



**PUBLIC SERVICE COMPANY OF COLORADO**

**WILDFIRE MITIGATION PLAN  
2021 ANNUAL REPORT**

Proceeding No. 20A-0300E  
May 20, 2022

PUBLIC SERVICE COMPANY OF COLORADO  
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## I. EXECUTIVE SUMMARY

Public Service Company of Colorado (“Public Service” or the “Company”) is pleased to submit to the Colorado Public Utilities Commission (“Commission”) its annual Wildfire Mitigation Plan (“WMP” or the “Plan”) Report (the “WMP Report”) for Plan Year 2021, in accordance with Recommended Decision No. R21-0109 in Proceeding No. 20A-0300E (“the WMP Decision”).<sup>1</sup> In accordance with the WMP Decision, this WMP Report serves to update the Commission and stakeholders on the activities and associated costs the Company undertook in calendar year 2021 to support the WMP, and to provide data tracking the progress and efficacy of the Plan’s overall implementation.

The primary objective of the Company’s approved WMP is to promote public safety through programs to construct, maintain, and operate the electric system in a manner to minimizing wildfire risk. In developing the Plan, the Company identified three main categories of actions that will promote public safety and systematically mitigate wildfire risk. Those categories include:

**Engagement:** Increased engagement with local, county, and state entities to facilitate more coordinated planning and mitigation efforts across organizations and ensure Public Service customers, communities, and emergency response responders are aware and informed of the Company’s operations, existing procedures, and the WMP;

**Technology:** Equipment upgrades and increased use of technology, including extreme wind loading analyses and the collection of Light Detection and Ranging data, which will enable the Company to systematically mitigate the risk of electrical infrastructure starting a wildfire, as well as the use of Unmanned Aerial Systems (“UAS”) to provide detailed pole top inspections;

**Acceleration:** Accelerating certain utility practices that mitigate wildfire risk, such as routine pole inspections and replacements, from traditional timeframes to shorter cycles in areas designated as Public Service’s Wildfire Risk Zone (“WRZ”) based on data from the Colorado State Forest Service. This aspect of the Plan will help promote public safety and environmental stewardship in light of the increasing intensity and frequency of wildfires in Colorado and an expanding wildland-urban interface.

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<sup>1</sup> Proceeding No. 20A-0300E, Decision No. R21-0109 (mailed Feb. 26, 2021) (affirmed with modification by Decision No. C21-0237 (mailed Apr. 16, 2021)). Pursuant to Paragraph 96 of the WMP Decision, Public Service is filing this WMP Report annually in May.

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A summary of the primary actions contained in the Company's Plan include:

- Accelerated and enhanced equipment and vegetation inspections and replacements, system protection and wind strength modeling programs, and asset data gathering;
- System protection enhancements;
- Expanded and incremental vegetation management actions;
- Repair and replacement of equipment identified through inspections, system protection, and wind modeling programs;
- Metrics, Tracking, and Reporting;
- Community and stakeholder outreach; and,
- Ongoing assessment of new and innovative activities for future consideration.

In 2021, the Company continued to refine and execute its comprehensive WMP, building on the accomplishments and learnings from 2020 and prior years. A key 2021 focus included the expansion of repair and replacement programs on the Distribution system. The Company made great progress, as reflected by achieving Work Completion Ratios ("WCRs") of 1.07 and 0.91 respectively, for two major WMP programs, the System Protection and Repair/Replacement programs. Additionally, the Company completed 100 percent of all planned Transmission and Distribution vegetation management activities. Public Service met 91 percent of its program targets and completed 4,400 Distribution pole replacements, 256 Transmission priority defect corrections, nearly 15,000 UAS Distribution pole inspections, over 2,800 miles of Transmission visual inspections, and installed 31 substation protection relays and distribution reclosers. The Company will continue to manage its spend and create program efficiencies to obtain cost savings wherever possible. In Section J, however, Public Service discusses some of the challenges it is facing in 2022 given the current supply chain issues and tight labor market, which are driving costs up.

Building on 2020's progress, the Company's Wildfire Mitigation Team ("WMT") continued to facilitate Fire Prevention, Wires Down, and Ignition Reporting training programs, as well as wildfire equipment and standards training. The Company continues to maintain and update its Wildfire Protection website, and is exploring other ways to provide information about the wildfire efforts, including through social media.

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The Company has continued to engage with industry partners, including the Electric Power Research Institute and the Edison Electric Institute. Through its continued collaborations and partnerships, Public Service continues to learn and lead in its understanding of industry best practices, benchmarking, and emerging wildfire technologies and solutions.

## II. BACKGROUND AND PURPOSE OF REPORT

The purpose of the Company's approved WMP is to protect public safety through minimizing the risk of the Company's equipment being the potential source of wildfire. The WMP is designed to accomplish this through enhanced inspections, incremental vegetation management programs, infrastructure and/or system hardening, situational awareness, training, stakeholder engagement, evaluation of new technologies, and operational practices. These initiatives are designed to enhance overall system reliability and resiliency by reducing the likelihood of outages. The WMP also includes the proactive exploration of existing and emerging wildfire mitigation tools through the implementation of programs in targeted parts of Public Service's system. The Company conducted extensive asset-based risk modeling to identify the highest-risk assets on its system. Using our own data and state data available through the Colorado Wildfire Risk Assessment Portal developed by the Colorado State Forest Service, we have developed the WRZ, which is a targeted area where the Company continues to focus its efforts. The WRZ includes approximately 2,100 miles of overhead distribution feeder (out of 9,500 miles total on the system) and over 2,800 miles of transmission lines (of nearly 5,000 total). The core components of the WMP include:

