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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF AVISTA CORPORATION FOR THE AUTHORITY TO INCREASE ITS RATES AND CHARGES FOR ELECTRIC AND NATURAL GAS SERVICE TO ELECTRIC AND NATURAL GAS CUSTOMERS IN THE STATE OF IDAHO	)))))))	CASE NO. AVU-E-21-01 CASE NO. AVU-G-21-01 EXHIBIT NO. 12 OF DAVID R. HOWELL

FOR AVISTA CORPORATION

(ELECTRIC AND NATURAL GAS)

Avista Utilities

Wildfire Resiliency Plan

Exhibit No. 12
Case Nos. AVU-E-21-01 & AVU-G-21-01
D. Howell, Avista
Schedule 1, Page 1 of 67

Avista has been delivering safe and reliable electric energy for over 130 years. Our history is one of collaboration with communities and customers to ensure a balance of safety, economic vitality, and of stewardship. Recent wildfires have galvanized our commitment to public safety, emergency preparedness, and to protect our regional economy. Wildfires represent a growing threat to homes, businesses, and our way of life. This Wildfire Resiliency Plan represents Avista's commitment to mitigating potential wildfire risk associated with the delivery of electricity. It also affirms our commitment to working closely with community leaders, with property owners, and emergency first responders.

This Plan leverages the Company's experience with responding to adverse weather and environmental conditions including wildland fires. It also represents the knowledge of Avista's employees, that of peer utilities, together with fire protection and land management agencies. This is who we are.

Heather Rosentrater

Senior Vice President, Energy Delivery and Shared Services

Sincerely,

Date: May 28, 2020

This report reflects the combined effort of many Avista employees. Though many hands were involved in the development of this document and their contributions should not be overlooked, I would like to acknowledge several key individuals without whom this report would not have been possible. To Bob Brandkamp for doing the early work to quantify wildfire risk and for leading the PNW Utility Wildfire Forum and the Spokane County Fire District committee. To Greg Hesler for initiating the 'call to action' and for his counsel throughout this process. To David Howell for his unwavering leadership & personal support and for responding to Greg's call to action. And finally, to Heather Rosentrater for making Wildfire Resiliency one of her top priorities and for lending her voice to the issue. Many voices, one message.

Thank you all for your time, involvement, counsel, and commitment to this effort.

David James, Wildfire Resiliency Plan Manager 

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The steering committee members of Avista's Wildfire Resiliency Plan approve this document.

David Howell Director, Electric Operations Signature Date	Bruce Howard Sr. Director, Environmental Affairs Signature Date	Bob Brandkamp Sr. Manager, Enterprise Risk Signature Date

Elizabeth Andrews Sr. Manager, Revenue Requirements Signature Date	Casey Fielder Manager, Corporate Communications Signature Date	Annie Gannon Manager, Communications Signature Date

Alicia Gibbs Manager, Asset Maintenance Signature Date	Greg Hesler Vice President, General Counsel & Chief Compliance Officer Signature Date

Executive Summary

Objective

This report details the recommended response to the increasing threat of wildfires within Avista's service territory. The recommendations within this report seek to reduce the risk of wildfire from the interaction of Avista's energy delivery system and the environment as well as the impacts of wildfire to Avista's system. These recommendations represent Avista's initial Wildfire Resiliency Plan. The Plan will be periodically reviewed to ensure consistency with industry best practices and that it is providing benefits to customers and the communities Avista serves.

Background

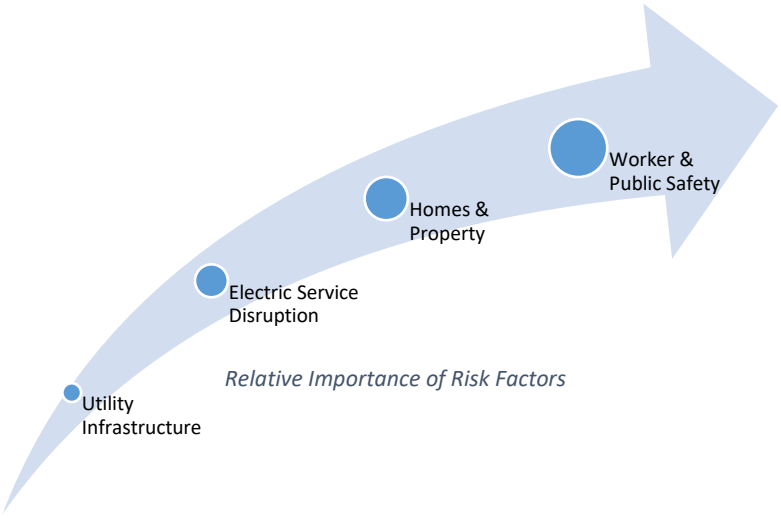
Avista's Wildfire Resiliency Plan reflects the Company's 130-year operating history combined with recent efforts to quantify and respond to the financial, safety related, and service reliability risks associated with wildfires. Risks are not static and this Plan will be updated to align with environmental, political, financial, and other factors that influence those risks. Plan objectives include focus in the following strategic areas:

- Protect lives and property
- Ensure emergency preparedness and align operating practices with fire threat conditions
- Protect Avista's energy delivery infrastructure

Protecting Lives and Property

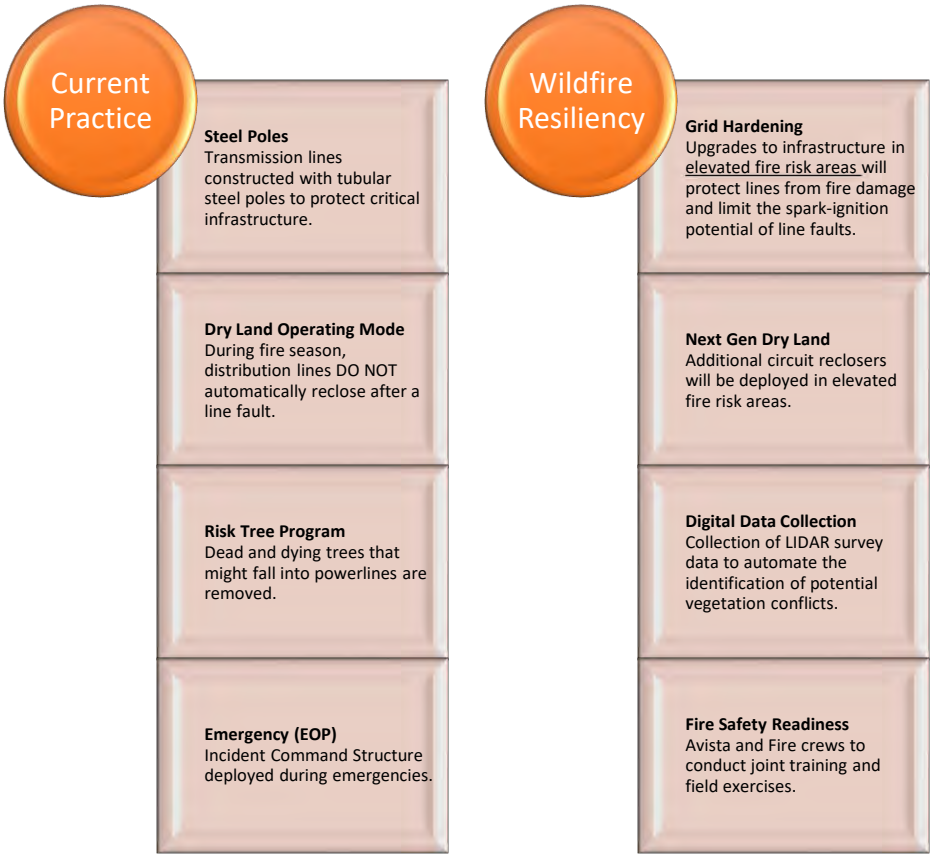
Though many elements of this plan focus attention on Avista's transmission and distribution infrastructure and the effort to reduce spark ignition events, the reader should not lose sight of the plan's primary objective: to protect lives and property by reducing the number of utility involved wildfires. In November 2018, 18,804 structures were destroyed and 85 residents lost their lives in the wildfire at Paradise, California. Though investigations continue, it is clear that the initiating action involved one of PG&E's transmission towers. This fact spurred actions by utilities across the nation, including Avista, to mitigate the potential for causing such fires.

Avista provides electrical service to over 380,000 customers with many customers living in elevated fire risk areas. A key factor in Avista's plan is how best to reduce the likelihood of a wildfire caused by Avista's electric operations. The recommendations contained in this plan are based on the ability to reduce the risks associated with public and worker safety, the risks to property and infrastructure, and to lessen the impact of electric system outages. The relative importance of those risks is indicated in the graphic.



Past Fire Mitigation

Avista has a long history of responding to adverse operating conditions including wildfires. In October of 1991, 60 mph winds combined with persistent drought sparked over 90 fires in the Spokane area.[1] Most of those fires were the result of vegetation contacts with powerlines. More recent fires in the Colville and Davenport operating districts have also influenced operating, maintenance, and design construction practices. This Plan builds upon that experience to mitigate the risk of wildfires. A few examples are shown below:



Increased Frequency and Severity of Fire Activity

The number and size of wildfires is increasing throughout the western United States. Data from the United States Forest Service (USFS) indicates that the number of large fires (>1000 acres) has tripled since 1970. Also, the duration of fire season has grown by over 100 days. A report from NASA's global science department summarizes the situation indicating six underlying trends.[2]

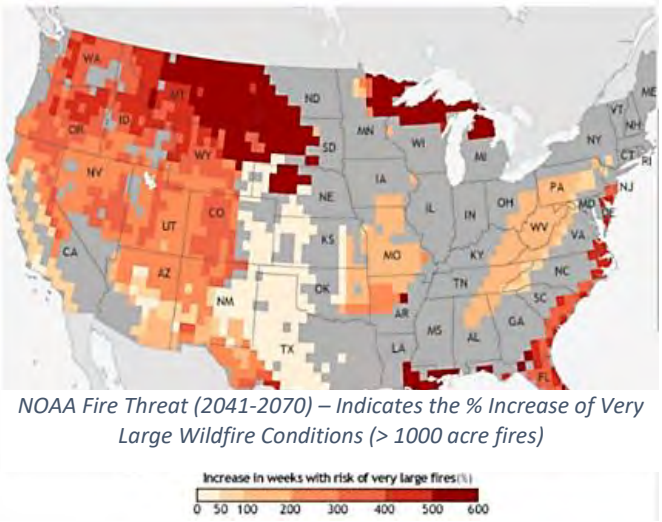
[1] Spokesman Review, 8/21/15 "Firestorm 1991"
[2] NASA, global science, www.climate.nasa.gov/blog/2830

1. ***There are more fires*** (61% of fires in the western U.S. have occurred since 2000)
2. ***And those fires are larger*** (since 1950 acres burned per year has increased 600%)
3. ***A small percentage of the west has burned*** (11% of land mass impacted since 1950)
4. ***The same areas keep burning*** (~33% of land is subject to cyclic wildfire activity)
5. ***Fires are burning more coniferous forest than any other type of landscape*** (since 2000, wildfires have shifted from burning shrub-lands to coniferous forest)
6. ***Wildfires are going to have a big impact on our future*** (climate simulations from National Oceanic and Atmospheric Agency (NOAA) researchers suggest a 200-500% increase in the number of large fires by mid-century)

40% of Avista's distribution and 20% of transmission lines are located in elevated fire threat areas. 123,300 Avista electric customers reside in these areas.

