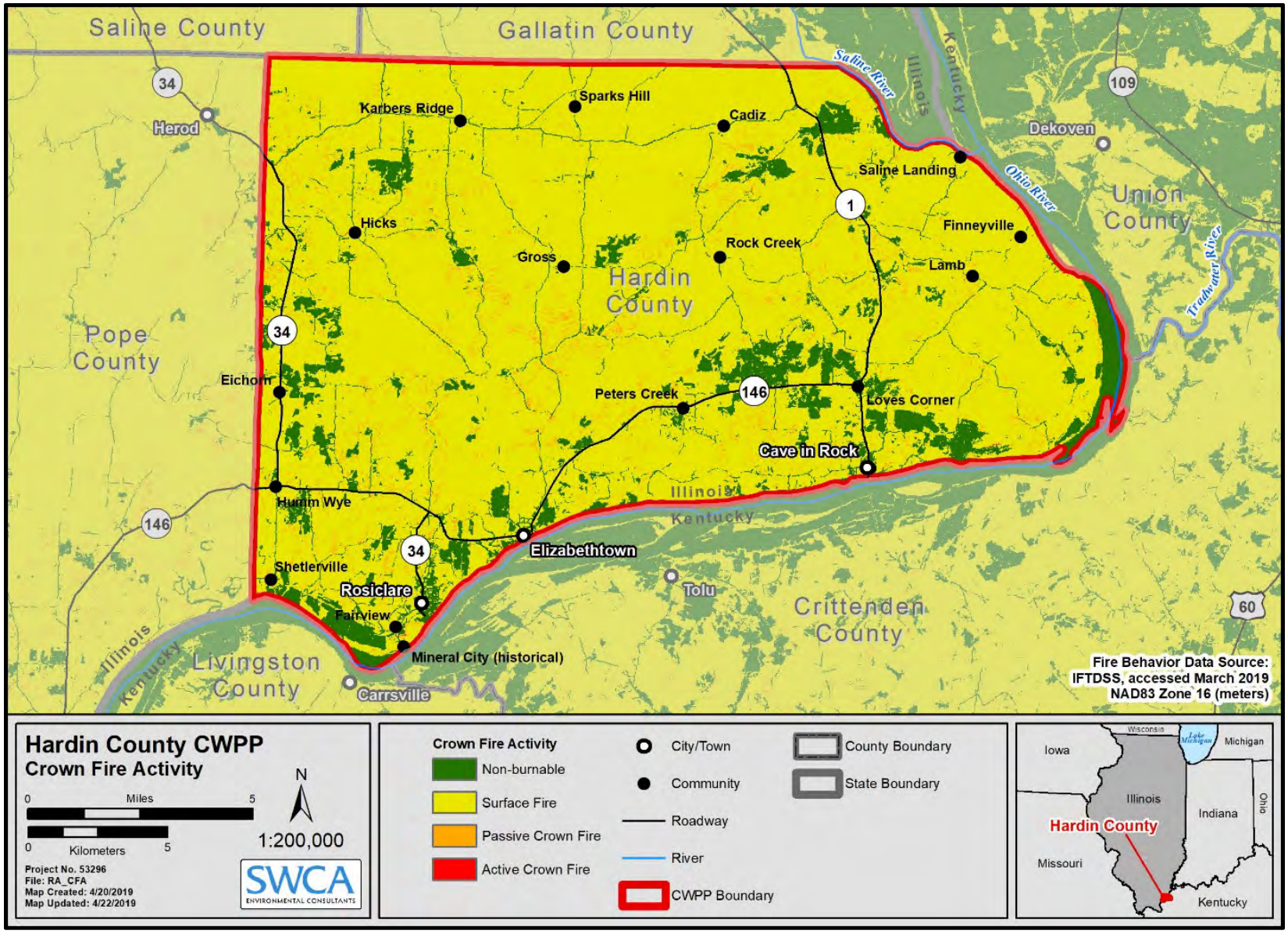
Map 2. Risk Assessment Inputs: Flame Length.



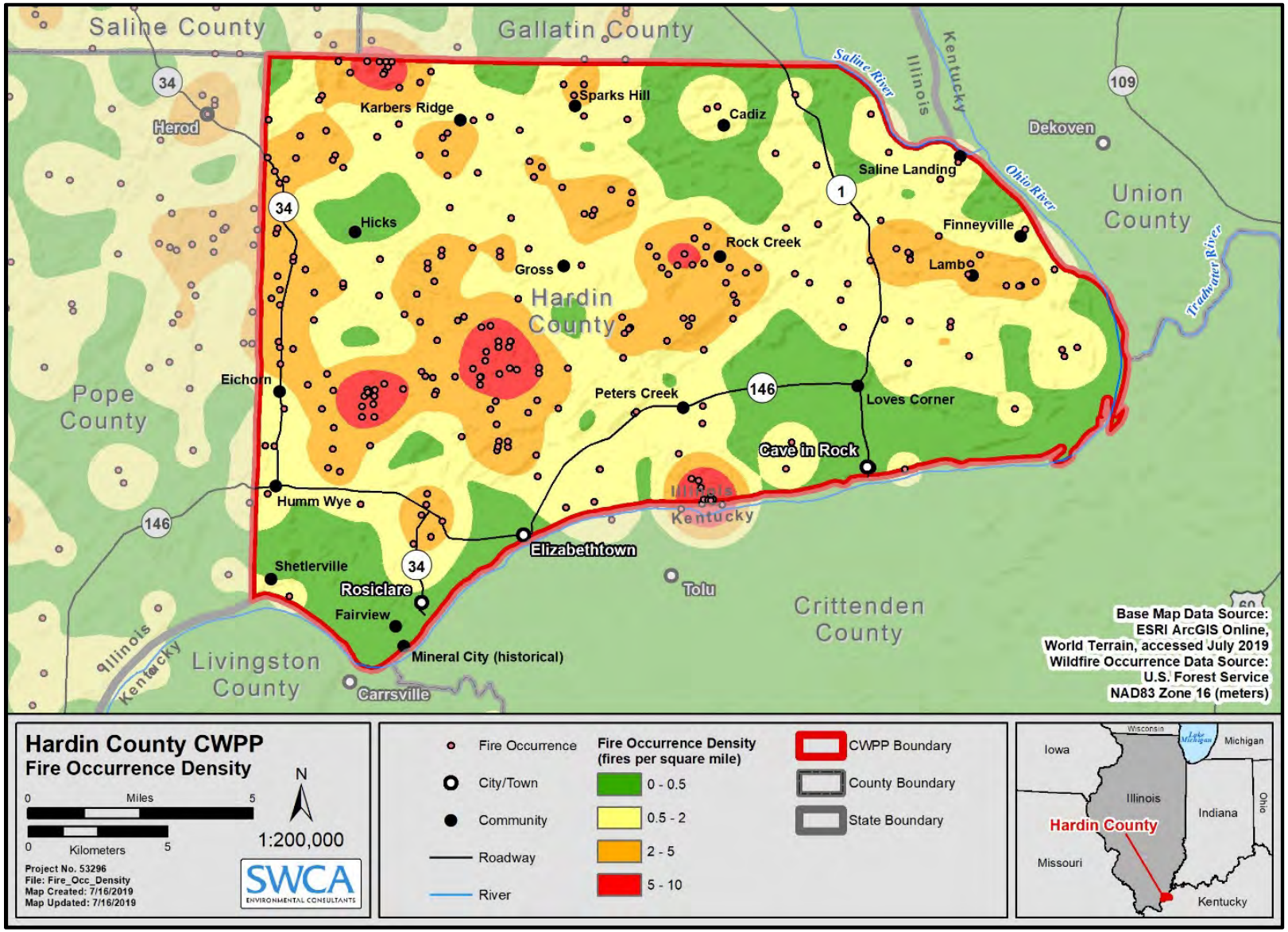
Map 3. Risk Assessment Inputs: Fireline Intensity.



