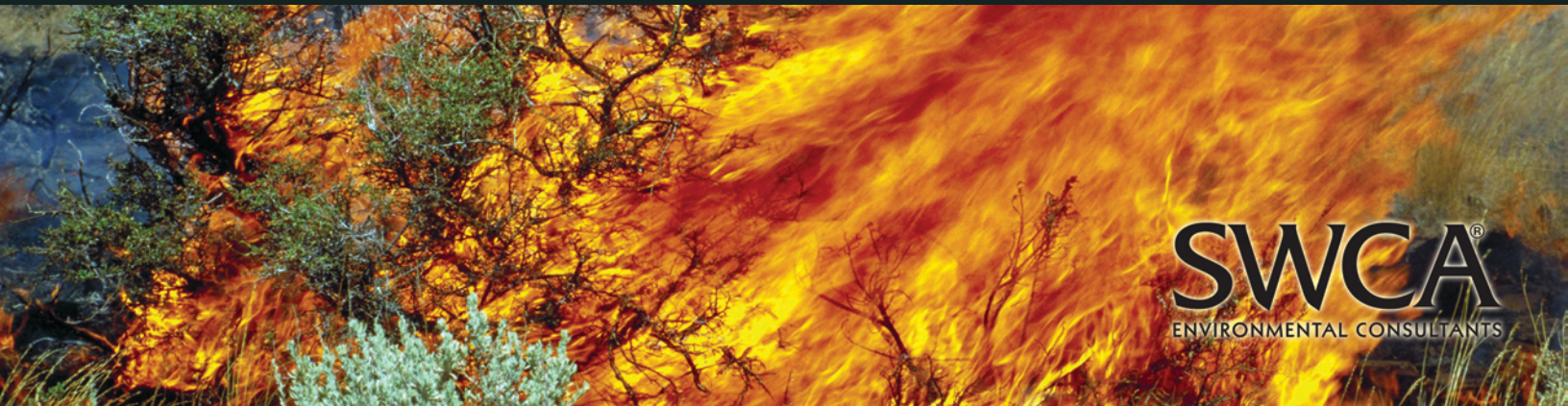


November 2016



# Pope County Community Wildfire Protection Plan



**SWCA**<sup>®</sup>  
ENVIRONMENTAL CONSULTANTS



# **POPE COUNTY COMMUNITY WILDFIRE PROTECTION PLAN**

Prepared for

**Pope County**

Southeastern Illinois Regional Planning and Development Commission

Prepared by

**SWCA Environmental Consultants**

200 West 22<sup>nd</sup> Street, Suite 220  
Lombard, IL 60148

[www.swca.com](http://www.swca.com)

SWCA Project No. 38031

November 2016





**CHAPTER 1 INTRODUCTION ..... 1**

- Overview of Community Wildfire Protection Plans..... 2**
- Need for a Community Wildlife Protection Plan..... 3**
- Goal of a Community Wildfire Protection Plan..... 4**
- Planning Process..... 4**
  - Core Team ..... 5
  - Project Area ..... 5
  - Public Involvement..... 7
- Outcomes of a Community Wildfire Protection Plan ..... 7**
  - Adhering to State, National, and Regional Forest and Wildfire Strategies ..... 7
  - Building Collaboration ..... 9

**CHAPTER 2 COMMUNITY BACKGROUND..... 13**

- Location and Geography ..... 13**
- Population ..... 13**
- History and Land Use..... 14**
- Landownership ..... 14**
- Recreation ..... 16**
  - Public Lands..... 16
- Climate and Weather Patterns..... 18**
- Vegetation and Land Cover ..... 21**
  - Forest ..... 21
  - Grassland..... 25
  - Glades ..... 26
  - Barrens..... 27
  - Springs and Seeps..... 28

Riparian Areas, Lakes, and Watersheds ..... 28

Wildlife..... 31

**Roads and Transportation..... 31**

**Adjoining Counties..... 32**

**CHAPTER 3 FIRE ENVIRONMENT ..... 33**

**Wildland Urban Interface ..... 33**

**Fire History ..... 36**

Ignition Sources ..... 39

**Fire Regimes ..... 40**

Fire Regime Classifications ..... 40

Fire Regime Condition Class ..... 40

**Challenges for Future Restoration Efforts..... 41**

**Fire Management Policy ..... 42**

Laws, Ordinances, Standards, and Codes for Wildfire Prevention..... 42

Fire Planning ..... 42

Emergency Management Planning..... 43

Land Management Strategies ..... 43

**Fire and Response Capabilities ..... 48**

Responsible Wildfire Agencies (Federal, State, County, and Cities)..... 48

Mutual Aid ..... 50

Evacuation Resources ..... 51

Water Availability and Supply ..... 52

Public Education and Outreach Programs..... 52

**CHAPTER 4 WUI HAZARD AND RISK ASSESSMENT ..... 57**

**Purpose ..... 57**

**Fire Behavior Model ..... 58**

Overview ..... 58

Fire Behavior Model Components ..... 58

Fire Behavior Model Inputs ..... 59

Fire Behavior Model Outputs ..... 64

**Composite Risk/Hazard Assessment ..... 65**

**Community Hazard Assessments..... 68**

**Communities at Risk Descriptions ..... 73**

Dixon Springs ..... 73

McCormick ..... 76

Robbs and Glendale ..... 79

Oak Road ..... 81

Herod..... 84

Hartsville ..... 87

Lusk..... 90

Bushwack Road ..... 93

Raum..... 96

Brownfield ..... 99

Rosebud ..... 101

Mann Lake ..... 105

Hohman Lake..... 109

Golconda ..... 113

Temple Hill ..... 115

Eddyville..... 118

Highway 146 between Dixon Springs and Golconda..... 121

Bay City ..... 122

**Community Values at Risk ..... 125**

    Natural CVARs..... 125

    Socioeconomic CVARs..... 126

    Cultural CVARs ..... 127

**CHAPTER 5 COMMUNITY OUTREACH..... 129**

**Community Survey, Webinar, and Social Media ..... 129**

        Community Survey..... 129

        Social Media..... 133

        Fall Festival Public Outreach Event ..... 133

**Findings of Public Outreach ..... 133**

**CHAPTER 6 MITIGATION STRATEGIES ..... 137**

**Recommendations and Action Items ..... 137**

**Recommendations for Fuels Reduction Projects ..... 137**

**Fuels Treatment Scales ..... 148**

        Defensible Space ..... 148

        Fuel Breaks and Open Space Cleanup ..... 149

        Larger-scale Treatments ..... 150

**Fuel Treatment Methods ..... 150**

        Manual Treatment..... 151

        Mechanized Treatments..... 152

        Prescribed Burning..... 152

        Thinning and Prescribed Fire Combined ..... 154

        Management of Non-native Plants..... 155

        Fuel Breaks ..... 155

**Recommendations for Public Education and Outreach ..... 157**

**Recommendations for Reducing Structural Ignitability ..... 160**

        Action Items for Homeowners to Reduce Structural Ignitability..... 162

**Recommendations for Improving Firefighting Capabilities ..... 164**

**CHAPTER 7 MONITORING AND EVALUATION STRATEGY ..... 169**

**Identify Timeline for Updating the CWPP ..... 171**

**Implementation ..... 172**

**REFERENCES..... 173**

**APPENDICES**

- Appendix A: Maps**
- Appendix B: Core Contact Team List**
- Appendix C: Illinois Fire Protection District Act**
- Appendix D: Media Outreach**
- Appendix E: Firefighting Resources**
- Appendix F: Wildfire Fire Risk and Hazard Severity Form NFPA 1144**
- Appendix G: Example Livestock Evacuation Plan**
- Appendix H: Funding Opportunities**
- Appendix I: Homeowner's Guide**
- Appendix J: Community Survey Questions**
- Appendix K: Fire-dependent Endangered & Threatened Species in Pope County**



**FIGURES**

**Figure 1. Project location map. .... 6**

**Figure 2. Goals of the NERAP and Cohesive Strategy. Source: Forests and Rangelands (2013:7)..... 8**

**Figure 3. Landownership and forest management. .... 15**

**Figure 4. Monthly average temperature in Pope County (1997–2015) (Dixon Springs Station)..... 19**

**Figure 5. Monthly average precipitation in Pope County (1997–2015) (Dixon Springs Station)..... 19**

**Figure 6. Monthly average wind speed in Pope County (1997–2015) (Dixon Springs Station)..... 20**

**Figure 7. Pope County land cover. .... 22**

**Figure 8. Japanese stiltgrass, a non-native species that is prolific in disturbed areas of Pope County (USFS 2012). .... 24**

**Figure 9. Grassland habitat managed with prescribed fire. Photo Credit: Jody Shimp. . 25**

**Figure 10. Remnant of a native prairie in southern Pope County. Photo Credit. Jody Shimp. .... 26**

**Figure 11. Sandstone glade natural community at Bell Smith Springs, Shawnee National Forest. .... 26**

**Figure 12. Limestone barrens community located near Grand Pierre Creek. .... 27**

**Figure 13. Location of the Barrens Region of Pope County. Source: Stritch (1987)..... 28**

**Figure 14. Lusk Creek. Photo Credit: Jody Shimp..... 29**

**Figure 15. Millstone Lake. Photo credit: Stephanie Dowdy. .... 30**

**Figure 16. Lake Glendale Forest Plantation (USFS). Photo credit: Gerald Flood. .... 30**

**Figure 17. Some homes have insufficient defensible space and have forest vegetation surrounding the structure..... 34**

**Figure 18. WUI designation. .... 35**

**Figure 19. Fire history data for Pope County (1986–2016) on all jurisdictions..... 37**

**Figure 20. Wildfire size (acres) in Pope County (1986–2015) on all jurisdictions..... 37**

**Figure 21. Fire occurrence density map. .... 38**

**Figure 22. Oak-hickory pre-treatment. Photo credit: David Allen. .... 47**

**Figure 23. Oak-hickory post-prescribed fire treatment. Photo Credit: David Allen..... 47**

**Figure 24. Shawnee National Forest tractor plow used for fire suppression. .... 48**

**Figure 25. IDNR Fire Program. .... 49**

**Figure 26. Rural Pope County Fire Department fire truck. .... 49**

**Figure 27. Golconda City Fire Department fire truck. .... 50**

**Figure 28. Rural Pope County road in the Rosebud neighborhood, showing narrow road width and overhanging vegetation. .... 51**

**Figure 29. Defensible space standards from the Insurance Institute for Business and Home Safety ..... 56**

**Figure 30. Composite Risk/Hazard Assessment overlay. .... 66**

**Figure 31. Composite Risk/Hazard Assessment map..... 67**

**Figure 32. Typical setting of homes and structures in Pope County-on open plots with good defensible space on most sides, with some wooded areas adjacent. Note propane tank. .... 74**

**Figure 33. Example of home where defensible space should be implemented to protect from wildfire. .... 74**

**Figure 34. Location of Dixon Springs State Park showing extensive continuous forest lands to the north and northeast..... 75**

**Figure 35. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact Dixon Springs.. 75**

**Figure 36. McCormick showing extensive forest land in vicinity of the community..... 77**

**Figure 37. Many homes in Pope County are constructed with combustible wood components and although defensible space is generally good throughout the county, some homes are located immediately adjacent to woodland with overhanging vegetation. .... 77**

**Figure 38. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact McCormick. .... 78**

**Figure 39. Robbs and Glendale, showing land cover mosaic ..... 80**

**Figure 40. Example of a well maintained and manicured home ..... 80**

**Figure 41. Oak Road (located in the north-central portion of Pope County) showing adjacent forested areas..... 82**

**Figure 42. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents along Oak Road. .... 83**

**Figure 43. Location of Herod in a mosaic of vegetation types from patchy forests to agricultural lands. .... 85**

**Figure 44. Image showing homes along Raum Road with minimal defensible space and surrounded by wooded vegetation. .... 85**

**Figure 45. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Herod..... 86**

**Figure 46. Location of Hartsville relative to Herod, showing mosaic of agricultural lands within the community, but wide swath of forested land at distance. .... 88**

**Figure 47. Home with good defensible space, access, turnaround space and pond. .... 88**

**Figure 48. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Hartsville..... 89**

**Figure 49. Community of Lusk showing forested land adjacent to community. .... 91**

**Figure 50. Image showing good defensible space surrounding homes and structures and good separation between trees on residential plots..... 91**

**Figure 51. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Lusk..... 92**

**Figure 52. Bushwack Road, north of Golconda, showing the predominantly agricultural land use but with the northern section becoming more wooded. .... 94**

**Figure 53. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living along Bushwack Road. .... 95**

**Figure 54. Location of Raum relative to Eddyville, showing the mosaic of agricultural and forested land. .... 97**

**Figure 55. Examples of structures with limited defensible space located within large continuous forested stands..... 97**

**Figure 56. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Raum..... 98**

**Figure 57. Location of Brownfield showing varied land use and patchy forest stringers..... 100**

**Figure 58. Location of Rosebud relative to adjacent forest land. .... 102**

**Figure 59. View off dead-end road north west of Rosebud where a number of cabins are situated. .... 102**

**Figure 60. Evidence of fuel treatment work around cabins at end of dead-end road. .... 103**

**Figure 61. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Rosebud. .... 104**

**Figure 62. Location of Mann Lake Road relative to the Pope and Massac County border showing expansive forested land to the east and north. .... 106**

**Figure 63. Mann Lake showing Mann Lake Road access along southern edge of lake on Massac County side and relatively open fuels adjacent to homes. .... 106**

**Figure 64. A narrow unsurfaced road skirts Mann Lake. .... 107**

**Figure 65. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Mann Lake. .... 108**

**Figure 66. Location of Hohman Lake relative the Massac and Pope County boundary. 110**

**Figure 67. Many roads in Pope County are unsurfaced and have vegetation in close proximity. .... 110**

**Figure 68. Hohman Lake showing location of Hohman Lake Road and homes adjacent to the lake..... 111**

**Figure 69. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Rosebud. .... 112**

**Figure 70. Golconda, County Seat, showing location and mosaic of fuel types. .... 114**

**Figure 71. Temple Hill showing the diversity of land uses, large lot sizes, and good structure separation. .... 116**

**Figure 72. Church and graveyard at Temple Hill..... 116**

**Figure 73. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Temple Hill..... 117**

**Figure 74. Location of Eddyville among a patchwork of forest and agricultural lands. . 119**

**Figure 75. General store at Bear Branch Horse camp located close to Eddyville (source: [www.bearbranch.com](http://www.bearbranch.com)). .... 119**

**Figure 76. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Eddyville. .... 120**

**Figure 77. Highway 146 between Dixon Springs and Golconda showing agricultural patchwork with some forested patches and stringers. .... 121**

**Figure 78. Location of Bay City relative to the Ohio River showing the large forested area to the west of the community. .... 123**

**Figure 79. Some Bay City homes are situated close to wooded lands at their rear..... 123**

**Figure 80. Agricultural lands and natural areas are highly valued by the Pope County community..... 125**

**Figure 81. Communication site on Williams Hill. .... 126**

**Figure 82. Historic barns are commonplace throughout Pope County and are valued by the community for the agricultural heritage that they represent..... 127**

**Figure 83. CVARs in Pope County. .... 128**

**Figure 84. Existing and proposed fuel Treatments across all jurisdictions. .... 147**

**Figure 85. Defensible space zones. Source: [www.firewise.org](http://www.firewise.org)..... 148**

**Figure 86. Post burn treatment area showing open understory..... 153**

**TABLES**

**Table 1. Fuel Model Classification for PCCWPP Planning Area ..... 60**

**Table 2. Fuel Model Breakdown in Order of Acres ..... 61**

**Table 3. Community Assessment Summary..... 69**

**Table 4. Fuels Reduction Treatment Recommendations ..... 139**

**Table 5. Example of a Phased Approach to Mitigating Home Ignitability..... 149**

**Table 6. Summary of Fuels Treatment Methods..... 151**

**Table 7. Recommendations for Public Outreach and Education ..... 158**

**Table 8. Recommendations for Reducing Structural Ignitability ..... 161**

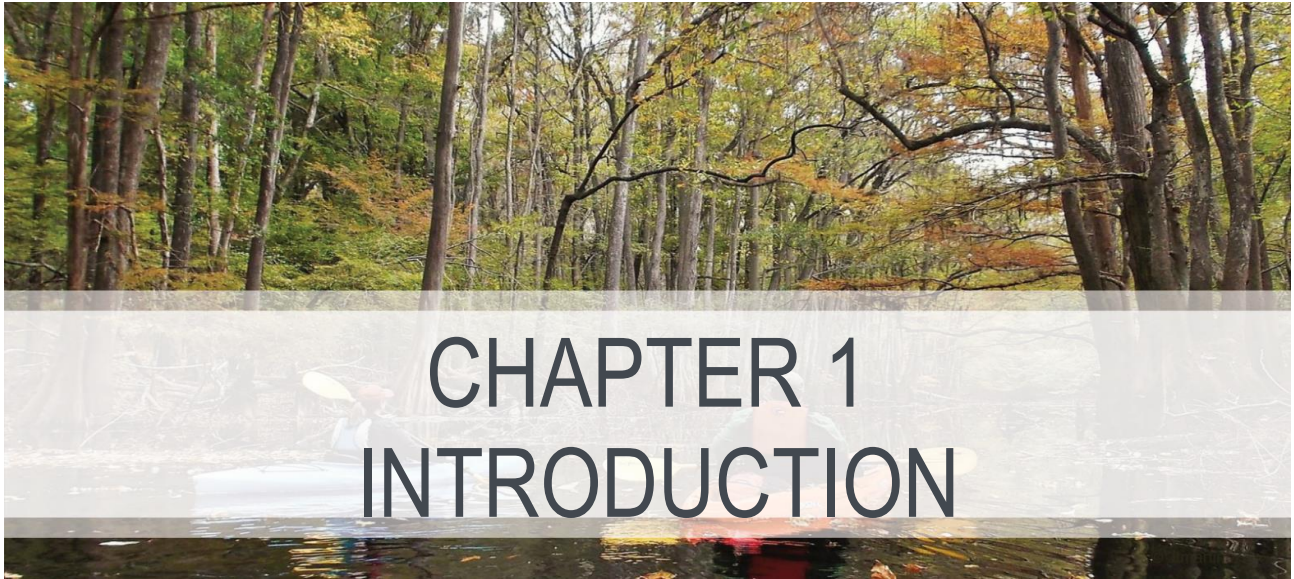
**Table 9. Recommendations for Improving Firefighting Capabilities ..... 165**

**Table 10. Recommended Monitoring Strategies ..... 170**

## LIST OF ACRONYMS AND ABBREVIATIONS

°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
GPS	global positioning system
HFRA	Healthy Forests Restoration Act
HIZ	home ignition zone
HOA	homeowner association
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
ISST	Southern Illinois Invasive Species Strike Team
NEPA	National Environmental Policy Act
NFP	National Fire Plan
NFPA	National Fire Protection Association
NIFC	National Interagency Fire Center
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group
PCCWPP	Pope County Wildfire Protection Plan
PPE	personal protective equipment
RC&D	Shawnee Resource Conservation and Development Area, Inc.
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

*This page intentionally left blank*



With increasing frequency, the national news media report tragic stories of communities impacted in the latest wave of severe wildfire. In order to mitigate fire impacts, communities in fire-prone environments need to have a plan to 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 Pope County CWPP (PCCWPP) 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 Pope 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 provides 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 6 provides suggested approaches to monitoring actions. The PCCWPP 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, meaning 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 Contact Team List is shown in Appendix B. A copy of the Illinois Fire Protection District Act can be found in Appendix C. Appendix D details Media Outreach. A list of Firefighting Resources are included as Appendix E. The Wildfire Fire Risk and Hazard Severity Form NFPA 1144 can be found 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. Appendix J shows the Community Survey Questions and Appendix K provides a map of the Fire-dependent Endangered & Threatened Species in Pope County

## 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 WILDLIFE 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 (Pyne 1982; Abrams 1992). 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 Pope 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.

Pope County is characterized by a scattered population with homes in proximity to this fire-prone ecosystem. The Pope County communities are served by 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 PCCWPP:

**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 (detailed in annexes to 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 June 2016 and is made up of stakeholders who have jurisdictional responsibility related to wildfire suppression and prevention and/or planning for the planning area. The Core Team contact list can be found in Appendix B. The first Core Team meeting was held on July 8, 2016; a second meeting was held on September 21, 2016; and the final meeting will be held via conference call on November 1<sup>st</sup> 2016. Average attendance at each Core Team meeting was approximately 10 people.

## PROJECT AREA

The PCCWPP is a county-level plan that includes the entire Pope County with some communities that straddle the border with adjacent Massac County (Figure 1).

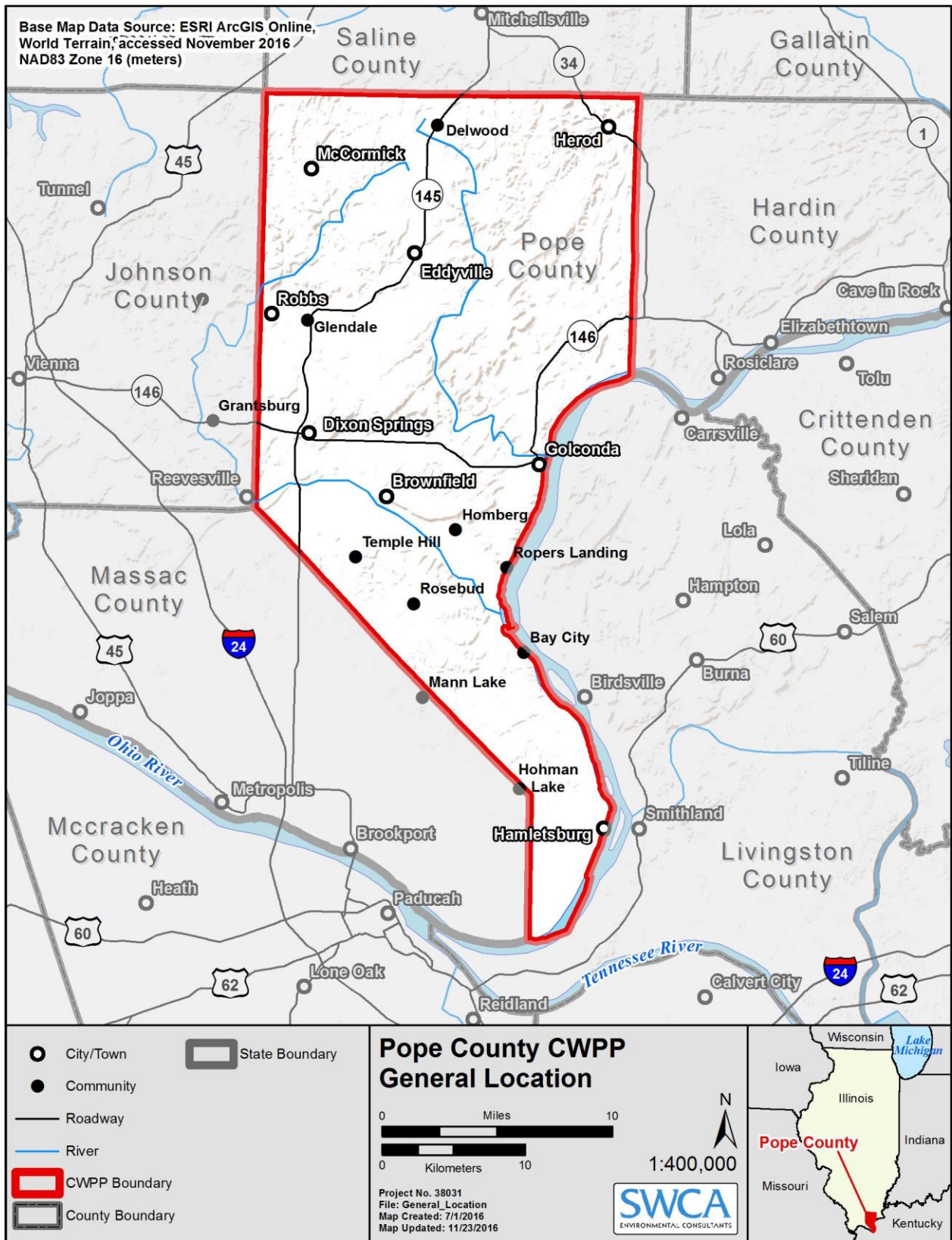


Figure 1. Project location map.

## 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 Pope County Community Wildfire Protection Plan), 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 the Pope County Courthouse in Golconda.

One public outreach session was held on October 9, 2016, at the Golconda Fall 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 October 3, 2016, describing the project and inviting the public to get involved. *The Herald* published the article on October 5, 2016. The article highlighted the need for ongoing public involvement in the project and directed residents to the online survey and the upcoming public outreach opportunity.

The public was invited to review the draft CWPP during a 2-week review period from November 8 to 22, 2016. The review period was advertised in *The Herald* in an article published on November 9, 2016.

## OUTCOMES OF A COMMUNITY WILDFIRE PROTECTION PLAN

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

#### *Illinois Forest Action Plan*

The 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 Pope 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: <http://www.stateforesters.org/files/IL-Assess-Strategy-20100528.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.

For more information on the Cohesive Strategy, please visit: <https://www.forestsandrangelands.gov/strategy/documents/strategy/CSPPhaseIIINationalStrategyApr2014.pdf>

**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 2).

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

**Figure 2. Goals of the NERAP and Cohesive Strategy. Source: Forests and Rangelands (2013:7).**

For more information on the NERAP, please visit: <http://wildfireinthe.blogspot.com/> or [https://www.forestsandrangelands.gov/strategy/documents/rsc/northeast/NERAP\\_Final2013April.pdf](https://www.forestsandrangelands.gov/strategy/documents/rsc/northeast/NERAP_Final2013April.pdf)

## 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.

## ***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 PCCWPP 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.

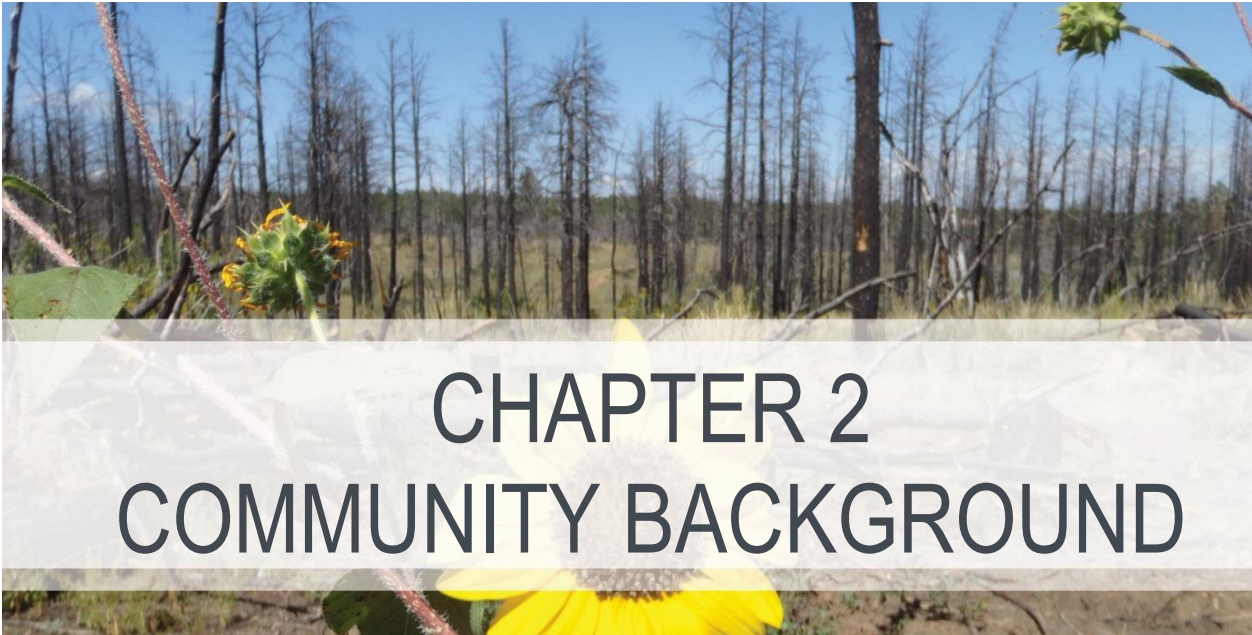
### ***Prioritize Fuel Reduction***

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.

*This page intentionally left blank*



## LOCATION AND GEOGRAPHY

Pope 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).

Pope County has a total area of 374 square miles, made up of flat agricultural lands and the hilly undulating land of the Illinois Shawnee Hills, part of the Shawnee National Forest. The county is bordered on the south and east by the Ohio River, which marks the state border with Kentucky. 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.

## POPULATION

According to the 2010 census, Pope County has a population of 4,470 residents, the second least populous county in Illinois, with 12.1 inhabitants per square mile. The county is composed of 15 villages. The County Seat of Golconda is the most populated urban area in Pope County with 726 residents, followed by Eddyville with 153 residents. Six other unincorporated communities fall within the county boundary: Brownfield, Hamlettsburg, Herod, Lusk's Ferry, Rosebud, and Temple Hill.

The population has been in decline in Pope County over the last century, and population density remains historically low (IDNR 2005a). Employment in the county is dominated by the USFS, Pope County, and the Pope County Unit School District in Golconda, as well as the Illinois Fuel Company in Herod. The farming sector has been declining in the county since the early 1970s.

## HISTORY AND LAND USE

Pope County has the largest forest acreage in the state (140,229 acres) and the largest percentage cover of land in forest (58.6%) (Illinois Interagency Landscape Classification Project 2002). The Shawnee National Forest accounts for most of the forest distribution in the region. Agricultural lands make up 30.5% of the county and have been in decline since 1995 (Gin and Flint 2002). 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 lands with a Forest Management Plan. This accelerated the rate of increase of forest area particularly during the late 1990s and early 2000s.

Pope County is considered extremely rural, with only 1.9% of the county comprising urban land, or 4,643 acres; urban land use has been increasing, however, since the mid-1990s.

## LANDOWNERSHIP

The majority of forest land in Pope County is managed by the Shawnee National Forest (Figure 3) or held by private landowners or private groups (corporations, associations, etc.). About 25% of these private landowners has a Forest Management Plan or has sought management assistance.

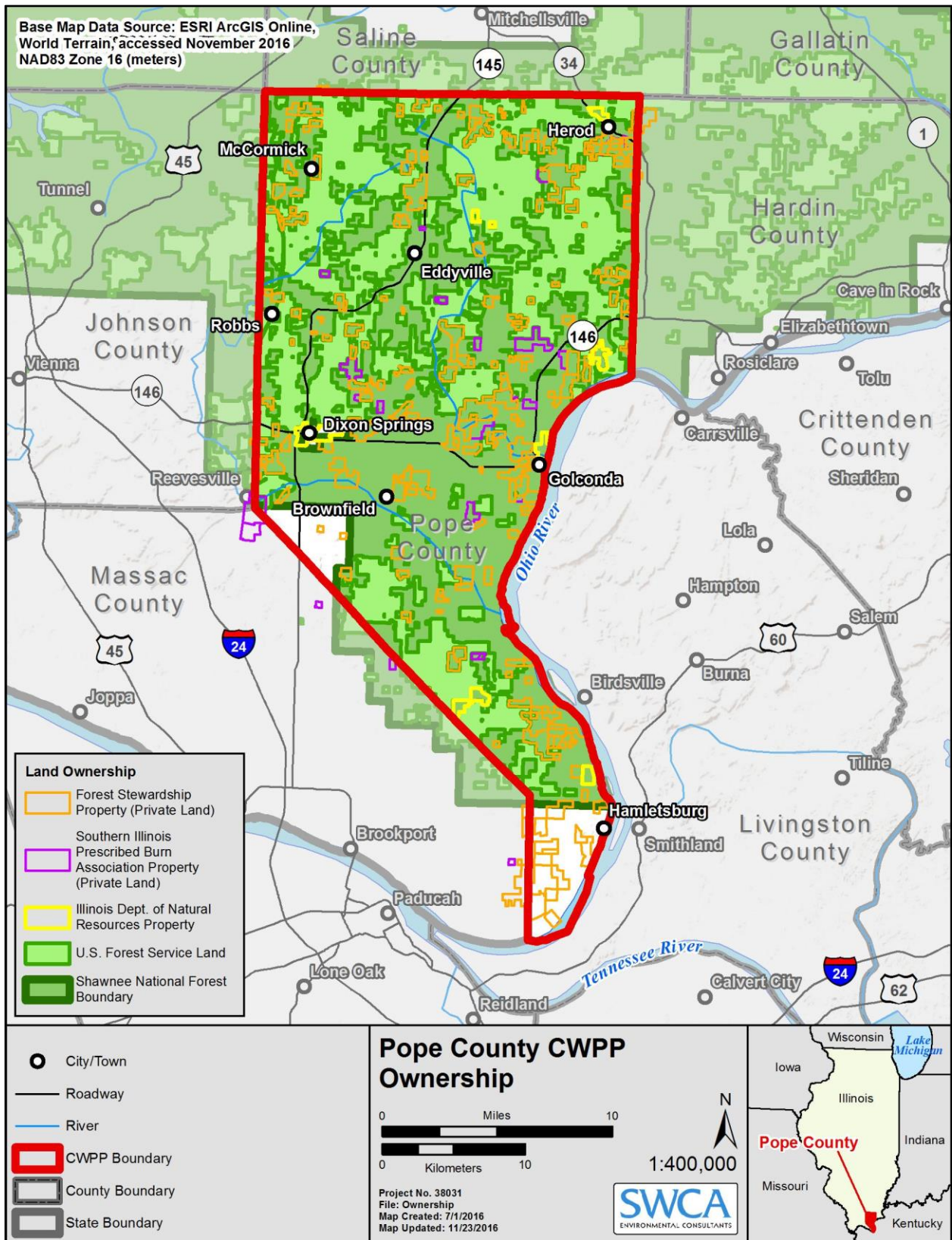


Figure 3. Landownership and forest management.

## RECREATION

Outdoor recreation is extremely popular in Pope County, with the Shawnee National Forest, Dixon Springs State Park, natural areas, geologic sites, scenery, campsites, fishing, hunting, and equestrian trails drawing most tourists to the area. Camping is very popular and private campgrounds are relatively common. A number of equestrian camps are scattered throughout the area. These are communal horse camps; although some are closely managed, some have limited management or oversight meaning people can set up their campsites however they want. This raises some evacuation concerns, as well as concern regarding potential ignition and locations of combustible structures and equipment close to people and animals. During peak seasons a large number of people can congregate in a relatively small space and that constitutes a large population to evacuate. There is pretty good defensible space around many campground structures, but the density of people and animals still creates a hazard.

## PUBLIC LANDS

Pope County comprises extensive public lands both federally and state managed, including National Forest land, two State Parks, three Illinois nature preserves, an Illinois Audubon Sanctuary, two Illinois Land and Water Reserves, and a large number of Illinois Natural Areas Inventory Sites (IDNR 2005a).

### *Shawnee National Forest*

The Shawnee National Forest comprises 285,000 acres of southern Illinois, with the greatest number of acres occurring within the county. The Shawnee National Forest is the single largest publically owned body of land in Illinois. The forest was designated in 1939 and originally comprised largely exhausted farmlands that were planted, during the 1930s and 1940s, with non-native pine trees to combat heavy erosion and stabilize the soils. 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 forests unique biodiversity.

### 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).

As a testament to Pope County’s natural character, there are 31 Illinois Natural Area Inventory (INAI) sites. First conducted from 1975 to 1978 the INAI’s initial goal was to find, evaluate, describe, and classify natural areas of statewide significance. The purpose of the INAI is to provide *accurate, detailed, and contemporary* information about the location and characteristics of natural areas statewide. The INAI has been continually updated and maintained since its creation to become one of the largest and most complete data sets of its kind.

### ***Dixon Springs State Park***

Dixon Springs State Park is an 801-acre park, 10 miles west of Golconda, managed by the IDNR. The park, situated atop a large rock substrate, is composed of oak-hickory forest with walnut, cypress, gum, sycamore, birch, and maple forest. Facilities at Dixon Springs State Park include a modern swimming pool, bathhouse, picnic tables, stoves, playgrounds, and parking areas. Hiking trails, basketball courts, volleyball, and an archery range are available at a Class B trailer camping site, and primitive camping sites are also present.

### ***Cretaceous Hills Nature Preserve***

Cretaceous Hills Nature Preserve is managed by the IDNR. The preserve is characterized by steep to rolling hills of coastal plains gravel. The preserve is wooded with slope forest, dry ridge forest, and ravine forest communities (IDNR 2016). Seep springs create boggy, acid areas in some areas. Upland forest supports oak-hickory forest, with tulip tree and red oak in the ravines. Spring areas support unusual plants, including cinnamon fern, marsh fern, and sphagnum moss. The area is of important historical significance, with an abundance of artifacts from the Archaic period.

### ***Lusk Creek Canyon Nature Preserve***

Lusk Creek Canyon is a 906-acre canyon located within the Lusk Creek Wilderness of the Shawnee National Forest. The area is a large gorge formed by the erosion of Pennsylvanian sandstone around a horseshoe bend in the creek. The preserve is home to 10 endangered and threatened plant species.

### ***Spivey's Valley Glade Nature Preserve***

Spivey's Valley Glade is a privately owned nature preserve that protects 18.4 acres of Grade A limestone glade and barrens natural communities. This site is unique because it represents the only valley glade known in Illinois. The preserve harbors three threatened and endangered species (IDNR 2005a).

### ***Gibbons Creek Land and Water Reserve***

Gibbons Creek Land and Water Reserve is located in the northeast corner of Pope County in the Greater Shawnee Hills Section of the Shawnee Hills Natural Division. The site is primarily a wooded upland which is recognized for its grade A dry barrens community by the INAI. The proposed Gibbons Creek Barrens Land and Water Reserve contains approximately 138 acres of the 220.68 acres found within the original inventory boundary (INAI #0339). The proposed land and water reserve also encompasses numerous other natural communities including sandstone cliff, a stream, sandstone glades, and several forest types ranging from wet-mesic to dry forest. Two state-listed species occur at the site.

### ***Big Grand Pierre Land and Water Reserve***

Big Grand Pierre Land and Water Reserve is significant because it is a large block of forest, with a significant part of the area having frontage on the Big Grand Pierre Creek. The site provides habitat for several state-endangered or threatened species. The area is situated along Big Grand Pierre Creek less than 0.5 mile from the Ohio River, making it a prime location for nesting and migration foraging for neotropical migrant birds.

### ***Bell Smith Springs National Natural Landmark***

Bell Smith Springs is a 1,387-acre designated National Natural Landmark located within the Shawnee National Forest and is an example of fragile ecosystems typical of sharply dissected sandstone substrates. The springs are a popular recreation area containing a series of clear, rocky streams, and scenic canyons bordered by high sandstone cliffs and an abundance of vegetation unique to Illinois. There is a series of hiking trails situated within the wooded canyons and slopes.

### ***Big Grand Pierre Glade Land and Water Reserve***

The reserve is managed by the IDNR and comprises 328 acres.

### ***Gibbons Creek Barrens Land and Water Reserve***

The reserve is managed by the IDNR and comprises 194 acres.

