Red Lodge Fire Rescue
Home Ignition Hazard Assessment Protocols (May, 2009)

Introduction
The Red Lodge Fire Department has developed an assessment system to evaluate homes in the Wildland-Urban Interface (WUI) for likelihood of ignition during a wildfire. The goal of this assessment is to educate homeowners as to hazards that may increase the chance of home ignition, as well as to offer suggestions for reducing threats. This assessment system is designed to assign a point value to features of the home and surrounding area that increase the likelihood of home ignition. The higher the score, the greater the risk of home ignition.

Moderate < 55 pts	High 56-90 pts	Extreme > 90 pts

The variables that are evaluated in this assessment are drawn from FireSmart and Firewise, as well as the International Wildland-Urban Interface Code and NFPA 1144. The following information is designed to clarify the categories on the paper and electronic check sheet.

This data will be collected utilizing Redzone software and a Palm Pilot. Select the "Home Assessment" tab from the Palm Pilot to begin.

General Impression
When you first approach the home, form your general impression. This will consist of the most obvious topographic and vegetative characteristics.
What is the structure's location in relation to the predominant topographic features such as flat open areas, ridges, saddles, steep slopes, natural chimneys, or small canyons that will increase the risk of ignition potential for the structure?

Factors that affect likely home ignition are widely known among fire analysts and firefighters. However, home ignition cannot predicted in all cases. Keep this in mind when completing these assessments and if you interact with a home owner. Document significant findings in the notes section.

The following questions are in the Palm Pilot which you will be using:

1. Evaluator's Names
Put in first initial and last name (i.e. W Bernard, T Rae)

2. Resident
This field may be automatically populated. If you know the resident, you may manually input the name.

3. Value Type
This question helps to roughly categorize the type of structure. If you are unsure, select "unknown"

4. Street Signs
Select one of three answers: 1) Present and visible, 2) Present, but not visible, 3) Not present. Comment in the notes section if the number is different than our database.

5. Bridge Limits/Widths
If the driveway to the house has a bridge, do you best to determine if it could support structure protection apparatus. If you don't know select "unknown." If there is no bridge select "not applicable."

6. Gated Access
Yes or no. If there is an open gate, you should still mark it as gated access.

7. Grade of Driveway
Mark the percent grade of the driveway. Remember percent is (rise/run) x 100. For example, if the driveway is 100ft long and it rises 5 ft: (5/100) x 100 = 5% slope.

Choose ONE:
- ☐ Flat (0-5%)
- ☐ Low (6-10%)
- ☐ Moderate (11-15%)
- ☐ Steep (>15%)

8. Driveway Width
Choose from: 20 feet or less, 20-26 feet, >26 feet, or inaccessible. Take into account vegetation that may limit structure protection equipment.

9. Ingress/Egress
There are three choices in this category: Two or more primary roads (most homes will not have this), One road (most homes will be in this category) and One-way road in/One-way road out (this is mostly seen with campgrounds).

10. Adequate Turnarounds
An adequate turnaround would be a three point turn around with a wildland engine.

11. Roofing Material
The roof is most important in determining whether or not an interface fire will consume the building. Wildland fires produce firebrands that travel great distances, often igniting many spot fires ahead of the main fire. If not suppressed, firebrands landing on a combustible roof can start a fire that will consume the building. Use only fire-retardant roof covering assemblies rated Class A, B, or C in interface areas. Roofing classifications denote the relative combustibility of the exterior roofing surface. The Class A rating denotes lower combustibility; the Class C rating denotes higher combustibility. Install roofing material to preclude entry of flame or embers.

Choose ONE:
- ☐ Asphalt shingles
- ☐ Metal
- ☐ Other noncombustible material (i.e., clay tile)
- ☐ Fire resistant wood shingles
- ☐ Unrated wood shake shingles

12. Roof Cleanliness

Accumulation of combustible debris on a roof increases fire risk. The fire resistance of most roofing materials is reduced when needles and debris burn on the roof surface.