Washington State's Department of Natural Resources is responsible for fire suppression on over 13 million acres of private and state owned forest lands. Its 2015 forest health report states that, "*Nearly 2.7 million acres of eastern Washington forestland need treatment to be more resilient against insects, disease, and wildfires*." That report recommends a variety of treatments including mechanical thinning and prescribed burns. To compound the issue, there are two million Washington homes located in elevated fire threat areas.[3]

Researchers at NOAA predict that by mid-century (2041-2070),[4] the conditions for 'very large fires' will substantially increase throughout the western United States. The graphic on the right indicates the percentage increase for very large fires. Note that areas of eastern Washington and northern Idaho suggest a 300% to 400% increase. This trend, based on NOAA climate studies, combined with development in fire prone areas is projected to make wildfire one of the most significant environmental threats in the western United States.[5]



NOAA Fire Threat (2041-2070) – Indicates the % Increase of Very Large Wildfire Conditions (> 1000 acre fires)

[3] Washington Dept. of Natural Resources Forest Health, www.dnr.wa.gov/ForestHealth
[4] National Oceanic and Atmospheric Administration, www.climate.gov
[5] Caitlyn Kennedy, "Risk of Very Large Fires Could Increase Sixfold by Mid-Century in the US," Climate.gov, August 26, 2015, https://www.climate.gov/news-features/featured-images/risk-very-large-fires-could-increase-sixfold-mid-century-us

Public Safety Power Shutoff

In November 2018, a wildfire near Paradise, California burned over 18,000 homes and resulted in 85 fatalities. No wildfire in modern history has created an industry response equivalent to the 'Camp Fire'. The California Public Utilities Commission mandated that utilities develop fire mitigation strategies. As a result, major utilities in California pre-emptively shutoff power to prevent spark-ignitions from overhead powerlines. This system is known as Public Safety Power Shutoff (PSPS).[6] Though Avista is closely monitoring the situation in California and continues to work closely with utility peers including PacifiCorp, Pacific Gas & Electric, San Diego Gas & Electric, and Southern California Edison, at this time Avista does not plan to pre-emptively shutoff power to mitigate the risk of wildfire.

This report details 28 individual recommendations aimed to reduce the risk of wildfires. Many of those elements support a system that Avista developed in the early 2000s. This system is known internally as Dry Land Mode or Dry Land Conditions (page 28). Avista operations and engineering staff support enhancements to the existing Dry Land system and believe it provides a balanced approach to mitigating wildfire risk while maintaining electric service during fire season. As detailed in this report, Avista's Dry Land Mode system involves both identifying electric circuits that operate in elevated fire risk areas and the reconfiguration of protection systems. Several elements of this plan support enhancements to that system including:

- Development of a Fire-Weather Dashboard (computerized fire risk prediction system)
- Annual electric distribution fuse coordination report (optimal protection)
- Recloser event reporting (continuous improvement of protection systems)
- Dry Land Mode engineering review (comprehensive system review)
- Dry Land Mode 'trigger' (initiate seasonal protection based on fire risk threshold)
- Midline recloser communication
  (retrofit existing circuit reclosers with monitoring & control equipment)
- Additional midline reclosers in elevated fire threat areas
  (aligning system protection with fire risk)
- Wildland Urban Interface (identify elevated fire risk zones)
- Substation SCADA (retrofit existing substation with monitoring & control systems)

It is impossible to prevent all tree contacts or equipment failures associated with the electric delivery system. However, by adding defense strategies specifically designed to reduce spark-ignition sources, Wildfire Resiliency represents a holistic approach to safeguarding human lives, property, and infrastructure against the threat of utility involved wildfires.

[6] Public Safety Power Shutoff – California PUC – www.cpuc.ca.gov/deenergization

Goals and Objectives of Avista's Wildfire Resiliency Plan

Emergency Operating Plan — **Emergency Response**

- To prepare and train for episodic wildfire events. To recognize wildfire as a recurring threat to utility infrastructure, the communities we serve, Avista employees and customers.

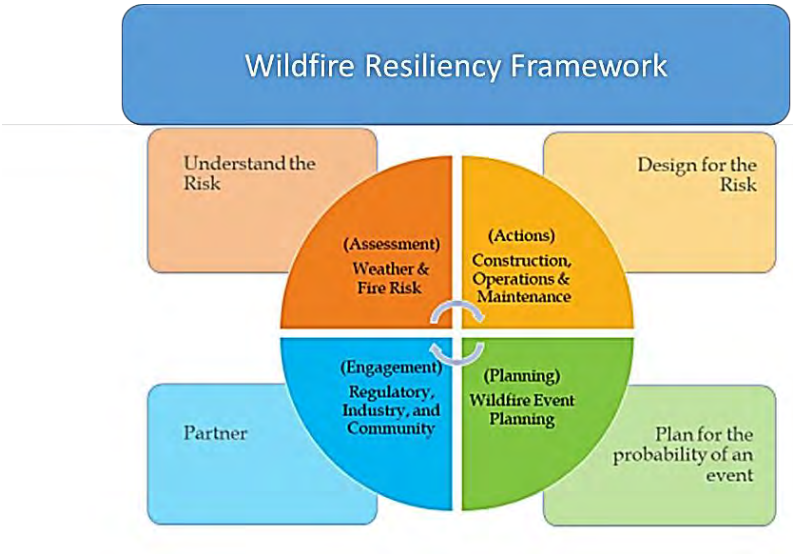
Promote Safety — **Protect Life and Property**

- To protect physical assets, property, and human lives against the threat of wildland fires. To recognize fire potential as a manageable risk element of Avista's operating and maintenance strategies.

Financial Protection — **Safeguard Company Assets**

- To mitigate the probability and consequence of direct financial and liability costs associated with large scale fire events.

Throughout the development of this Plan, a model framework has been used to balance risks, costs, and benefits. Collaboration extended well beyond the internal walls of Avista to include voices from the community, fire protection professionals, regulators, utility peers, and professional service and material suppliers.



Understand the Risk *– Combining infrastructure data with fire threat and weather conditions to yield a 'fire risk potential' metric.*

Design for the Risk *– Adapt transmission and distribution materials and construction to minimize the potential for utility involved fire ignition.*

Plan for an Event*- Prepare field and office support staff through training and field simulation exercises.*

Partner with others *– Collaborate with others to leverage the strengths of various partners and create a stronger response system for all involved.*

Wildfire Resiliency Plan Elements

This Plan includes 28 individual recommendations grouped into four categories. These categories are similar to other utility wildfire plans including those from PG&E, SDG&E, SCE, and PacifiCorp:[7]

Enhanced Vegetation Management

Situational Awareness

Operations & Emergency Response

Grid Hardening & Dry Land Mode

- **Grid Hardening** – by replacing infrastructure in fire prone areas, the likelihood of a spark-ignition source is mitigated and critical infrastructure is protected from the impacts of fire.
- **Vegetation Management** – by identifying potential conflicts on an annual basis and prioritizing those risks from highest to lowest, Wildfire Resiliency aligns resources with risk metrics.
- **Situational Awareness** – by adding line and monitoring equipment, system operators can respond quickly to variable weather and fire threat conditions.
- **Operations & Emergency Response** – through training and simulation, Avista personnel will be better prepared to work with fire professionals during an event.

Plan recommendations also reflect cost prudency and were adopted on their basis to:

- Leverage existing asset programs and operating practices
- Promote public safety
- Mitigate financial risk

The following tables provide more information about the recommendations.