- **Repair and Replacement Programs.** These include the following subcategories of work: bare secondary conductor replacement, covered conductor installation, accelerated distribution pole repair/replacements, equipment upgrades (cutouts, arresters, etc.), overhead rebuilds of small conductor, accelerated high priority defect corrections, and accelerated major line rebuilds.
- **Inspection, Modeling, and Asset Data Gathering.** This includes the following subcategories of work: enhanced Above Groundline inspections, Infrared inspections, overhead secondary open wire quantification, overhead inspection, accelerated distributed pole inspections, risk modeling development, situational awareness tools, structure wind strength reviews, and annual visual inspections.
- **Protection Programs.** These include the following subcategories of work: Advanced Distribution Management System enhanced system protection, protection study for feeders, recloser communications network, substation relay communications upgrade, substation relay upgrade for remote non-reclosing, and design and install revised protection schemes.
- **Expanded Vegetation Management.** This includes creating a defensible space around poles ("DSAP") or pole brushing on equipment poles, secondary voltage line clearance, and right-of-way ("ROW") vegetation type conversion.
- **Metrics, Tracking, and Reporting.** To measure the Company's WMP performance over time, the Company is actively tracking and measuring a series of Commission-approved metrics. These include Plan and cost performance

metrics in addition to a set of metrics designed to measure Plan efficacy, or wildfire risk reduction, over time as programs are implemented. The WMP Decision directs the Company to track and annually report on a series of Key Performance Indicators, or “KPIs,” during the three-year term of the deferred accounting mechanism authorized for WMP costs, as well as report on a series of metrics throughout the duration of the WMP.<sup>2</sup>

- **Ongoing Assessment of Other Activities for Future Consideration.** In addition to the core components of the Plan described above, the Company will continue to study new, emerging, and evolving technologies and practices that it will consider for future implementation in conjunction with the Plan. For example, the Company continues to consider how or when Public Safety Power Shut-Offs (“PSPS”) should be deployed within Public Service’s service territory. While the Company does not currently have a PSPS Plan in effect, it has been actively working to evaluate how a plan might be implemented in the future for our Colorado system. The Company is also actively studying potential applications for technologies such as expanded use of covered conductor, microgrids, storage, and additional use of drones for asset inspection and patrol throughout the WRZ. In addition, software and professional services such as fire experts and advanced risk modeling software will improve the development of the WMP. The Company is also considering how targeted undergrounding might be a cost-effective alternative in some instances.
- **Community and Development.** For example, the Company used third party resources to stand up the website, [www.xcelenergywildfireprotection.com](http://www.xcelenergywildfireprotection.com), as a means of providing the most up-to-date WMP information to the general public, including announcements of upcoming meetings and access to materials from previous meetings. For example, community-specific initiatives with non-profit fire protection agencies will also be considered and funded through the Community and Development program.

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<sup>2</sup> Decision No. R21-0109 ¶¶ 94-96.

### III. KEY PERFORMANCE INDICATORS

The WMP Decision directs the Company to track and annually report on a series of Key Performance Indicators, or “KPIs,” during the three-year term of the deferred accounting mechanism authorized for WMP costs. The WMP Decision also directs the Company to report on a series of metrics throughout the duration of the WMP.<sup>3</sup>

Below is a list of the approved KPIs, along with Public Service’s 2021 performance:<sup>4</sup>

- **Vegetation Management Maintenance Cycle:** During each of the calendar years 2021 and 2022 Public Service will maintain vegetation around all distribution and transmission assets in the Company’s identified WRZ on at least a 90 percent completion of cycle basis. The Company will provide annual reporting on this metric, including its progress on achieving the 90 percent targets.
  - In 2021 the Company maintained a 100 percent on cycle completion, which exceeds the 90 percent KPI target.
- **Work Completion:** During each of the calendar years 2021 and 2022, Public Service will complete 90 percent of its scheduled work annually as proposed in the Company’s WMP. The Company will provide annual reporting on this metric, including its progress on achieving this target.
  - In 2021 the Company completed 91 percent of its scheduled work, which exceeds the 90 percent KPI target.
- **Work Completion Ratio (WCR):** During the calendar years 2021 and 2022, Public Service will complete system hardening Repair/Replacement and System Protection programs to the percent of actual spend as compared to budget, across the entire WRZ, equal to or exceeding 0.900 and report the actual WCR by county in the WRZ. If the WCR is less than 0.900 then the Company will report WCR by system hardening program repaired or replaced for each county within the WRZ.
  - In 2021 the Company reached a 0.91 WCR, which exceeds the .90 KPI target.

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<sup>3</sup> Decision No. R21-0109, ¶¶ 94-96.

<sup>4</sup> Decision No. R21-0109, ¶ 94.



## IV. METRICS REPORTING

Additionally, the WMP Decision directs the Company to report on the following specific metrics for each calendar year as part of its annual reporting:<sup>5</sup>

- A. Number of ignitions associated with electric overhead power lines within the WRZ;
- B. Number of downed transmission and distribution wires within the WRZ;
- C. Number of Red Flag Warning Days in Colorado;
- D. Communities or areas which experienced Red Flag Warnings and the dates they occurred;
- E. Total number of wildfires in the Company's service territory;
- F. Annual WCR for 2021 and 2022, as set forth in paragraph 94 of the WMP Decision;<sup>6</sup>
- G. Annual budgeted and planned distribution and transmission spend by WMP program for each county in the WRZ;
- H. Total actual annual distribution and transmission investment by WMP program for each county in the WRZ;
- I. Balances and monthly detail of the deferred accounts authorized in the WMP Decision;
- J. Company's progress on executing equipment upgrades, major line rebuilds, small conductor replacement, covered conductor, and overhead rebuilds with a summary of work completed and remaining work to be completed; and,
- K. Percentage on-cycle vegetation management activities for transmission and distribution assets in WRZ.

Public Service addresses each of these metrics below, in turn.

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<sup>5</sup> Decision No. R21-0109, ¶ 95.

## **A. & B. NUMBER OF IGNITIONS & NUMBER OF DOWNED TRANSMISSION AND DISTRIBUTION WIRES WITHIN THE WRZ**

Although the word “ignition” is used throughout the Company’s underlying WMP, Public Service notes that the use of the term has led to confusion and misunderstanding as some interpret “ignition” to be synonymous with “fire”. To clarify, the term is not, and was never intended to refer to a confirmed fire started by Company equipment. Instead, the term broadly covers any situation where there is some evidence of a potential incidence, or “risk event,” that may or may not have resulted in the potential for an actual fire. Although this confusion has arisen after gaining approval to execute its WMP, Recommended Decision No. R21-0109 nonetheless directs the Company to report “the number of ignitions associated with electric overhead power lines within the WRZ”. For the Company’s tracking purposes, it has been recording any evidence of potential risk event, which does not necessarily mean that an actual fire occurred, as a fire requires a combination of ignition plus fuel plus oxygen. The vast majority of risk events do not result in a fire. Public Service believes it is important to capture any evidence of a risk event, whether or not if it resulted in an actual fire so that it can best assess risk and plan its mitigation efforts going forward.

