

Supplemental Table S1 – Economic Burden of Wildfire used to assess the Return on Investment into Wildfire Interventions.

Economic Burden of Wildfire used to assess the Return on Investment into Wildfire Interventions		
Characterization	Direct	Indirect
Deaths and injuries (Civilian & Firefighter)	X	
Psychological Impacts (PSTD)	X	
Structure and Infrastructure Loss	X	
Environmental Impact	X	
Habitat and Wildlife Loss	X	
Timber Loss	X	
Agricultural Loss	X	
Remediation/Cleanup	X	
General Economic Impacts (Business Interruption, Tourism, Supply Chain)		X
Evacuation Costs		X
Accelerated Economic Decline of Community		X
Utility & Pipeline Interruption (Elec., Gas, Water, Oil)		X
Transportation Interruption (Roads & Rail)		X
Government Service Interruption (including Education)		X
Psychological Impacts (Loss of Natural Amenities)		X
Housing Market Impact (Loss Due to Fire Risk)		X
Interference with military operations x of Ecosystem Services (e.g., Watershed/Water Service)	Loss	X
Increased Risk of Other Hazards (e.g., mudslide, invasive species)		X
Decrease in Tax Base (Structure Loss or Decline in Value of Structure)		X
Decrease in Government Services		X
Health/Environmental Impacts from Use of Fire Retardants / Suppressants.		X

Supplemental Table S2 – Washington Historical Megafires.

Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
1902	Yacolt Burn	238,900	96,679	Unknown	Clark / Skamania / Cowlitz	-
1910	Great Fire of 1910	150,000	60,703	Lightning	Pend Oreille / Spokane	Highway 2
1929	Dole Valley	227,500	92,066	Unknown	Clark / Skamania	-
1970	Lightning Bust	188,000	76,081	Unknown	<u>Chelan / Okanogan</u>	Highway 2
1994	Tyee Creek Fire	135,000	54,633	Lightning	Chelan	Highway 2 & Highway 97
Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
2000	24 Command Fire	192,000	77,700	Human	Benton	Washington State Route 24
2006	Tripod Complex Fire	175,184	70,894	Lightning	Okanogan	Highway 97
2006	Columbia Complex	109,402	44,273	Lightning	Columbia / Garfield	Highway 12
Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
2014	Carlton Complex fire	256,108	103,643	Lightning	Okanogan	Highway 97
2015	Okanogan Complex	304,782	123,341	Lightning	Okanogan	-
2015	North Star Fire	218,138	88,277	Lightning	Ferry / Okanogan	-
2015	Tunk Block Fire	165,918	67,145	Lightning	Okanogan	-
2015	Lime Belt Fire	133,450	54,005	Lightning	Okanogan	-
2016	Range 12 Fire	177,210	71,714	Human	Yakima	-
Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
2020	Cold Springs Canyon	189,923	76,859	Power Transmitter Explosion	Near Omak in Okanogan County	Hwys 97, 115
2020	Pearl Hill	223,729	90,540	Power Transmitter Explosion	Near Bridgeport in Douglas County	Hwys 2, 17, 172
2020	Whitney Fire	127,430	51,569	Powerlines	Near Davenport in Lincoln County	Highway 2

1. 17 Megafires recorded in WA State history
2. 5/17 in the 20th Century or 29%
3. 3/17 in the 1st decade of the 21st Century or 18%
4. 6/17 in the 2nd decade of the 21st Century or 35%
5. 3/17 in the 3rd decade of the 21st Century so far or 18%

Supplemental Table S3 – Oregon Historical Megafires – 19th and 20th Century.

Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
1845	The Great Fire	1,500,000	607,028	Human	Lincoln/Tillamook	-
1848	Nestucca Fire	290,000	117,359	Human	Nestucca, OR	-
1849 (sometimes listed as 1853)	Yaquina fire	480,000	194,249	Unknown	Started near Corvallis and roaring across the Coast Range to Yaquina Bay on the Pacific Ocean at Newport.	-
1849	Siletz Fire	800,000	323,749	Unknown	Siletz, OR	-
1865	Silverton Fire	998,000	403,876	Unknown	Silverton, OR	-
1868	Coos Bay fire	300,000	121,406	Unknown	What is now the Elliott State Forest in Coos County.	-
1902	Columbia fire	170,000	68,797	Land clearing	Also known as the Yacolt burn. Near Mount Hood	-
1933	Tillamook Burn	240,000	97,125	Logging	Washington, Yahmill, Tillamook counties.	-
1936	Bandon fire	287,000	116,145	Logging	The city of Bandon and its surroundings	-
1939	2nd Tillamook Burn/Saddle Mountain Fire	217,000	87,817	Logging	Near the Wilson and Salmonberry rivers.	-
1945	3rd Tillamook Burn or Wilson River/Salmon Fire	173,000	70,011	Human	Burned portions of the two earlier Tillamook burns.	-
1996	Simnasho fire	118,000	47,753	Engine exhaust	Warms Springs Reservation	Highway 26 and Highway 9
1996	Ashwood/Donnybrook	100,590	40,707	Human	Burned in Wasco and Jefferson counties. Multiple sources vary on how much acreage was actually burned. The numbers range between 94, 720 and 118,000 acres. The fire burned completely on private land and was fought by area ranchers until the governor invoked the Conflagration Act.	Fire burned completely on private land

Supplemental Table S4 – Oregon Historical Megafires – 1st decade of 21st Century.

Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
2000	Jackson Fire	108,000	43,706	Human	Wildfire in Malheur County that threatened the Snake River Correctional Institution.	NE of Ontario, OR: I-84 or Highway 30, Hwy 20, or Hwy 26
2001	Lakeview Complex	179,400	72,601	Lightning	A cluster of 5 fires that burned near Lakeview.	West of U.S. 395 southeast of Lakeview
2002	Toolbox Complex	120,085	48,597	Lightning	Started in Lake County and scorched the Fremont National Forest.	Lake County/Wilderness
2002	Biscuit fire	500,000	202,343	Lightning	Southern Oregon and northern California. This was the largest fire in North America during the 2002 fire season	Wilderness
2006	South End Complex	117,553	47,572	Lightning	Between Frenchglen and Fields in Harney County	State Highway 205 is closed at the Hart Mountain junction south to Fields
2007	Egley Complex	140,360	56,802	Lightning	Southeast Oregon. At one point the fire threatened the towns of Burns and Hines.	U.S. 20

Supplemental Table S5 – Oregon Historical Megafires – 2nd decade of 21st Century.

Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
2011	High Cascades Complex	108,154	43,768	Lightning	7 large individual fires were later combined and called the High Cascades Complex. Most of the fire burned in the Warm Springs Reservation.	Parts of Interstate 84 and U.S. 26
2012	Miller Homestead	160,853	65,095	Lightning	Harney County - 1/2 mile west of Frenchglen, Oregon	Highway 205 south of Burns
2012	Holloway	245,000	99,148	Lightning	Scorched more than 245,000 in Oregon and more than 215,000 in Nevada.	U.S. 205 between Lakeview and McDemmitt
2012	Long Draw fire	558,198	225,895	Lightning	Southeastern Oregon rangeland, near Basque, OR	Highway 95 South of Burns Junction
2014	Buzzard Complex	395,747	160,153	Lightning	The complex was made of several fires that burned on rangeland southeast of Burns. Its name came from the nearby Buzzard Butte.	U.S. 395 about 45 mi southeast of Burns — raced across the rangeland
2015	Canyon Creek Complex	110,262	44,621	Lightning	The Berry Creek and Mason Springs fires merged together to become the Canyon Creek Complex	U.S. 395, south of Burns
2015	Cornet-windy Ridge	103,887	42,042	Lightning	The fire was located west of Durkee and south of Baker City	Highway 245 (closed 11 mi north of Hereford)
2017	Chetco Bar fire	191,088	77,331	Lightning	The fire burned in the Kalmiopsis Wilderness, between Brookings, Oregon on the west and Cave Junction on the east.	Wilderness
2018	Klondike fire	175,258	70,924	Lightning	5.5 mi northwest of Selma, OR	Highway 199
2018	Boxcar fire	100,207	40,552	Lightning	one mile southeast of Maupin, Oregon	U.S. 197

Supplemental Table S6 – Oregon Historical Megafires – 3rd decade of 21st Century.

Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
2020	Riverside	131,900	53,378	Human	Clackamas River Ranger District of the Mt. Hood National Forest.	Highway 224
2020	Beachie Creek	182,600	73,896	Unknown	Merged with the Lionshead Fire on September 8, which were briefly named the Santiam Fire	Highway 022
2020	Lionshead	192,900	78,064	Lightning	Merged with the Beachie Creek Fire on September 8; the combined fires were briefly renamed Santiam Fire	Highway 022
2020	Holiday Farm	173,393	70,170	Unknown	East of Springfield, OR	Highway 126
2020	Archie Creek	125,500	50,788	Unknown	East of Glide, Oregon	Highway 138
2021	Bootleg Fire	413,765	167,445	Lightning	near Beatty, OR	Highway 140
2022	Cedar Creek Fire	112,287	45,441	Lightning	Approximately 15 mi East of Oakridge	Highway 58

1. 36 megafires recorded in ODOT State history
2. 6/36 or 17% in the 19th century
3. 7/36 or 19% in the 20th century
4. 6/36 or 17% in the 1st decade of the 21st century
5. 10/36 or 28% in the 2nd decade of the 21st century
6. 7/36 or 19% so far, in the 3rd decade of the 21st century

Supplemental Table S7 – California Historical Megafires.

