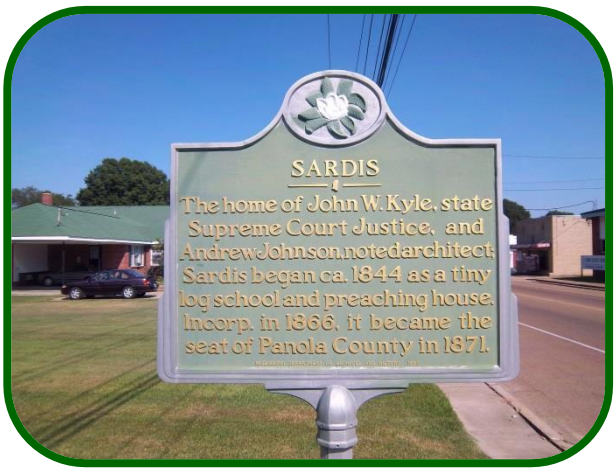
Firewise Communities/ USA Assessment

Prepared for
Sardis, Mississippi



MISSISSIPPI FORESTRY COMMISSION

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Introduction

The Firewise Communities/USA program is designed to provide an effective management approach for preserving wildland living aesthetics. Participating in this education program gives communities like Sardis a way to balance sustainable ecological lifestyles with an effective means of wildland fire protection.

The Firewise Communities/USA program seeks input from participating communities and agencies regarding modifications that, when made, will make this recognition program more effective. This program can be tailored for adoption by any community and/or neighborhood association that is committed to ensuring its citizens maximum wildfire protection. This Firewise Communities/USA plan should be implemented in a collaborative manner and updated and/or modified as needed. This community assessment is intended as a resource that can be used to create a wildfire protection plan. It is dynamic and will change as homes are completed and the community develops.

The assessment was developed by the Mississippi Forestry Commission (MFC) Fire Services Division and Information Systems Department in partnership with Sardis Mayor Billy Russell, Sardis VFD Chief Chris Clark, Mississippi Forestry Commission Assistant District Forester Drew Stafford, and USDA Natural Resources Conservation Service District Conservationist Joe Addy.

The objective of this assessment is to set clear priorities of the implementation of wildfire mitigation in your community. This includes prioritized recommendations as to appropriate types and methods of fuel reduction and structure ignitability reduction that will protect this community and its essential infrastructure. It also includes a plan for wildfire suppression, identifies existing resources, describes how to maximize resources, outlines additional resources needed and presents options for creating sustainability. Specifically, this plan includes community-centered actions that will:

- Educate citizens on wildfire, its risks and ways to protect lives and properties,
- Support fire rescue and suppression entities,
- Focus on collaborative decision-making and citizen participation,
- Develop and implement effective mitigation strategies,
- Suggest effective community wildfire protection standards.

Even homes and businesses classed in “Low Risk” can be lost to wildland fire under certain conditions. Property owners in “Low Risk” communities should read and understand this report.

The Assessment

Fire happens but not by choice. The variables in a fire scenario are when the fire will occur and where it will occur. This assessment addresses the wildfire-related characteristic in your community. It examines the area’s exposure to wildfire as it relates to ignition potential, and, examines both representative home sites and the community as a whole.

A house burns because of the interrelationship with its immediate surroundings. To avoid an ignition, a homeowner must eliminate the fire’s potential relationship with a house. This can be accomplished by interrupting the fire’s natural path. A way to accomplish this is to clean up around your home. This easy task can help avoid home loss. Flammable items must be removed from the area within 100 to 200 feet

of the structure to prevent flames from contacting it. This area is known as the home ignition zone. Reducing the volume and placement of live vegetation will also affect the intensity of the wildfire.

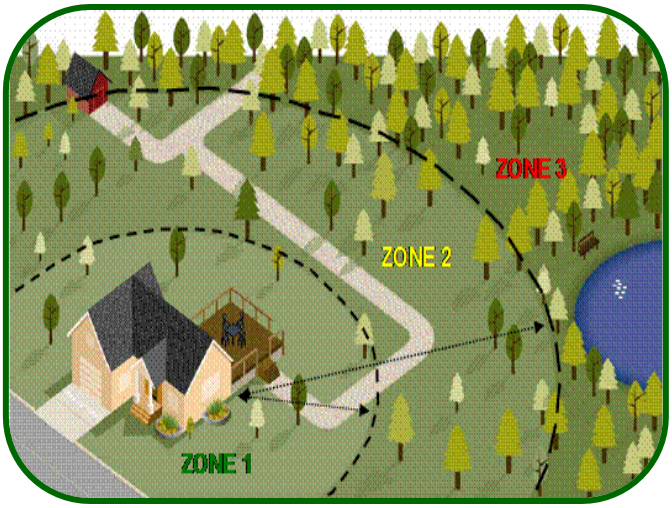

Figure 1: Zones of Defense

ZONES OF DEFENSE:
(distances are greater when living on slopes)

ZONE 1: HOME IGNITION ZONE
0-10' from structures →***Lean, Green, and Clean***

ZONE 2: REDUCED FUEL ZONE
10'-50' from structures→***Remove flammable plants, Prune trees***

ZONE 3: FUEL MODIFICATION ZONE
50 – 100' (or more) →***Spread the canopy, Reduce fuel ladders***

Fire intensity and spread rate depends on the fuel type and condition (live/dead), the weather conditions prior to and during ignition and the topography. Generally, that relationship holds between the fire behavior and the fuel, weather and topography. ***These variables will at some point align to produce a fast moving, uncontrollable wildfire in* your community*. Damage will be significant.***

- Fine fuels ignite more easily and spread faster with higher intensities than coarser fuels. For a given fuel, the more there is and the more continuous it is, the faster the fire spreads and higher the intensities. Fine fuels take a shorter time to burn out than coarser fuels.
- The weather conditions affect the moisture content of the dead and live vegetative fuels. Dead fine fuel moisture content is highly dependent on the relative humidity and the degree of sun exposure. Increased sun exposure combined with lower relative humidity reduces fuel moisture content. Lower fuel moistures produce higher spread rates and fire intensities.
- Wind speed significantly influences the rate of fire spread and fire intensity. The higher the wind speed, the greater the spread rate and intensity.
- Topography influences fire behavior principally by the steepness of the slope. However, the configuration of the terrain such as narrow draws, saddles, etc. can influence fire spread and intensity. In general, the steeper the slope, the greater the uphill fire spread and intensity.

Community Background and Existing Situation

- Sardis was incorporated in 1866 and is located in Sections 25, 26, 27, 33, 34, 35, and 36, Township 7 South, Range 7 West. The city of Sardis covers approximately 2 square miles or approximately 1,279 acres. Transportation corridors include Highways 51 and 315 as well as Interstate 55. The Canadian National Railroad also runs through the city. Electric power is provided by Entergy and natural gas is provided by Center Point Energy. At least one resident has a propane tank for their gas service.

- According to the latest census figures, Sardis has 1680 residents. There are approximately 800 structures. Approximately 700 of these are homes and 100 are businesses. Building construction material choices for homes and businesses includes non-flammable brick and metal construction as well as flammable wood frame construction.

- Sardis has a part time mayor and city council consisting of five members.

- The topography of Sardis ranges from flat to steep hills. The elevation ranges from 300 feet to 380 feet above sea level.

- The Sardis Volunteer Fire Department was formed in 1962 and currently has 13 firefighters on roll. For the period November 21, 2012, to present, the Sardis VFD has responded to 114 calls. Of this number, 30 have been fires with 17 of those structure fires and 13 brush or grass fires. The resources for the Sardis VFD are a 1990 Ford with a 750 gallon capacity which is used in the city only; a 1997 Pierce Engine with a 1300 gallon tank for use in and outside the city; and a 1998 Ford F350 brush truck with a 300 gallon capacity. Sardis has a Fire Classification Rating of 6.

- The Mississippi Forestry Commission resources in Panola County include 6 wildland firefighters, a 1999 JD450 G Dozer with 2004 Sterling transport truck, and a 2000 JD 450 H Dozer with 2004 Sterling transport. During the period July 1, 2009 – June 30, 2011, the MFC responded to 47 wildfires that burned 649 acres. These figures do not include any responses to fires by Volunteer or Municipal fire departments. Batesville is surrounded by a variety of fuel types. These include agricultural fields, grasses, brush, and timber.

- Class A roofing is predominant in the City, but varies in the degree of maintenance. There were at least two Class B roofs noted during this assessment. These could cause control problems in the event of fire.

- Home and business landscaping ranges from none to extensive. Flammable organic mulch is the popular choice (pine straw and bark). Landscape plants range from low to high flammability.

Community Map

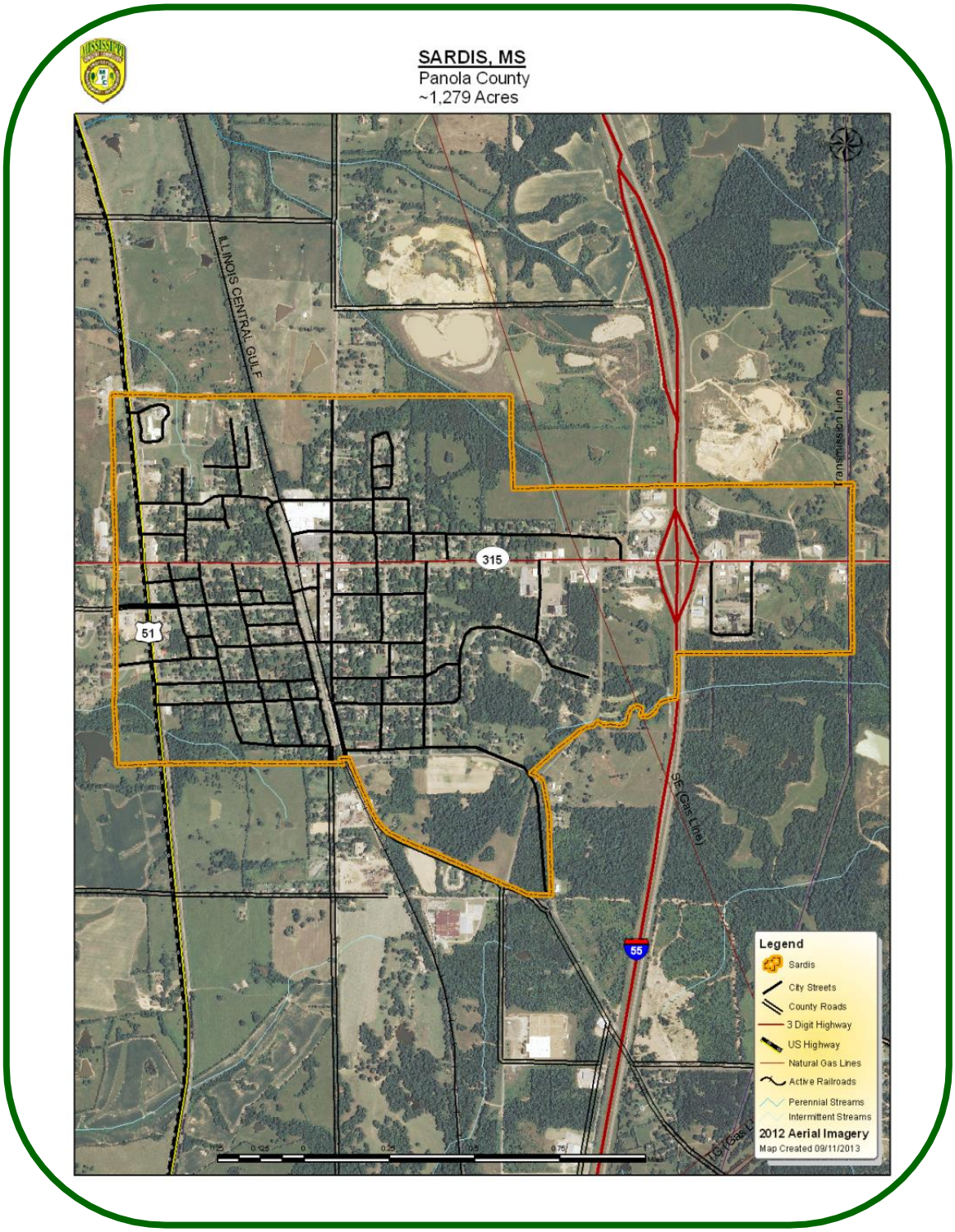

Figure 2: Map of Sardis, Mississippi

Community Wildfire Risk Assessment

Wildfire Risk

In Mississippi, over 95 percent of all wildfires are caused by people and their activities. Wildfire risk is related to weather conditions and risk increases when people's outdoor activities coincide with periods of low humidity, high wind or drought.