The Company also uses the term “Wires-Down” for a variety of events that include more than just a wire being physically down on the ground. The events captured also refer to instances where a wire is displaced from its normal location, whether or not the wire actually contacts the ground. The Company similarly believes it is important to capture any downed or displaced events that could result in potential risk events. For example, if a tree contacts a conductor and knocks it out of its connection point, that would be recorded as a Wires Down event.

It is important to note that potential risk events are not always associated with downed wires and vice versa.

Public Service has continued to develop and manage programs that maintain and improve the performance of its Transmission and Distribution assets. The information derived through these efforts is used to assist in analyzing and further hardening the system to prevent facilities from failing and mitigating the risk of wildfire and other public safety hazards. In 2021, the Company used its Outage Management System (“OMS”), as well as its Wires Down & Ignition Reporting process to track these metrics.

As discussed in previous filings, the OMS is a common method for utilities to track electric outage data. Public Service has developed and continues to refine its methodology for reviewing the thousands of entries of OMS data to search for instances of actual and potential risk events. The reporting process enables Public Service field

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personnel that respond to reports of equipment issues and outages to document any observed incidents of abnormal wire conditions and potential ignition events. These responders, who typically include linemen and troublemen, not only complete the appropriate repairs, but they also complete a form, which is collected for further analysis. The information collected includes any evidence downed or displaced conductors, or any potential sign of an ignition.

Since initiating its wildfire mitigation efforts, the Company has focused on continuous improvement of its wildfire data collection and analytics. In the fall of 2020, the Company implemented software such that enables responders to electronically create the applicable forms. The following table, Table 1, summarizes the information the Company has collected based on the methods described above. The table has been expanded from what was reported in previous filings to show the incidents that were in the WRZ as well as those outside the WRZ, whereas the Company has previously reported to the Commission total events. For these reasons, while the integrity of our data is improving, it may not be reasonable or accurate to compare 2021 data with previous years' data.

**Table 1 – 2021 Estimated Ignitions<sup>7</sup>/Downed Wire<sup>8</sup> Events**

2021 Estimated Events						
	Downed Wires			Ignitions		
	Non-WRZ	WRZ	Total	Non-WRZ	WRZ	Total
Distribution	746	335	1081	560	220	780
Transmission	20	1	21	6	0	6
Total	766	336	1102	566	220	786

There were 198 events where there was a combination of both events. None of those involved Transmission assets.

The Company tracks this data by cause categories and has more than 30 cause categories that are associated with the events. The three primary cause categories

<sup>7</sup> As described above, this is a record of incidents where there is some evidence of a potential risk event that may or may not have resulted in an ignition.

<sup>8</sup> As described above, this is number of events that include more than just a wire being physically down on the ground.

include Object Contact, Equipment/Facility Failure, and Other Issues. The Company is providing a full breakdown of events by cause in Appendix A.

Appendix A also includes some additional data pertaining to 2020 for comparison purposes. In the WMP and in the 2020 Annual Report, the Company provided a simple table of events, and showed the total number of incidents. Since the reporting requirement is for the events in the WRZ, Table 1 was expanded to include the incidents that were in the WRZ as well as those outside the WRZ. Appendix A provides similar information for 2020.

### **C. NUMBER OF RED FLAG WARNING DAYS IN COLORADO**

The National Weather Service issues Red Flag Warnings (“RFW”) & Fire Weather Watches (“FWW”) to alert interested parties of critical weather and dry conditions that could lead to increases in wildfire activity. The National Weather Service and the Storm Prediction Center (“SPC”), which are both part of the National Oceanic and Atmospheric Administration, are the primary sources of wildfire warning information. These sources provide daily information on RFW<sup>9</sup> as well as FWW. A RFW is issued when a combination of temperature, humidity, and wind are expected to combine to produce an increased risk of fire danger. The criteria for a RFW is shown in Appendix B.

As part of the Company’s routine utility operations, and in connection with its wildfire mitigation and response efforts, Public Service monitors and tracks RFW and FWW weather risk indicators, as well as the communities or areas that experienced RFW and the dates they occurred. The Company has a meteorology group that provides fire risk data.<sup>10</sup> Table 2, below shows the fire risk weather alerts, including RFW days in Colorado in 2021. It is important to note that RFW is just one indicator of fire risk. Also, in Colorado some counties do not issue a RFW unless there is a presence of dry thunderstorms, meaning there must be a presence or potential for lightning. As a result, the Company has been exploring the use of other risk indicators, such as the National Fire Danger Rating System adjective class ratings.<sup>11</sup>

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<sup>9</sup> See [https://www.weather.gov/bou/RFW\\_Definitions](https://www.weather.gov/bou/RFW_Definitions).

<sup>10</sup> The Company notes this data is typically only provided on weekdays.

<sup>11</sup> [Adjective Class Rating \(wfas.net\)](https://www.wfas.net)

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**Table 2 – 2021 Red Flag Warning Days**

<b>2021 Red Flag Warning Days and Other Weather Tracking</b>													
<b>2021</b>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2021 total
RFW	2	1	4	12	5	8	2	4	1	5	6	5	55
RFW Day Ahead	0	0	0	3	1	4	2	0	0	0	1	1	12
FWW Day Ahead	0	0	3	7	3	6	1	3	2	4	3	4	36
FWW 2-Day Ahead	0	0	0	1	0	2	1	0	0	0	1	1	6
SPC Elevated Fire Danger	3	1	6	11	5	11	2	1	5	7	8	13	73
SPC Elevated Fire Danger Issued for the Day Ahead	0	0	6	7	3	10	3	0	2	7	5	11	54
total fire danger days (RFW and/or Elevated Fire Danger)	3	1	6	14	7	10	2	5	5	7	10	13	83
No advance notice of fire danger	1	1	3	3	1	2	0	1	0	2	1	0	15

**D. COMMUNITIES AFFECTED BY RED FLAG WARNINGS**

Community information is gathered from National Weather Service fire zones.<sup>12</sup> There are 51 fire weather zones in Colorado. The Company tracks which zones are impacted by RFW days, and then compile a list of the communities that are within those zones. For a list of the communities affected by RFW and the dates they occurred please see Attachment A.

