

Section 19

Wildland Fire Hazard Profile

Definition

Wildland fires are fires caused by nature or humans that result in the uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property (Washington State Hazard Mitigation Plan, Tab 7.1.9 - p. 1).

Description

Wildland fires are a very unusual event in Gray Harbor County, normally occurring during years of drought periods when fuel is dry and precipitation is below normal. The County is not identified as a high risk for wildland fire in the Washington State Hazard Mitigation Plan, but the potential was discussed in the Grays Harbor County Comprehensive Emergency Management Plan. This plan suggests a moderate probability for a wildland fire in the County; however, historical evidence suggests the possibility of a large wildland fire is quite low.

Wildfires depend on four factors: available fuel, moisture, terrain, and an ignition source. There is ample available fuel in County forests and on beach dunes, but the annual precipitation in Grays Harbor County keeps moisture content in vegetation, fuels on the forest floors and beach dunes normally high. During very dry years, fuels that dry can ignite easily.

Table 125
Characteristics of Wildland Fires in Grays Harbor County

- Very dry to drought conditions
- Reduced moisture content in vegetation
- Accumulation of dry fuel on forest floors
- Prevailing east wind in late summer and early fall

Both natural forces and human causes produce wildfires. Lightening in combination with an accumulation of fuels on the forest floor and very dry conditions is the most likely natural cause of a wildland fire in Grays Harbor County. Wildland fires attributed to human behavior can be recreational fires, arson, or burning debris.

Strong dry east winds in late summer and early fall combined with several years of below average precipitation can make the heavily treed areas on the slopes of the Olympic Mountains vulnerable to wildland fire if fuels are dry. The beach grasses on dunes are also vulnerable to wildland fire if very dry. Other areas in Grays Harbor County which can be vulnerable to wildland fire, but less so, are a fire spread by grasses ignited by sparks along railroad tracks and fires spreading through prairie grass or crops to farm homes and agricultural buildings in East County.

History

In the late 1800's, driftwood fires destroyed extensive woodpiles along beaches in southwest Washington State. The removal of this natural wood barrier eventually caused significant changes in the coastal shoreline. Sand dunes built up where none had been before, covering most of the coastal prairie. The destruction of the driftwood barricade also removed an effective obstacle against ocean winds and tide surges.

The famous fire of 1902 "... crept to the outskirts of Elma and Montesano. Sweeping from Summit to Satsop, it cut a swath 13 miles long and from one to two miles wide, leaving a strip of charred and burning ruins. A dam on the west branch of the Hoquiam (River) burned and the New London community was destroyed. Travel on the Wishkah road was impossible. The White Star mill and a million board feet of lumber turned into smoke. Telephone and telegraph lines to Puget Sound were cut by burning and falling timber" (They Tried to Cut It All. p. 192). The smoke was so thick it blocked out the sun and sent the county into darkness.

Table 126
Significant Wildland Fire in Grays Harbor County

Year	Features
Mid 1800's	Multiple drift wood fires
Summer/Fall 1867	Forest fires and smoke
September 1902	Massive forest fire
July 1910	Forest fires, drought
August 1939	Forest fires, especially near Copalis
June-August, 1941	Forest fires
July 1945	Forest fires
August 1951	Wildfire near Grayland

Source: Columbia River Chronology, Historical Dates, Pacific County Historical Society and Museum and They Tried to Cut It All.

Effects

Chiefly, effects of a large-scale wildfire in Grays Harbor County will be economic. There is always the concern for loss of life, but there is no history of wildfire fatalities in the County. A significant fire in forestlands has the potential to create both short term and long-term consequences. In the short-term, traffic disruptions are likely and heavy smoke can pose a health risk. Long-term economic impacts will be destruction of timber and equipment and loss of industry jobs. Secondary impacts will be erosion on burned slopes that increases runoff contributing to flooding and landslide problems. Less likely would be a wildfire in dune grass could quickly spread to structures destroying homes and tourist facilities. A threat to consider in East County is an uncontrolled fire that spreads to crops, farm homes, and agriculture structures.

