

## 7.0 WILDLAND/URBAN INTERFACE FIRES

### 7.1 Overview

Fire has posed a threat to mankind since the dawn of civilization. Fires often cause substantial damage to property and may also result in deaths and injuries.

For the purposes of mitigation planning, we define three types of fires:

- Structure fires and other localized fires,
- Wildland fires, and
- Wildland/urban interface fires.

**Structure fires** are fires where structures and contents are the primary fuel. In dealing with structure fires, fire departments typically have three primary objectives: 1) minimize casualties, 2) prevent a structure fire from spreading to other structures, and 3) minimize damage to the structure and contents. Structure fires and the other common types of fires, such as vehicle or trash fires are most often limited to a single structure or location, although in some cases they may spread to adjacent structures.

**Wildland fires** are fires where vegetation (grass, brush, trees) is the primary fire fuel and with few or no structures involved. For wildland fires, the most common suppression strategy is to contain the fire at its boundaries and then to let the fire burn itself out. Fire containment typically relies heavily on natural or manmade fire breaks. Water and chemical fire suppressants are used primarily to help make or defend a fire break, rather than to put out an entire fire, as would be the case with a structure fire. For wildland fires, fire suppression responsibility is generally with state and federal fire agencies, although local agencies may also participate.

**Wildland/urban interface fires** are fires where the fire fuel includes both structures and vegetation. The defining characteristic of the wildland/urban interface area is that structures are built in or immediately adjacent to areas with essentially continuous vegetative fuel loads. When wildland fires occur in such areas, they often spread quickly and structures in these areas may, unfortunately, simply become additional fuel sources. Fire suppression efforts for wildland/urban interface fires focus first on saving lives and then on protecting structures to the extent possible. Local fire agencies have primary fire suppression responsibility for most wildland/urban interface fires, although state and federal agencies may also contribute.

This chapter focuses on wildland/urban interface fires that pose a substantial threat to districts with K-12 facilities in locations subject to wildland/urban interface fires.

### 7.2 Wildland/Urban Interface Fires

Many urban or suburban areas have a significant amount of landscaping and other

vegetation. However, in most areas the fuel load of flammable vegetation is not continuous, but rather is broken by paved areas, open space and areas of mowed grassy areas with low fuel loads. In these areas, most fires are single structure fires. The combination of separations between buildings, fire breaks, and generally low total vegetative fuel loads make the risk of fire spreading much lower than in wildland areas.

Furthermore, most developed areas in urban and suburban areas have water systems with good capacities to provide water for fire suppression and fire departments that respond quickly to fires, with sufficient personnel and apparatus to control fires effectively. Thus, the likelihood of a single structure fire spreading to involve multiple structures is generally quite low.

Areas subject to wildland/urban interface fires have very different fire hazard characteristics which are more similar to those for wildland fires. The level of fire hazard for wildland/urban interface fires depends on:

- Vegetative fuel load,
- Topography,
- Climate and weather conditions,
- Ignition sources and frequency of fire ignitions, and
- Fire suppression resources (fire agency response time and resources of crews and apparatus, access and water supplies).

High vegetative fuel loads, especially brush and trees, increase the level of wildland/urban fire hazard. Steep topography increases the level of fire risk by exacerbating fire spread and impeding fire suppression efforts by making access more difficult.

The level of fire hazard in areas prone to wildland/urban interface fires is also substantially increased when weather conditions including high temperatures, low humidity, and high winds greatly accelerate the spread of wildland fires and make containment difficult or impossible.

Fire suppression resources are typically much lower in wildland/urban interface fire areas than in more highly developed areas. Fire stations are more widely spaced, with fewer resources of crews and apparatus and longer response times because of distance and/or limited access routes. Water resources for fire suppression are typically lower in these areas, which are often predominantly residential and may be served by pumped pressure zones with limited water storage or by individual wells which provide no significant water supply for fire suppression.

These reduced fire suppression resources make it more likely that a small wildland fire or a single structure fire in an urban/wildland interface area will spread before it can be extinguished.

The level of risk from wildland/urban interface fires for K-12 facilities depends on:

- Level of fire hazard as outlined above,
- Value and importance of buildings and infrastructure,
- Vulnerability of inventory at risk, including whether fire-safe construction practices and defensible space measures have been implemented, and
- Population at risk and the efficacy of evacuations.