<sup>12</sup> See [https://www.weather.gov/media/pimar/FireZone/co\\_firezone.pdf](https://www.weather.gov/media/pimar/FireZone/co_firezone.pdf).

## **E. TOTAL NUMBER OF REPORTED WILDFIRES IN THE COMPANY'S SERVICE TERRITORY**

The Company actively monitors wildfires throughout the State of Colorado. In 2021, actual fire information was collected from a variety of sources, including:

- IndjiWatch – displays all Xcel Energy asset layers (<https://www.indji.net/client/>);
- Dataminr – Social media monitoring tool (<https://corp.dataminr.com/login>);
- WildCAD – Public sector fire dispatch logs (<http://www.wildcad.net/WildCADWeb.asp>);
- Intterra – National Interagency Fire (<https://maps.nwcg.gov/sa/#/%3F/%3F/38.2598/-105.2423/7>);
- InciWeb (<https://inciweb.nwcg.gov/>);
- Colorado Division of Homeland Security and Emergency Management (<http://www.coemergency.com/2012/06/map-of-current-colorado-fires.html>);
- Colorado Forest Atlas Informational Portal ([Colorado Forest Atlas - Portal](#));
- Google Earth Pro – Secondary tool to used display Xcel Energy assets and various KML/KMZ files;
- NC4 Email Notifications – Incident notifications from outside vendor and with information from local media and government sources;
- FS360 Camera network – Look out towers located strategically throughout Colorado; primary ownership is through the Forest Service;
- Xcel Energy Security Cameras – located on Xcel Energy buildings in substations;
- Xcel Energy Personnel – Tier 1 will collect information using Intake Form; and,
- News Outlets/Media.

Public Service uses those sources to determine if any wildfires have the potential to impact its assets. The Company has guidelines for wildfire monitoring, initial decision making, initial notification, classification, and communication. Once an initial notification is received, wildfires are not actively monitored unless they are within 10 miles<sup>13</sup> or have the potential to encroach Company assets in less than 96 hours. In 2021, the Company recorded 1,012 fires based on information obtained from the sources identified above.

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<sup>13</sup> In 2021, the Company modified its monitoring process to track wildfires that are within 10 miles of Company assets.

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Of the 1,012 fires monitored, 291 were within five miles of Company assets. There were 62 wildfires within 0.5 miles of Company assets. Twenty-nine wildfires resulted in Public Service needing to make operational changes, and the Company dispatched personnel and resources to respond to 118 wildfire events.

Attachment B to this WMP Report provides a list of the actual fires tracked in 2021, as derived from the sources listed above. These were wildfires that were close enough to Company assets to warrant some form of notification and subsequent monitoring. At the end of 2020, the responsibility for monitoring fires changed from the Company’s Gas Control division to its Enterprise Command Center. Due to the organizational change in responsibility for monitoring, there are no fires reported from January through April of 2021. Although not reported, there were no fires that threatened Company assets during that timeframe.

**F. ANNUAL WCR FOR 2021**

The following table provides information regarding the Company’s annual WCR for 2021. As provided in the WMP Decision, the WCR is calculated by dividing the percentage of annual work completed as compared to scheduled work, by the percentage of annual actual capital spend as compared to budget by program.

**Table 3 – 2021 Wildfire Completion Ratios**

2021 WCR by Program Area (Capital)	WCR (% Complete / % Budget)	Weight by Program Area Budget	Total Weighted WCR (% Complete / % Budget by Program Area)*
<b>Protection</b>			<b>1.07</b>
Substation Relay Upgrade	1.07	100%	
<b>Replacement</b>			<b>0.91</b>
Bare Secondary Conductor Replacement	0.21	1%	
Covered Conductor	0.48	5%	
High Priority Defect Corrections	0.79	5%	
Major Line Rebuilds	0.56	21%	
Equipment Upgrades	3.76	2%	
Pole Replacement	1.10	50%	
Small Conductor Replacement	0.63	16%	
*There may be differences between the product of the individual program weight and WCR amounts due to rounding.			

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**G. & H. ANNUAL BUDGETED/PLANNED AND ACTUAL DISTRIBUTION & TRANSMISSION SPEND**

The following tables provide information on the Company's budgeted/planned and actual WMP spending for calendar year 2021, with the budgeted values derived from what the Company provided to the Commission in Proceeding No. 20A-0300E. The actual spend by county as compared to budget is also provided. The Company's 2021 spend by county and 2021 investment by county can be found in Attachments C and D respectively.

**Table 4 – 2021 Actual and Budgeted Investment**

2021 Actual Compared to Budget Investment (\$ million)								
Business Unit	Actuals		Budget		Variance \$		Variance %	
	O&M	Capital Expenditures	O&M	Capital Expenditures	O&M	Capital Expenditures	O&M	Capital Expenditures
Distribution	\$4.424	\$67.354	\$6.606	\$87.539	(\$2.182)	(\$20.185)	33%	23%
Transmission	\$0.964	\$34.571	\$0.919	\$28.900	\$0.045	\$5.671	5%	20%
<b>Total</b>	<b>\$5.388</b>	<b>\$101.925</b>	<b>\$7.525</b>	<b>\$116.439</b>	<b>\$0.123</b>	<b>(\$14.339)</b>	<b>28%</b>	<b>12%</b>

**Table 5 – 2021 Actual and Budgeted Investment by Program Area**

2021 Actual Investment Compared to Budget by Program (\$ million)								
Business Unit	Actual		Budget		Variance \$		Variance %	
	O&M	Capital Expenditures	O&M	Capital Expenditures	O&M	Capital Expenditures	O&M	Capital Expenditures
Community and Development	\$0.388	\$0.000	\$1.425	\$0.100	(\$1.037)	(\$0.100)	73%	100%
Inspection / Modeling	\$2.393	\$0.006	\$2.921	\$0.050	(\$0.528)	(\$0.044)	18%	89%
Protection	\$0.028	\$6.555	\$0.075	\$7.526	(\$0.047)	(\$1.171)	62%	16%
Repair and Replace	\$1.499	\$95.565	\$1.224	\$108.763	\$0.275	(\$13.198)	22%	12%
Vegetation Management	\$1.080	\$0.000	\$1.880	\$0.000	(\$800)	\$0.000	43%	0%
<b>Total</b>	<b>\$5.388</b>	<b>\$101.925</b>	<b>\$7.525</b>	<b>\$116.439</b>	<b>(\$2.137)</b>	<b>(\$14.514)</b>	<b>28%</b>	<b>12%</b>