A wildland fire risk assessment was conducted using the NFPA (National Fire Protection Association) 1144 Standard for Protection of Life and Property from Wildfire, 2002 Edition. The average home score was 52.64 points and places Sardis in the ***Moderate*** hazard range. Sample home scores ranged from 29points (Low Hazard rating) up to 92 points (High Hazard rating). The wildland fire risk assessment takes into consideration accessibility, vegetation (based on fuel models), topography, roofing assembly, building construction, availability of fire protection resources, placement of gas and electric utilities and additional rating factors.

The following factors (elements) contributed to the **Moderate** wildfire hazard score. A copy of your Wildland Fire Risk and hazard Severity Assessment form with your ratings is located in Appendix A.

A. Means of Access

Access to your community includes state highways, county roads, and city streets. A portion of state highways 51 and 315 run through Sardis as well as Interstate 55 which bisects the city. The state highway rights-of-way are well maintained by mowing and use of herbicides. Community ingress and egress via county roads and city streets varies. While some neighborhoods have two or more roads in and out others have one. Road widths for paved and gravel roads range from less than twenty feet to twenty-four feet. The majority of roads in the town are twenty feet wide with limited drivable shoulders.

1. Ingress and egress

a. Two or more roads in/out

Most neighborhoods in this assessment have two or more roads in and out but have very limited drivable shoulders.

Figure 3. Means of Access – Ingress and egress – Two or more roads in/out

b. One road in/out

Emergency response is compromised without access. Traffic jams are likely. An example of one road in/out situation is dead end or no outlet roads.

Figure 4: Means of Access – Ingress and egress – One road in/out

***2.* Road Width**

a. Greater than or equal (≥) to 7.3 m (24 feet)

Wide roads with drivable shoulders and good visibility allow two-way traffic. Interior streets are smaller and are easily blocked by parked vehicles.

Figure 5: Means of Access – Road Width –greater than or equal to 7.3m (24 feet)

b. Greater than or equal (≥) 6.1 m (20 feet) and less than (<) 7.3 m (24 feet)

Medium width roads with drivable shoulders and good visibility support resident evacuation and reduce emergency response time.

Figure 6: Means of Access – Road Width – *≥ 6.1 m (20 feet) and < 7.3 m (24 feet)*

c. *Less than (<) 6.1 m (20 feet)*
Narrow roads coupled with limited visibility limit evacuation and emergency response times. Traffic problems will occur and entrapment is likely. Overhead brush can damage emergency response equipment.

Figure 7: Means of Access – Road Width – less than 6.1m (20 feet)

3. All-Season Road Condition

a. Surfaced road, grade less than (<) 5 %
Gently sloping surfaced roads can support high volumes of large fire equipment.

Figure 8: Means of Access – All-season Road Condition – Surfaced road, grade < 5%

b. *Surfaced road, grade greater than (>) 5%*
Steep roads limit the amount of water a fire truck can carry.

Figure 9: Means of Access – All season Road Condition – Surface road, grade >5%

c. *Non-surfaced road, grade less than (<) 5%*

A portion of the Fire Department response area extends into the county. Gently sloping roads support larger fire equipment. Road and right-of-way maintenance is essential for access and visibility. Overhanging brush will damage fire equipment.

Figure 10: Means of Access – All season Road Condition – Non-surface road, grade < 5%

d. *Non-surfaced road, grade greater than (>) 5%*

Steep and narrow non-surfaced roads are difficult to access. One-way traffic is a hazard. Overhanging brush will damage fire equipment.

Figure 11: Means of Access – All season Road Condition – Non-surface road, grade > 5%

e. *Other than all season*

Jeep trails and log roads limit most two wheel drive emergency response equipment.

Locked gates can be accessed in many cases only by either destroying the gate or cutting the lock. Hunting camps and homesteads are at risk.

Figure 12: Means of Access – All-season Road Condition – Other than all season

4. Fire Service Access

a. Less than or equal to (≤) 91.4 m (300 feet) with turnaround

Figure 13: Means of Access – Fire Season Access – Less than or equal to (≤) 91.4 m (300 feet) with turnaround

b. Greater than (>) 91.4 m (300 feet) with turnaround

Adequate turn-around space is important for large fire equipment. Homeowner's yards can quickly become crowded. Long dead-end streets can also become crowed with abandoned vehicles.

Figure 14: Means of Access – Fire Service Access – Greater than (>) to 91.4 m (300 feet) with turnaround

c. Less than (<) 91.4 m (300 feet) with no turnaround

Backing up with fire equipment is time consuming and dangerous. Short roads or dead- end streets can become crowded with homeowner's and emergency responder's vehicles.

Narrow streets, a lack of drivable shoulders and overhanging limbs limit two-way visibility and are safety issues.

Figure 15: Means of Access – Fire Service Access – Less than (<) 91.4 m (300 feet) with no turnaround

d. Greater than or equal (≥) to 91.4m (300 feet) with no turnaround

Backing up with fire equipment can be time consuming and dangerous. Long roads or dead-end streets can become blocked with homeowner's as well as emergency response vehicles.

Figure 16: Means of Access – Fire Service Access – Greater than or equal (≥) to 91.4 m (300 feet) with no turnaround

5. Street Signs

a. Present [10.2 cm (4 in.) in size and reflectorized]

Most street signs are present but some are in poor condition. Adoption of NFPA street sign standards could be considered in the future.

Figure 17: Means of Access – Street signs – Present [10.2 cm (4 in.) in size and reflectorized]

b. Not Present

Missing or unreadable street signs will cause problems for either local or out-of-town emergency responders.

Figure 18: Means of Access – Street Signs – Not present

B. Vegetation (Fuel Models)

Your community contains and is surrounded by a variety of all vegetation fuel models fuels. Wildland fire behavior will range from light to extreme depending on fuels, weather and topography. Your community is surrounded by heavy dense brush, pine plantations and/or hardwoods. This vegetation poses a very real threat to the town and structures in and around your community.

1. Characteristic Of Predominate Vegetation Within 91.4 M (300 Feet)

a. Light (e.g., grasses, forbs, sawgrasses and tundra) NFDRS fuel models A, C, L, N, S and T

Short grass will burn during dry weather or after frost. Fire behavior in short grass is substantially less than in tall grass.

Figure 19: Vegetation (Fuel Models) – Characteristics of predominate vegetation within 91.4 m (300 feet) – Light

b. Medium (e.g., light brush and small trees) NFDRS fuel models D, E, F, H, P, Q and U

Fire behavior increases with the availability of wildland fuels. Electrical service is often interrupted during wildfires.

Figure 20: Vegetation (Fuel Models) – Characteristics of predominate vegetation within 91.4 m (300 feet) – Medium

c. *Heavy (e.g., dense brush, timber and hardwoods) NFDRS fuel models B, G and O*

Independent crown fires are more likely in dense timber not managed by prescribed burning and thinning.

Figure 21: Vegetation (Fuel Models) – Characteristics of predominate vegetation within 91.4 m (300 feet) – Heavy

d. Slash (e.g., timber harvesting residue) NFDRS fuel models J, K and L

Dense residual fuel from forest management activities can be reduced prior to the management work by prescribed burning, herbicide application or under story mulching.

This Firewise element was not found in your community during our assessement.

Figure 22: Vegetation (Fuel Models) – Characteristics of predominate vegetation within 91.4 m (300 feet) – Slash

2. Defensible Space

a. *More than 30.48 m (100 feet) of vegetation treatment from the structure(s)*

Regardless of location, conifer species are more flammable due to the resinous chemistry of the needles. A home with limbs overhanging the roof will pose a hazard. Pruning can mitigate many tree hazards. Maintaining a lean, clean, green landscape aids firefighters.

Figure 23: Vegetation (Fuel Models) – Defensible Space – more than 30.48 m (100 feet) of vegetation treatment from the structure(s)

b. *21.6 m – 30.48 m (71 – 100 feet) of vegetation treatment from the structure(s)*

Adequate clearance around the home gives firefighters room to work and greatly increases the probability of success.

Figure 24: Vegetation (Fuel Models) – Defensible Space – 21.6 m – 30.48 m (71 to 100 feet) of vegetation treatment from the structure(s)

c. *9.14 m – 21.3 m (30 – 70 feet) of vegetation treatment from the structure(s)*

Routine yard maintenance is important and provides a defensible space for the home.

Figure 25: Vegetation (Fuel Models) – Defensible Space – 9.1 m – 21.3 m (30 to 70 feet) of vegetation treatment from the structure(s)

d. *Less than (<) 9.1 m (30 feet) of vegetation treatment from the structure(s)*

During a wildfire event, some homes and structures may not be savable. Diligent application of Firewise landscape and maintenance suggestions can greatly reduce the vulnerability of homes and structures to wildfire damage.

Figure 26: Vegetation (Fuel Models) – Defensible Space – <9.1 m (Less than 30 feet) of vegetation from structure(s)

C. Topography Within 91.4 m (300 Feet) Of Structure(s)

The topography of your community is flat to rolling hills. The elevation of the city ranges from 300 feet to 380 feet above sea level. The range of the slope is 0- 45+/-%.

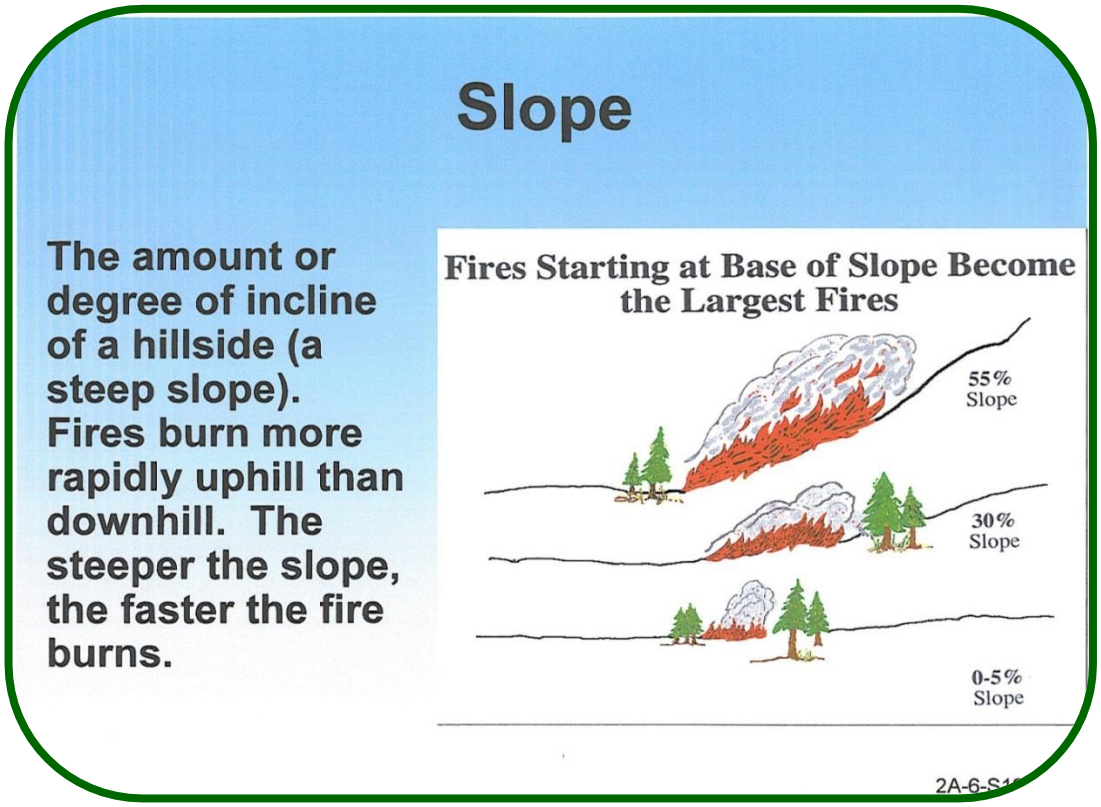

Figure 27: Topography within 91.4 m (300 feet) of structure(s) – Slope Map

A slope is the angle of the ground relative to the horizon and is commonly measured in either degrees or as a percent. Slope topography shows the steepness of the slope and the shape of the land. The steeper the slope, the more quickly a fire moves and the hotter it burns. For example, ***a fire will spread twice as fast on a 30% slope than it will on level ground.*** This means that houses located on steep slopes need more fire resistance.