Life safety risk in wildland/urban interface fires arises in large part from delays in evacuations, once a fire has started. For K-12 facilities with significant risk from wildland/urban interface fires, a well-defined, practical and practiced evacuation plan is essential to minimize potential life safety risk.

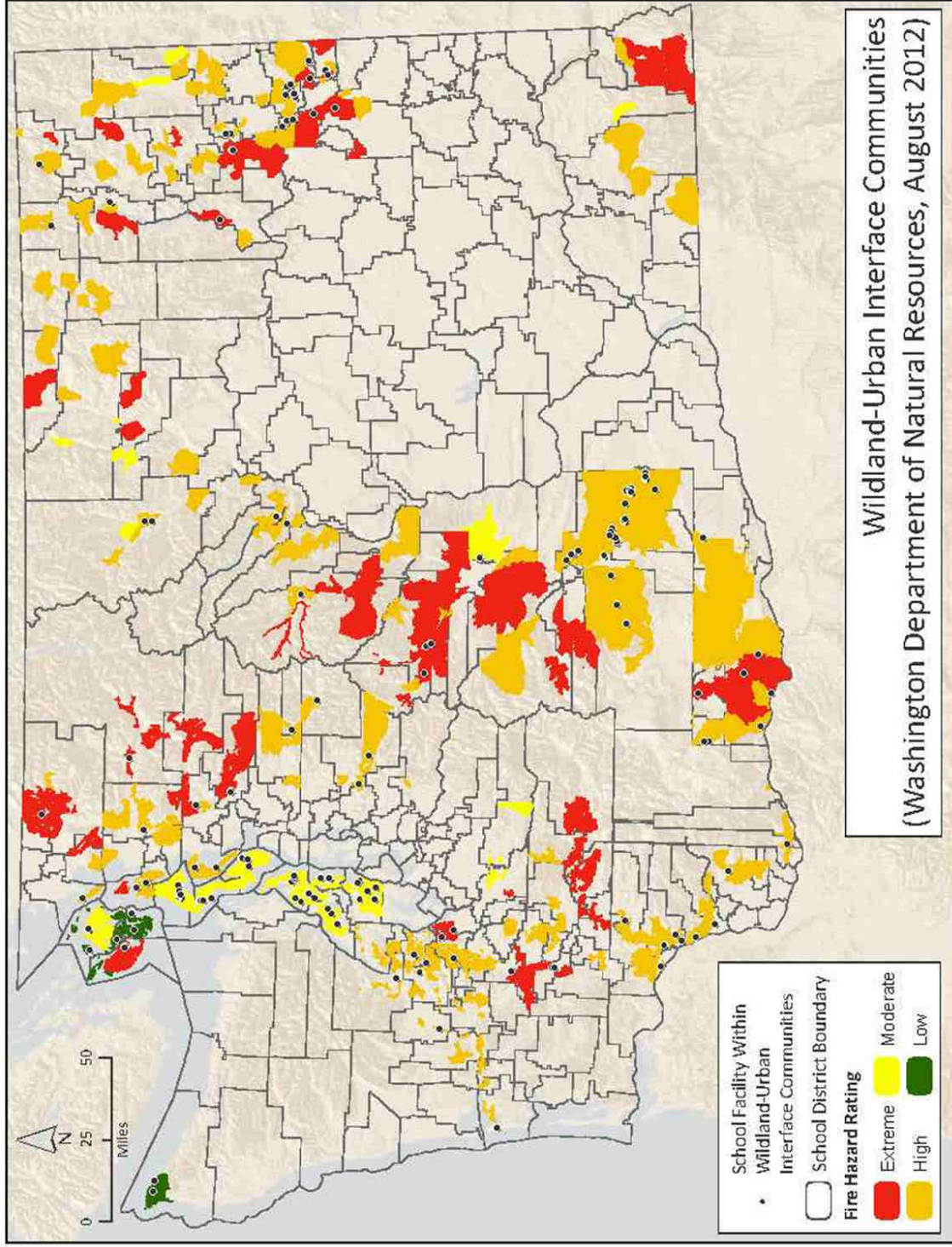
### **7.3 Wildland and Wildland/Urban Fire Hazard Mapping and Hazard Assessment**