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**Table 6 – 2021 Actual and Budgeted Investment by County**

<b>2021 Actual Investment Compared to Budget by County (\$ Million)</b>			
<b>County</b>	<b>Actuals</b>	<b>Budget</b>	<b>Variance \$</b>
Adams	\$0.144	\$0.000	\$0.144
Alamosa	\$20.771	\$16.220	\$4.551
Arapahoe	\$2.036	\$0.250	\$1.786
Boulder	\$11.136	\$15.330	(\$4.194)
Broomfield	\$0.002	\$0.000	\$0.002
Chaffee	\$0.826	\$1.890	(\$1.064)
Clear Creek	\$2.099	\$2.370	(\$0.271)
Conejos	\$4.735	\$3.310	\$1.425
Costilla	\$5.917	\$3.310	\$2.607
Denver	\$0.040	\$0.000	\$0.040
Douglas	\$0.763	\$0.000	\$0.763
Eagle	\$2.837	\$0.000	\$2.837
El Paso	\$0.695	\$0.000	\$0.695
Garfield	\$6.445	\$1.840	\$4.605
Gilpin	\$0.181	\$0.000	\$0.181
Gunnison	\$0.000	\$0.000	\$0.000
Jefferson	\$20.384	\$14.160	\$6.224
La Plata	\$0.007	\$0.000	\$0.007
Lake	\$1.803	\$0.030	\$1.773
Larimer	\$1.739	\$0.000	\$1.739
Mesa	\$5.576	\$0.000	\$5.576
Moffat	\$0.004	\$0.000	\$0.004
Montrose	\$0.004	\$0.000	\$0.004
Park	\$1.282	\$0.830	\$0.452
Pitkin	\$0.170	\$0.000	\$0.170
Pueblo	\$0.108	\$0.000	\$0.108
Rio Blanca	\$0.043	\$0.000	\$0.043
Rio Grande	\$1.978	\$1.920	\$0.058
Routt	\$0.030	\$0.000	\$0.030
Saguache	\$13.147	\$4.580	\$8.567
San Miguel	\$0.001	\$0.000	\$0.001
Summit	\$1.764	\$0.140	\$1.624
Teller	\$0.014	\$0.000	\$0.014
Weld	\$0.352	\$0.000	\$0.352

Actual spend by county was executed to maximize efficiencies and progress toward year end targets. Additionally, actual workplans by county had to evolve as the year progressed to overcome design, construction, and material challenges that resulted in a deviation from the original county budgets. The Company continues to look into ways to maximize efficiencies and the work we can complete within the WMP.

## **I. BALANCES AND MONTHLY DETAIL OF THE DEFERRED ACCOUNTS**

In 2021, the Company in-serviced \$47.2 million of Distribution WMP plant additions. These costs are largely related to Distribution system work for reconductoring, pole replacements and substation relay work. In 2021, Public Service incurred \$6.7 million in Distribution WMP O&M. Please see Attachment E for the monthly Distribution plant addition and O&M detail. The Company is currently recovering \$2.4 million of Distribution WMP O&M and \$140 thousand of depreciation and return related to Distribution WMP capital in base rates. The 2021 deferred balances are included as Attachment F.

## **J. COMPANY'S PROGRESS**

The table below provides the Company's progress on executing equipment upgrades, major line rebuilds, small conductor replacement, covered conductor installation, and overhead rebuilds, with a summary of work completed and remaining work to be completed.

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**Table 7 – Equipment Upgrades Progress**

<b>Progress on System Protection and Replacement Projects</b>							
<b>Project</b>	<b>T/D/G</b>	<b>2019 Completed</b>	<b>2020 Completed</b>	<b>2021 Completed</b>	<b>2022 Target</b>	<b>Total</b>	<b>Units</b>
High Priority Defect Correction	T	72	225	256	250	<b>803</b>	Defects
Major Line Rebuilds	T	NA	E&P <sup>14</sup> for 2 circuits	22	18	<b>40</b>	Miles
Pole Replacement	D	2,305	3,697	4,302	2,754 <sup>2</sup>	<b>11,524</b>	Poles
Recloser Installation	D	NA	43	13	N/A	<b>56</b>	Reclosers
Relay Upgrade	D	Engineering	7	18	36	<b>61</b>	Relays
Bare Secondary Conductor Replacement	D	NA	NA	6	34	<b>40</b>	Miles
Small Conductor Replacement	D	NA	NA	21	60	<b>81</b>	Miles
Covered Conductor	D	NA	NA	4	12 <sup>4</sup>	<b>16</b>	Miles
Equipment Upgrades*	D	NA <sup>1</sup>	NA <sup>1</sup>	2,400 <sup>1</sup>	3,500 <sup>3</sup>	<b>5,900</b>	Count

1: Equipment Upgrades in 2019, 2020, and 2021 occurred with new pole replacements and conductor replacement efforts. Specific cases and were not tracked separately as individual pieces of equipment.

2: Pole replacement target updated from 1,220 based on small conductor and bare secondary rebuild efforts. Pole replacements are required in these rebuilds.

3: Equipment Upgrade target updated from 2,400 based on poles small conductor and bare secondary rebuild efforts and the equipment required to support these.

4: Covered conductor scope not completed in 2021 has been targeted for completion in 2022.

In 2021, Public Service met the overall Work Completion metric of 90% with a final Work Completion ratio of **91%**.

Nonetheless, the Company encountered challenges in 2021 that impacted its ability to fully execute its Repair and Replace workplan. This was specifically in the areas of bare secondary conductor replacement, covered conductor, transmission line major line rebuild, and small conductor replacement, with more detail provided below:

<sup>14</sup> “E&P” stands for Engineering & Procurement.