## **CLIMATE AND WEATHER PATTERNS**

Average temperatures in Golconda range from a low of 21 degrees Fahrenheit (°F) in January to a high of 87°F in July (Figure 4). Average precipitation ranges from 3.22 inches in October to 5.02 inches in May (Figure 5). 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 are the driest and windiest months (Figure 6). Late April and early May see the start of a wetter period with some heavy thunderstorms. Hot and humid conditions in May through August prevent ignition and spread of fire. August and September see a decline in rain showers and occasional short-term drought. 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; this marks the start of the fall fire season (USFS 2015). In years that see 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.



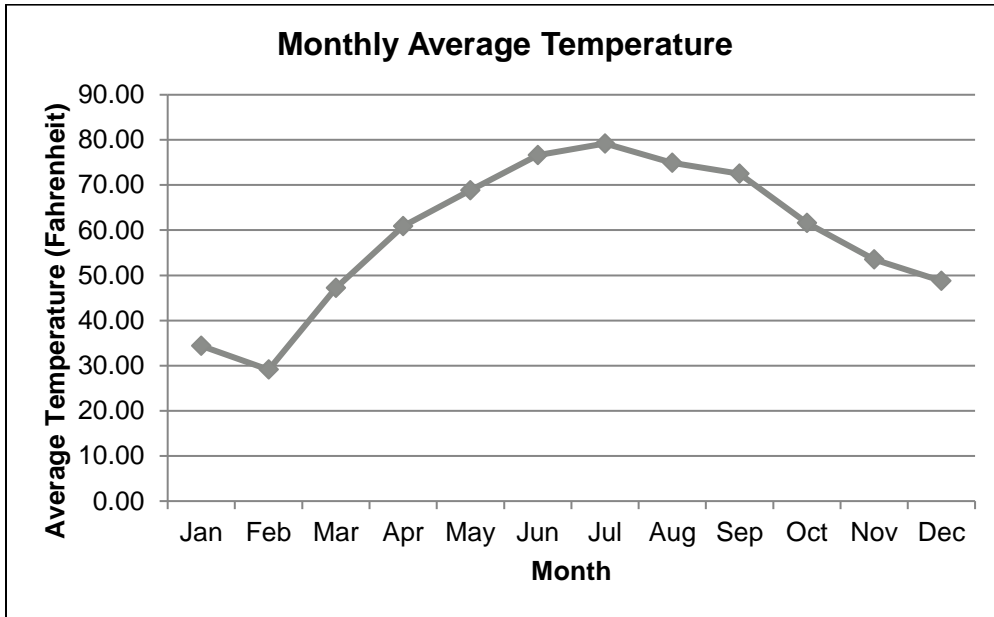


Figure 4. Monthly average temperature in Pope County (1997–2015) (Dixon Springs Station).

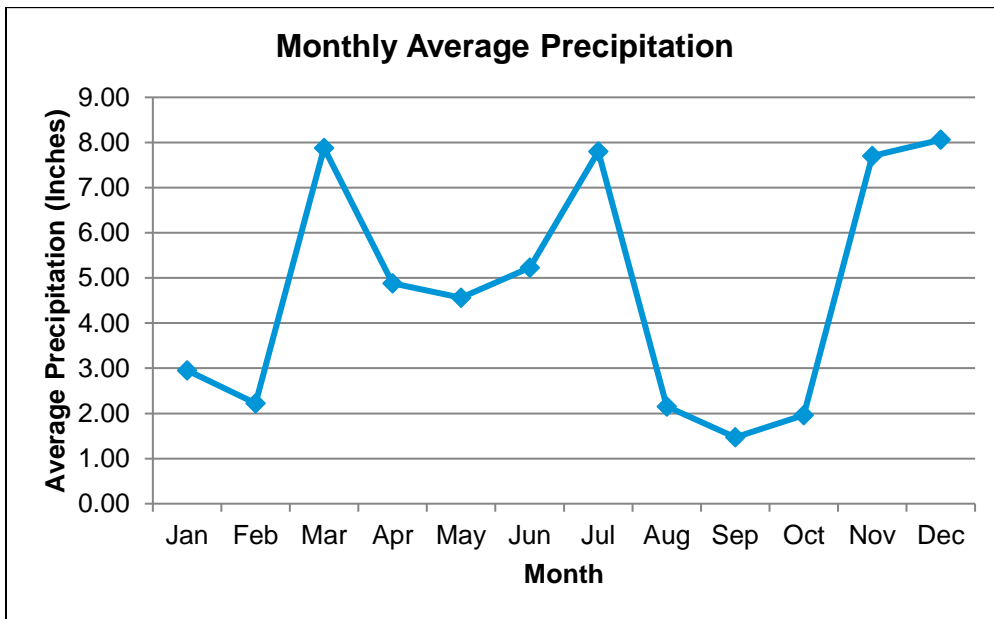


Figure 5. Monthly average precipitation in Pope County (1997–2015) (Dixon Springs Station).

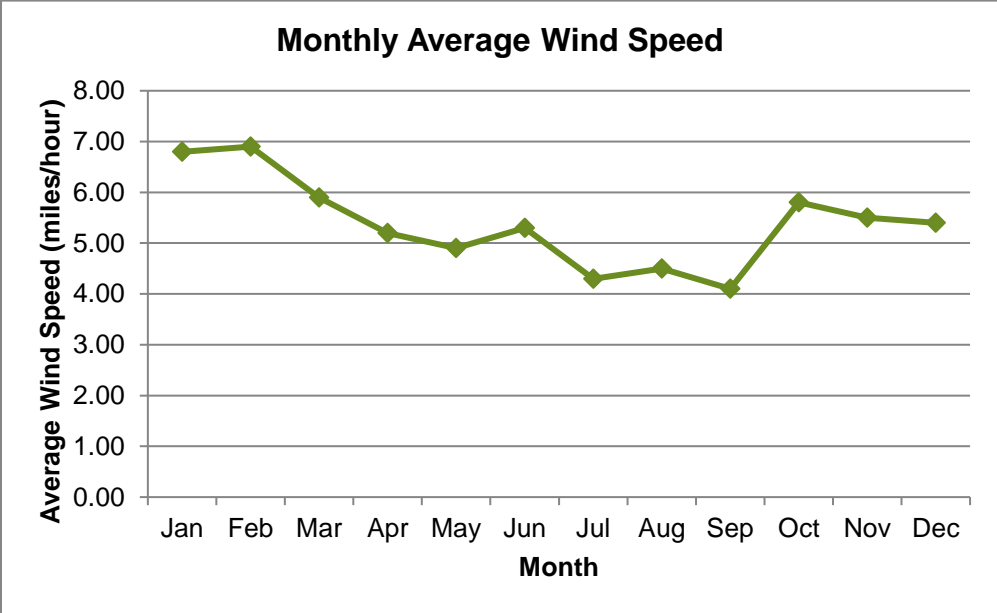


Figure 6. Monthly average wind speed in Pope County (1997–2015) (Dixon Springs Station).

## VEGETATION AND LAND COVER

Vegetation and land cover in the project area is shown in Figure 7.

### 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 (*Acer saccharum*), along with a host of understory species.

Pope County forest land falls primarily within the Eastern Broadleaf ecological province being 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 (USFS 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.

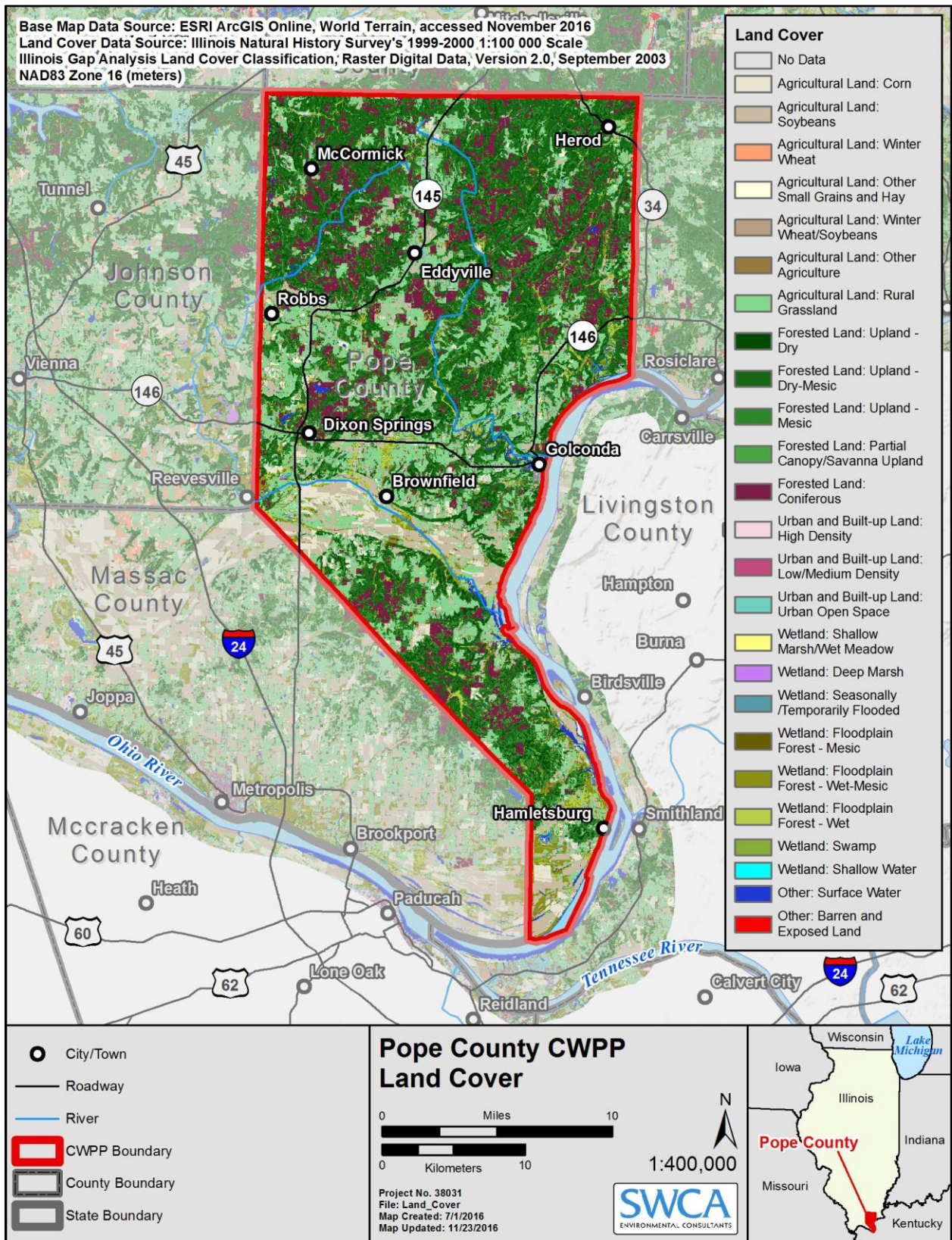


Figure 7. Pope County land cover.

## Pine Forest

In addition to the broadleaf habitat in Pope County, non-native pine plantations (comprising loblolly [*Pinus taeda*] and shortleaf pine [*P. echinata*]) are also common across the county, having been established in the 1930s for erosion control on depleted farmland (USFS 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 as compared to native hardwoods.

## Forest Health Considerations

The Illinois Statewide Forest Resource Assessments and Strategies (IDNR 2010) identifies the following factors that threaten Illinois forest health and can be applied to forest resources across Pope 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 the oak (Zaczek et al. 2002; Parker and Ruffner 2004; Tikusis 2009). 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 to lignin-rich oak leaves, which alters fire behavior and renders oak-hickory forests less likely to burn with desired effects (Rebertus and Burns 1997; Abrams 2005; Nowacki and Abrams 2008; Tikusis 2009). The long-term prospects for oak dominance are poor (Tikusis 2009) and there is a need for wide-scale intervention to prevent the replacement of oaks by non-oak species (IDNR 2010).

**Forest lands are 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 is a major overstory component but its decline (related to oak wilt and old age) is likely to result in replacement by maples in the overstory (IDNR 2010).

**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*), autumn olive (*Elaeagnus umbellata*), thorny multiflora rose (*Rosa multiflora*), bush honeysuckle (*Lonicera maackii*) and woody vine 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).

**Harmful exotic insects threaten Illinois forests**, including gypsy moth (*Lymantria dispar*), Asian long-horned beetle (*Anoplophora glabripennis*), and emerald ash borer (EAB) (*Agrilus planipennis*). The gypsy moth is isolated to northern areas, however, and Asian long-horned beetle is believed to have been eradicated. EAB remains a significant concern for forest lands in Pope County and the entirety of Illinois' ash resource (IDNR 2010).

**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 Pope 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 2010).

Other factors that can contribute to forest health and also impact wildfire risk and hazard include the following:

**Storm damage from ice storms** in 2008 and 2009 has contributed to dead and down fuel loads in Pope County, particularly in the most southerly areas. Some areas have fuel loads that may exceed 40 tons/acre, compared to 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 (*Microstegium vimineum*), 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 8). Research has also suggested that invasion by stiltgrass can intensify fire behavior (Crooked River Cooperative Weed Management Area 2016).



**Figure 8. Japanese stiltgrass, a non-native species that is prolific in disturbed areas of Pope County (USFS 2012).**

**Pine plantations on the Shawnee National Forest comprise non-native loblolly and shortleaf pine** and now occupy 45,000 acres of the forest (not all within Pope 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.

## GRASSLAND

Approximately 22% of Pope County is composed of grassland habitat, though a large proportion of this is held in pasture. Native prairie is rare in Pope County but grassland planted for pasture and hayfields are an important habitat component for wildlife and highly valued throughout the county for providing species diversity and juxtaposition with forested areas (IDNR 2005a). The native prairies in Pope 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 of 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 Pope 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 9 and Figure 10).



*Figure 9. Grassland habitat managed with prescribed fire. Photo Credit: Jody Shimp.*



**Figure 10. Remnant of a native prairie in southern Pope County. Photo Credit. Jody Shimp.**

## Glades

Glades are open, rocky barren areas or pavements with shallow soils that support unique communities of drought-adapted flowering plants, stunted trees, warm-season grasses, and specialized animals. Glades occur as openings within landscapes primarily dominated by woodlands or forests and are generally located on western or southern exposures or on ridges, knobs, or domes, where soils are thin and moisture conditions favor drought-tolerant species. Lichens and mosses occur on exposed rock surfaces, especially on sandstone. Pope County has some of the largest and highest quality sandstone glades in the country (Figure 11).



**Figure 11. Sandstone glade natural community at Bell Smith Springs, Shawnee National Forest. Photo Credit: 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.

Pope 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). 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. The majority of barrens in Pope County are located in the Cretaceous Hills subsection, along the Massac County border, but many other barrens can be found throughout the county (Figure 12 and Figure 13).



*Figure 12. Limestone barrens community located near Grand Pierre Creek. Photo Credit: Jody Shimp.*

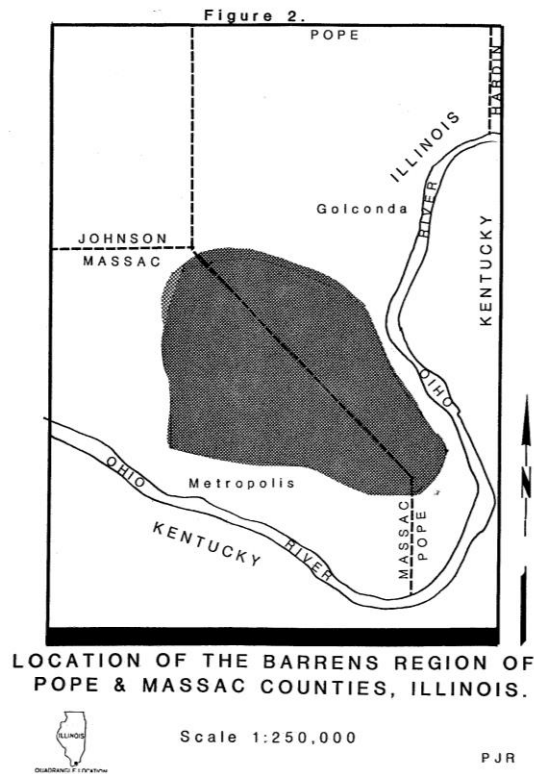


Figure 13. Location of the Barrens Region of Pope County. Source: Stritch (1987).

## SPRINGS AND SEEPS

Acid seeps (acid-gravel seeps) that occur within Pope County are concentrated primarily in the Cretaceous Hills ecological subsection located in south Pope County. Seeps are very rare and unique natural communities. Seep are caused when groundwater, percolating through large gravel deposits, flows to the surface where it meets underlying sandstone. An abundant and diverse flora grows in these moist areas, including many unusual and rare species of orchids, mosses, and ferns. Many of the largest springs and rarest seeps are included in natural areas and managed for their protection. All are protected to some extent by Shawnee National Forest-wide standards and guidelines (USFS 2006). These seeps have shallow deposits of peat moss and exhibit an acidic pH from water percolating through the Cretaceous sands and gravels. Seeps are generally located in small stream floodplains or issuing from the lower or middle slopes of the moderately rolling Cretaceous Hills (USFS 2006). Seeps are highly valued for their biodiversity and are priority areas for protection from management impacts.

## RIPARIAN AREAS, LAKES, AND WATERSHEDS

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

Pope 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 Glendale, between the communities of Glendale and Dixon Springs; One Horse Gap Lake, south of Herod; Millstone Lake, west of Eddyville; Grand Pierre Lake, south of Herod; and on the boundary with Massac County are Mann Lake and Hohman Lake (Figure 14–Figure 16). 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 Bay Creek and 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 Pope 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 as 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.

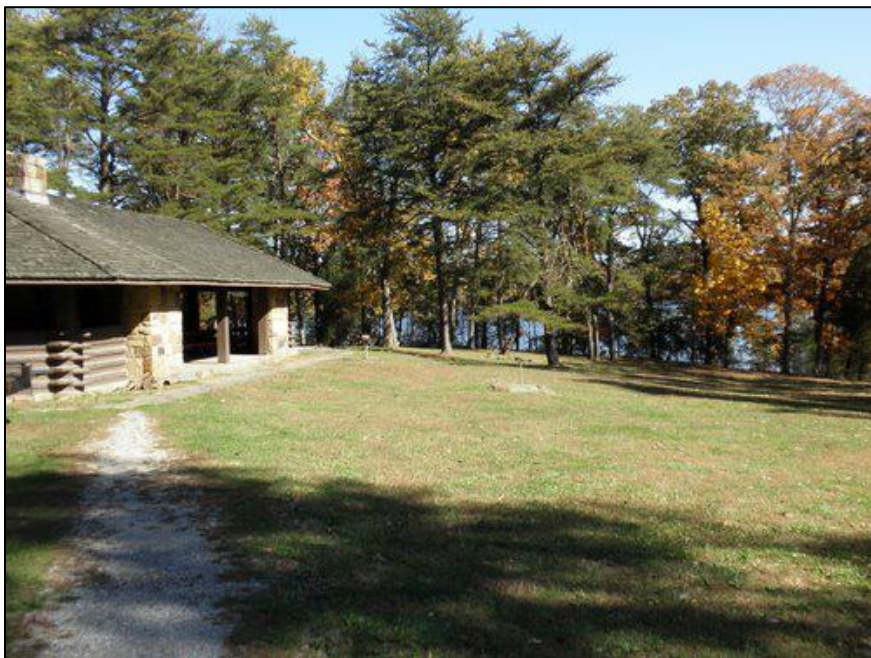
The Ohio River forms the east and south border of the area and is a vital conduit for the region. No bridges span the Ohio River from Pope County.



**Figure 14. Lusk Creek. Photo Credit: Jody Shimp.**



**Figure 15. Millstone Lake. Photo credit: Stephanie Dowdy.**



**Figure 16. Lake Glendale Forest Plantation (USFS). Photo credit: Gerald Flood.**

## WILDLIFE

Closed canopy mid to late seral habitat currently predominates across Pope 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 occur (USFS 2016). Currently over 90% of the forest habitat within Pope 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 90 species considered critically imperiled (56 classified as endangered, and 34 as threatened) in Pope 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 See Appendix K for their general distribution throughout the county.

## ROADS AND TRANSPORTATION

Pope County is devoid of any major interstate; U.S. Highway 45 cuts through a small portion of the county (IDNR 2005a). The main transportation routes throughout the county are Illinois Route 146, which is an east-west highway serving the communities of Golconda and Dixon Springs, and the north-south Illinois Route 145 that runs through the central portion of the Shawnee National Forest and serves Dixon Springs State Park and Dixon Springs. Route 145 is a rural two-lane road through its entire length. The route also meets Illinois Route 147 approximately 6 miles south of Eddyville, just north of Glendale. It connects with Illinois Route 146 just west of Dixon Springs. Eddyville Road, which runs from Eddyville to just north of Golconda at Illinois Route 146, is a well-maintained Pope County Route that serves as a shortcut from Eddyville to Golconda.

Many roads throughout the county are unsurfaced rural routes with some sections that receive very little maintenance. Travel in more rural areas of the county could be slowed by the road conditions.

Road systems on the Shawnee National Forest are currently undergoing a travel analysis that is intended to guide future road management planning and address concerns about the future of the sustainability of the National Forest road system (USFS 2016). The results of this analysis should be reviewed during the CWPP update process.

## **ADJOINING COUNTIES**

Pope County is located along the Ohio River, with Saline and Gallatin Counties to the north, Hardin County to the northeast, Johnson County to the west, Massac County to the southwest and the state of Kentucky to the southeast.



# 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, the development of defensible space around homes (Figure 17).



**Figure 17. Some homes have insufficient defensible space and have forest vegetation surrounding the structure.**

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 Core Team decided to delineate the WUI as an area 0.5 mile from the edge of an at-risk community. At-risk communities are defined as all communities and residential properties or clusters of properties throughout Pope County. In addition, a 0.5-mile buffer is also delineated either side of all roads. This would act as a fuel break from ignitions on the highways, as well as protection so that roads may serve as escape routes for the public in the event of a wildfire (Figure 18). Due to the scattered population within Pope County, this delineation resulted in almost the entire planning area falling into the WUI. This is to be expected since this planning area was chosen because of the concern for these communities that abut public lands.



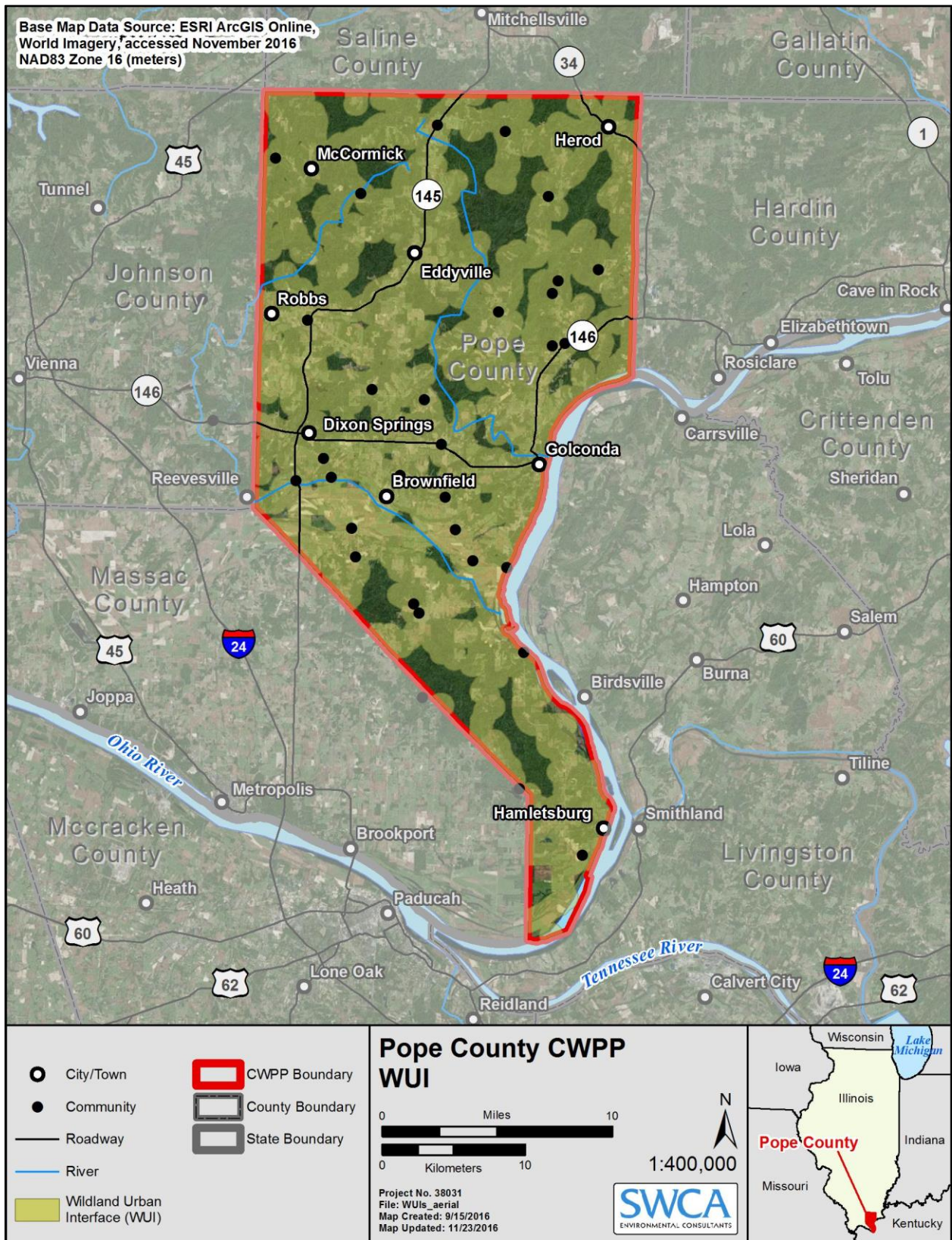


Figure 18. WUI designation.

## FIRE HISTORY

Fire has played a prominent role in the history of hardwood forests of the eastern United States (Pyne 1982; Williams 1989; Guyette et al. 2002). 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 fire frequency on the Shawnee National Forest averaged 29 fires per year from 1981 to 1995, and 26 per year from 1981 to 2004 (USFS 2015). An approximately 100-acre fire occurs every 2 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. Most of the county has missed one or more fire return interval (USFS 2016) and where there are fires, most are suppressed before they gain size, resulting in limited acres burned. Figure 19 through Figure 21 show fire occurrence over the period of record (1986–2016), and illustrates that the density of those fires tends to cluster in some areas. Some high density of fires is shown between Robbs and McCormick, around Golconda, around Dixon Springs, and south of Herod. These may be areas that see a lot of debris burning or could be areas that see a lot of human starts associated with recreational use (campgrounds) or vehicle-ignited fires. These are fires that have occurred on both public and private lands, though it is thought that many fires in the county may have gone unreported. VFDs that cover the area may receive notice of fires and/or suppress them without informing Shawnee National Forest officials. The Pope County Fire Department is currently focusing on improving its fire documentation and reporting. The fire occurrence history depicted in Figure 21 is an important component of the Risk Assessment discussed in Chapter 4.

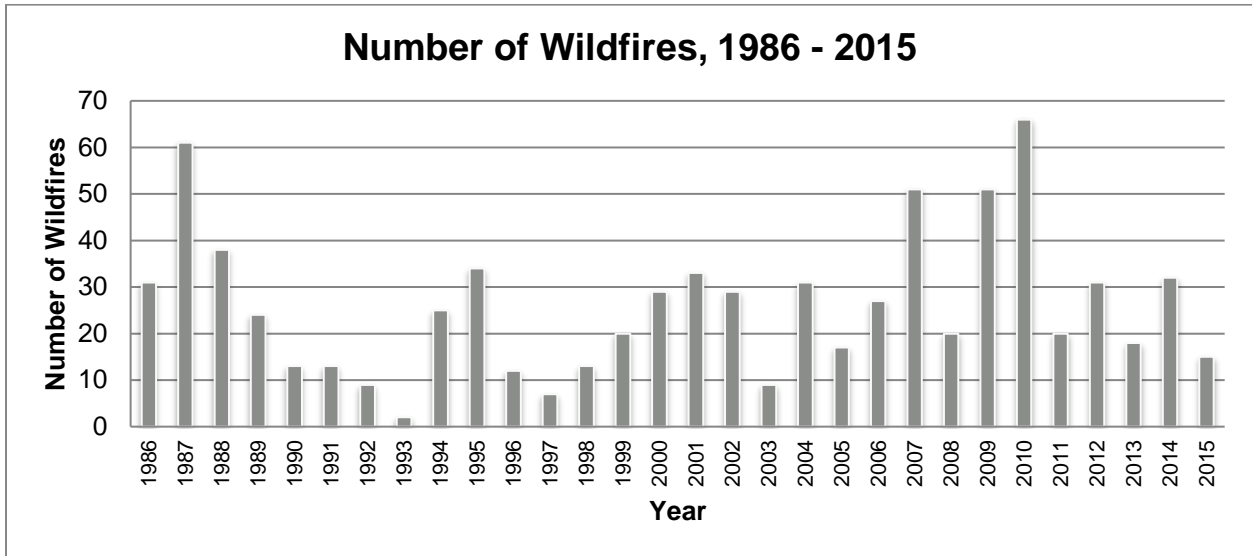


Figure 19. Fire history data for Pope County (1986–2015) on all jurisdictions.

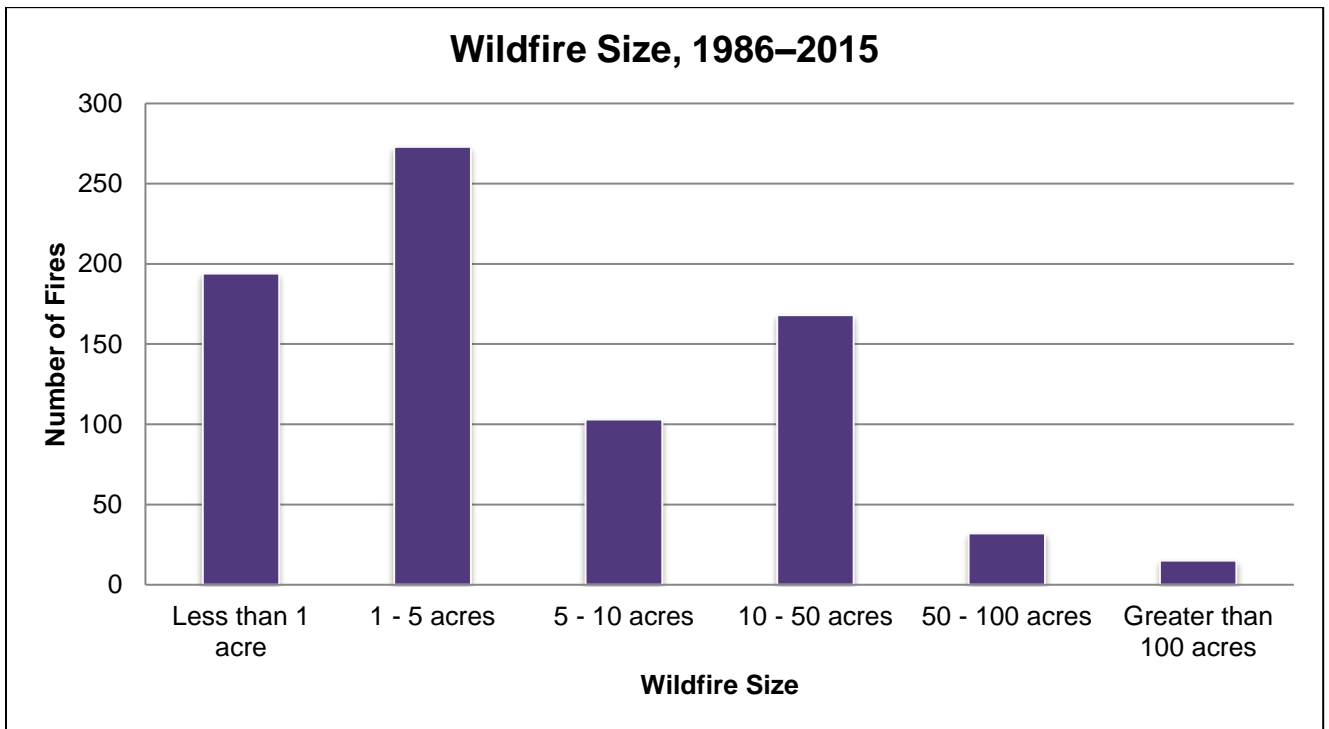


Figure 20. Wildfire size (acres) in Pope County (1986–2015) on all jurisdictions.

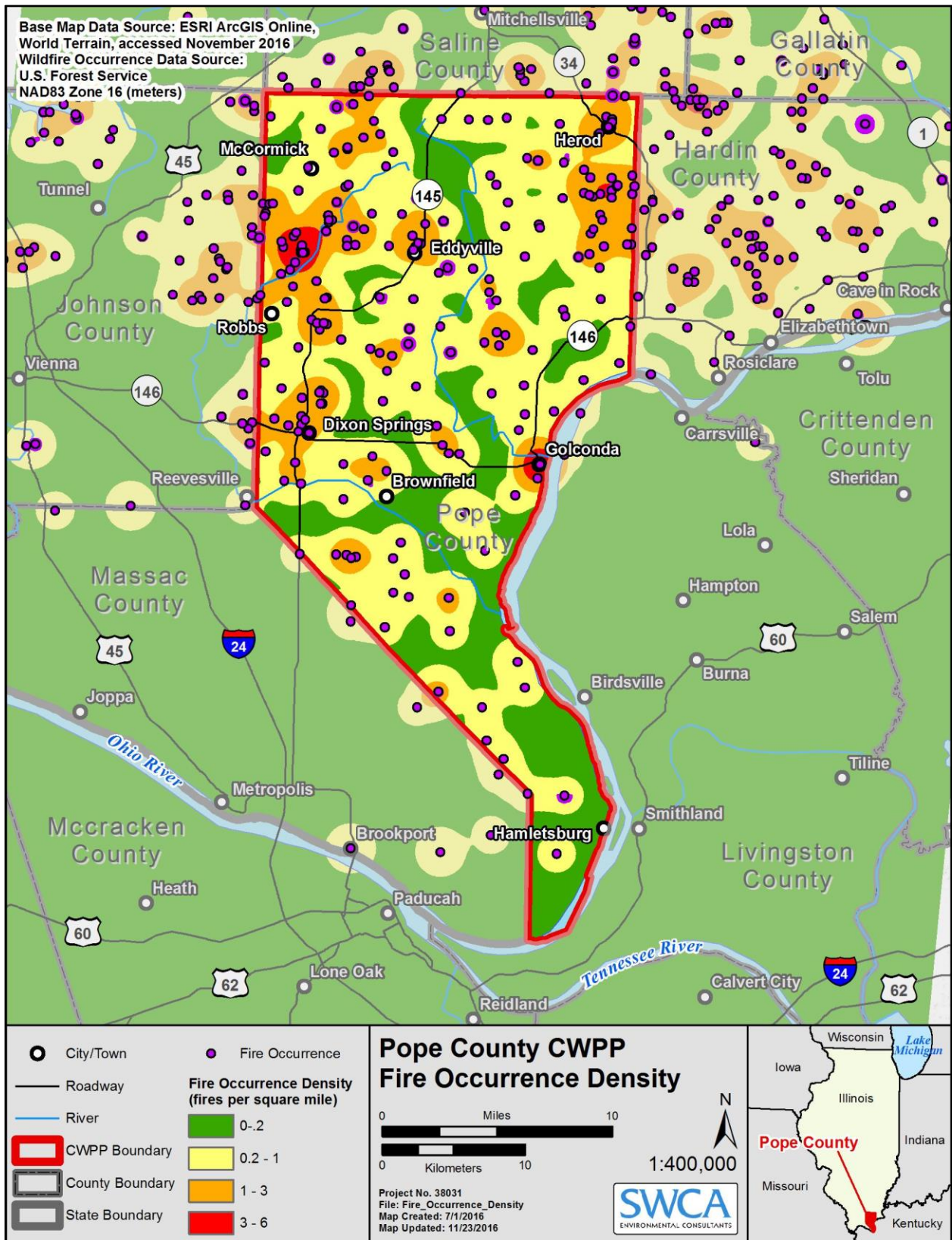


Figure 21. Fire occurrence density map.

The 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).

## 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 sees some of its highest visitor use rates (USFS 2015).

As stated in the Shawnee National Forest Fire Management Plan (FMP), fire season officially corresponds to the time between snowmelt and “green up” in the spring (USFS 2015). 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, where there are exposed, grassy fuels, these dry much quicker than forested areas, allowing fires throughout the year (USFS 2015). Wildfires occurring in Pope County are typically suppressed before they gain any acreage. The majority of fires occur during the spring or fall fire seasons, with limited ignitions occurring during the summer due to frequent rainstorms during that time. Gradual warming temperatures are shortening the fire season, but may increase fire behavior. 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 USFS, IDNR, and Pope County Fire Department reported fires that fall within the CWPP planning area total 785 (see Figure 21). It should be noted that fire records for private lands are available only from 2006 to 2016. All other fires are recorded from 1986 to 2016.

The majority of fires in Pope 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 lands, 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 Pope 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 Pope 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 U.S. (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 (Schmidt et al. 2002; Hann et al. 2008).

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 range of  $\pm 33\%$  deviation from the central tendency (Hann and Bunnell 2001; Hardy et al. 2001; Hann et al. 2008).

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 one-tenth of a 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).

Some patterns of fire behavior exist in Pope County making it possible to plan for and mitigate wildfire based on previous behavior. Fire seasons are planned for in terms of preparation of resources, and wind directions are known to prevail from west southwest but also northwest. There is a southeast component at night that fire managers can prepare for during suppression operations.

## 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 2015 10,125,149 acres were burned across the country, the highest total acres burned in 56 years of record (NIFC 2016).

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.

## **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 Pope 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 Pope 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 Pope 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. This CWPP is meant to supplement and not replace the FMP or any other existing plans.



## EMERGENCY MANAGEMENT PLANNING

Pope County developed an Emergency Operations Plan (EOP) in 2014. The EOP addresses Pope County's planned response to extraordinary emergencies associated with natural disasters, technological incidents, human-made disasters, and nuclear release response. It provides operational concepts relating to the various emergency management organizations and describes protecting life, property, and the overall wellbeing of the population of Pope County. The EOP also identifies the sources of outside support consisting of, but not limited to, other jurisdictions, state and federal agencies, and the private sector (Pope County 2014).

Authority for the Pope County EOP is provided by:

1. the Illinois Emergency Interim Executive Succession Act, which provides the basis for delegation of emergency authority to ensure that specific emergency-related legal authorities can be exercised by elected or appointed leadership or their designated successors;
2. the Illinois Emergency Services and Disaster Agency Act of (20 Illinois Compiled Statutes 3305/1 et seq., January 1, 2002); and
3. Rules for Emergency Services and Disaster Agencies Established Pursuant to the Illinois Emergency Management Agency Act (29 Illinois Administrative Code Part 301, February 26, 2002).

The Chairman of the Pope County Board, or his/her designated replacement, is the Chief Executive Official and with support from appropriate county departments, other governmental agencies, and non-governmental personnel, will exercise overall direction and control over disaster operations within Pope County. The Pope County Emergency Management Agency Coordinator will assist the Chief Executive Official in this function (Pope County 2014).