Year	Wildfire	Acres	Hectares	Cause	Description	Highway Impacted
1889	Santiago Canyon Fire	300,000	121,406	Human	Orange County, San Diego County, and Riverside counties	-
1932	Matilija	220,000	89,031	Unknown	Ventura County	-
1977	Marble Cone	177,866	71,980	Lightning	Monterey County	-
2003	Cedar	273,246	110,579	Human	San Diego County	
2007	Zaca	240,207	97,208	Human	Santa Barbara County	
2007	Witch	197,990	80,124	Powerlines	Siskiyou and Trinity counties	
2008	Klamath Theater Complex	192,038	77,715	Lightning	Siskiyou County	
2012	Rush	271,911	110,038	Lightning	Lassen County	
2013	Rim	257,314	104,131	Human	Tuolumne County	
2017	Thomas	281,893	114,078	Powerlines	Ventura and Santa Barbara counties	
2018	Mendocino Complex	459,123	185,800	Human	Colusa, Lake, Mendocino, and Glenn counties	
2018	Carr	229,651	92,936	Human	Shasta and Trinity counties	
2020	SCU Lightning Complex	396,625	160,508	Lightning	Stanislaus, Santa Clara, Alameda, Contra Costa, and San Joaquin counties	Hwy 130
2020	Creek	379,895	153,738	Unknown	Fresno and Madera counties	Hwy 168
2020	LNU Lightning Complex	363,220	146,990	Lightning	Napa, Solano, Sonoma, Yolo, Lake, and Colusa counties	Hwy 16, I80, 121, 128
2020	North Complex	318,935	129,068	Lightning	Butte, Plumas, and Yuba counties	Hwy 162
2020	August Complex	1,032,648	417,898	Lightning	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, and Colusa counties	Hwy 36
2021	Dixie	963,309	389,837	Powerlines	Butte, Plumas, Lassen, Shasta, and Tehama counties	
2021	Monument	229,651	92,936	Lightning	Trinity County	
2021	Caldor	221,835	89,773	Human	Alpine, Amador, and El Dorado counties	
2021	River Complex	199,359	80,678	Lightning	Siskiyou and Trinity counties	

1. 21 Megafires recorded in CA State history
2. 1/21 or 5% in the 19th century
3. 2/21 or 9% in the 20th century
4. 4/21 or 19% in the 1st decade of the 21st century
5. 5/21 or 24% in the 2nd decade of the 21st century
6. 9/21 or 43% so far, in the 3rd decade of the 21st century

Supplemental Table S8 – Highway Megafire Study Area Summary 2020.

Highway Impacted	Wildfire	State	Location	Start Date	Containment	Cause	Hectares Burned	Number of Days of Wildfire
Hwys 97, 115	Cold Springs Canyon	WA	Near Omak in Okanogan County	9/6/2020	9/19/2020	Power Transmitter Explosion	76,859	13
Hwys 2, 17, 172	Pearl Hill	WA	Near Bridgeport in Douglas County	9/7/2020	9/22/2020	Power Transmitter Explosion	90,540	15
Hwy 2	Whitney	WA	Near Davenport in Lincoln County	9/7/2020	9/16/2020	Powerlines	51,569	10
Hwy 224	Riverside	OR	Clackamas County	8/8/2020	12/3/2022	Human	53,378	117
Hwy 22	Beachie Creek	OR	Near the towns of Lyons/Mehama, Mill City, Gates, Detroit, and Idanha in the Santiam Canyon in Marion and Linn counties	8/16/2020	10/13/2020	Unknown	78,336	59
Hwy 22	Lionshead	OR	Around 14 miles west of the Warm Springs community in Jefferson, Marion, Linn, and Wasco counties & was situated close to Lionshead Canyon on the Confederated Tribes of Warm Springs Reservation	8/16/2020	11/13/2020	Lightning	78,064	90
Hwy 126	Holiday Farm	OR	Near the town of Springfield in Lane County	9/7/2020	10/29/2020	Unknown	70,170	59
Hwy 138	Archie Creek	OR	Near the town of Glide in Douglas County	9/18/2020	11/16/2020	Unknown	52,233	77
Hwy 36	August Complex	CA	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, and Colusa counties	8/17/2020	11/12/2020	Lightning	417,898	88
Hwy 162	North Complex	CA	Butte, Plumas, and Yuba counties	8/17/2020	12/3/2020	Lightning	129,068	109
Hwys 16, 80, 121, 128	LNU Lightning Complex	CA	Napa, Solano, Sonoma, Yolo, Lake, and Colusa counties	8/17/2020	10/2/2020	Lightning	146,990	47
Hwy 130	SCU Lighting Complex	CA	Stanislaus, Santa Clara, Alameda, Contra Costa, and San Joaquin counties	8/16/2020	10/1/2020	Lightning	160,508	47

Hwy 168

Creek

CA

Fresno and Madera counties

9/4/2020

12/24/2020

Unknown

153,738

112

Supplemental Table S9 – Costs of Slope/rock Scaling Damage from the 2020 Washington Labor Day Wildfires.