Grid Hardening and Dry Land Mode			
Recommendation	**Current State**	**Future State**	**Benefits**
Transmission Fire Retardant (FR) Program	FR paint program requires refresh every 3-5 years	Genic Fire-Mesh wrap with 20-year expected life	Will reduce operating expense to maintain fire protection of transmission wood poles
Transmission Line Inspection	Aerial surveys to identify structure defects (reliability based)	Aerial and ground inspections to identify structure defects (fire risk based)	Reduce transmission fire ignition events which are less likely than distribution related fires, but generally result in larger fires
Dry Land Operating Mode (DLM)	Seasonal implementation (single mode)	Adapted to fire-weather metrics (multi-mode)	By aligning DLM modes with weather and fire threat conditions, operators can balance service reliability with fire risk potential

[7] California Public Utilities Commission, www.cpuc.ca.gov/wildfiremitigationplans/

Grid Hardening and Dry Land Mode			
Recommendation	**Current State**	**Future State**	**Benefits**
Transmission Grid Hardening	Condition-Based Steel Conversion	Risk-Based Steel Conversion	Reduce likelihood of damage to Avista transmission assets. 20% of Avista's transmission assets are located in elevated fire threat areas
Distribution Grid Hardening	Condition based pole, conductor, and equipment programs	Risk based approach to replacing equipment and conductors associated with spark-ignition potential	Reduce likelihood of distribution related fires. 40% of Avista's distribution assets are located in elevated fire threat areas

Enhanced Vegetation			
Recommendation	**Current State**	**Future State**	**Benefits**
Digital Data Collection	Human based ground and aerial inspections	Augment with computer automated analysis to identify vegetation encroachment and structural defects	Allows for scenario based planning of treatment options and serves as the QA tool to assess the efficacy of previous field work
Fuel Reduction Partnerships	No formal program	Partnering with Fire Agencies to remove fuels near critical infrastructure	Strengthens relationships between Avista and fire first responders and reduces fire severity threats to infrastructure
Widen Transmission Rights-of-way	No formal program	Align right-of-way boundaries to fire risk potential	Protect critical infrastructure and serve as fire break
Annual Risk Tree	Cadence based program (e.g. 1-3 years)	System-wide effort to annually identify and remove dead, dying, and diseased trees	Reduce tree fall-ins, which are 3 times more likely to occur than grow-ins
Public Outreach "Right Tree, Right Place" Campaign	General information available to all customers	Work with customers in elevated fire risk areas to remove tall growing trees from underneath powerlines	Reduces the risk of tree grow-ins and subsequent spark-ignition sources

Situational Awareness			
Recommendation	**Current State**	**Future State**	**Benefits**
Fire-Weather Dashboard	Weather forecast data subject to individual interpretation	By combing weather forecast and fire threat condition data, operating personnel will have clear guidance relative to likelihood and potential impact of fires	Promotes a more consistent approach among operations and emergency managers
Additional Distribution Circuit Reclosers	Based on system protection and reliability performance	Deployed in elevated fire threat areas. Reflects a risk-based strategy	Supports the evolution of Avista's Dry Land operating mode to align with forecasted weather and fire threat conditions

Situational Awareness			
Recommendation	**Current State**	**Future State**	**Benefits**
Substation Supervisory Control & Data Acquisition (SCADA)	SCADA added to new or reconstructed substations. Reflects a condition based approach	Enables control and monitoring of substation equipment including circuit reclosers in elevated fire risk areas	(as stated above)

Operations and Emergency Response			
Recommendation	**Current State**	**Future State**	**Benefits**
Emergency Operating Procedure & Avista Incident Command Representative	No formal wildfire policy	Avista EOP to delineate wildfire from other storm events. Avista to offer assistance at all fire ICS.	Coordinate Avista system restoration with fire protection and evacuation activities
Wildfire Performance Metrics	None	Develop fire-specific performance metrics to ensure that Plan objectives are being met	Supports the adaptation of the Resiliency Plan to meet current operating and environmental conditions
Wildland Urban Interface (WUI) map	Developed in Q3/2019	Categorize Avista T&D infrastructure with respect to fire ignition potential and fire impact consequence	Focuses vegetation management and grid hardening efforts in the highest fire risk areas
Emergency first responder training	No formal program	Annual fire safety training to Avista field personnel and electrical hazard training to fire protection personnel	Promotes safety of first responders and supports a variety of partnering activities including fuel reduction and fire adapted communities
Expedited Fire Response	Draft MOU under consideration with Spokane Fire Districts (2020 Pilot Project)	Fire agency personnel to investigate transmission line faults during fire season	Suppress fires before they have an opportunity to spread

The Wildland Urban Interface (WUI)

The interface area between forest lands and human development is referred to as Wildland Urban Interface (WUI). Homes and businesses located near the WUI are most at-risk from the impact of wildfires and are often located in rural areas that lack fire suppression resources.

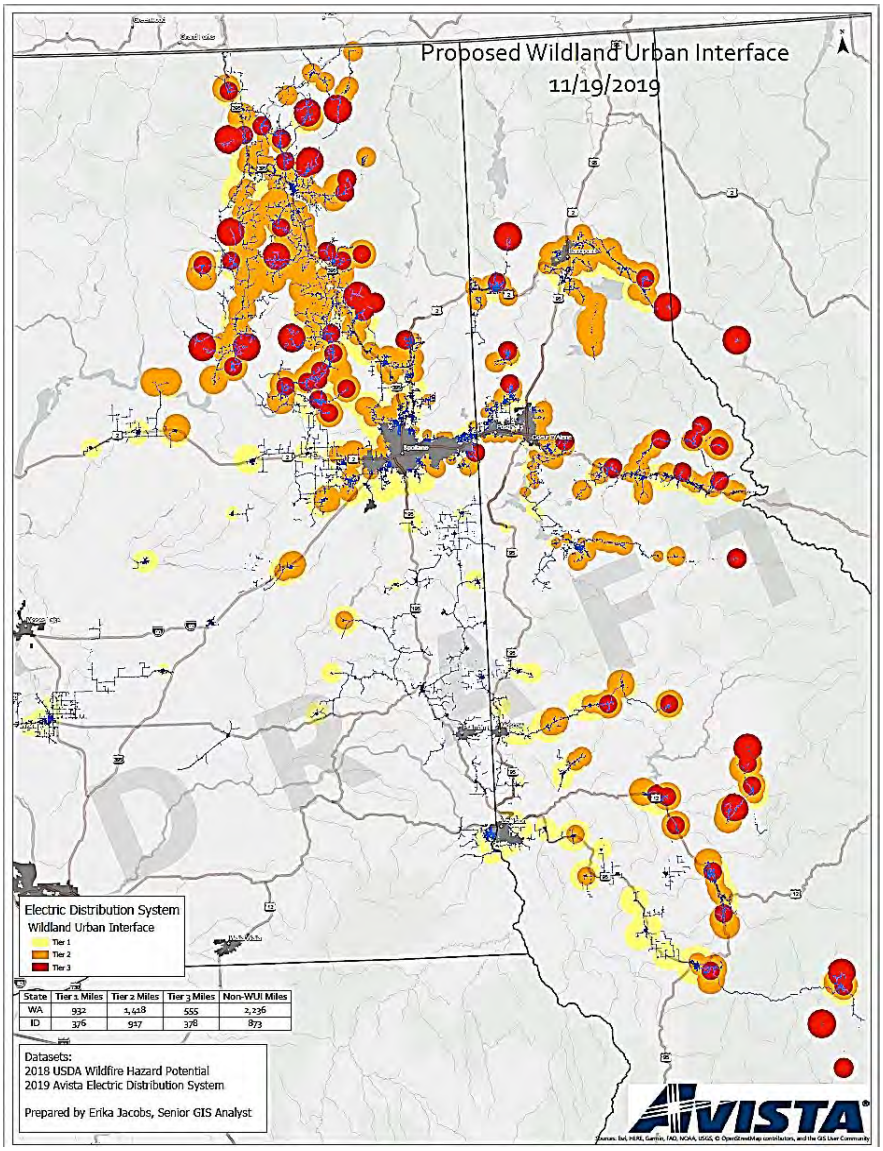
In 2019, Avista's GIS Technical Group created a WUI map for the electric service territory based on the following principles:

- **Fuel Concentration** – areas identified as having moderate to high fuel concentrations were considered. Fuels data was derived from the U.S. Department of Agriculture's Wildfire Hazard Potential map.[8]
- **Housing Density** – parcels smaller than 20 acres were included in the analysis but highly-developed urban areas were excluded. Urban areas do not meet the definition of Wildland Urban Interface because fuel canopies are dispersed and fire protection is readily available.

The WUI map helps to identify and prioritize areas of greatest risk and serves to inform the recommendations and operational decisions related to wildfire resiliency. The Plan denotes the

[8] U.S. Department of Agriculture, data.nal.usda.gov/dataset/wildfire-hazard-potential…….

combination of WUI Tiers 2 & 3 as "elevated fire threat areas". These areas comprise 40% of Avista's electric distribution and 20% of the high-voltage transmission systems. Elevated fire threat levels are depicted in orange (Tier 2) and red (Tier 3) highlighted areas. Portions of the map not highlighted are classified as Non-WUI and represent areas with low fuel concentrations, very low housing densities, or large urban areas (> 10,000 population).



The Plan denotes the combination of WUI Tiers 2 & 3 as "elevated fire threat areas". These areas comprise 40% of electric distribution and 20% of transmission systems. Elevated fire threat levels are depicted in orange (Tier 2) and red (Tier 3). Portions of the map not highlighted are classified as Non-WUI and represent areas with low fuel concentrations, very low housing densities, or densely populated urban areas.

Summary of Risks and Costs

Precise identification of the risk-cost for any given year is not realistic, and for wildfires, there is a significant difference between small fire events which can occur many times per season versus a large scale event which may occur once every few years. Therefore, in order to represent a more realistic picture of relative risks and costs, a 10-year planning horizon was adopted.

Risk and cost values shown in the following table represent a 10-year planning horizon, and include both incremental operating expenses as well as capital improvements to infrastructure. Capital plan elements are projected to sunset in 10 years but the majority of expense items are on-going and are generally related to vegetation management. In simple terms, risk is the product of the probability of an event and financial consequence:

Risk = (The likelihood of occurrence, or probability) X (The financial impact of an event)

Inherent Risk - describes the current state risk level and reflects defense strategies already in place.

Managed Risk - describes the future state risk level with the addition of Wildfire Resiliency elements.

The values shown for risk are percentage based and reflect a range for each category. Note that vegetation and grid hardening risk scores indicated a bounded range because the probability of occurrence is based on the frequency of forced outages, and the frequency of electrical outages is well understood. However, an event's impact can vary widely based on several factors including weather, fire risk levels, emergency response, and location. Note that the managed risk scores represent future state levels and lower levels of event probability and event outcome. The column labeled 'Risk Reduction' indicates the average percentage difference between current state and future state risk levels.