The three maps on the following pages present different measures of wildland and wildland/urban interface fire hazards in Washington. There are important caveats regarding these maps when making wildland/urban interface fire mitigation decisions for K-12 facilities within mapped fire hazard areas:

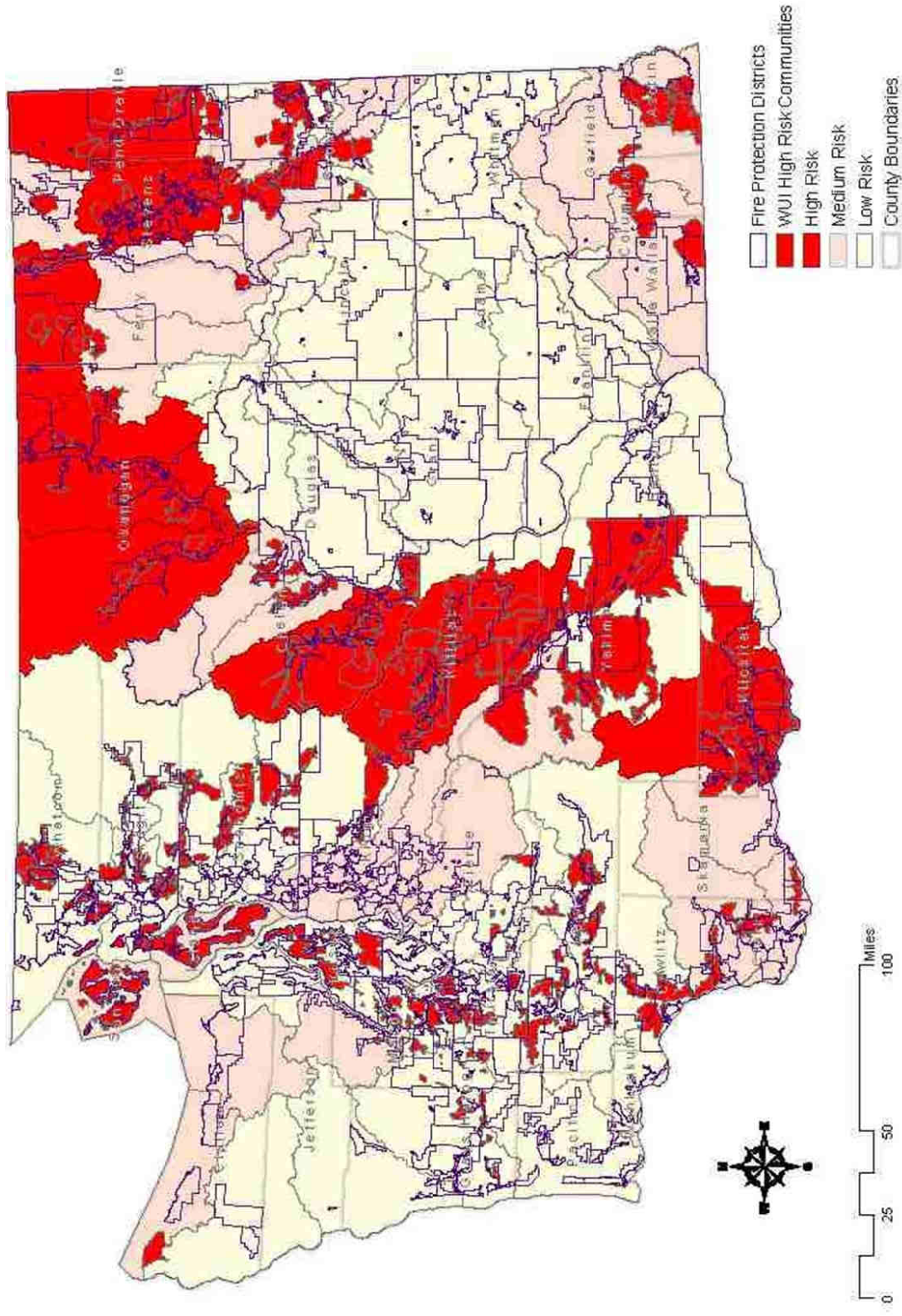
- The DNR rankings of Wildland/Urban Interface Communities of extreme, high, moderate or low risk should be interpreted as qualitative or semi-quantitative indicators of the relative level of risk. Facilities identified as being located in communities with “extreme” or “high” levels of risk may not have extreme or high risk as generally understood for mitigation planning purposes. Some of the extreme or high risk interface communities have long burn return periods (the average time interval between fire events) per the USGS Landfire map.
- The USGS Landfire Return Period values should also be interpreted as semi-quantitative indicators of the relative level of risk. The numerical estimates of the burn return period and the corresponding probabilities over a 50-year time period should not be interpreted literally.

