

Final- Hazard Profile – Urban Fire

Urban Fire

 Urban Fire	Frequency	50+ yrs	10-50 yrs	1-10 yrs	Annually
	People	<1,000	1,000-10,000	10,000-50,000	50,000+
	Economy	1% GDP	1-2% GDP	2-3% GDP	3%+ GDP
	Environment	<10%	10-15%	15%-20%	20%+
	Property	<\$100M	\$100M-\$500M	\$500M-\$1B	\$1B+
	Hazard scale	< Low to High >			

Risk Level

- Frequency – Fires in urban areas of Washington occur annually.
- People – An urban fire affecting 1,000 people or more is highly unlikely.
- Economy – The economy of Washington is not likely to be impacted by a fire in an urban area to the point that it meets the minimum threshold for this category.
- Environment – While an urban fire can affect habitat and species, the probability that the fire will destroy 10% of a habitat or kill 10% of a species is considered highly unlikely.
- Property – According to the “2010 Fire in Washington”, report prepared by the Office of the State Fire Marshal, total property and content loss due to fire was estimated to be approximately \$215 million dollars.

Hazard Area Map

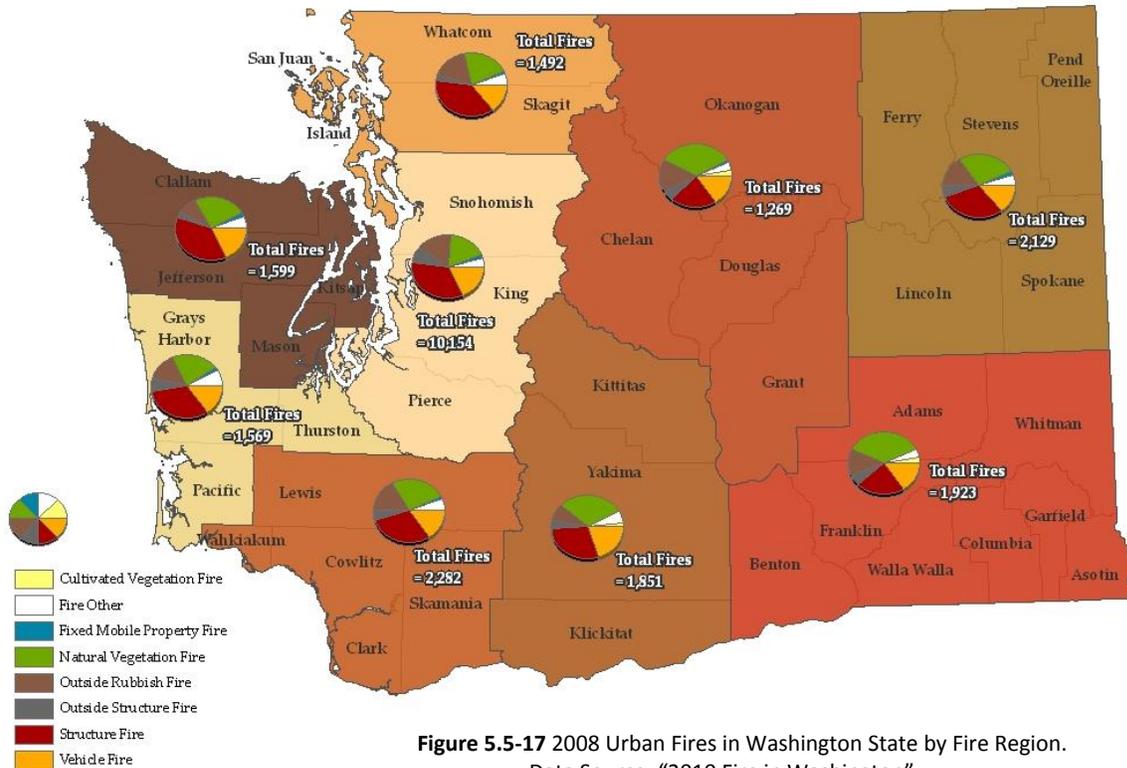


Figure 5.5-17 2008 Urban Fires in Washington State by Fire Region.
Data Source: “2010 Fire in Washington”

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The Hazardⁱ

Urban fires are classified as “uncontrolled burning in a residence or building from natural, human or technical causes”. These fires have a potential to spread to adjoining structures. Local city and county fire departments are tasked with the response and control of urban fires.