The Pope County EOP does not address wildfire activities in detail. If approved by the Pope County Board, this CWPP could serve as an annex to the EOP to address wildfire incidents.

## LAND MANAGEMENT STRATEGIES

Pope 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 landownership, 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 Pope 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 Pope 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 (*Lonicera maackii*), 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. See Appendix K for more details on wildlife species that are dependent on disturbance by fire.
- **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; Parker and Ruffner 2004; Ruffner and Groninger 2006; Nowacki and Abrams 2008). 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. 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).

The use of fire as a land management tool in southern Illinois is a long standing practice; however, applying fire to the mosaic of landownership 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.
- Public education and outreach is 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 (once more common in rangeland areas in the United States) 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 Pope 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 Forests, please visit: <http://www.fs.usda.gov/land/shawnee/landmanagement>.

**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:

1. coordination and outreach to landowners adjacent and nearby to projects on National Forest lands; and
2. 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 Pope 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 Pope 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 22 and Figure 23), 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, Appendix K). 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 22. Oak-hickory pre-treatment. Photo credit: David Allen.**



**Figure 23. Oak-hickory post-prescribed fire treatment. Photo Credit: 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 (see Figure 23) compared to control (see Figure 22) and that this treatment may help facilitate desirable regeneration in mature oak-hickory forests.

## FIRE AND RESPONSE CAPABILITIES

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

Wildfires in Pope County are responded to by the Shawnee National Forest (federal), the IDNR (state), the Pope County Fire Department (county), and the Golconda Fire Department (city). There are only two incorporated towns in Pope County, Eddyville and Golconda. Pope County has no dispatch; dispatch is instead provided by Saline County. Emergency radio repeaters and cell towers are located on Eagle Ridge and Williams Hill. 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 x 4 wildland fire engines;
- 15 firefighters; and
- one Type 3 tractor plow unit (Figure 24).

These resources are subject to change.



*Figure 24. Shawnee National Forest tractor plow used for fire suppression.*

***Illinois Department of Natural Resources***

The IDNR has limited fire suppression resources available in Pope County. The IDNR has three individual firefighters, one Type 6 engine, and three utility task vehicles (Figure 25).



***Figure 25. IDNR Fire Program.***

***Pope County Fire Department***

Pope County Fire Department is an all-volunteer force with five certified firefighters and 17 on the roster (Figure 26).



***Figure 26. Rural Pope County Fire Department fire truck.***

### *City of Golconda Fire Department*

The City of Golconda Fire Department is an all-volunteer force with 12 firefighters on the roster, but none trained in wildland fire (Figure 27).



**Figure 27. Golconda City Fire Department fire truck.**

### **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 lands may have their associated costs reimbursed by the responsible federal agency, and the reverse is true for federal resources suppressing a wildfire on state lands.

A number of cooperative agreements exist between fire response agencies in Pope County. The Shawnee National Forest has cooperating agreements with the Pope County 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 Pope County and adjacent Massac County for wildfires along the common border.



## EVACUATION RESOURCES

The Pope County EOP Evacuation Annex (Pope County 2014) outlines the procedure for evacuation in the event of an incident (including fire) in the county. The following is an excerpt from the Concept of Operations section (Section III, page 1) from the EOP:

- *The Chief executive Officer of Pope Co. is responsible for recommending the implementation of a large evacuation. The Sheriff, the EMA director or the fire chief may recommend evacuation when the event calls for a small evacuation. The EMA Coordinator in conjunction with the Unified Command Post, in a law enforcement situation or a fire department situation stemming from a disaster, will coordinate evacuations within the county.*
- *The County Road Districts will be responsible for setting up blockades and direction signs along designated routes.*
- *The Transportation Officer will make necessary arrangements for providing transportation for those who need it. Staging areas will be established and residents not having transportation will be brought to these staging areas by emergency vehicles or alternate transportation as set up by the Transportation Officer or the Pope Co. EMA director. (Pope County 2014:III-1)*

### Road Systems

Much of Pope County is accessible via surfaced roads and highways; however, some communities are accessed only via unsurfaced roads (see Figure 1), which are often narrow and windy. These routes may prove hazardous during emergency evacuation, especially where they are adjacent to forested lands with vegetation close to or overhanging the road (Figure 28); as such, all roads and highways have been identified as priority areas for protection by being delineated part of the WUI. 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.



**Figure 28. Rural Pope County road in the Rosebud neighborhood, showing narrow road width and overhanging vegetation.**

## ***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 Pope 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. Although there is a good network of hydrants that are accessible to most communities, water pressure problems throughout Pope County, as well as some water rights issues, result in the Pope County Fire Department resorting to the use of known (good operating) hydrants to fill their tanks and engines. 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; 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.

## **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](http://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 and 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 3-year 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](http://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 29).

# Reduce Your Wildfire Risk

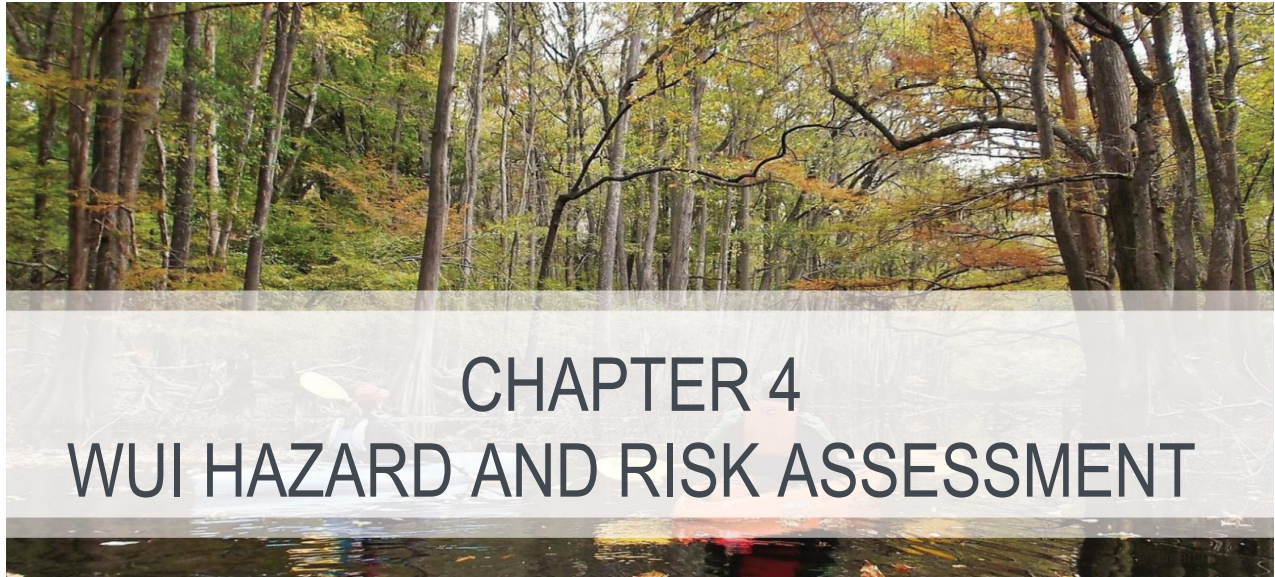
## Create Defensible Space

Additional wildfire resources are available at [DisasterSafety.org/Wildfire](https://DisasterSafety.org/Wildfire)

## Know Your Zones

<p style="margin: 0;"><b>ZONE 1</b> 0-5FT</p>	<p>Reduce the chance of wind-blown embers igniting materials near your home, exposing it to flames.</p> <ul style="list-style-type: none"> <li> Choose products and features such as rock, gravel mulches, brick, or concrete walkways.</li> <li> Noncombustible materials are the best choice.</li> <li> Firewood/lumber and other combustibles should not be stored under the deck or beside your home.</li> </ul>
<p style="margin: 0;"><b>ZONE 2</b> 5-30FT</p>	<p>Create a landscape that will not readily transmit fire to the home.</p> <ul style="list-style-type: none"> <li> Remove shrubs under trees and thin trees. Prune branches overhanging your home and remove dead vegetation.</li> <li> Move trailers/recreational vehicles, storage sheds and other combustible structures out of this zone and into the 30 - 100 ft. zone. If unable to move, create defensible space around them.</li> </ul>
<p style="margin: 0;"><b>ZONE 3</b> 30-100FT</p>	<p>Reduce the energy and speed of the wildfire.</p> <ul style="list-style-type: none"> <li> Remove dead plant materials and tree branches.</li> <li> Thin and separate trees and shrubs. Limb up trees and remove shrubs that can serve as ladder fuels.</li> <li> Extend zone to 150 - 200 ft. if home is near the top of a slope, or on a ridge.</li> </ul>

Figure 29. Defensible space standards from the Insurance Institute for Business and Home Safety



## 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 Pope 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, 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 PCCWPP 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) Nonburnable      (TU) Timber-Understory
- (GR) Grass              (TL) Timber Litter
- (GS) Grass-Shrub      (SB) Slash-Blowdown
- (SH) Shrub

Table 1 provides a description of each fuel type.

**Table 1. Fuel Model Classification for PCCWPP Planning Area**

<b>1. Nearly pure grass and/or forb type (Grass)</b>	
i.	<b>GR1:</b> 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.	<b>GR2:</b> 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.	<b>GR5:</b> Dense coarse grass, average depth 1–2 feet. Spread rate very high (50–150 chains/hour); flame length moderate (4–8 feet).
iv.	<b>GR6:</b> Dryland grass, average depth 1–2 feet. Spread rate very high (50–150 chains/hour); flame length very high (12–25 feet).
<b>2. Mixture of grass and shrub, up to about 50% shrub cover (Grass-Shrub)</b>	
i.	<b>GS1:</b> 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.	<b>GS2:</b> 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).
<b>3. Shrubs cover at least 50% of the site; grass sparse to non-existent (Shrub)</b>	
i.	<b>SH2:</b> 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.	<b>SH3:</b> 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.	<b>SH7:</b> 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).
<b>4. Grass or shrubs mixed with litter from forest canopy (Timber-Understory)</b>	
i.	<b>TU1:</b> 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).
<b>5. Dead and downed woody fuel (litter) beneath a forest canopy (Timber Litter)</b>	
i.	<b>TL2:</b> Low load, compact. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
ii.	<b>TL3:</b> Moderate load. Spread rate very slow (0–2 chains/hour); flame length low (1–4 foot); fine fuel load 0.5 (ton/acre).
iii.	<b>TL8:</b> Long needle litter; long needle fuel. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
iv.	<b>TL6:</b> Moderate load, less compact. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
<b>6. Insufficient wildland fuel to carry wildland fire under any condition (Nonburnable)</b>	
i.	<b>NB1:</b> Urban or suburban development; insufficient wildland fuel to carry wildland fire.
ii.	<b>NB3:</b> Agricultural field, maintained in nonburnable condition.
iii.	<b>NB8:</b> Open water.

**Notes:** Based on Scott and Burgan's (2005) 40 Fuel Model System. For more information refer to Scott and Burgan (2005).

Map 1 in Appendix A illustrates the fuels classification throughout the planning area, Table 2 shows the acreage within each fuel class for Pope 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
SH3	32.23
TU1	160.25
TL3	168.81
GR5	188.04
GS2	251.48
TL8	534.44
SH7	2,768.28
NB8	3,865.17
GR6	4,433.52
NB1	5,483.71
SH2	5,721.23
GS1	14,852.21
NB3	17,968.55
GR2	18,294.70
GR1	30,104.53
TL2	35,742.29
TL6	99,081.28

## Hardwood Forest

### Oak-Hickory Forest – Fuel Model TL6

Oak-hickory is classified as a TL 6 fuel model with moderate rates of spread and low flame lengths (1–4 feet). This fuel type is dominant in the county, making up 41% of the land cover. Compared to 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 TL 2 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 can be found throughout the county as a result of storm damage associated with 2008 and 2009 ice storms. These areas of mortality occurred primarily in the southern portion of the county. 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 12% and 7% 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 2% and <0.1% of the land cover, respectively, and 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 lands, 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 2% of the land cover is classified as moderate fuel load shrub with low spread rate and flame length. Typical vegetation that are classified in this way include autumn olive, which has low combustibility and is also difficult to build fireline through as well as smaller stands of sumac and dogwood.

### Shrub – Very Heavy Fuel Load – SH7

Approximately 1% of the land cover is classified as very heavy fuel load shrub, with high spread rate and flame length. Typical vegetation classified in this way include red cedar (*Juniperus virginiana*), 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 Pope 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 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 suppression activities are planned according to it. 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 or extreme and the extreme areas 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 Pope County, with most fuels predicted to burn through surface fire.

### ***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 Pope County Fire Department, and when combined the points show the location of fire starts within the planning area from 2000 to 2014. 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 definite pattern of fires close to populated areas, at intersections and along all highways. High fire density is observed in a number of locations for example between Robbs and McCormick, surrounding Golconda, south of Herod, and around Dixon Springs.

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 are then placed into a Weighted Overlay 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. The resulting dataset contains only values 1 through 4 (1 = low, 2 = medium, 3 = high, 4 = extreme) to denote fire risk. This ranking shows the relative fire risk of each cell based on the input parameters. Figure 30 illustrates the individual datasets and the relative weights assigned within the modeling framework.

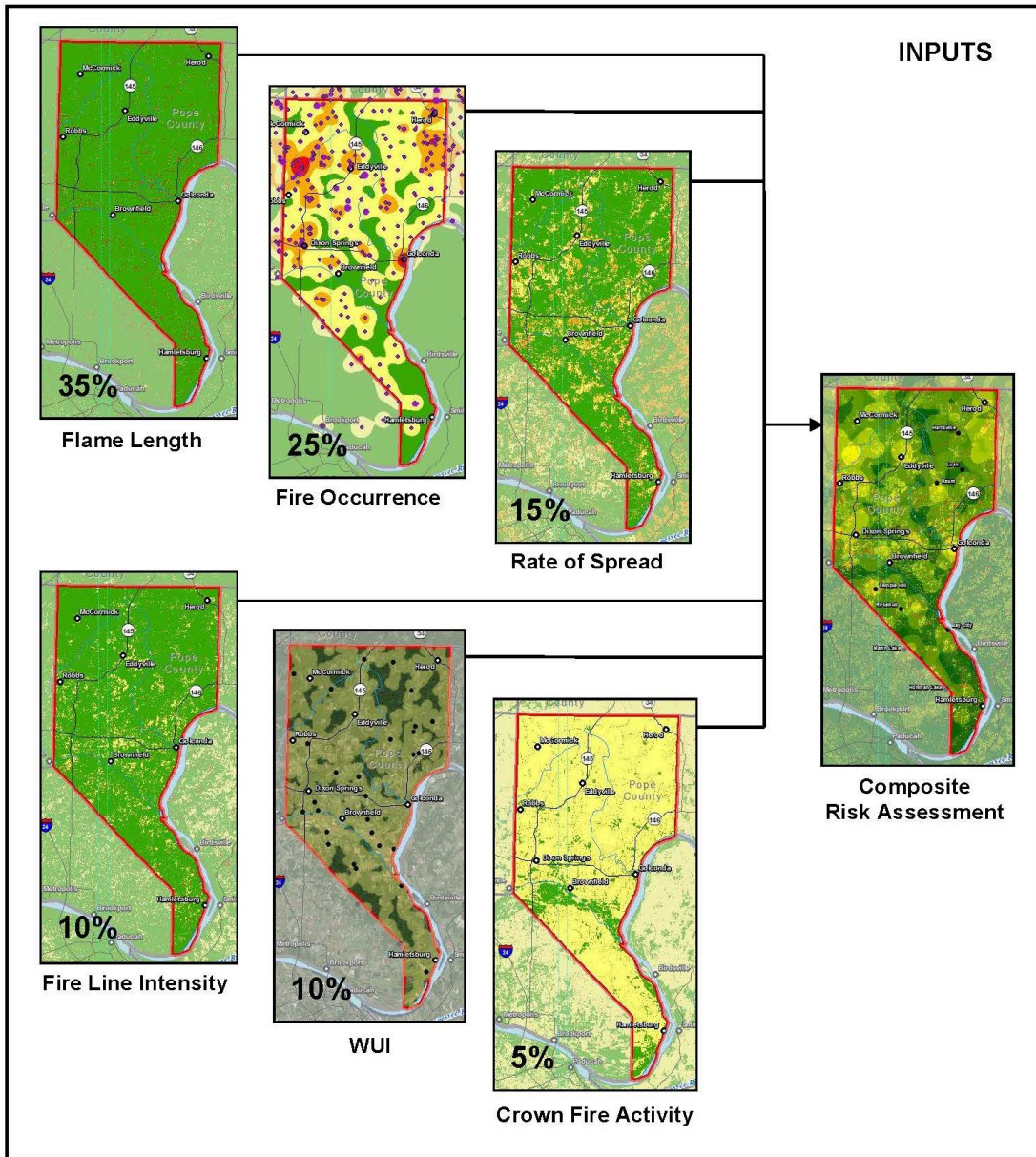


Figure 30. Composite Risk/Hazard Assessment overlay.

Figure 31 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.



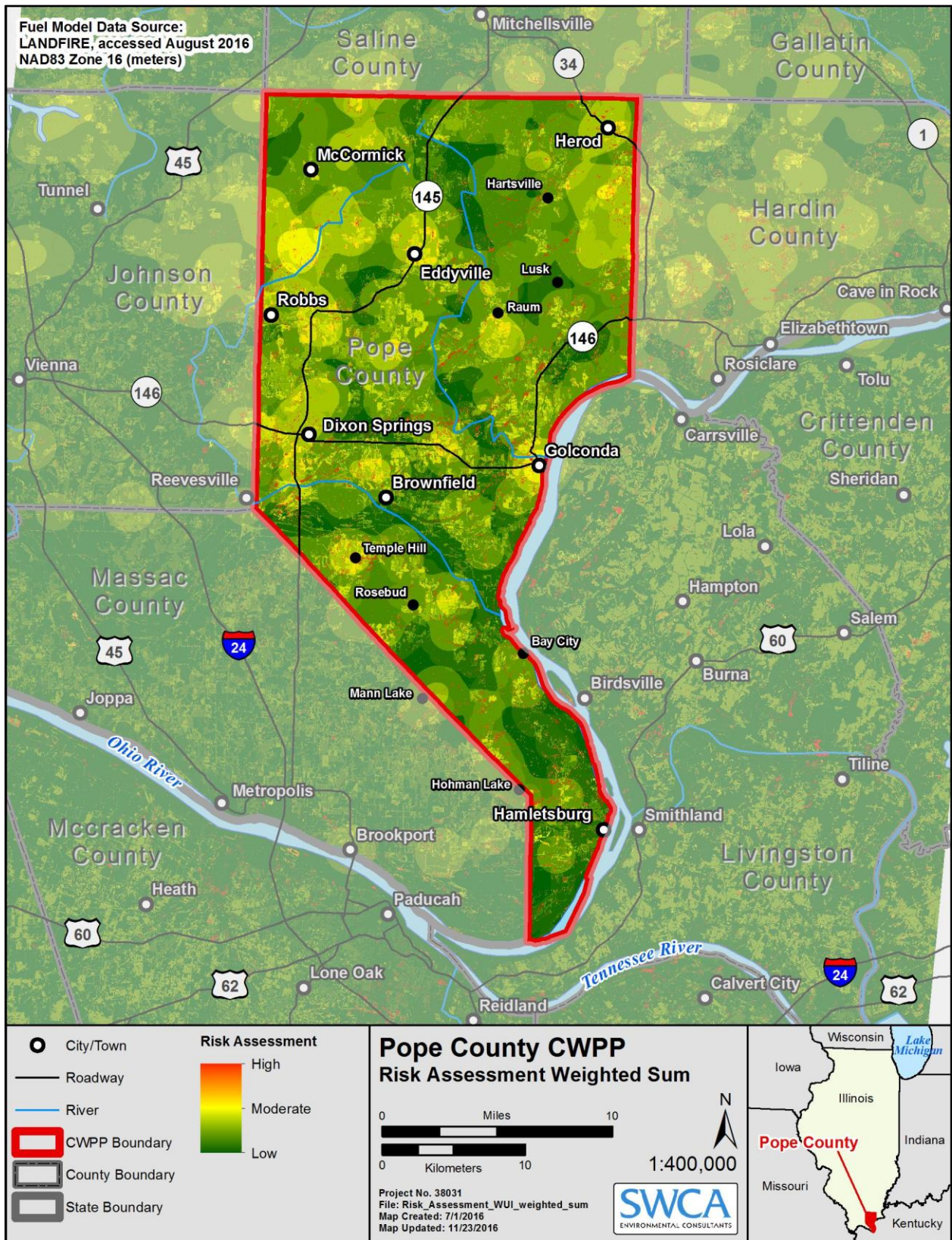


Figure 31. Composite Risk/Hazard Assessment map.

## COMMUNITY HAZARD ASSESSMENTS

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

The assessments were conducted in July and September 2016 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](http://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 can be found 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 3. This table also includes a summary of the positive and negative attributes of a community as they relate to wildfire risk.

**Table 3. Community Assessment Summary**

COMMUNITY	NFPA 1144 RISK RATING	GIS RISK RATING	POSITIVE	NEGATIVE
Dixon Springs	58 (Moderate)	Moderate with patchy high	<ul style="list-style-type: none"> <li>• Access: easily accessed via Route 145 and Route 146.</li> <li>• Structural characteristics: well-maintained buildings and roofs.</li> <li>• Water: hydrants (but low pressure).</li> <li>• Fire Response: fast; station in the community.</li> </ul>	<ul style="list-style-type: none"> <li>• CVARs: Large number of values at risk situated within Dixon Springs State Park.</li> <li>• Fuels: surrounded by continuous and heavy fuels.</li> </ul>
McCormick	66 (Moderate)	Moderate to High	<ul style="list-style-type: none"> <li>• Fire Response: fast; station in the community.</li> <li>• Large plots and good separation between structures.</li> <li>• Good defensible space.</li> <li>• Homes situated amongst agricultural land primarily (during some seasons could be a fire hazard).</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply is variable.</li> <li>• At considerable distance from main highways.</li> <li>• In close proximity to large swaths of forested land.</li> <li>• History of high fire occurrence.</li> </ul>
Robbs and Glendale	52 (Moderate)	Moderate	<ul style="list-style-type: none"> <li>• Easily accessed via main highways.</li> <li>• Homes situated amongst agricultural land primarily (during some seasons could be a fire hazard).</li> <li>• Good defensible space.</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply is variable.</li> <li>• In close proximity to large swaths of forested land.</li> <li>• History of high fire occurrence.</li> <li>• CVAR in close proximity.</li> </ul>
Oak Road	52 (Moderate)	Moderate	<ul style="list-style-type: none"> <li>• Fuels: grassland areas and pasturing farms. Grazing and mowing keeps fuel loads low.</li> <li>• Access: driveways are relatively wide with turnarounds.</li> <li>• Structural characteristics: good defensible space and yard maintenance. Wooden siding and decks common. Roofs are either composite shingle or metal. Underground fiber optics being installed will improve connectivity of rural areas.</li> <li>• Water supply: ponds for drafting.</li> </ul>	<ul style="list-style-type: none"> <li>• Access: unsurfaced gravel roads, moderate width.</li> <li>• Structural characteristics: some aboveground utilities.</li> <li>• Fire response: slow; closest station is Eddyville.</li> </ul>
Herod	62 (Moderate)	Moderate and High	<ul style="list-style-type: none"> <li>• Fuels: Surrounded by wooded vegetation but some patchy agricultural lands break up the continuity.</li> <li>• Access: surface roads to access community.</li> </ul>	<ul style="list-style-type: none"> <li>• Access: long driveways and some very narrow with overhanging vegetation.</li> <li>• Structural characteristics: some cabins that are not well maintained. Limited defensible space but sufficient given fire behavior in these fuel types. Under extreme conditions, additional defensible space is necessary.</li> <li>• Water: limited.</li> <li>• Fire response: slow; closest station is Eddyville.</li> </ul>
Hartsville	59 (Moderate)	Moderate	<ul style="list-style-type: none"> <li>• Fuels: wooded vegetation at further distance from community and large areas of agricultural lands break up the continuity.</li> <li>• Access: good; surfaced roads and accessible from Herod.</li> <li>• Structural characteristics: larger lots and good defensible space. Good separation between structures.</li> <li>• Water: some ponds on properties.</li> </ul>	<ul style="list-style-type: none"> <li>• Fire response: very slow, closest station is Eddyville.</li> </ul>

COMMUNITY	NFPA 1144 RISK RATING	GIS RISK RATING	POSITIVE	NEGATIVE
Lusk	45 (Moderate)	Low/Moderate	<ul style="list-style-type: none"> <li>Structural characteristics: larger lots, farms with good separation between structures. Good defensible space with good separation between trees.</li> <li>Water: ponds associated with properties.</li> <li>Access: good access to community via Route 146.</li> </ul>	<ul style="list-style-type: none"> <li>Fuels: surrounded by wooded area with minimal break-up of fuel continuity.</li> <li>Access: within community roads are narrow</li> <li>Fire response: moderate; closest station is Golconda.</li> </ul>
Bushwack Road	67 (Moderate)	Moderate with patchy high	<ul style="list-style-type: none"> <li>Fuels: some agricultural lands break up fuel continuity.</li> <li>Structural characteristics: larger lots, farms with good separation between structures. Good defensible space with good separation between trees.</li> <li>Water: ponds associated with properties.</li> </ul>	<ul style="list-style-type: none"> <li>Fuels: history of fire along road.</li> <li>Access: narrow roads and spurs. Road dead-ends to the north. One way in and out.</li> <li>Structural characteristics: homes spread along highway backed by wooded areas and insufficient defensible space. Transmission lines through the area that may cause ignitions.</li> </ul>
Raum	43 (Moderate)	Moderate	<ul style="list-style-type: none"> <li>Access: unsurfaced roads but relatively wide.</li> <li>Structural characteristics: well-maintained yards.</li> </ul>	<ul style="list-style-type: none"> <li>Fuels: history of fires from debris and brush burning.</li> <li>Structural characteristics: smaller lots and many backing to wooded areas. Older homes with some lacking maintenance.</li> <li>Water: limited.</li> <li>Fire Response: slow; Golconda is closest station.</li> </ul>
Brownfield	38 (Low)	Low to moderate	<ul style="list-style-type: none"> <li>Fuels: mostly agricultural lands that break up the fuel continuity. Some wooded stringers that could support fire spread.</li> <li>Access: good access to community via Routes 146 and 145.</li> <li>Structural characteristics: larger lots with good separation between structures, good defensible space, manicured.</li> </ul>	<ul style="list-style-type: none"> <li>Water: hydrants but low pressure.</li> <li>Fire response: moderate-good; Dixon Springs is closest fire station.</li> </ul>
Rosebud	83 (High)	Moderate with patchy high	<ul style="list-style-type: none"> <li>Fuels: Some fuel work has been done at end of Rosebud Road close to cabins.</li> <li>Seasonal residents to the cabins, so reduced population; however, residents most likely present during fire seasons.</li> <li>Cabin retrofits have been made adding new metal roofs and more defensible space.</li> </ul>	<ul style="list-style-type: none"> <li>Fuels: heavy wooded vegetation on both sides of road and overhanging vegetation.</li> <li>Access: poor; narrow roads within the community, unsurfaced and poorly maintained in places. One way in and out.</li> <li>Structural characteristics: older homes, poor construction, less separation between structures. Many cabins that are not well maintained.</li> <li>Water: none.</li> <li>Fire response: slow; fire department is seeking new fire station to support the community.</li> </ul>

COMMUNITY	NFPA 1144 RISK RATING	GIS RISK RATING	POSITIVE	NEGATIVE
Mann Lake	67 (Moderate)	Moderate with patchy high	<ul style="list-style-type: none"> <li>Seasonal residents to the cabins, so reduced population; however, residents most likely present during fire seasons.</li> <li>Structural characteristics: well-maintained yards and good defensible space. Metal roof construction common.</li> <li>Water: lake as water source.</li> </ul>	<ul style="list-style-type: none"> <li>Fuels: heavy wooded vegetation especially on the backside of the lake.</li> <li>Access: poor; narrow roads within the community, unsurfaced and poorly maintained in places. One way in and out. Evacuation is a concern.</li> <li>Structural characteristics: small lots with minimal separation between structures.</li> <li>Fire response: slow; both Pope County and Massac County would likely respond, but closest station in Massac County is in Metropolis.</li> </ul>
Hohman Lake	76 (High)	Moderate with patchy high	<ul style="list-style-type: none"> <li>Seasonal residents to the cabins, so reduced population; however, residents most likely present during fire seasons.</li> <li>Structural characteristics: well-maintained yards and good defensible space. Metal roof construction common.</li> <li>Water: lake as water source.</li> </ul>	<ul style="list-style-type: none"> <li>Fuels: heavy wooded vegetation especially on the backside of the lake.</li> <li>Access: poor; narrow roads within the community, unsurfaced and poorly maintained in places. One way in and out. Evacuation is a concern.</li> <li>Structural characteristics: small lots with minimal separation between structures. Many manufactured homes.</li> <li>Fire response: slow; both Pope County and Massac County would likely respond, but closest station in Massac County is in Metropolis.</li> <li>Some additional development could occur along access road; lots for sale.</li> </ul>
Golconda	39 (Low)	Moderate	<ul style="list-style-type: none"> <li>Fuels: wooded land is patchy with agricultural lands breaking up continuity of fuels.</li> <li>Access: good via Route 146 east-west, Highway 1 south or Ohio River Scenic Byway north.</li> <li>Structural characteristics: more urbanized area and good defensible space.</li> <li>Fire response: good; Golconda Fire Department in town and also served by Pope County Fire.</li> <li>Water: good; hydrants and river as source if needed.</li> </ul>	<ul style="list-style-type: none"> <li>Fuels: wooded land in vicinity of town.</li> <li>Structural characteristics: smaller lots and little separation between structures.</li> </ul>
Temple Hill	71 (High)	Moderate with patchy high	<ul style="list-style-type: none"> <li>Larger homes on large lots with good separation.</li> <li>Good construction.</li> </ul>	<ul style="list-style-type: none"> <li>Poor access.</li> <li>Slow fire response times</li> <li>Large area of forested land in vicinity of community.</li> <li>Limited water supply.</li> </ul>
Eddyville	41 (Moderate)	Low to moderate	<ul style="list-style-type: none"> <li>Urban land use.</li> <li>Agricultural buffer to wildlands (during some seasons could be a fire hazard).</li> <li>Fire response good, station in town.</li> <li>Good water supply.</li> </ul>	<ul style="list-style-type: none"> <li>Larger area of forested land in vicinity of community.</li> <li>CVARs in vicinity; camping and recreation could create hazard and evacuation concerns.</li> </ul>

COMMUNITY	NFPA 1144 RISK RATING	GIS RISK RATING	POSITIVE	NEGATIVE
Highway 146 Between Dixon Springs and Golconda	39 (Low)	Moderate	<ul style="list-style-type: none"> <li>• Agricultural land primarily (during some seasons could be a fire hazard).</li> <li>• Fire response good, station in Dixon Springs and Golconda.</li> <li>• Major highway increases response time.</li> <li>• Good water supply.</li> </ul>	<ul style="list-style-type: none"> <li>• Highway may create ignition potential.</li> <li>• Some woody patches and stringers.</li> </ul>
Bay City	38 (Low)	Low to Moderate	<ul style="list-style-type: none"> <li>• Sparsely populated.</li> <li>• Fire response good, station in Bay City.</li> <li>• Number of ways to access community.</li> <li>• Good water supply.</li> </ul>	<ul style="list-style-type: none"> <li>• Good defensible space for most properties though some back to forest patches.</li> <li>• Some older construction with combustible materials.</li> </ul>

## COMMUNITIES AT RISK DESCRIPTIONS

### DIXON SPRINGS

**Rated 58 (Moderate) with NFPA Assessment; Moderate with Patchy High with Composite GIS Risk Assessment**

Dixon Springs is a small community on the western edge of the county located at the intersection of Highways 146 and 145.

**Fuels:** The community is surrounded by forest land to the north, west, and east and an agricultural mosaic to the south and southeast.

**Access:** Because of its location at the intersection of the two main highways in the county, it is easily accessed from all directions.

**Fire Response:** Pope County Fire Department has a station located within the community so fire response is good.

**Water Supply:** Although the community has fire hydrants located throughout, not all have good pressure. The fire department is aware of the best hydrants and use those whenever possible.

**Structural Characteristics:** Most homes within the community have good defensible space with many being located on large lots with good clearance from adjacent forested vegetation and good separation from adjacent structures (Figure 32). An isolated number of homes are located within forested vegetation with roofs connecting with overhanging trees (Figure 33); it is important that these homeowners implement increased defensible space to reduce their risk from wildfire.

**CVARs:** Dixon Springs State Park is located in this community (Figure 34). The park was listed by community members as a CVAR to be prioritized for protection. The park has slightly reduced continuity of vegetation due to road and trail networks and park structures but is still located in the vicinity of a large swath of forested land with very few breaks in fuel continuity. Because of the location of Highways 146 and 145, the park has good protection from the west and south, which would help provide containment to fires that spread with the prevailing west and southwest winds (Figure 35).

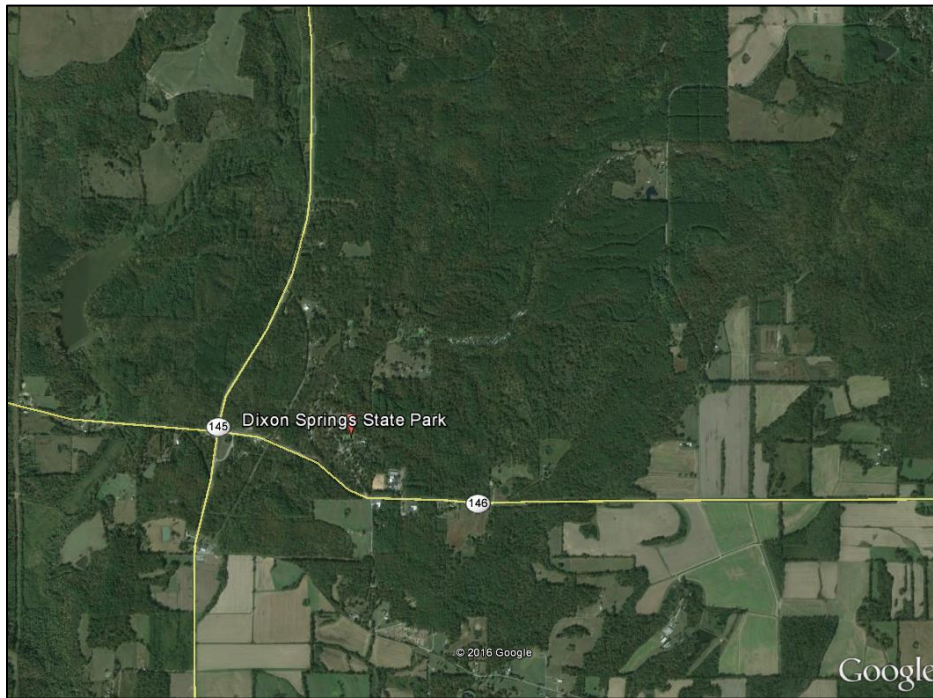


**Figure 32. Typical setting of homes and structures in Pope County-on open plots with good defensible space on most sides, with some wooded areas adjacent. Note propane tank.**

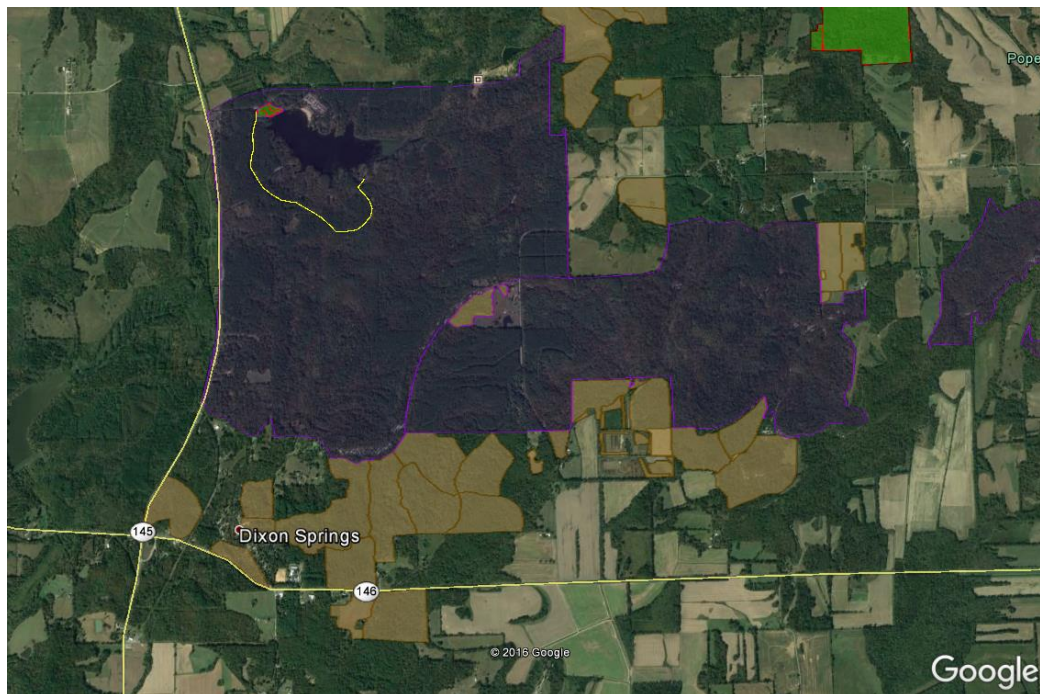


**Figure 33. Example of home where defensible space should be implemented to protect from wildfire.**





**Figure 34.** Location of Dixon Springs State Park showing extensive continuous forest lands to the north and northeast.



**Figure 35.** Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact Dixon Springs. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. A conceptual fuel break is shown here with a yellow line that would be positioned to protect infrastructure associated with Lake Glendale. Brown areas denote existing State and Private land fuel treatments. Green areas denote existing USFS fuel treatments. See Figure 84 in Chapter 6 for more details.

## MCCORMICK

### **Rated 66 (Moderate) with NFPA Assessment; Moderate to High with Composite GIS Risk Assessment**

McCormick is a sparsely populated unincorporated community in the northwest section of Pope County.

**Fuels:** The community is primarily agricultural based but surrounded by forested land on its edges. Large swaths of plantation pine are located close to the community.

**Access:** The community is easily accessed via small unsurfaced roads. The closest highway is Highway 145, 5 miles to the east.

**Fire Response:** Fire response to the community is good with a Pope County Fire Department station located in town.

**Water Supply:** There are no fire hydrants located throughout the community but water is available from the fire station.