Asset Vulnerability Analysis for Structures and People

A wildland fire can occur almost anywhere in the county; thus all property and residents would be at risk. A wild fire can be expected to be confined to a local area rather than spread throughout the County, but it can be assumed about the same percent of damage would occur. A reasonable estimate assumes not more than 1% of structures and people might be exposed to damaging impacts by a major wildland fire.

Table 127
Wildland Fire
District 1

Land Use	Number of Structures			Value of Structures in Dollars			Number of People		
	Total Number	Number Exposed to Hazard	Percent Exposed to Hazard	Total Value	Total Value Exposed to Hazard	Percent Exposed	Total People	Number Exposed to Hazard	Percent Exposed to Hazard
Residential	4,384	44	1.0%	358,814,110	3,588,141	1.0%	10,872	109	1.0%
Manufacturing	21	0	1.0%	49,266,847	492,668	1.0%			
Transportation, Communication & utilities	22	0	1.0%	102,451,430	10,04,514	1.0%			
Trade	38	0	1.0%	6,286,350	62,864	1.0%			
Services	62	1	1.0%	24,537,375	245,374	1.0%			
Cultural, Entertainment & Recreation	31	0	1.0%	10,697,220	106,972	1.0%			
Agriculture	277	3	1.0%	30,038,035	300,380	1.0%			
Fisheries & Forestry	126	1	1.0%	11,894,785	118,948	1.0%			
Structures on Undeveloped Lands	114	1	1.0%	33,638,240	336,382	1.0%			
TOTALS	5,075	51	1.0%	627,624,392	6,276,244	1.0%	10,872	109	1.0%

**Table 128
Wildland Fire
District 2**

Land Use	Number of Structures			Value of Structures in Dollars			Number of People		
	Total Number	Number Exposed to Hazard	Percent Exposed to Hazard	Total Value	Total Value Exposed to Hazard	Percent Exposed	Total People	Number Exposed to Hazard	Percent Exposed to Hazard
Residential	1,914	19	1.0%	136,115,404	1,381,154	1.0%	4,747	41	0.9%
Manufacturing	6	0	1.0%	75,389,901	753,899	1.0%			
Transportation, Communication & utilities	12	0	1.0%	4,374,935	43,749	1.0%			
Trade	34	0	1.0%	3,574,140	35,741	1.0%			
Services	45	0	1.0%	186,598,830	1,865,988	1.0%			
Cultural, Entertainment & Recreation	33	0	1.0%	8,833,645	88,336	1.0%			
Agriculture	27	0	1.0%	2,342,965	23,430	1.0%			
Fisheries & Forestry	46	0	1.0%	4,392,195	43,922	1.0%			
Structures on Undeveloped Lands	99		1.0%	3,827,925	38,279	1.0%			
TOTALS	2,216	22	1.0%	427,449,940	4,274,499	1.0%	4,747	41	0.9%

**Table 129
Wildland Fire
District 3**

Land Use	Number of Structures			Value of Structures in Dollars			Number of People		
	Total Number	Number Exposed to Hazard	Percent Exposed to Hazard	Total Value	Total Value Exposed to Hazard	Percent Exposed	Total People	Number Exposed to Hazard	Percent Exposed to Hazard
Residential	2,823	28	1.0%	172,086,580	1,720,866	1.0%	7,001	61	0.9%
Manufacturing	48	0	1.0%	9,766,936	488,347	5.0%			
Transportation, Communication & utilities	24	0	1.0%	18,374,255	918,713	5.0%			
Trade	65	1	1.0%	6,052,930	302,646	5.0%			
Services	153	2	1.0%	40,108,232	2,005,412	5.0%			
Cultural, Entertainment & Recreation	72	0	1.0%	18,680,430	934,022	5.0%			
Agriculture	24	0	1.0%	1,376,160	68,808	5.0%			
Fisheries & Forestry	80	0	1.0%	6,229,575	311,479	5.0%			
Structures on Undeveloped Lands	128	1	1.0%	4,231,935	211,597	5.0%			
TOTALS	3,417	34	1.0%	276,907,033	13,845,352	5.0%	7,001	61	0.9%