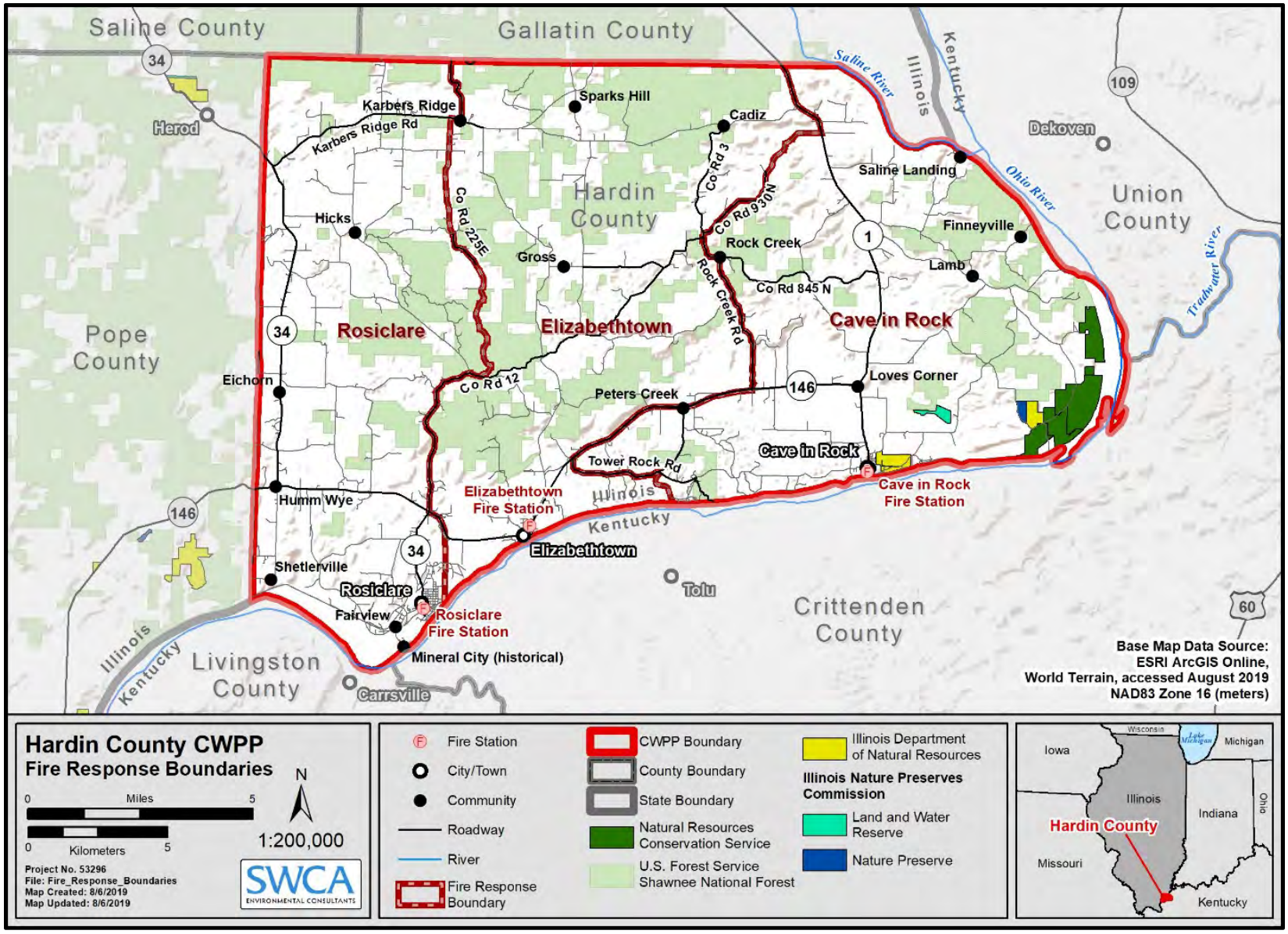
Map 4. Risk Assessment Inputs: Rate of Spread.



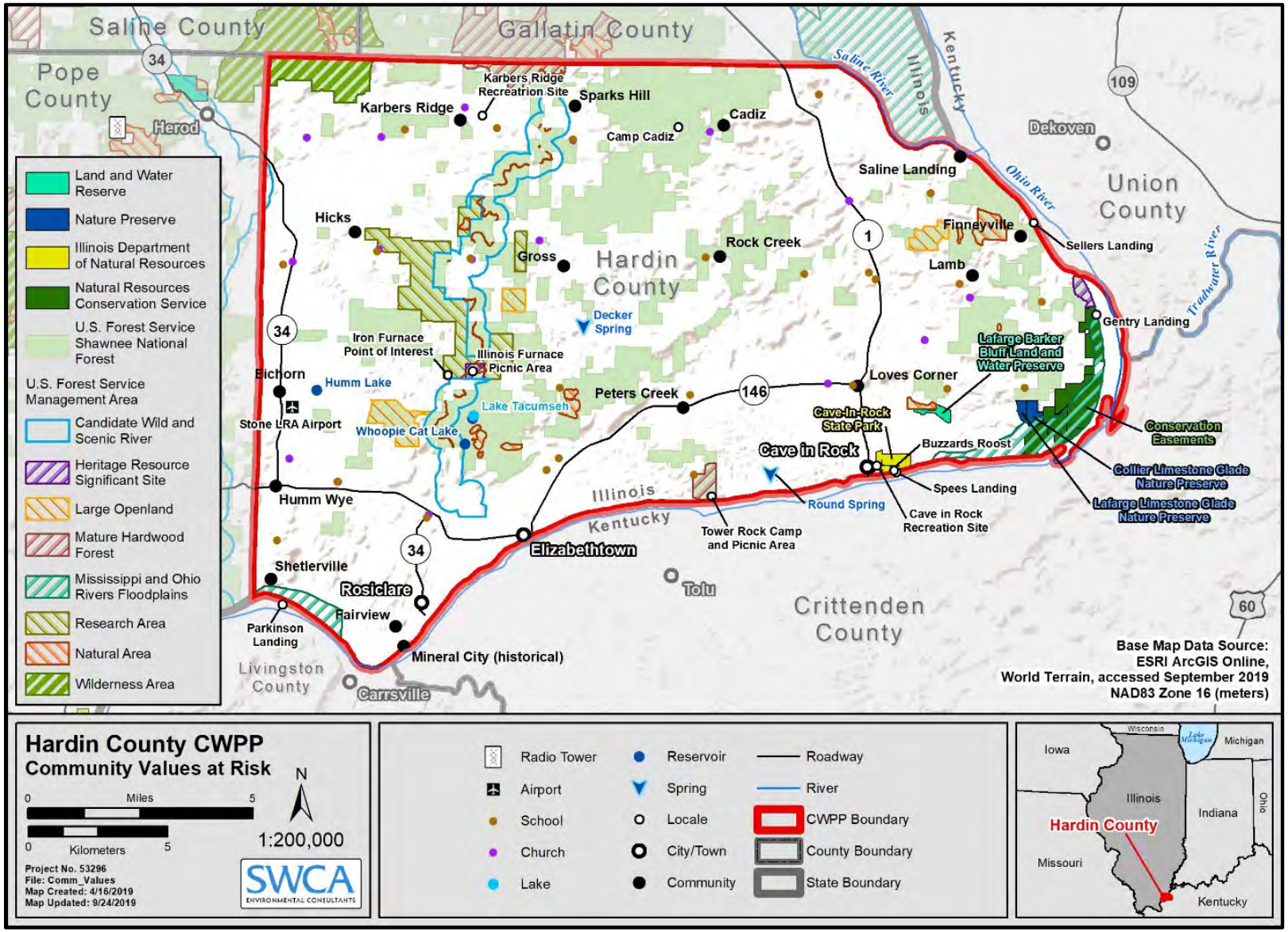
Map 5. Risk Assessment Inputs: Crown Fire Activity.



Map 6. Risk Assessment Inputs: Fire Occurrence Density.



Map 7. Fire Response Boundaries.



Map 8. Community Values at Risk.

APPENDIX B:

Core Team List

Name	Organization
Alene Carr	Southern Illinois Regional Planning and Development Commission
Adam Phillips	Illinois Department of Natural Resources
Amy Nemeth	Elizabethtown Fire Department
Brandon Spradling	Shawnee National Forest- Dispatch
Chris Evans	University of Illinois
David Allen	Illinois Department of Natural Resources/ Shawnee RC &D
Jarrett Kumorek	Cave-In-Rock Fire Department
Jason Rose	Shawnee National Forest
Jenny Lesko	Illinois Department of Natural Resources
Jessica Fricker	Hardin County Sheriff's Department- Dispatch
Jessica Hershey	Hardin County Emergency Management Agency
Jim Nemeth	Elizabethtown Fire Department
Jody Shimp	Shawnee Resource Conservation and Development
Kevin Carman	Rosiclare Fire Department
Mike Kumorek	Cave-In-Rock Fire Department
Rusty Warren	Hardin County Sheriff's Department
Scott Crist	Shawnee National Forest
Sheriff Jerry Fricker	Hardin County Sheriff's Department
Terry Angleton	Rosiclare Fire Department

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APPENDIX C:

Illinois Fire Protection District Act

TITLE 17: CONSERVATION
CHAPTER I: DEPARTMENT OF NATURAL RESOURCES
SUBCHAPTER d: FORESTRY

PART 1560
FOREST FIRE PROTECTION DISTRICTS ACT

Section

AUTHORITY: Implementing and authorized by the Forest Fire Protection District Act [425 ILCS 40].

SOURCE: Adopted at 13 Ill. Reg. 10577, effective June 16, 1989; amended at 13 Ill. Reg. 17376, effective October 30, 1989; recodified by changing the agency name from Department of Conservation to Department of Natural Resources at 20 Ill. Reg. 9389.