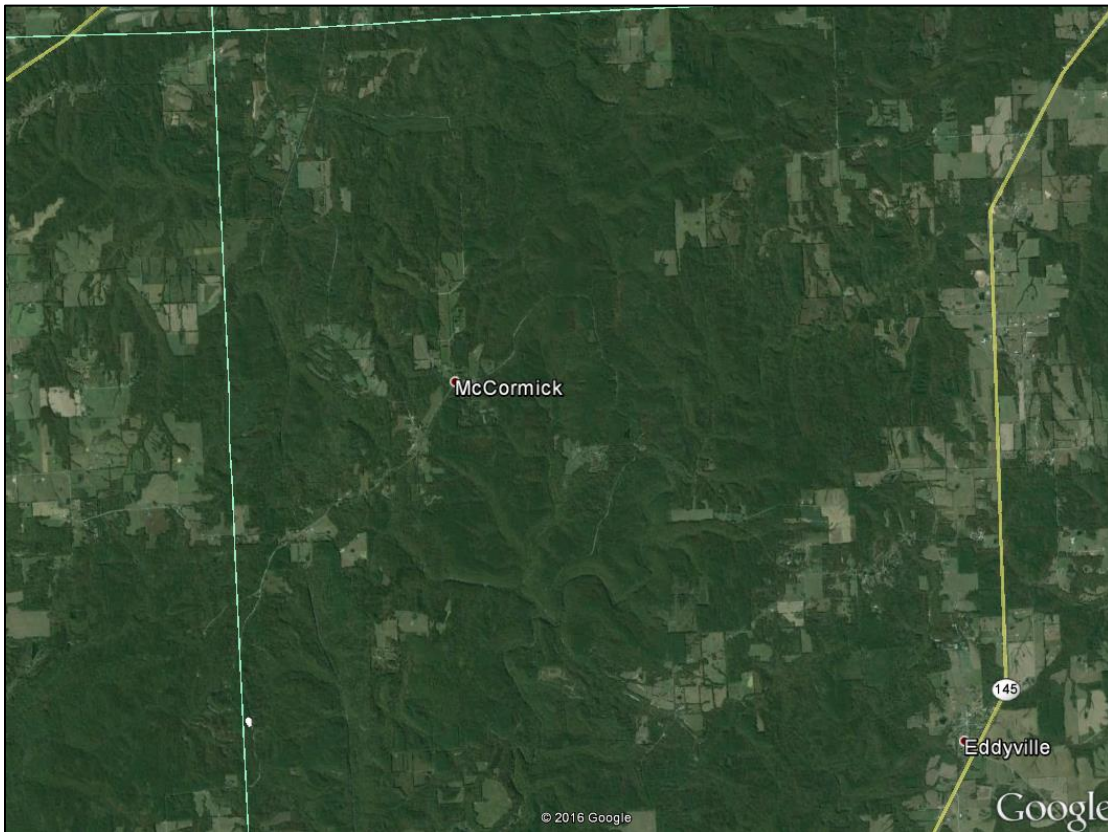
**Structural Characteristics:** Most homes are situated on large lots with good defensible space and good separation between structures, those properties that abut directly to forested land may require additional clearance (Figure 36). Although there is some agricultural buffer around some structures, agricultural lands during some periods of the year can still pose a risk to WUI areas however, due to agricultural burning and due to cured crops or residual vegetation following harvest that could still carry fire. Construction types vary throughout the community but most have wood construction (Figure 37), wood decks and fences.

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in tables Table 4, Table 7-Table 9.

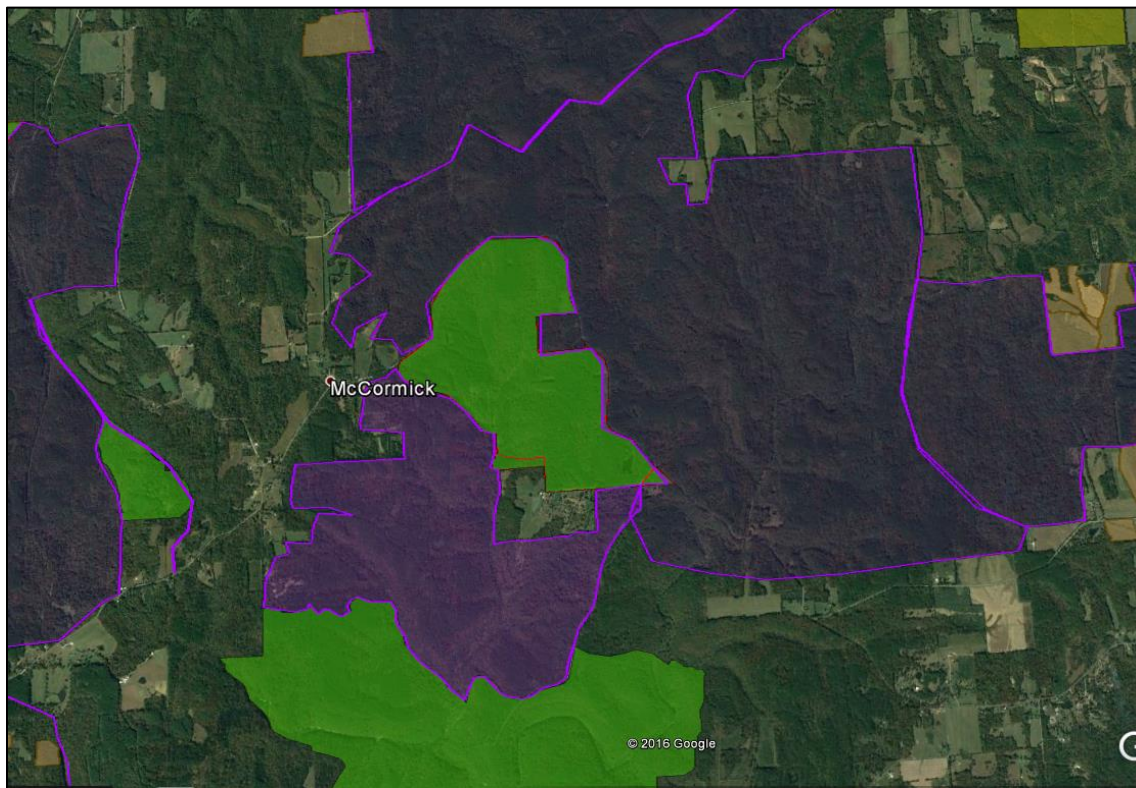
- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 38 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
-



**Figure 36. McCormick showing extensive forest land in vicinity of the community**



**Figure 37. Many homes in Pope County are constructed with combustible wood components and although defensible space is generally good throughout the county, some homes are located immediately adjacent to woodland with overhanging vegetation.**



**Figure 38. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact McCormick. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. Green areas denote existing USFS treatments. See Figure 84 in Chapter 6 for more details.**

## ROBBS AND GLENDALE

### **Rated 52 (Moderate) with NFPA Assessment; Moderate with Composite GIS Risk Assessment**

Robbs and Glendale are two adjacent unincorporated communities in the northwest section of Pope County (Figure 39).

**Fuels:** The communities are both primarily agricultural based but surrounded by forest patches and stringers. This area has experienced some of the highest fire occurrence in Pope County. This could be due to the heavy recreational use in the surrounding natural areas, or could be a result of ignitions sparked by the railroad that runs north south along the western edge of Pope County.

**Access:** The communities are easily accessed via Highway 147 and Highway 145.

**Fire Response:** Fire response to the communities is good with a Pope County Fire Department station located in Eddyville and McCormick.

**Water Supply:** There are fire hydrants located throughout the communities but water pressure is unknown.

**Structural Characteristics:** Most homes are situated on grass manicured lots (Figure 40) with good defensible space and good separation between structures. Although there is some agricultural buffer around some structures, agricultural lands during some periods of the year can still pose a risk to WUI areas however, due to agricultural burning and due to cured crops or residual vegetation following harvest that could still carry fire. Construction types vary throughout the communities but most have wood construction, wood decks and fences.

**CVAR:** Robbs and Glendale are located close to a number of natural areas, including Simpson Lake, Lake Glendale and Millstone Lake, all of which have been identified as natural and recreational community values at risk. The area has experienced some of the highest fire occurrence according to fire history statistics (Map 6). This could be a result of camping in the area and campfire related incidences. Lake Glendale is instituting installation of fire sheds to store fire suppression apparatus. This action may help to reduce the high fire occurrence.

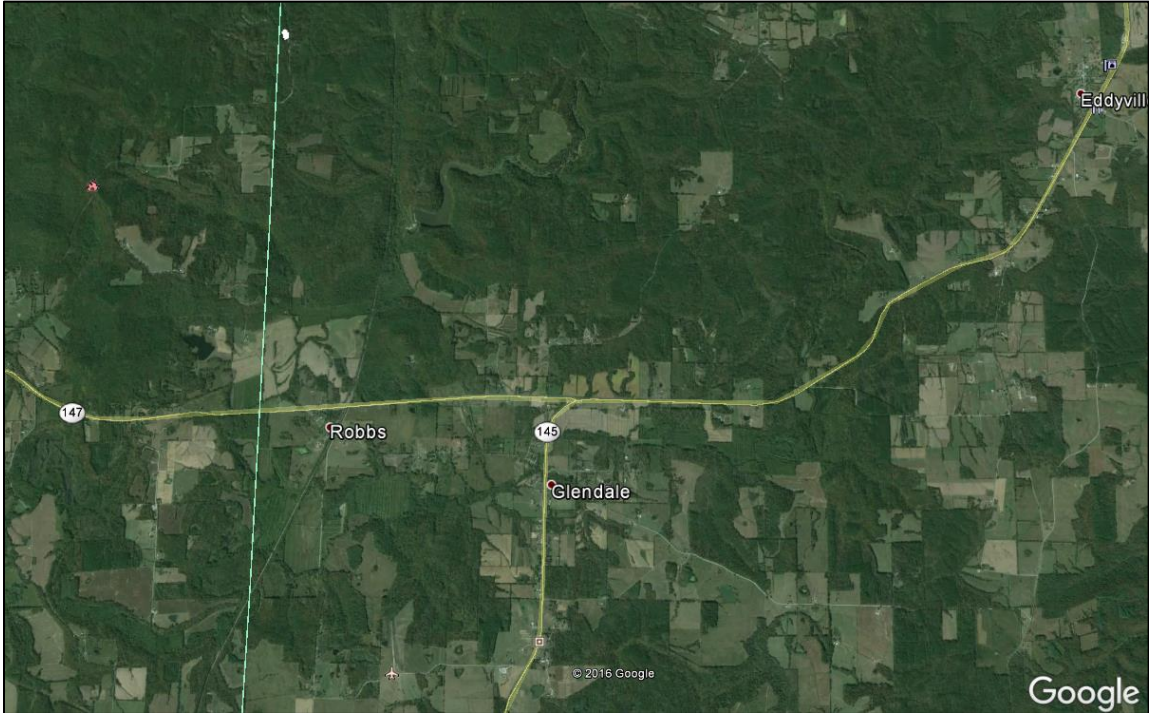


Figure 39. Robbs and Glendale, showing land cover mosaic



Figure 40. Example of a well maintained and manicured home

---

## Action Items

- Wildfire signage should be placed at access points to public open space (such as Simpson Lake, Lake Glendale, and Millstone Lake) describing fire hazards and risks and listing fire prevention measures.
  - Although many homes have 30 to 70 feet of defensible space, additional clearance is recommended, particularly where wooden decks and fence lines come into close contact with wildland fuels.
  - Pope County should work with the railroad to ensure maintenance of adequate clearing of brush and grass along the railroad right-of-way.
- 

## OAK ROAD

### Rated 52 (Moderate) with NFPA Assessment; Moderate with Composite GIS Risk Assessment

Oak Road is located in the north-central portion of the county (Figure 41). This road was identified by fire managers because of the density of forested vegetation close to the road and some structures.

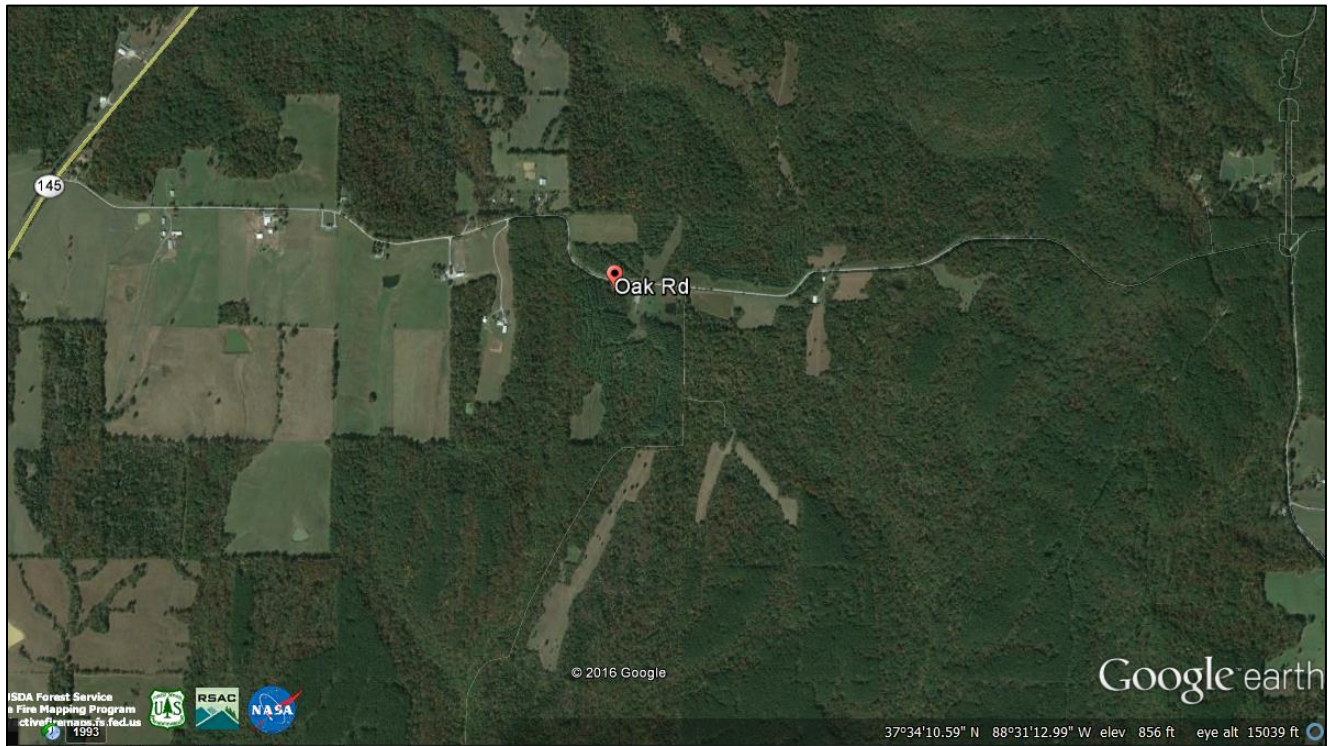
**Fuels:** Much of the homes along the road are close to or adjacent to large swaths of forested land on both the north and south sides of the road, with the exception of homes closer to the intersection with Highway 145 that have more extensive agricultural lands surrounding their homes and large well-maintained and manicured lawns.

**Access:** Oak Road is easily accessed via Highway 145, but homes further east would take longer to access or evacuate from due to the windy and unsurfaced road. The road width is moderate and would allow transport of fire apparatus. Driveways are relatively wide with good turnaround space.

**Fire Response:** The closest Pope County Fire Department station is Eddyville. Response time would be especially slow for homes located on the eastern sections of the road.

**Water Supply:** Although the community has fire hydrants located throughout, not all have good pressure. The fire department is aware of the best hydrants and use those whenever possible. Water may be filled in Eddyville.

**Structural Characteristics:** Most homes within the community have good defensible space with many being located on large lots with good clearance from adjacent forested vegetation and good separation from adjacent structures. Wood siding and decks are common, but roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are above and below ground. Some underground fiber optics being installed throughout the county.



**Figure 41. Oak Road (located in the north-central portion of Pope County) showing adjacent forested areas.**

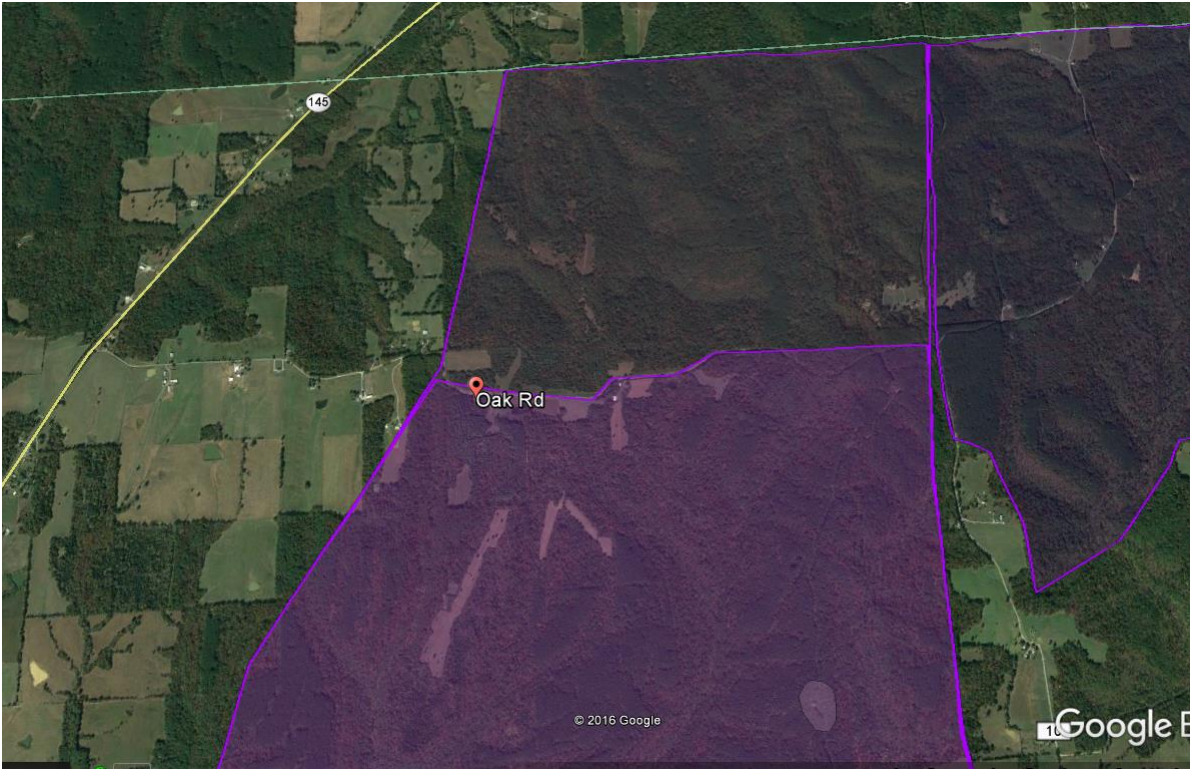
---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in tables Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 42 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
  - Pre-fire planning should be implemented to address slow response times and possible access concerns with larger apparatus.
-





**Figure 42. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents along Oak Road. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both.**

## HEROD

### **Rated 62 (Moderate) with NFPA Assessment; Moderate to High with Composite GIS Risk Assessment**

Herod is a small unincorporated town in the north east corner of the county close to Saline and Hardin Counties.

**Fuels:** The community is surrounded by forested areas but with some patchy agricultural lands that break up the continuity of fuels (Figure 43).

**Access:** The town is accessed via Highway 34 from Saline County and Hardin County, but access from other areas of the county are via smaller unsurfaced roads (Raum Road and Blackmans Cemetery Road). Some homes have narrow driveways and overhanging vegetation that may slow or prevent access by emergency responders.

**Fire Response:** The closest Pope County Fire Department station is Eddyville, which is 18 miles by road. Response time would be slow for homes located in this community. The Pope County Fire Department is seeking funds to establish a fire station within the community to mitigate the slow response times.

**Water Supply:** Although the community has fire hydrants located throughout, not all have good pressure. The fire department is aware of the best hydrants and uses those whenever possible. Water may be filled in Eddyville.

**Structural Characteristics:** Some homes have limited defensible space and are completely surrounded by forested land (Figure 44). Some of these homes may be seasonal hunting cabins and not permanent residences, but owners should increase clearance to reduce fire risk. Most homes have sufficient defensible space given the fire behavior in this fuel type, except during periods of extreme drought and extreme weather. Wood siding and decks are common, but roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are aboveground. Some underground fiber optics are being installed throughout the county. Most homes are on larger lots with good separation between structures.



Figure 43. Location of Herod in a mosaic of vegetation types from patchy forests to agricultural lands.

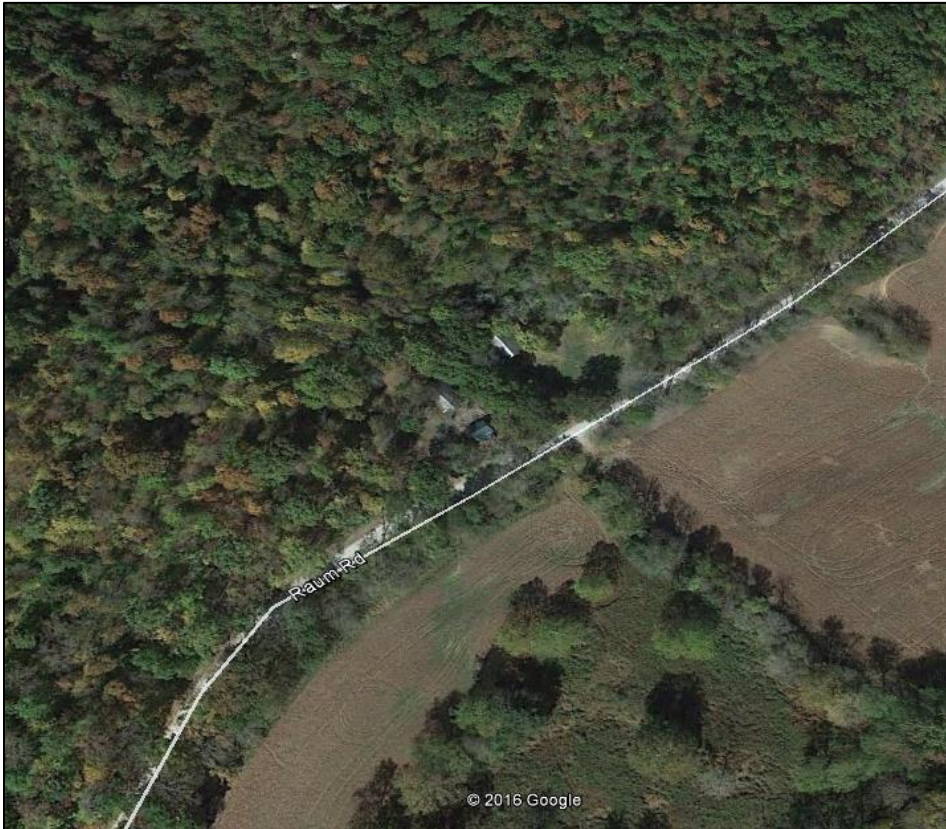
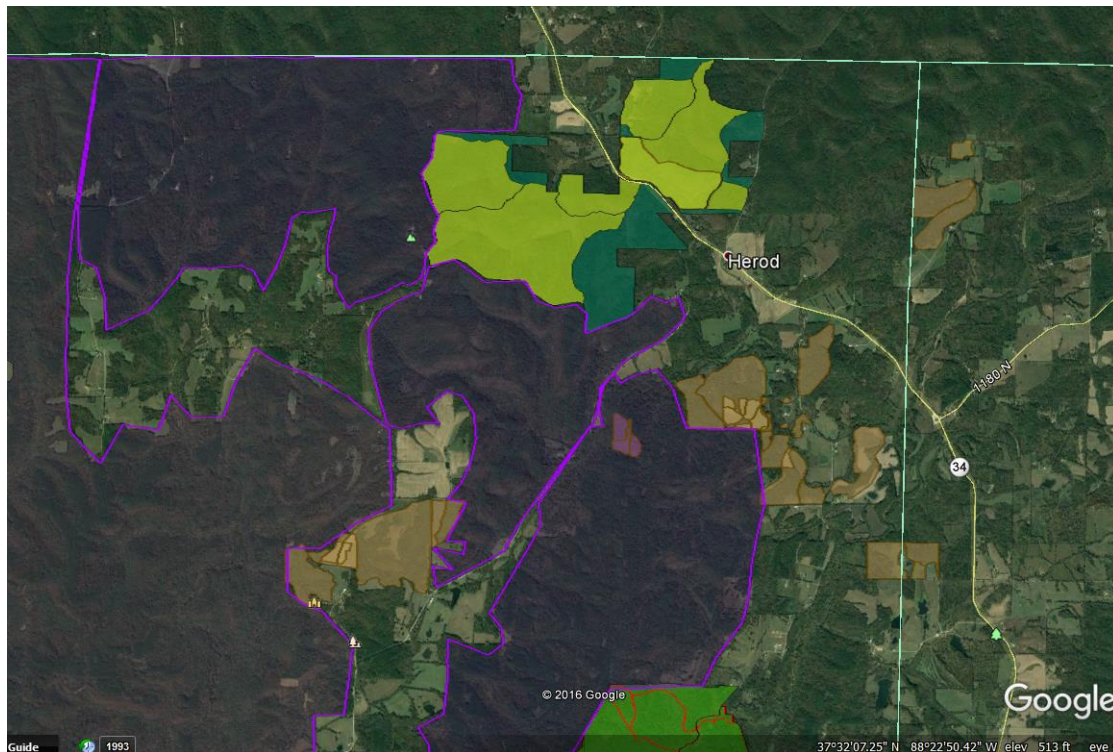


Figure 44. Image showing homes along Raum Road with minimal defensible space and surrounded by wooded vegetation.

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 45 and Figure 84 in Chapter 6.
- Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
- Pre-fire planning should be implemented to address slow response times and possible access concerns with larger apparatuses.
- Funding should be sought to establish a new fire station for the community of Herod to address concerns for slow response.
- Water storage tanks could be erected at the new fire station site.
- Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.



**Figure 45. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Herod. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. Brown and Green areas denote existing State and Private land treatments, See Figure 84 in Chapter 6 for details.**

## HARTSVILLE

### **Rated 59 (Moderate) with NFPA Assessment; Moderate with Composite GIS Risk Assessment**

Hartsville is a small unincorporated community southwest of Herod (Figure 46).

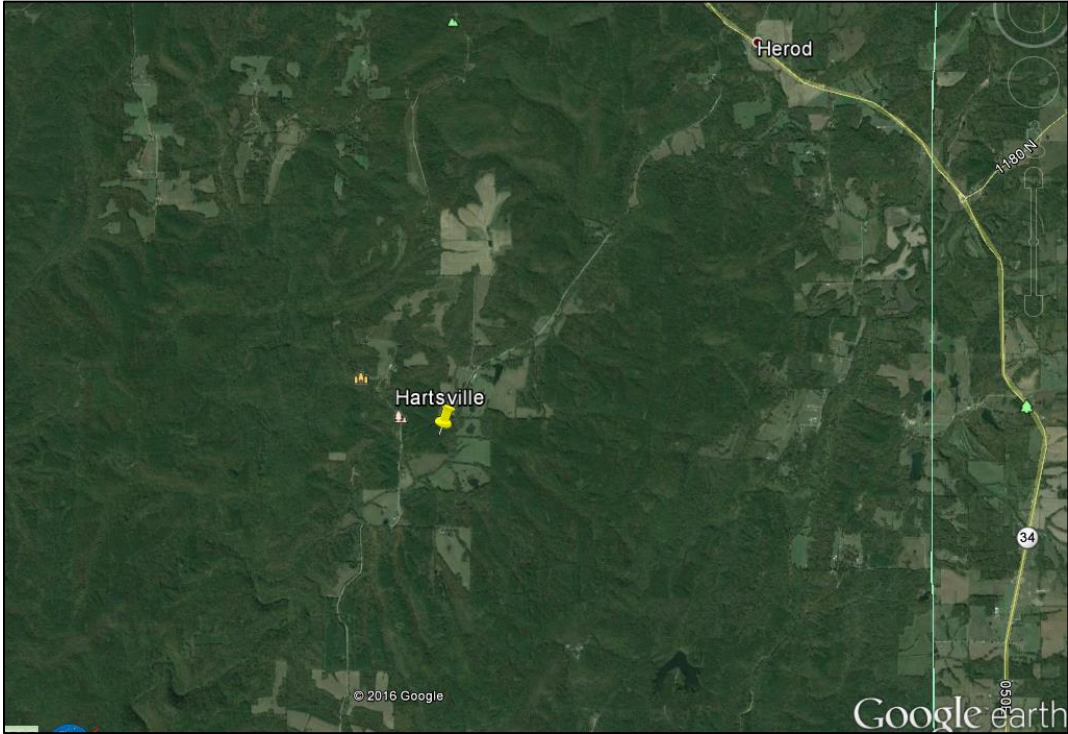
**Fuels:** The community is surrounded by forested areas at a distance, but with some patchy agricultural lands close to structures that break up the continuity of fuels.

**Access:** The town is accessed from Herod via small unsurfaced roads (Raum Road). There are very few homes within the community and most are situated on agricultural land with larger lots that have driveways and turnaround space.

**Fire Response:** The closest Pope County Fire Department station is Eddyville, which is more than 18 miles by road via Herod. Response time would be slow for homes located in this community. The Pope County Fire Department is seeking funds to establish a fire station in Herod that could serve this community.

**Water Supply:** There are no fire hydrants in the community; however, there are some ponds that could be used for drafting with the consent of the landowner. The Pope County Fire Department would typically use water from hydrants in Eddyville or Herod.

**Structural Characteristics:** Most homes have extensive defensible space with mowed and well-maintained yards (Figure 47). Wood siding and decks are common, but roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are above ground. Some underground fiber optics are being installed throughout the county. Most homes are on larger lots with good separation between structures.



**Figure 46. Location of Hartsville relative to Herod, showing mosaic of agricultural lands within the community, but wide swath of forested land at distance.**



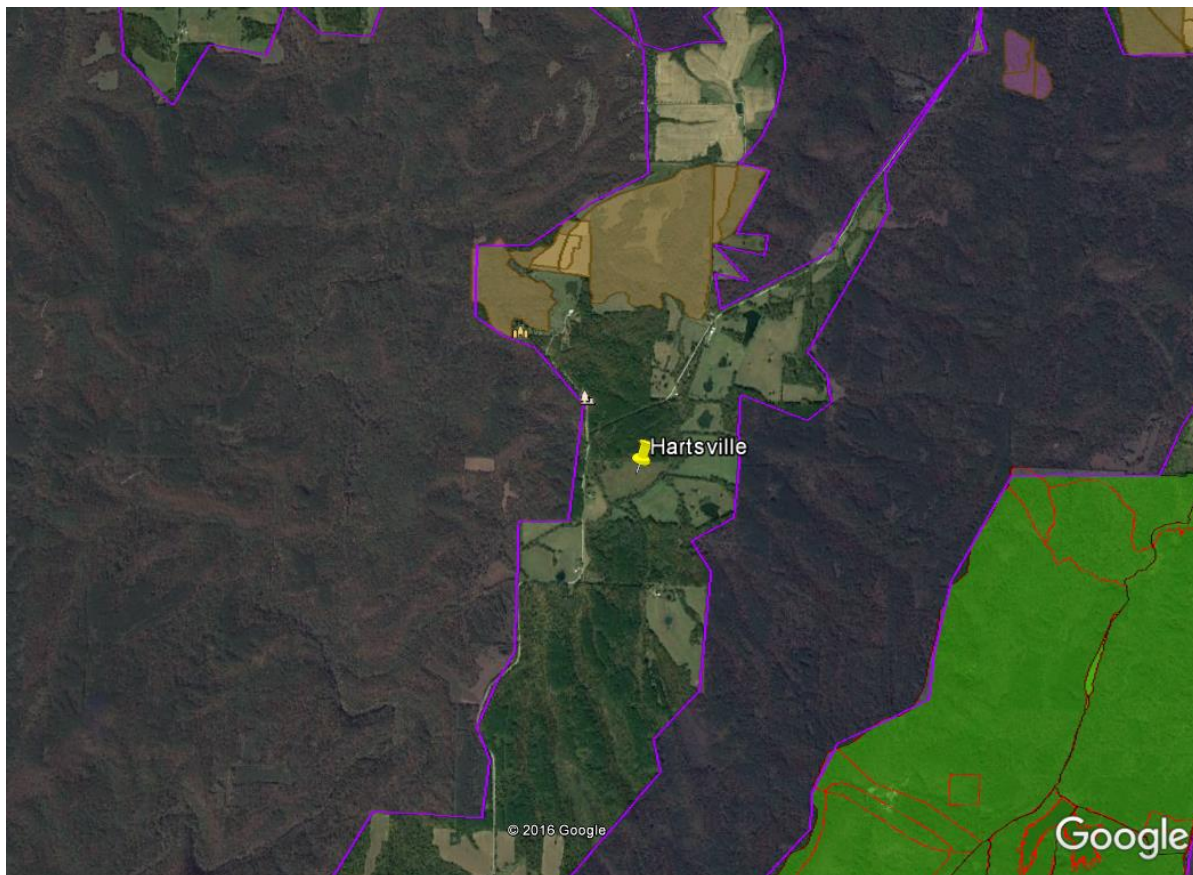
**Figure 47. Home with good defensible space, access, turnaround space and pond.**

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 48 and Figure 84 in Chapter 6.
  - Pre-fire planning should be implemented to address slow response times and possible access concerns with larger apparatuses.
  - Funding should be sought to establish a new fire station for the community of Herod, which could serve Hartsville, drastically reducing response by emergency responders.
  - Water storage tanks could be erected at the new fire station site in Herod.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
- 



**Figure 48. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Hartsville. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. Brown and Green areas denote existing USFS and State and Land Treatments. See Figure 84 in Chapter 6 for details.**

## LUSK

### **Rated 45 (Moderate) with NFPA Assessment; Low to Moderate with Composite GIS Risk Assessment**

Lusk is a small unincorporated community in the east-central part of the county.

**Fuels:** The community is surrounded by forested areas on all sides (Figure 49); however, fuels within the community appear to have been treated having greater separation between trees (Figure 50).

**Access:** The town is accessed via Lusk Road and is at some distance to major highways. Most homes in the community are located close to the road and have relatively short driveways and good turnaround space for emergency vehicles.

**Fire Response:** The closest Pope County Fire Department station is located north of Golconda on Highway 146. Response time would be relatively slow for homes located in this community.

**Water Supply:** There are no fire hydrants in the community; however, there are some ponds that could be used for drafting with the consent of the landowner. The Pope County Fire Department would typically use water from hydrants close to the north Golconda Station.

**Structural Characteristics:** Most homes have good defensible space with mowed and well-maintained yards (Figure 50). Wood siding and decks are common, but roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are above ground. Some underground fiber optics are being installed throughout the county. Most homes are on smaller lots with some limited separation between structures relative to other communities in the county.





Figure 49. Community of Lusk showing forested land adjacent to community.



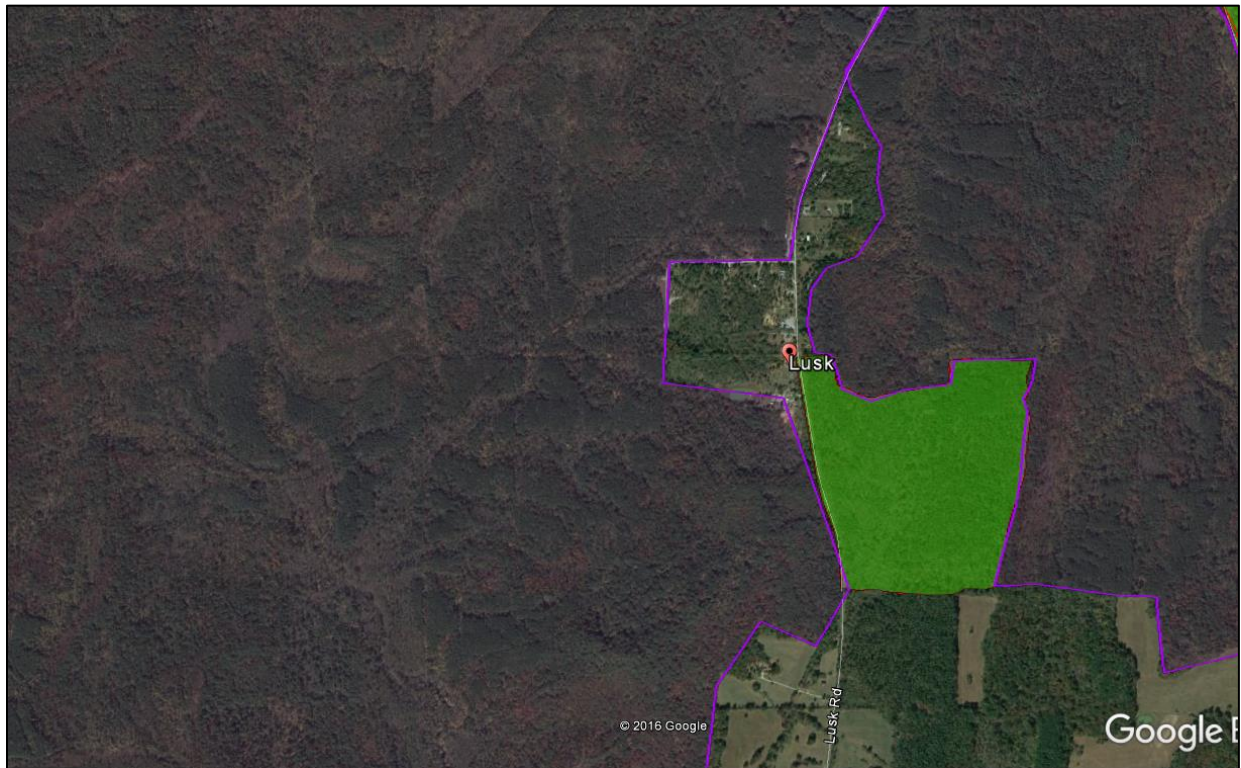
Figure 50. Image showing good defensible space surrounding homes and structures and good separation between trees on residential plots.

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 51 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
  - Pre-fire planning should be implemented to address slow response times and possible access concerns with larger apparatuses.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
- 



**Figure 51.** Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Lusk. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. Green areas denote existing USFS Treatments. See Figure 84 in Chapter 6 for details.

## BUSHWACK ROAD

### **Rated 67 (Moderate) with NFPA Assessment; Moderate with Patchy High with Composite GIS Risk Assessment**

Bushwack Road is located north of Golconda on a north-south orientation.