Photo by Chris Schnepf

Photo by Don Mortimer

Choose ONE:

- ☐ No needles, leaves, or other combustible materials
- ☐ Scattered needles and leaves
- ☐ Clogged gutters and/or extensive leaf and pine litter

13. Building Exterior

With the exception of the roof, siding material is the structural component most vulnerable to fire. An interface fire involving the forest and vegetation surrounding a building will produce flames that can start the exterior on fire.

The high winds that often accompany wildfires can carry airborne firebrands and embers. These firebrands can easily become lodged in and against structural exteriors, possibly causing ignition. How well a building survives wildfire depends on how fire resistant the siding material is. Where the siding material is combustible or melts, it becomes more critical to clear vegetation or other combustible material from the building exterior. Similarly, eliminate or modify design features ("nooks and crannies") on the building exterior that act as firebrand accumulators. Untreated wooden shake or shingle siding provides no fire protection for the building. Vinyl siding is vulnerable to fire exposure. It quickly melts, exposing areas on the building exterior where sparks and embers might lodge.

Choose ONE:

- ☐ Non-combustible material (i.e., stucco, metal siding, composite, brick)
- ☐ Logs or heavy timbers
- ☐ Wood, vinyl siding or wood shakes

14. Eaves and Vents

While vents perform the important function of removing trapped moisture from attics, soffits, and crawlspaces, they are ready-made openings that can allow heat and embers to enter a building and ignite it. Open eaves (exposed
rafter ends unenclosed by fascia and soffits) increase structural fire danger because more of the under-eave area is exposed to heat and embers. Under-eave soffit vents placed close to the exterior wall also increase structural fire hazard as heat and embers travel up exterior walls and directly into soffit vents. All openings should be properly located and screened with corrosion-resistant, 1/8" wire mesh.

Following three photos by Don Mortimer

Closed eaves

Vents not screened

Open eaves

- ☐ Closed eaves/vents with ≤ 1/8" wires mesh
- ☐ Closed eaves/vents with no mesh
- ☐ Open eaves/vents

15. Balcony, Deck, Porch

Outdoor living areas are important to the interface lifestyle. Some homeowners may be unwilling to eliminate the stilt construction and overhangs of decks and balconies, despite the fire danger they create by trapping heat rising along exterior siding. Stilt construction allows fire to get under overhangs and ignite the building. The fire danger is further increased if vegetation, debris, or stored combustibles accumulate under the overhang. Closing in balconies and decks and building them with flame-resistant materials affects the hazard rating. Slotted deck surfaces can allow needle litter to accumulate below the deck, increasing the fire danger. There should be access to these spaces so that needle litter can be removed easily.

Note: Decks and balconies are part of the building. To measure the fuel modification area required, start from the outer perimeter of deck, balcony and overhang buildings.

Choose ONE:

- ☐ No decks
- ☐ All decks, balconies, and porches are screened with fire resistant material
- ☐ All decks, balconies, and porches are screened with combustible material
- ☐ Decks, balconies, and porches are not screened

16. Windows and Doors

Window glazing that fractures and collapses creates an opening in a building exterior that allows firebrands to enter the building. Avoid having concentrations of vegetative fuels within 30 feet of windows and glass doors. Large windows, often used in interface homes to maximize view, are more vulnerable to fracture and collapse than smaller windows or multiple-pane windows. Triple or double
(thermal) pane windows are more fracture- and collapse-resistant than are single pane windows. Tempered glass provides more safety than plate glass does. It is unlikely that an interior will ignite from thermal radiation through intact plate glass.

Choose ONE (based on the worst):

- ☐ Tempered glass in all windows and doors

  Double pane glass
- ☐ Small/medium (**<** 3' x 3')
- ☐ Large (**>** 3' x 3')

  Single pane glass
- ☐ Small/medium (**<** 3' x 3')
- ☐ Large (**>** 3' x 3')

17.Coordinates

Coordinates should be obtained using the Garmin eTrex unit. Coordinate system should be in Degrees, minute. Minute (hddd°mm.mmm') You can find this setting in the GPS menu Units Position Format

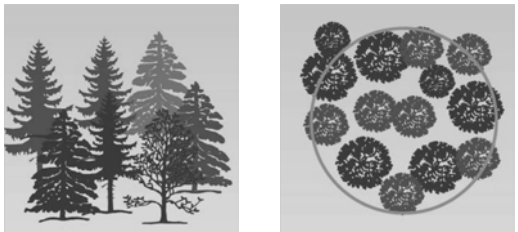
i.e. N 45° 11.705'
W 109° 14.847'

18. Vegetation within 30ft (<30')

Crown fire in the forest vegetation presents a significant hazard to adjacent buildings. Buildings may ignite by radiant heat transfer when the fire is burning all around it, or when firebrands land on the building before the wildfire arrives.