Section 1560.10 Definitions

"Burning Permit Writer" means any individual appointed by the Director and certified by the Chief of the Division of Forest Resources to issue burning permits.

"Department" means the Department of Natural Resources.

"Director" means the Director of the Department of Natural Resources.

"District" means a geographic area determined by the Director to be in need of special protection from forest fires and designated as an intensive forest fire prevention district in accordance with this Act.

"Fire Danger" means the daily rating of severity of the potential for wildfire as designated by the National Fire Danger Rating System, as contained in the National Fire Protection Association Standard #295 entitled "Wildfire Control," 1985. (This standard does not include any later amendments or editions).

"Forest Fires" means uncontrolled, wild or running fires occurring on forest, marsh, field, cutover or other lands.

"Regional Administrator" means the Regional Administrators of the Division of Forest Resources of the Department of Natural Resources.

"The Act" means the Forest Fire Protection District Act [425 ILCS 40].

Section 1560.20 Intent of Forest Fire Protection Districts Act

Nothing in this Act relieves the owners or lessees of lands upon which fires may burn or be started from the duty of extinguishing such fires so far as it may be within their power. This Act provides for the creation of intensive forest fire prevention districts to regulate the burning of combustible materials during certain periods of the year when the potential for forest fires is highest, and provides for penalties for violation.

(Source: Amended at 13 Ill. Reg. 17376, effective October 30, 1989)

Section 1560.30 Creation of Districts

a) Public recommendations for the creation of a District shall be submitted in any manner to the Division of Forest Resources for the Director.

b) All landowners within a created District shall be contacted by an agent of the Department of Natural Resources personally or by newspaper publication or by mail and shall be informed of the creation of the District and the intent and provisions of the Act.

(Source: Amended at 13 Ill. Reg. 17376, effective October 30, 1989)

Section 1560.40 Proclamation Prohibiting Fires

a) A proclamation, issued by the Director, prohibiting a fire without first obtaining a burning permit within a District shall be effective in Illinois for the period of the proclamation and shall be determined by the chief of the Division of Forest Resources who will use the National Fire Danger Rating System as criteria for the determination.

b) Such proclamation shall be published by the Department of Natural Resources in one or more newspapers having a general circulation within the District prior to or upon the date the proclamation becomes effective.

2

c) A proclamation has been issued for the following counties: Jackson, Pope, Hardin, Johnson, Union, Alexander, and Pulaski to cover the peak fire hazard months of February, March, April, October and November.

Section 1560.50 Administration of Act

The Division of Forest Resources in the Department is responsible for the administration of this Act.

Section 1560.60 Issuance of Burning Permit

a) The Director of the Department may appoint burning permit writers.

b) Burning Permit Writers must be certified (Form F-20) by the Chief, Division of Forest Resources, who will assign the Burning Permit Writer to a District.

c) Burning Permits can only be issued by a duly authorized Burning Permit Writer.

d) A permit to kindle a fire in the open air outside the limits of any city, village or incorporated town within a District will be issued only on the official Burning Permit form as supplied by the Department.

e) The Regional Administrator in whose Region the District is located is responsible for all training, supplies, maps, forms and any other provisions needed by the Burning Permit Writer in the performance of their assigned duties.

f) The Burning Permit can only be issued for 3-5 days depending upon the anticipated fire dangers for the length of the Permit.

g) The Burning Permit must be completed by the Burning Permit Writer and signed by the Writer and the person to whom the permit is issued.

h) The Burning Permit must include the person's name and address, the legal location of the property on which the burn is to take place, the material and amount to be burned, the hours when burning will be permitted and the dates of the burning.

i) The Burning Permit must be completed in triplicate. The white copy is to be given to the person to whom the Permit is issued; the green copy will be sent to the Goreville District Forestry Office, Post Office Box 67, Goreville, Illinois 62939; the yellow copy will be retained by the Burning Permit Writer.

j) If the Fire Danger Rating reaches very high or extreme classification within a District, the Director, upon notification of such a fire danger by the Chief of the Division of Forest Resources shall suspend the issuance of burning permits or proclaim a closure on all burning within the district or a portion thereof until such time as burning conditions fall below the very high designation.

k) The Regional Administrator in whose Region the issuance of burning permits is suspended or closure is imposed is responsible for posting such a notice in public places within the District, notifying all Burning Permit Writers in the District and notifying the Administrator of the Shawnee National Forest if the affected District is within the Shawnee National Forest Protection Area.

Section 1560.70 Enforcement of Act

Any law enforcement officer within the State of Illinois has the duty to issue a citation to persons violating any provision of the Act and this Part and to cooperate with the Department in the enforcement of same.

Section 1560.80 Violation of Act

a) Any person who kindles or authorizes any other person to kindle a fire in the open air outside the limits of any city, village or incorporated town within an intensive fire protection district during the months of February, March, April, October and November or during such other times when fire hazard conditions are declared to exist by order of the Director in accordance with this Act, without first obtaining a burning permit issued by a forest fire warden for the District in which such burning shall take place, or does not strictly comply with the terms of the permits, commits a Class B misdemeanor.

b) Subsection (a) does not apply to land owned or controlled by a railroad corporation when the fire is for the purpose of clearing its right of way of dangerous combustible materials or for the kindling of a fire in a plowed field, garden or public highway when such fire is kindled at a distance of 200 feet or more from any woodland, brush land or field containing dry grass or other combustible material.

c) Any person who kindles or authorizes any other person to kindle any woods, brush, grass, grain, weeds or stubble within an intensive fire protection district without first having obtained a burning permit issued by a forest fire warden for the District in which such burning shall take place at any time period for which the Director has issued a proclamation declaring such burning unlawful shall, upon conviction, be fined not to exceed $1,000 or be imprisoned in a

penal institution other than the penitentiary not exceeding 6 months, or both.

Section 1560.90 Correspondence and Inquiries Regarding This Act

All correspondence and/or inquiries regarding this Act shall be directed to:

State of Illinois
Department of Natural Resources
Division of Forest Resources
524 South Second Street
Springfield, Illinois 62701-1787

ATTENTION: Forest Protection Program

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APPENDIX D:

Media Outreach

APPENDIX E:

Fire Fighting Resources (To be Finalized)

APPENDIX F:

NFPA 1144 Form

Means of Access						
Ingress and Egress	**Points**					
Two or more roads in and out	0					
One road in and out	7					
Road Width						
>24 feet	0					
>20 feet, <24 feet	2					
<20 feet	4					
Road Conditions						
Surfaced road, grade <5%	0					
Surfaced road, grade >5%	2					
Nonsurfaced road, grade <5%	2					
Nonsurfaced road, grade >5%	5					
Other than all season	7					
Fire Access						
<300 feet with turnaround	0					
>300 feet with turnaround	2					
<300 feet with no turnaround	4					
>300 feet with no turnaround	5					
Street Signs						
Present–reflective	0					
Present–nonreflective	2					
Not present	5					
Vegetation (fuel models)						
Predominant veg						
Light–1,2,3	5					
Medium–5,6,7,8,9	10					
Heavy–4,10	20					
Slash–11,12,13	25					
Defensible Space						
>100 feet around structure	1					
>70 feet, <100 feet around structure	3					
>30 feet, <70 feet around structure	10					
<30 feet around structure	25					
Topography within 300 Feet of Structures						
Slope						
<9%	1					
10% to 20%	4					
21% to 30%	7					
31% to 40%	8					
>41%	10					
Additional Rating Factors (rate all that apply)						
Additional Factors						
Topographic features	0–5					
History of high fire occurrence	0–5					

Means of Access						
Severe fire weather potential	0–5					
Separation of adjacent structures	0–5					
Roofing Assembly						
Roofing						
Class A	0					
Class B	3					
Class C	15					
Unrated	25					
Building Construction						
Materials (predominant)						
Non-combustible siding, eaves, deck	0					
Non-combustible siding/combustible desk	5					
Combustible siding and deck	10					
Building Set-back						
>30 feet to slope	1					
<30 feet to slope	5					
Available Fire Protection						
Water Sources						
Hydrants 500 gpm, <1,000 feet apart	0					
Hydrants 250 gpm, <1,000 feet apart	1					
Nonpressurized, >250 gpm/2 hours	3					
Nonpressurized, <250 gpm/2 hours	5					
Water unavailable	10					
Organized Response						
Station <5 miles from structure	1					
Station >5 miles from structure	3					
Fixed Fire Protection						
NFPA sprinkler system	0					
None	5					
Placement of Gas and Electric Utilities						
Utilities						
Both underground	0					
One above, one below	3					
Both above ground	5					
Totals for Home or Subdivision						

Hazard Rating Scale	**<40 Low**	**>40 Moderate**	**>70 High**	**>112 Extreme**

APPENDIX G:

Example Livestock Evacuation Plan

EXAMPLE LIVESTOCK EVACUATION PLAN TEMPLATE

ORGANIZATION

GENERAL PRINCIPALS

1. Designate holding area locations for large animals.
2. Receive written access on private property granted from residents.
3. Collect all data: phone, map, who to call, where to house/shelter animals, where to park trailers.
4. Provide all above information to person in authority for evacuation.