Slope/Rock Scaling Damage	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 01	Information not provided	WA State Route 2 MP 167.20 - 172.26	There are areas in drainages and sensitive slopes that will need to be hydroseeded with seed, fertilizer & mulch to help stabilization the slope to prevent erosion.	\$0.00	\$26,940.45

Supplemental Table S10 – Costs of Traffic Control from the 2020 Washington Labor Day Wildfires.

Traffic Control	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 01	Information not provided	WA State Route 2 MP 163 - 190	Traffic control and pilot car operations for highway closures.	\$12,092.71	\$0.00
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 02	Information not provided	WA State Route 17 MP 120 - 144	Traffic control and pilot car operations for highway closures.	\$27,255.67	\$0.00
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 03	Information not provided	WA State Route 97 MP 260 - 292	Traffic control and pilot car operations for highway closures.	\$19,939.27	\$0.00
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 04	Information not provided	WA State Route 155 MP 44 - 80	Traffic control and pilot car operations for highway closures.	\$10,127.86	\$0.00
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 05	Information not provided	WA State Route 172 MP 20 - 34	Traffic control and pilot car operations for highway closures.	\$2,958.22	\$0.00
Whitney Fire DDIR Site Number DMG075 - 04 & 05	12/16/2020	WA State Route 21 MP 72 - 73.5	Traffic control and pilot car operations for highway closures.	\$7,454.00	\$0.00
Whitney Fire DDIR Site Number DMG079 - 02 & 03	12/16/2020	WA State Route 2 MP 238 - 243	Traffic control and pilot car operations for highway closures.	\$9,387.00	\$0.00

Supplemental Table S11 – Costs of Structure Damage from the 2020 Washington Labor Day Wildfires.

Structure Damages	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 02	Information not provided	WA State Route 17 MP 120 - 144	Sign, Guardrail, fencing, delineator posts, and mile markers and post damage.	\$989,782.65	\$0.00
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 03	Information not provided	WA State Route 97 MP 260 - 292	Sign, guardrail, fencing, delineator posts, and mile markers and post damage.	\$245,507.01	\$0.00
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 04	Information not provided	WA State Route 155 MP 44 - 80	Sign, guardrail, fencing, delineator posts, and mile markers and post damage.	\$15,223.36	\$0.00
Pearl Hill/Cold Springs Fire DDIR Site Number DMB075 - 05	Information not provided	WA State Route 172 MP 20 - 34	Sign, guardrail, fencing, delineator posts, and mile markers and post damage.	\$28,811.91	\$0.00
Whitney Fire DDIR Site Number DMG079 - 02 & 03	12/16/2020	WA State Route 2 MP 238 - 243	Sign, guardrail, fencing, delineator posts, and mile markers and post damage.	\$13,140.00	\$0.00
Whitney Fire DDIR Site Number DMG075 - 04 & 05	12/16/2020	WA State Route 21 MP 72 - 73.5	Sign, guardrail, fencing, delineator posts, and mile markers and post damage.	\$16,899.00	\$0.00

Supplemental Table S12 – Costs of Hazard Tree Removal from the 2020 Oregon Labor Day Wildfires.

Wildfire Site	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
Riverside Fire DDIR Site Number 2C-02	10/27/2020	OR224 (Clackamas Highway 171), MP 18 to 49.97	Hazardous trees: weakened standing and fallen trees.	\$6,000,000	\$0
Beachie Creek Fire DDIR Site Number D03-001	11/20/2020	OR 22 (Hwy 162 North Santiam Hwy) MP 13–65	Catastrophic wildfire damage from Beachie Creek Fire to approximately 40K trees along highway requiring immediate removal	\$2,840,000	\$0
Lionshead Fire determined the boundary/break between the Beachie Creek and Lionshead fires to be at approximately MP 50 along Highway 022	No separate report was provided for the Lionshead Fire, due to it being on the same highway as the Beachie Creek Fire	OR22 (Highway 162 North Santiam Highway) MP 50 - 65	Catastrophic wildfire damage from Lionshead Fire to approximately 11,600 trees along highway requiring immediate removal	\$1,160,000	\$0
Holiday Farm Fire DDIR Site Number D5-001	11/19/2020	OR 126 (Hwy 015) MP 12.7–56	Catastrophic wildfire damage from the Holiday Farm fire to approximately 10K trees along highway requiring immediate removal	\$1,000,000	Information not provided
Archie Creek Fire DDIR Site Number D07-001	12/1/2020	North Umpqua Hwy, OR 138 East, MP 17–28.8	Hazardous trees: weakened standing and fallen trees	\$605,000	\$1,083,000
Archie Creek Fire DDIR Site Number D08-006	12/1/2020	North Umpqua Hwy, OR 138 East, MP 28.8–43	Hazardous trees: weakened standing and fallen trees	\$605,000	\$1,695,000
Archie Creek Fire DDIR Site Number D08-013	1/12/2021	North Umpqua Hwy, OR 138 East, MP 73–83	Hazardous trees: weakened standing and fallen trees	\$75,000	\$151,000

Supplemental Table S13 – Costs of Slope/rock Scaling Damage from the 2020 Oregon Labor Day Wildfires.