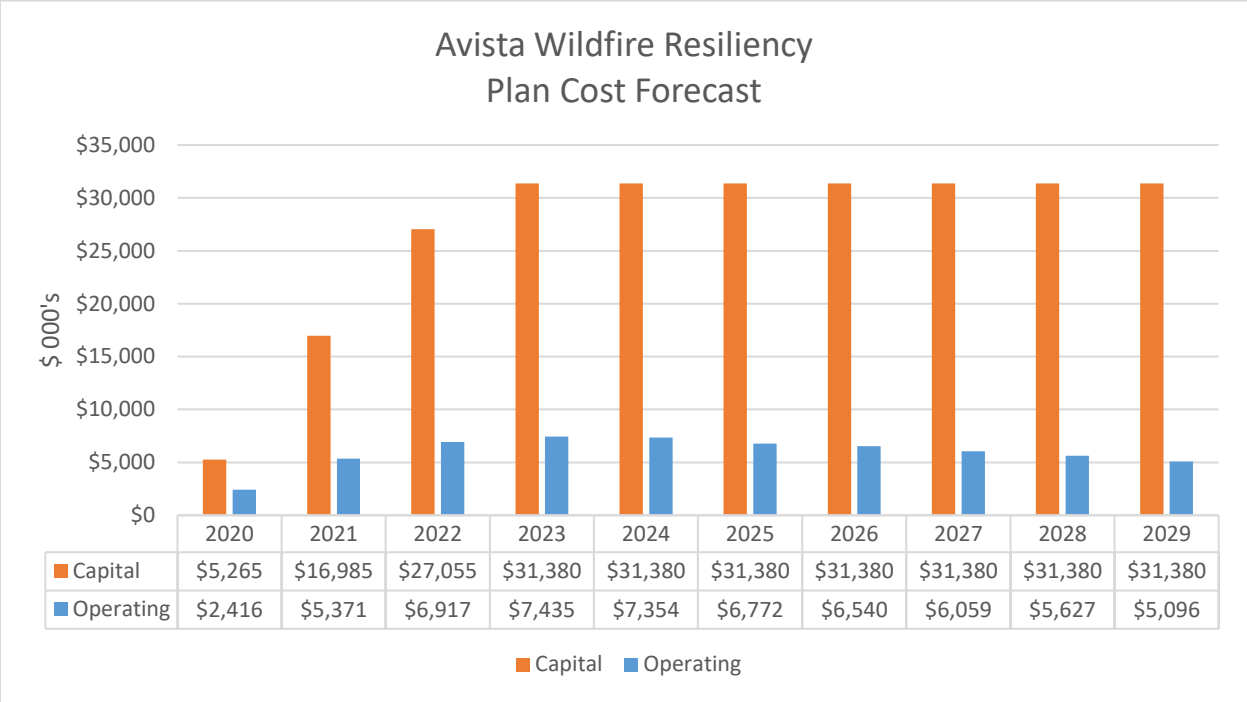
Resiliency Risk and Cost Summary-Washington and Idaho Electric

2020-2029 Operating Horizon	Inherent Risk (range %)	Managed Risk (range %)	Risk Reduction (avg %)	10-yr Capital Investment ($)	10-yr Operating Expense ($)
Enhanced Vegetation Management	48.3-100	3.2-14.5	88%	$5,100,000	$51,175,000
Situational Awareness	25.9-100	0.8-1.1	98%	$17,965,000	$1,019,000
Operations & Emergency Response	19.7-100	5.3-23.4	76%	$300,000	$2,378,000
Grid Hardening & Dry Land Mode	41-100	0.7-2.7	98%	$245,600,000	$5,014,000
Plan Total	**44.1-100**	**2.8-12.5**	**89%**	**$268,965,000**	**$59,586,000**

As noted, the wildfire resiliency program includes electric system (Washington and Idaho) capital investments of $268,965,000 over 10 years with corollary operating expenses of $59,586,000. Expenditures are illustrated on the following page from 2020 through 2029.

The single largest capital investment is grid hardening of the electric distribution system. This accounts for $193,200,000 invested in distribution systems located in elevated fire risk areas and another $44,000,000 invested in the transmission system to convert from wood to steel poles. These two Plan elements account for 88% of total capital spend. For operating expense, three elements: T&D digital data collection, annual risk tree, and the public safety initiative 'right tree right place' account for

$42,700,000 (72%) over the same 10-year period. Though, this Plan includes 28 recommendations to mitigate the risk of wildfire, these five elements account for 85% of the total program investments.



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	$5,265	$16,985	$27,055	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380
Operating	$2,416	$5,371	$6,917	$7,435	$7,354	$6,772	$6,540	$6,059	$5,627	$5,096

Potential Operating & Maintenance Expense Cost Reductions

The goal of wildfire resiliency is to reduce the overall risk associated with wildfires. In short, the benefits of this Plan are largely measured in terms of risk reduction for all parties involved. However, we recognize the potential for costs savings and cost shifts from operating and maintenance expense activities towards capital investment. The overall impact of cost savings is speculative until the Plan becomes operational and performance data can be analyzed. However, one objective of this Plan is to reduce the number of equipment failures and tree related outages and by doing so, avoid emergency response. Consider a hypothetical scenario whereby Wildfire Resiliency reduces these outages by 10%.

From 2014 to 2018, the electric distribution system experienced 6,200 outages per year. This corresponds to an annual frequency index (SAIFI) of 1.1 with a duration index (SAIDI) of approximately 2 hours and 20 minutes. On average, 67 customers were impacted during each outage.

Equipment failures and tree related outages account for approximately 1,000 outages per year and it is these outages that wildfire resiliency aims to mitigate through grid hardening and enhanced vegetation management. If those outages were reduced by just 10% (100 outages), the reduction in customer impact would equate to $990,780 per year.[9] Again, this is a hypothetical exercise to illustrate the Plan's value proposition.

[9] Based on Avista Asset Management Risk Analysis Standard (service interruption cost = $63 per customer* hour)

The following table lists several potential cost savings opportunities associated with wildfire resiliency.

Plan Element	Benefit	Cost Savings/Shift
Annual Risk Tree and Right Tree Right Place Programs	Improved System Performance (fewer outages)	Reduced spend on emergency response and unplanned repairs
Digital Data Collection	Automates data gathering process for vegetation and structure condition inspection	Reduces field inspection activities. Enables automated QA/QC functions
Grid Hardening	Improves System Performance (fewer outages)	Reduced spend on emergency response and unplanned repairs
Situational Awareness (communication & control systems)	Enables remote monitoring and control of equipment	Reduced service related truck rolls
Operations & Emergency Response	Better prepared and equipped first responders	Reduces the risk of injury and accidents

It should be noted that this Plan indicates program level spend estimates and does not differentiate between incremental and embedded costs. Though many Plan elements represent incremental costs, some activities will simply be absorbed by the workforce. For example, annual fire safety training will occur at monthly safety meetings which are well established. This imbedded cost is estimated at $1,300,000 over 10-years. However, the bulk of the Plan elements including enhanced vegetation management and grid hardening represent additional activities and incremental costs. As previously indicated, these categories account for 85% of overall program costs.

Conclusion

The risk of large wildfire events is increasing across the western United States. The recent fires in California serve to illustrate that utility operating risks are increasing due to wildfires. Managing this risk is critical for customers, communities, investors, and the regional economy. Avista has taken a proactive approach for many years to manage wildfire risks, and through this Plan, the Company has identified additional wildfire defenses. The goals, strategies, and tactics set forth in this Plan reflect a quantitative view of risk. Additional research, conversation and analysis with Avista's operating staff and steering group provided critical qualitative and contextual information that also shaped the recommendations. This combination of quantitative and qualitative analysis ensures the recommendations are robust, well-rounded, thoughtful, and align with the Plan objectives.

Comprehensive risk analysis indicates a cumulative 10-year financial risk of at least $8 billion dollars. This value includes the accumulated risks associated with all 28 Plan recommendations and should not be interpreted as a precise financial estimate. A better metric is the percentage of risk mitigation which reflects a 90% reduction for the overall Plan.

Though planned investments in infrastructure and vegetation maintenance defenses represent the bulk of costs, human investments in training, partnerships, and engagement with customers are core components of Wildfire Resiliency.

Wildfire Resiliency represents a departure from traditional utility strategies aligned with meeting customer demand (capacity) and maintaining service continuity (reliability). Avista's strategy aligns with other utility wildfire plans by adding defenses in four key areas: vegetation management, grid hardening, situational awareness and operations and emergency response.

Avista has a long history and tradition of 'doing the right thing' for our customers and the communities we serve. Working together to promote safety and manage the risk of wildfire is not a new concept but simply one that will be built upon.

End of Executive Summary_____

Partnering with Others

The Western Energy Institute

The Edison Electric Institute

Washington Department of Natural Resources

Idaho Department of Lands

AEGIS Insurance

PNW Utility Wildfire Group (PSE, PAC, CHPD, IPC, NWE, PGE, AVA)

The University of Idaho

Idaho Smart Growth Initiative

Spokane County Fire Districts

City of Spokane Fire Department

Spokane Valley Fire Department

Palouse County Fire Districts

Spokane Emergency Management

NOAA & NWS (Weather)

Washington Utilities and Transportation Committee (WUTC)

Idaho Public Utilities Commission (IPUC)

Washington Dept. of Natural Resources (DNR) Utility Taskforce

Western Governor's Association

West Coast Utility Commission Seminar (Vendors)