A. Shelter Command Center Coordinator

1. Animal Control Officer will be the single point of contact for management decisions in responding to the needs of all animals during an emergency or disaster.
   - Ensure large animal corrals are in working order.
   - Provide support services for volunteers.
   - Maintain communication with Police, Fire Department, Mayor, Animal Control, volunteers and field animal shelter.
   - Coordinate volunteers sign in and tasks.
   - Communicate with media, radio, TV, etc.
2. Main Volunteer - If needed, Animal Control Officers shall designate a volunteer or volunteers, if required to help. That person will help implement the staging, opening of holding pens, coordinate volunteers.
   - Identify all animals with registration/intake form. A digital photo might be helpful.
     - Attach intake form to cage or pen.
   - Evaluate animal's immediate needs and carry out if possible.
   - Provide food and water.
   - Ensure safe and secure containment.
   - Euthanasia – coordinate with a veterinarian.
   - Assign all tasks including those of volunteers.

B. Set Up Staging Area

1. Area for trailer personnel to gather and take directions as to which homes or areas they are to go to evacuate animals.
2. Have on board, the granting authority to gain access in a mandatory evacuation.
3. Have with trailers, tools, halters, and paper work to identify home/animals
4. Volunteers who remove animals from private property must leave notice as to where animals will be taken.

C. Holding Areas

1. Will be opened by Animal Control Officer.
2. Small animal pens, crates shall be staged where they are visible to the volunteers.
3. Will be staffed by on site volunteers.
    - feed, water, pens, lights.
4. Determine a veterinarian to be on call.

D. Release Procedure

1. The [designated authority] has the authority to release animals.
2. Owner must sign release form after providing proof of ownership.
    - Owner's driver license or State ID.
    - Proof of ownership (Animal Control to determine requirements).

E. Maintain List of Volunteers Who Have Trailers/List Trailer Capacity

F. Maintain List of Large and Small Animal Owners Who Agree to Evacuation of Their Animals

G. Provide Training/Seminars

1. How to handle animals and how to transport animals during emergencies.

SHELTER SETUP

GENERAL PRINCIPALS

1. Move the animals from danger to designated areas, if needed, in county and state facilities. If owners bring in their animals they are responsible for feeding and watering all their animals at the Field Shelter.
2. Set up a command center and ensure to establish contact and coordination of all intake and releases of animals.

A. Field Shelter Checklist for Setup of Field Shelter

Provide the following if required:

- Information Table
    - First stopping point for everyone entering the Field Shelter area. Volunteers at this location direct people to where they can get the services they need.
- Animal Intake Area
    - Where paperwork is completed on all incoming animals. The animals are identified and ID is placed on their stalls.
- Stalls, Pens, and Crates
    - Where animals are housed until they are reclaimed. Areas must be designated for dogs, cats, livestock, and all other animals. Large animals shall be taken [Name of

shelter/Arena] or other designated areas in Hardin County. A large-scale evacuation may require coordination and evacuation to county and state facilities.

- Medical Care
    - Where all animals are treated for minor injuries. Seriously injured animals may be treated elsewhere depending on available resources. It is especially important to keep animals suspected to have contagious diseases, separate from the rest of the population.
- Animal Care
    - Animal supplies are kept for the animals – Supplies should include feeding dishes, buckets, litter boxes, litter, scoops, manure forks, cages, halters and lead ropes, collars and identification tags, muzzles, leashes, newspaper, towels, blankets, tarps, trash bags and any other needed items.
    - Provide alfalfa or grass hay.
- Dead Animals
    - Dead animals must be kept in corrals until proper authorities can come to remove them. Cover large animals with tarps.
- Volunteer Information and Sign In
    - After volunteers report sign in, they should be assigned tasks.
- Rescue Equipment Storage (if available)
    - Volunteers are responsible for providing their own “go kits.” Go kits are defined as the equipment necessary to effect rescue and service in their specified area of expertise.
- Parking
    - Designated areas for volunteers and visitors to the Field Shelter. Effort should be made if possible, to not disturb adjacent residents or businesses.
- Human First Aid
    - First Aid should be provided by qualified personnel.
- Garbage Area
    - Designated area for bagged garbage until it is picked up by the proper authority.
- Volunteer Groups/Guidelines – Ensure that all volunteers are covered by liability insurance

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APPENDIX H:

Funding Resources

FUNDING RESOURCES

The following section provides information on funding opportunities for conducting wildfire mitigation projects.

I. Federal Funding Information

Source: Predisaster Mitigation Grant Program

Agency: Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA)

Website: http://www.fema.gov/government/grant/pdm/index.shtm

Description: The DHS includes FEMA and the U.S. Fire Administration. FEMA's Federal Mitigation and Insurance Administration is responsible for promoting predisaster activities that can reduce the likelihood or magnitude of loss of life and property from multiple hazards, including wildfire. The Disaster Mitigation Act of 2000 created a requirement for states and communities to develop predisaster mitigation plans and established funding to support the development of the plans and to implement actions identified in the plans. This competitive grant program, known as PDM, has funds available to state entities, tribes, and local governments to help develop multihazard mitigation plans and to implement projects identified in those plans.

Source: Funding for Fire Departments and First Responders

Agency: DHS, U.S. Fire Administration

Website: http://www.usfa.dhs.gov/fireservice/grants/

Description: Includes grants and general information on financial assistance for fire departments and first responders. Programs include the Assistance to Firefighters Grant Program, Reimbursement for Firefighting on Federal Property, State Fire Training Systems Grants, and National Fire Academy Training Assistance.

Source: Conservation Innovation Grants (CIG)

Agency: National Resource Conservation Service

Website: http://www.nm.nrcs.usda.gov/programs/cig/cig.html

Description: CIG State Component. CIG is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program (EQIP) funds are used to award competitive grants to non-federal governmental or nongovernmental organizations, tribes, or individuals. CIG enables the Natural Resources Conservation Service (NRCS) to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with federal, state, and local regulations. The NRCS administers the CIG program. The CIG requires a 50/50 match between the agency and the applicant. The CIG has two funding components: national and state. Funding sources are available for water resources, soil resources, atmospheric resources, and grazing land and forest health.

Source: Regional Conservation Partnership Program

Agency: National Resource Conservation Service

Website: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/

Description: The Regional Conservation Partnership Program (RCPP) promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements.

RCPP combines the authorities of four former conservation programs – the Agricultural Water Enhancement Program, the Chesapeake Bay Watershed Program, the Cooperative Conservation Partnership Initiative and the Great Lakes Basin Program. Assistance is delivered in accordance with the rules of EQIP, CSP, ACEP and HFRP; and in certain areas the Watershed Operations and Flood Prevention Program.

Source: Volunteer Fire Assistance

Agency: U.S. Forest Service

Website: http://www.fs.fed.us/fire/partners/vfa/

Description: U.S. Forest Service funding will provide assistance, through the states, to volunteer fire departments to improve communication capabilities, increase wildland fire management training, and purchase protective fire clothing and firefighting equipment. For more information, contact your state representative; contact information can be found on the National Association of State Foresters website.

Source: USFS Wood Innovations Program

Agency: U.S. Forest Service

Website: http://www.na.fs.fed.us/werc/wip/2017-rfp.shtm

Description: The U.S. Forest Service (Forest Service) requests proposals to substantially expand and accelerate wood energy and wood products markets throughout the United States to support forest management needs on National Forest System and other forest lands.

The program focuses on the following priorities, to:

- Reduce hazardous fuels and improve forest health on National Forest System and other forest lands.
- Reduce costs of forest management on all land types.
- Promote economic and environmental health of communities.