The Washington State Office of State Fire Marshall suspended publishing annual fire reports for Washington State in 2011 because of budget cuts. Consequently, the last available report is from the 2010 calendar year. Revised Code of Washington (RCW) 43.44.060 states that fire agencies are required to submit fire incidents to the Office of State Fire Marshall in accordance with the National Fire Incident Reporting System (NFIRS). In 2010, participation decreased 2% compared to the previous year with 411 out of 488 fire agencies providing information.

Nonetheless, in 2010, fire departments in Washington responded to nearly 615,000 calls with over 20,000 of these due to urban fire. These fire incidents caused an estimated \$215 million dollars in damaged property and possession loss. Further, it is estimated that the indirect costs of urban fires can be 8 to 10 times greater for “temporary lodging, psychological damage, lost business, medical expenses, and others” than suppression, possessions and damage costs.

2010 Incident Type Category Summary (Sorted by Dollar Loss)

Incident Type Category	Total Number of Incidents	% of Total Incidents	Total Property and Content Loss	% of Total Loss
Fire	20,019	3.3%	\$215,429,333	95.8%
<i>Structure Fires (including confined fires)</i>	6,784	1.1%	\$176,043,129	78.3%
<i>Natural Vegetation Fires</i>	4,202	0.7%	\$18,842,637	8.4%
<i>Vehicle Fires (Mobile Properties)</i>	3,496	0.6%	\$15,973,245	7.1%
<i>Fixed Mobile Property Fires</i>	261	0.0%	\$2,811,031	1.2%
<i>Fire, Other</i>	1,133	0.2%	\$1,060,274	0.5%
<i>Cultivated Vegetation Fires</i>	172	0.0%	\$300,775	0.1%
<i>Outside Storage & Equipment Fires</i>	1,032	0.2%	\$243,259	0.1%
<i>Outside Rubbish Fires</i>	2,939	0.5%	\$154,983	0.1%
Overpressure Rupture, Explosion, Overheat (No Fire)	1,189	0.2%	\$5,070,504	2.3%
Rescue and Emergency Medical Service	443,008	72.0%	\$2,498,370	1.1%
Service Calls	40,650	6.6%	\$715,000	0.3%
Hazardous Conditions (No Fire)	11,785	1.9%	\$573,505	0.3%
Other Types of Incidents	6,572	1.1%	\$283,500	0.1%
False Alarms & False Calls	40,284	6.5%	\$281,947	0.1%
<i>Unintentional False Fire Protection System Activation</i>	20,752	3.4%	\$203,230	0.1%
<i>Fire Protection System Malfunction</i>	11,136	1.8%	\$78,002	0.0%
<i>Malicious or Mischiefous False Alarm</i>	8,396	1.4%	\$715	0.0%
Good Intent Calls	51,032	8.3%	\$37,820	0.0%
Severe Weather & Natural Disaster	913	0.1%	\$7,350	0.0%
Undetermined Type of Incident	16	0.0%	\$0	0.0%
Grand Total	615,468	100.0%	\$224,897,329	100.0%

In 2010, one structure fire was reported every 1.3 hours with a resulting dollar loss of over \$590,000 a day, about \$25,000 an hour or \$410 every minute. Fire statistics in Washington State for 2010 are summarized in the table above.

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In 2010, the number of fires reported decreased 20% compared to the previous year but fewer fire agencies were reporting incidents. Over the past five years, structure fires were the leading fire incident type reported. Washington’s residential property ranked second in number of fire incidents, but number one in dollar loss. Statewide, structure fires average approximately 1.2 fires per thousand people. Structure fires include buildings or other types of structures, and fires confined to non-combustible containers such as food stoves, chimneys or flues, boilers, trash receptacles, or commercial compactors.