**Table 130
Wildland Fire
All Districts**

Land Use	Number of Structures			Value of Structures in Dollars			Number of People		
	Total Number	Number Exposed to Hazard	Percent Exposed to Hazard	Total Value	Total Value Exposed to Hazard	Percent Exposed	Total People	Number Exposed to Hazard	Percent Exposed to Hazard
Residential	9,121	91	1.0%	669,016,094	6,690,161	1.0%	22,620	196	0.9%
Manufacturing	75	1	1.0%	134,423,684	1,734,914	1.3%			
Transportation, Communication & utilities	58	1	1.0%	125,200,620	1,986,976	1.6%			
Trade	137	1	1.0%	15,913,420	401,251	2.5%			
Services	260	3	1.0%	251,244,437	4,116,774	1.6%			
Cultural, Entertainment & Recreation	136	1	1.0%	38,211,295	1,129,330	3.0%			
Agriculture	328	3	1.0%	33,757,160	392,618	1.2%			
Fisheries & Forestry	252	3	1.0%	22,516,555	474,349	2.1%			
Structures on Undeveloped Lands	341	3	1.0%	41,698,100	586,258	1.4%			
TOTALS	10,708	107	1.0%	1,331,981,365	17,512,632	1.3%	22,620	196	0.9%

Asset Vulnerability Analysis for County and Critical Facilities

County Facilities and Major Arterials At-Risk to Wildland Fire Hazards

No county facilities are potentially at-risk to wildland fire hazards.

Critical Facilities Serving County Government & Residents At-Risk to Wildland Fire Hazards

No critical facilities are potentially at-risk to wildland fire hazards.

Section 20

Tornado Hazard Profile

Definition

A tornado is a storm with a violently rotating column of air that contacts the ground; tornadoes usually develop from severe thunderstorms. Tornadoes can produce winds of 100 to 300 mph. (National Weather Service).

Description

Grays Harbor County is considered vulnerable to tornadoes, but has never experienced a tornado causing more than minimal property damage. Currently there is no way to forecast which storm could cause a tornado or specific locations where a tornado might touch down.

There is little documentation of tornadoes in the county. Records describing tornadoes in Grays Harbor County indicate they can be characterized as a “twister” or a cold weather funnel rather than a full-scale tornado. No tornado recorded in the county has ever been rated higher than FO on the Fujita Tornado Measurement Scale which is used to estimate the intensity level of a tornado. FO is the lowest category tornado, described as an event with winds of 40 to 72 mph with only light damage expected. It is estimated that there is a 5% chance of one occurrence of a tornado in Grays Harbor County every 20 years. (Washington State Hazard Mitigation Plan. Tab 7.1.6 - p.22)

History

August 26, 1997

- A weak tornado was reported 3 miles west of Elma, which caused minor tree damage.

December 22, 1997

- A tornado was reported 5 miles southwest of Westport, caused little damage. Damage included a fence ripped up and dropped 25' from its original location and some debris blown around.

Asset Vulnerability Analysis for Structures and People

Hypothetically, a tornado could occur anywhere in the county; thus, all property is at risk. The analysis on Table 1 represents an estimated percentage of the total structures and residents in the County that may be damaged by a tornado.

**Table 131
Tornado
All Districts**

Land Use	Number of Structures			Value of Structures in Dollars			Number of People		
	Total Number	Number Exposed to Hazard	Percent Exposed to Hazard	Total Value	Total Value Exposed to Hazard	Percent Value Exposed	Total People	Number Exposed to Hazard	Percent Exposed to Hazard
Residential	9,121	9	0.1%	669,016,094	669,016	0.1%	22,620	20	0.1%
Manufacturing	75	0.1	0.1%	134,423,684	134,424	0.1%			
Transportation, Communication & utilities	58	0.1	0.1%	125,200,620	125,201	0.1%			
Trade	137	0.1	0.1%	15,913,420	15,913	0.1%			
Services	260	0.1	0.1%	251,244,437	251,244	0.1%			
Cultural, Entertainment & Recreation	136	0.1	0.1%	38,211,295	38,211	0.1%			
Agriculture	328	0.3	0.1%	33,757,160	33,757	0.1%			
Fisheries & Forestry	252	0.3	0.1%	22,516,555	22,517	0.1%			
Structures on Undeveloped Lands	341	0.3	0.1%	41,698,100	41,698	0.1%			
TOTALS	10,708	11	0.1%	1,331,981,365	1,331,965	0.1%	22,620	20	0.1%