- **Materials and Supply Chain Issues:** Nationwide shortages on required necessary materials and what materials could be utilized under newly developed standards and specifications. These supply chain issues have led to delays and increased costs for necessary parts, and the Company expects this issue to persist through at least 2022 and likely longer.
- **Labor Constraints:** Colorado has been increasingly facing a shortage of electric line construction crews to timely perform the scope of work. Public Service retained resources from out of state, which came at a higher price point and negatively impacted the Company's planned schedule due to mobilization and ramp-up times. To further exacerbate the challenge, 25 construction crews were sent on a Mutual Aid deployment to Louisiana for a period of six weeks to assist with rebuilding damage from Hurricane Ida. Public Service anticipates these labor constraints are likely to persist as national wildfire conditions and events worsen.
- **Unexpected Changes in Scope for Reconductoring Projects:** The Company encountered more than anticipated line reconductoring projects that needed to be converted to rebuild projects upon inspection. This caused delays and cost increases as the change in scope requires time to revise the project designs and requires additional field work to complete.
- **Construction Challenges:** New program complexities and scope changes required a "ramp up" period. The wildfire construction standards involved new construction methods and equipment, especially for the covered conductor. The Company has used legacy covered conductor materials, but has not utilized it in many years. The crews required additional training and familiarization. Significant vegetation management was needed in certain areas before construction was able to commence. Unanticipated long-lead permitting requirements also (e.g. United States Forest Service) prevented certain projects from initiating or completing construction in 2021.
- **Environmental Restrictions:** Several Transmission Major Line Rebuild projects were impacted by the work restrictions imposed during the occupied habitat season for Gunnison Sage Grouse in certain project areas. This restriction eliminated the opportunity to construct Line 6905 in the spring. In addition, early summer load and system operational limitations further caused the required outage for Line 6905 to be delayed to the fall season and ultimately caused more delays for other rebuild constructions that were planned for late 2021 and early 2022.

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- **Construction Outage Availability:** Unexpected system interruptions, caused by asset failures or emergencies such as active wildfires, and system operations limitations resulted in some planned construction outages getting canceled or delayed. Competing outage needs for other projects made it even more difficult to identify alternative construction windows to complete projects in 2021.
- **New Wildfire Standards and Specifications:** Time lag encountered in creation and utilization of new wildfire standards and specifications.

These challenges have yielded opportunities to create better practices and procedures around wildfire repair and replace work. Lessons learned from the challenges encountered in 2021 are being utilized in 2022. As such, repair and replace work is projected to have a higher completion rate in 2022. As of the end of Q1 2022 the Company has replaced nearly as much distribution conductor mileage than in the entirety of 2021. Other programs such as pole replacements and equipment replacements are also on track to meet targets. Additionally, the shortfall in covered conductor mileage in 2021 will be constructed in 2022.

The table below provides the percentage of on-cycle vegetation management activities for transmission and distribution assets in the WRZ.

**Table 8 – Percentage of On-Cycle Vegetation Management Activities**

Program	2021 YE Goal	2021 YE Actual	Status
<b>DSAP</b>	4,000 poles	4,002 poles	100% of pole target
<b>Dist. Secondary Clearance</b>	19 Distribution Maintenance Areas (“DMAs”) (~Circuits) on 2021 work plan in WRZ	Completed secondary voltage clearing on all 19 DMA projects	100% of applicable projects
<b>Dist. MHT / Enhanced MHT (“EHMT”)</b>	MHT: 788 miles	MHT: 788 miles	100%
	EMHT: in MHT total	EMHT: in MHT total	
<b>Trans. MHT / EMHT</b>	MHT: 178 miles	MHT: 178 miles	100%
	EMHT: in MHT total	EMHT: in MHT total	
<b>Trans. ROW Conversion</b>	22 acres	22 acres	100%

## **V. 2022 FORECAST DISCUSSION**

As discussed above, the Company encountered a number of challenges while executing repair and replace programs in 2021. Since these programs are important to support the hardening of the system in the WRZ, the Company is committed to continuing to develop best practices in this area. Therefore, in response to these challenges, modifications have been and will continue to be made to work practices, project estimation, and forecasting. From a budget and forecasting standpoint, the Company is anticipating that costs beyond what was initially budgeted as part of the WMP submitted in Proceeding No. 20A-0300E for this repair and replace work will be required to continue to meet equipment and line mile targets. This increase is based on various factors including increased material costs, increased construction and labor rates, increased construction scope (rebuild versus reconductor), and carryover for increased covered conductor scope from 2021.

A large driver of these cost increases will be changes to distribution construction scope, specifically the additional pole replacements. Many small conductor and bare secondary conductor replacements are requiring the rebuild of the line, versus the original estimated scope of a reconductor. The need to rebuild is the result of numerous factors, including: poles unable to withstand the new conductors, equipment, and standards and pole condition in need of replacement. Programs such as the wind strength and clearance inspections and analysis have helped to identify areas in need of repair. In 2021 we inspected 5,400 poles using the wind strength and clearance inspections.

The Transmission High Priority Defects Correction program's scope is developed based on the previous year's inspection results. Approximately 2,800 miles of transmission line are inspected every year to identify these defects and other areas of concern. 2021 represented the Company's third year performing detailed visual inspections of the transmission line assets in the WRZ. Therefore, the Company anticipated a large decrease in the number of new defects identified in 2021. However, the Company still found 250 new priority defects in the WRZ that need to be addressed in 2022.

Other programs' year-end targets will be adjusted downward due to certain factors beyond the Company's control. For example, the 2022 Major Line Rebuild project's scope and schedule have impacted our ability to develop information for securing approvals from communities and agencies. Our plan development is complex in determining how we will access difficult terrain, plan around construction outage availability, and schedule crews to complete the work. This effort is taking more time than we originally anticipated. In addition, Lines 6914, Alamosa to Antonito 69 kV and Line 6683, Uintah to Fruita 69 kV, are radial lines and the Company has determined there is

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no viable solution to take the existing lines out of service to rebuild in-place while maintaining service to customers. Therefore, the construction schedules and the in-service dates for these projects have been adjusted to account for alternative route identification, develop construction plans and to obtain necessary permits and land -rights to rebuild these lines. The original in-service dates were moved from 2022 to 2023, as reported in the Company's recent Rule 3206 filing<sup>15</sup>.