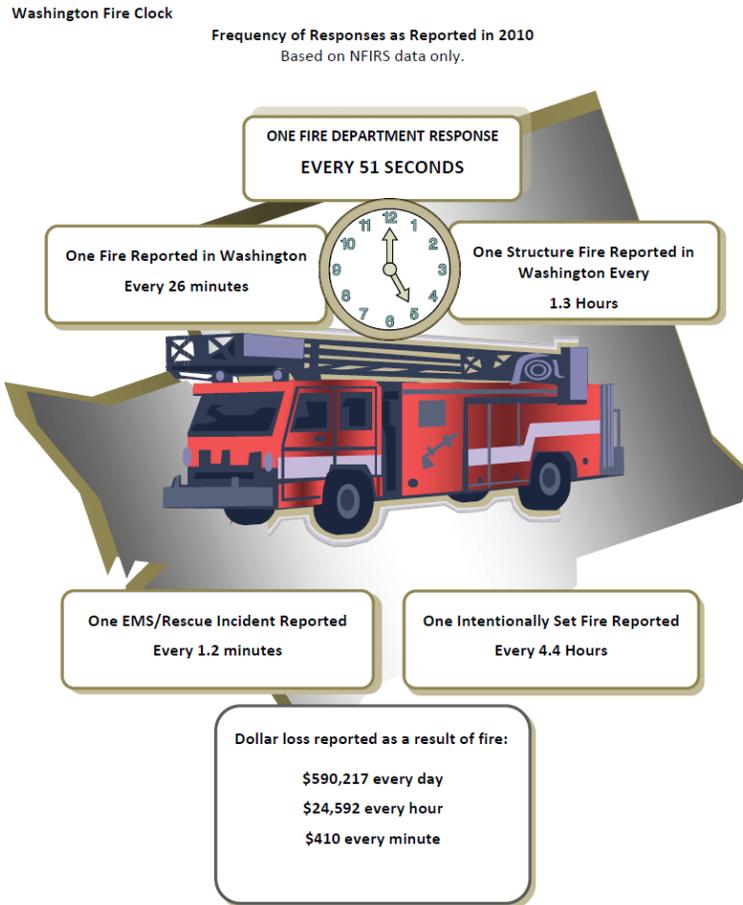


Figure 5.5-18 Frequency of WA Fire Department Responses in 2010 (Based on NFIRS data only)

<http://www.wsp.wa.gov/fire/firemars.htm>

While the dollar amount lost to fire is considerably high, the loss of life due to fire in Washington remains lower than the national average. 289 people lost their lives in fires within our state from 2006-2010. Yet, according to the last available national statistics from 2007, the fire fatality rate for the United States is 13.2 per million population. Washington State’s rate was 10.0 fire deaths per million people and it ranked 14th lowest in the nation.

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Previous Occurrencesⁱⁱ

Washington has had two notable large urban fires in its history, both occurring in 1889. The Great Seattle Fire occurred on June 6, 1889 and destroyed the entire central business district of Seattle. This fire burned the majority of 29 city blocks, including the central business district, four of the city's piers, and the railroad terminal. Only one person is known to have died in this fire and total losses were estimated around \$20 million. The Spokane Fire occurred on August 4, 1889 and destroyed most of what was then downtown Spokane. Other notable historic fires include a fire in the Ozark Hotel in Seattle on March 21, 1970 that killed 19 people and the Great Ellensburg Fire of July 4, 1889 that destroyed 200 Victorian homes and 10 blocks of businesses.

With the advent of more modern fire fighting technology, zoning and building codes that mitigation conflagration, and a skilled professional class of firefighters, we are unlikely to experience a fire of catastrophic magnitude again. However recent urban fires continue to kill people and destroy millions of dollars in property.

Probability of Future Eventsⁱⁱⁱ

Zoning, building codes, building materials, trained firefighters, specialized apparatus, and early detection technology has mitigated urban fires so that they no longer decimate whole cities like in 1889. Sustained mitigation efforts over the past 100 years has reduced the risk of an urban conflagration fire to nearly nil but urban fires continue to kill people and destroy millions of dollars in property each year. The hazard is still real whether its acts of negligence, chance occurrences, arsonists, terrorism, riots, warfare, or an earthquake. Urban fires will still happen with sometimes tragic consequences.

Structure fires represented 31% of the total urban fires reported in 2006-2010. Among these fires, 27% were caused by operating equipment such as sparks, embers, or flames from space heaters, stoves, etc, or other conductive or radiated heat sources and 14% were caused by open flame, matches and lighters, flares, fuses and torches, candles and smoking material (cigars, cigarettes, pipes, etc). Hot or smoldering objects were the third leading known heat source category such as molten materials, hot embers or ash, heat from friction, etc.