The DNR rankings and the USGS Landfire Return Periods are based on analysis of fire regime characteristics – such as vegetative fuel loads, topography, climate and fire suppression resources. The USGS Landfire Return Periods may indicate higher levels of fire risk than suggested by historical fire data. Furthermore, most of the acreage burned has been wildland with relatively few structures and very few, if any, K-12 facilities.

**Figure 7.1**  
**Wildland/Urban Interface Communities Identified by Washington Department of Natural Resources**

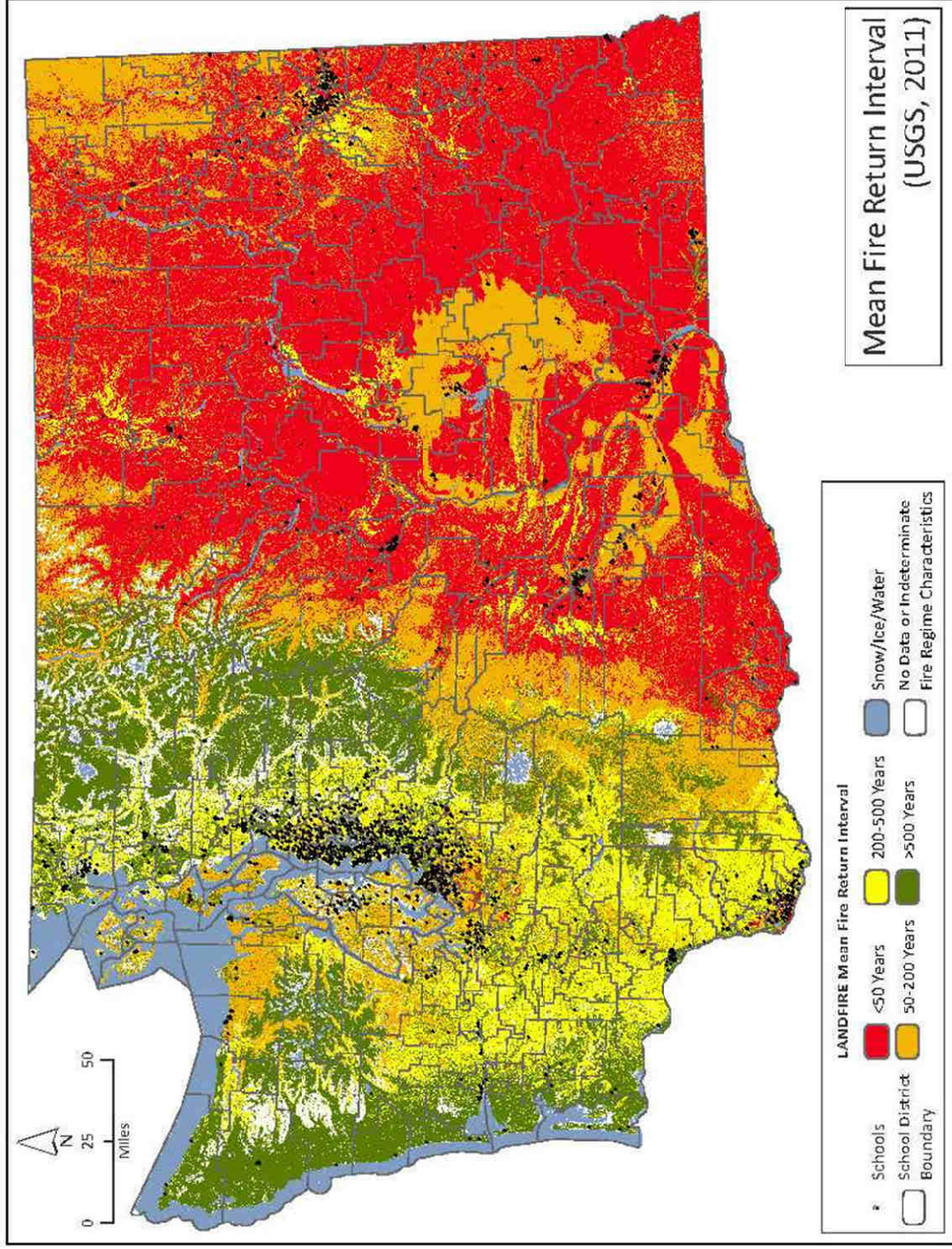


**Figure 7.2**  
**Washington Wildland/Urban Interface High Risk Communities and Statewide Assessment High and Moderate Risk Areas<sup>1</sup>**



<sup>1</sup>Washington State Department of Natural Resources, Fire Risk Map, 2010.

**Figure 7.3**  
**United States Geological Survey Landfire Fire Return Period Map**



## **7.4 Wildland/Urban Interface Fire Hazard and Risk Assessments**

The potential impacts of future wildland/urban interface fires on the South Whidbey District are primarily damage to buildings and contents (include possible complete destruction), disruption of educational services, and displacement costs for temporary quarters if some buildings have enough damage to require moving out while repairs are made. The likelihood of deaths or injuries is generally low, because schools will be evacuated whenever fire warnings are issued. However, in events where evacuation is not timely, there may a substantial risk of deaths and injuries.

The vulnerability of the South Whidbey District's facilities to wildland/urban interface fires varies from campus to campus. The approximate levels of wildland/urban interface fire hazards and vulnerability are identified at the campus level in the following sections.

There have been no historical wildland/urban interface fires that directly affected or came very close to any of the district's campuses.

The campus-level wildland/urban interface fire hazard and risk report for the South Whidbey School District is shown on the following page. The fire hazard and risk levels are generated within the OSPI ICOS Pre-Disaster Mitigation database, by combining the DNR Wildland Interface Community rankings, the Landfire fire return periods and the campus-specific information entered into the database.