The variations of topographic features such as valleys, ridges, canyons and saddles can be dangerous areas that further intensify or attract a fire. A **valley**, as a concave form tends to collect and concentrate winds. This means that as a wildland fire moves through such an area, its intensity increases. If the valley is narrow with steep sides, such as a **canyon**, this effect is even more pronounced. When a valley crosses a ridge it creates a **saddle** between the higher parts of that ridge. Like a valley, saddles will channel, intensify and speed up a fire. These areas tend to be built upon because they offer some shelter and flat areas. It is important to recognize that saddles are natural fire paths where fire will travel first, and with more intensity. **Ridges** experience more wind primarily because they are elevated above the surrounding land. When a fire moves up a slope towards a ridge it gathers speed and intensity. As the wind crosses a ridge it usually has a leeward eddy where the wind rolls around and comes up the leeward side, exposing both sides of the structure to wind and fire. There are usually no flat or protected areas on ridges to provide some protection from the fire.

1. Slope < 9%

Figure 28: Topography within 91.4 m (300 feet) of structure(s) – Slope – <9%

2. Slope 10% to 20%

Figure 29: Topography within 91.4 m (300 feet) of structure(s) – Slope – 10% to 20%

3. Slope 21% to 30%

Figure 30: Topography within 91.4 m (300 feet) of structure(s) – Slope – 21% to 30%

4. **Slope 31% to 40%**

Figure 31: Topography within 91.4 m (300 feet) of structure(s) – Slope – 31% to 40%

5. **Slope > 41%**

Figure 32: Topography within 91.4 m (300 feet) of structure(s) – Slope – > 41%

D. Additional Rating Factors

Fuel, weather, topography, the condition of the home and its surroundings are driving forces behind wildfire damage.

1. Topographical Features That Adversely Affect Wildland Fire Behavior

The topography of Sardis is flat to rolling hills. The city is surrounded by a variety of fuels ranging from heavy timber to light grasses. Homes are constructed with very little space between them and many are backed up against heavy fuels.

Figure 33: Additional Rating Factors – Topographical features that adversely affect wildland fire behavior

2. **Areas with a history of higher fire occurrence than surrounding areas due to special situations (e.g., heavy lightning, railroads, escaped debris burning, arson, malicious burning)**
   a. Outdoor debris burning is common in Mississippi. During dry windy weather, numerous grass fires and large forest wildfires often develop from small escaped debris burning piles.

Figure 34: Additional Rating Factors – Areas with history of higher fire occurrence than surrounding areas due to special situation – Outdoor debris burning

   b. Mississippi Forestry Commission resources in Panola County consist of 6 wildland firefighters, a 1999 John Deere 450G dozer on a 2004 Sterling truck, and a 2000 John Deere 450H dozer on a 2004 Sterling truck.

   Panola County is located in the Mississippi Forestry Commission's Northwest District and ranks toward the top of the rankings in Mississippi for wildfire occurrence. During the period of July 1, 2009 – June 30, 2011, the county experienced 47 wildfires that burned 649 acres. These numbers do not include responses from the county's Volunteer and Municipal Fire Departments.

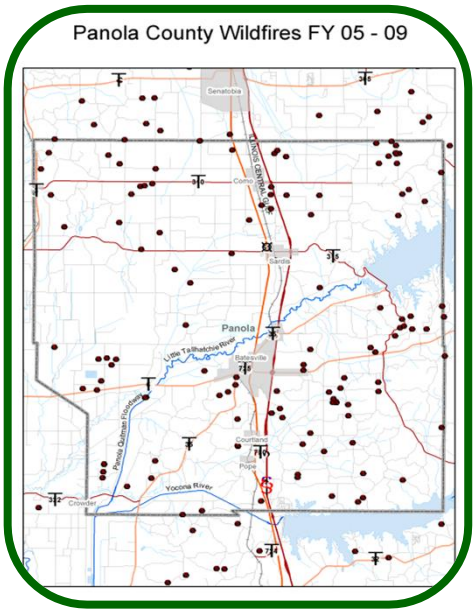

Figure 35: Additional Rating Factors – Areas with history of higher fire occurrence than surrounding areas due to special situation

3. **Areas that are periodically exposed to unusaually severe fire weather and strong dry winds.**

   Droughts ranging from short to prolonged drive severe fire seasons and are not uncommon in Mississippi. October is historically the driest month of the month of the year.

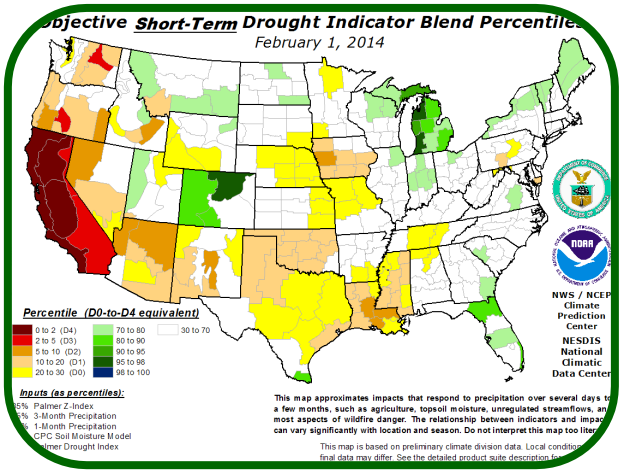

Figure 36: Additional Rating Factors – Areas that are periodically exposed to unusually severe fire weather and strong dry winds – Short Term Drought

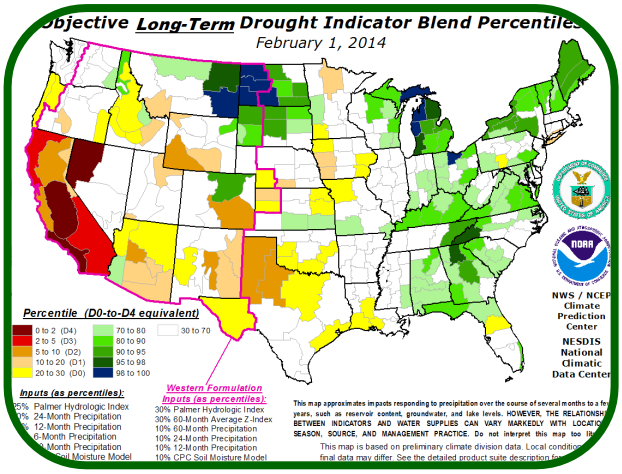

Figure 37: Additional Rating Factors – Areas that are periodically exposed to unusually severe fire weather and strong dry winds – Long Term Drought

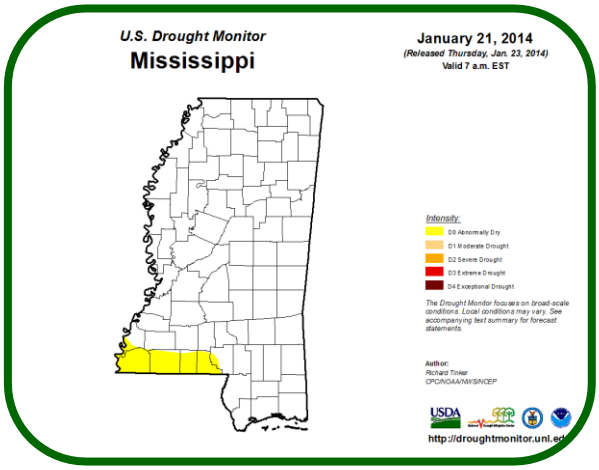

Figure 38: Additional Rating Factors – Areas that are periodically exposed to unusually severe fire weather and strong dry winds –Drought Map for Mississippi

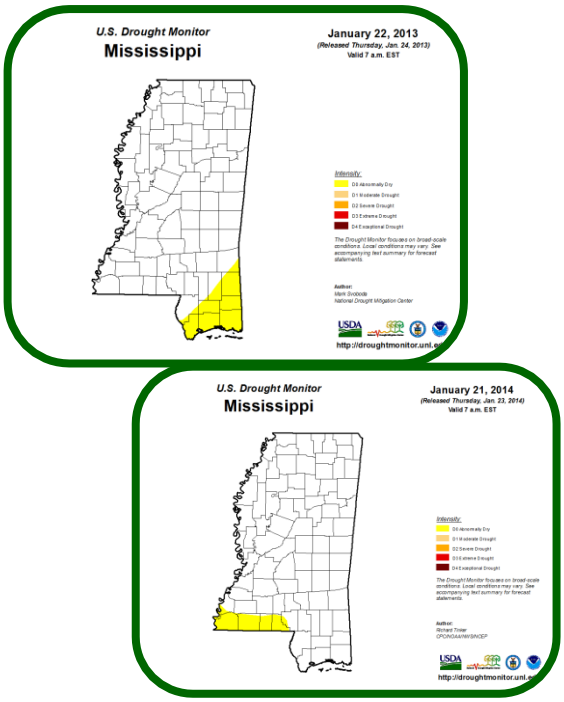

Figure 39: Additional Rating Factors – Areas that are periodically exposed to unusually severe fire weather and strong dry winds – Comparing Drought Condition in 2012 and 2013

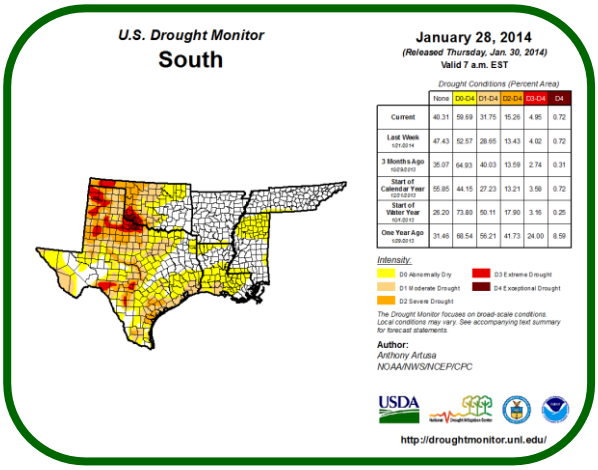

Figure 40: Additional Rating Factors – Areas that are periodically exposed to unusually severe fire weather and strong dry winds – Drought Map for Southern U. S., April 2012 Indicators

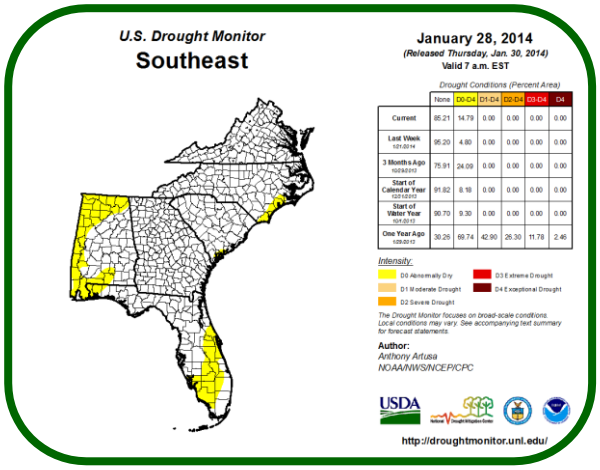

Figure 41: Additional Rating Factors – Areas that are periodically exposed to unusually severe fire weather and strong dry winds. Drought Map for Southeast U.S., April 2012

4. Separation of adjacent structures that can contribute to fire spread

Most homes have a minimum of 30 feet of defensible space but some homes and outbuilding are severely compromised.