While the Company is adjusting its internal 2022 budget accordingly, these cost and schedule changes are not reflected in the original cost estimates provided in Proceeding No. 20A-0300E. Accordingly, the Company anticipates its WCR performance metric could be impacted in 2022, but will update the Commission as appropriate.

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<sup>15</sup> 2022 Rule 3206 Filings Report, Proceeding No. 22M-0005E.

## APPENDIX A

### ADDITIONAL WIRES DOWN & IGNITIONS DATA AND 2020 METRICS FOR COMPARISON

There are over 30 cause categories that are associated with events. The breakdown of events by cause is shown in the following table. Those can be broken into three primary categories: Object Contact, Equipment/Facility Failure and Other Issues. Table 1 shows the Wires Down events by cause and Table Y shows the potential events by cause.

**Appendix Table 1 – 2021**

2021 Wires Down Cause Categories				
	Non-WRZ	WRZ	Total	% (WRZ)
<b><u>Object Contact</u></b>	360	155	515	46.73%
Debris In Line	24	13	37	3.36%
Environment Grass Fire	1		1	0.09%
Environment Ice Falling	9	6	15	1.36%
Lightning Strike	1	1	2	0.18%
Vegetation Tree Inside Maintenance Corridor	120	65	185	16.79%
Vegetation Tree Outside Maintenance Corridor	205	70	275	24.95%
<b><u>Equipment/Facility Failure</u></b>	215	102	317	28.77%
Conductor Fatigue Aluminum	21	14	35	3.18%
Conductor Fatigue Copper	18	12	30	2.72%
Connector Failure Auto Splice	6	2	8	0.73%
Connector Failure Bolted	50	11	61	5.54%
Connector Failure Compression Sleeve	4	2	6	0.54%
Connector Failure Crimped Connection	6	6	12	1.09%
Connector Failure Hotline Clamp		1	1	0.09%
Connector Failure Set Screw Type	6	3	9	0.82%
Connector Failure Spade		1	1	0.09%
Connector Failure Stirrup	1		1	0.09%
Connector Wrong Size		1	1	0.09%
Crossarm Arm Broken	27	9	36	3.27%
Crossarm Brace Broken	3	1	4	0.36%
Customer Primary Equipment	1		1	0.09%
Customer Secondary Equipment	19	4	23	2.09%
Fused Cutout Failure	2	1	3	0.27%
Guy Anchor Failure	1		1	0.09%
Improper Install Bushing		1	1	0.09%
Improperly Installed Connector		1	1	0.09%



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Improperly Installed Other	2		2	0.18%
Insulator Flash	1	1	2	0.18%
Insulator Glass/Porcelain Deadend	1		1	0.09%
Insulator Glass/Porcelain Line	1	2	3	0.27%
Lightning Arrester Polymer	1		1	0.09%
Metering or Associated Equipment Failure	1		1	0.09%
Overloaded Fuse	2		2	0.18%
Pole Broken / Good condition	25	12	37	3.36%
Pole Fire	3	8	11	1.00%
Pole Rotten	10	4	14	1.27%
Recloser Failure to Open		1	1	0.09%
Switch Overhead Single Blade Disc	1		1	0.09%
Terminator Failure Polymer		3	3	0.27%
Distribution Transformer Completely Self Protecting	1	1	2	0.18%
Distribution Transformer Conventional	1		1	0.09%
<b>Other Utility Caused Issues</b>	191	79	270	24.50%
Conductor Contact - Floating	48	21	69	6.26%
Conductor Contact - Galloping	44	22	66	5.99%
Conductor Contact - Poor Sag	5	5	10	0.91%
Ground Settling Secondary Equipment	1		1	0.09%
Industrial Contamination Pole Fire Insulator Tracking		1	1	0.09%
Industrial Contamination Pole Fire Unknown Equipment	1		1	0.09%
Intentional to Clear Pole Fire	1		1	0.09%
No Outage -- Non-outage Work	4	1	5	0.45%
Public Damage Broken Pole	40	11	51	4.63%
Public Damage Deliberate/Vandal		1	1	0.09%
Public Damage Fire	8	5	13	1.18%
Public Damage Guy Wire Broken	2		2	0.18%
Public Damage Non-Xcel Tree Trim	7	3	10	0.91%
Public Damage Overhead Line Contact	13	5	18	1.63%
Public Damage Other/Unknown	9	3	12	1.09%
Road Spray Pole Fire Insulator Tracking	1		1	0.09%
Unknown Cause Not Determined	7	1	8	0.73%
<b>Total</b>	766	336	1102	

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2021 Potential Ignition Cause Categories				
	Non-WRZ	WRZ	Total	% in WRZ
<b><u>Object Contact</u></b>	142	63	205	26.08%
Animal Contact Overhead Switch	1	2	3	0.38%
Animal Contact Overhead Transformer	5	1	6	0.76%
Animal Contact Other	1	5	6	0.76%
Animal Contact Terminal Pole	3		3	0.38%
Debris In Line	7	4	11	1.40%
Environment Grass Fire	2		2	0.25%
Environment Ice Falling	2	1	3	0.38%
Lightning Strike	3	2	5	0.64%
Vegetation Tree Inside Maintenance Corridor	39	22	61	7.76%
Vegetation Tree Outside Maintenance Corridor	79	26	105	13.36%
<b><u>Equipment/Facility Failure</u></b>	274	84	358	45.55%
Breaker Failure Air Circuit Breaker	1		1	0.13%
Bushing Failure Distribution Transformer	1		1	0.13%
Conductor Fatigue Aluminum	24	4	28	3.56%
Conductor Fatigue Copper	8	6	14	1.78%
Connector Failure Auto Splice	2	2	4	0.51%
Connector Failure Bolted	59	12	71	9.03%
Connector Failure Compression Sleeve	10	3	13	1.65%
Connector Failure Crimped	22	7	29	3.69%
Connector Failure Hotline Clamp	1	2	3	0.38%
Connector Failure Set Screw Type	8		8	1.02%
Connector Failure Shoot On	1		1	0.13%
Connector Failure Stirrup	3	1	4	0.51%
Connector Wrong Size		1	1	0.13%
Crossarm Arm Broken	5	1	6	0.76%
Crossarm Brace Broken	2		2	0.25%
Customer Primary Equipment	2	1	3	0.38%
Customer Secondary Equipment	70	27	97	12.34%
Fuse Link Broken	1		1	0.13%
Fused Cutout Failure	8		8	1.02%
Improperly Installed Bushing		1	1	0.13%
Improperly Installed Connector	4		4	0.51%
Improperly Installed Other	4		4	0.51%
Improper Install Secondary Cable	2		2	0.25%
Insulator Flash	4	2	6	0.76%
Insulator Glass/Porcelain Line	2	2	4	0.51%
Lightning Arrester Porcelain	1	1	2	0.25%
Metering or Associated Equipment Failure	1		1	0.13%