For campuses where the hazard and risk level is moderate or higher, the recommendation is to consult with the local fire agency regarding the level of risk at each campus and to determine whether fire mitigation measures may be appropriate. However, regardless of risk levels, all campuses in a wildland/urban interface should have evacuation plans for wildland/urban interface fire events.

More accurate evaluation of wildland/urban interface fire risk for a campus or a building starts with the fire hazard factors listed previously, but also requires higher-resolution, campus-level and building-level information, including:

- Vegetative fuel loads on, adjacent and near the campus, including fuel types, fuel density, and proximity of high fuel load areas to the campus,
- Extent to which campus buildings have fire-safe construction details and defensible space.
- The number of available evacuation routes and the effectiveness of evacuation plans.

Locations with only one or two evacuation routes, which might be blocked by a given fire event, have much higher life safety risk than locations with multiple possible evacuation routes. Evaluation of the above characteristics may require technical advice and support from fire professionals, including local fire agency staff or other fire experts. Such professional advice is beneficial for any campus in a wildland/urban interface.

Building-level risk assessment reports for wildland/urban interface fires are shown on the pages following the campus-level report.

**Table 7.1  
South Whidbey School District Campus Level Wildland/Urban Interface Hazard and Risk Assessment Report**

Wildland and Urban Interface (Fire) Campus-Level Hazard and Risk Report							
Campus	WUI Community DNR Rating	USGS Landfire Return Period Range <sup>1</sup> (Years)	High Fuel Load Areas Near Campus <sup>2</sup>	History of WUI Fires Affecting or Near Campus	Fire Agency Concern about WUI Fires	WUI Hazard Level and Preliminary Risk Level <sup>3</sup>	Recommendation
							Consult with Local Fire Agency About Risk and Mitigation
<b>SOUTH WHIDBEY SCHOOL DISTRICT</b>							
Admin/Maintenance/Transportation	Not Applicable	NA	Yes	No	No	Moderate	Yes
Bayview Alternative School	Moderate	501-1000	Yes	No	No	High	Yes
Langley Middle School	Moderate	71-80	Yes	No	No	High	Yes
South Whidbey Academy	Not Applicable	501-1000	Yes	No	No	Moderate	Yes
South Whidbey Elementary School	Moderate	71-80	Yes	No	No	High	Yes
South Whidbey High School	Moderate	71-80	Yes	No	No	High	Yes