Figure 42: Additional Rating Factors – Separation of adjacent structures that may contribute to fire spread

E. Roof Assembly

Most homes in this community are roofed with either Class A metal or asphalt roof material.

1. Class A Roof

Example of Class A roofing materials are brick, tile, clay, metal, concrete, slate asphalt and fiber-cement. Roof material in this class has the highest resistance to fire.

Figure 43: Roofing Assembly – Class A Roof

2. Class B Roof

Examples of Class B roofing materials are pressure-treated shakes and shingles.

Figure 44: Roofing Assembly – Class B Roof

3. Class C Roof

Examples of Class C roofing materials are wood shakes and shingles, plywood or particleboard. Roof material in this class has the lowest resistance to fire.

Figure 45: Roofing Assembly – Class C Roof

F. Building Construction

1. Materials (predominate)

a. *Noncombustible/fire-resistive siding, eaves and deck*

Fire resistant building materials don't support combustion.

Figure 46: Building Construction – Materials – Non-combustible/fire-resistive siding, eaves & deck

b. *Noncombustible/fire-resistive siding and combustible deck*

Unscreened wooden porches and decks occur in many communities throughtout the South. A combustible deck's flammability is greatly increased by storing flammable materials on, as well as, underneath the structure.

Figure 47: Building Construction – Materials – Non-combustible/fire-resistive siding and combustible deck

c. *Combustible siding and deck*

Flammable vegetation should be removed from around homes built of wood.

Figure 48: Building Construction – Materials – Combustible siding and deck

2. Building setback relative to slope of 30% or more

a. Greater than or equal to (≥) 9.1 m (30 feet) to slope

Figure 49: Building Construction – Building setback relative to slope – greater than or equal to (≥) 9.1m (30 feet) to slope

b. Less than(<) 9.1m (30 feet) to slope

Figure 50: Building Construction – Building setback relative to slopes – less than (<) 9.1m (30 feet) to slope

G. Available Fire Protection

1. Water Source Availability

a. *Pressurized water source availability*

i. *1892.7 L/min (500 gpm) hydrants less than or equal to (≤) 304.8 m (1000 feet) apart*

Sardis has 150 pressurized fire hydrants. On average, the hydrants are located 400 feet apart.

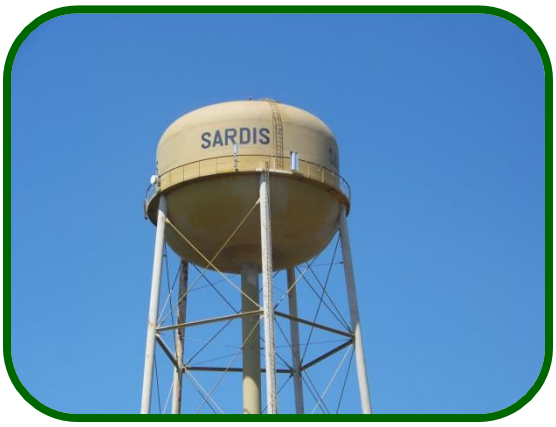

Figure 51: Available Fire Protection – Water Source – Pressurized – 1892.7 m L/min (500 gpm) hydrants less than or equal to (≤) 304.8 m (1000 feet) apart.

ii. 946.4 L/min (250 gpm) hydrants less than or equal to (≤) 304.8 m (1000 feet) apart

Figure 52: Available Fire Protection – Water Source – Pressurized – 946.4 L/min (250 gpm) hydrants less than or equal to (<) 304.8 m (1000 feet) apart.

b. Non-Pressurized water source available (off-site)

i. Greater than or equal (≥) to 946.4 L/min (250 gpm) continuous for 2 hours

Figure 53: Available Fire Protection – Water Source – Non-pressurized water source availability (off-site) – Greater than or equal to (≥) to 946.4 L/min (250 gpm) continuous for 2 hours

ii. Less than 946.4 L/min (250 gpm) continuous for 2 hours

Figure 54: Available Fire Protection – Water Source – Non-pressurized water source availability (off-site) – Less than 946.4 L/min (250 gpm) continuous for 2 hours

iii. Example of Dry Hydrant

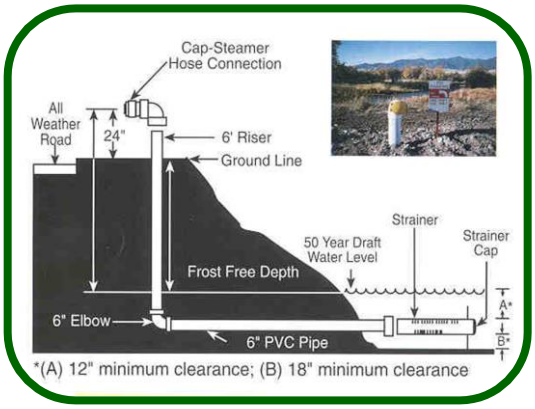

Figure 55: Available Fire Protection – Water Source – Non-pressurized water source availability (off-site) – Water unavailable – Dry Hydrants.

c. Water unavailable

2. Organized Response Resources

a. Station less than (≤) 8 km (5 miles) from structure

The Sardis Volunteer Fire Department one station located in the city. The newest fire truck is a 1997 1300 GPM Pierce for City and County use. The oldest fire truck is a 1990 750 GPM Ford for City use only. Sardis also has a 1998 Ford F350 Brush Truck with a 300 gallon water tank.

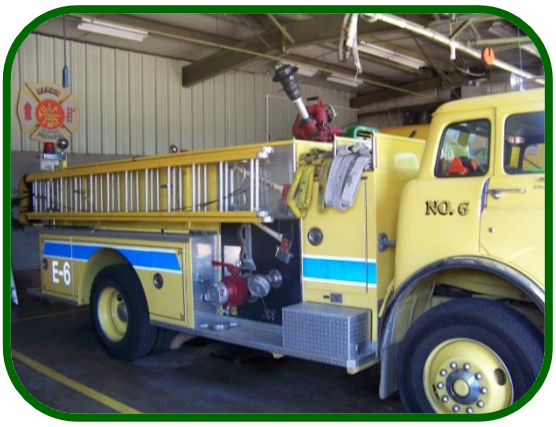

Figure 56: Available Fire Protection – Organized Response Resources – Station less than (≤) 8 km (5 miles) from structure

b. Station greater than (>) 8 km (5 miles) from structure

Figure 57: Available Fire Protection – Organized Response Resources – Station greater than (>) 8 km (5 miles) from structure

3. Fixed Fire Protection

a. NFPA 13, 13R, 13D sprinkler system

Example of ceiling sprinkler system.

A few businesses have sprinkler systems in Sardis.

Figure 58: Available Fire Protection – Fixed Fire Protection – Example of Ceiling Sprinkler System

b. None

Example of an office/home celling without sprinklers.

Figure 59: Available Fire Protection – Fixed Fire Protection – Sprinkler – None

H. Placement of Gas and Electric Utilities

1. *Both underground*

   Utilities are not underground in this community.

Figure 60: Placement of Gas and Electric Units – Both underground

2. *One underground, one aboveground*

   Aboveground liquid propane (LP) gas tanks and woodpiles should not be located within thirty (30) feet of the structure

   Entergy's electrical lines in Sardis are both above and below ground. Maintenance of the vegetation within the electrical line right-of-way varies across the community. Center Point Corporation's natural gas lines are below ground except for the home meters.

Figure 61: Placement of Gas and Electric Units – One underground, one aboveground.

3. **Both aboveground**
   Utilities are not aboveground in this community.

   Aboveground utilities can be problematic in wildfire-prone areas. Overhead power lines may stretch or arc when exposed to radiant heat and become a clearance problem for firefighting equipment. This may even cause a wildfire if windblown branches come into contact with live lines. Aboveground utility connections or wellheads around rural homes must be protected from wildfire through vegetation clearance and/or noncombustible housings.

   Aboveground liquid propane (LP) gas tanks and woodpiles should not be located within thirty (30) feet of the structure.

Figure 62: Placement of Gas and Electric Units – Both aboveground.

Wildfire Hazard

Wildfire hazard is the description of existing conditions, especially fuels, which indicate ease of ignition and the degree of control difficulty expected if those fuels burn. Management of vegetative fuels is the principal approach to reducing the wildfire hazard to houses. Fuel management is not only necessary to protect the landscape from wildfire, but it is critical to protect the structure itself from ignition. A Mississippi home at medium risk of wildfire should be surrounded by at least thirty (30) feet of defensible space. Homeowners in high-risk or extreme-risk areas should go beyond the basic thirty (30) feet of defensible space and establish a zoned landscape of up to 100 feet wide to protect structures from ignition.

Fuels

Fine fuels are usually the first to ignite and contribute to the early spread of wildfire; the primary fine fuel is pine straw. A moderate to heavy accumulation of these fuels is present throughout the wooded areas.

Intermediate fuels consist of dead branchwood and living brush. Moderate to heavy concentrations of these types of fuels are present. A light to moderate evergreen shrub understory of southern wax myrtle and yaupon holly make up this fuel classification. Southern wax myrtle and yaupon holly are very volatile and fast moving. Once ignited, they burn very intensely.

Heavy fuels like dead logs and stumps do not ignite readily, but once ablaze they will burn for a long time and contribute significantly to the intensity and duration of a wildfire. Moderate to heavy concentrations of such fuels are present.

Prioritized Risk Mitigation Plan

There are several ways to reduce fine fuel accumulation in the undeveloped portions of your community or town. Homeowners should also be encouraged to clear fine fuels immediately adjacent to their homes and other structures. In the event of a wildfire, this will prevent direct flame contact with wooden components of the structures. Maintaining a minimum of thirty (30) feet of defensible space around the home helps break the fuel chain between the wooded areas and the home and is the key to home protection from wildland fire. The average defensible space in your community is thirty (30) feet per home.

Dead logs should be removed from within thirty (30) feet of structures. Homeowners should be encouraged to use any suitable deadwood as fireplace fuels, stacking it well away from any structure. Logs not used for fuel should be naturally scattered in adjacent woodlands rather than bunched or piled. Brushy vegetation should be cleared within thirty (30) feet of any structure. Landscaping with highly flammable plant material should be discouraged. Low growing juniper ground cover should be at least six (6) feet from wooden components of homes. Pampas grass should not be planted within fifteen (15) feet of any flammable structure; it should be cut back in late February or early March of each year to prevent accumulations of dead material. Planting beds mulched with pine straw or bark should be avoided within three (3) feet lateral distance from flammable structural components.

No tree crowns should be allowed to brush against or overhand the roofs of structures. Crown fires are possible in this area. Homeowners may consider thinning trees in their yard so that there is a separation between crowns. This will break the continuity of aerial fuels should a crown fire occur. All homeowners should keep their roofs and gutters clear of dead leaves and pine needles.

Risk Mitigation

The expected losses from a wildfire make risk mitigation a primary concern. Risk can be minimized by the use of the NFPA 1144 Standards for Protection of Life and Property from Wildfire 2002 and 2008 Editions:

- Be aware of low-hanging mufflers and trailer safety chains, especially on contractor and service vehicles,
- All fireplace and wood stove chimneys and flues should have a approved spark arrestor constructed of a minimum 12-guage welded wire or woven wire mesh, with the openings not to exceed ½ inch,
- Risk can be minimized by safe burning of debris by residents. As an alternative, a chipper could be installed at a maintenance site. Homeowners could bring vegetative debris, have it chipped and use it as mulch,
- Regulating and strictly enforcing on-site debris burning by contractors. Warming fires for workers should be confined in sturdy metal barrels,
- Distribution of a wildfire protection information packet to all residents. The MFC can provide these materials,
- Incorporating fire safety messages on a community action board or community newsletter, when wildfire danger is high, can raise awareness of severe fire weather conditions.