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Overloaded Fuse	2		2	0.25%
Overloaded Transformer	8		8	1.02%
Pole Broken / Good condition	2		2	0.25%
Pole Rotten	1	1	2	0.25%
Recloser Bushing Failure	1		1	0.13%
Relay Failure		2	2	0.25%
Switch Overhead Gang Operated		1	1	0.13%
Switch Overhead Motor Operated/Auto	2		2	0.25%
Switch Overhead Single Blade Disc	4		4	0.51%
Switch Underground or Load Center	3	4	7	0.89%
Terminator Failure Polymer	1	2	3	0.38%
Terminator Failure Porcelain	1		1	0.13%
Transformer Distribution Self Protecting	2	1	3	0.38%
Transformer Substation Non-Load Tap Changing	1		1	0.13%
<b><u>Other Utility Caused Issues</u></b>	150	73	223	28.37%
Conductor Contact - Floating	4	5	9	1.15%
Conductor Contact - Galloping	7	6	13	1.65%
Conductor Contact - Poor Sag	4	1	5	0.64%
Customer Requested Outage	3		3	0.38%
Ground Settling Sec Equipment	2	1	3	0.38%
Industrial Contamination Pole Fire Arrestor Tracking	1		1	0.13%
Industrial Contamination Pole Fire Insulator Tracking	3	1	4	0.51%
Industrial Contamination Pole Fire Unknown Equipment	1	1	2	0.25%
Industrial Contamination Switch Gear Flash Over	1		1	0.13%
Intentional to Clear Pole Fire	4		4	0.51%
No Outage -- Non-outage Work	2		2	0.25%
Pole Fire	43	36	79	10.05%
Public Damage Broken Pole	5		5	0.64%
Public Damage Deliberate/Vandal	5		5	0.64%
Public Damage Fire	38	14	52	6.62%
Public Damage Guy Wire Broken	1		1	0.13%
Public Damage Non-Xcel Tree Trim	3		3	0.38%
Public Damage Overhead Line Contact	4	2	6	0.76%
Public Damage Other/Unknown	3		3	0.38%
Public Damage Pad Mount Vehicle	2		2	0.25%
Road Spray Overhead Switch Flash Over	1		1	0.13%
Road Spray Pole Fire Insulator Tracking	1		1	0.13%
Road Spray Pole Fire Term Tracking	1		1	0.13%
Road Spray Pole Fire Unknown Equipment	1		1	0.13%
Unknown Cause Not Determined	10	6	16	2.04%
<b>Total</b>	566	220	786	

### 2020 Wires Down & Ignition Metrics

As discussed in Sections A. & B. (Number of Ignitions & Number of Downed Transmission and Distribution Wires), the 2020 Annual Report provided a simple table of events, showing the total number of risk events. Table 2 below shows what was provided in the 2020 Annual Report.

**Appendix Table 1**

<b>2020 Ignitions and Wires-Down Events</b>		
	<b>Downed Wires</b>	<b>Ignitions</b>
Distribution	457	642
Transmission	3	5
<b>Total</b>	<b>460</b>	<b>647</b>

The following table, Table 3 has been expanded to include the risk events that were in the WRZ as well as those outside the WRZ.

**Appendix Table 3**

<b>2020 Estimated Events</b>						
	<b>Downed Wires</b>			<b>Ignitions</b>		
	<b>Non-WRZ</b>	<b>WRZ</b>	<b>Total</b>	<b>Non-WRZ</b>	<b>WRZ</b>	<b>Total</b>
Distribution	325	132	457	489	153	642
Transmission	2	1	3	4	1	5
<b>Total</b>	<b>327</b>	<b>133</b>	<b>460</b>	<b>493</b>	<b>154</b>	<b>647</b>

In 2021, there were some refinements to the methodology used for extracting risk events from OMS. These include modifications to filtering, in part to ensure consistency going forward. The 2020 incidents based on the revised methodology, are shown in the following table, Appendix Table 4.

**Appendix Table 4**

<b>2020 Estimated Events Using 2021 Methodology</b>						
	<b>Downed Wires</b>			<b>Ignitions</b>		
	<b>Non-WRZ</b>	<b>WRZ</b>	<b>Total</b>	<b>Non-WRZ</b>	<b>WRZ</b>	<b>Total</b>
Distribution	628	176	804	612	96	708
Transmission	4	1	5	5	5	10
Total	632	177	809	617	101	718

## **APPENDIX B**

### **RED FLAG WARNING CRITERIA & FIRE WEATHER WATCH**

#### **RFW Criteria:**

A combination of weather and fuels conditions (as determined by fire management) for any 3 hours or more in a 12-hour period. These criteria are defined as the following:

1. Frequent gusts of 25 mph or greater – AND relative humidity of 15% or less
2. Dry thunderstorms (15% coverage or more, constituting an LAL 6.)

#### **OTHER FACTORS:**

In addition to the basic criteria above, a combination of other elements may result in Red Flag Conditions:

3. Haines Index of 5 or 6, indicating a moderate or high potential for large, plume dominated fire growth.
4. Wind shifts associated with frontal passages.
5. First significant lightning event (wet or dry) after an extended hot and dry period.
6. Poor relative humidity recovery overnight (RH remains at 40% or lower.)
7. Any combination of weather and fuel moisture conditions which, in the judgment of the forecaster, would cause extensive wildfire occurrences.

#### **Fire Weather Watch**

Alert for the high potential for development of Red Flag criteria (see above) in the next 12-72 hours. The watch may be issued for all, or portions of a fire weather zone or region.