Slope/Rock Scaling Damage	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
Riverside Fire DDIR Site Number 2C-03	8/29/2022	OR224 (Clackamas Highway 171), MP 18 to 49.97	Unstable slopes causing rock, tree, and other material to fall onto the roadway	\$9,000,000.00	\$5,500,000.00
Beachie Creek Fire DDIR Site Number D03-004	11/20/2020	OR22 (Highway 162 North Santiam Highway) MP 13 - 50	Catastrophic wildfire damage to highway from Beachie Creek Fire requires scope scaling and assessment to assess corridor slope damage.	\$11,289.00	\$0.00
Lionshead Fire Determined the boundary/break between the Beachie Creek and Lionshead Fire to be at approximately MP 50 along highway 022 Beachie Creek Fire DDIR Site Number D03-006	No separate report was provided for the Lionshead Fire, due to it being on the same highway as the Beachie Creek Fire	OR22 (Highway 162 North Santiam Highway) MP 50 - 65	Catastrophic wildfire damage to highway from Lionhead Fire requires scope scaling and assessment to assess corridor slope damage.	\$4,611.00	\$0.00
Beachie Creek Fire DDIR Site Number D03-006	12/16/2020	OR22 (Highway 162 North Santiam Highway) MP 34 - 43	Catastrophic wildfire damage to highway from Beachie Creek Fire requires rock scaling to remove loose hazard rocks, trees, and vegetation on 8 slopes between MP 34 - 43	\$588,125.00	Information not provided
Beachie Creek Fire DDIR Site Number D03-008	2/22/2021	OR22 (Highway 162 North Santiam Highway) MP 40 - 44	Catastrophic wildfire damage to highway from Beachie Creek Fire requires rock screen repairs to damaged screens on slopes between MP 40 - 44	\$930,286.00	\$0.00
Beachie Creek Fire DDIR Site Number D03-009	2/22/2021	OR22 (Highway 162 North Santiam Highway) MP 40 - 60	Catastrophic wildfire damage to highway from Beachie Creek Fire requires rock screen repairs to damaged screens on slopes between MP 40 - 60	\$582,500.00	\$0.00

Lionshead Fire Determined the boundary/break between the Beachie Creek and Lionshead Fire to be at approximately MP 50 along highway 022	No separate report was provided for the Lionshead Fire, due to it being on the same highway as the Beachie Creek Fire	OR22 (Highway 162 North Santiam Highway) MP 40 - 60	Catastrophic wildfire damage to highway from Lionshead Fire requires rock screen repairs to damaged screens on slopes between MP 40 - 60	\$582,500.00	\$0.00
Holiday Farm Fire DDIR Site Number D5-002	11/25/2020	OR126 (Highway 015) North Umpqua Hwy, OR138 East, MP 24.85	Rock Scaling/Slope Assessment Unstable slopes causing rock, tree, and other material to fall onto the roadway	Information not provided	Information not provided
Archie Creek Fire DDIR Site Number D07-004	10/29/2020	North Umpqua Hwy, OR138 East, MP 26.42	Unstable slopes causing rock, tree, and other material to fall onto the roadway	\$4,000.00	\$9,500.00
Archie Creek Fire DDIR Site Number D07-006	12/2/2020	North Umpqua Hwy, OR138 East, MP 34.02	Unstable slopes causing rock, tree, and other material to fall onto the roadway	Information not provided	\$11,000.00
Archie Creek Fire DDIR Site Number D08-009	12/1/2020	North Umpqua Hwy, OR138 East, MP 37.9	Unstable slopes causing rock, tree, and other material to fall onto the roadway	\$12,500.00	\$27,000.00
Archie Creek Fire DDIR Site Number D08-010	12/1/2020	North Umpqua Hwy, OR138 East, MP 31.7	Unstable slopes causing rock, tree, and other material to fall onto the roadway	\$2,500.00	\$6,500.00
Archie Creek Fire DDIR Site Number D08-011	12/1/2020	North Umpqua Hwy, OR138 East, MP 33.45	Unstable slopes causing rock, tree, and other material to fall onto the roadway	\$5,000.00	\$214,850.00
Archie Creek Fire DDIR Site Number D08-016	12/2/2020	North Umpqua Hwy, OR138 East, MP 34.3	Unstable slopes causing rock, tree, and other material to fall onto the roadway	Information not provided	\$8,000.00
Archie Creek Fire DDIR Site Number D08-017	12/2/2020	North Umpqua Hwy, OR138 East, MP 34.3	Unstable slopes causing rock, tree, and other material to fall onto the roadway	Information not provided	\$8,000.00

Supplemental Table S14 – Costs of Structure Damage from the 2020 Oregon Labor Day Wildfires.