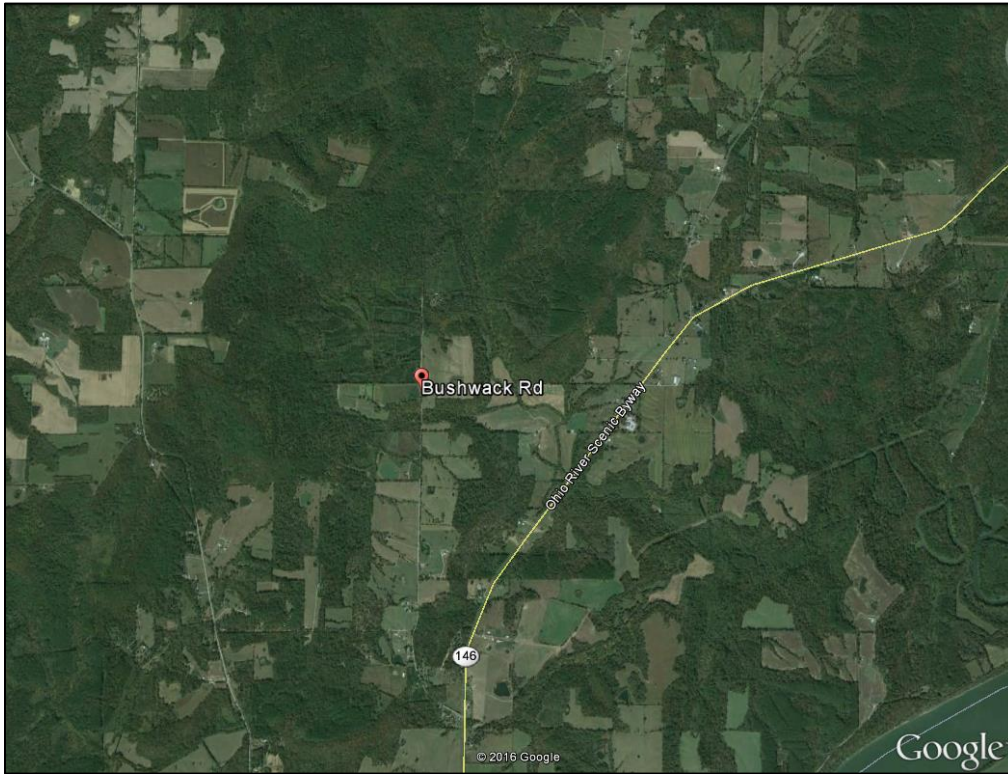
**Fuels:** There is a history of fire along this road, with a number of wildfire starts over the last few years. Fuels along the road are mixed, with a large portion of the southern extent being primarily agricultural but with some stringers and woody patches. The northern portion of the road is more wooded and open to a large area of forested land to the north (Figure 52).

**Access:** Access from Golconda is good via Highway 146, but the road is slow and unsurfaced, slowing access to the north. The road dead-ends to the north creating concerns for evacuation if movement to the south is impeded.

**Fire Response:** Fire response is relatively good, with a Pope County Fire Department station located north of Golconda on Highway 146.

**Water Supply:** There are no fire hydrants; however, the Pope County Fire Department has access to good water supply at or close to the Golconda station. Some ponds are located on private land and could provide water for suppression efforts with the landowner's consent.

**Structural Characteristics:** Much of the extent of the road comprises agricultural land use. Those homes that do occur along the road have good defensible space and tend to occur on larger lots with good clearance and well-maintained and manicured yards. Wood siding and decks are common, but roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are above and below ground. Some underground fiber optics are being installed throughout the county.



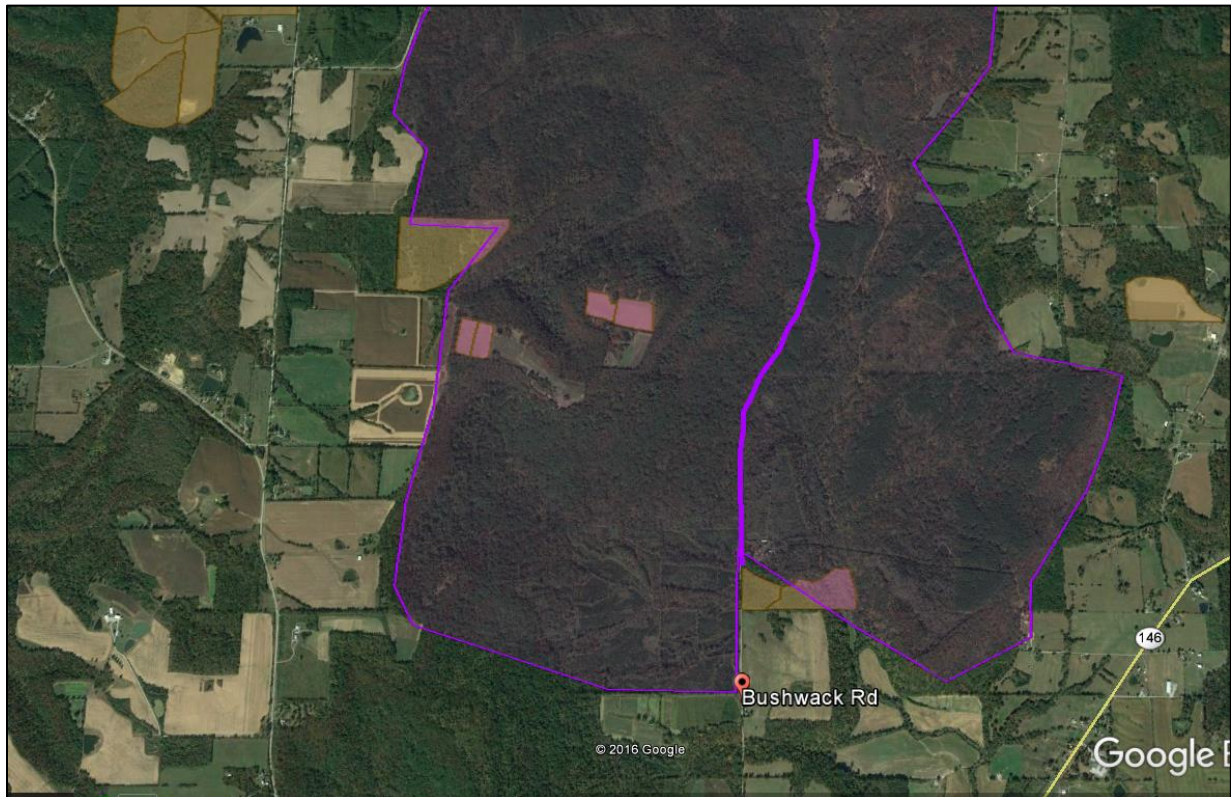
**Figure 52.** *Bushwack Road, north of Golconda, showing the predominantly agricultural land use but with the northern section becoming more wooded.*

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 53 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
  - Pre-fire planning should be implemented to address slow response times and possible access concerns with larger apparatuses.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
  - Fire danger signage should be installed along the road or at intersections to try and address high fire occurrence.
  - Roadside thinning should be implemented to reduce vehicle fire starts and provide safe passage of residents and emergency responders in the event of wildfire.
-



**Figure 53.** Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living along Bushwack Road. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. The purple line following the location of the road is a suggested location for roadside mechanical thinning in order to reduce the potential for vehicle started fires from the road, but also provide a safe evacuation route for residents and emergency responders.

## RAUM

### **Rated 41 (Moderate) with NFPA Assessment; Moderate with Composite GIS Risk Assessment**

Raum is a small unincorporated hamlet of scattered homes located southeast of Eddyville (Figure 54).

**Fuels:** There is a history of fire in this areas as a result of debris and brush burning. The community is largely agricultural with forested land on the edges.

**Access:** The community is accessed via the Eddyville Road from Eddyville or from Highway 146 north of Golconda. Eddyville Road is surfaced along its extent with moderate width, but side roads are unsurfaced.

**Fire Response:** Fire response is relatively good, with a Pope County Fire Department station located north of Golconda on Highway 146 and in Eddyville.

**Water Supply:** There are fire hydrants located along Eddyville Road and the Pope County Fire Department has access to good water supply at or close to the Golconda and Eddyville stations. Some ponds are located on private land and could provide water for suppression efforts with the landowner's consent.

**Structural Characteristics:** Much of the community is located within agricultural land use and homes have good defensible space, tending to occur on larger lots with good clearance and well-maintained and manicured yards. Some homes are of older construction with wood siding and decks that may need maintenance. Roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are above and below ground. Some underground fiber optics are being installed throughout the county. Some smaller cabins are located along Eddyville road and back immediately to large areas of forested vegetation with variable topography, these structures have very limited defensible space (Figure 55). Landowners should implement defensible space around these properties to reduce their risk from wildfire.

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 56 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
  - Fire danger signage should be installed along the road or at intersections to try and address high fire occurrence.
-

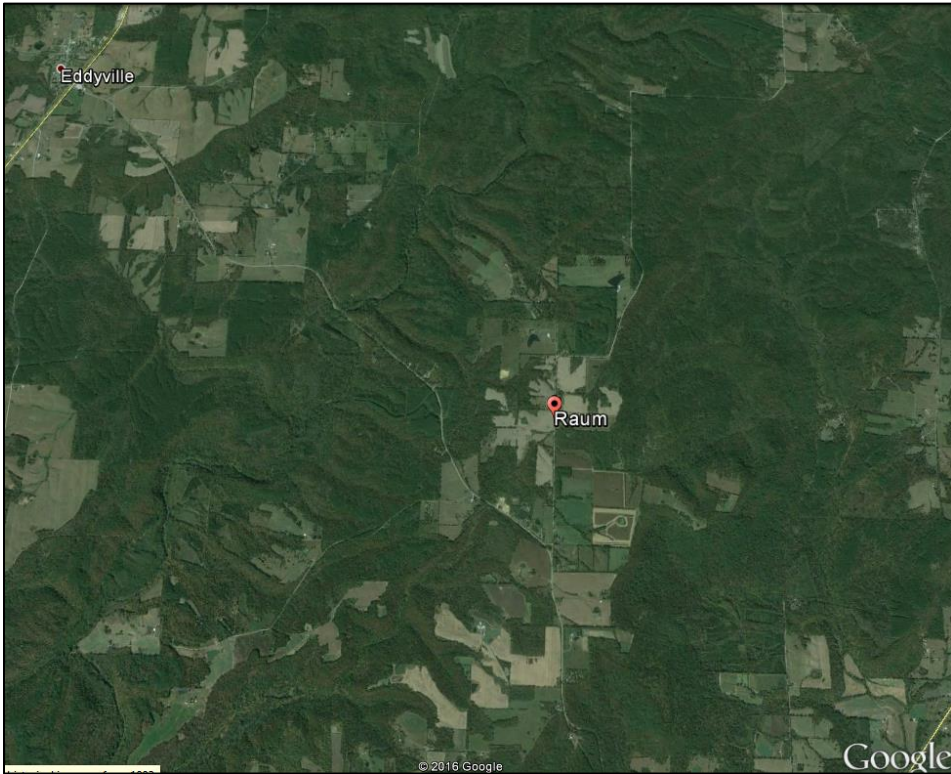
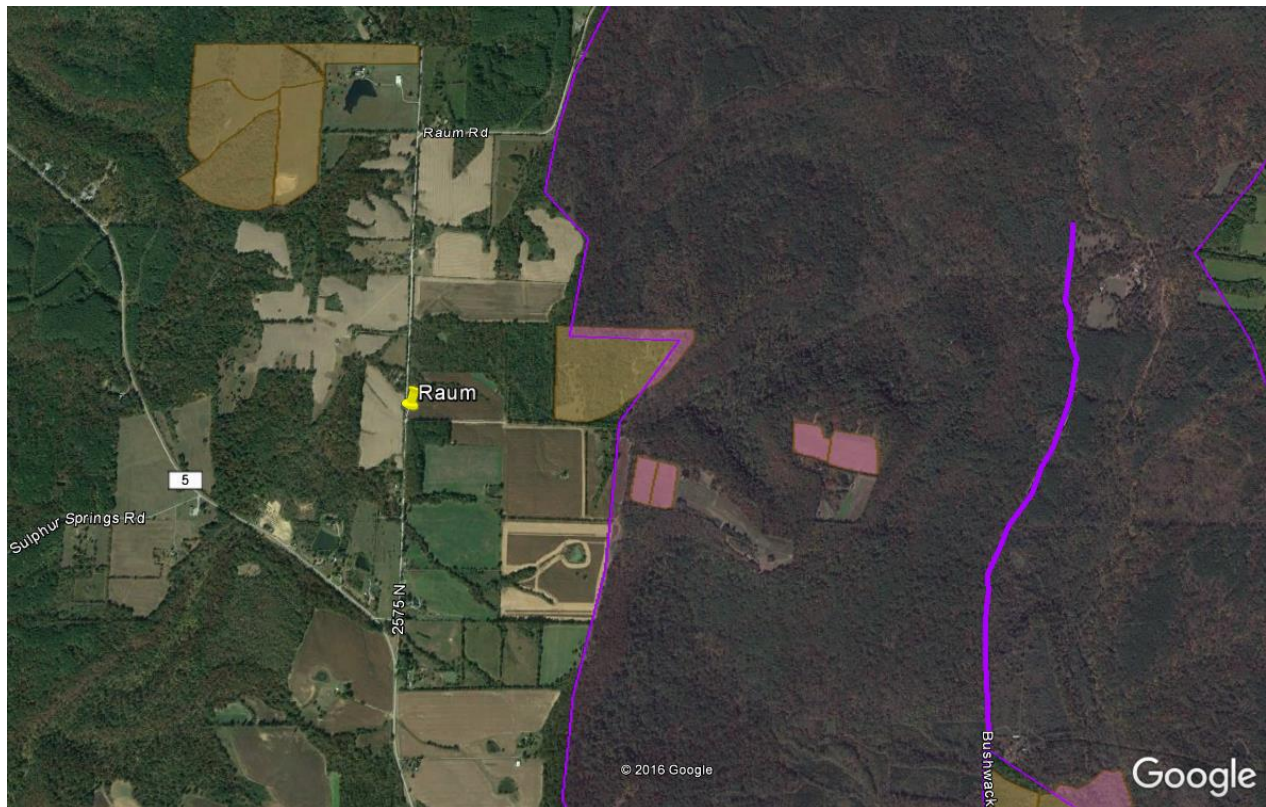


Figure 54. Location of Raum relative to Eddyville, showing the mosaic of agricultural and forested land.



Figure 55. Examples of structures with limited defensible space located within large continuous forested stands.



**Figure 56. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Raum. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. Brown areas denote existing State and Private treatments. See Figure 84 in Chapter 6 for more details.**



## BROWNFIELD

### Rated 38 (Low) with NFPA Assessment; Low to Moderate with Composite GIS Risk Assessment

Brownfield is a small unincorporated community in central Pope County. It is characterized by large areas of agricultural crop land.

**Fuels:** Primarily agricultural crop land with dotted residences and forested stringers (Figure 57).

**Access:** The community is accessed via smaller unsurfaced roads of moderate width.

**Fire Response:** Fire response is relatively good, with the closest Pope County Fire Department station located in Dixon Springs.

**Water Supply:** There are fire hydrants located in the community and the Pope County Fire Department has access to good water supply at or close to the Dixon Springs station. Some ponds are located on private land and could provide water for suppression efforts with the landowner's consent.

**Structural Characteristics:** Much of the community is located within agricultural land use and homes have good defensible space. Lots sizes vary though most structures have good separation. There is a mix of construction within the community with some manufactured homes and some newer build. Most homes have wood or composite siding and decks, some that may need maintenance. Roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are above and below ground. Some underground fiber optics are being installed throughout the county.

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures. Priority areas are those homes located next to wooded stringers or homes immediately adjacent to grassland areas that are of high fire risk during fire season.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
-



*Figure 57. Location of Brownfield showing varied land use and patchy forest stringers.*

## ROSEBUD

### **Rated 83 (High) with NFPA Assessment; Moderate to Patchy High with Composite GIS Risk Assessment**

Rosebud is a small isolated unincorporated community located in south-central Pope County (Figure 58).

**Fuels:** The community is surrounded by forested land on its north and west edges and agricultural land to the east and southeast. The forested land to the west of the community extends for approximately 3 miles with very little break in the continuity and very dense fuel conditions.

**Access:** The community and remote cabins associated with the community are accessed via smaller unsurfaced roads with narrow width and overhanging vegetation (Figure 59). The closest highway is Bay City Road, more than 3 miles to the east as the crow flies. There are a number of dead-end roads that access cabins in the community raising concerns for evacuation (see Figure 59).

**Fire Response:** Fire response to the community is extremely slow. The closest Pope County Fire Department station is Dixon Springs to the north or Bay City to the south. The Pope County Fire Department is seeking funds to establish a station in the community to address the slow response times. Education regarding defensible space and evacuation procedures would be important for this community. Pre-fire planning would help to address concerns of the fire department regarding slow response time.

**Water Supply:** There are no fire hydrants located in the community. The Pope County Fire Department would need to truck in water for suppression.

**Structural Characteristics:** Much of the community is made up of older homes with wood construction and combustible roofs; however, most have well-maintained yards and some defensible space. Some homes that back to forested lands would benefit from additional defensible space to protect the structure in the event of extreme winds. Lot sizes tend to be smaller and structures therefore have less separation, so fire could spread quickly from structure to structure. Some retrofits have been made to seasonal cabins in the area (installation of metal roofs and maintenance of siding), and fuel treatments and defensible space have been extended (Figure 60). Utilities are above ground.

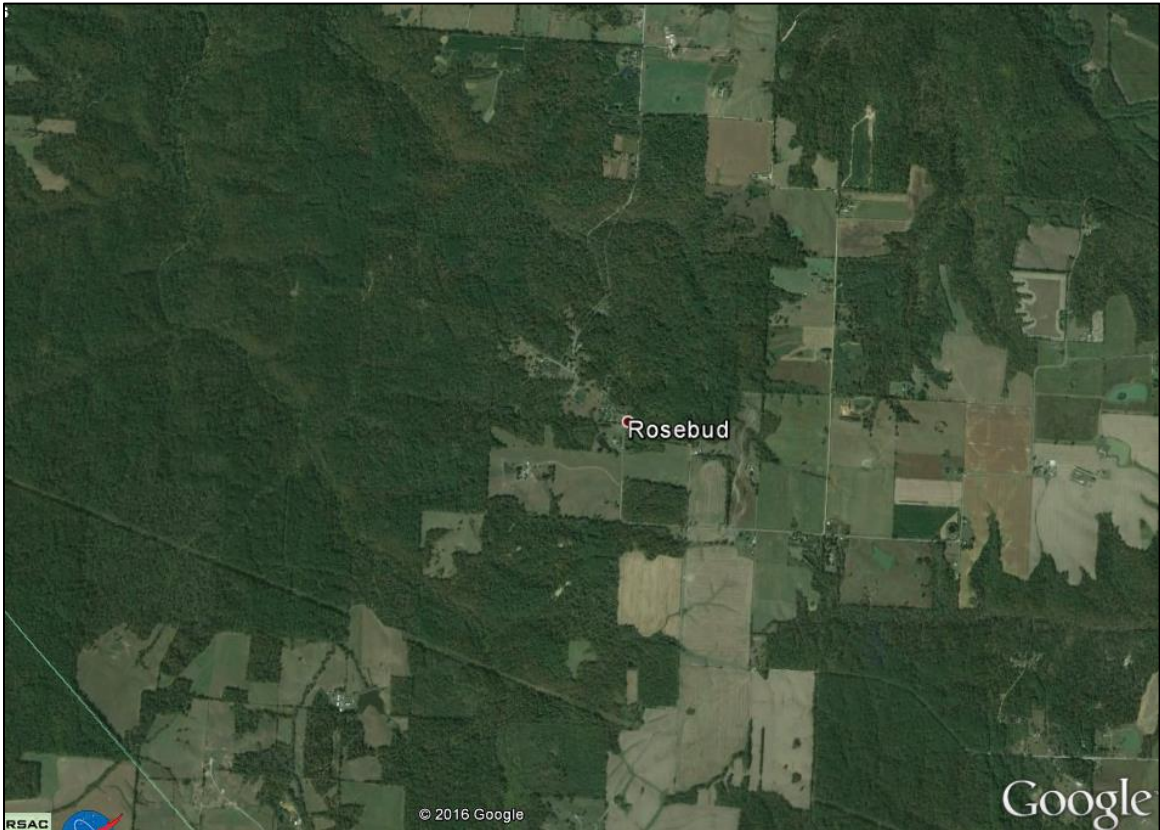


Figure 58. Location of Rosebud relative to adjacent forest land.

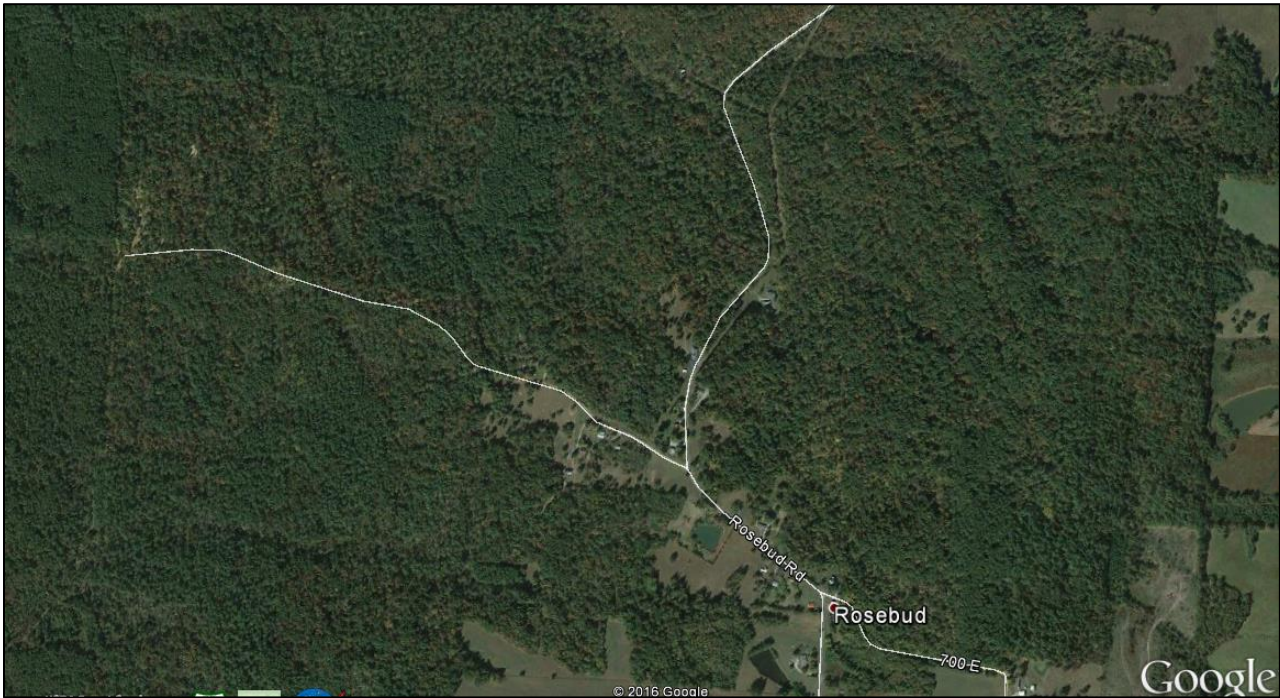


Figure 59. View off dead-end road north west of Rosebud where a number of cabins are situated.



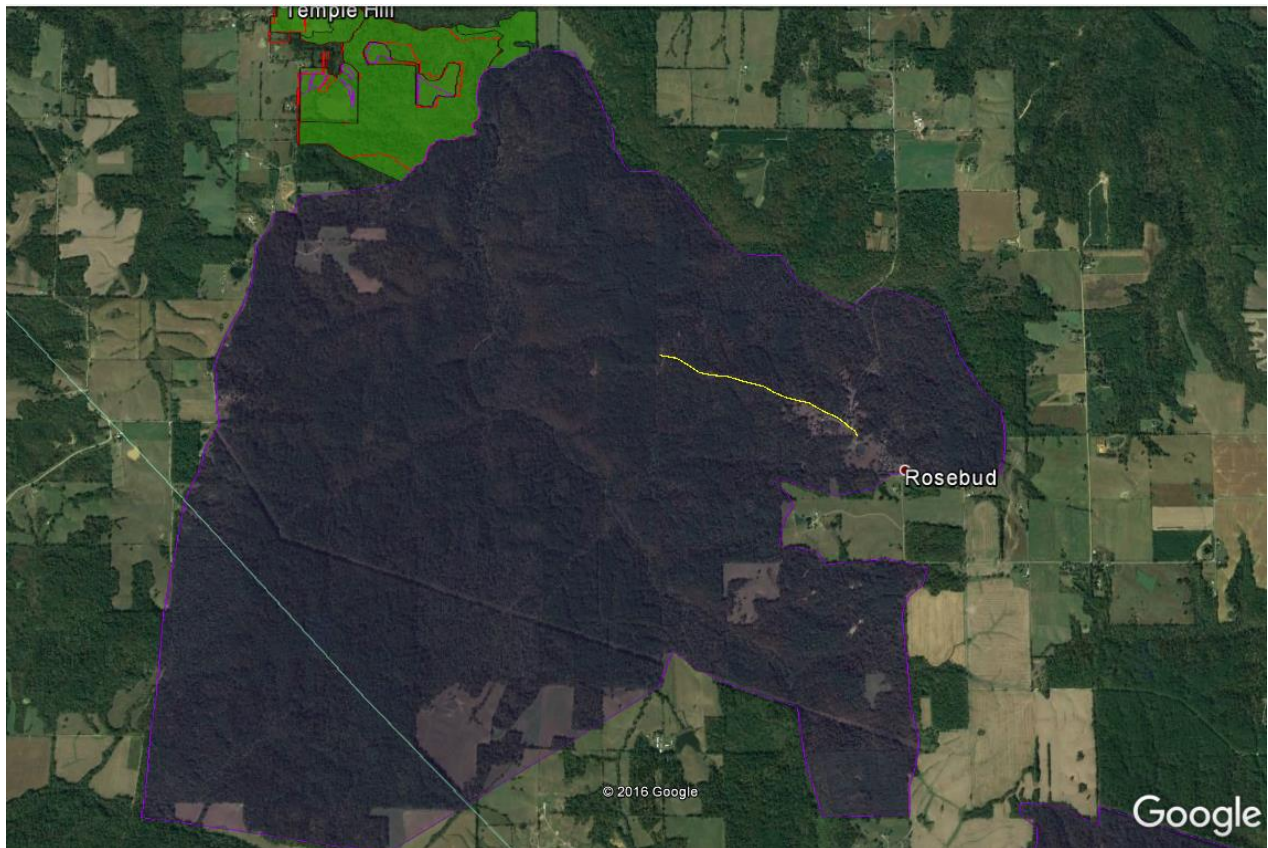
*Figure 60. Evidence of fuel treatment work around cabins at end of dead-end road.*

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 61 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
  - Pre-fire planning should be implemented to address slow response times and possible access concerns with larger apparatuses.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
  - Fire danger signage should be installed along the road or at intersections to try and address high fire occurrence.
  - Roadside thinning should be implemented to reduce vehicle fire starts and provide safe passage of residents and emergency responders in the event of wildfire.
  - Funding should be sought to establish a new fire station at Rosebud to address slow emergency response times.
-



**Figure 61.** Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Rosebud. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. The yellow line following the location of the road northwest from Rosebud is a suggested location for roadside mechanical thinning in order to reduce the potential for vehicle started fires from the road, but also provide a safe evacuation route for residents and emergency responders accessing the dead end road. Green areas denote existing USFS treatments. See Figure 84 in Chapter 6 for more details.

## MANN LAKE

### **Rated 67 (Moderate) with NFPA Assessment; Moderate with Patchy High with Composite GIS Risk Assessment**

Mann Lake is located within adjacent Massac County, but the community straddles both counties (Figure 62).

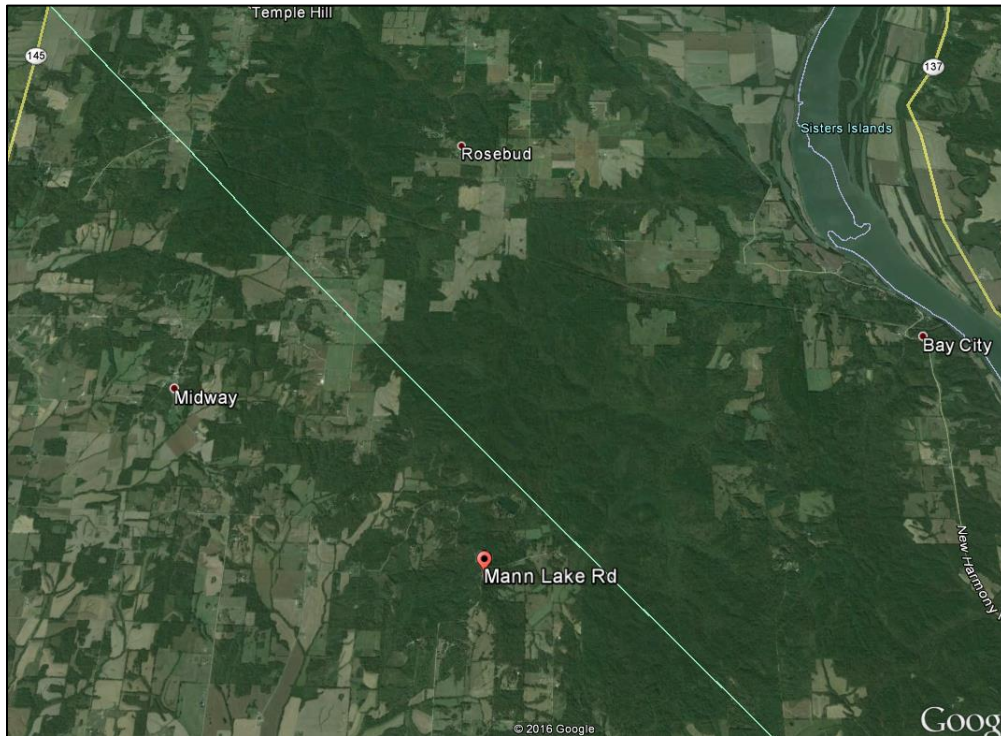
**Fuels:** The community is surrounded by expansive forest land to the northeast and east (all on the Pope County side of the border). On the Massac County portion, the community is situated among more patchy forest and agricultural land, but with one continuous patch of forest southwest of the community that could facilitate fire spread with prevailing winds.

**Access:** Travel time to access the community through Pope County is long and on narrow unsurfaced roads. The community is accessed via Massac County and dead-ends on the north side of the lake (Figure 63). Within the community the lake road is narrow (Figure 64) with varying gradient and little grading making the road surface poor in some places. Evacuation and access are concerns for fire managers, particularly if a wildfire occurred during the busy summer season.

**Fire Response:** Fire response to the community would be extremely slow with the closest Pope County Fire Department station located in Bay City and the closest Massac County Fire Department in Metropolis. In the event of a fire, both departments would respond. Education regarding defensible space and evacuation procedures would be important for this community. Pre-fire planning would help to address concerns of the fire department regarding slow response time.

**Water Supply:** There are fire hydrants located in the community, but water pressure is unknown. The Pope County Fire Department could draft from the lake if needed.

**Structural Characteristics:** Much of the community is made up of older homes, cabins, and manufactured homes and trailers. Some property construction is older and not as well maintained as in other areas, possibly due to the seasonal nature of many of the structures. It is estimated that there are approximately 11 homes within the lake area. There is a homeowner association (HOA) that could help with community organizing and help promote a “Firewise” message to the community, as well as enforce maintenance of properties and yards. Most of the homes had relatively good separation from adjacent forest land and sufficient defensible space, except in the event of extreme winds. Property owners with homes that back immediately to the forest should consider additional clearance. Lot sizes tend to be smaller and structures therefore have less separation so fire could spread quickly from structure to structure. Utilities are above ground and there are many propane tanks situated close to homes.



**Figure 62. Location of Mann Lake Road relative to the Pope and Massac County border showing expansive forested land to the east and north.**



**Figure 63. Mann Lake showing Mann Lake Road access along southern edge of lake on Massac County side and relatively open fuels adjacent to homes.**





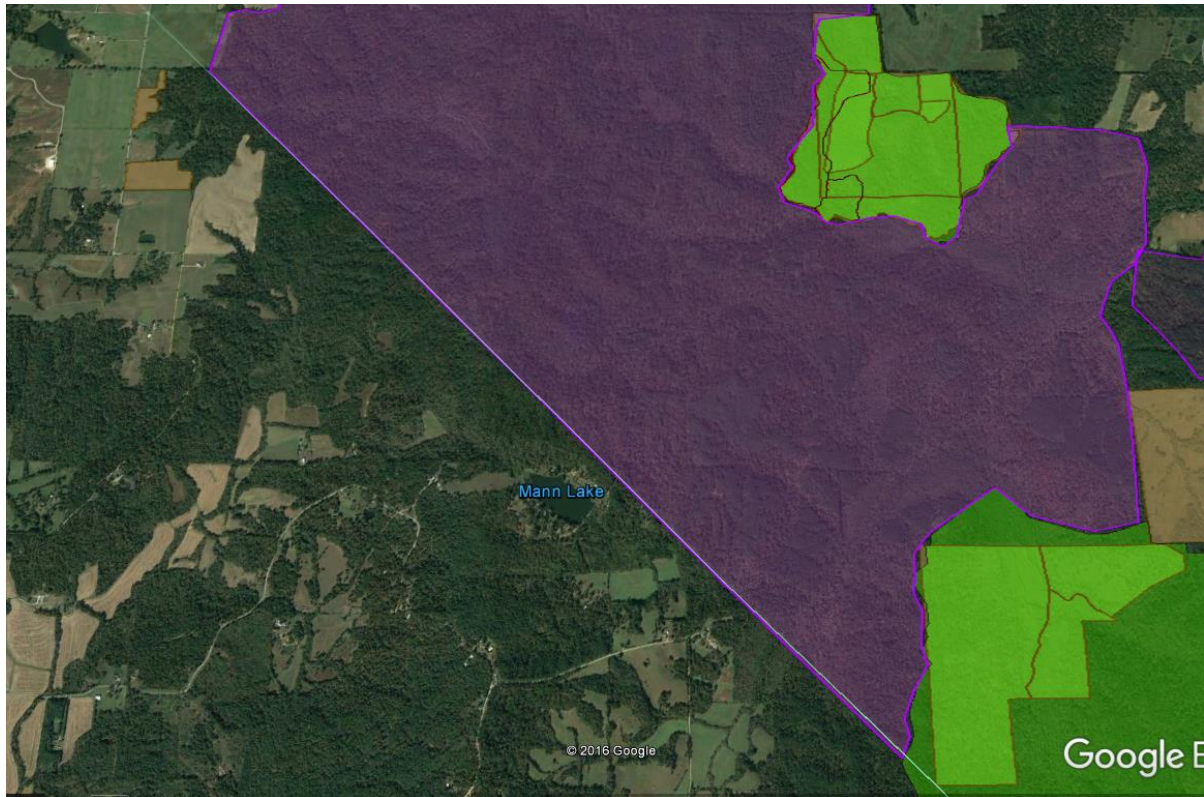
**Figure 64.** A narrow unsurfaced road skirts Mann Lake.

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 65 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
  - Pre-fire planning should be implemented from both Pope County and Massac County departments to address slow response times and possible access concerns with larger apparatuses. Agreements should be established/revised between both departments on response to fires along the shared border.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
  - Fire danger signage should be installed along the road or at intersections to try to address high fire occurrence.
  - Roadside thinning should be implemented along Mann Lake Road to reduce vehicle fire starts and provide safe passage of residents and emergency responders in the event of wildfire.
  - The community could consider pursuing a Firewise Community Certification. This could be pursued through working with the HOA and IDNR. Actions to reduce structural ignitability would need to be carried out by homeowners to reduce the existing risk rating. Organized educational events regarding defensible space and Firewise activities would benefit the community.
-



**Figure 65.** Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Mann Lake. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. Treatments should be extended beyond the Pope/Massac County line with collaboration from Massac County. Green and Brown areas denote existing State and Private land and USFS treatments. See Figure 84 in Chapter 6 for more details.

## HOHMAN LAKE

### **Rated 76 (High) with NFPA Assessment; Moderate with Patchy High with Composite GIS Risk Assessment**

Hohman Lake is located in Massac County, but the community crosses over the county border into southern Pope County (Figure 66). This is a WUI area of concern because of the high number of homes adjacent to forested lands. Some additional development potential is on the road into lake with tracts of land for sale.

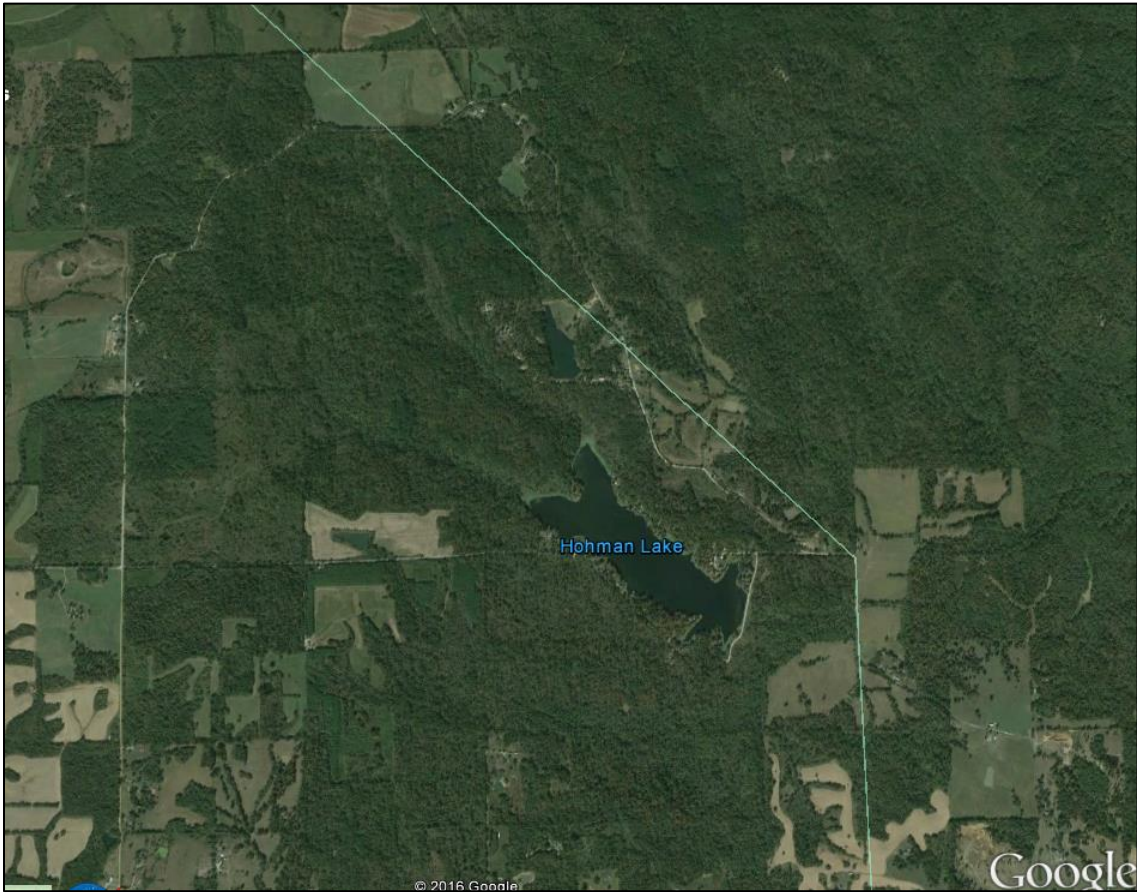
**Fuels:** The community is situated on the lake edge but adjacent to forested fuels on all sides. A large expanse of forested land occurs northeast of the community but with some break in the fuel continuity as a result of a band of agricultural land use along the county line. Forested land is more continuous on the southern edge of the lake on the Massac County side.

**Access:** The community is relatively remote with the largest community being Bay City to the east. Travel time to access the community through Pope County is slowed by the network of narrow unsurfaced roads (Figure 67). Travel time via Massac County may be faster due to the larger more urban road network around Metropolis. Within the community the lake road is narrow with varying gradient and little grading making the road surface poor in some places. Evacuation and access are concerns for fire managers, particularly if a wildfire occurred during the busy summer season.