Proposed Hazard and Structural Ignitability Reduction Priorities

Table 1 – Community Hazard and Structural Ignitability Reduction Plan

	Treatment Area	Treatment Types	Treatment Method(s)
1.	All Structures	Create minimum of 30 feet of defensible space	Trim shrubs and vines to 30 feet from structures, trim overhanging limbs, replace flammable plants near homes with less flammable varieties, remove vegetation around chimneys.
2.	Applicable Structures	Reduce structural ignitability	Clean flammable vegetative material from roofs and gutters, store firewood appropriately, install skirting around raised structures, store water hoses for ready access and replace pine needles and mulch around planting with less flammable landscape materials.
3.	Community Clean-up Day	Cutting, mowing, pruning	Cut, prune and mow vegetation in shared community spaces
4.	Standards/Codes	Consider adopting NFPA Standards	Improve driveway access and widen gates, improve the visibility of house numbers, store firewood appropriately, create defensible space and clear bush, require Class A roofing materials, provide for maintenance of community lots and restrict debris burning.
5.	Interior Perimeter	Reduce hazardous fuels	Mow common property along interior perimeter. Treatment priority should be addressed by the community as conditions allow.
6.	Utilities Corridor	Reduce hazardous fuels	Mow corridor and thin vegetation. Treatment priority should be addressed by the community as conditions allow.

Proposed Education and Outreach Priorities

Table 2 – Proposed Education and Outreach Activities

1. Conduct "How to Have a Firewise Home" Workshop for Homeowners

Conduct a workshop for homeowners that teach the principles of making homes and properties safe from wildfire. Topics for discussion include defensible space, landscaping, building construction, etc. Workshop will be scheduled for evenings or weekends when most homeowners are available and advertised through conventional media outlets and homeowner association newsletters and emails.

Homeowners take home a free copy of the *How to Have a Firewise Home* CD-Rom containing practical video seminars on living in the wildland/urban interface, why homes burn, how to protect your home from wildland fire, and a 3-D home activity in which homeowners turn a home that is a wildfire hazard into a home that is "Firewise."

Table 2 – Proposed Education and Outreach Activities

2. Conduct "Living on the Edge" Workshop for Community Leaders

Conduct a workshop for community leaders that teaches the principles of making communities safe from wildfire. Discussion includes the perspectives of builders/ developers, real estate agents, insurance agents, landscape designers, urban planners, homeowners and more.

Participants leave with a free copy of the *Living on the Edge* CD-ROM, containing practical video seminars on the wildland/urban interface and interactive exercises on how to assess your community's risk in a wildfire event and how to design and develop a community based on "Firewise" principles.

3. Spring Clean-up Event

Conduct clean-up event every spring involving the Mississippi Forestry Commission, local Municipal and Volunteer Fire Departments, County Emergency Management and residents. Set up information table with educational materials and refreshments. Initiate the event with a morning briefing by the MFC mitigation specialist and the neighborhood association president detailing plans for the day and safety precautions. Activities to include the following:

- Clean flammable vegetative material from roofs and gutters
- Trim shrubs and vines to 30 feet away from structures
- Trim overhanging limbs
- Mow interior, shared community property
- Clean fire lines

Celebrate the work with a community cookout, with Emergency Management discussing and commending the work accomplished.

4. Neighborhood Association Newsletter

Establish and/or distribute the following in the neighborhood newsletter:

- Firewise Status Reports
- Firewise Tips (including fire-resistant plants lists and defensible space ideas)

5. Information Packets

Develop and distribute informational packets to residents. Included in the packet are the following:

- Mississippi Firewise Landscaping Guide
- Firewise Landscaping and Construction Checklist
- Native Mississippi Shrubs
- Native Mississippi Tress

The above education and outreach activities should begin immediately.

Assessment Strategy

To accurately assess progress and effectiveness of this assessment, the community will implement the following:

- Annual wildfire risk assessment will be conducted to re-assess wildfire hazards and prioritize needed actions,
- Mitigation efforts that are recurring (such as mowing, burning and clearing of defensible space) will be incorporated into an annual renewal of the original assessment.
- Mitigation efforts that could not be funded in the requested year will be incorporated into the annual renewal of the original assessment.

- Continuing educational and outreach programs will be conducted and assessed for effectiveness. Workshops will be evaluated based on attendance and post surveys that are distributed by mail 1 month and 6 month following workshop date.
- The community will publish an annual report detailing mitigation projects initiated and completed, progress for ongoing actions, funds received, funds spent and in-kind services utilized. The report will include a "state of the community" section that critically evaluates mitigation progress and identifies areas for improvement. Recommendations will be incorporated into the annual renewal of the assessment.

Fire Suppression

The quick, effective initial attack is the key to managing wildland fires. Fires that are attacked while small can usually be readily contained. If the response is slow or initial attack fails, a wildfire threatening the community may quickly develop into a major incident.

Emergency Action

In every emergency, including wildfire suppression, the order of priorities is: **life, property** and **resources**.

Order of Emergency Actions:

- Reporting the Fire: The first person to detect a wildfire should immediately report the fire to the local Fire Department or 911.
- The Fire Department will most likely be the first response unit to arrive on scene and will notify all other departments or agencies if their services are needed.
- The Incident Command System will be in effect from the beginning of any wildfire. If it is a significant wildfire event, an Information Officer will be assigned.

Next Step

After reviewing the contents of this assessment and its recommendations, the members of the Firewise Board should determine whether or not they wish to continue with the Firewise Communities/USA project. The Firewise Communities/USA representative, Leslie G. "Opie" Blackwell, will contact the Firewise Committee to learn of their decision. If the site assessment and recommendations are accepted and the project continues the Firewise Committee should create agreed-upon, area-specific solutions to the Firewise recommendations. A Firewise Communities/USA representative will visit with you during this process for the purpose of monitoring program progress. **This Firewise Community Action plan will be completed within six months of the receipt of this assessment**. Following its submittal to local state or federal officials or Firewise Communities/USA, the committee will meet with Firewise representatives to discuss the next steps and to critique the progress. Should your community seek to achieve national Firewise Communities/USA status and recognition, it will integrate the following standards into its plan:

- Sponsor a local Firewise task force, committee, commission or department to maintain the Firewise Community program and status.
- Enlist a Wildland/Urban interface specialist to complete an assessment and create a plan from which it identifies agreed-upon, achievable local solutions.
- Invest a minimum of $2.00 annually per capita in its Firewise Communities/USA program. (Work done by municipal employees or volunteers using municipal or other equipment can be included, as can state/federal grants dedicated to that purpose.)
- Observe a Firewise Communities/USA Day each spring that is dedicated to a Firewise project.
- Submit an annual report to Firewise Communities/USA.

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Appendix A – Wildfire Hazard and Risk Assessment Score Sheet

Wildland Fire Risk and Hazard Severity Assessment Form – Station 1 Response Area

(Circle the most appropriate element in each category and total the points)
Source: NFPA 1144 Standard for the Protection of Life & Property from Wildfire, 2002 edition, NFPA, Quing, MA

Element	AP[1]	CA[2]
A. Means Of Access		
1. Ingress and egress		
a. Two or more roads in/out	0	1.3
b. One road in/out	7	
2. Road width		
a. ≥7.3 m (24 ft.)	0	
b. ≥ 6.1m (20 ft.) and < 7.3 m (24 ft.)	2	1.75
c. < 6.1m (20 ft.)	4	
3. All-season road condition		
a. Surfaced road, grade < 5%	0	
b. Surfaced road, grade >5%	2	
c. Non-surfaced road, grade < 5%	2	0.7
d. Non-surfaced road, grade >5%	5	
e. Other all-season	7	
4. Fire Service Access		
a. ≤91.4 m (300 feet) with turnaround	0	
b. >91.4 m (300 feet) with turnaround	2	1.94
c. <91.4 m (300 feet) w/o turnaround	4	
d. ≥91.4 m (300 feet) w/o turnaround	5	
5. Street Signs		
a. Present [10.2 cm (4 in.) in size & reflectorized]	0	1.15
b. Not present	5	
B. Vegetation (Fuel Models)		
1. Characteristics of predominate vegetation with in 91.4m (300 ft.)		
a. Light (Grasses, Forbs, Sawgrass, Tundra, NFDRS Fuel Models A, C, L, N, S, & T.	5	
b. Medium (Light brush & small trees) NFDRS Fuel Models D, E, F, H, P, Q & U.	10	7.54
c. Heavy (Dense brush, timber & hardwood) NFDRS Fuel Models B, G & O.	20	
d. Slash (Timber harvesting residue) NFDRS Fuel Models J, K & L.	25	
2. Defensible Space		
a. More than 30.48m (100 ft.) of vegetation treatment from the structure(s)	1	
b. 21.6m – 30.48m (71-100 ft.) of vegetation treatment from the structure(s)	3	3.54
c. 9.14m – 21.3m (30-70 ft.) of vegetation treatment from the structure(s)	10	
d. <9.1m (30 ft.) of vegetation of treatment from structure(s)	25	
C. Topography Within 91.4m (300 Ft.) Of Structure(s)		
1. Slope <9%	1	
2. Slope 10% to 20%	4	
3. Slope 21% to 30%	7	3.18
4. Slope 31% to 40%	8	
5. Slope > 41%	10	

Elements	AP[1]	CA[2]
D. Additional Rating Factors (Rate All That Apply)		
(Assign a rating factor between 0 and 5)		
1. Topographical features that adversely affect wildland fire behavior		5
2. Areas with a history of higher fire occurrence than heavy surrounding areas due to special situations, (e.g., lightning, railroads, escaped debris burning, arson, malicious burning)		5
3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds		5
4. Separation of adjacent structures that may contribute to fire spread		1
E. Roofing Assembly		
1. Class A roof	0	
2. Class B roof	3	.05
3. Class C roof	15	
4. Non-rated	25	
F. Building Construction		
1. Materials (predominate)		
a. Noncombustible/fire-resistive siding, eaves & deck	0	
b. Noncombustible/fire-resistive siding & combustible deck	5	5.38
c. Combustible siding and deck	10	
2. Building setback relative to slopes >30%		
a. ≥ 9.1m (30 ft.) to slope	1	1.68
b. < 9.1m (30 ft.) to slope	5	
G. Available Fire Protection		
1. Water Source		
a. Pressurized water source availability	0	
i. 1892.7 L/min (500 gpm) hydrants ≤ 304.8 m (1000 ft.) apart		0
ii. 946.4 L/min (250 gpm) hydrants ≤ 304.8 m (1000 ft.)apart	1	
b. Non-pressurized water source availability (off site)		
i. ≥ 946.4 L/min (250 gpm) continuous for 2 hours	3	
ii. < 946.4 L/min (250 gpm) continuous for 2 hours	5	
c. Water unavailable	10	
2. Organized Response Resources		
a. Station ≤8 km (5 mi) from structure	1	1
b. Station >8 km (5 mi) from structure	3	
3. Fixed Fire Protection		
a. NFPA 13, 13R, 13D sprinkler system	0	4.85
b. None	5	
H. Placement Of Gas And Electric Units		
1. Both underground	0	
2. One underground, one aboveground	3	2.63
3. Both aboveground	5	

Hazard Rating	Total Points
1. Low	<40
2. Moderate	40-69
3. High	70-112
4. Extreme	>112

AP[1] – Assessed Points from NFPA
CA[2] – Community Average – how your community rates against the NFPA Assessed Points

Home /Subdivision Total **52.69**

Hazard Rating **Moderate**

Appendix B - Building Materials and Design

Building Materials and Design. A structure's ability to survive a wildfire is directly related to material and design. This is especially significant where fire hazard is high and fire suppression is difficult.

Researchers at the USDA Forest Service Fire Sciences Laboratory in Missoula, MT have studied structure survival on large wildfires around the country. Some of their findings are as follows:

1. Roof materials are the single most important factor in construction.
   a. Ceramic materials are probably the safest. Some are made to look like wood shakes.
   b. Fiberglass-asphalt shingles were observed melting rather than igniting on a large California fire incident.
   c. Wood shingles pressure treated with fire retardant may provide some protection for up to five years. Observations indicate that the effective life of the treatment may be as little as eighteen months. Re-treatment by spraying on retardant may be effective for about a year.