Wildfire Site	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
Riverside Fire DDIR Site Number 2C-04	8/29/2022	OR224 (Clackamas Highway 171), MP 18 to 49.97	Damage to over 200 highway signs and guardrail	\$0	\$950,000
Riverside Fire DDIR Site Number 2C-06	8/29/2022	OR224 (Clackamas Highway 171), MP 18 to 49.97	Damage to 1-1/2 mi of guardrail through the burn area	\$0	\$3,500,000
Beachie Creek Fire DDIR Site Number D03-002	11/20/2020	Bad Banks Bridge (State Bridge #06761) at OR 22 (Hwy 162, North Santiam Hwy) MP 36.74	Catastrophic wildfire damage to Bad Banks Bridge due to Beachie Creek Fire, to include structural damage to the concrete inlet, wing walls, and apron, culvert liner, and retaining wall; galvanized coating melted off of manhole cover; melted HDPE diversion pipes and burned trees endangered bridge	\$386,880	\$0
Beachie Creek Fire DDIR Site Number D03-005	11/24/2020	OR 22 (Hwy 162 North Santiam Hwy) MP 13–65	Catastrophic wildfire damage from the Beachie Creek Fire to approximately 14K linear feet of guardrail, signs, and delineators on OR 22E requiring repair	\$348,596	\$0
Lionshead Fire Determined the boundary/break between the Beachie Creek and Lionshead Fire to be at approximately MP 50 along Highway 022	No separate report was provided for the Lionshead Fire, due to it being on the same highway as the Beachie Creek Fire	OR22 (Highway 162 North Santiam Highway) MP 50 - 65	Catastrophic wildfire damage from the Beachie Creek Fire to approximately 4,060 linear feet of guardrail, signs, and delineators on OR22E requiring repair.	\$142,384	\$0
Holiday Farm Fire DDIR Site Number D5-004	11/19/2020	OR 126 (Hwy 015) MP 12.7–56	Catastrophic wildfire damage from the Holiday Farms fire to approximately 14k linear feet of guardrail, 119 signs, and 520 Lane delineators on OR 126	\$888,780	\$0

Archie Creek Fire DDIR Site Number D07-003	12/1/2020	North Umpqua Hwy, OR 138 East, MP 17–28.8	Sign, guardrail, fencing, delineator posts, and mile markers and post damage	\$177,500	\$310,000
Archie Creek Fire DDIR Site Number D08-008	12/1/2020	North Umpqua Hwy, OR138 East, MP 28.8–83	Sign, guardrail, fencing, delineator posts, and mile markers and post damage	\$212,500	\$347,700

Supplemental Table S15 – Costs of Traffic Control from the 2020 Oregon Labor Day Wildfires.

Wildfire Site	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
Riverside Fire DDIR Site Number 2C-01	10/27/2020	OR224 (Clackamas Highway 171), MP 18 to 49.97	Traffic Control for Road Closure	\$1,500,000	\$0
Beachie Creek Fire DDIR Site Number D03-003	11/20/2020	OR 22 (Highway 162 North Santiam Hwy) MP 13–65	Traffic control and pilot car operations for highway closure due to Beachie Creek Fire	\$200,433	\$0
Lionshead Fire Determined the boundary/break between the Beachie Creek and Lionshead Fire to be at approximately MP 50 along Highway 022	No separate report was provided for the Lionshead Fire, due to it being on the same highway as the Beachie Creek Fire	OR22 (Highway 162 North Santiam Hwy) MP 50 - 65	Traffic control and pilot car operations for highway closure due to Lionshead Fire	\$81,867	\$0
Holiday Farm Fire DDIR Site Number D5-003	11/25/2020	OR 126 (Highway 015)	*Erection and removal of barricades and detour signs *Flagging and pilot cars during the emergency period	Information not provided	Information not provided
Archie Creek Fire DDIR Site Number D07-002	12/1/2020	North Umpqua Hwy, OR 138 East, MP 17–28.8	Traffic control for road closure	\$260,000	\$335,000
Archie Creek Fire DDIR Site Number D08-007	12/1/2020	North Umpqua Hwy, OR 138 East, MP 28.8–83	Traffic control for road closure	\$285,000	\$510,000

Supplemental Table S16 – Costs of Hazard Tree Removal from the 2020 California Labor Day Wildfires.