Quantum Spatial

Genics Corporation

Geo Digital Corporation

Western Weather

The Eaton Corporation

TROVE Corporation

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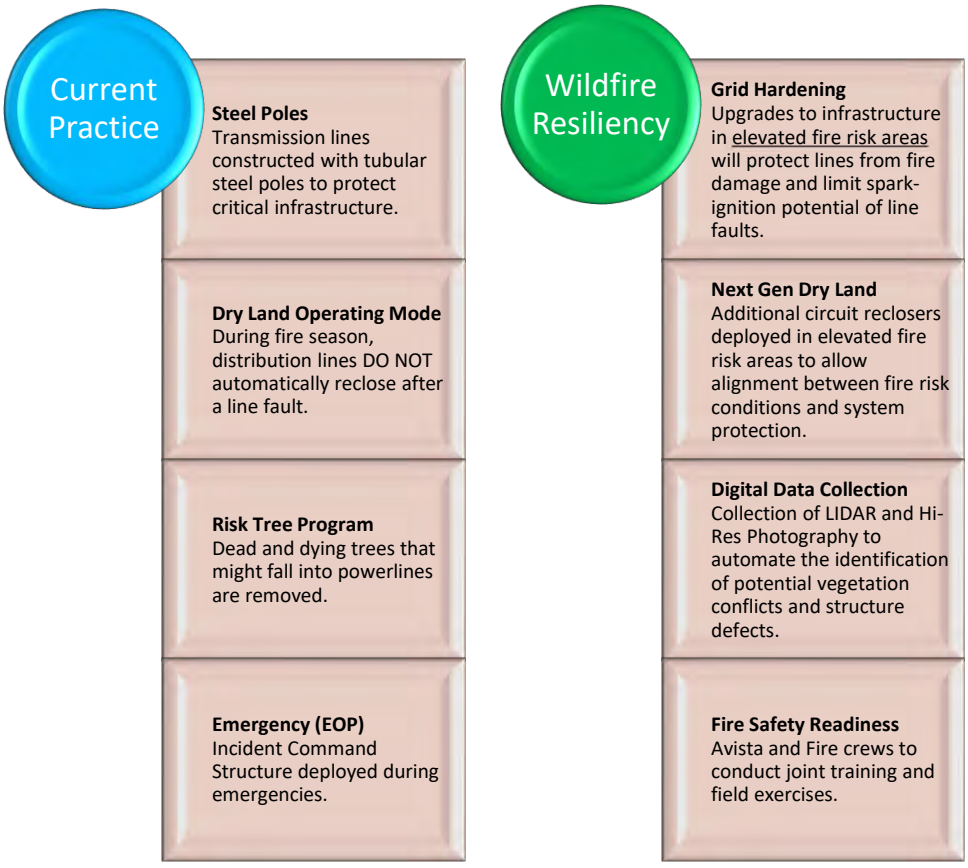
Wildfire Resiliency Plan Overview

Avista's Wildfire Resiliency Plan reflects the Company's 130-year operating history combined with recent efforts to quantify the financial risk of wildfires. Risks are not static and this Plan will adapt and evolve over time to align with environmental, political, financial, and other factors that influence those risks. The foundation of this Plan is the monetization of risk resulting in a series of recommendations to:

- Protect Avista's energy delivery infrastructure
- Enhance vegetation management programs and reduce tree contacts with powerlines
- Deploy additional system monitoring and control equipment
- Align operating practices and emergency response with fire threat conditions

Past Fire Mitigation

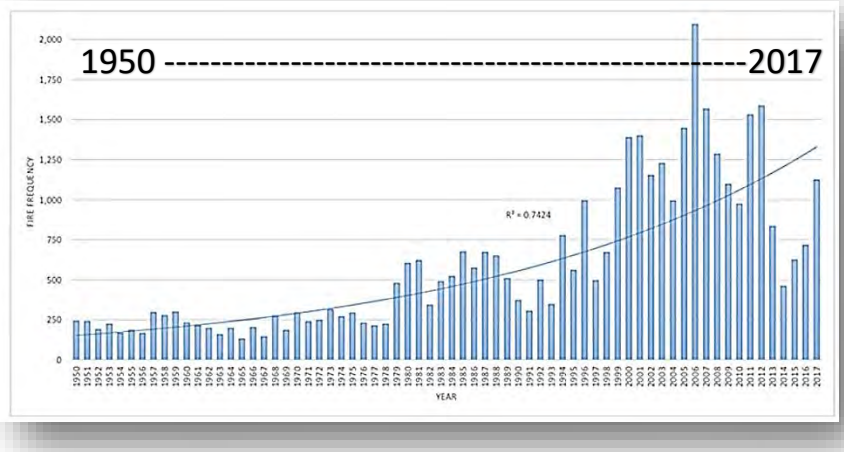
Avista has a long history of responding to adverse operating conditions including wildfires. In October of 1991, 60 mph winds combined with persistent drought sparked over 90 fires in the Spokane area.[10] Most of those fires were the result of vegetation contacts with powerlines. Recent fires in the Colville and Davenport operating districts have also influenced operating, maintenance, and design construction practices. This Plan builds upon that experience by leveraging current defense strategies and focusing efforts in elevated fire risk areas. A few examples are shown below:



[10] Spokesman Review newspaper, "Firestorm 1991", August 21, 2015 publication

Increased Frequency and Severity of Fire Activity

The number and size of wildfires is increasing throughout the western United States. Data from the United States Forest Service (USFS) indicates that the number of large fires (>1000 acres) has tripled since 1970. Also, the duration of fire season has grown by over 100 days. The graph below indicates wildfire frequency from 1950 to 2017.[11]



Over the past six decades, 61% of fires in the western U.S. have occurred since 2000.

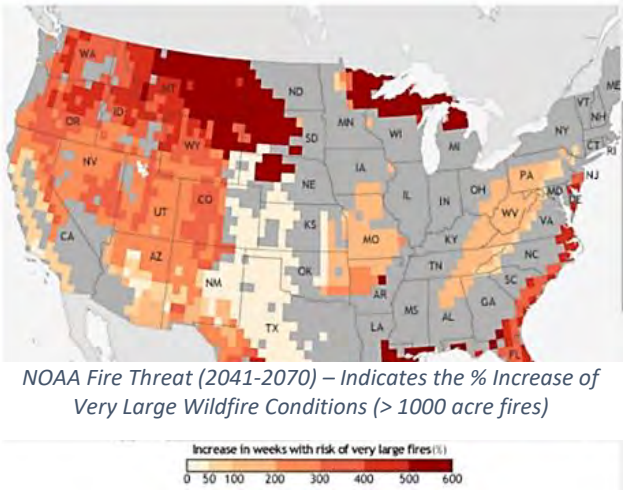
40% of Avista's distribution and 20% of transmission lines are located in elevated fire threat areas. 123,300 Avista electric customers reside in these areas.

Washington State's Department of Natural Resources is responsible for fire suppression on over 13 million acres of private and state owned forest lands. Its 2015 forest health report states that, "*Nearly 2.7 million acres of eastern Washington forestland need treatment to be more resilient against insects, disease, and wildfires*."[12] That report recommends a variety treatments including mechanical thinning and prescribed burns. To compound the issue, there are two million Washington homes located in elevated fire threat areas.

In September of 2015, the Carpenter road fire impacted 64,000 acres of land near Davenport, WA and damaged 42 structures. The costs to suppress this fire exceeded $200 million.[13]

[11] NASA, www.climate.nasa.gov/blog/2830
[12] Washington Department of Natural Resources 20-year Forest Health Plan (2017)
[13] Spokesman Review newspaper, Carpenter Road Fire, September 15, 2015

Researchers at the National Oceanic and Atmospheric Agency (NOAA) predict that by mid-century (2041-2070), the conditions for 'very large fires' will substantially increase throughout the western United States.[14] The graphic shown to the right indicates the percentage increase for very large fires. Note that areas of E. Washington and N. Idaho indicate a 300% to 400% increase. The combined trends of more frequent and larger fires combined with development in fire prone areas is projected to make wildfire one of the most significant environmental threats in the western United States.



NOAA Fire Threat (2041-2070) – Indicates the % Increase of Very Large Wildfire Conditions (> 1000 acre fires)

Wildfire Resiliency Plan Goals

Objective:

This report details Avista's recommended response to the increasing threat of wildfires to the energy delivery system. The plan will be periodically reviewed to ensure that it is consistent with industry best practices and continues to provide benefits to customers and the communities Avista serves.

Goals of the Wildfire Resiliency Plan

The stated goals of this Plan are:

1. **Emergency Preparedness** – to prepare and train for episodic wildfire events. To recognize wildfire as a recurring threat to infrastructure, the communities we serve, Avista employees and customers.

2. **Promote Public & Worker Safety** – To protect physical assets, property, and human lives against the threat of wildland fires. To recognize fire potential as a manageable risk element of Avista's operating and maintenance strategies.

3. **Financial Protection** – To mitigate the probability and consequence of direct financial costs and liability associated with large scale fire events.

Risk Assessment

Wildfire Risk Framework

Recommended actions described in this Plan are based on Avista's Enterprise Risk Model and Asset Management risk methodology. In addition to risk analysis, a model framework was established to help guide the process for identifying, quantifying, and adopting recommendations.

[14] Internet source: www.climate.gov/news-features/featured-images/risk-very-large-fires-could-increase-sixfold-mid-century-us

Understand the Risk – Combining infrastructure data with fire threat and weather conditions to yield a 'fire risk potential' metric.

Design for the Risk – Adapt transmission and distribution materials and construction to minimize the potential for utility involved fire ignition.

Plan for an Event- Prepare field and office support staff through training and field simulation exercises.

Partner with Others – Direct collaboration with Fire Protection Agencies and customers to reduce fuel loadings near homes and powerlines.

Risk Assessment Methodology

The recommendations in this report are based on their ability to reduce the operating and financial risk of wildfires. Understanding how to quantify risk is fundamental to understanding the content of this report.

In order to illustrate this concept, consider the risk of distribution pole fires. Pole fires are a common occurrence on overhead electric distribution system and generally occur when dust and other contaminates accumulate during a prolonged period of drought. In most years, the drier months of July through September present the most likely period to experience a pole fire. For each pole fire there is an associated risk cost.

On average, Avista experiences 92 pole fires per year. In most cases, Avista crews use fire suppression equipment to contain the fire and repair any damage. In some instances, pole fires are conveyed to the ground and can spread quickly under the right fuel and weather conditions. Wildfire Resiliency risk modeling considered three potential impacts:

Public Safety – the cost of injuries associated with Avista employees and the general public.

Service Reliability – the costs associated with service disruption based on the Department of Energy's Interruption Cost Estimator (ICE). For Avista customers, this value is $63 dollars per customer-hour.

Financial Impact– the replacement costs of infrastructure (direct) and third party claims to reimburse for property damage, timber loss, and fire suppression (indirect).

The following table provides an example of outcomes and impacts.