Asset Vulnerability Analysis for County and Critical Facilities

County Facilities and Major Arterials At-Risk to Tornado Hazards

All county facilities and major arterials are potentially at-risk to tornado hazards.

Critical Facilities Serving County Government & Residents At-Risk to Tornado Hazards

All critical facilities are potentially at-risk to tornado hazards.

References

Publications

American Red Cross. 2001. Winter Storms, The Deceptive Killers. NOAA/PA 200160.

Federal Emergency Management Agency (FEMA). 2001. Understanding Your Risks, Identifying Hazards and Estimating Losses. FEMA 386-2. Washington DC: Department of Homeland Security.

Grays Harbor County:

- 1994. Vance Creek Drainage Evaluation.
- 1995. Grayland Flood Hazard Reduction Plan.
- 1997. South Coastal Flood Hazard Management Plan.
- 1999. North Beach Flood Hazard Management Plan.
- 2001. Comprehensive Flood Plan and Attachment 1, Addendum to the Final Comprehensive Flood Hazard Management Plan.
- 2003. Emergency Management Plan, Revised.

Johnson, D. et al. 2002. Results of the August-September Washington State Tsunami Survey, Science Report 2002/17. Lower Hutt, New Zealand: Institute of Geological & Nuclear Sciences Limited.

United States Army Corps of Engineers:

- 2000. Section 905(b) Expedited Reconnaissance Study, Chehalis River Basin, Washington. Seattle, WA.
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- 2001. Hazard Identification and Vulnerability Analysis.
- 2004. State of Washington Hazard Mitigation Plan.

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1946, February 14
1949, April 13
1950, January 1 - 5, 10, 12, 13
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1964, March 28, 30 & 31
1975, December 2, 3, 4, 6, & 9
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2001, February 28
2002, December 16
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December 30

South Beach Bulletin. Westport, WA

1950, January
2002, December 19

Vidette. Montesano, WA

1982, February 18
1997, April 24
2001, December 27

Timberland Library, Westport. 2004. Various reference files.

Internet Sites

Please note that internet addresses change frequently

Building Seismic Safety Council

<http://www.bssconline.org>

Environmental Protection Agency:

Chemical Emergency Preparedness and Prevention

<http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/chemicalinfo.htm>

Electronic – Facility Data Release (e-FDR) for Reporting Year 2003

<http://www.epa.gov/tri-efdr/#tool>

Federal Emergency Management Agency:

Region X, Western States

<http://www.fema.gov/regions/x>

Background information on hazards

<http://www.fema.gov/hazards>

Dam safety

<http://www.fema.gov/hazards/damsafety>

Federally Declared Disasters

<http://fema.gov/library/drcys.shtm>

Geography Exchange, The Richter and Mercalli Scales.

<http://zephyrus.demon.co.uk/geography/resources.earth>

National Oceanic and Atmospheric Administration:

About Earthquakes

<http://wcatwc.gov/subpafe5.htm>

Costal Services Center

<http://www.csc.noaa.gov/>

Estimating Wind Speed

<http://nimbo.wrh.noaa.gov/pqr/info/wind.php>

National Climate Data Center

<http://lwf.ncdc.gov/oa/nede.html>

National Weather Service, Seattle Office

<http://www.wrh.noaa.gov/sea>

United States Local Storm Data

<http://www.ncdc.gov/oa/climate/severeweather/extreme>

Washington's top weather events of 1900's

<http://www.wrh.noaa.gov/pqr/paststorms/washington10php>

Wind producing storm track

<http://www.wrh.noaa.gov/images/pgr/storm1.gif>

Winter Storms

<http://www.weather.gov/om/winter/index.shtml>

Pacific County Historical Society and Museum, Historical Dates

<http://www.pacificcountyhistory.org/columbia.htm>

Pacific States – British Columbia Oil Spill Task Force

2002 West Coast Offshore Vessel Traffic Risk Management Project

http://www.oilspilltaskforce.org/wcovtrm_report.htm

United States Army Corps of Engineers, Chehalis River Basin and Chehalis River Basin Study