Occupancy Categories	Total	% of Total
Single Family Dwellings	27	40.3%
Multi-Family Dwellings	18	26.9%
Oil Refinery	7	10.4%
Recreational Vehicle/Travel Trailer	6	9.0%
Outside (including tents)	5	7.5%
Detached Garage or Shed	2	3.0%
Motor Vehicle	2	3.0%
Grand Total	67	100.0%

Figure 5.5-19 Places Fire Fatalities Occurred in 2010

<http://www.wsp.wa.gov/fire/firemars.htm>

Fatal fires most frequently occur in places where people live or sleep. In 2010, approximately 67% of the fire fatalities occurred in residential occupancies. Single-family dwellings alone accounted for 40% of the reported fire fatalities, of which nearly a quarter of those deaths were in mobile homes. Multi-family dwellings accounted for 27% of the fire related deaths in Washington in 2010. Smoking related

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fires resulted in 22% of the fire fatalities in 2010. Explosions, electrical-related fires, and fires caused by cooking, home heating and candles were the other leading causes for fire fatalities.

The leading areas of origin reported between 2006 and 2010 were those fires starting in outside areas (32%) and in vehicle areas (22%). Fires that started in functional areas (16%) resulted in the greatest amount of dollar loss to property and contents at over \$242 million. Functional areas include bedrooms, dining or eating areas, kitchens, bathrooms, laundry rooms, office spaces, etc. Fires that started in structural areas (7%) such as crawl spaces, balconies or enclosed porches, attics, wall assemblies and surfaces, roof surfaces, and awnings accounted for more than \$235 million in losses for the period 2006 through 2010. Total dollar loss for this period from all areas of origin was \$1.138 billion.

The use of fire protection devices such as fire sprinklers and smoke detectors can greatly reduce the loss from a fire. Approximately 66% of the fire fatalities occurred where no operable smoke alarms or detectors were reported. Seventeen fire fatalities occurred in areas where smoke alarms or detectors were present and operational but human factors such as the person was asleep, under the influence of drugs or alcohol, or had physical or mental impairment, may have contributed to the individual not escaping the fire. None of the fire fatalities in 2010 occurred in buildings equipped with fire sprinklers.

Cause Category	2006	2007	2008	2009	2010	5-Year Total	5-Year % of Total
Smoking	14	9	4	10	15	52	18.0%
Electrical Appliance/Distribution	9	6	5	8	4	32	11.1%
Intentionally Set	3	6	7	6	0	22	7.6%
Vehicle-Related	7	4	4	3	0	18	6.2%
Cooking	5	2	5	2	2	16	5.5%
Under Investigation	1	7	2	4	1	15	5.2%
Home Heating	6	3	3	1	2	15	5.2%
Candle	5	2	1	0	2	10	3.5%
Explosion	0	0	0	0	7	7	2.4%
Flammable Vapors Ignited	0	1	1	0	2	4	1.4%
Drug Manufacturing/Lab	0	0	0	3	0	3	1.0%
Portable Gas Powered Heating Appliance	0	0	0	3	0	3	1.0%
Child with access to ignition device	2	0	0	0	0	2	0.7%
Vehicle Collision	0	0	0	0	1	1	0.3%
Gas Stove - Combustibles Too Close to Heat Source	0	0	0	1	0	1	0.3%
Camp Fire	0	0	0	1	0	1	0.3%
Outside Fire Pit	0	0	1	0	0	1	0.3%
Cutting Torch	0	0	0	1	0	1	0.3%
Portable Propane Heater	0	0	0	0	1	1	0.3%
Lighter	0	0	0	1	0	1	0.3%
Oil Lamp	0	1	0	0	0	1	0.3%
Over Heated Vehicle Exhaust	0	0	0	1	0	1	0.3%
Open Flame Device	0	1	0	0	0	1	0.3%
Tire Friction	0	0	0	0	1	1	0.3%
Open Flame	0	0	0	0	1	1	0.3%
Bricks on Gas Range	1	0	0	0	0	1	0.3%
Generator too close to combustibles	1	0	0	0	0	1	0.3%
Undetermined	13	9	12	14	28	76	26.3%
Grand Total	67	51	45	59	67	289	100.0%

In conclusion, urban fires in Washington occur in the places where people feel the most safety and security, their own homes. Fire education can help reduce fires in homes and make people more aware of potentially dangerous situations. These programs can be accessed through local fire departments, community centers, and are part of some public school curriculums. With the proper use of smoke

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detectors and fire suppression systems loss of life due to urban fire can be greatly reduced. Human factors contributing to fires in the home can be reduced by operating heating equipment per the manufacturer’s safety precautions, placing a fire extinguisher in the kitchen near cooking equipment, and smoking in areas of the home where combustible material is less abundant.