Outcome	Probability per event	Impact Cost ($)		Risk Cost ($)		Notes
		Optimistic	Pessimistic	Optimistic	Pessimistic	
Direct Financial	1	$1,500	$7,500	$1,500	$7,500	Avista crews responding to pole fires
Indirect Financial (minor)	0.1	$5,000	$20,000	$500	$2,000	3rd Party costs (e.g. suppression)
Indirect Financial (large)	.002	$100,000	$2,000,000	$200	$4,000	Ground fire spread by wind and fuel loading
Safety-Employee	.05	$2,500	$75,000	$125	$3,750	Employee injury ranging from minor burn to back or shoulder injury
Safety-Public (minor)	.01	$10,000	$50,000	$100	$500	Injury
Safety-Public (major)	.001	$2,000,000	$10,000,000	$2,000	$10,000	Fatality
Reliability (minor)	0.7	$200	$2,000	$140	$1,400	Service point (2-15 customers)
Reliability (moderate)	0.25	$18,000	$30,000	$3,600	$6,000	Lateral circuit (140-240 customers)
Reliability (major)	0.05	$190,000	$378,000	$9,500	$18,900	Feeder circuit (1500-3000 customers)
Total (per event)				$14,515	$48,800	
Inherent Risk = 92 events/year x $/event				**$1,335,380**	**$4,489,600**	Pole fire risk cost per year.
Inherent Risk over 10-year planning horizon (assumes level rate)				**$13,353,800**	**$44,896,000**	*This is illustrative of the range used in the Wildfire Resiliency Plan for a sub element of distribution grid hardening*

The table on the previous page reflects the inherent risk (current state) of pole fires. Poles fires are mitigated by replacing wood crossarms with fiberglass units. In the above example, the outcome scenario or impact would remain unchanged but the probability of occurrence would be drastically reduced.

For illustration purposes, if one assumes an 80% efficacy rate, the new risk costs ranges from $2,670,000 to $8,880,000 reflecting a median risk reduction of $23,300,000 over the 10-year planning horizon. This value would then be compared to cost estimates to determine if the treatment is warranted.

In May and June of 2019, a series of Wildfire Risk Workshops were facilitated by Avista's Business Process Improvement team to assess the overall risk cost of wildfires. Six individual workshops were held over a 15-day period involving 30 employees. Over 160 treatments were identified and nearly half of those were analyzed for their risk reduction capacity. Ultimately, 28 treatments were carried forward and serve as the individual recommendations in this report.

Pole fires generally occur on wood poles with wood crossarms. Since the early 2000's, Avista has adopted fiberglass crossarms as the standard unit. Replacing wood crossarms in elevated fire risk areas is a component of Wildfire Resiliency.

The Wildland Urban Interface (WUI)

An additional element of risk reduction includes the prioritized application of solutions. Recommendations within this report consider geographic location and apply risk reduction measures in areas with higher fire threat potential.

Homes and businesses most at-risk from the impact of wildfires are those located near the boundaries of forest lands and in rural areas that lack fire suppression resources. In 2019, Avista's GIS Technical Group created a Wildland Urban Interface map based on the following principles:

Fuel Concentration – Areas identified as having moderate to high fuel concentrations were considered in the analysis. Fuels data was derived from the U.S. Department of Agriculture's Wildfire Hazard Potential map.[15]

Housing Density – Parcel's smaller than 20 acres were included in the analysis but highly-developed urban areas were excluded.[16] *Urban areas do not meet the definition of Wildland Urban Interface*.

[15] USDA, Wildfire Hazard Potential, 2018
[16] Avista GIS System, Electric Distribution Service Connections

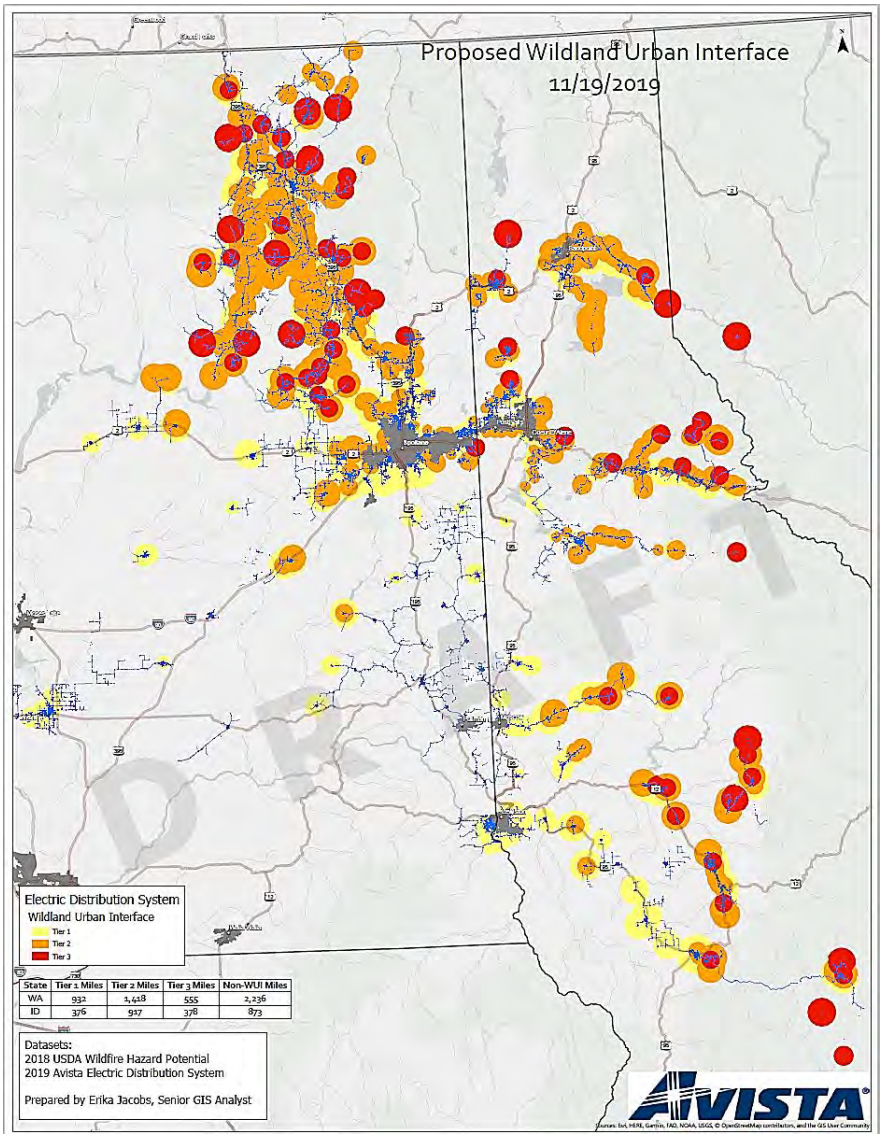
WUI Risk Levels – Similar to the work done in California, Avista's WUI identifies three wildfire risk levels:

Tier 1 – Moderate levels of fuel and low to moderate housing densities (low)

Tier 2 – Moderate to high levels of fuel and moderate housing densities (medium)

Tier 3 – High fuels levels and moderate to high housing densities (high)

Avista's Wildland Interface Map



This Plan describes the combination of WUI Tiers 2 & 3 as "elevated fire threat areas". These areas comprise 40% of the electric distribution and 20% of the transmission systems. Elevated fire threat levels are depicted in orange (Tier 2) and red (Tier 3) highlighted areas. Portions of the map not highlighted are classified as Non-WUI and represent areas with low fuel concentrations, very low housing densities, or densely populated urban areas.

Many of the elements described in this Plan will be deployed only in elevated fire threat areas including grid hardening, digital data collection, and fire-specific aerial inspections.

Plan Recommendations Summary

This Plan contains 28 individual recommendations grouped into four categories. These categories are similar to other utility wildfire plans including those from PG&E, SDG&E, SCE, and PacifiCorp and include:

- **Grid Hardening** – Replacing infrastructure in fire prone areas, the likelihood of a spark-ignition source is mitigated and critical infrastructure is protected from the impacts of fire.
- **Enhanced Vegetation Management** – Identifying potential conflicts on an annual basis and prioritizing those risks from highest to lowest, Wildfire Resiliency aligns resources with risk.
- **Situational Awareness** – Adding line and monitoring equipment, system operators can respond quickly to variable weather and fire threat conditions.
- **Operations & Emergency Response** – Through training and simulation, Avista personnel will be better prepared to work with fire professionals during an event.

Plan recommendations reflect cost prudency and were adopted on their basis to:

- Leverage existing asset programs and operating practices
- Promote safety and safe practices
- Mitigate financial risks to property and infrastructure

The following tables provide more information about the recommendations.

Grid Hardening and Dry Land Mode			
Recommendation	**Current State**	**Future State**	**Benefits**
Transmission Fire Retardant (FR) Program	FR paint program requires refresh every 3-5 years	Genic Fire-Mesh wrap with 20-year expected life	Will reduce operating expense to maintain fire protection of transmission wood poles
Transmission Line Inspection	Aerial surveys to identify structure defects (reliability based)	Aerial and ground inspections to identify structure defects (fire risk based)	Reduce transmission fire ignition events which are less likely than distribution related fires, but generally result in larger fires
Dry Land Operating Mode (DLM)	Seasonal implementation (single mode)	Adapted to fire-weather metrics (multi-mode)	By aligning DLM modes with weather and fire threat conditions, operators can balance service reliability with fire risk potential
Transmission Grid Hardening	Condition-Based Steel Conversion	Risk-Based Steel Conversion	Reduce likelihood of damage to Avista transmission assets. 20% of Avista's transmission assets are located in elevated fire threat areas
Distribution Grid Hardening	Condition based pole, conductor, and equipment programs	Risk based approach to replacing equipment and conductors associated with spark-ignition potential	Reduce likelihood of distribution related fires. 40% of Avista's distribution assets are located in elevated fire threat areas

Enhanced Vegetation			
Recommendation	**Current State**	**Future State**	**Benefits**
Digital Data Collection	Human based ground and aerial inspections	Augment with computer automated analysis to identify vegetation encroachment and structural defects	Allows for scenario based planning of treatment options and serves as the QA tool to assess the efficacy of previous field work
Fuel Reduction Partnerships	No formal program	Partnering with Fire Agencies to remove fuels near critical infrastructure	Strengthens relationships between Avista and fire first responders and reduces fire severity threats to infrastructure
Widen Transmission Rights-of-way	No formal program	Align right-of-way boundaries to fire risk potential	Protect critical infrastructure and serve as fire break
Annual Risk Tree	Cadence based program (e.g. 1-3 years)	System-wide effort to annually identify and remove dead, dying, and diseased trees	Reduce tree fall-ins, which are 3 times more likely to occur than grow-ins
Public Outreach "Right Tree, Right Place" Campaign	General information available to all customers	Work with customers in elevated fire risk areas to remove tall growing trees from underneath powerlines	Reduces the risk of tree grow-ins and subsequent spark-ignition sources