Crown fire is most likely to occur and spread rapidly in dense coniferous forests. Mixed-wood forests are less likely to sustain crown fire; although, firebrand transport from pockets of coniferous trees can threaten buildings. Deciduous forests are unlikely to sustain crown fire, especially after leaf flush. The probability of fire spreading laterally from crown to crown is reduced when coniferous trees are spaced far apart.

Good Separation



Continuous

Choose ONE (based on most prevalent surrounding forest type):

Deciduous Trees	Coniferous Trees	Mixed Trees
☐ Good separation	☐ Good separation	☐ Good separation
☐ Continuous	☐ Continuous	☐ Continuous

19. Vegetation 30-100ft (>30ft)
Same criteria as described in #18.
Choose ONE (based on most prevalent surrounding forest type):

Deciduous Trees	Coniferous Trees	Mixed Trees
☐ Good separation	☐ Good separation	☐ Good separation
☐ Continuous	☐ Continuous	☐ Continuous

20. Ladder Fuels (within 100ft)
Ladder fuels are shrubs, immature trees, and branches extending near the ground (e.g. within 6 feet) that give surface fires a pathway to the upper canopies of the trees. Trees with branches extending near the ground (within 6 feet) have ladder fuels. Removal of ladder fuels reduces the likelihood of crown fire development.

☐ None
☐ Scattered
☐ Abundant

21. Surrounding Vegetation
Surface vegetation includes grasses, herbs, shrubs, dead and down woody debris (logs, branches, and twigs), and immature trees up to 6 feet in height. Concentrations of surface fuels will sustain high-intensity surface fires and can initiate crown fires. Dry surface fuels are a particular concern when vegetation is cured due to drought or seasonal effects. A surface fire can ignite buildings by direct contact with the building exterior or nearby flammable materials. Untreated surface fuels can also support and spread small accidental ignitions from the site to the surrounding continuous forest. Treatment of surface vegetation is most critical within 30 feet of the home. Aggressive removal of all surface fuels and replacement with noncombustible materials or trimmed lawn is recommended. Treatment of surface vegetation 30-100 feet from structure is also important. Removing all or most understory vegetation or accumulated ground fuels is recommended.

Wild grass *(photo: Stew Walkinshaw)*

Scattered *(Photo: Kelvin Hirsch)*

Dense *(Photo: Kelvin Hirsch)*

☐ Well-watered lawn or non-combustible surface (within 30 feet)

Uncut wild grass or shrubs **<** 30 feet from structure (choose one if applicable)
☐ Scattered
☐ Dense

Dead and down wood debris **<** 30 feet of structure (choose one if applicable)
☐ Scattered
☐ Dense

Dead and down wood debris 30-100 feet of structure (choose one if applicable)
☐ Scattered
☐ Dense

22. Exterior Combustible Materials
Firewood, building material (and other combustible debris piles), neighboring buildings and wooden storage shacks are all serious fire dangers. These items will ignite and burn intensely. Homeowners often do not consider the potential
fire danger of these items and must be encouraged to clean up or relocate such accumulations of fuel farther from the building. Where combustibles are located downslope from a building, the hazard to buildings is increased.


Photo by Chris Schnepf


Photo by John Luckhurst


Photo by Don Mortimer

Note: Any combustible building (neighboring building, garage or carport) or assembly (fence or trellis) should be included. Neighboring structures are a significant potential ignition source, because of radiant heat exposure, longer burning times and the additional risk to the building from firebrands produced by nearby burning structures.