Source: Northeastern Area State and Private Forestry (S&PF) Cohesive Fire Strategy

Agency: U.S. Forest Service

Website: http://www.na.fs.fed.us/fire/rfp/index.shtm

Description: The Northeastern Area **Cohesive Fire Strategy Competitive Request for Proposals** is designed to support and carry out the goals of the National Cohesive Wildland Fire Management Strategy (NCS) across the Midwestern and Northeastern States as well as meet the intent of the current year budget direction. These national goals are:

1. **Restore and Maintain Landscapes:** Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
2. **Create Fire Adapted Communities:** Human populations and infrastructure can withstand a wildfire without loss of life and property.
3. **Improve Wildfire Response:** All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

Regional options have been identified in the Northeast Regional Action Plan that help to ensure that funds from this competitive grant process are used to address the national goals. Proposals will be accepted that clearly identify the reduction of wildfire risk and/or improve wildfire response in coordination with their respective State's Forest Action Plan and meet one or more of the nine Northeast Regional Action Plan options listed below:

***Northeast Regional Action Plan Options* Goal 1: Restore & Maintain Landscapes**	**Goal 2: Fire Adapted Communities**	**Goal 3: Response to Wildfire**
Regional Option 1A – Expand the use of prescribed fire as an integral tool to meet management objectives in the Northeast.	**Regional Option 2A** – Focus on promoting and supporting local adaptation activities to be taken by communities.	**Regional Option 3A** – Improve the organizational efficiency and effectiveness of the wildland fire community.
Regional Option 1B – Maintain and increase, where possible, the extent of fire-dependent ecosystems and expand the use of fire as a disturbance process.	**Regional Option 2B** – Focus on directing hazardous fuel treatments to the wildland urban interfaces.	**Regional Option 3B** – Increase the local response capacity for initial attack of wildfires.
Regional Option 1C – Focus on mitigating "event" fuels to reduce potential fire hazard.	**Regional Option 2C** – Focus on promoting and supporting prevention programs and activities.	**Regional Option 3C** – Further develop shared response capacity for extended attack and managing wildfire incidents with long duration fire potential

Source: Catalog of Federal Funding Sources for Watershed Protection

Agency: N/A

Website: http://cfpub.epa.gov/fedfund/

Examples of the types of grants found at this site are:

- Native Plant Conservation Initiative: http://www.nfwf.org/AM/Template.cfm?Section=Browse_All_Programs&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=3966
- Targeted Watershed Grants Program, http://www.epa.gov/owow/watershed/initiative/
- Predisaster Mitigation Program, http://www.fema.gov/government/grant/pdm/index.shtm
- Environmental Education Grants, http://www.epa.gov/enviroed/grants_contacts.html

Source: Firewise Communities

Agency: Multiple

Website: http://www.firewise.org

Description: The Wildland/Urban Interface Working Team (WUIWT) of the National Wildfire Coordinating Group is a consortium of wildland fire organizations and federal agencies responsible for wildland fire management in the United States. The WUIWT includes the U.S. Forest Service, Bureau of Indian Affairs, BLM, U.S. Fish and Wildlife Service, National Park Service, FEMA, U.S. Fire Administration, International Association of Fire Chiefs, National Association of State Fire Marshals, National Association of State Foresters, National Emergency Management Association, and National Fire Protection Association. Many different Firewise Communities activities are available help homes and whole neighborhoods become safer from wildfire without significant expense. Community cleanup days, awareness events, and other cooperative activities can often be successfully accomplished through partnerships among neighbors, local businesses, and local fire departments at little or no cost. The Firewise Communities recognition program page (http://www.firewise.org/usa) provides a number of excellent examples of these kinds of projects and programs.

The kind of help you need will depend on who you are, where you are, and what you want to do. Among the different activities individuals and neighborhoods can undertake, the following actions often benefit from some kind of seed funding or additional assistance from an outside source:

- Thinning/pruning/tree removal/clearing on private property—particularly on very large, densely wooded properties
- Retrofit of home roofing or siding to non-combustible materials
- Managing private forest
- Community slash pickup or chipping
- Creation or improvement of access/egress roads
- Improvement of water supply for firefighting
- Public education activities throughout the community or region

Some additional examples of what communities, counties, and states have done can be found in the National Database of State and Local Wildfire Hazard Mitigation Programs at:

http://www.wildfireprograms.usda.gov.

You can search this database by keyword, state, jurisdiction, or program type to find information about wildfire mitigation education programs, grant programs, ordinances, and more. The database includes links to local websites and e-mail contacts.

Source: Ready-Set-Go Grants

Website: http://www.wildlandfirersg.org/

Description:

Mitigation Grants: The grants are awarded in quantities of up to $5,000 to assist departments and emergency service agencies in the purchase or rental of equipment or other costs to implement or enhance community fuels mitigation programs within their jurisdiction.

Outreach Grants: The grants are awarded in quantities of up to $1,000 to assist departments and emergency service agencies with the cost of outreach materials and events to promote community wildfire readiness and preparedness.

Source: The National Fire Plan (NFP)

Website: http://www.forestsandrangelands.gov/

Description: Many states are using funds from the NFP to provide funds through a cost-share with residents to help them reduce the wildfire risk to their private property. These actions are usually in the form

of thinning or pruning trees, shrubs, and other vegetation and/or clearing the slash and debris from this kind of work. Opportunities are available for rural, state, and volunteer fire assistance.

Source: Staffing for Adequate Fire and Emergency Response (SAFER)

Agency: DHS

Website: http://www.firegrantsupport.com/safer/

Description: The purpose of SAFER grants is to help fire departments increase the number of frontline firefighters. The goal is for fire departments to increase their staffing and deployment capabilities and ultimately attain 24-hour staffing, thus ensuring that their communities have adequate protection from fire and fire-related hazards. The SAFER grants support two specific activities: (1) hiring of firefighters and (2) recruitment and retention of volunteer firefighters. The hiring of firefighters activity provides grants to pay for part of the salaries of newly hired firefighters over the five-year program. SAFER is part of the Assistance to Firefighters Grants and is under the purview of the Office of Grants and Training of the DHS.

Source: The Fire Prevention and Safety Grants (FP&S)

Agency: DHS

Website: http://www.firegrantsupport.com/fps/

Description: The FP&S are part of the Assistance to Firefighters Grants and are under the purview of the Office of Grants and Training in the DHS. FP&S offers support to projects that enhance the safety of the public and firefighters who may be exposed to fire and related hazards. The primary goal is to target high risk populations and mitigate high incidences of death and injury. Examples of the types of projects supported by FP&S include fire-prevention and public-safety education campaigns, juvenile fire-setter interventions, media campaigns, and arson prevention and awareness programs. In fiscal year 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include firefighter safety research and development.

Source: Title III Rural School Funds

Agency: USDA Forest Service

Website: http://www.fs.usda.gov/main/pts/countyfunds

Description: The Secure Rural Schools Act (SRS Act) was reauthorized by section 524 of P.L. 114-10 and signed into law by the President on April 16, 2015. This reauthorization extended the date by which title III projects must be initiated to September 30, 2017, and the date by which title III funds must be obligated to September 30, 2018. Counties seeking funding under Title III must use the funds to perform work under the Firewise Communities program.

Counties applying for Title III funds to implement Firewise activities can assist in all aspects of a community's recognition process, including conducting or assisting with community assessments, helping the community create an action plan, assisting with an annual Firewise Day, assisting with local wildfire mitigation projects, and communicating with the state liaison and the national program to ensure a smooth application process. Counties that previously used Title III funds for other wildfire preparation activities such as the Fire Safe Councils or similar would be able to carry out many of the same activities as they had before. However, with the new language, counties would be required to show that funds used for these activities were carried out under the Firewise Communities program.

Source: Federal Excess Personal Property

Agency: USFS

Website: http://www.fs.fed.us/fire/partners/fepp/

Description: The Federal Excess Personal Property (FEPP) program refers to Forest Service-owned property that is on loan to State Foresters for the purpose of wildland and rural firefighting. Most of the property originally belonged to the Department of Defense (DoD). Once acquired by the Forest Service, it is loaned to State Cooperators for firefighting purposes. The property is then loaned to the State Forester, who may then place it with local departments to improve local fire programs. State Foresters and the USDA Forest Service have mutually participated in the FEPP program since 1956.

Source: State Farm Safe Neighbors Grant

Agency: State Farm

Website: https://www.statefarm.com/about-us/community/education-programs/grants-scholarships/company-grants

Description: State Farm funding is directed at:

- Auto and roadway safety
- Teen Driver Education
- **Home safety and fire prevention**
- **Disaster preparedness**
- **Disaster recovery**

Source: Rural Fire Assistance (RFA)

Agency: USDI – U.S. Fish and Wildlife Service

Website: http://www.nifc.gov/rfa.
Description: The RFA program provides funds for RFDs that Protect rural, wildland-urban interface communities; play a substantial cooperative role in the protection of federal lands; are cooperators with the Department of the Interior (USDI) managed lands through cooperative agreements with the USDI, or their respective state, tribe or equivalent; are less than 10,000 in population. The required cost share amount for the recipient RFD will not exceed 10 percent of the amount awarded. The RFD must demonstrate the capability to meet cost share requirements Cooperator contribution may be contributed as in-kind services. Cooperator contribution may exceed, but not amount to less than 10 percent. Examples of in-kind services may include but are not limited to: facility use incurred by and RFD for hosting training courses, travel and per diem costs incurred by an RFD when personnel attend training courses, and administration costs related to purchasing RFA equipment and supplies. Finding or in-kind resources may not be derived from other federal finding programs.