Situational Awareness			
Recommendation	**Current State**	**Future State**	**Benefits**
Fire-Weather Dashboard	Weather forecast data subject to individual interpretation	By combing weather forecast and fire threat condition data, operating personnel will have clear guidance relative to likelihood and potential impact of fires	Promotes a more consistent approach among operations and emergency managers
Additional Distribution Circuit Reclosers	Based on system protection and reliability performance	Deployed in elevated fire threat areas. Reflects a risk-based strategy	Supports the evolution of Avista's Dry Land operating mode to align with forecasted weather and fire threat conditions
Substation Supervisory Control & Data Acquisition (SCADA)	SCADA added to new or reconstructed substations. Reflects a condition based approach	Enables control and monitoring of substation equipment including circuit reclosers in elevated fire risk areas	(as stated above)

Operations and Emergency Response			
Recommendation	**Current State**	**Future State**	**Benefits**
Emergency Operating Procedure & Avista Incident Command Representative	No formal wildfire policy	Avista EOP to delineate wildfire from other storm events. Avista to offer assistance at all fire ICS.	Coordinate Avista system restoration with fire protection and evacuation activities
Wildfire Performance Metrics	None	Develop fire-specific performance metrics to ensure that Plan objectives are being met	Supports the adaptation of the Resiliency Plan to meet current operating and environmental conditions

Operations and Emergency Response			
Recommendation	**Current State**	**Future State**	**Benefits**
Wildland Urban Interface (WUI) map	Developed in Q3/2019	Categorize Avista T&D infrastructure with respect to fire ignition potential and fire impact consequence	Focuses vegetation management and grid hardening efforts in the highest fire risk areas
Emergency first responder training	No formal program	Annual fire safety training to Avista field personnel and electrical hazard training to fire protection personnel	Promotes safety of first responders and supports a variety of partnering activities including fuel reduction and fire adapted communities
Expedited Fire Response	Draft MOU under consideration with Spokane Fire Districts (2020 Pilot Project)	Fire agency personnel to investigate transmission line faults during fire season	Suppress fires before they have an opportunity to spread

Plan Recommendations by Category

Grid Hardening & Dry Land Mode

Nearly 10% of Avista distribution outages are related to equipment and conductor failures. These include transformers, overhead conductor, connectors, insulators, and larger equipment like circuit reclosers and voltage regulators. Over 600 outages per year occur due to these failures. Recent data from the California State Fire Authority (CAL FIRE) indicates that over 1,000 utility involved fires occurred in California during 2018. The breakdown of that data is shown below and indicates that 38% of utility events were related to utility equipment. CAL FIRE estimates that utility ignition sources account for approximately 10% of wildfires across the state, while data from Washington State indicates a range of 4-6% for the Pacific Northwest region.[17] Though the contribution is relatively low, wildfires are increasing in both size and number across the western United States, and represent a significant risk to companies.

As part of the Wildfire Resiliency Plan, Avista will track fire ignition data associated with powerline electrical faults.

2018 California Utility Involved Fires (source: CAL FIRE)	# of ignitions
Vegetation Contact	552
Equipment	151
Downed Wire	218
Fuse	35
Animal	117
Total	**1,073**

Currently, Avista does not track fire ignition events associated with transmission or distribution line faults. As noted, Avista's Outage Management System (OMS) is the system of record for T&D customer outage records, and, in many instances, forms the basis of fire probability used in this report.

Annual Avista Electric Distribution Unplanned Outages (source: Avista 2014-2018 OMS Data)	
Vegetation Contact	6.2%
OH Equipment/Conductor	9.5%
Pole Fire	1.5%
Public Fire	2.1%
Wind	26.1%
Animal	9.0%
Car Hit Pole	2.8%
Storm Related & UG	42.7%

Between 2014 and 2018 the breakdown of Avista's distribution system outages is summarized in the table on the left. Based on this information and subsequent risk analysis, the grid hardening objectives are:

1. Reduce the number of spark ignition events on the distribution system (Event Probability)
2. Reduce wildfire impact to transmission lines (Event Outcome)

[17] Western Utility Commission Wildfire Seminar, Portland OR, April 2019

As part of Wildfire Resiliency, Avista will focus grid hardening efforts in the Wildland Urban Interface Tier 2 and 3 areas (elevated fire risk). The program includes:

- Transmission Wood Pole Fire Retardant Protection (Fire-Mesh Wrap)
- Transmission Line Fire Inspection Program
- Transmission Grid Hardening (Wood to Steel Pole Conversion)
- Dry Land Mode engineering review
- Dry Land Mode standing operating procedure (initiating)
- Distribution Midline Recloser in WUI Areas
- Distribution Grid Hardening

Grid hardening efforts reflect the bulk of capital investment in the Wildfire Resiliency Plan. On average, equipment and conductor failures account for 10% of all forced outages and reducing those outages is a primary objective of this Plan. Many sources of powerline outages are difficult to control, including winter storms, strong wind events, thunderstorms, and public caused outages including vehicular accidents and trees that are felled through powerlines. However, by upgrading powerline conductor and equipment, these failures are manageable and represent a cost effective means to reduce the overall number of spark-ignition events. Take for instance, pole fires.

The mechanism that causes pole top fires is well-known and is related to insulator leakage current which increases during periods of hot, dry weather when insulators become covered with dust and other contaminants. This leakage current can be concentrated between wood to wood contacts such as the contact point between wood crossarms and wood poles. In the early 2000's, Avista began using fiberglass crossarms and this has virtually eliminated fires on poles with the new fiberglass crossarms. As part of Wildfire Resiliency, wood crossarms on structures located in elevated fire areas will be replaced with fiberglass units. Grid hardening risk levels and costs are summarized in the table below.

Grid Hardening & Dry Land Mode operations	2020-2029
Inherent Risk Exposure (category %)	41-100
Managed Risk Exposure (category %)	0.7-2.7
Risk Mitigation (average %)	98%
Total Operating Expense	$5,014,000
Total Capital Investment	$245,600,000

*Various internal reports including the Wildfire Summary Risk Analysis and Wildfire Resiliency Cost Plan included a numbering system used to track individual Plan elements. For example, the Plan element designated as "**D-16/17 Distribution System Grid Hardening**" is described on the next several pages. That numbering system is maintained throughout this report to assist with continuity between various internal reports and datasets.*

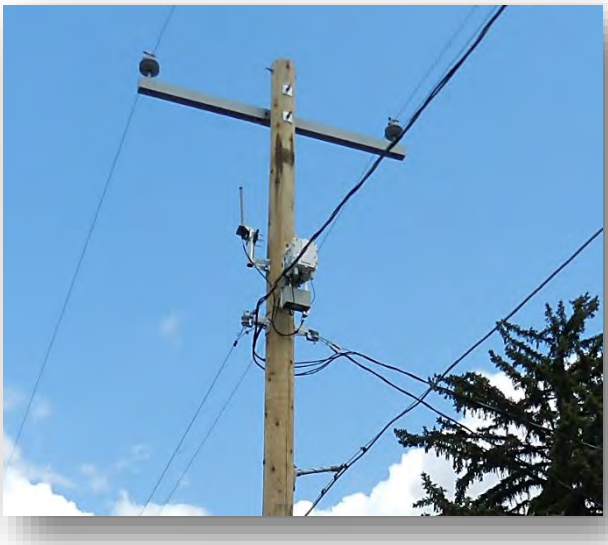
D-16/17 Distribution System Grid Hardening

Recommendation:		Replace aging and obsolete equipment in elevated fire risk areas (40% System)
Cost:		$23,000,000/year Capital Investment ($193,200,000 total over 10 years)
Benefit:		Reduced fire events caused by Avista's electric distribution system.

Distribution grid hardening represents the single largest infrastructure investment in this Plan. Pole fires, together with equipment failures, can potentially be reduced by replacing aging and deteriorated poles, equipment, and conductors. Though Avista has well-established programs to replace poles, conductor, and equipment, existing programs are condition-based and aligned with reliability objectives. Wildfire grid hardening objectives are focused on reducing the number of spark ignition events. The following activities are included in the distribution grid hardening plan:

- Replace wood crossarms with fiberglass units
- Remove small copper wire
- Install wildlife guards (e.g. fuse holders, lightning arrestors, and transformer bushings)
- Replace wood poles with steel poles at 'high value' locations
  (e.g. highway crossings, corner poles, and heavy equipment poles)
- Eliminate open wire secondary districts
- Install wedge/bail clamps at hot tap connection points

Pole fires are a significant contributor to wildfire risk. Each year there are approximately 90 pole fires on Avista's distribution system, and the vast majority are related to wood on wood contact between crossarms and poles.



The combination of wood poles with fiberglass crossarms rarely cause pole top fires. This is a proven tactic for reducing the risk of utility involved fires and is a component of distribution grid hardening.

Avista adopted the use of fiberglass crossarms in the early 2000's and has been replacing wood units steadily since that time. However, many wood crossarms remain on the system. By replacing wood crossarms in elevated fire risk areas, the number of pole fires can be significantly reduced. Of the grid hardening efforts listed above, this is the most cost effective treatment to reduce fire risk. The following table lists current outage rates for each treatment. The data is from the 2014-2018 operating period and reflects an annual rate.