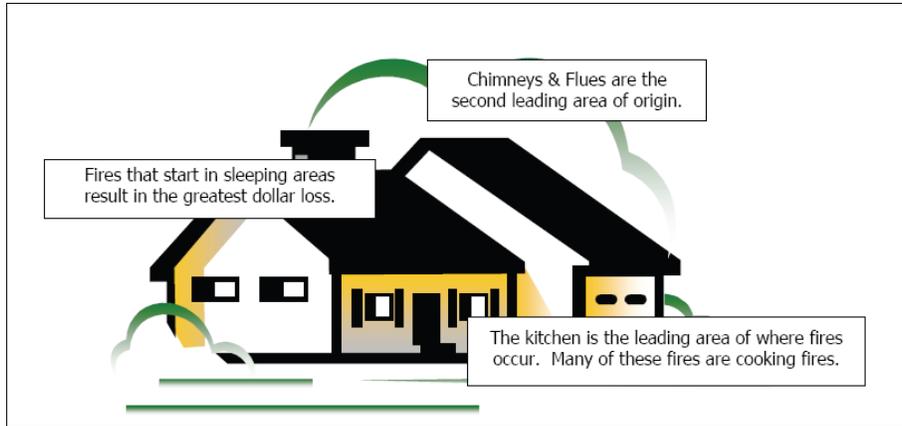


Figure 5.5-20 Places Where Home Fires in Washington Most Frequently Occur

Jurisdictions Most Threatened and Vulnerable to Urban Fire

In Washington State, 11 of the 39 counties have populations of over 100,000, representing 83% of the state’s population. In 2010, approximately 86% of the incidents and 74% of the dollar loss reported as a result of fire occurred in the most densely populated counties.

Additionally, when the weather turns cold in Washington State, fire fatalities tend to increase as people stay inside where the risk is higher. December 2009 was the deadliest month in the past five years with 19 fire deaths while August 2007 was the only month in the past five years with zero fire fatalities.

Potential Climate Change Impacts^{iv, v}

With the advent of climate change coming into worldwide focus; it is necessary to take into account the potential effects this emerging climate crisis may have on the dangers associated with urban fires. The research done so far indicates the potential for unusual or more frequent heavy rainfall and flooding is greater in some areas while the potential for drought is predicted in other areas. Landslide frequency is correlated with heavy rainfall and flooding events.

Recognizing Washington’s vulnerability to climate impacts, the Legislature and Governor Chris Gregoire directed state agencies in 2009 to develop an integrated climate change response strategy to help state, tribal and local governments, public and private organizations, businesses and individuals prepare. The state Departments of Agriculture, Commerce, Ecology, Fish and Wildlife, Health, Natural Resources and Transportation worked with a broad range of interested parties to develop recommendations that form the basis for a report by the Department of Ecology: *Preparing for a Changing Climate: Washington State’s Integrated Climate Change Response Strategy*.

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Over the next 50 - 100 years, the potential exists for significant climate change impacts on Washington's coastal communities, forests, fisheries, agriculture, human health, and natural disasters. These impacts could potentially include increased annual temperatures, rising sea level, increased sea surface temperatures, more intense storms, and changes in precipitation patterns. Therefore, climate change has the potential to impact the occurrence and intensity of natural disasters, potentially leading to additional loss of life and significant economic losses. Recognizing the global, regional, and local implications of climate change, Washington State has shown great leadership in addressing mitigation through the reduction of greenhouse gases.

At-Risk State Agency Facilities

The number of state facilities at risk to Urban Fire has not been determined.

References

Fire, Urban

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ⁱⁱ “Fire in the United States 1995-2004,” *U.S. Fire Administration*, 14th Edition, August 2007, <http://www.usfa.dhs.gov/downloads/pdf/publications/fa-311.pdf> (December 17, 2007).

ⁱⁱⁱ “Working Together for Home Fire Safety,” *U.S. Fire Administration*, March 2006, <http://www.usfa.dhs.gov/downloads/pdf/fswy11.pdf> (December 31, 2007).

^{iv} Snover, A.K., P.W. Mote, L. Whitely Binder, A.F. Hamlet, and N.J. Mantua. (2005) *Uncertain Future: Climate Change and its Effects on Puget Sound*. A report for the Puget Sound Action Team by the Climate Impacts Group (Center for Science in the Earth System, Joint Institute for the Study of Atmosphere and Oceans, University of Washington, Seattle).

^v Steve Running, “Is Global Warming Causing More, Larger Wildfires?” *Science Magazine*, Online July 6, 2006, Vol. 313, No. 5789, pp. 927-928, (December 17, 2007).