Illinois Department of Natural Resources Funding:

"Illinois, in spite of the field forestry staff available through programs of the Illinois Department of Natural Resources and the record number of private consultant foresters, is faced with a dilemma in attempting to provide forest management assistance to the over 169,000 forest landowners. Various programs have been developed at the state and federal level that are designed to provide management assistance to forest landowners, industry and fire departments. Forest Product Industries are an important part of the State's economy. These privately owned primary and secondary operations employ over 65,000 people, have an annual payroll of approximately $1.9 million, and contribute over $4.5 billion annually to the State's economy through value added by manufacturing.

Goals: The goals of forestry programs in Illinois are to maintain and improve the State's rural and urban forests, and enable forests to remain as an important component in the ecological processes that sustain the State's valuable natural resources and economy. These goals and private landowner objectives will be

accomplished by using non-regulatory approaches and voluntary participation" (excerpt from the IDNR Illinois Forest Assistance Program website, (2016):

https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf

Source: Rural Forest Landowner Assistance

Agency: IDNR

Website: https://www.dnr.illinois.gov/grants/Documents/IDNRGrantOpportunitiesListing.pdf

Description: Rural Forest Landowner Assistance: Provides technical assistance to Non-industrial Private Forests (NIPF) landowners to manage their forests for multiple resources. In addition, cost-share assistance is available for landowners to implement forest stewardship practices. This program has been developed to assist and encourage landowners to become good land stewards, achieve land management objectives, and maintain ecological processes. The program produces: 1. clean air and water 2. sustainable rural forests 3. sustainable economic development 4. improved forest health 5. restored ecological processes 6. enhanced wildlife habitat and populations.

Source: Urban and Community Forestry

Agency: IDNR

Website: https://www.dnr.illinois.gov/grants/Documents/IDNRGrantOpportunitiesListing.pdf

Description: Urban and Community Forestry: Provides technical and financial assistance to the State's 2,000 cities and towns. This program builds a local community's capacity to manage their natural resources. Program goals are accomplished by engaging local citizens in tree planting, care and protection activities, and the development of comprehensive natural resource management plans. The Urban and Community Forestry Program helps achieve community sustainability and enhances the quality of life by improving and maintaining the health of trees and other related natural resources. The Urban and Community Forestry Program: 1. increases awareness of natural resources 2. improves environmental quality 3. creates partnerships to manage community natural resources 4. implements long-term natural resource management in the State's cities and towns.

Source: Forest Products Industry Assistance

Agency: IDNR

Website: https://www.dnr.illinois.gov/grants/Documents/IDNRGrantOpportunitiesListing.pdf

Description: Forest Products Industry Assistance: Provides assistance to forest industries by providing: Forestry Development Act (FDA): Provides the funding source for a forest landowner cost-share program. This program is funded through the collection of a four (4) percent harvest fee on all timber sales. These funds are only available for the cost-share program and the operations of the Illinois Legislature's Council on forestry Development. *The Council gathers and disseminates information on the State's forest resources and industries, and makes recommendations on appropriate forest management practices. 1. timber, lumber and forest-based herbal product marketing information, 2. forest resource information for potential new forest industries, and 3. recommendations regarding improved operating techniques.

Additional grants Administered by the Illinois Department of Natural Resources are listed at the following address: https://www.dnr.illinois.gov/grants/Documents/IDNRGrantOpportunitiesListing.pdf

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APPENDIX I:

Homeowner Guide

HARDIN COUNTY CWPP

HOMEOWNERS GUIDE

This guide has been developed to address site-specific information on wildfire for the Hardin County communities. This guide 1) suggests specific measures that can be taken by homeowners to reduce structure ignitability and 2) enhances overall preparedness in the planning area by consolidating preparedness information from several local agencies and departments.

BEFORE THE FIRE—PROTECTION AND PREVENTION

REDUCING STRUCTURE IGNITABILITY

Structural Materials

Roofing—The more fire-resistant the roofing material, the better. The roof is the portion of the house that is most vulnerable to ignition by falling embers, known as firebrands. Metal roofs afford the best protection against ignition from falling embers. Slate or tile roofs are also non-combustible, and Class-A asphalt shingles are recommended as well. The most dangerous type of roofing material is wood shingles. Removing debris from roof gutters and downspouts at least twice a year will help to prevent fire, along with keeping them functioning properly.

Siding—Non-combustible materials are ideal for the home exterior. Preferred materials include stucco, cement, block, brick, and masonry.

Windows—Double-pane windows are most resistant to heat and flames. Smaller windows tend to hold up better within their frames than larger windows. Tempered glass is best, particularly for skylights, because it will not melt as plastic will.

Fencing and trellises—Any structure attached to the house should be considered part of the house. A wood fence or trellis can carry fire to your home siding or roof. Consider using nonflammable materials or use a protective barrier such as metal or masonry between the fence and the house.

If you are designing a new home or remodeling your existing one, do it with fire safety as a primary concern. Use nonflammable or fire resistant materials and have the exterior wood treated with UL-approved fire-retardant chemicals. More information on fire-resistant construction can be found at http://www.firewise.org.

SCREEN OFF THE AREA BENEATH DECKS AND PORCHES

The area below an aboveground deck or porch can become a trap for burning embers or debris, increasing the chances of the fire transferring to your home. Screen off the area using screening with openings no larger than one-half inch. Keep the area behind the screen free of all leaves and debris.

FIREWOOD, KINDLING, AND OTHER FLAMMABLES

Although convenient, stacked firewood on or below a wooden deck adds fuel that can feed a fire close to your home. Be sure to move all wood away from the home during fire season. Stack all firewood uphill, at least 30 feet and preferably 100 feet from your home.

When storing flammable materials such as paint, solvents, or gasoline, always store them in approved safety containers away from any sources of ignition such as hot water tanks or furnaces. The fumes from highly volatile liquids can travel a great distance after they turn into a gas. If possible, store the containers in a safe, separate location away from the main house.

CHIMNEYS AND FIREPLACE FLUES

Inspect your chimney and damper at least twice a year and have the chimney cleaned every year before first use. Have the spark arrestor inspected and confirm that it meets the latest safety code. Your local fire department will have the latest edition of National Fire Prevention Code 211 covering spark arrestors. Make sure to clear away dead limbs from within 15 feet of chimneys and stovepipes

FIREPLACE AND WOODSTOVE ASHES

Never take ashes from the fireplace and put them into the garbage or dump them on the ground. Even in winter, one hot ember can quickly start a grass fire. Instead, place ashes in a metal container, and as an extra precaution, soak them with water. Cover the container with its metal cover and place it in a safe location for a couple of days. Then either dispose of the cold ash with other garbage or bury the ash residue in the earth and cover it with at least 6 inches of mineral soil.

PROPANE TANKS

Your propane tank has many hundreds of gallons of highly flammable liquid that could become an explosive incendiary source in the event of a fire. The propane tank should be located at least 30 feet from any structure. Keep all flammables at least 10 feet from your tank. Learn how to turn the tank off and on. In the event of a fire, you should turn the gas off at the tank before evacuating, if safety and time allow.

SMOKE ALARMS

A functioning smoke alarm can help warn you of a fire in or around your home. Install smoke alarms on every level of your residence. Test and clean smoke alarms once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.

FIRE-SAFE BEHAVIOR

- If you smoke, always use an ashtray in your car and at home.
- Store and use flammable liquids properly.
- Keep doors and windows clear as escape routes in each room.

DEFENSIBLE SPACE

The removal of dense, flammable foliage from the area immediately surrounding the house reduces the risk of structure ignition and allows firefighters access to protect the home. The pruning and limbing of trees along with the selective removal of trees and shrubs is recommended to create a minimum defensible space area of 30 feet. Steep slopes require increased defensible space because fire can travel quickly uphill.

Within the minimum 30-foot safety zone, plants should be limited to fire-resistant trees and shrubs. Focus on fuel breaks such as concrete patios, walkways, rock gardens, and irrigated garden or grass areas within this zone. Use mulch sparingly within the safety zone, and focus use in areas that will be watered regularly. In areas such as turnarounds and driveways, nonflammable materials such as gravel are much better than wood chips or pine needles.

Vegetative debris such as dead grasses or leaves provide important erosion protection for soil but also may carry a surface fire. It is simply not feasible to remove all the vegetative debris from around your property. However, it is a good idea to remove any accumulations within the safety zone and extending out as far as possible. This is particularly important if leaves tend to build up alongside your house or outbuildings.

Removing dead vegetation and leaves and exposing bare mineral soil are recommended in a 2-foot-wide perimeter along the foundation of the house. Also, be sure to regularly remove all dead vegetative matter including grasses, flowers, and leaf litter surrounding your home and any debris from gutters, especially during summer months. Mow the lawn regularly and promptly dispose of the cuttings properly. If possible, maintain a green lawn for 30 feet around your home.