**Fire Response:** Fire response to the community would be extremely slow with the closest Pope County Fire Department station located in Bay City and the closest Massac County Fire Department station in Metropolis. In the event of a fire, both departments would respond. Education regarding defensible space and evacuation procedures would be important for this community. Pre-fire planning would help to address concerns of the fire department regarding slow response time.

**Water Supply:** There are fire hydrants located in the community, but water pressure is unknown. The Pope County Fire Department could draft from the lake if needed.

**Structural Characteristics:** Much of the community is made up of older homes, cabins and manufactured homes and trailers. Some property construction is older and not as well maintained as in other areas possibly due to the seasonal nature of many of the structures. The lake is larger than Mann Lake and has significantly more homes. There is a HOA that could help with community organizing and help promote a “Firewise” message to the community, as well as enforce maintenance of properties and yards. Most homes are immediately adjacent to forested land with very little defensible space, although Hohman Lake Road does provide some separation from the forest land, as all homes fall to the lake side of the road (Figure 68). The road is overgrown in some sections, however, so under extreme conditions fire could easily jump the road. Lot sizes tend to be smaller and structures therefore have less separation, so fire could spread quickly from structure to structure. Utilities are above ground and there are many propane tanks situated close to homes.



**Figure 66. Location of Hohman Lake relative the Massac and Pope County boundary.**



**Figure 67. Many roads in Pope County are unpaved and have vegetation in close proximity.**



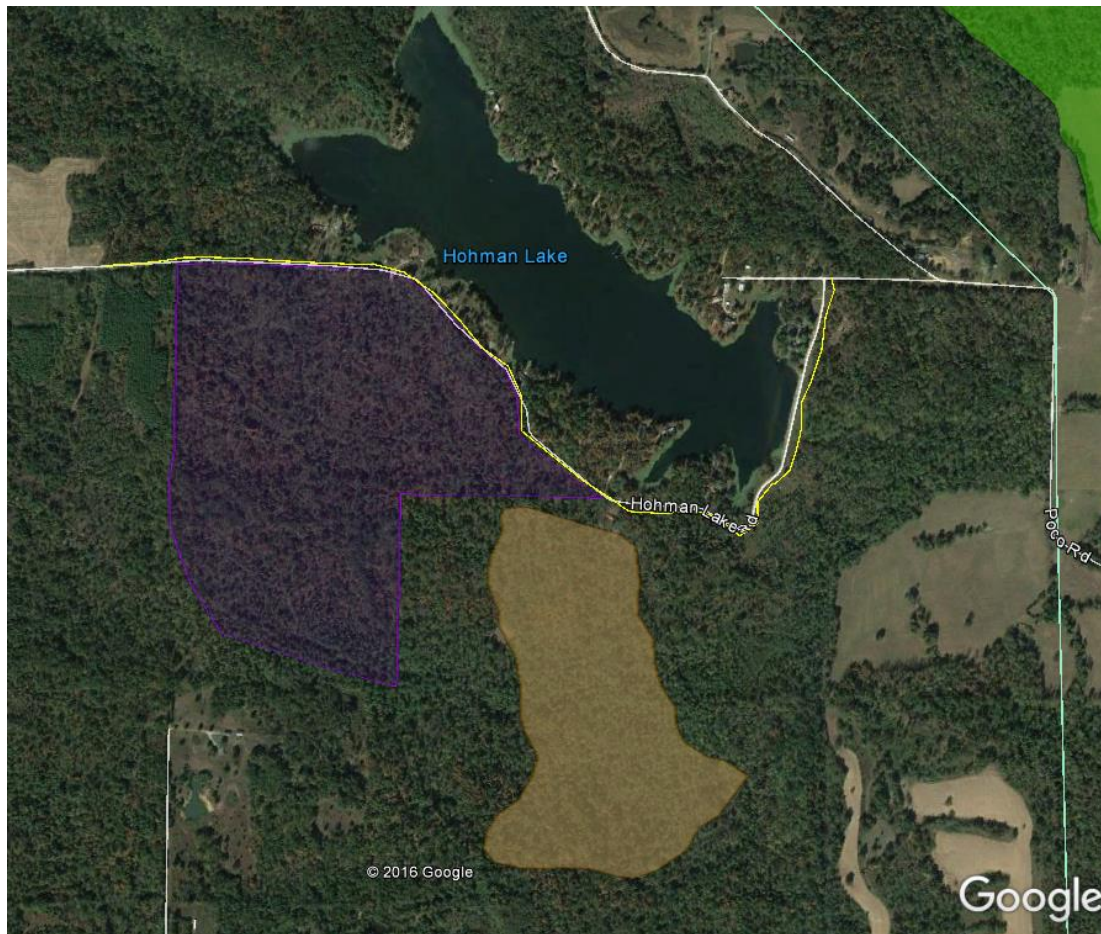
**Figure 68. Hohman Lake showing location of Hohman Lake Road and homes adjacent to the lake.**

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9..

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 69 and Figure 84 in Chapter 6.
  - Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
  - Pre-fire planning should be implemented from both Pope County and Massac County departments to address slow response times and possible access concerns with larger apparatuses. Agreements should be established/revised between both departments on response to fires along the shared border.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
  - Fire danger signage should be installed along the road or at intersections to try and address high fire occurrence.
  - Roadside thinning should be implemented along Hohman Lake Road to reduce vehicle fire starts and provide safe passage of residents and emergency responders in the event of wildfire.
  - The community could consider pursuing a Firewise Community Certification. This could be pursued through working with the HOA and IDNR. Actions to reduce structural ignitability would need to be carried out by homeowners to reduce the existing risk rating. Organized educational events regarding defensible space and Firewise activities would benefit the community.
-



**Figure 69.** Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents living in Rosebud. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. The yellow line following Hohman Lake Road is a suggested location for roadside mechanical thinning in order to reduce the potential for vehicle started fires from the road, but also provide a safe evacuation route for residents and emergency responders accessing the community. The brown and green areas denote existing State and Private land and USFS treatments. See Figure 84 in Chapter 6 for more details.

## GOLCONDA

### **Rated 39 (Low) with NFPA Assessment; Moderate with Composite GIS Risk Assessment**

Golconda is the County Seat and one of only two incorporated communities in Pope County. The town is situated on the eastern edge of the county adjacent to the Ohio River (Figure 70).

**Fuels:** The community is surrounded along its north, west, and south edges with patchy forest and agricultural land. The patchiness breaks up the continuity of the forest fuels.

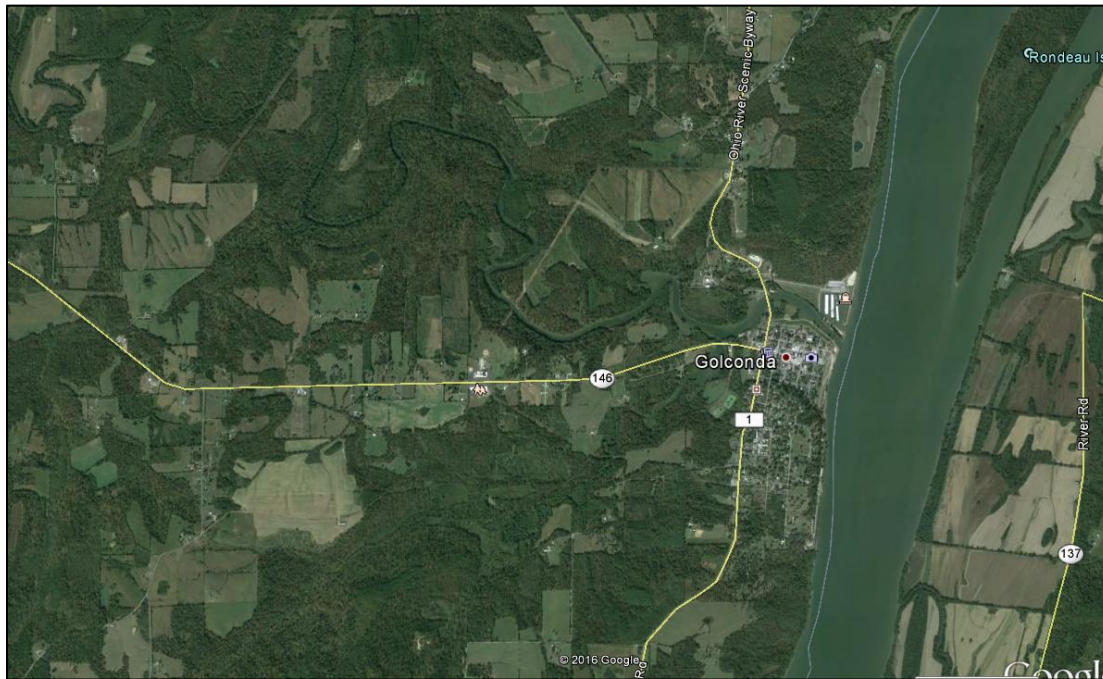
**Access:** The community is easily accessed via Highway 146 east-west, Highway 1 south (Bay City Road), or the Ohio River Scenic Byway to the north.

**Fire Response:** Fire response to the community is good with the City of Golconda VFD serving the community and a 5-mile radius from the city and the Pope County Fire Department Golconda Station located just north of town.

**Water Supply:** There are fire hydrants located throughout the community with good water pressure.

**Structural Characteristics:** Much of the community is relatively urban. Homes on the edge of the community are at the greatest risk from wildfire; however, fuel continuity in adjacent areas is low. Agricultural lands during some periods of the year can still post a risk to WUI areas, however, due to agricultural burning and due to cured crops or residual vegetation following harvest that could still carry fire. Construction types vary throughout the community, but most have wood construction, wood decks, and fences. Lot sizes tend to be smaller than other areas in the county, reducing separation between structures.

**CVARs:** Much of Golconda is part of the Golconda Historic District, which is a designated historic district listed on the National Register of Historic Places. The historic district was identified by community members as an important community value to be protected from wildfire. Golconda is also home to the County Court House and other municipal infrastructure.



**Figure 70. Golconda, County Seat, showing location and mosaic of fuel types.**

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures. Priority areas are those homes located next to wooded stringers or homes immediately adjacent to grassland areas that are of high fire risk during fire season.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
-



## TEMPLE HILL

### **Rated 71 (High) with NFPA Assessment; Moderate with Patchy High with Composite GIS Risk Assessment**

Temple Hill is a scattered unincorporated community located in south-central Pope County, northwest of Rosebud (Figure 71).

**Fuels:** The community is surrounded by forested land on its east and southeast edges and agricultural land in mosaic with forest stringers and patches to the west and north. The forested land to the east of the community extends southeast for approximately 3 miles to abut with Rosebud.

**Access:** The community is scattered along a network of small narrow roads. The closest highway is Highway 145 to the west, but access is slowed by the limited road network. Some homes have long driveways; homeowners should ensure that driveway width is sufficient for access by large apparatuses.

**Fire Response:** Fire response to the community is slow. The closest Pope County Fire Department station is Dixon Springs to the northwest.

**Water Supply:** There are no fire hydrants located in the community. The Pope County Fire Department would need to truck in water for suppression from Dixon Springs. Some properties have lakes or ponds that could be used for suppression with the landowner's consent.

**Structural Characteristics:** Much of the community is made up of larger homes on large agricultural lots with good defensible space. The large lots sizes increase structure separation. Construction tends to be combustible with wood siding, deck, and fencing, but roof materials are typically composite shingles or metal roof.

**CVAR:** Prominent in the community is a historic church and graveyard (Figure 72).



**Figure 71. Temple Hill showing the diversity of land uses, large lot sizes, and good structure separation.**

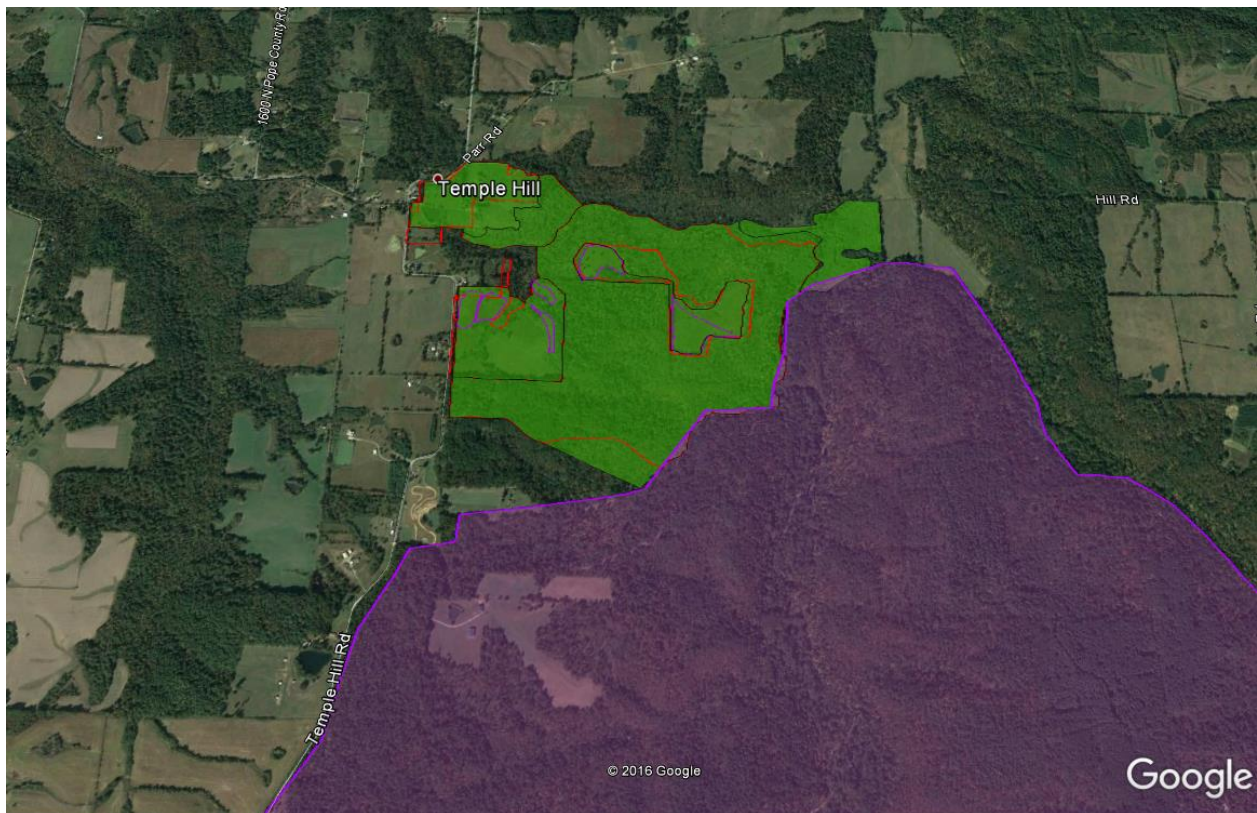


**Figure 72. Church and graveyard at Temple Hill.**

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 73 and Figure 84 in Chapter 6.
- Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures.
- Pre-fire planning should be implemented to address slow response times and possible access concerns with larger apparatuses.
- Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.



**Figure 73.** Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Temple Hill. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. Green areas denote existing USFS treatments. See Figure 84 in Chapter 6 for more details.

## EDDYVILLE

### **Rated 41 (Moderate) with NFPA Assessment; Low–Moderate with Composite GIS Risk Assessment**

Eddyville is the second incorporated community in the county. The community is located in the center of the county and is surrounded by forested vegetation with an agricultural buffer (Figure 74).

**Fuels:** The community is surrounded with agricultural land and some patchy forest land that becomes more continuous with distance from the town. The patchiness breaks up the continuity of the forest fuels but the agricultural fuels can still pose a WUI hazard during certain times of the year as a result of agricultural burning, pre-harvest curing, and residual material left following harvest that could carry fire into the community.

**Access:** The community is easily accessed via Highway 145 north.

**Fire Response:** Fire response to the community is good with the Pope County Fire Department Eddyville Station located in town.

**Water Supply:** There are fire hydrants located throughout the community with good water pressure.

**Structural Characteristics:** Much of the community is relatively urban. Homes on the edge of the community are at the greatest risk from wildfire; however, fuel continuity in adjacent areas is low especially when agricultural fields are irrigated and or harvested. Construction types vary throughout the community but most homes have wood construction, wood decks and fences. Lot sizes tend to be smaller than other areas in the county, reducing separation between structures.

**CVARs:** A number of camping areas are located on the edge of Eddyville, including several horse camps north and south of town (Figure 75). These areas were identified by the Core Team and the public as community values at risk and could also act as points of ignition that could impact the community of Eddyville.

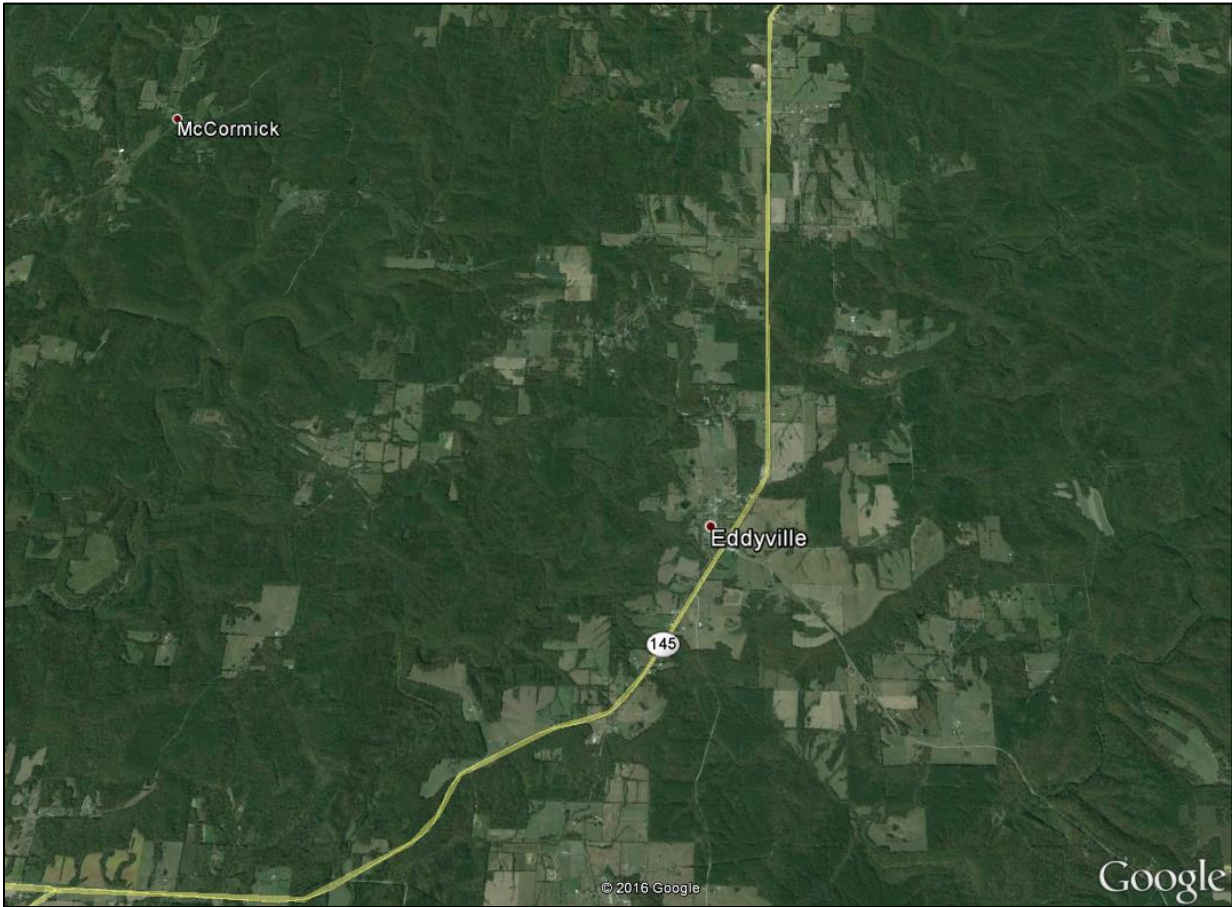


Figure 74. Location of Eddyville among a patchwork of forest and agricultural lands.

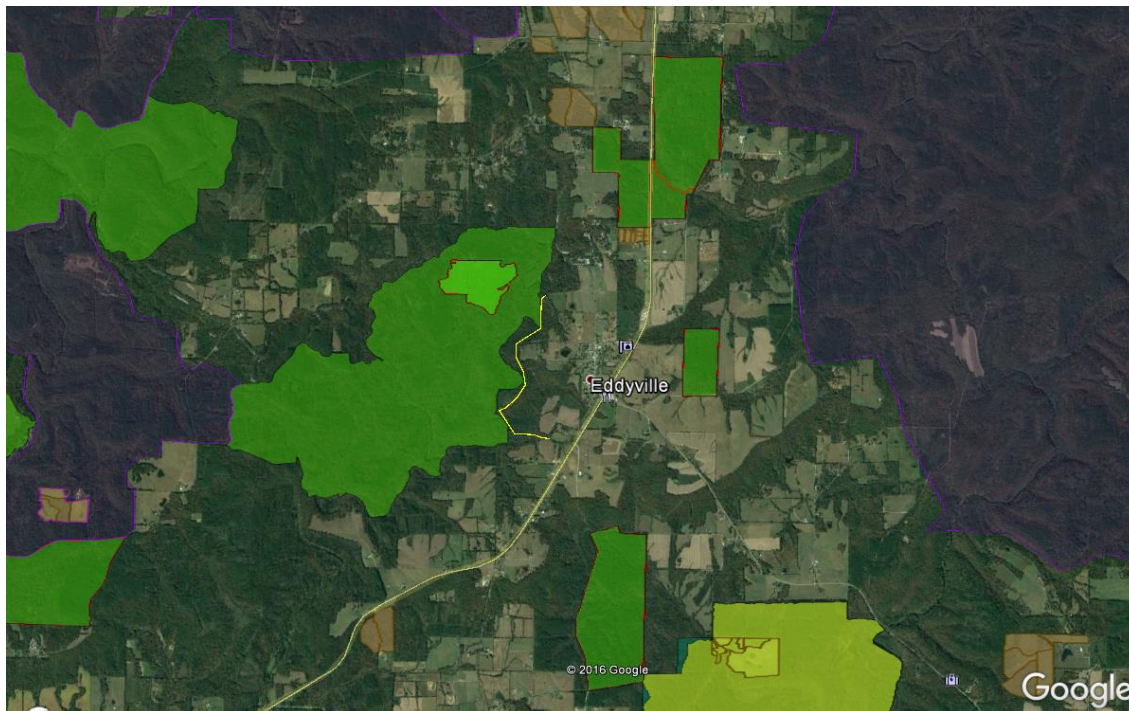


Figure 75. General store at Bear Branch Horse camp located close to Eddyville (source: [www.bearbranch.com](http://www.bearbranch.com)).

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Fuel reduction projects should be implemented on a landscape level to improve forest health and reduce the potential for a large-scale fire that would threaten the community and vegetation composition. See Figure 76 and Figure 84 in Chapter 6. A fuel break could be erected on the west-southwest edge of the community in a suitable location in order to slow spread of fire from the prevailing winds out of the west and southwest.
- Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures. Priority areas are those homes located next to wooded stringers or homes immediately adjacent to grassland areas that are of high fire risk during fire season.
- Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
- Fire danger signs should be installed at public open space areas or campgrounds to raise awareness of fire risk and reduce fire starts.
- Pre-fire planning should be carried out for camping areas and horse camps in order to identify possible evacuation issues/and or emergency access issues for people and livestock.



**Figure 76. Purple areas denote conceptual landscape treatment area that is recommended in order to restore native forests while also reducing risk of landscape-scale fires that could impact residents of Eddyville. The nature and method of treatment should be decided upon through site-specific planning but may include mechanical treatments, prescribed fire, or a combination of both. The purple line denotes the location of a possible fuel break in order to provide additional protection for the community. Green and Brown areas denote existing State, Private and USFS treatments. See Figure 84 in Chapter 6 for details.**

## HIGHWAY 146 BETWEEN DIXON SPRINGS AND GOLCONDA

### Rated 39 (Low) with NFPA Assessment; Moderate with Composite GIS Risk Assessment

Highway 146 forms a major thoroughfare between Dixon Springs and Golconda. A number of homes and agricultural lands are located along the highway (Figure 77).

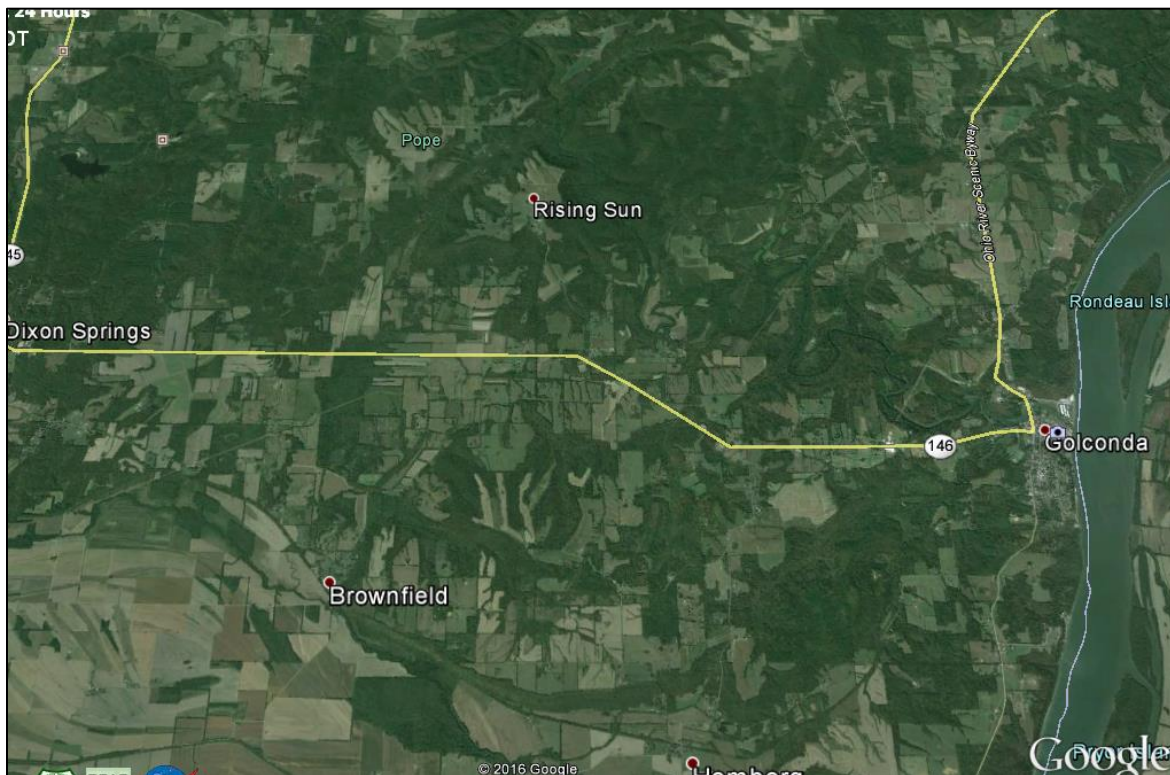
**Fuels:** The highway is banded on both sides by extensive agricultural lands, intermixed with some forested patches. Some homes back to forested vegetation, but there is limited continuity of forest fuels.

**Access:** Access along the highway is good assuming there are no blockages.

**Fire Response:** The Pope County Fire Department has stations located in Dixon Springs and Golconda so fire response times are good.

**Water Supply:** There are fire hydrants located along the highway and the Pope County Fire Department has access to good water supply at or close to its stations.

**Structural Characteristics:** Much of the extent of the highway comprises agricultural land use. Those homes that do occur along the highway have good defensible space and tend to occur on larger lots with good clearance and well-maintained and manicured yards. Wood siding and decks are common, but roofs are typically constructed of low combustible materials such as composite shingles or metal. Utilities are above and below ground. Some underground fiber optics are being installed throughout the county.



**Figure 77. Highway 146 between Dixon Springs and Golconda showing agricultural patchwork with some forested patches and stringers.**

---

## Action Items

Since the highway is well traveled by residents and visitors, fire danger signs should be installed to raise awareness of fire risk and reduce fire starts.

---

## BAY CITY

### Rated 38 (Low) with NFPA Assessment; Low to Moderate with Composite GIS Risk Assessment

Bay City is a small unincorporated community located on the Ohio River in the southern portion of the county (Figure 78).

**Fuels:** The community is surrounded along its north, west, and south edges with patchy forest and agricultural land. The patchiness breaks up the continuity of the forest fuels, which are more abundant to the west in the Cretaceous Hills area.

**Access:** The community is accessed via Highway 146 east-west, Highway 1 south (Bay City Road), or the Ohio River Scenic Byway to the north.

**Fire Response:** Fire response to the community is good with a Pope County Fire Department station located at Bay City.

**Water Supply:** There are fire hydrants located throughout the community, though water pressure is unknown.

**Structural Characteristics:** The community is composed of very few homes, many of which are located along the river corridor. Construction types vary throughout the community, but most have wood construction, wood decks, and fences. Lot sizes tend to be smaller than other areas in the county, reducing separation between structures. Some homes back directly onto forested land with limited set-back and defensible space (Figure 79).



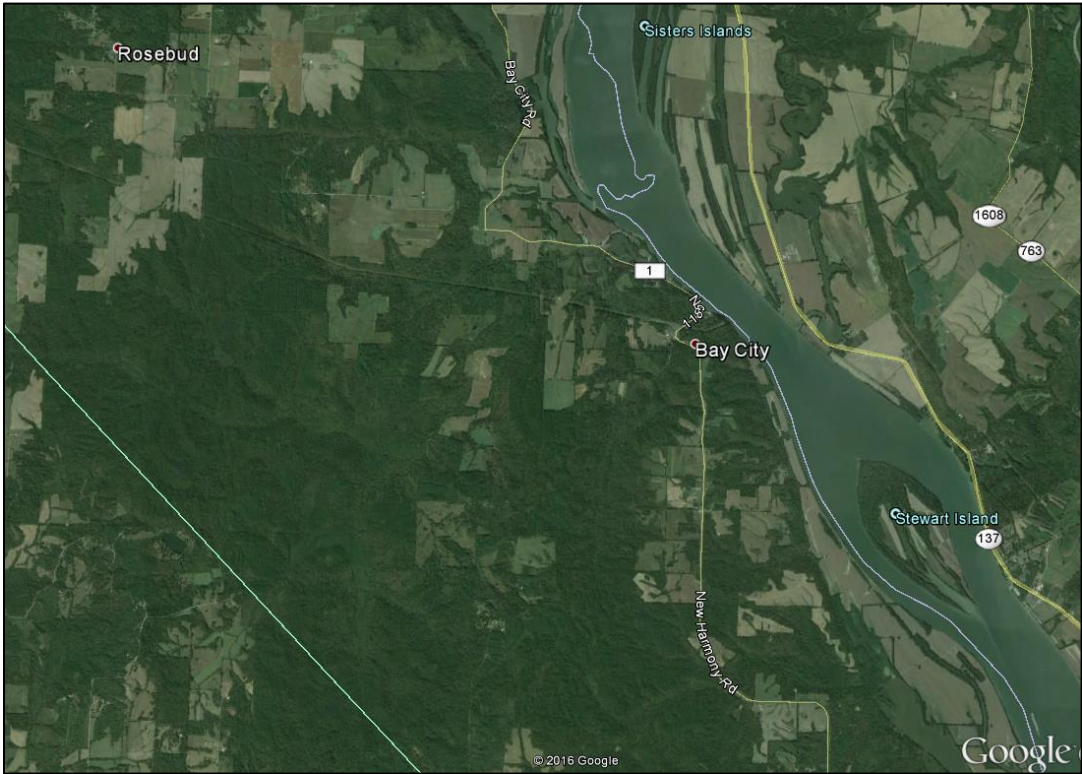


Figure 78. Location of Bay City relative to the Ohio River showing the large forested area to the west of the community.



Figure 79. Some Bay City homes are situated close to wooded lands at their rear.

---

## Action Items

The following is a list of priority action items for this community. Many of these action items are relevant across the planning area and as such are described in more detail in Table 4, and Table 7-Table 9.

- Defensible space projects should be implemented to encourage community-led defensible space practices and reduction of structural ignitability using Firewise materials and procedures. Priority areas are those homes located next to wooded stringers or homes immediately adjacent to grassland areas that are of high fire risk during fire season.
  - Water sources (ponds/lakes) and dry hydrants should be mapped and tested for functionality. New dry hydrants could be installed in areas lacking sufficient water for fire suppression.
-

## COMMUNITY VALUES AT RISK

Earlier compilation of the critical infrastructure in the planning area (see Map 7, Appendix A), 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 Figure 83 below). 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:

- Natural areas
- Native species
- Wildlife habitat
- Threatened and endangered species
- Wetland areas
- Agricultural lands (Figure 80)
- Timberland
- Game habitat
- Air quality
- Acid seeps
- Dixon Springs State Park
- Heron Pond
- Bell Smith Springs



**Figure 80. Agricultural lands and natural areas are highly valued by the Pope 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:

- Stores and businesses
- Cabins and campgrounds
- Horse camps
- Timber resources
- Trails and recreational infrastructure
- Signage
- Utility lines, infrastructure, etc.
- Fire departments
- Highways
- Schools
- Churches
- Rest homes, senior housing, day care, and other groups homes
- Water storage
- Communication sites, e.g., Williams Hill (Figure 81)
- Dixon Springs Airport
- Dixon Springs Agricultural Center



*Figure 81. Communication site on Williams Hill.*

## CULTURAL CVARS

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

- Golconda Historic District
- Cemeteries
- Churches
- Barns and other historic infrastructure from agricultural land uses (Figure 82)



***Figure 82. Historic barns are commonplace throughout Pope County and are valued by the community for the agricultural heritage that they represent.***

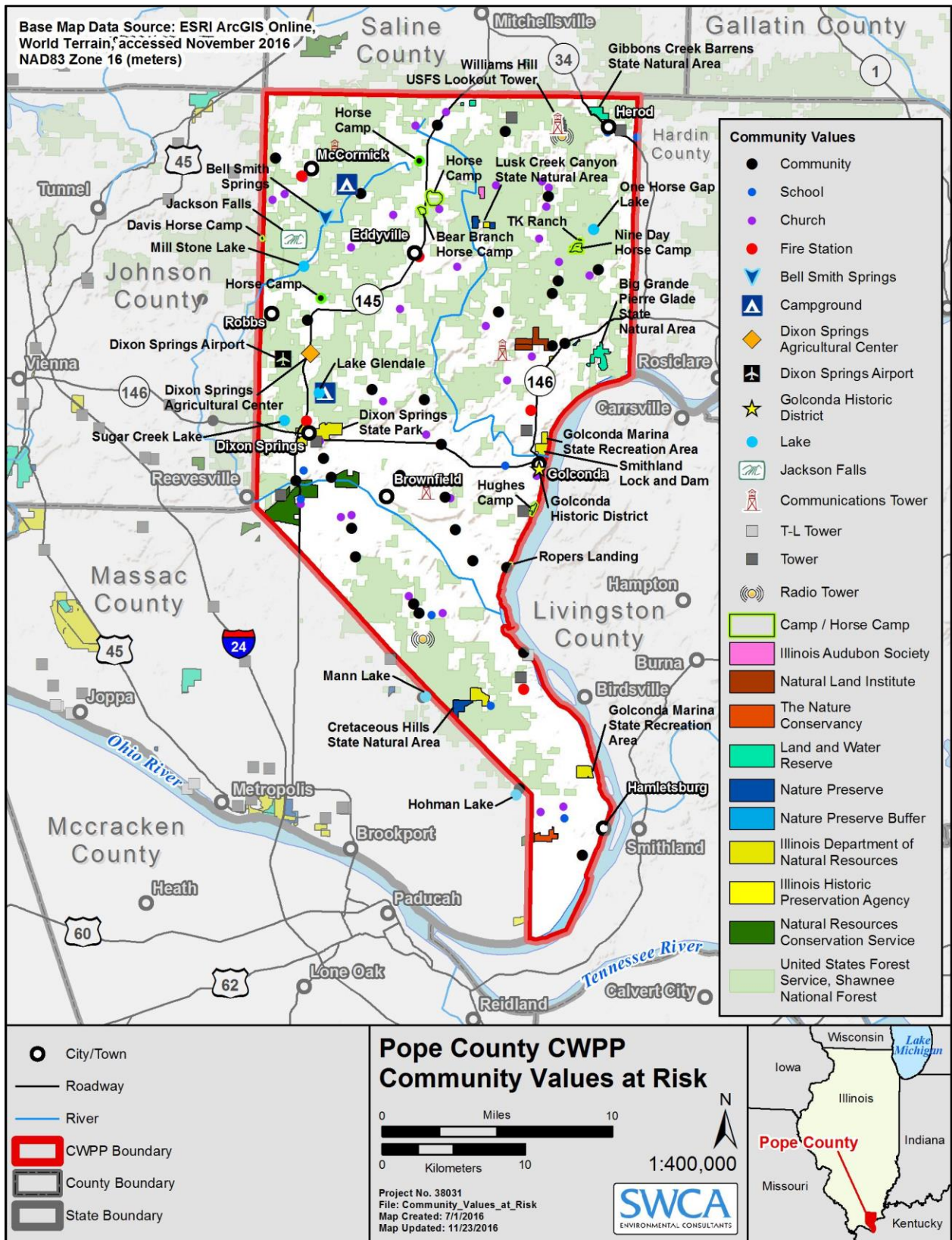
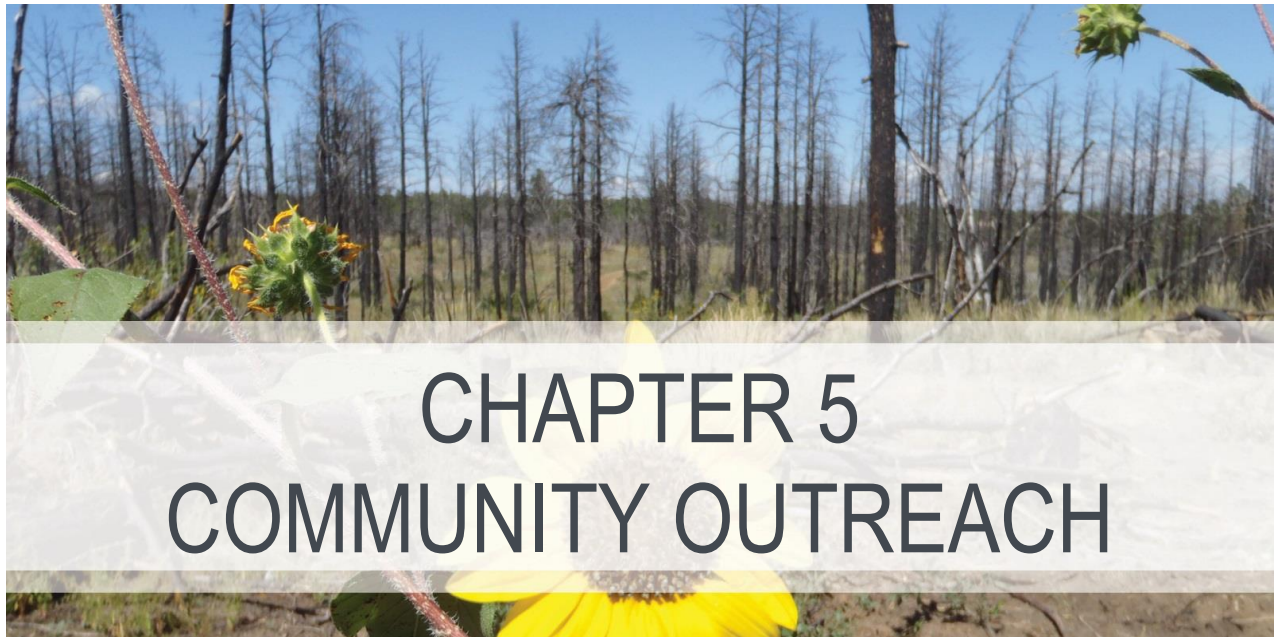


Figure 83. CVARs in Pope County.