   Note: According to researcher Jack Cohen of the USDA Forest Service Fire Sciences Laboratory in Missoula, MT, in mountain fires that are throwing burning materials: ". . . if you have a wooden roof, your house will likely burn regardless of the vegetation around it."

2. Wood siding (T-111) does not ignite readily unless exposed to direct flame. No flammable materials should be allowed within three (3) feet of wood siding. Siding is more likely to ignite when flame is applied to the edges, so no combustibles should be allowed beneath bottom edges of siding.
3. Expanses of glass, especially on down-slope side of homes, can increase vulnerability.
   a. Use double-paned plate glass. This reduces the amount of heat energy transmitted into the home. If the outside pane breaks from the heat, the second pane still affords some protection.
   b. Double-paned, tempered glass is best; double-pained, non-tempered is adequate.
   c. Pane size is significant. Large windows present greater danger; if a large expanse of glass is used, it is safer to have several small panes than one large plate.
4. A clean, simple exterior design is safer in that it minimizes surface exposed to heat and flame.
   a. Enclose eaves, limit "gingerbread trim"
   b. Avoid designs that include many angles and set-backs in exterior walls. Limit valleys and dormers in roof constructions.
   c. If the house or deck is cantilevered or otherwise overhangs a slope, it is imperative that the underside be sealed or kept immaculately clean of any flammables. Even if support posts are non-flammable they may provide a chimney effect, carrying sparks and flames into the underbelly of the structure.

Structure Density. For single story homes with 18 foot roof peaks, there should be a minimum horizontal separation of 25-30 feet between homes. Two-story homes should be separated by 50-60 feet of horizontal distance.

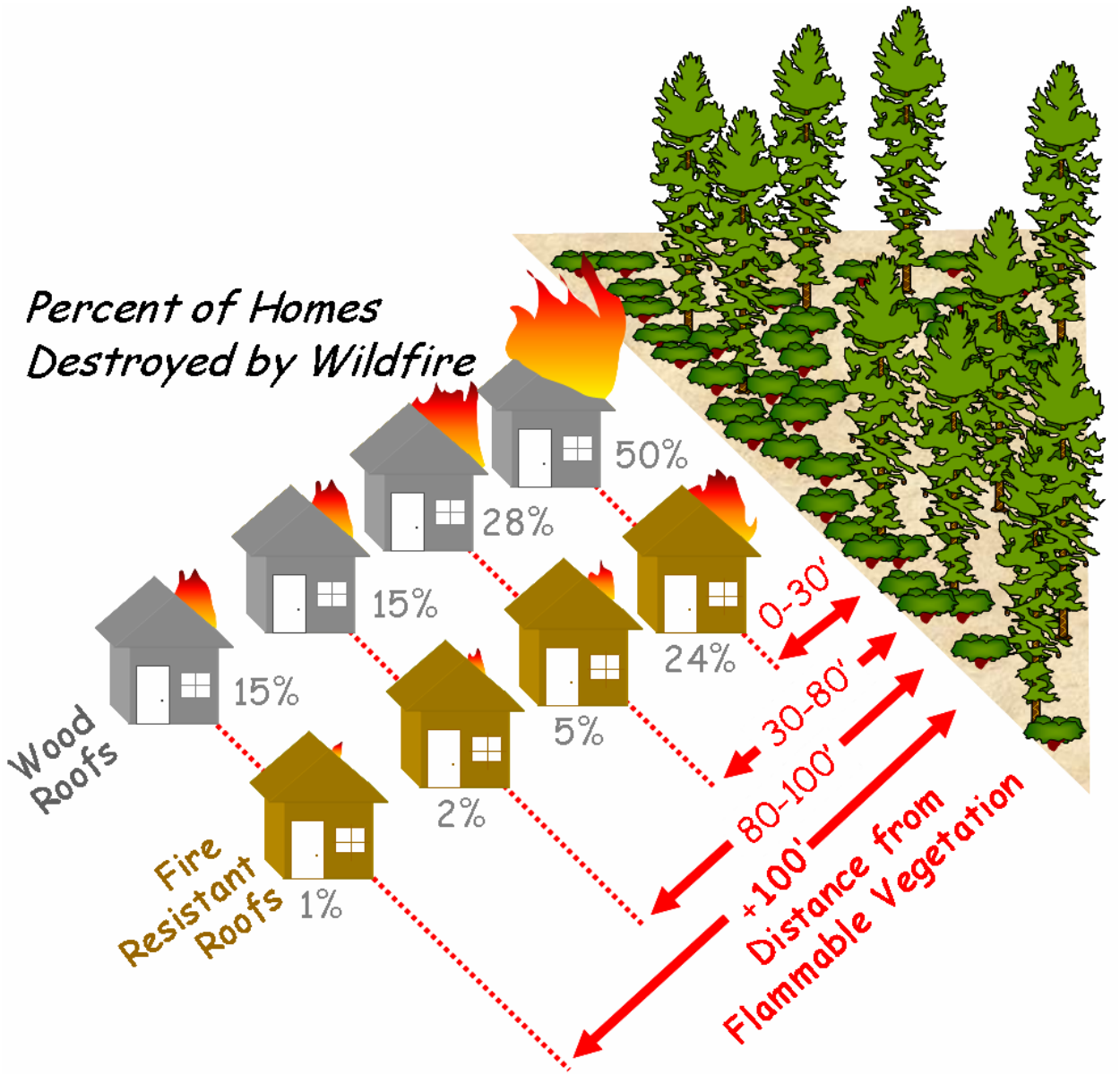

Figure 63: Percent Of Homes Destroyed By Wildfire

Appendix C – Building Construction For Reduced Wildfire Risk

Roofing

After the fuels in the landscape, the roof is the next most vulnerable part of the property to wildfire. Roofs are susceptible to firebrands that may fall on them from a wildfire. Roofs are also vulnerable to radiant heat of an extreme crown wildfire.

The best way to avoid rooftop ignition is to have a fire-resistant or noncombustible roof covering. Fire-resistant roofing materials are categorized as Class A, B, or C in accordance with the ASTM E108 test standard, which is the test for determining the rate of spread of flame in roofing materials.

ASTM does not rate noncombustible roofing materials because they cannot be ignited. Noncombustible roofing materials are appropriate for high-risk areas. These materials included standing-seam or exposed-fastener metal roofing, fiber-cement shingles (such as HardiPlank brand), concrete or clay tiles and natural slate roofing.

Roofing Classes

Class A rated roofing materials have the highest level of fire-resistance. Class A Rated roofing materials for Firewise construction include 20-year, 25-year and architectural-grade fiberglass composition shingles and shingles and shakes made from recycled materials. Wood shingles may be purchased with a fire-retardant coating, but the shingles must be annually treated to maintain their fire-retardant qualities. Wood shake shingles are the most flammable roofing material. Class A roof coverings are effective against severe fire exposure. Under such exposures, Class A roof coverings are not readily flammable, afford a fairly high degree of fire protection to the roof deck, do not slip from position and pose no firebrand hazard.

Class B roof coverings are effective against moderate fire exposures. Under such exposures, Class B roof coverings are not readily flammable, afford a moderate degree of fire protection to the roof deck, do not slip from position and pose no firebrand hazard. Examples of Class B roof coverings are pressure-treated shakes and shingles.

Class C roof coverings are effective against light fire exposures. Under such exposures, Class C roof coverings are not readily flammable, afford a measurable degree of fire protection to the roof deck, do not slip from position and pose no firebrand hazard. Examples of Class C roof coverings are wood shakes and shingles, plywood and particleboard.

Eaves, Soffits, Vents and Gutters

The eaves of the house are often the closest point of the structure to the flames of a wildfire. Because eaves protrude from the edge of the house, they are vulnerable to both radiant and convective exposure. It is important to understand that, because these features often are designed to ventilate attics or roof spaces and because of the strong convection currents created during a severe wildfire, superheated air and embers may actually be sucked into soffits or fascia vents and into the attic or interior roof space, creating an interior fire that usually cannot be stopped.

In medium-, high-, or extreme-risk areas, eaves should be enclosed with noncombustible materials. The size of the soffit vents should be minimized and the vents themselves should be made of noncombustible and non-melting materials, such as metal. PVC, fiberglass and vinyl are all vulnerable to melting or igniting under the influence of radiant heat.

The same recommendations apply for attic vents, subfloor vents, foundation vents or other structural vents – that they be made of noncombustible and non-melting materials and be protected with ⅛ metal mesh to prevent embers from entering.

Exterior Walls

It is important to prevent the ignition of exterior walls as the first line of defense against losing a house to wildfire. Exterior walls are vulnerable to both radiant and convective ignition. If defensible space and a zoned Firewise landscape have been installed around a building, radiant heat is unlikely to be hot enough to ignite an exterior wall. Although a fire on an exterior wall may not automatically transfer to the interior through the wall itself, fire on an exterior wall can more easily enter the home through the eaves, soffits, vents, windows or attic areas. Some siding materials (e.g., vinyl, fiberglass) will burn only at very high temperatures, but will melt and fall away when exposed to radiant heat, exposing the sheathing or wall space to radiant heat or flames. Exterior wall materials that are resistant to radiant heat and flames include plaster, stucco, fiver cement, metal and masonry (stone, brick and block).

Chimneys

Chimneys can be a hazard in wildfire-prone areas. Embers from a fire in the fireplace can leave the chimney and ignite the roof or start a wildfire in the neighborhood, threatening the structure itself as well as neighboring structures and adjacent natural areas. To easily protect both the structure and the surrounding forest from wildfire, every chimney should be fitted with an approved welded or woven wire-mesh spark arrestor. This feature has the added benefit of keeping birds and animals from entering or nesting in the chimney space. In addition, all siding on the chimney housing should be noncombustible materials.

Crawl Spaces, Decks, Balconies, Carports, Fences and Attachments

Raised buildings without skirting are more vulnerable to wildfire because firebrands or hot embers can be blown into the crawl space under the structure, increasing the possibility of ignition of accumulated debris and the subflooring. Decks, balconies and other overhangs or attachments to a structure are often most vulnerable to ignition from convective exposure (direct contact with nearby flames) and from firebrands being blown under them to ignite debris on the underside of the attachment.

One solution is to enclosed crawl spaces, decks, balconies, carports and overhangs with noncombustible sheet shirting or metal mesh to prevent firebrands from getting under the house or attachment. Clearing debris from under decks and overhangs is the minimum maintenance required in wildfire-prone areas.

Any feature of the property attached to the house should be considered a part of the building during a wildfire risk assessment. For example, an attached garage, storage space or fence should be considered part of the structure. The vulnerability of these attachments can be reduced by enclosing them with noncombustible or fire-resistant materials to reduce the possibility of ignition. Combustible (i.e. wooden) sheds and fences should not be adjacent to or touching a house. The problem can be fixed by separating the combustible attachment from the house (e.g., by moving a storage shed away from the house) or by providing a 12 foot long noncombustible or melt-away connection between the house and the attachment (e.g., a 12 foot section on noncombustible metal or melt away vinyl fencing between a wood fence and the house). Woodpiles should be kept outside the thirty (30) foot defensible space.

Windows, Glass Doors and Skylights

Radiant heat from a wildfire can cause glass window panes to fracture, leaving an opening for flames or firebrands to enter the interior of a structure. Heat-resistant (tempered or double-paned) glass should

be used for windows, glass doors and/or skylights in houses being built in high-risk or extreme-risk areas. Replacing nylon or plastic window screens with metal screens is a minimum first step for houses in medium- or high-risk areas.

Utilities

Aboveground utilities can be problematic in wildfire-prone areas. Overhead power lines may stretch or arc when exposed to radiant heat and become a clearance problem for firefighting equipment, This may even cause a wildfire if windblown branches come into contact with live lines. Aboveground utility connections or wellheads around rural homes must be protected from wildfire through vegetation clearance and/or noncombustible housings.

All flammable materials should be stored more than thirty (30) feet away from structures. Aboveground liquid propane (LP) gas tanks and woodpiles should not be located within thirty (30) feet of the structure.