All trees within the safety zone should have lower limbs removed to a height of 6–10 feet. Remove any branches within 15 feet of your chimney or overhanging any part of your roof. Ladder fuels are short shrubs or trees growing under the eaves of the house or under larger trees. Ladder fuels carry fire from the ground level onto the house or into the tree canopy. Be sure to remove all ladder fuels within the safety zone first. The removal of ladder fuels within about 100 feet of the house will help to limit the risk of crown fire around your home. More information about defensible space is provided at http://www.firewise.org.

FIRE RETARDANTS

For homeowners who would like home protection beyond defensible space and fire-resistant structural materials, fire-retardant gels and foams are available. These materials are sold with various types of equipment for applying the material to the home. They are similar to the substances applied by firefighters in advance of wildfire to prevent ignition of homes. Different products have different timelines for application and effectiveness. The amount of product needed is based on the size of the home, and prices may vary based on the application tools. Prices range from a few hundred to a few thousand dollars. An online search for "fire blocking gel" or "home firefighting" will provide a list of product vendors. Residents should research and consider environmental impacts of chemicals.

ADDRESS POSTING

Locating individual homes is one of the most difficult tasks facing emergency responders. Every home should have the address clearly posted with numbers at least three inches high. The colors of the address posting should be contrasting or reflective. The address should be posted so that it is visible to cars approaching from either direction.

ACCESS

Unfortunately, limited access may prevent firefighters from reaching many homes in the planning area. Many of the access problems occur at the property line and can be improved by homeowners. First, make sure that emergency responders can get in your gate. This may be important not only during a fire but also to allow access during any other type of emergency response. If you will be gone for long periods during fire season, make sure a neighbor has access, and ask them to leave your gate open in the event of a wildfire in the area.

Ideally, gates should swing inward. A chain or padlock can be easily cut with large bolt cutters, but large automatic gates can prevent entry. Special emergency access red boxes with keys are sold by many gate companies but are actually not recommended by emergency services. The keys are difficult to keep track of and may not be available to the specific personnel that arrive at your home. An alternative offered by some manufacturers is a device that opens the gate in response to sirens. This option is preferred by firefighters but may be difficult or expensive to obtain.

Beyond your gate, make sure your driveway is uncluttered and at least 12 feet wide. The slope should be less than 10%. Trim any overhanging branches to allow at least 13.5 feet of overhead clearance. Also make sure that any overhead lines are at least 14 feet above the ground. If any lines are hanging too low, contact the appropriate phone, cable, or power company to find out how to address the situation.

If possible, consider a turnaround within your property at least 45 feet wide. This is especially important if your driveway is more than 300 feet in length. Even small fire engines have a hard time turning around and

cannot safely enter areas where the only means of escape is by backing out. Any bridges must be designed with the capacity to hold the weight of a fire engine.

NEIGHBORHOOD COMMUNICATION

It is important to talk to your neighbors about the possibility of wildfire in your community. Assume that you will not be able to return home when a fire breaks out and may have to rely on your neighbors for information and assistance. Unfortunately, it sometimes takes tragedy to get people talking to each other. Don't wait for disaster to strike. Strong communication can improve the response and safety of every member of the community.

PHONE TREES

Many neighborhoods use phone trees to keep each other informed of emergencies within and around the community. The primary criticism is that the failure to reach one person high on the tree can cause a breakdown of the system. However, if you have willing and able neighbors, particularly those that are at home during the day, the creation of a well-planned phone tree can often alert residents to the occurrence of a wildfire more quickly than media channels. Talk to your neighborhood association about the possibility of designing an effective phone tree.

NEIGHBORS IN NEED OF ASSISTANCE

Ask mobility-impaired neighbors if they have notified emergency responders of their specific needs. It is also a good idea for willing neighbors to commit to evacuating a mobility-impaired resident in the event of an emergency. Make sure that a line of communication is in place to verify the evacuation.

ABSENTEE OWNERS

Absentee owners are often not in communication with their neighbors. If a home near you is unoccupied for large portions of the year, try to get contact information for the owners from other neighbors or your neighborhood association. Your neighbors would probably appreciate notification in the event of an emergency. Also, you may want to contact them to suggest that they move their woodpile or make sure that the propane line to the house is turned off.

HOUSEHOLD EMERGENCY PLAN

A household emergency plan does not take much time to develop and will be invaluable in helping your family deal with an emergency safely and calmly. One of the fundamental issues in the event of any type of emergency is communication. Be sure to keep the phone numbers of neighbors with you rather than at home.

It is a good idea to have an out of state contact, such as a family member. When disaster strikes locally, it is often easier to make outgoing calls to a different area code than local calls. Make sure everyone in the family has the contact phone number and understands why they need to check in with that person in the event of an emergency. Also, designate a meeting place for your family. Having an established meeting site helps to ensure that family members know where to go, even if they can't communicate by phone.

CHILDREN

Local schools have policies for evacuation of students during school hours. Contact the school to get information on how the process would take place and where the children would likely go.

The time between when the children arrive home from school and when you return home from work is the most important timeframe that you must address. Fire officials must clear residential areas of occupants to protect lives and to allow access for fire engines and water drops from airplanes or helicopters. If your area is evacuated, blockades may prevent you from returning home to collect your children. It is crucial to have a plan with a neighbor for them to pick up your children if evacuation is necessary.

PETS AND LIVESTOCK

Some basic questions about pets and livestock involve whether you have the ability to evacuate the animals yourself and where you would take them. Planning for the worst-case scenario may save your animals. An estimated 90% of pets left behind in an emergency do not survive. Don't expect emergency service personnel to prioritize your pets in an emergency. Put plans in place to protect your furry family members.

PETS

Assemble a pet disaster supply kit and keep it handy. The kit should contain a three-day supply of food and water, bowls, a litter box for cats, and a manual can opener if necessary. It is also important to have extra medication and medical records for each pet. The kit should contain a leash for each dog and a carrier for each cat. Carriers of some kind should be ready for birds and exotic pets. In case your pet must be left at a kennel or with a friend, also include an information packet that describes medical conditions, feeding instructions, and behavioral problems. A photo of each pet will help to put the right instructions with the right pet.

In the event of a wildfire you may be prevented from returning home for your animals. Talk to your neighbors and develop a buddy system in case you or your neighbors are not home when fire threatens. Make sure your neighbor has a key and understands what to do with your pets should they need to be evacuated.

If you and your pets were evacuated, where would you go? Contact friends and family in advance to ask whether they would be willing to care for your pets. Contact hotels and motels in the area to find out which ones accept pets. Boarding kennels may also be an option. Make sure your pets' vaccinations are up-to-date if you plan to board them.

Once you have evacuated your pets, continue to provide for their safety by keeping them cool and hydrated. Try to get your pets to an indoor location rather than leaving them in the car. Do not leave your pets in your vehicle without providing shade and water. It is not necessary to give your pets water while you are driving, but be sure to offer water as soon as you reach your destination.

LIVESTOCK

Getting livestock out of harm's way during a wildfire is not easy. You may not be able or allowed to return home to rescue your stock during a wildfire evacuation. Talk to your neighbors about how you intend to deal with an evacuation. If livestock are encountered by emergency responders, they will be released and allowed to escape the fire on their own. Make sure your livestock have some sort of identification. Ideally, your contact information should be included on a halter tag or ear tag so that you could be reached if your animal is encountered.

If you plan to evacuate your livestock, have a plan in place for a destination. Talk to other livestock owners in the area to find out whether they would be willing to board your stock in the event of an emergency. Often in large-scale emergencies, special accommodations can be made at fair and rodeo grounds, but personal arrangements may allow you to respond more quickly and efficiently.

If you do not own a trailer for your horses or other livestock, talk to a neighbor who does. Find out whether they would be willing to assist in the evacuation of your animals. If you do own a trailer, make sure it is in working condition with good, inflated tires and functioning signal lights. Keep in mind that even horses that are accustomed to a trailer may be difficult to load during an emergency.

Practicing may be a good idea to make sure your animals are as comfortable as possible when being loaded into the trailer.

HOUSE AND PROPERTY

Insurance companies suggest that you make a video that scans each room of your house to help document and recall all items within your home. This video can make replacement of your property much easier in the unfortunate event of a large insurance claim. See more information on insurance claims in the "After the Fire" section below.

PERSONAL ITEMS

During fire season, items you would want to take with you during an evacuation should be kept in one readily accessible location. As an extra precaution, it may be a good idea to store irreplaceable mementos or heirlooms away from your home during fire season.

It is important to make copies of all important paperwork, such as birth certificates, titles, and so forth, and store them somewhere away from your home, such as in a safe deposit box. Important documents can also be protected in a designated firesafe storage box within your home.