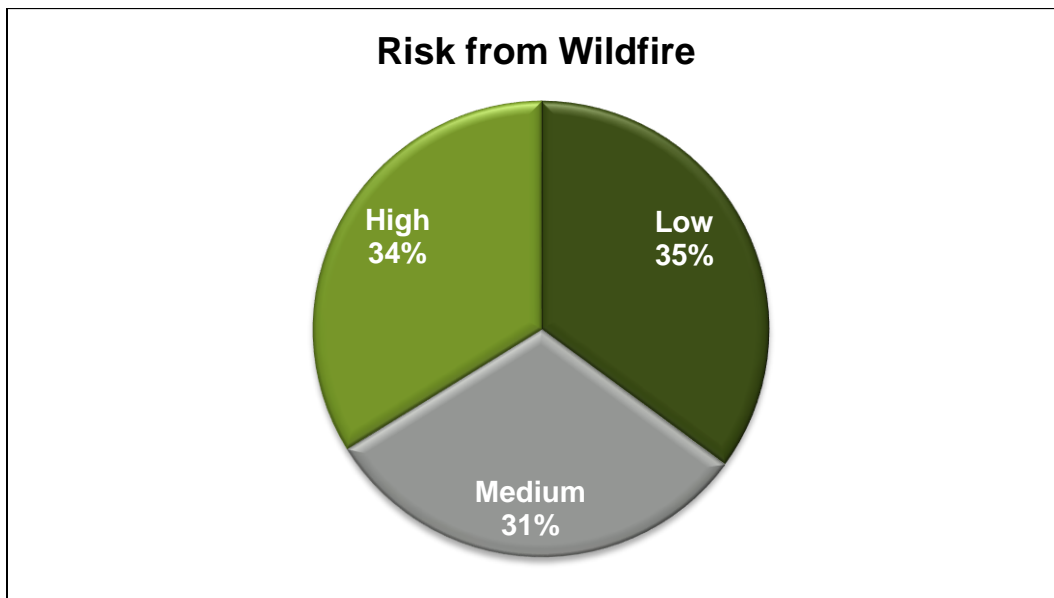


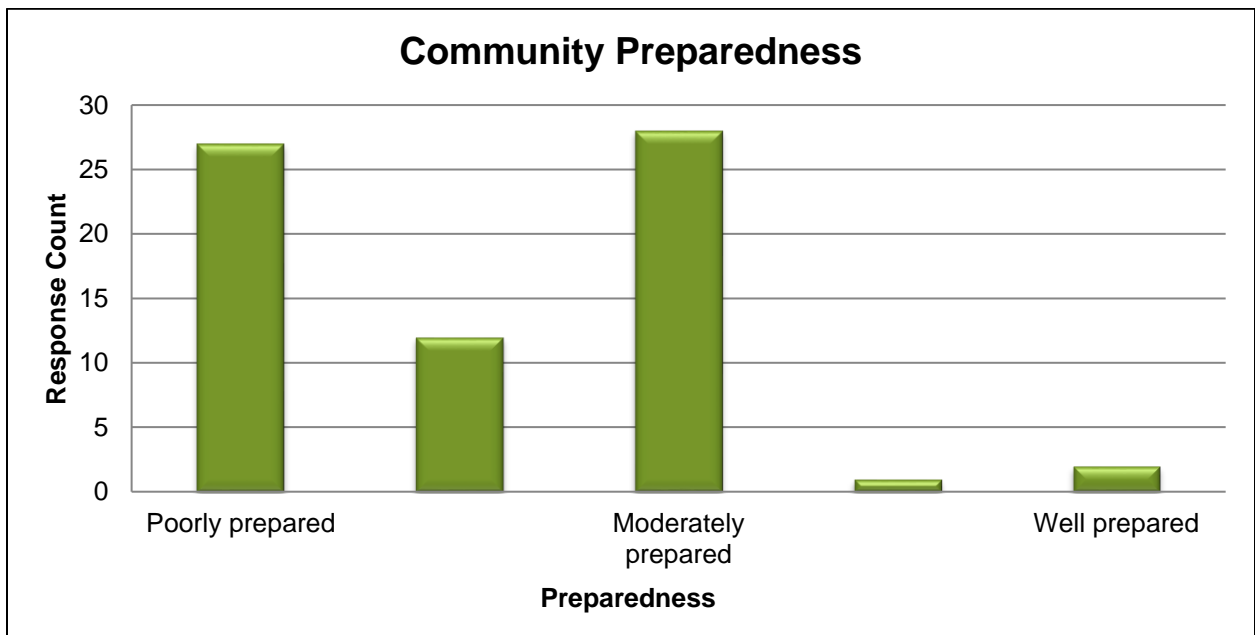
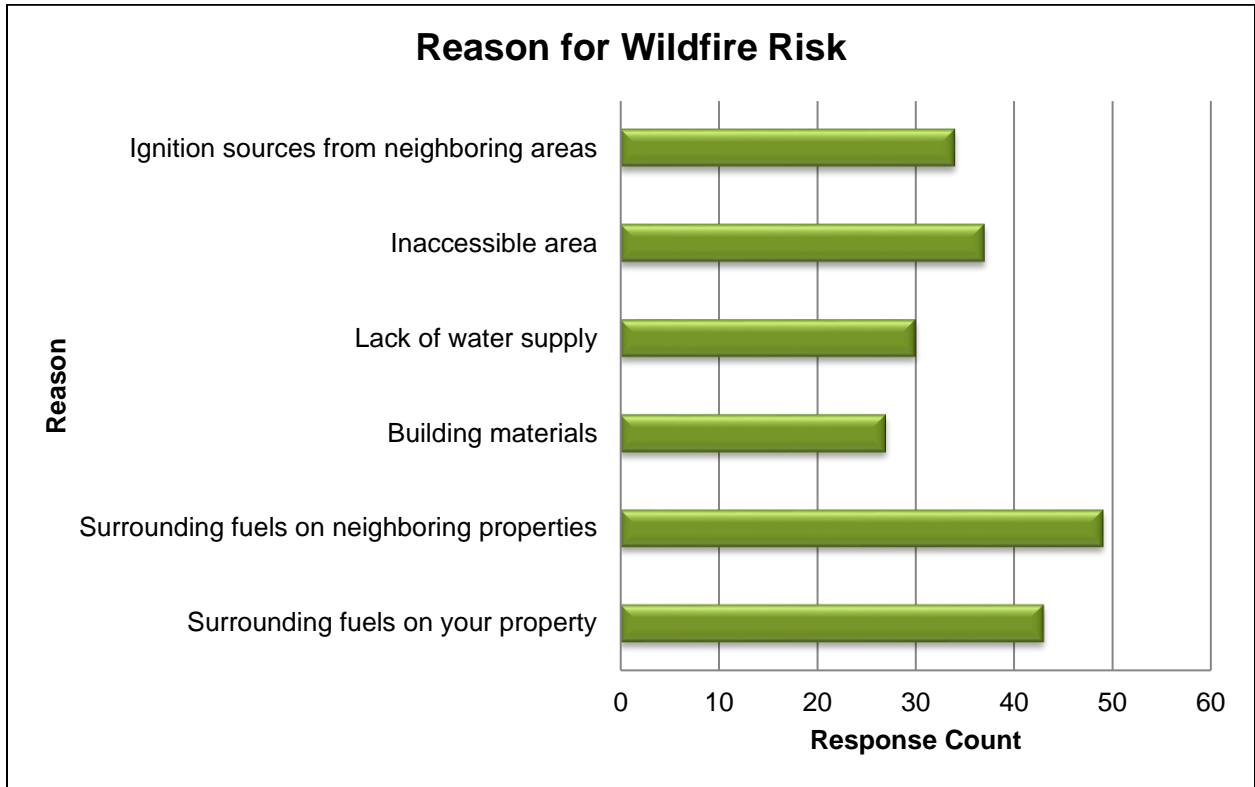
# CHAPTER 5 COMMUNITY OUTREACH

## COMMUNITY SURVEY, WEBINAR, AND SOCIAL MEDIA

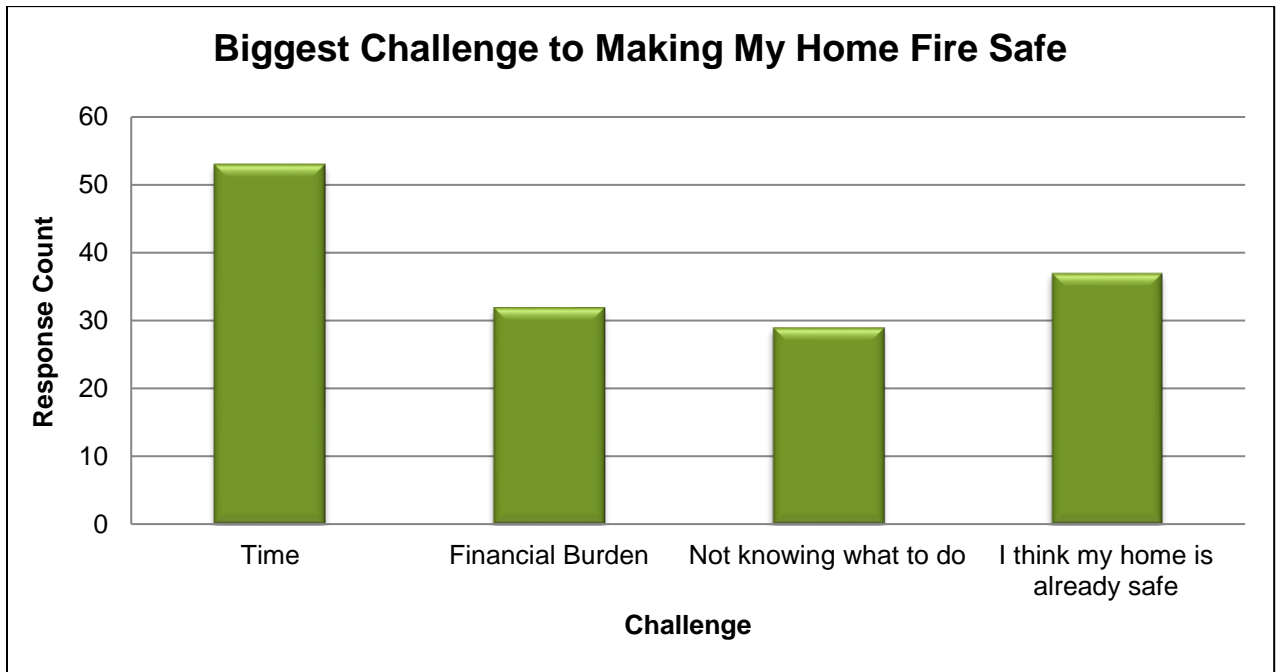
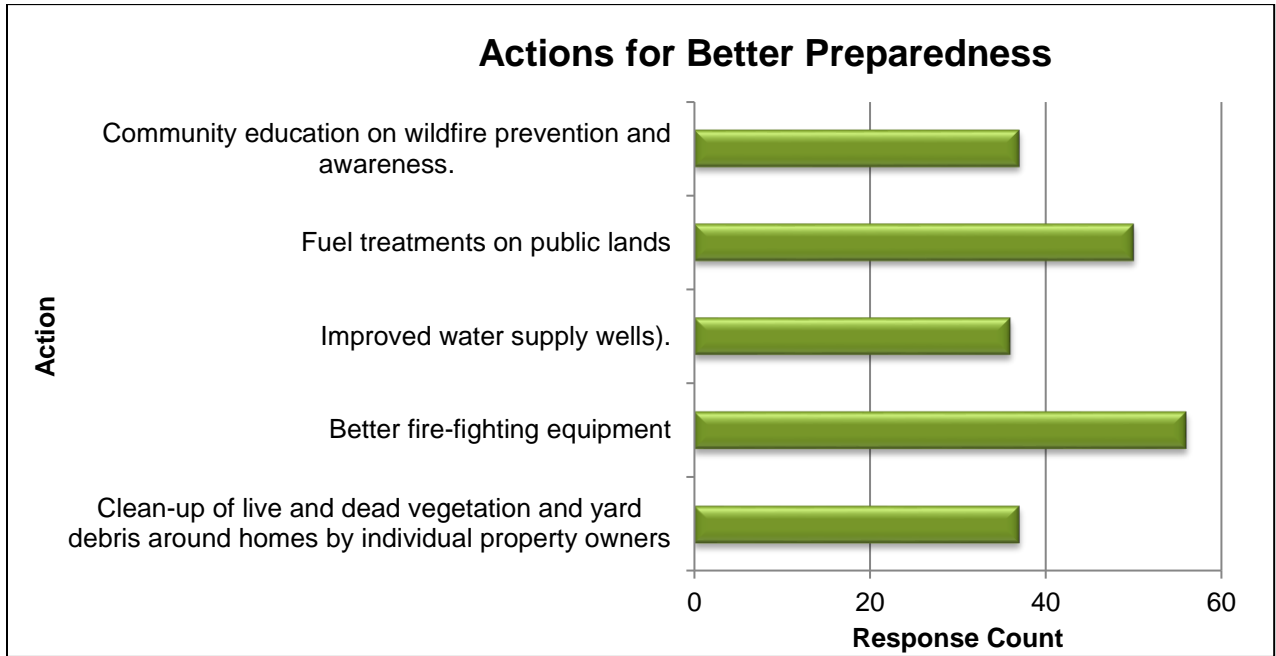
### COMMUNITY SURVEY

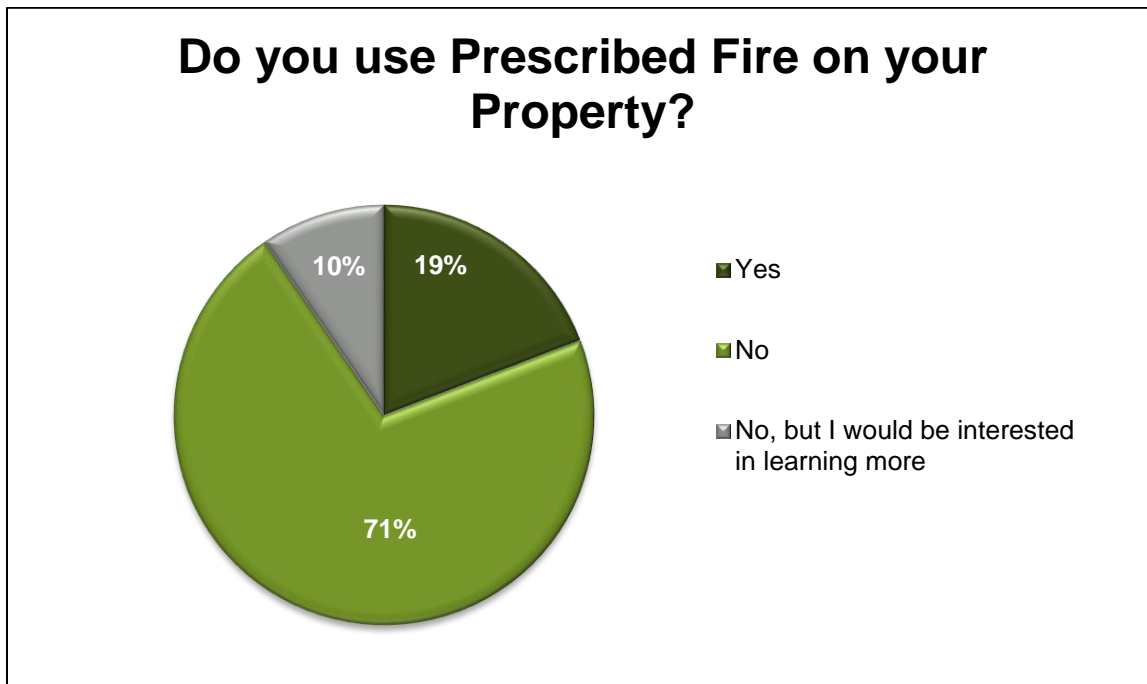
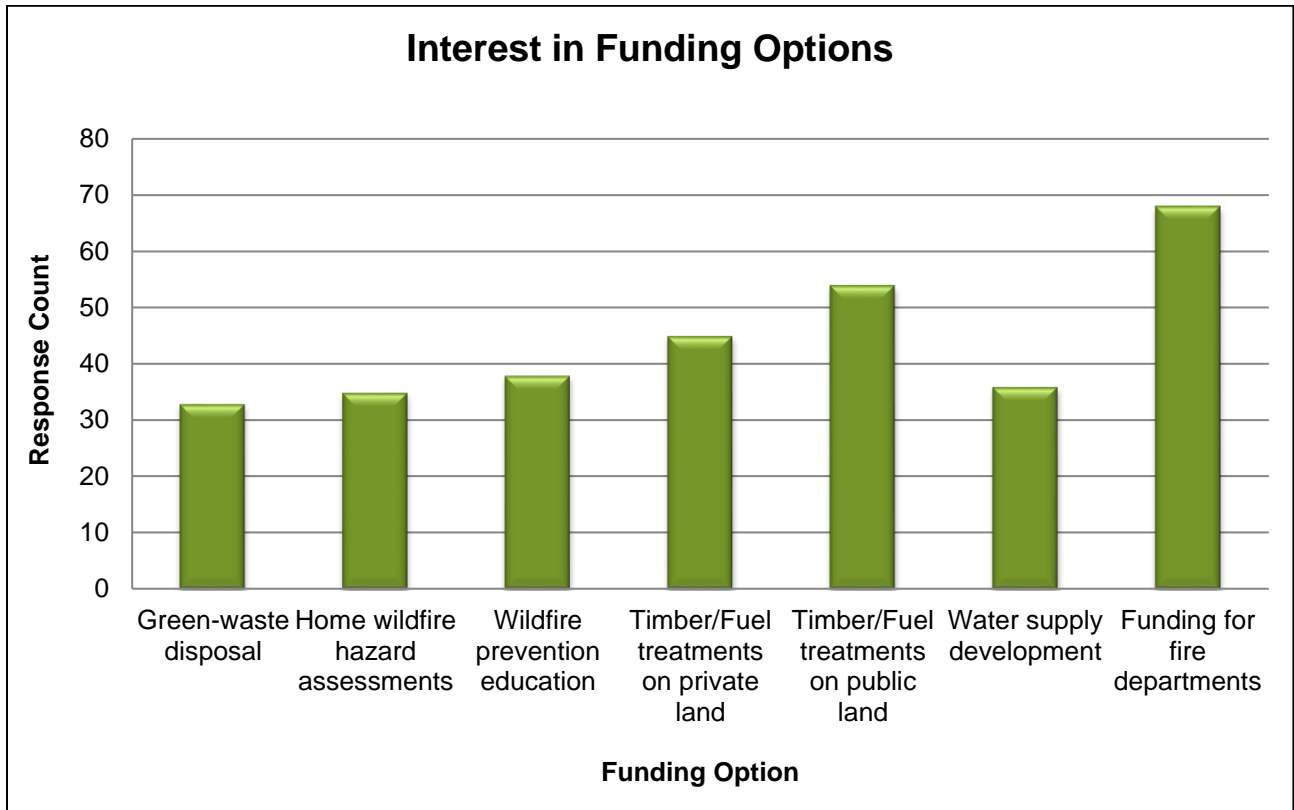
An online survey was developed for this project in order to gather feedback from the community on wildfire concerns, assistance that the community needs to reduce wildfire risk and barriers to action. The following is a summary of the results of the community survey. Seventy-four residents responded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











## **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/PopeCountyWildfirePlan/>.

## **FALL FESTIVAL PUBLIC OUTREACH EVENT**

The CWPP contractor (SWCA) manned an informational booth at the Golconda Fall Festival on October 9, 2016, in order to discuss the CWPP with the public and solicit feedback. During that event the public was asked to review the WUI map, answer the community survey and provide additional comments regarding concerns for wildfire risk and hazard in Pope County. The public was invited to pick up Ready, Set, Go! literature and a tote bag.

## **FINDINGS OF PUBLIC OUTREACH**

The community survey, social media page, and the Fall 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**

There was no obvious pattern on how the community perceive their fire risk with answers fairly evenly divided between low, moderate, and high risk. This could be because the survey was successful in reaching a good cross-section of the community, i.e., respondents were split evenly between urban areas that have less perceived risk of wildfire due to a limited area in the WUI (e.g., Golconda and Eddyville), WUI areas that have less direct adjacency to public lands and forest fuels (e.g., Brownfield and Bay City), and WUI areas that are more remote or more closely intertwined with the forest landscape and therefore have a greater perceived wildfire risk (e.g., Rosebud, Herod).

---

Many community members attribute wildfire risk to surrounding fuels on both public and private lands, as well as the accessibility of their community. In contrast building materials, water supply, and ignition are not considered as important when it comes to weighing their risk.

---

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 increased clean-up of fuels on private and public lands. 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. Community education was considered the least important factor to improving fire preparedness suggesting that the community already feel well informed regarding preparedness.

---

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 funding to treat fuels on public and private lands. 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. Almost 20% of respondents said they were using prescribed fire and of the remainder almost 10% of people 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:**

Some rural roads are not well maintained preventing use of them for accessing wildfire and preventing fire spread.

Absentee landowners are becoming prevalent. Residents questioned what can be done to maintain their land in their absence?

One resident suggested that there is a need for a countywide initiative to clean up properties to reduce wildfire hazard. This sentiment appears to be common based upon the survey results that suggests cleanup of personal and neighboring property is important in reducing existing wildfire risk.

One resident is seeking more access to USFS lands for hunting, stating that the USFS should resume maintaining feedlots as hunters help to boost the economy.

Although many residents factored education and outreach as less important in reducing wildfire risk, a number of residents did call for additional public education in order that individual home and property owners can help themselves reduce their risk instead of depending on outside resources. There does appear to be a dependence from many residents on the Pope County Fire Department to suppress a fire as opposed to prevent the fire, based on the call for additional firefighting equipment and equipment upgrades.

Residents place immense value on the Shawnee National Forest and many called for protection of the forest from wildfire. Suggestions on how to protect included fuel treatments and better fire prevention signage placed along roadways.

A number of residents and the Core Team mentioned the value of utilizing the Golconda Job Corp as a firefighting resource for the county. This is an ongoing process in the county being spearheaded by state and federal partners.

**Input Gathered at the Fall Festival**

Residents expressed concern that farm fields are being sold, and they are no longer in production. It is common for hunters to buy previously farmed land. In some cases, the hunters continue to farm a small portion of the land for wildlife. The remaining portion of the farm field is allowed to become overgrown with shrubs and small trees. This could be a fire hazard during dry weather or drought conditions.

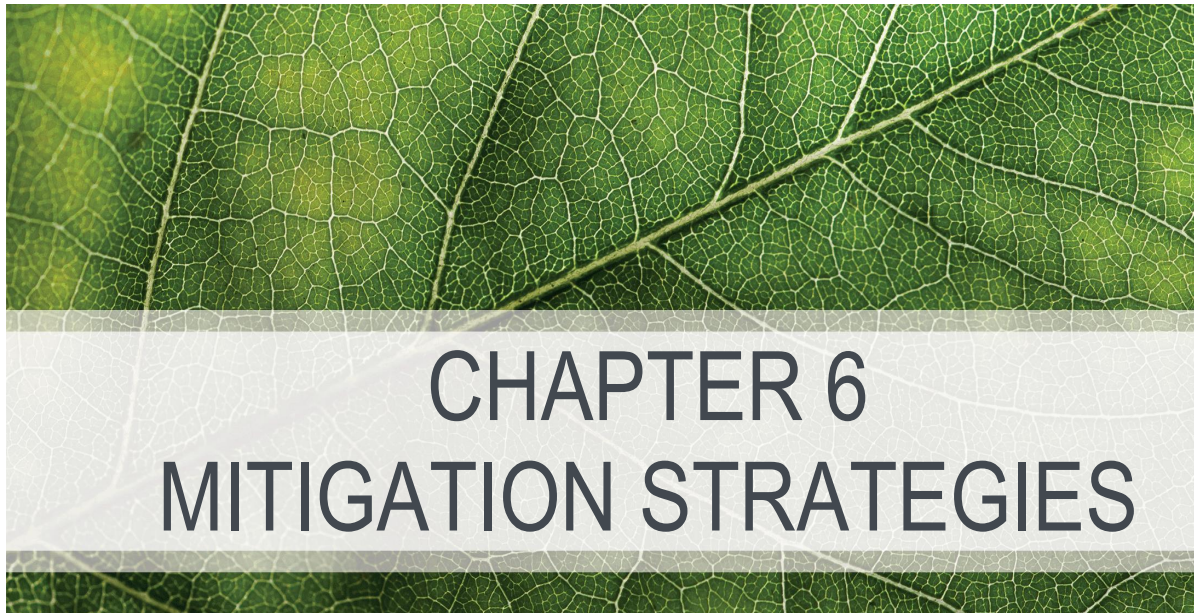
A number of community members commented on the Pope County Fire Department stating that it is a VFD consisting of good people; however, they could use more training and greater long-term planning for future growth and sustainability, particularly as volunteers leave or retire from the department.

A Pope County 911 dispatcher provided comments regarding the need for improved mapping of county roads to help expedite responses. Some roads are not well signposted or are not familiar to responders, so a more detailed map of grid system may be needed to resolve the situation.

A campground host from Lake Glendale noted specific concerns about the lake that could also be applied to the other lakes and recreation sites in the county: There is a need for fire sheds to be posted throughout the campgrounds to house basic firefighting equipment.

**Input Received during Public Review**

A landowner in adjacent Hardin County raised concerns regarding public health issues with lingering smoke from prescribed fire. The landowner is also concerned about the environmental impacts of burning, i.e., “carbon monoxide placed into the atmosphere.” The landowner suggests that the conversion of oak-hickory forests to beech cannot be reversed by the small amount of prescribed burning completed by the USFS.



## RECOMMENDATIONS AND ACTION ITEMS

This chapter addresses four different types of recommendations: 1) fuels reduction projects, 2) public education and outreach, 3) actions homeowners and communities can take to reduce structural ignitability, and 4) actions to improve firefighting capability. These recommendations are based on Core Team input, public outreach, the Composite Risk/Hazard Assessment, and the Community Risk/Hazard Assessment. The recommendations are general in nature to provide maximum flexibility in implementation.

## RECOMMENDATIONS FOR FUELS REDUCTION PROJECTS

The purpose of any fuels reduction treatment is to protect life and property by reducing the potential for 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.

Fuels should be modified with a strategic approach across Pope 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 4 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 4 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 lands.

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 the Northeastern Area State and Private Forestry Cohesive Fire Strategy. These funds are designed to be used to address the Northeastern Region goals outlined on page 8 of this document but also available at the following link: [http://www.na.fs.fed.us/fire/rfp/files/WRR-WR-RFP%20FY-2017\\_Guidance\\_FINAL\\_20161108.pdf](http://www.na.fs.fed.us/fire/rfp/files/WRR-WR-RFP%20FY-2017_Guidance_FINAL_20161108.pdf).

For an additional list of funding sources please refer to Appendix H.

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 PCCWPP planning area as they change in risk category over time.



**Table 4. Fuels Reduction Treatment Recommendations**

PROJECT DESCRIPTION	LOCATION	LAND OWNERSHIP	METHOD AND GOAL	TIMELINE	RESOURCES/ FUNDING SOURCES AVAILABLE	PRIORITY
Roadside thinning along access roads and evacuation routes with scheduled maintenance to improve sustainability.	All communities where appropriate. Priority areas: Rosebud, Temple Hill, Bushwack Road, Mann Lake, Hohman Lake.	Private and USFS lands	Reduce fuel loading along roadways in order to mitigate potential ignitions from 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 over grown 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
Increase small diameter wood utilization.	Countywide	All jurisdictions	Develop wood product related industry for small diameter timber.	Long-term goal- over the next decade.	USFS Wood Innovations Program: <a href="http://www.na.fs.fed.us/werc/wip/2017-rfp.shtm">http://www.na.fs.fed.us/werc/wip/2017-rfp.shtm</a> IDNR Forest Products Industry Assistance	Low

PROJECT DESCRIPTION	LOCATION	LAND OWNERSHIP	METHOD AND GOAL	TIMELINE	RESOURCES/ FUNDING SOURCES AVAILABLE	PRIORITY
Build additional landscape-level treatments to support Illinois Forest Action Plan goal of oak-hickory forest restoration.	Countywide	All jurisdictions	<p>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, and SIPBA to increase collaboration across boundaries.</p> <p>Utilize the risk assessment to help locate priority areas within the WUI.</p> <p>Appoint a chair and a representative responsible for seeking grant opportunities.</p>	<p>High priority due to goals of the IFAP.</p> <p>Quarterly meeting of working group.</p>	<p>IDNR Urban and Community Forestry Program</p> <p>IDNR Forest Protection and Health Management</p> <p>IDNR Rural Forest Landowner Assistance:</p> <p><a href="https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf">https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf</a></p> <p>RC&amp;D:</p> <p><a href="http://www.shawnercd.org/currently-funded-grants">http://www.shawnercd.org/currently-funded-grants</a></p> <p>Northeastern Area State and Private Forestry Cohesive Fire Strategy funds</p>	High
Design and implement insect and disease focused treatments to combat existing and potential threats to native species.	Countywide	USFS, IDNR	<p>Design and implement treatments to combat: EAB, episodic oak decline after drought that would create an increased fuel hazard over the next decade or more. Continue to implement annual monitoring flights to identify and map badly hit areas.</p>	<p>Medium to long term; seek to develop plan out 10 years to address potential future threats.</p>	<p>IDNR Forest Protection and Health Management</p> <p>IDNR Special Wildlife Funds Grant Program:</p> <p><a href="https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx">https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx</a></p>	Moderate

PROJECT DESCRIPTION	LOCATION	LAND OWNERSHIP	METHOD AND GOAL	TIMELINE	RESOURCES/ FUNDING SOURCES AVAILABLE	PRIORITY
<p>Develop integrated treatments across jurisdictions to serve wildlife habitat and fuel reduction goals.</p>	<p>Countywide</p>	<p>All jurisdictions</p>	<p>Follow treatment guidelines for threatened and endangered species, i.e., timing of treatment and proximity of treatment to vernacular: Northern long-eared bat, gray bat, and Indiana bat. Utilize the Central Hardwoods Joint Venture Model to provide multi-benefit for same actions.</p> <p>Prioritize treatments utilizing the Illinois Forest Action Plan priority zone areas and the CWPP Risk Assessment high and extreme areas.</p>		<p>IDNR Urban and Community Forestry Program IDNR Forest Protection and Health Management IDNR Rural Forest Landowner Assistance: <a href="https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf">https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf</a> IDNR Special Wildlife Funds Grant Program: <a href="https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx">https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx</a> Illinois Wildlife Preservation Fund: <a href="https://www.dnr.illinois.gov/grants/Pages/IllinoisWildlifePreservationFund.aspx">https://www.dnr.illinois.gov/grants/Pages/IllinoisWildlifePreservationFund.aspx</a> USFS Hazard Fuels Grants Northeastern Area State and Private Forestry Cohesive Fire Strategy funds</p>	<p>Moderate</p>

PROJECT DESCRIPTION	LOCATION	LAND OWNERSHIP	METHOD AND GOAL	TIMELINE	RESOURCES/ FUNDING SOURCES AVAILABLE	PRIORITY
<p>Develop action plan for landscape treatment of invasive species to reduce impacts of infestation on fire hazard.</p> <p>Target species: Stiltgrass, Japanese honeysuckle, Oriental bittersweet, phragmites, tree of heaven</p>	<p>Countywide Priority areas: Acid-seeps in southern Pope County Natural areas WUI areas, with primary focus on western edge of communities</p>	<p>All jurisdictions-encourage landscape level treatments on private lands through NRCS, River to River CWMA, and SIPBA outreach. Utilize existing networks created through the Southern Illinois Invasive Species Strike Team and CWMA.</p>	<p>Work closely with the River to River CWMA and Southern Illinois Invasive Species Strike Team to develop action plan for control of stiltgrass and Japanese honeysuckle on a landscape scale and/or watershed scale throughout the county.</p> <p>Consider pre-treatment of areas scheduled for timber stand improvement and prescribed burning.</p>	<p>High priority in order to address existing and potential future threats. Implement in 2017.</p>	<p>IDNR Urban and Community Forestry Program IDNR Forest Protection and Health Management IDNR Rural Forest Landowner Assistance: <a href="https://www.dnr.ilinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf">https://www.dnr.ilinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf</a> IDNR Special Wildlife Funds Grant Program: <a href="https://www.dnr.ilinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx">https://www.dnr.ilinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx</a> RC&amp;D: <a href="http://www.shawnercd.org/currently-funded-grants">http://www.shawnercd.org/currently-funded-grants</a> CWMA education and public awareness, early detection, prevention, control, and management</p>	<p>High</p>

PROJECT DESCRIPTION	LOCATION	LAND OWNERSHIP	METHOD AND GOAL	TIMELINE	RESOURCES/ FUNDING SOURCES AVAILABLE	PRIORITY
<p>Promote increased use of prescribed fire on private forest lands to promote landscape-scale restoration of oak-hickory forest.</p> <p>Include planning for treatment monitoring and maintenance.</p>	<p>Countywide</p> <p>Priority areas: as delineated in the IFAP</p>	<p>All jurisdictions</p>	<p>Continue the existing collaboration between SIPBA, USFS, IDNR, CWMA, RC&amp;D, and others to build better cross-border collaboration for landscape level prescribed fire treatments.</p> <p>Build on enthusiasm of residents (voiced in survey) to increase private partners in the SIPBA network.</p> <p>Seek additional funding to support SIPBA's work with private landowners.</p> <p>Pursue additional grants that would allow continued monitoring and maintenance burns.</p> <p><i>Maintenance cycles for treatments:</i></p> <p><i>Repeat treatment 2–5 years for prescribed fire.</i></p> <p><i>Invasive species treatment: annual return to start and then maintenance.</i></p> <p><i>2–4 entries and then back off (timber)</i></p> <p><i>Grassland and shrubs: 2 year cycle.</i></p> <p><i>Thinning treatments follow up with fire every 2–5 years; 10–15 years thinning again.</i></p>	<p>High priority given the continued decline of forest health in the county and succession to beech and maple forests.</p> <p>Ongoing.</p>	<p>NRCS Regional Conservation Partnership Program- <a href="https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/">https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/</a></p> <p>IDNR Rural Forest Landowner Assistance: <a href="https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf">https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf</a></p> <p>IDNR Special Wildlife Funds Grant Program: <a href="https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx">https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx</a></p> <p>RC&amp;D: <a href="http://www.shawnercd.org/">http://www.shawnercd.org/</a></p>	<p>High</p>

PROJECT DESCRIPTION	LOCATION	LAND OWNERSHIP	METHOD AND GOAL	TIMELINE	RESOURCES/ FUNDING SOURCES AVAILABLE	PRIORITY
<p>Improve promotion to the public of forest improvement plans (FIPs) or forest stewardship plans and seek additional funds to implement.</p>	<p>Countywide</p>	<p>All jurisdictions</p>	<p>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.                      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&amp;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.</p>	<p>High priority. Ongoing.</p>	<p>IDNR Rural Forest Landowner Assistance:  <a href="https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf">https://www.dnr.illinois.gov/conservation/Forestry/Documents/IFAssistanceProgram.pdf</a>                      IDNR Special Wildlife Funds Grant Program:  <a href="https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx">https://www.dnr.illinois.gov/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx</a>                      USFS Participating Agreements                      USFS Hazardous Fuels Grants                      State and Private Forestry Landscape Scale Restoration Grant                      RC&amp;D:  <a href="http://www.shawneercd.org/">http://www.shawneercd.org/</a>                      Northeastern Area State and Private Forestry Cohesive Fire Strategy funds</p>	<p>High</p>

PROJECT DESCRIPTION	LOCATION	LAND OWNERSHIP	METHOD AND GOAL	TIMELINE	RESOURCES/ FUNDING SOURCES AVAILABLE	PRIORITY
Create new or maintain existing fuel breaks on the western edge of communities	High and extreme risk areas in the CWPP planning area.	Federal and state lands	<p>Strategically place treatments on public land to improve effectiveness. Fuel break prescriptions should be site-specific, depending on fuel type, topography, soils, and adjacent land management practices. Examples include mowing and blading strips along fence lines or shaded fuel breaks.</p> <p>Help mitigate extreme fire behavior and provide an area from which firefighters can safely suppress a fire.</p> <p>Regular maintenance needed to ensure access is clear of vegetation or obstructions including stumps that impact access by emergency vehicles. Monitoring should occur prior to fire season (January).</p>	2017–2018	<p>National Fire Plan Rural Fire Assistance</p> <p>FEMA Hazard Mitigation Grant funding</p> <p>FEMA Pre-disaster Mitigation funding</p> <p>USFS Hazard Fuels Grants</p> <p>Northeastern Area State and Private Forestry Cohesive Fire Strategy funds</p>	High
Collaborate with power company to identify priority areas for treatment of right-of-way for power lines and communication lines using the CWPP Risk Assessment for planning area.	Utility company right-of-way through forested state and federal lands.	Maintain clearance under power lines and around posts to prevent arching or downed trees impacting line.	<p>Power company will have established standards and actions are ongoing currently but prioritizing the most at risk areas could improve efficiency.</p> <p>Action helps to prevent destruction of energy or communications infrastructure in event of fire.</p> <p>Regular maintenance needed to ensure lines are clear of vegetation.</p>	Annual monitoring. Assess whether the current 3 year rotation is sufficient to maintain clearance.	Utility company funded	Moderate

Figure 84 illustrates past, present, and future conceptual fuel treatments on lands in Pope County. There has been a significant amount of treatment completed and planned throughout the County by State and Federal entities as well as private citizens. 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 lands that were identified as moderate to high risk for wildfire in the CWPP risk assessment and are delineated based upon vegetation type, roads, and drainage features on the landscape. 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.