(This appendix was taken in part from the "Wildfire Mitigation In Florida – Land use planning strategies and best development practices", April 2004 (Chapter 5) and fitted to suit Mississippi's environment.)

Appendix D – Support of Wildfire Protections and Suppression Efforts

In the worst-case scenario, a wildfire approaches and ignites a structure. At this point, any factors or hazards that slow or delay the response of firefighters create a greater chance that the house will be lost in the wildfire. There are a number of landscape, access, infrastructure and water supply issues that must be address in order to provide full support for firefighting services.

Defensible Space

The first step in supporting firefighting activity is to create at least 30 feet of defensible space around the house. The defensible space is so named because it provides space for the structure to "defend itself" from wildfire. The primary purpose of defensible space is to separate the structure from wildland fuels so that the structure can survive even in the absence of firefighting assistance. Defensible space secondarily allows firefighters a better working space to protect the house in the event that help is needed.

Access and Infrastructure

Street Signs and House Numbers

All street signs and house/site numbers should be visible from the road and should be made of noncombustible materials. Wooden signs may burn during a wildfire, making it difficult for firefighters who may not be familiar with the layout of the roads. Clear labels make it easier for firefighters to quickly locate and defend threatened structures. Home 911 numbers should be at least four (4) inches tall, one-half (1/2) inch wide and reflective with a contrasting background. The physical house numbers should visible from the road. The reflective numbers are useful in smoky / nighttime conditions.

Road and Bridges

Roads and bridges should be in good condition and should be at least 20 feet wide to accommodate firefighting equipment and allow for evacuation. Bridges should have a minimum capacity of 60,000 pounds (30 tons gross vehicle weight) to allow for passage of heavy firefighting equipment. It is always better to have two routes of access into a property or subdivision; dead-end roads may require that residents pass through a wildfire in order to evacuate and may increase the chance that firefighters and their equipment are cut off from escape routes.

Driveways and Gates

Driveways must be large enough to accommodate firefighting equipment. Typical fire trucks require a driveway at least twelve (12) feet wide and with fifteen (15) feet of clearance from vegetation on sides and above the driveway. A sixteen (16) foot wide driveway is preferable. Driveways longer than 150 feet need to provide a turnaround. Driveways longer than 200 feet should have both turnarounds and turnouts, which are spaces for firefighting equipment to pull off the side of the drive so that another piece of equipment can pass.

Gates should open inward and be wide enough to accommodate firefighting equipment, at least two (2) feet wider than the width of the driveway. Gates should be at least thirty (30) feet off the main road so that the equipment can pull off the road to open the gate.

Water Supply

Along with the plowing of firelines to break the continuity of vegetative fuels, the use of water is a key to successful wildfire suppression efforts. Sources of water for firefighting should be supplied in both rural and suburban wildland-urban interface settings. A pressurized hydrant system is ideal, but where there are no fire hydrants, elevated water tanks, pools, ponds or other static water sources should be available to provide a continuous supply of water for firefighting efforts. Suitable dry hydrants or drafting sites – where firefighting equipment can easily pull up to a water source or pool to fill up – should be provided throughout neighborhood in high-risk areas.

(This appendix was taken in part from the "Wildfire Mitigation In Florida – Land use planning strategies and best development practices", April 2004 (Chapter 5) and fitted to suit Mississippi's environment.)

Appendix E – Firewise Landscaping

If a neighborhood is at high risk for wildfire, resident should prepare for wildfires just as coastal residents prepare for hurricane season. Unlike hurricanes, fire behavior is somewhat predictable from the fuels and conditions on a site. Therefore, fuel reduction is an important step in wildfire mitigation.

At the most basic level, the three main factors that contribute to wildfire risk at an individual home site are:

- Vegetation;
- Location and surrounding land use;
- Building construction (Appendix C & D)

The basic steps to reduce the level of wildfire risk in the landscape are:

- Determine the level of risk (NFPA 1144 Assessment)
- Create a "zoned" landscape matched to the level of risk
- Perform regular landscape maintenance

A house is more likely to withstand a wildfire if grasses, brush, trees and landscape plants are selected and managed to reduce the wildfire's intensity. A wisely landscaped yard can greatly reduce the hazard by slowing the spread of a wildfire and keeping the wildfire as far away from building as possible. In addition, Firewise landscaping increases the effectiveness of fire-resistant building construction materials. It is not necessary to remove all of the trees and vegetation in a landscape to protect the property from wildfire. Remember that the reduction of surface-level fuels is the most important action to reduce the wildfire threat in the wildland-urban interface.

A wildfire mitigation landscape involves creating a series of concentric zones around a house, depending on the level of risk from wildfire. The objective of zoned landscaping is to progressively reduce vegetation flammability and fuel volume closer to the house or other structures to slow a wildfire's approach while reducing it intensity. The landscaping around detached garages, storage buildings, barns and other structures should be included in the plan.

If the site is at medium risk of wildfire, the owners should create the first of the landscaping zones, called the defensible space. Defensible space is an area of managed vegetation at least thirty (30) feet wide. The basic defensible space should be created for all properties in areas at medium or higher risk of wildfires. If the site is high or extreme risk, the owners should created a complete zoned landscape to protect the house and property. In area of high or extreme risk, a thirty (30) foot defensible space may not be sufficient to protect a structure from ignition. In these cases, additional zones should be created beyond the basic defensible space.

Zone 1: Defensible Space (0 to 30 feet from structures to be protected)

Zone 1 is the most important zone and is the area of maximum fuel reduction. In order to be effective, the defensible space must be continually maintained. Listed below are some things that should be included in a defensible space plan:

- Keep all vegetation and organic mulches at least 5 feet from the house and other structures – use noncombustible separators such as gravel mulches, patios, walkways, driveways, stone walls, raised planters or pools as fuel breaks directly adjacent to the house.

- Replace flammable plants with less flammable plants in the landscape (see Appendix I for suggestions) – plant grasses, flowers and small shrubs that stay green and growing during the fire season.
- Arrange plants in mulched beds or islands separated by at least 10 feet of low groundcover or turf.
- Remove stressed, diseased or dying trees and plants.
- Remove or modify ladder fuels under pine trees or eaves. Ladder fuels, which channel fire from the ground to the treetops or eaves, are: vines climbing on trees or walls; small pine trees (up to 15 feet tall) under larger pine trees; tall shrubs under pine trees or under eaves; shrubs that are conical in shape under pine trees or under eaves.
- Thin pine trees to 15-foot spacing between tree crowns.
- Be certain that there is a 16-foot wide clearance between trees and structures or pools for use by firefighting equipment.
- Prune tree branches to 6-10 feet above the ground.
- Prune tree branches to 10-15 feet away from roof, chimney, stovepipe, siding and driveway.
- Do not keep firewood, flammable materials, storage buildings or compost in Zone 1.
- Irrigate wisely (i.e., without wasting water) during dry seasons to keep groundcover moist.

Zone 2: The Fuel Reduction Zone (30 to 60 feet)

Zone 2 is an area of moderate fuel reduction and modification should be added in high-risk and extreme-risk conditions. The idea of Zone 2 is to break the continuity of the fuel available for a wildfire by thinning and grouping shrubs and reducing the presence of flammable plants. This zone should be extended along the driveway or other access road in order to provide a wildfire – free access zone. Reduce the fuels in Zone 2 in the following ways:

- Removed stressed, diseased or drying trees and plants.
- Replace flammable plants with less flammable plants.
- Mow or remove vegetation between shrubs to create separated shrub islands; arrange new planting in mulched beds or planting areas separated by groundcover.
- Remove or modify ladder fuels under pine trees.
- Consider thinning closely planted pine trees
- Extend thinning along either side of the driveway and access road.
- Prune tree branches to 6-10 feet above the ground.
- Prune tree branches to 10-15 feet away from driveways and wooden fences.
- Firewood or flammable materials may be stored in Zone 2, but provide 15 foot vegetation clearance around propane tanks, barbeque grills, firewood piles and flammable materials.
- Irrigate wisely (i.e., without wasting water) during dry seasons to keep groundcover moist.

Zone 3: The Transition Zone (60 to 100 feet)

Zone 3 is a transition between the inner zones and the natural landscape beyond. This is an important zone if the site is at high or extreme risk from wildfire. Fuel reduction in this zone can keep a hot crown fire from approaching and igniting the house or other structures. Here are some steps to take in Zone 3:

- Thin shrubs lightly.
- Move or remove vegetation between shrubs to create separated shrub islands.
- Removed or modify ladder fuels under pine trees

Zone 4: Perimeter Fuel Management Zone (100 to 200 feet and beyond)

Zone 4 is the area beyond the zoned landscape. This zone extends out 100+ feet from any structures that need protection. Periodic fuel reduction in Zone 4 will help to protect the house and property in

the event of a wildfire. The goal is to slow an approaching wildfire, reduce the intensity and keep the wildfire low on the surface. Fuel reduction techniques might include prescribe burning, mechanical methods (mowing, chopping), biomass removal (pine straw harvesting, thinning of trees), herbicides or grazing.

- If the site owner also owns the property in Zone 4, engage in fuel management practices to reduce the risk of wildfire and protect the property.
- If Zone 4 falls in a neighborhood common area, management should be coordinated through the homeowner's association or community management. Properly managed common green spaces can make an effective buffer to wildfire.
- If Zone 4 is owned by someone else, encourage and tolerate prescribed fire and other fuel management activities on the adjacent forest or natural lands.

(This appendix was taken in part from the "Wildfire Mitigation In Florida – Land use planning strategies and best development practices", April 2004 (Chapter 6) and fitted to suit Mississippi's environment.)

Figure 64: Clear forest fuels immediately adjacent to homes.

Figure 65: Clear area for 25 feet around structures

Figure 66: Landscaping with highly flammable plant material is discouraged

Figure 67: No tree crowns should be allowed to brush against or overhang the roofs of houses

Appendix F – Fuel Mitigation Zone

A fuel mitigation zone is a specified area of wildland where the fuel has been physically reduced by one or more of the following methods: prescribed burning, mowing, herbicides, thinning and/or firebreak construction.

The purpose is to provide a zone of reduced fuels which will cause a high intensity fire that moves across the zone to become less intense. This reduction in a fire's intensity will promote more effective fire-fighting efforts and cause a significant reduction in radiant heat that a building bordering the fuel mitigation zone would be exposed to.

The idea is NOT to construct a barren piece of ground which would be visually unpleasing, but to construct an area which still has natural beauty but with less fuel hazard.

Problems associated with fuel mitigation zones:

- Cost of construction varies depending on method used to construct the zone.
- Since understory vegetation grows at high rates in the Southern United States, zones would have to be maintained every two - four years to retain its effectiveness.
- High probability of multiple landowners involved in the construction of large fuel mitigations zones. Difficulty may arise in getting group cooperation.
- There may be a lack of consensus by the community at large to establish fuel mitigation zones. Some property owners may oppose the construction of fuel mitigation zones due to the inherent requirement to alter the landscape in this process. These property owners would rather accept the high risks and retain the unaltered looks of the wildland bordering their property.

Figure 68: Before the creation of a fuel mitigation zone

Figure 69: After the creation of a fuel mitigation zone

Appendix G – Firewise Construction Checklist

Firewise Construction

Firewise Construction Checklist

When constructing, renovating or adding to a Firewise home, consider the following:

- Choose a Firewise location.
- Design and build a Firewise structure.
- Develop and maintain a Firewise landscape.

To select a Firewise location, observe the following:

- ☐ Build on the most level portion of the land, since fire spreads more rapidly on any slope.
- ☐ Set a single story structure at least thirty (30) feet back from any ridge and increase the distance for buildings higher than one story.