☐ **>** 30 feet from structure
☐ **<** 30 feet from structure

23. Percent Slope (within 150ft)
Slope has a direct effect on fire's rate of spread: the steeper the slope, the faster the rate of spread. In other words, fire will burn more rapidly uphill than on a flat or level surface. Consequently, fuels on slopes are treated/modified to a greater extent than they are on flat ground.
Remember percent is (rise/run) x 100. A 50-percent slope means 50 feet of rise over 100 feet of horizontal distance. Make at least two measurements on the site and record the average value.

☐ 0-10%
☐ 11-30%
☐ 31-40%
☐ >40%

24. Slope Position
The slope of the ground affects fire behavior and the rate of spread. Fire will burn more rapidly uphill than on a flat or level surface. Consider the location of the building on flat or rising ground and its position on the slope. Convective heat and firebrands from burning fuels on the slope below the building can readily ignite buildings located on the mid to upper portion or crest of a hill. Structures located on a slope must be constructed with entirely non-combustible exteriors with surrounding mitigation work or they will be especially vulnerable to fire.

☐ Not applicable/flat
☐ Structure located at bottom or lower portion of hill
☐ Structure is located at mid or upper portion or crest of a hill

25. Structure Setback
Structures located at the crest of a hill can be protected somewhat by setback provisions. A single-story building should be set back 30 feet from the crest of the slope. Taller buildings will need proportionately greater setback distances.

☐ Not applicable
☐ Adequate
☐ Inadequate

26. Aspect
If the structure is built into a slope, turn your back to the hillside and look in that direction. Determine what direction the hillside predominantly faces.

Choose ONE:
☐ Flat
☐ North
☐ East
☐ South
☐ West

27. Adequate Safety Zone
Although there are methods to calculate safety zone, this will be based on firefighter experience.
Considerations:
- Avoid locations downwind of fire
- Avoid locations that are in chimneys, saddles, or narrow canyons
- Avoid locations that require a steep uphill escape route
- Burn out safety zones before flame front approach

☐ Yes
☐ No

28. Interior Sprinklers
☐ Yes
☐ No
☐ Unknown

29. Knox box
☐ Yes
☐ No
☐ Unknown

30. Evacuation

Select all that apply:

- ☐ None
- ☐ Handicapped
- ☐ Seniors
- ☐ Children
- ☐ Insufficient resident transport
- ☐ Difficult access
- ☐ Large numbers of livestock
- ☐ Other

31. Hazards

Select all that apply:

- ☐ Propane tanks/stored fuel
- ☐ Dangerous animals
- ☐ Livestock
- ☐ Hazmat
- ☐ Poor escape routes/safety zones
- ☐ Above ground fuel storage
- ☐ Overhead electrical line hazard
- ☐ Other (describe in notes section)
- ☐ None

32. Onsite Water Sources

Select all that apply:

- ☐ Pressurized hydrant
- ☐ Dry hydrant
- ☐ Underground tank
- ☐ Residential well
- ☐ Creek, pond, lake
- ☐ Other (describe in notes)
- ☐ None or insufficient

33. Homeowner Mitigation

Select all that apply:

- ☐ Replace roof with noncombustible
- ☐ Replace siding with noncombustible material
- ☐ Improve driveway/access road
- ☐ Close eaves/screen vents
- ☐ Remove forest vegetation around home
- ☐ Post visible/reflective address marker
- ☐ Clean under home/decks
- ☐ Screen decks
- ☐ Clean roof/gutters
- ☐ Limb up trees
- ☐ Remove firewood/combustibles
- ☐ Clear around propane tank/ move >30ft from home
- ☐ Create defensible space around home
- ☐ Improve onsite water source
- ☐ Other (describe in notes)

34. Contact with Landowner

☐ Yes
☐ No

35. Triage category

This is a firefighter discretion category. If the mitigation work can be completed in less than one hour by a two-person engine crew, mark it as "threatened, but savable with some work." If more than one hour is required, or an engine crew would need to remain with the home, mark it as "threatened, but saveable with much work."

Choose ONE:

☐ Needs no attention for now
☐ Threatened, but savable with some work
☐ Threatened, but savable with much work
☐ Not savable/Too dangerous to protect

36. Photo Number

Record the number in the digital camera. You can take more than one photo if necessary.

37. Notes

Put additional information from other categories here. Add information that is important to the survey and future firefighting crews.