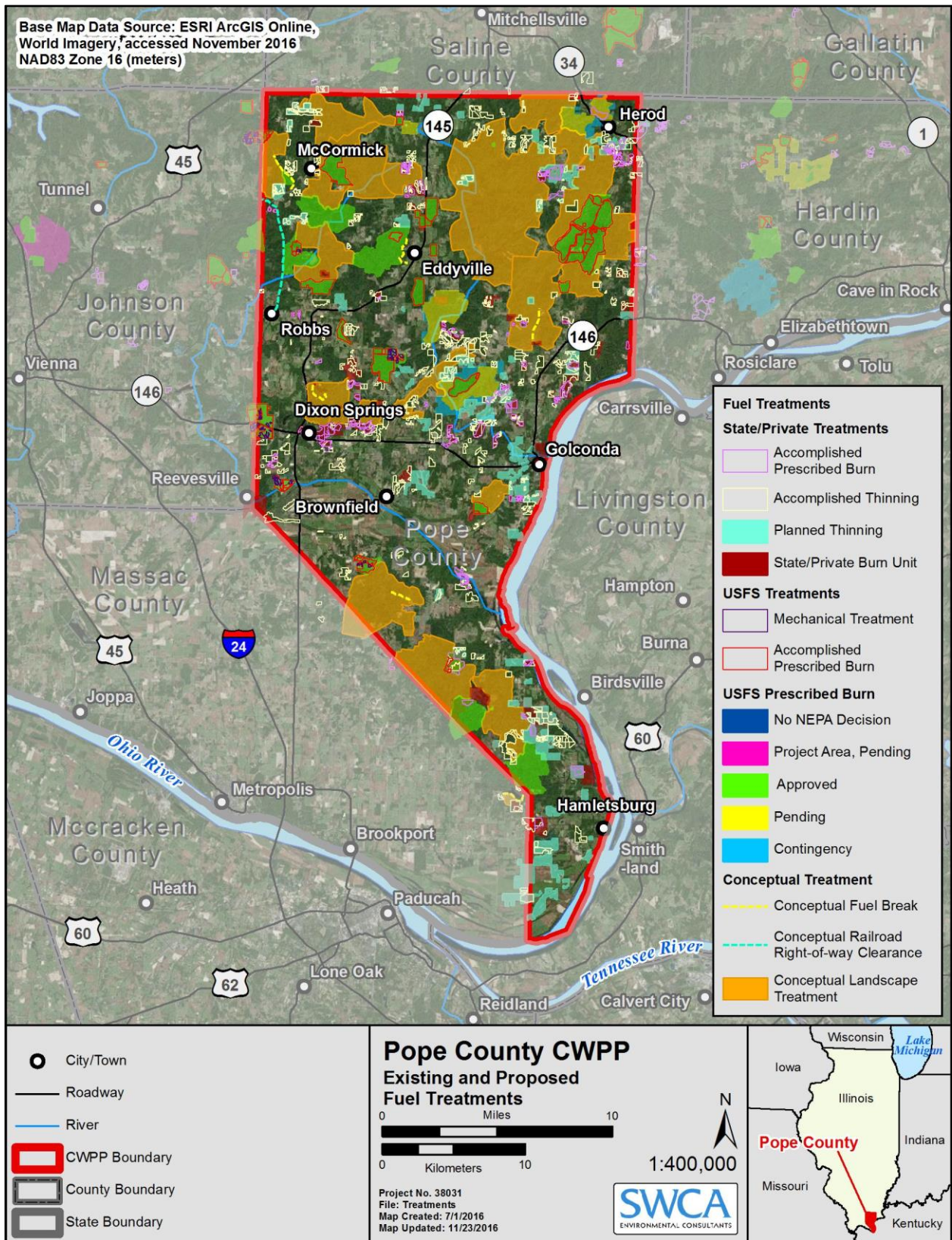


Figure 84. Existing and proposed fuel Treatments across all jurisdictions.

## FUELS TREATMENT SCALES

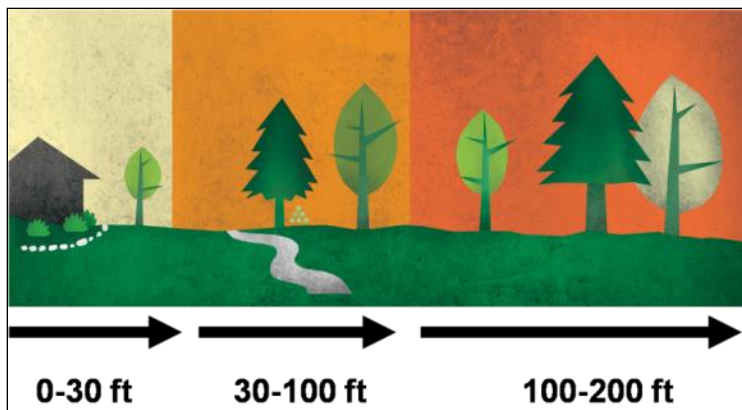
### DEFENSIBLE SPACE

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.

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 85).



**Figure 85. Defensible space zones. Source: [www.firewise.org](http://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. Firewise guidelines and the Homeowners Guide (Appendix I) are an excellent resource, 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 5).

**Table 5. 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 Pope County and region and have ongoing projects planned on public lands that are designed to reduce hazardous fuels to protect communities and resources, while restoring the declining oak-hickory forest community (see Figure 84). Consideration is needed as part of the wider planning process for landscape level fuel reduction, as to the condition of wilderness areas throughout the Shawnee National Forest and the need to implement restoration actions to enhance forest health in the wilderness.

## FUEL TREATMENT METHODS

Since specifics of the treatments are not provided in detail in Table 4, 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). 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. 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), and whole tree felling. These treatments allow for more precision than prescribed fire, and are often more cost-effective than manual 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. 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.

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, 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 Pope County (Figure 86).



**Figure 86. Post burn treatment area showing open understory.**

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.

Like prescribed fires, wildfires may also significantly decrease air quality across large areas because of the smoke they produce; however, during wildfires, nearby air quality monitoring stations are effectively switched off—the data are not included in daily emissions counts and do not impact whether the area is “in attainment.” This is because wildfires are not considered to be intentional. However, prescribed fires are always subject to air quality standards, so their use must be planned carefully to keep the smoke they produce at acceptable levels (Monroe et al. 2015). Although smoke from prescribed fires does impact communities, the short-term smoke impacts of prescribed fire under carefully controlled weather conditions are often much less than the potential smoke production of a more intense wildfire that could result from the buildup of heavy fuels.

### ***Burning across Borders***

Due to the complex landownership in Pope County, the Shawnee National Forest has, for the last 10 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 Pope 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. Maintenance of existing breaks could be more cost efficient than installation of new features.

---

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

---

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.

## RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

A third of Pope County residents perceive themselves to be at low 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 7 lists recommendations for improving public education and outreach.

Many residents could benefit from greater exposure to the Firewise Communities 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 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 7. Recommendations for Public Outreach and Education**

PROJECT	DESCRIPTION	PRESENTED BY	TARGET DATE	RESOURCES NEEDED	SERVES TO
Targeted wildfire info sessions	Review existing programs (Ready, Set, Go!, Firewise) for suitability of existing fire prevention materials and where necessary fund development of unique adapted materials and presentations to highlight how a fire might affect particular groups within the community.	USFS	Summer/Fall 2017	Funding for research, writing, and presentation of detailed information on how large-scale wildfire would affect the target audience and the measures that could be taken to reduce the threat. Flyers could be sent out with utility bills or other community mailings.	Deliver a clear and consistent message that impacts of wildfire are far-reaching and that it is in the best interest of a diverse set of stakeholders to become involved in planning and preparing for fire.
Fire departments open invitation days	Raise awareness of the Pope County Volunteer Fire Department and City of Golconda Volunteer Fire Department through open house and tours of equipment.	Pope County Fire Department, City of Golconda Fire Department	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.
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 Golconda Job Corps.	Fire Departments, Golconda Job Corp, USFS.	Spring 2017	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.
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 Emergency Management	Monthly column year-round	Columns, information, and articles to be provided by fire departments, towns, county, state representatives.	Protect communities and infrastructure through increasing public awareness and providing a channel for information regarding emergency fire response.
Radio announcements	Create public service announcements to be run during periods of elevated fire danger.	Agency Public Information Officers, Emergency Manager	Annually, seasonal	Radio contacts, Professional voice over person to create and record announcements.	Raise awareness of elevated fire danger.
Fire danger rating brochure	Create fire danger rating brochure that explains the fire danger rating signs and what the public should do at the different rating levels.	USFS	Spring 2018	Printing costs and distribution. Could be available as online resource to save on costs.	Raise awareness of elevated fire danger and inform residents of suitable actions.
Increase signage/replace or augment existing signage	Utilize existing signage to spread fire prevention message along highways and in public open space areas (trailheads, info kiosks) to reduce human ignitions.  Promote the use of existing electronic signs at firehouses and other locales to display fire prevention information, safety messages and fire danger rating linked to safety actions.	County	Summer 2018	Mostly existing signs and posting sites, people to post and update signs.  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.	Protect communities and infrastructure by raising awareness of local citizens and those traveling in the area about actions that can prevent fire.

PROJECT	DESCRIPTION	PRESENTED BY	TARGET DATE	RESOURCES NEEDED	SERVES TO
Promote and Increase the use of prescribed burning as a fuels 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, Pope County Fire Department, IDNR	Spring 2018	Prescribed burn prescription, type 6 engines, hand crews, equipment. Research and costs of producing <sup>1</sup> , printing, and distributing paper informational flyer.	Protect communities and infrastructure by reducing fuel loads.
Homeowner's guide	Develop a handbook that gives locally relevant and detailed information to help residents be more prepared for wildfire, including a defensible space checklist specific to local structural and wildland fuel considerations. Refer to Appendix I. Utilize local landscape and residence photos. Could include prescribed burn information as in project above.	Local fire departments, County Emergency Management	Fall 2017	Review existing materials for potential to adapt to local conditions. Funding to develop and print copies of the handbook. Volunteers to help distribute and explain the document.	Give residents detailed and locally specific tools that they can use to improve preparedness.
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. Ready Set Go Program	American Red Cross, town, county, state personnel VFDs, etc.	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.
Plan livestock evacuation routes and inform communities	Work with emergency management officials to plan evacuation routes for residents with livestock and then hold community meetings to disseminate to the public.	Emergency management officials, livestock agencies	Fall 2017	GIS software or maps.	Protect communities, livestock and infrastructure through increased awareness.
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.	County, VFDs, town, and state representatives. USFS PIO.	Spring 2018	Firewise materials, Smokey Bear literature, presenters.	Protect communities and infrastructure through increased awareness.
Increase outreach to communities regarding smoke management concerns from prescribed fire.	Smoke management concerns were raised during public outreach. Land management agencies should continue to engage with residents that have concerns regarding the public health impacts of prescribed fire smoke. Mitigation measures should be explored for example placement of smoke monitors at sensitive receptor sites. This could be combined with ongoing outreach efforts being carried out by SIPBA, the RC&D and others to build more collaboration for prescribed fire on private lands as described in cells above.	USFS, IDNR, SIPBA	Spring 2017	USFS Public Information Officer and other outreach personnel.	Reduce impacts to sensitive receptors within the community.

## RECOMMENDATIONS FOR REDUCING STRUCTURAL IGNITABILITY

Table 8 provides a list of community-based recommendations to reduce structural ignitability that should be implemented throughout the PCCWPP 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 lands 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>) and Firewise ([www.firewise.org](http://www.firewise.org)). 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 8. Recommendations for Reducing Structural Ignitability**

PROJECT	PRIVATE LANDS/ HOMEOWNER	PROGRAMS AVAILABLE	DESCRIPTION	POSSIBLE CONTACTS FOR MORE INFORMATION OR FUNDING	PRIORITY
Offer fire protection workshops	All residents would be encouraged to participate. Could work in cooperation with Pope County Fire Department and/or Golconda Job Corps.	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, and installing wire mesh over eaves, vents, and under decks.	<a href="http://www.firewise.org">www.firewise.org</a> , <a href="http://www.nfpa.org">www.nfpa.org</a> , <a href="http://www.wildlandfirersg.org">www.wildlandfirersg.org</a> , <a href="https://www.fema.gov/hazard-mitigation-grant-program">https://www.fema.gov/hazard-mitigation-grant-program</a> .	High 2017–2018
Individual home-hazard assessments	All residents would be encouraged to participate. Could work in cooperation with the Pope County Fire Department adopt a “train the trainer” approach to develop a citizen strike team.	Firewise Assessing Hazards in the Home Ignition Zone	Develop or train a team of citizens that could do home assessments. Could be tiered from workshops described above. Would build through word-of-mouth between neighbors. Pope County Fire Department could provide senior oversight and training.	<a href="http://www.firewise.org">www.firewise.org</a> , <a href="http://www.nfpa.org">www.nfpa.org</a> , <a href="http://www.wildlandfirersg.org">www.wildlandfirersg.org</a> , <a href="https://www.fema.gov/hazard-mitigation-grant-program">https://www.fema.gov/hazard-mitigation-grant-program</a> .	High 2017–2018
Develop a Firewise landscaping plant list for homeowners to use. Assess potential to develop a demonstration site.	Available to all residents through Pope County.	Firewise	Research Firewise plants suitable for the region.  Staff time to develop plant list, poster materials and research demonstration site.  Provide residents with an alternative landscaping option that enables them to maintain an aesthetically pleasing yard, while reducing flammability and risk of fire spread to property.	<a href="http://www.firewise.org">www.firewise.org</a>	Low 2018
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.	County Waste Management	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 Pope County and waste pick-up coordinated with the event.	Pope County	High 2017– 2018
Assess and improve accessibility to property	All residents would be encouraged to participate.	Pope County Fire Department	Weekend program to inform homeowners about the importance of keeping driveways accessible to fire trucks and emergency responders.	Pope County Fire Department, IDNR, seek community “spark plugs” to assist in coordination, Golconda Job Corp	Moderate 2017
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: <u>Low or no cost</u> – ensure house numbers are easily viewed from the street. <u>Medium cost</u> – annual clearance and thinning of trees and shrubs along driveways to facilitate safe access by emergency vehicles.	County, Pope County Fire Department	High 2017

**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. Since the 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.

## RECOMMENDATIONS FOR IMPROVING FIREFIGHTING CAPABILITIES

There are two fire departments that have district jurisdiction within the planning area, the Pope County Fire Department and the City of Golconda Fire Department. Both of these departments are run by volunteers. 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 9 provides recommendations for improving firefighting capabilities. Many of these recommendations are general in nature.

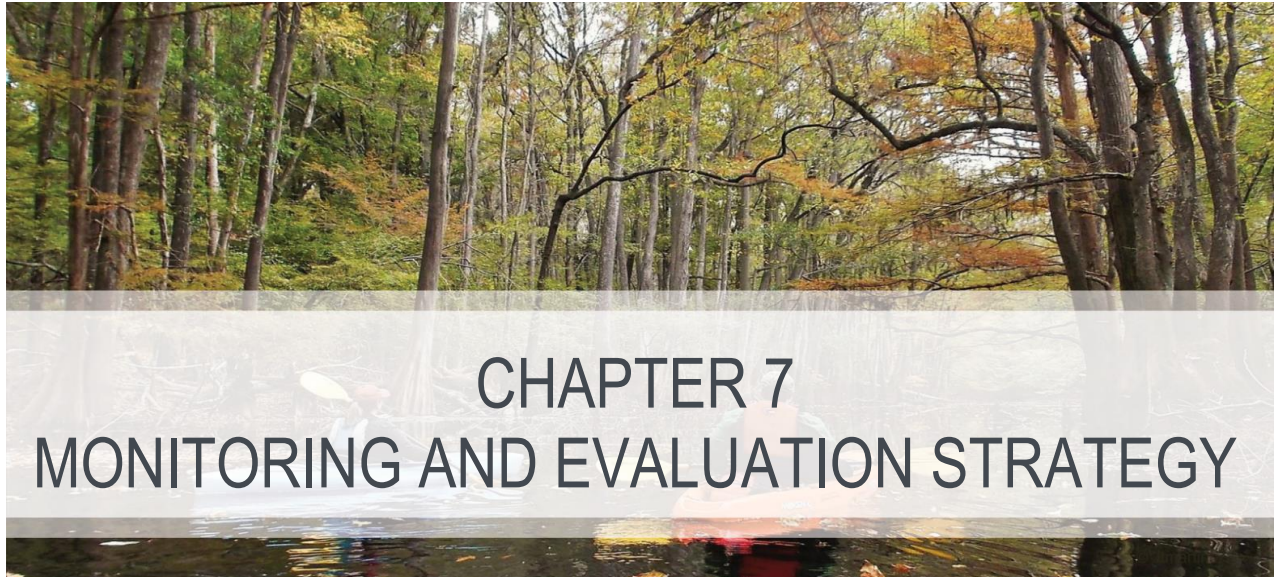
**Table 9. Recommendations for Improving Firefighting Capabilities**

PROJECT	FIRE DEPARTMENT	DESCRIPTION	TIMELINE	CONTACT	PRIORITY
Provide minimum wildland personal protective equipment (PPE) for all firefighters in Pope County and City of Golconda Department.	Pope County and City of Golconda	Seek grant money to be spent on acquisition of PPE. Task a member of each district 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.	Very high
Increase the number of "red-carded" individuals in the Fire Departments.	Pope County and City of Golconda	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 Pope County wide refresher.	Annually, or following recruitment drives	USFS, IDNR, SIPBA, Pope County Fire Department, City of Golconda Fire Department.	Very high
Define specific qualification needs for each district.	Pope County and City of Golconda	Determine qualification needs and provide training to accomplish needs; e.g., in three years this department would like to have x Type II firefighters, x squad leaders, x driver/operators, x engine bosses..... This would aid in recruiting strategies, resource allocations, and mutual aid.	Project out 3 years	Fire Chief	High
Carry out detailed pre-incident planning for remote communities that may be subject to slow response times.  Priority areas: Rosebud, Herod, Temple Hill, Mann Lake, Hohman Lake.	Pope County	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.	Annually during winter months	USFS, Pope County Fire Department, Massac County Fire Department	Very high

PROJECT	FIRE DEPARTMENT	DESCRIPTION	TIMELINE	CONTACT	PRIORITY
Increase VFD recruitment (diversify age classes).	Pope County and City of Golconda	Target fire education in schools 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	Pope County Fire Chief, school districts, Public Information Officers	High
Increase funds for VFDs.	Pope County and City of Golconda	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 (RFA) SAFER VFD Assistance	High
Install global positioning system (GPS) tracking systems on all vehicles.	Pope County and City of Golconda	In order to track fire department vehicles and improve oversight install GPS tracking on all vehicles.	Fall 2017	Pope County Fire Department RFA, SAFER	Low
Improved communication between agencies and dispatch.	Pope County and City of Golconda, USFS, 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".	Spring 2017 and then annual	Pope County Fire Department, City of Golconda Fire Department, USFS, Saline County Dispatch, IDNR.	High
Improve mapping for fire responders.	Pope County Fire Department and Dispatch	Print large format detailed road maps to be posted at each station and supplied to each firefighter as well as to dispatch. Utilize a coordinate grid system and road name index to label smaller roads. Print on high quality paper- waterproof if possible.	Spring 2017	Saline County Dispatch, Pope County Emergency Management	High
Map and test dry hydrant systems.	Pope County Fire Department in cooperation with NRCS	Locate existing dry hydrants and map locations- provide to fire departments- and/or install new dry hydrants in areas with minimal water supply for suppression.	Spring 2018	NRCS, Environmental Quality Incentives Program (EQIP), USFS, DNR.	High

PROJECT	FIRE DEPARTMENT	DESCRIPTION	TIMELINE	CONTACT	PRIORITY
Improve radio communication between responders.	USFS, Pope County Fire Department, Dispatch	Seek funding for programmable radios to improve communication between agencies.  There is currently a lack of interoperability of systems. Training component would be needed.  Convene a workshop for all operators	Fall 2017	USFS, IDNR, Pope County Fire Department, City of Golconda Fire Department	High
Utilize Job Corps Civilian Conservation Centers for fire crews: Golconda Job Corp.	Pope County Fire Department, City of Golconda Fire Department	The USFS is currently hiring a position to train the Job Corp students. Need to be able to address issue of rapid turnover to the Corp. Goal is that by end of 2017 there may be half dozen responders from Golconda to bolster the depleted City Fire Department.	Spring 2017	USFS, Pope County Fire Department, City of Golconda Fire Department	High
New Fire Station for Rosebud and Herod Communities.	Pope County Fire Department	Rosebud and Herod have been identified as two communities with excessively long response times due to their remote location. The Pope County Fire Department has identified as a priority the need for two new stations to serve these communities.  Would also need to recruit volunteers to service these stations.	Spring 2018	Pope County Fire Department  Department of Homeland Security Funding: Pre-Disaster Mitigation and Assistance to Firefighters Grant Program.	High
Improved road mapping and house numbering.	Pope County	There is a need for improved mapping with associated house numbers actually signposted on the road. Would alleviate confusion and delay by responders due to unfamiliar house numbering.  A new E911 System is being installed- will help with number designation.	Spring 2017	County	High
Mandatory house numbering.	Pope County	Seek grant funding to support standardization of address markers throughout Pope County using reflective numbers. Community ordinance could require that all residents are required to have reflective house number. Currently Pope County has numbers for purchase (for \$15), a grant could help subsidize this cost.	Summer 2017	County	High
Greater enforcement of burn permitting.	Pope County	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 2017	County	High

PROJECT	FIRE DEPARTMENT	DESCRIPTION	TIMELINE	CONTACT	PRIORITY
Installation of fire boxes at all recreation areas (as is proposed for Lake Glendale).	Depends on agency managing lands	Managers at Lake Glendale are installing fire boxes to house fire equipment around the lake. Additional boxes are needed for Lake Glendale and the same model could be applied across Pope County for other recreation areas.	Fall 2017	County, USFS, IDNR	High



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 PCCWPP. Table 4 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 all 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 10 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 10. Recommended Monitoring Strategies**

STRATEGY	TASK/TOOL	LEAD	REMARKS
Photo 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 Photos

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, GPS-recorded locations and photographs are 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 are encouraged to meet on an annual basis to review the project list, discuss project successes and strategize regarding project implementation funding.

## IMPLEMENTATION

The PCCWPP 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 PCCWPP 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 can be found in Appendix H.

## REFERENCES

- Abrams, M.D. 1992. Fire and the development of oak forests. *BioScience* 42 (5):346–353.
- Abrams, M.D., and G.J. Nowacki. 1992. Historical variation in fire, oak recruitment, and post-logging accelerated succession in central Pennsylvania. *Bulletin of the Torrey Botanical Club* 119(1):19–28.
- Abrams, M.D. 2005. Prescribing fire in eastern oak forests: Is time running out? *Northern Journal of Applied Forestry* 22(3):190–196
- Agee, J.K. 1993. *Fire Ecology of Pacific Northwest Forests*. Washington, D.C.: Island Press.
- Archer, S., T.W. Boutton, and C.R. McMurtry. 2004. Carbon and nitrogen accumulation in a savanna landscape: field and modeling perspectives. In *Global Environmental Change in the Ocean and on Land*, edited by M. Shiyomi, H. Kawahata, H. Koizumi, A. Tsuda, and Y. Awaya, pp. 359–373. Tokyo: Terrapub.
- Ashton, I.W., L.A. Hyatt, K.M. Howe, J. Gurevitch, and M.T. Lerdau. 2005. Invasive species accelerate composition and litter nitrogen loss in a mixed deciduous forest. *Ecological Applications* 15(4):1263–1272.
- Bailey, R.G. 1995. Description of the ecoregions of the United States. Fort Collins, CO: U.S. Department of Agriculture, Forest Service. Available at: [http://www.fs.fed.us/land/ecosysmgmt/ecoreg1\\_home.html](http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html).
- Batek, M.J., A.J. Rebertus, W.A. Schroeder, T.L. Haithcoat, E. Compas, and R.P. Guyette. 1999. Reconstruction of early nineteenth-century vegetation and fire regimes in the Missouri Ozarks. *Journal of Biogeography* 26:397–412.
- Brandt, L., H.H. Le, L. Iverson, F.R. Thompson, P. Butler, S. Handler, and M. Janowiak. 2013. Central Hardwoods Ecosystem Vulnerability Assessment and Synthesis: A Report from the Central Hardwoods Climate Change Response Framework Project. General Technical Report NRS-124. Newtown Square, Pennsylvania: U.S. Department of Agriculture Forest Service Northern Research Station.
- Breshears, D.D. 2006. The grassland-forest continuum: trends in ecosystem properties for woody plant mosaics? *Frontiers in Ecology and the Environment* 4:96–104.
- Brooks, M.L., C.M. D'Antonio, D.M. Richardson, J.B. Grace, J.E. Keeley, J.M. Ditomaso, R.J. Hobbs, M. Pellant, and D. Pyke. 2004. Effects of invasive alien plants on fire regimes. *BioScience* 54(7):677–688.
- Brown, T.J., B.L. Hall, and A.L. Westerling. 2004. The impact of twenty-first century climate change on wildland fire danger in the western United States: an applications perspective. *Climatic Change* 62:365–388.
- Cohen, J.D. 2008. The wildland–urban interface fire problem. *Forest History Today*(Fall):20–26.
- Cohen, J.D., and B.W. Butler. 1998. Modelling Potential Structure Ignitions from Flame Radiation Exposure with Implications for Wildland/Urban Interface Fire Management. *Proceedings of the 13<sup>th</sup> Fire and Forest Meteorology Conference*. Lorne, Australia.
- Crist, S. 2009. Buttermilk Hill and Talbott Hollow Blowdown Project fire and fuels paper. Unpublished Report, Shawnee National Forest, U.S. Department of Agriculture Forest Service.

- Crooked River Cooperative Weed Management Area. 2016. About Invasive Plants. Available at: <http://crcwma.org/index.php/about-invasive-plants/>. Accessed October 2016.
- DeGraaf, R.M., M. Yamasaki, W.B. Leak, and J.W. Lanier. 1992. *New England Wildlife: Management of Forest Habitats*. U.S. Department of Agriculture Forest Service, Gen. Tech. Rep. NE-144.
- Delcourt, P.A., H.R. Delcourt, C.R. Ison, W.E. Sharp, and K.J. Gremillion. 1998. Prehistoric human use of fire, the Eastern Agricultural Complex and Appalachian oak-chestnut forests: paleoecology of Cliff Palace Pond, Kentucky. *American Antiquity* 63(2):263–278.
- Dey, D.C., and Z. Fan. 2009. A review of fire and oak regeneration and overstory recruitment. In *Proceedings of the 3rd Fire in Eastern Oak Forests Conference*, pp. 2–20. Gen. Tech. Rep. NRS-P-46. Newtown Square, Pennsylvania. U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Dibble, A.C., and C.A. Rees. 2005. Does the lack of reference ecosystems limit our science? A case study in nonnative invasive plants as forest fuels. *Journal of Forestry* 103(7):329–338.
- Forests and Rangelands. 2006. *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Strategy Implementation Plan*. Available at: [https://www.forestsandrangelands.gov/resources/plan/documents/10-yearstrategyfinal\\_dec2006.pdf](https://www.forestsandrangelands.gov/resources/plan/documents/10-yearstrategyfinal_dec2006.pdf). Accessed January 2016.
- . 2013. National Cohesive Wildland Fire Management Strategy, Northeast Regional Action Available at: [https://www.forestsandrangelands.gov/strategy/documents/rsc/northeast/NERAP\\_Final2013April.pdf](https://www.forestsandrangelands.gov/strategy/documents/rsc/northeast/NERAP_Final2013April.pdf). Accessed October 2016.
- . 2014. *The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy*. Available at: <https://www.forestsandrangelands.gov/strategy/documents/strategy/CSPhaseIIINationalStrategyApr2014.pdf>. Accessed January 2016.
- Fralish, J.S. 1997. Community succession, diversity, and disturbance in the Central Hardwood Forest. In *Conservation in Highly Fragmented Landscapes*, edited by M.K. Schwartz, pp. 234–266. New York: Chapman and Hall.
- Graham, R., S. McCaffrey, and T. Jain. 2004. *Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity*. Gen. Tech. Rep. RMRS-GTR-120. Fort Collins, Colorado: U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station.
- Guyette, R.P., R.M. Muzika, and D.C. Dey. 2002. Dynamics of an anthropogenic fire regime. *Ecosystems* 5:472–486.
- Haines, T.K., R.L. Busby, and D.A. Cleaves. 2001. Prescribed burning in the South: trends, purpose, and barriers. *Southern Journal of Applied Forestry* 25:149–153.
- Haines, T.K., C.R. Renner, and M.A. Reams. 2005. A Review of State and Local Regulation for Wildfire Mitigation. Available at: [http://www.srs.fs.usda.gov/pubs/ja/ja\\_haines005.pdf](http://www.srs.fs.usda.gov/pubs/ja/ja_haines005.pdf). Accessed August 2016.

- Hann, W.J., and D.L. Bunnell. 2001. Fire and land management planning and implementation across multiple scales. *International Journal of Wildland Fire* 10:389–403.
- Hann, W., A. Shlisky, D. Havlina, K. Schon, S. Barrett, T. DeMeo, K. Pohl, J. Menakis, D. Hamilton, J. Jones, M. Levesque, and C. Frame. 2004. *Interagency Fire Regime Condition Class Guidebook*. Version 1.2.0 Homepage of the Interagency and the Nature Conservancy fire regime condition class website, U.S. Department of Agriculture Forest Service, U.S. Department of the Interior, the Nature Conservancy, and Systems for Environmental Management.
- Hardy, C.C., K.M. Schmidt, J.M. Menakis, and N.R. Samson. 2001. Spatial data for national fire planning and fuel management. *International Journal of Wildland Fire* 10:353–372.
- Holzmueller, E.J., J.W. Groninger, and C.M. Ruffner. 2014. Facilitating oak and hickory regeneration in mature central hardwood forests. *Forests* 5:3344–3351.
- Illinois Department of Natural Resources (IDNR). 2005a. *The Shawnee Area. An Inventory of the Regions Resources*. A project of the Critical Trends Assessment Program. October 2005.
- . 2005b. *Illinois Wildlife Action Plan*. Available at: <http://dnr.state.il.us/orc/wildliferesources/theplan/>. Accessed November 2016.
- . 2010. *Illinois Statewide Forest Resource Assessments and Strategies (Illinois Forest Action Plan)*. Available at: <http://www.stateforesters.org/files/IL-Assess-Strategy-20100528.pdf>. Accessed October 2016.
- . 2016. Cretaceous Hills Nature Preserve Description. IDNR Website. Available at: <https://www.dnr.illinois.gov/INPC/Pages/Area9PopeCretaceousHills.aspx>. Accessed October 2015.
- Illinois Interagency Landscape Classification Project 2002. Illinois Gap Analysis Project Website. Available at: <http://www.inhs.illinois.edu/research/gap/landcover/>. Accessed October 2016.
- Jackson County. 2010. *Jackson County Community Wildfire Protection Plan*.
- McCaffrey, S.M. 2004. Fighting fire with education: what is the best way to reach out to homeowners? *Journal of Forestry* 102:12–19.
- McShea, W.J., and W.M. Healy, eds. 2002. *Oak Forest Ecosystems: Ecology and Management for Wildlife*. Baltimore, Maryland: Johns Hopkins University Press.
- Miller, R.B. 1920. *Fire Prevention in Illinois Forests*. Forestry Circular No. 2. Urbana, Illinois: Division of the Natural History Survey, Department of Registration and Education.
- Monroe, M.C., A.C. Watts, and L.N. Kobziar. 2015. Where There's Fire, There's Smoke: Air Quality and Prescribed Burning In Florida. University of Florida IFAS Extension. Available at: <http://edis.ifas.ufl.edu/fr058>. Accessed November 2016.
- National Interagency Fire Center (NIFC). 2016. Wildland Fire Statistics. Available at: [http://www.nifc.gov/fire\\_info/fire\\_stats.htm](http://www.nifc.gov/fire_info/fire_stats.htm). Accessed January 2016.
- National Wildfire Coordinating Group (NWCG). 1998. *Fireline Handbook*. NWCG Handbook 3. PMS 410–1. NFES 0065. Boise, Idaho: National Interagency Fire Center.

———. 2012. FAMWEB Data Warehouse. Available at: [http://fam.nwcg.gov/fam-web/famweb/index\\$.startup](http://fam.nwcg.gov/fam-web/famweb/index$.startup). Accessed January 6, 2012.

Neilson, R., J. Lenihan, R. Drapek, and D. Bachelet. 2004. *Forests Fire Risk and Climate Change*. Pacific Northwest Research Station-Science Update. Issue 6. January 2004.

Nowacki, G.J., and M.D. Abrams. 2008. The demise of fire and “mesophication” of forests in the eastern United States. *BioScience* 58(2):123–138.

———. 2015. Is climate an important driver of post-European vegetation change in the eastern United States? *Global Change Biology* 21:314–334.

Ottmar, R., R. Vihnanek, and J. Regelbrugge. 2000. *Wildland Fire in Ecosystems: Effects of Fire on Fauna*. Vol. 1. Gen. Tech. Rep. RMRS-GTR-42. Ogden, Utah: U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station.

Ozier, T.B., J.W. Groninger, and C.M. Ruffner. 2006. Community composition and structural changes in a managed Illinois Ozark Hills forest. *The American Midland Naturalist* 155(2):253–269.

Parker, G.R., and C.M. Ruffner. 2004. Current and historical forest conditions and disturbance regimes in the Hoosier-Shawnee Ecological Assessment Area. In *The Hoosier-Shawnee Ecological Assessment*, edited by F.R. Thompson, III, pp. 23–58. General Technical Report NC-244. St. Paul, Minnesota: U.S. Department of Agriculture Forest Service, North Central Research Station.

Pyne, S.J. 1982. *Fire in America: A Cultural History of Wildland and Rural Fire*. Princeton, New Jersey: Princeton University Press.

———. 2001. The fires this time, and next. *Science* 294(2):12–17.

Ready, Set, Go! 2016. Ready, Set, Go! Home. Available at: <http://wildlandfirersg.org/>. Accessed October 2016.

Rebertus, A.J., and B.R. Burns. 1997. The importance of gap processes in the development and maintenance of oak savannas and dry forests. *Journal of Ecology* 85(5):635–645.

Reinhardt, E.D., R.E. Keane, D.E. Calkin, and J.D. Cohen. 2008. Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States. *Forest Ecology and Management*. Available at: [http://www.fs.fed.us/rm/pubs\\_other/rmrs\\_2008\\_reinhardt\\_e001.pdf](http://www.fs.fed.us/rm/pubs_other/rmrs_2008_reinhardt_e001.pdf). Accessed November 2016.

River to River Cooperative Weed Management 2016. Home Page- About CWMA. Available at: <http://www.rtrcwma.org/>. Accessed October 2016.

Robertson, P.A., and A.L. Heikens. 1994. Fire frequency in oak-hickory forests of southern Illinois. *Castanea* 59(3):286–291.

Rodewald, A.D., and M.D. Abrams. 2002. Floristics and avian community structure: Implications for regional changes in eastern forest composition. *Forest Science* 48(2):267–272.

Rothermel, R.C. 1983. *How to Predict the Spread and Intensity of Forest and Range Fires*. Gen. Tech. Rep. INT-143. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.

- Ruffner, C.M., and M.D. Abrams. 1998. Lightning strikes and resultant fires from archival (1912-1917) and current (1960-1997) information in Pennsylvania. *Journal of the Torrey Botanical Society* 125:249–252.
- . 2002. Dendrochronological investigation of disturbance history for a Native American site in northwestern Pennsylvania. *Journal of the Torrey Botanical Society* 129(3):251–260.
- Ruffner, C.M., A. Trieu, S. Chandy, M.D. Davis, D. Fishel, G. Gipson, J. Lhotka, K. Lynch, P. Perkins, S. van de Gevel, W. Watson, and E. White. 2003. From savanna to campus woodlot: the historical ecology of farm woodlots in Southern Illinois. In *Proceedings of the 13th Central Hardwood Forest Conference*, edited by J.W. Van Sambeek, J.O. Dawson, F. Ponder, Jr., E.F. Loewenstein, and J.S. Fralish, pp. 333–342. General Technical Report NC-234.
- Ruffner, C.M., and J.W. Groninger. 2006. Making the case for fire in southern Illinois forests. *Journal of Forestry* 104(2):78–83.
- Schmidt, K.M. J.P. Menakis, C.C. Hardy, W.J. Hann, and D.L. Bunnell. 2002. *Development of Coarse-scale Spatial Data for Wildland Fire and Fuel Management*. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, Colorado: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Scott, J.H., and R.E. Burgan. 2005. *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model*. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, Colorado: U.S. Forest Service, Rocky Mountain Research Station.
- Society of American Foresters (SAF). 2004. *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland Urban Interface Communities*. Sponsored by Communities Committee, National Association of Counties, National Association of State Foresters, Society of American Foresters, and Western Governors' Association. Available at: [http://www.safnet.org/policyandpress/cwpp handbook.pdf](http://www.safnet.org/policyandpress/cwpp%20handbook.pdf). Accessed June 1, 2006.
- Southern Illinois Invasive Species Strike Team. 2015. Annual Report.
- Stephens, S.L., and L.W. Ruth. 2005. Federal forest-fire policy in the United States. *Ecological Applications* 15(2):532–542.
- Stewart, S.I., V.C. Radeloff, R.B. Hammer, and T.J. Hawbaker. 2007. Defining the wildland-urban interface. *Journal of Forestry* 105:201–207.
- Stritch, L.R. 1987. *Barrens Restoration in the Cretaceous Hills of Pope and Massac Counties, Illinois*. Illinois Department of Conservation.
- Taft, J.B. 2008. Effects of overstory stand density and fire on ground layer vegetation in oak woodland and savannah habitats. In *Proceedings of the 3<sup>rd</sup> Fire in Eastern Oak Forests Conference*, edited by J.B. Taft, pp. 21–39. GTR-NRS-P-46.
- Thompson, F.R., III, and D.R. Dessecker. 1997. *Management of Early-successional Communities in Central Hardwood Forests; With Special Emphasis on the Ecology and Management of Oaks, Ruffed Grouse, and Forest Songbirds*. General Technical Report NC-195. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station.
- Tikusis, P.D. 2009. Classifying the Fire Regime Condition Class for Upland Oak-Hickory Forests. Thesis. Paper 4.

U.S. Department of the Interior (USDI) and U.S. Department of Agriculture (USDA). 2001. Urban wildland interface communities within vicinity of federal lands that are at high risk from wildfire. *Federal Register* 66(3):751–777.

U.S. Forest Service (USFS). 2006. *Shawnee National Forest Land and Resource Management Plan*. Available at: [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5151577.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5151577.pdf). Accessed September 2016.

———. 2015. *Shawnee National Forest Fire Management Plan*.

———. 2016. *Cretaceous Hills Ecological Restoration Draft Environmental Impact Statement*. Shawnee National Forest. March 2016. Available at: [www.fs.usda.gov/project/?project=45123](http://www.fs.usda.gov/project/?project=45123). Accessed September 2016.

U.S. Fish and Wildlife Service 2016. Illinois County Distribution, Federally Endangered Threatened and Candidate Species. Available at: <https://www.fws.gov/midwest/endangered/lists/illinois-cty.html>. Accessed August 2016.

Westerling, A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and earlier spring increase in western U.S. forest wildfire activity. *Science* 313(5789):940–943.

Williams, M. 1989. *Americans and Their Forests: A Historical Geography*. Cambridge, UK: Cambridge University Press.

Winter, G., and J.S. Fried. 2000. Homeowner perspectives on fire hazard, responsibility, and management strategies at the wildland-urban interface. *Society and Natural Resources* 13:33–49.

Zaczek, J.J., J.W. Groninger, and J.W. Van Sambeek. 2002. Stand dynamics in an old-growth hardwood forest in southern Illinois, USA. *Natural Areas Journal* 22(3):211–219.