In designing and building your Firewise structure, the primary goals are fuel and exposure reduction:

- ☐ Use construction materials that are fire-resistant or non-combustible whenever possible.
- ☐ For roof construction, consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, cement and concrete products or terra-cotta tiles.
- ☐ On exterior wall cladding, fire-resistant materials such as stucco or masonry are much better than vinyl, which can soften and melt.
- ☐ Consider size and materials of windows: smaller panes of double glass or tempered glass are most effective; plastic skylights can melt.
- ☐ Cover windows and skylights with non-flammable screening shutters.
- ☐ Cover exterior attic and under-floor vents with 1/8-inch wire mesh; make sure under-eave and soffit vents are closer to the roof line than the wall.
- ☐ Include a driveway that is big enough to provide easy access for fire engines. Driveways should be at least twelve (12) feet wide with a fifteen (15) foot vertical clearance and a slope of less than twelve (12) percent. Driveways and access roads should be clearly marked and include ample turnaround space near the house. Also consider access to a water supply if possible.
- ☐ Provide at least two ground level doors for safety exits and at least two means of escape in each room, so that everyone has a way out of a building in case of an emergency.
- ☐ Keep gutters, eaves and the roof clear of leaves and other debris.
- ☐ Make an occasional inspection of your home or building, looking for deterioration such as breaks and spaces between roof tiles, warping wood or cracks and crevices in the structure.
- ☐ Inspect your property, clearing dead wood and dense vegetation from at least thirty (30) feet around your house. Move firewood away from the house or attachments, like fences or decks.

Any structures attached to the house, such as decks, porches, fences and outbuilding should be considered part of the house:

- ☐ If you wish to attach an all-wood fence to your home, use masonry or metal as a protective barrier between the fence and house.
- ☐ Use non-flammable metals when constructing a trellis and cover with high-moisture, non-flammable vegetation.
- ☐ Prevent combustible materials and debris from accumulating beneath a patio, deck or elevated porches; screen under decks with 1/8-inch wire mesh.
- ☐ Make sure an elevated wooden deck is not located at the top of a hill where it will be in direct line of fire moving up a slope, consider a terrace instead.

For more information, visit www.mfc.ms.gov or www.firewise.org, call Leslie Blackwell at (601) 540-3358 or email Leslie Blackwell at lblackwell@mfc.state.ms.us.

Appendix H – Firewise Landscaping Checklist

Firewise Landscaping

Firewise Landscaping Checklist

When designing and installing a Firewise landscape, consider the following:

- Local area fire history.
- Site location and overall terrain.
- Prevailing winds and seasonal weather.
- Property contours and boundaries.
- Native vegetation.
- Plant characteristics and placement (water, resin, and salt content, fuel load rations and size).
- Irrigation requirements.

To create a Firewise landscape, remember that the primary goal is fuel reduction. To do this, create a series of defensive landscape zones. Zone 1 is closest to the structure and Zones 2-4 move progressively farther away:

- Zone 1: This well-irrigated area encircles the structure for at least 30 feet in all sides, providing space for fire suppression equipment in the event of an emergency. Plantings should be limited to carefully spaced, fire-resistant species.
- Zone 2: Fire-resistant plant materials should be used here. Plant should be low growing, and the irrigation system should extend into this section.
- Zone 3: Place low growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.
- Zone 4: The farthest zone from the structure is often a natural area. Thin selectively here and remove highly flammable vegetation.

Also remember to:

- Leave a minimum of 30 feet around the house to accommodate fire equipment if necessary.
- Carefully space the trees you plant.
- Take out ladder fuels, vegetation that serves as a link between grass and treetops. Ladder fuels can carry fire to a structure or from a structure to vegetation.
- Give yourself added protection with fuel breaks such as driveways, gravel walkways and lawns.

When maintaining a landscape:

- Keep trees and shrubs pruned. Prune all trees from 6 to 10 feet above the ground.
- Remove leaf clutter and dead and overhanging branches.
- Mow your yard regularly.
- Dispose of cuttings and debris promptly, according to local regulations.
- Store firewood away from the house.
- Be sure the irrigation system is well maintained.
- Use care when refueling garden equipment and lawn equipment and maintain it regularly.
- Store and use flammable liquids properly and carefully.
- Become familiar with local regulations regarding vegetative clearance, disposal of debris and fire safety requirements for equipment.
- Follow manufactures instructions when using fertilizers and pesticides.

For more information, visit www.mfc.ms.gov or www.firewise.org, call Leslie Blackwell at (601) 540-3358 or email Leslie Blackwell at lblackwell@mfc.state.ms.us.

Appendix I – Flammability Ranking For Commonly Used Horticultural Plants In The South

Quick Guide to Firewise Shrubs

How to incorporate Firewise shrubs into your landscape:

- Select the "right plant for the right place," by choosing plants that are well adapted to the specific conditions where they are to be planted. Also consider the shrub's flammability characteristics.
- **Highly flammable** shrubs should be planted beyond the defensible space, 30 feet or more from the house.
- **Moderately flammable** shrubs may be planted in isolated landscape beds within the defensible space, at least 15 feet from the house.
- **Low flammability** shrubs can be planted within the defensible space, 6 feet or more from the house.
- Conduct routine landscape maintenance, such as pruning shrubs, to maintain vertical and horizontal separation from other plants.
- Periodically remove dead or diseased plant material from plants within your home landscape.
- Remember, there are no "fireproof" plants. All plants and organic mulches burn in extreme weather or fire conditions.

Did you know you can select shrubs based on their flammability?

Researchers at the USDA Forest Service, University of Florida, and the National Institute of Standards and Technology have developed flammability categories to indicate how easily and intensely a shrub will burn.

High Flammability

Plant these shrubs 30 feet or more away from the house. Maintain them regularly.

J. S. Peterson

Chinese juniper
Juniperus chinensis

Ted Bodner

Dwarf yaupon
Ilex vomitoria

Ted Bodner

Gallberry
Ilex glabra

Ted Bodner

Mountain laurel
Kalmia latifolia

Moderate Flammability

Use cautiously in isolated landscape beds within the defensible space, 15 feet or more from the house.

Joseph A. Marcus

Ashe juniper
Juniperus ashei

Eurico Zimbres

Azalea
Azalea obtusum

Missouri Botanical Garden

Blue holly
Ilex x meservea

Sten Porse

Boxwood
Buxus microphylla var. *koreana*

Wouter Hagens

Glossy abelia
Abelia x grandiflora

Kurt Stueber

Leyland cypress
Cupressocyparis leylandii

J. S. Peterson

Pipestem
Agarista populifolia

Boris Bauer

Rhododendron
Rhododendron x chionoides

Low Flammability

Shrubs suitable for planting within the defensible space; plant 6 feet or more from the house.

Ted Bodner

Adam's needle
Yucca filamentosa

Ted Bodner

Anisetree
Illicium floridanum

C. and L. Loughmiller

Arrowwood
Viburnum dentanum

Missouri Botanical Garden

Bayberry
Myrica pennsylvanica

Ted Bodner

Beautyberry
Callicarpa dichotoma

Kurt Stueber

Bigleaf hydrangea
Hydrangea macrophylla

R. and E. Chambers

Butterfly bush
Buddleia davidi

Gary Cooper

Camellia
Camellia japonica

Wikipedia

Coontie
Zamia pumila

Missouri Botanical Garden

Foster holly
Ilex x attenuata

Glenn Kopp

Gardenia
Gardenia jasminoides

Wikipedia

Klein's forsythia
Forsythia x intermedia

J.S. Peterson

Oakleaf hydrangea
Hydrangea quercifolia

Gary Cooper

Oleander
Nerium oleander

Kenpei

Pittosporum
Pittosporum tobira

William S. Justice

Rosebay
Rhododendron maximum

Wikipedia

Scarlet firethorn
Pyracantha coccinea

W. D. Bransford

Shrubby cinquefoil
Potentilla fruiticosa

Ted Bodner

Sweet pepperbush
Clethra alnifolia

Chris Evans

Walter's viburnum
Viburnum obovatum

For more information, contact Annie Hermansen-Baez of the USDA Forest Service, Southern Research Station at ahermansen@fs.fed.us, (352) 376-3271.
Also visit: www.interfacesouth.org/products/research.html

Opiola Jerzy

Weigela
Weigela florida

Stefan Bloodworth

Winterberry
Ilex verticillata

Additional Resources

- For more information on Firewise shrubs, see "Selecting and Maintaining Firewise Plants for Landscaping"at **www.interfacesouth.org/products/fact_sheets/Selecting_Firewise_Shrubs.pdf**
- To estimate the flammability of shrub and other plant species not shown here, see "Preparing a Firewise Plant List for WUI Residents" at **www.interfacesouth.org/products/fact_sheets/Preparing_Firewise_Plant_List.pdf** or **www.interfacesouth.org/products/flammability_key.html**
- For Firewise landscaping tips, see **www.interfacesouth.org/products/fact_sheets/Selecting_Maintaining_Firewise_Plants_Landscaping.pdf** and **www.interfacesouth.org/products/fact_sheets/Reducing_Wildfire_Risk.pdf**

The photographs in this fact sheet were gathered from various sources. All copyrighted photographs in this publication were used with the permission of the photographers. Shrubs are listed in alphabetical order and not by their intensity of flammablity within each category.

Appendix J – Firewise Communities/USA Firewise Activities

When your community has been successful in achieving Firewise Communities/USA recognition, you can maintain your status by following a few ideas for future Firewise community projects.

- Hold a "Chipping Day" for residents to remove excess vegetation from their property, as well as community property.
- Hold a pine needle or debris removal day in cooperation with the local fire department.
- Hold a Firewise education day that provides information about proper plant and construction choices, introduces local staff and distributes pertinent Firewise information for the community.
- Create a fuel removal project that enlists local volunteers.
- Place articles in the local paper about fire season and the need for your community to be prepared for it. Showcase your accomplishments.
- Conduct Firewise landscaping and construction information sessions at a local home improvement store.
- Modify homeowner association covenants to include Firewise concepts.
- Enlist local fire staff to conduct a wildfire hazard overview at a community meeting.
- Distribute Firewise information at community festivals.
- Include homeowner tips in community newsletters.
- Conduct Firewise information sessions at neighborhood association meetings.

Appendix K – Sub grants for Firewise Communities/USA

The Mississippi Forestry Commission offers two sub grants for designated Firewise Communities/USA. Grants will be awarded as funds allow.

- Field Day Sub Grant – a $500 Field Day Grant is available for all approved Firewise Communities/USA to fund their first Firewise field day.
- Fuel Mitigation Sub Grant – A $2,000 Fuel Mitigation Grant is available for the purchase of fuel mitigation equipment, rental of fuel mitigation equipment and contracting services.

Table 3 – Approved List of Equipment and Services

Approved Equipment	Not Approved
• DR Bush Mowers, multi-head attachment weed eaters	• Generators
• Chain saws and carrying cases	• Lawn mowers
• Leaf blowers	• ATV's
• Brush hogs	• Cameras
• Pole and hand pruners	• Boots
• Wheelbarrows	• Fire shelters
• Ropes and ladders	• Foam units
• Safety helmets or hard hats	• Backpack pumps
• Chaps	• Uniforms
• Leather gloves	• GPS units
• Fuel cans, bar and chain oil, files, etc	• Radios
• Fire rakes and Pulaski's (fuel reduction projects)	• Megaphone
	• Turnout gear

Table 3 – Approved List of Equipment and Services	
Approved Equipment	Not Approved
• Drip torches (fuel reduction projects) • Nomex clothing (fuel reduction projects) • Crew first aid kit • Firewise literature printing • Firewise signs and banners • Firewise workshop expense	• Fire hose

Table 4 – Approved Rental and Contracting Services	
Approved	Not Approved
• Equipment rental (dozers, bush hogs, etc.) to construct fire breaks, extend defensible space or extend the home ignition zone. • Prescribe burning contracts (construct fire-lines, prepare burning plan and execution of projects) to reduce fuel loading around residences. • Tree services contract (bucket truck, chipper, chainsaw operators) for removal, thinning and pruning of trees to extend defensible space or extend the home ignition zone.	• Salaries for firefighters • Mileage for firefighters personal vehicles • Projects not listed in the Firewise Communities/USA plan

The intent of these lists is to assist a designated FCUSA community with the means to facilitate the reduction of wildland fuels within the home ignition zone. This list is not exhaustive. The purchase or use of any equipment, rental or contracting service not listed is subject to review by the Mississippi Forestry Commission prior to payment of sub-grant.

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