<http://www.new.usac.mil/PublicMenue>

United States Department of Transportation:

Office of Hazardous Materials Safety

<http://hazmat.dot.gov/>

Federal Motor Carrier Safety Regulations, Rules, and Notices

<http://www.fmcsa.dot.gov/rules-regulations/administration/fmcshome.htm>

United States Geological Survey:

Community Internet Intensity Map, Nisqually earthquake

<http://pasadena.wr.usgs.gov/shake/pnw>

Earthquake Glossary

<http://usgs.gov/image-glossary/index.html>

Earthquake Hazards Program

<http://neic.usgs.gov/neis/states/washington>

Eruptions of Mt. St. Helens: Past, Present and Future.

<http://pubs.usgs.gov/publications/msh/>

Historical Earthquakes

http://www.pnsn.org/SEIS/EQ_Special/WEBDIR_04082119433p/

Earthquake Hazards in Washington and Oregon

<http://pnsn.org/cascadiaEQs.pfd>

Individual Hazards

<http://usgs.gov/themes/hazpics.htm>

Landslide

<http://landslides.usgs.gov>

Landslide Types & Processes

<http://usgs.gov/fs/2004/3072/fs/2004/3072/>

Large Floods in the United States: Where they Happen and Why

<http://water.usgs.gov/pubs/circ/2003/circ1245/>

Mt. St Helens data

<http://vulcan.wr.usgs.gov/Volcanoes/MSH/eruption04>

Recent Notable Northwest Earthquakes

http://pnsn.org/SEIS/EQ_Special/pnwtectonics.html

Tsunami

<http://walrus.wr.usgs.gov/tsunami/cascadia.html>

Volcanic ash

<http://volcanoes.usgs.gov/ash>

Washington Landslide information

<http://landslides.usgs.gov/wash-or/pnw98html>

Washington Water

<http://wa.water.usgs.gov>

Washington Volcano information

<http://vulcan.wr.usgs.gov>

What Are Volcano Hazards

<http://pubs.usgs.gov/fs/fs002-97/>

University of Washington:

Earthquake and volcano

<http://www.ess.washington.edu>

Tsunami

<http://www.geophys.washington.edu/tsunami/intro.html>

Washington State:

Department of Ecology:

Floods, home page

<http://www.ecy.gov/programs/sea/floods/index.html>

Facility/Site Identification System

<http://www.ecy.wa.gov/services/as/iss/fsweb/fshome.html>

Hazardous Waste and Toxics Reduction Program

<http://www.ecy.wa.gov/programs/hwtr/index.html>

Oil Spills in Washington State: A Historical Analysis

<http://www.ecy.wa.gov/pubs/97252.pdf>

Southwest Washington Coastal Erosion Study

<http://www.ecy.gov/programs/sea/swec/index.htm>

Department of Natural Resources:

Division of Geography, Liquefaction Susceptibility and Site Class Maps for Washington State

<http://www.dnr.wa.gov/>

Fire and Natural Hazards; earthquake, landslide, tsunami, volcano

<http://www.dnr.wa.gov/base/fire.html>

Office of the Washington State Climatologist:

<http://www.climate.washington.edu>

State Patrol:

Commercial Vehicle Division

<http://www.wsp.wa.gov/traveler/cvd.htm>

West Coast and Alaska Tsunami Warning Center, Tsunami and Earthquake

<http://www.wcatwa.gov/>

Western Regional Climate Center

www.wrcc.dri.edu

Interviews

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