IN THE EVENT OF A FIRE

NOTIFICATION

In the event of a wildfire, announcements from the local Emergency Management office will be broadcast over local radio and television stations. Media notification may be in the form of news reports or the Emergency Alert System (EAS). On television, the emergency management message will scroll across the top of the screen on local channels. The notice is not broadcast on non-local satellite and cable channels.

One good way to stay informed about wildfire is to use a National Oceanic and Atmospheric Administration weather alert radio. The radios can be purchased at most stores that carry small appliances, such as Target, Sears, or Radio Shack. The radio comes with instructions for the required programming to tune the radio to your local frequency. The programming also determines the types of events for which you want to be alerted. The weather alert radio can be used for any type of large incident (weather, wildfire, hazardous materials, etc.), depending on how it is programmed. Local fire personnel can assist with programming if needed.

WHEN FIRE THREATENS

Before an evacuation order is given for your community, there are several steps you can take to make your escape easier and to provide for protection of your home. When evaluating what to do as fire threatens, the most important guideline is: DO NOT JEOPARDIZE YOUR LIFE.

Back your car into the garage or park it in an open space facing the direction of escape. Shut the car doors and roll up the windows. Place all valuables that you want to take with you in the vehicle. Leave the keys in the ignition or in another easily accessible location. Open your gate.

Close all windows, doors, and vents, including your garage door. Disconnect automatic garage openers and leave exterior doors unlocked. Close all interior doors as well.

Move furniture away from windows and sliding glass doors. If you have lightweight curtains, remove them. Heavy curtains, drapes, and blinds should be closed. Leave a light on in each room.

Turn off the propane tank or shut off gas at the meter. Turn off pilot lights on appliances and furnaces.

Move firewood and flammable patio furniture away from the house or into the garage.

Connect garden hoses to all available outdoor faucets and make sure they are in a conspicuous place. Turn the water on to "charge," or fill your hoses and then shut off the water. Place a ladder up against the side of the home, opposite the direction of the approaching fire, to allow firefighters easy access to your roof.

EVACUATION

When evacuation is ordered, you need to go ***immediately***. Evacuation not only protects lives, it also helps to protect property. Some roads are too narrow for two-way traffic, especially with fire engines. Fire trucks often can't get into an area until the residents are out. Also, arguably the most important tool in the WUI toolbox is aerial attack. Airplanes and helicopters can be used to drop water or retardant to help limit the spread of the fire, but these resources cannot be used until the area has been cleared of civilians.

Expect emergency managers to designate a check-out location for evacuees. This process helps to ensure that everyone is accounted for and informs emergency personnel as to who may be remaining in the community. Every resident should check out at the designated location before proceeding to any established family meeting spot.

A light-colored sheet closed in the front door serves as a signal to emergency responders that your family has safely left. This signal saves firefighters precious time, as it takes 12–15 minutes per house to knock on each door and inform residents of the evacuation.

AFTER THE FIRE

RETURNING HOME

First and foremost, follow the advice and recommendations of emergency management agencies, fire departments, utility companies, and local aid organizations regarding activities following the wildfire. Do not attempt to return to your home until fire personnel have deemed it safe to do so.

Even if the fire did not damage your house, do not expect to return to business as usual immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. When you return to your home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Have the fire department or utility companies turn the utilities back on once the area is secured.

INSURANCE CLAIMS

Your insurance agent is your best source of information as to the actions you must take in order to submit a claim. Here are some things to keep in mind. Your insurance claim process will be much easier if you photographed your home and valuable possessions before the fire and kept the photographs in a safe place away from your home. Most if not all of the expenses incurred during the time you are forced to live outside your home could be reimbursable. These could include, for instance, mileage driven, lodging, and meals. Keep all records and receipts. Don't start any repairs or rebuilding without the approval of your claims adjuster. Beware of predatory contractors looking to take advantage of anxious homeowners wanting to rebuild as quickly as possible. Consider all contracts very carefully, take your time to decide, and contact your insurance agent with any questions. If it appears to be a large loss, consider whether you should hire a public adjuster that is licensed by the state department of insurance who will represent and advocate for you as the policyholder in appraising and negotiating the claimant's insurance claim to ensure you get the best outcome and recovery from your insurance company. Most public adjusters charge a small percentage of the settlement that is set by the state and primarily they appraise the damage, prepare an estimate and other claim documentation, read the policy of insurance to determine coverages, and negotiate with the insurance company's claims handler.

POST-FIRE REHABILITATION

Homes that may have been saved in the fire may still be at risk from flooding and debris flows. Burned Area Emergency Rehabilitation (BAER) teams are inter-disciplinary teams of professionals who work to mitigate the effects of post-fire flooding and erosion. These teams often work with limited budgets and manpower. Homeowners can assist the process by implementing treatments on their own properties as well as volunteering on burned public lands to help reduce the threat to valuable resources. Volunteers can assist BAER team members by planting seeds or trees, hand mulching, or helping to construct straw-bale check dams in small drainages.

Volunteers can help protect roads and culverts by conducting storm patrols during storm events. These efforts dramatically reduce the costs of such work as installing trash racks, removing culverts, and re-routing roads.

Community volunteers can also help scientists to better understand the dynamics of the burned area by monitoring rain gauges and monitoring the efficacy of the installed BAER treatments.

APPENDIX J:

Community Survey

Hardin County

Community Wildfire Protection Plan

Community Survey

Fire, forestry and emergency management agencies within Hardin County are currently working together to develop this Community Wildfire Protection Plan in order to identify communities within the County that are at risk from wildfire. We want to hear from you in order to understand how the County can better plan and prepare for potential wildfire in your community. This survey is also available online at the following Survey Monkey site (or QR code): https://www.surveymonkey.com/r/YBJBKMR

1. **Please enter as much or as little information about your home location as possible (if you wish to remain anonymous please provide general location information**

   Street Address_____

   Zip Code_____

   Or General Location_____

2. **How would you rate your house in terms of risk from wildfire? (*Consider the proximity of your house to tracts of undeveloped land, vegetated land, emergency response and access*)**

_____ Low

_____ Medium

_____ High

3. **My home is vulnerable to wildfire because of…… (*select top 2 reasons*).**

   _____ Surrounding fuels on your property- (i.e. live and dead trees, shrubs, grass, wood piles).

   _____ Surrounding fuels on neighboring property – (i.e. dense vegetation, wood piles, dead and downed trees.

   _____ Building materials- (i.e. wood shingles, clap board siding, wooden decks, wood fences).

   _____ Lack of water supply- (i.e. dependence on well water, far from hydrant).

   _____ Inaccessible area- (i.e. long narrow driveway, dead end road, can a fire truck easily access your property?)

   _____ Ignition sources from neighboring areas- (i.e. disposal of cigarette butts from trails or roads).

4. **How prepared is your community for a large wildfire? (*select one*)**

   _____ Poorly prepared

   _____ ⬇

   _____ Moderately prepared

   _____ ⬇

   _____ Well prepared

5. Rate the following actions in their importance to making the community better prepared for wildfire (please *RANK 1-5; 1 is most important*).

_____ Clean up live and dead vegetation and yard debris around homes by individual property owners.

_____ Better firefighting equipment.

_____ Improved water supply – (i.e. expansion of public water systems, increased number of hydrants, and installation of wells).

_____ Fuel treatments on public lands to reduce the amount of live and dead vegetation available to burn in a fire.

_____ Community education on wildfire prevention and awareness.

6. My biggest challenge to making my home fire safe is…. (*Please RANK 1-4; 1 is most important*).

_____ Time

_____ Financial burden of carrying out mitigation measures and maintain clearance.

_____ Not knowing what to do.

_____ I think my home is already safe.

7. I would be most interested in funding to help me and my community with…. (*please RANK from 1- 7; 1 is most important*-)

_____ Green waste disposal- (i.e. removal of leaves, branches, wood from cleared areas).

_____ Home wildfire hazard assessments.

_____ Wildfire prevention education.

_____ Timber/fuel treatments on private land.

_____ Timber/fuel treatments on public land.

_____ Water supply development- (i.e. extend public water systems, add additional hydrants, install fire wells, and acquire portable water supplies).

_____ Funding for fire departments- (i.e. to secure additional apparatus/equipment, fund training, fund additional staff).

8. Are you currently using prescribed fire to treat your property?

Yes _____

No _____

No, but I am interested in learning more _____

9. **Name any community resources you would most like to see prioritized for protection from wildfire (*e.g. natural areas, cultural sites, municipal infrastructure and recreation sites*). -**

_____
_____
_____
_____

10. Any other comments?

_____
_____
_____
_____
_____
_____
_____

The survey can be copied (scan or photo) and returned to the following email:

Victoria Amato (Contractor Project Manager) at vamato@swca.com

Thank you for contributing to this important project to reduce wildfire risk to your community. Your answers will be considered in the development of this community wildfire planning document.