Hazard Trees	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
August Complex Fire DAR Number 02-2J140	10/5/2020	CA State Route 36 MP 0.00 - 29.00	Remove hazard trees	\$900,000	\$0
Creek Fire DAR Number 06-1A630	10/12/2020	CA State Route 168 MP 29.00 - 63.00	Remove 4,000 hazard trees	\$1,970,000	\$0
SCU Lightning Complex Fire DAR Number 1W510	9/11/2020	CA State Route 130 MP 15.00 - 21.50	Remove 2,300 hazard trees	\$1,831,386	\$0
SCU Lightning Complex Fire DAR Number 1W620	9/30/2020	CA State Route 130 MP 11.20 - 22.50	Remove hazard trees	\$100,000	\$0
LNU Lightning Complex Fire DAR Number 1W480	9/14/2020	CA State Route 121 MP 16.08 - 22.08 & CA State Route 128 MP 7.52 - 34.21	Remove hazard trees	\$2,619,000	\$0
LNU Lightning Complex Fire DAR Number 1W480	9/14/2020	CA State Route 128 MP 0.00 - 0.72	Remove hazard trees	\$781,000	\$0
LNU Lightning Complex Fire DAR Number 1W490	9/14/2020	CA State Route 80 MP 20.92 - 25.30	Remove 75 hazard trees	\$128,924	\$0
LNU Lightning Complex Fire DAR Number 1W500	9/8/2020	CA State Route 1 MP 27.0 - 31.5	Remove hazard trees	\$700,000	\$0

Supplemental Table S17 – Costs of Structure Damage from the 2020 California Labor Day Wildfires.

Structure Damages	Date of Report	Site Location	Description of Damage	Emergency Repair Estimated Costs	Permanent Repair Estimated Costs
August Complex Fire DAR Number 02-2J140	10/5/2020	CA State Route 36 MP 0.00 - 29.00	Repair MBGR and signs, improve drainage (culverts upsizing, inlet protection, and debris racks	\$540,000	\$3,350,000
Creek Fire DAR Number 06-1A630	10/12/2020	CA State Route 168 MP 29.00 - 63.00	Damaged guardrail, pavement delineation, culverts, roadside signs, pavement	\$177,000	\$260,000
SCU Lightning Complex Fire DAR Number 1W510	9/11/2020	CA State Route 130 MP 15.00 - 21.50	Mt Hamilton Rd: Install erosion control, clean/repair/replace culverts, replace signs, and repair/replace guardrail	\$168,614	\$0
SCU Lightning Complex Fire DAR Number 1W620	9/30/2020	CA State Route 130 MP 11.20 - 22.50	Mt Hamilton Rd: Install erosion control, clean/repair/replace culverts, replace signs, and repair/replace guardrail: Culverts: 60 EA Signs/Delineators: 1,000+ EA Pavement: 13,000 SQYD	\$332,686	\$1,317,314
LNU Lightning Complex Fire DAR Number 1W480	9/14/2020	CA State Route 121 MP 16.08 - 22.08 & CA State Route 128 MP 7.52 - 34.21	Repair/replace guardrail, clean/repair/replace culverts, replace signs, and erosion control	\$0	\$5,141,000
LNU Lightning Complex Fire DAR Number 1W480	9/14/2020	CA State Route 128 MP 0.00 - 0.72	Repair/replace guardrail, replace signs, repair/replace fencing, and erosion control	\$0	\$1,959,000

LNU Lightning Complex Fire DAR Number 1W490	9/14/2020	CA State Route 80 MP 20.92 - 25.30	From N Texas Street to Alamo Drive: Repair/replace guardrail, replace signs, repair/replace fencing, and erosion control Guardrail: 2,540 LF Signs: 10 EA Fence: 6,200 LF	\$199,623	\$31,699
LNU Lightning Complex Fire DAR Number 1W500	9/8/2020	CA State Route 1 MP 27.0 - 31.5	From Meyers Grade Rd to Timber Gulch: Repair/replace guardrail, clean/repair/replace culverts, replace signs, repair/reconstruct retaining walls, and erosion control Guardrail: 2,600 LF Culverts: 6 EA Signs: 3 EA Retaining Walls: 4 EA (Son-1-27.3, 27.4, 27.5, 27.9)	\$750,000	\$15,300,000
LNU Lightning Complex Fire DAR Number 1J720	9/23/2020	CA State Route 16 MP: Various & CA State Route 128 MP: Various	Replace/clean culverts, erosion control, install new fence, and clearing ditch.	\$701,000	\$4,200,000

Supplemental Table S18 – Summary of Major Characteristics of the Labor Day 2020 Megafires and Highways Affected.