<sup>1</sup> USGS Landfire estimates of fire return periods have very short returns for many locations, with correspondingly high probabilities in 50 years. Historical fire data suggest longer return periods and lower probabilities. These estimates are best interpreted as indicating relative fire risk, not absolute fire risk.

<sup>2</sup> Within 0.5 mile.

<sup>3</sup> The WUI preliminary risk level characterized as the same as WUI hazard level. Building-level assessments required to determine risk more accurately.

**DISCLAIMER:** The information provided in this report is collected from various sources and may change over time without notice. The Office of Superintendent of Public Instruction (OSPI) and its officials and employees take no responsibility or legal liability for the accuracy, completeness, reliability, timeliness, or usefulness of any of the information provided.

The information has been developed and presented for the sole purpose of developing school district mitigation plans and to assist in determining where to focus resources for additional evaluations of natural hazard risks. The reports are not intended to constitute in-depth analysis or advice, nor are they to be used as a substitute for specific advice obtained from a licensed professional regarding the particular facts and circumstances of the natural hazard risks to a particular campus or building.



## 7.5 Mitigation for Wildland/Urban Interface Fires

Common goals for reducing wildland/urban interface fire risk include:

- 1) Reduce the probability of fire ignitions,
- 2) Reduce the probability that small fires will spread,
- 3) Minimize life safety risk, and
- 4) Minimize property damage.

School districts are not responsible for fire suppression or community-wide mitigation measures for wildland/urban interface fires, which are the responsibility of cities, counties and fire agencies.

For districts with campuses determined to be at significant risk from wildland/urban interface fires, there are three types of practical mitigation measures:

- For life safety, develop and practice effective evacuation plans for wildland/urban interface fires,
- For existing facilities with significant risk:
  - Maintain the maximum possible defensible space around buildings and reduce vegetative fuel loads adjacent to a campus,
  - Implement fire-safe improvements such as non-flammable roofs, covering vent openings and overhangs with wire mesh to prevent entry and trapping of embers and others, and
- Whenever possible, site new facilities outside of areas with high risk of wildland/urban interface fires, include fire-safe features in the design and ensure the maximum possible defensible space around new buildings.

Some types of mitigation projects for wildland/urban interface fire may be eligible for FEMA and other grant funding, including:

- Defensible space activities,
- Hazardous fuel reduction activities, and
- Ignition resistant construction activities.

For existing buildings, implementing many ignition resistant building upgrades may be most cost-effective when done incrementally. For example, replacing an old roof covering with a non-flammable roof covering may be done at the time the existing roof has reached the end of its useful life and is scheduled for replacement.

The South Whidbey School Districts' mitigation Action Items for wildland/urban interface fires are shown in the table on the following page.

**Table 7.3  
South Whidbey School District: Wildland/Urban Interface Fire Mitigation Action Items**

Hazard	Action Item	Timeline	Source of Funds	Responsible Party	Plan Goals Addressed			
					Life Safety	Protect Facilities	Enhance Emergency Planning	Enhance Awareness and Education
<b>Wildland/Urban Interface Fire Mitigation Action Items</b>								
Short-Term #1	Consult with Fire District #3 regarding level of fire risk for campuses for which this is recommended by the OSP1 ICOS PDM database campus-level wildland/urban interface fire report.	1-2 Years	District or Grants	Supt	X	X	X	X
Short-Term #2	Enhance emergency evacuation planning for all campuses for which wildland/urban fires are possible.	1 year	District or Grants	Supt	X	X	X	X
Long-Term #1	Review defensible space around district facilities and implement mitigation measures to reduce fire risk, increase defensible space, and reduce potential fuel sources.	1-2 Years	District or Grants	Supt	X	X		