Highway Impacted	Wildfire	State	Location	Start Date	Containment	Cause	Hectares Burned	Number of Days of Wildfire
Hwys 97, 115	Cold Springs Canyon	WA	Near Omak in Okanogan County	9/6/2020	9/19/2020	Powertransmitter Explosion	76,859	13
Hwys 2, 17, 172	Pearl Hill	WA	Near Bridgeport in Douglas County	9/7/2020	9/22/2020	Powertransmitter Explosion	90,540	15
Hwy 2	Whitney	WA	Near Davenport in Lincoln County	9/7/2020	9/16/2020	Powerlines	51,569	10
Hwy 224	Riverside	OR	Clackamas County	8/8/2020	12/3/2022	Human	53,378	117
Hwy 22	Beachie Creek	OR	Near the towns of Lyons/Mehama, Mill City, Gates, Detroit, and Idanha in the Santiam Canyon in Marion and Linn counties	8/16/2020	10/13/2020	Lightning	78,336	59
Hwy 22	Lionshead	OR	Around 14 miles west of the Warm Springs community in Jefferson, Marion, Linn, and Wasco counties & was situated close to Lionshead Canyon on the Confederated Tribes of Warm Springs Reservation	8/16/2020	11/13/2020	Lightning	78,064	90
Hwy 126	Holiday Farm	OR	Near the town of Springfield in Lane County	9/7/2020	10/29/2020	Powerlines	70,170	59
Hwy 138	Archie Creek	OR	Near the town of Glide in Douglas County	9/18/2020	11/16/2020	Powerlines	52,233	77
Hwy 36	August Complex	CA	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, and Colusa counties	8/17/2020	11/12/2020	Lightning	417,898	88
Hwy 162	North Complex	CA	Butte, Plumas, and Yuba counties	8/17/2020	12/3/2020	Lightning	129,068	109
Hwys 16, 80, 121, 128	LNU Lightning Complex	CA	Napa, Solano, Sonoma, Yolo, Lake, and Colusa counties	8/17/2020	10/2/2020	Lightning	146,990	47
Hwy 130	SCU Lightning Complex	CA	Stanislaus, Santa Clara, Alameda, Contra Costa, and San Joaquin counties	8/16/2020	10/1/2020	Lightning	160,508	47
Hwy 168	Creek	CA	Fresno and Madera counties	9/4/2020	12/24/2020	Lightning	153,738	112

Supplemental Table S19 – Historical Causes of Megafires by State, 1845 through 2023.

State	Human	Unknown	Land Clearing/ Logging	Lightning	Power Transmitter Explosion/Powerlines
WA	5	0	0	9	3
OR	7	7	4	18	0
CA	7	2	0	9	3
Total	19	9	4	36	6
Overall % of Causes	26%	12%	5%	49%	8%

Supplemental Table S20 – Historical Hectares Burned by Cause from Megafires by State, 1845 through 2023.

State	Human	Unknown	Land Clearing/ Logging	Lightning	Power Transmitter Explosion/Powerlines
WA	149,414	188,745	0	742,995	218,968
OR	979,942	1,238,134	1,239,412	718,864	0
CA	801,833	242,769	0	1,287,811	584,039
Total	1,931,189	1,669,648	1,239,412	2,749,670	803,007

Supplemental Table S21 – Hectares Burned per State in the 2020 Labor Day Megafires.

State	Total Hectares Burned over the 2020 Megafires	Total Hectares in State	Percent of Hectares burned in 2020 Megafires per size of state
WA	218,968	17,207,233.00	1.27% of Washington was burned
OR	332,181	25,381,883.00	1.31% of Oregon was burned
CA	1,008,202	42,397,069.00	2.38% of California was burned
			4.96% Total % of West Coast of U.S.

Supplemental Table S22 - Length of Highway (km) per state vs. Estimated Overall Damage Costs due to the 2020 Labor Day Wildfires.

Washington

Damage	Costs	Length of Highway Affected (km)
Hazard Trees	\$0	182
Slope-Rock Scaling	\$26,940	182
Structures	\$1,309,364	182
Traffic Control	\$89,215	182
Total	\$1,425,519	-

Oregon

Damage	Costs	Length of Highway Affected (km)
Hazard Trees	\$15,214,000	310
Slope-Rock Scaling	\$17,508,161	310
Structures	\$7,264,340	310
Traffic Control	\$3,172,310	310
Total	\$43,158,811	-

California

Damage	Costs	Length of Highway Affected (km)
Hazard Trees	\$9,030,310	197
Slope-Rock Scaling	\$0	197
Structures	\$34,427,936	197
Traffic Control	\$0	197
Total	\$43,458,246	-

Overall Costs

State	Overall Damage Costs	Length of Highway Affected (km)
Washington	\$1,425,519	182
Oregon	\$43,158,811	310
California	\$43,458,246	197