Material Unit	Outage Driver	Annual Outage Rate (#/yr.)	% of System Outages
Wood Crossarms	Pole Fires	92	1.5%
Small Copper Wire	Primary Conductor Failures	81	1.3%
Wildlife Guards	Animal related outages	557	9.0%
Secondary Wire Districts	Secondary Conductor Failures	101	1.6%
Hot Tap Connection	Primary Connector Failures	69	1.1%
	Totals	**1,087**	**14.5%**
Source	*Avista OMS 2014-2018*		

Risk Evaluation: Distribution Grid Hardening

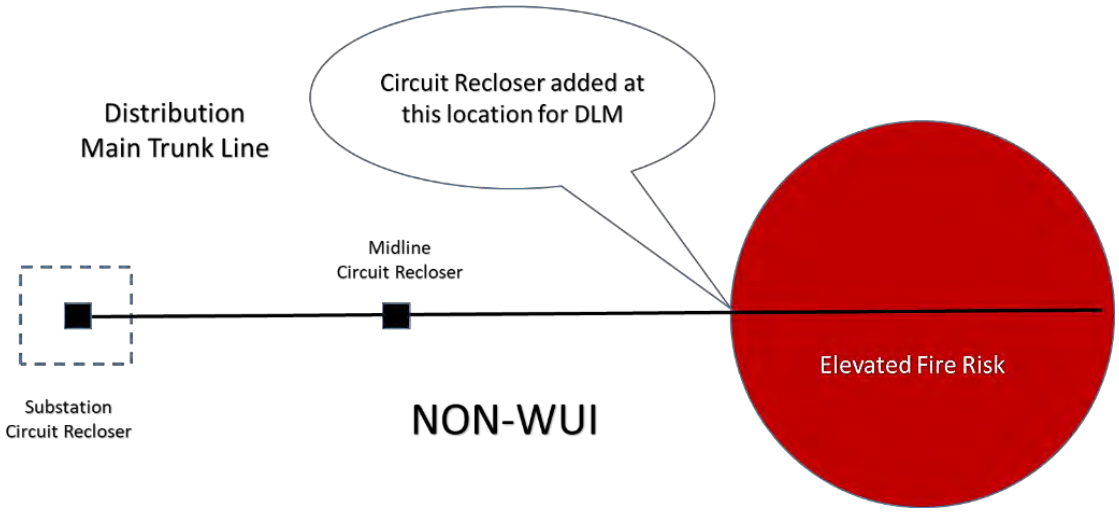
D-16/17: Distribution Grid Hardening	2020-2029
Inherent Risk Exposure (category %)	39.3-94.5
Managed Risk Exposure (category %)	0.3-1.9
Risk Mitigation (average %)	98%
Total Capital Investment	$193 million

D-13 Additional Dry Land Mode Circuit Reclosers

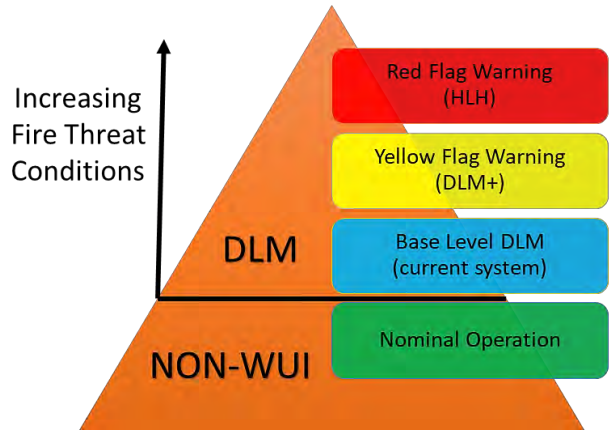
Recommendation:	To install additional circuit reclosers in elevated fire threat areas (40% System)
Cost:	$600,000 Capital Investment ($5,400,000 total over 10 years) $44,400 Operating Investment ($444,000 total over 10 years)
Benefit:	Provide protection schemes that can adjusted for the wildfire threat based on the operating location.

Midline circuit reclosers are often deployed on long distribution lines where substation-based equipment cannot adequately protect the entire length of the circuit. Urban distribution lines are typically 5 to 10 miles in length, while rural counterparts can extend hundreds of miles. As noted, Avista is evaluating its current dry land program and, although that work is on-going, there is consensus that additional equipment will help delineate elevated fire threat and non-WUI areas. It is estimated that upwards of 75 modern reclosers will be installed on the system, which is approximately one additional

recloser for every two rural distribution circuits. The situation is illustrated on the following page where elevated fire threat areas exists near the end of a distribution line.



By adding circuit reclosers at strategic locations, Avista Distribution Operations can re-task those devices during periods of elevated fire danger to operate in fire protection mode rather than reliability mode. A proposed scheme is illustrated in the block diagram below.



Avista has used a summer operating strategy or "Dry Land Mode" since the early 2000's. Avista anticipates adapting DLM to fire threat conditions and re-tasking circuit reclosers to align with field conditions.

D-6 Dry Land Mode Effectiveness Study

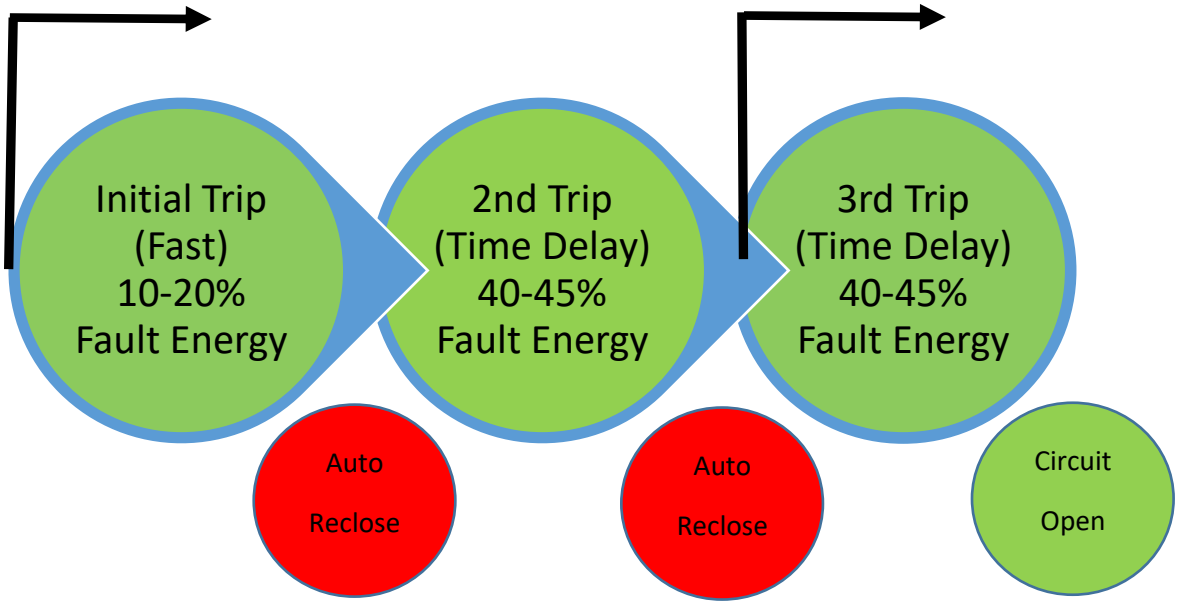
Recommendation:	To conduct an engineering review of Avista's Dry Land Mode protection scheme (in-process since March 2020)
Costs:	$100,000 Operating Expense (2 year engineering review)
Benefit:	More timely and responsive protection schemes that minimize fault energy and reduce the potential to start a wildfire.

During fire season, Avista operates a significant portion of the distribution system in what is referred to as Dry Land Mode (DLM). Electric circuits in DLM mode are operated with auto-reclosing and instantaneous overcurrent tripping disabled. In this configuration, faults that occur on lateral circuits are

cleared through fuse action while faults on trunk segments are cleared via circuit reclosers. During the Avista wildfire workshops, engineers agreed that the dry land operating system could be improved. A small work group was formed including several area engineers, the manager of protection engineering, and electric servicemen. The group is expected to issue recommendations prior to the 2020 fire season.

Most Avista circuit reclosers are configured with three automatic breaker trips and two reclose settings. Normal and DLM modes are illustrated below.

Normal Configuration **DLM**



The initial recloser trip is generated via instantaneous overcurrent relay and accounts for only 5-10% of total fault energy. The remaining recloser trips occur via time-delay relays and are coordinated with downstream fuse devices. If the fault is located downstream of a fuse, the fuse will blow and isolate the faulted segment. However, if the fault is located on the main trunk line, the circuit recloser will go through the automatic trip-reclose sequence to a final open, or lock-out condition. As the illustration suggests, by limiting the circuit recloser to a single, time-delay trip, fault energy can potentially be reduced by up to 60%.

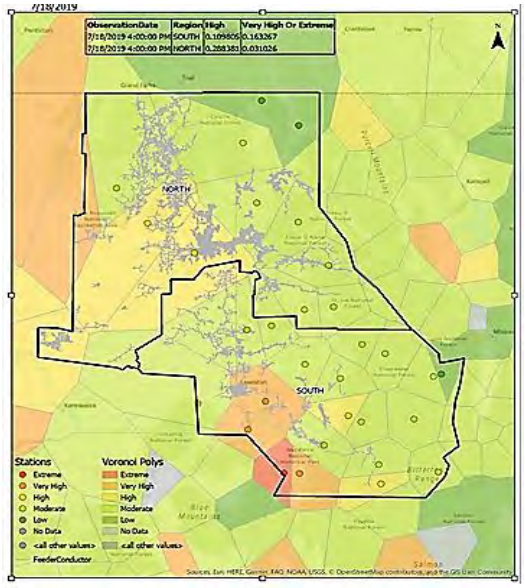
D-8 Dry Land Mode Trigger

Recommendation:	To develop a fire threat index to determine when Avista initiates Dry Land Mode (complete, June 2019)
Costs:	$2,000 Operating Expense per year ($20,000 over 10 years)
Benefit:	System operations that are consistent with wildfire risk.

In 2019, Avista's Technical Services group created a system to gather information from the Wildland Fire Assessment System (WFAS)[18] and used that information to determine when the distribution system would be set to dry land conditions. The DLM "trigger" was established as:

1) When 30% of Avista's Electric Operating area is designated as "High" fire threat, or
2) When 10% of the operating area is designated as "Very High"

By providing a clear metric, Avista aligns its operations with fire threat conditions.



The GIS Technical Services group created a fire threat index map for electric operations. This daily report for July 18, 2019 is shown for the north and south operating areas. Areas indicated with yellow, orange, and red highlights are associated with High, Very High, and Extreme fire danger.

Data Source: USFS/WFAS, Missoula Montana

Risk Evaluation: Dry Land Mode Operating Program (D-6, D-8, and D-13)

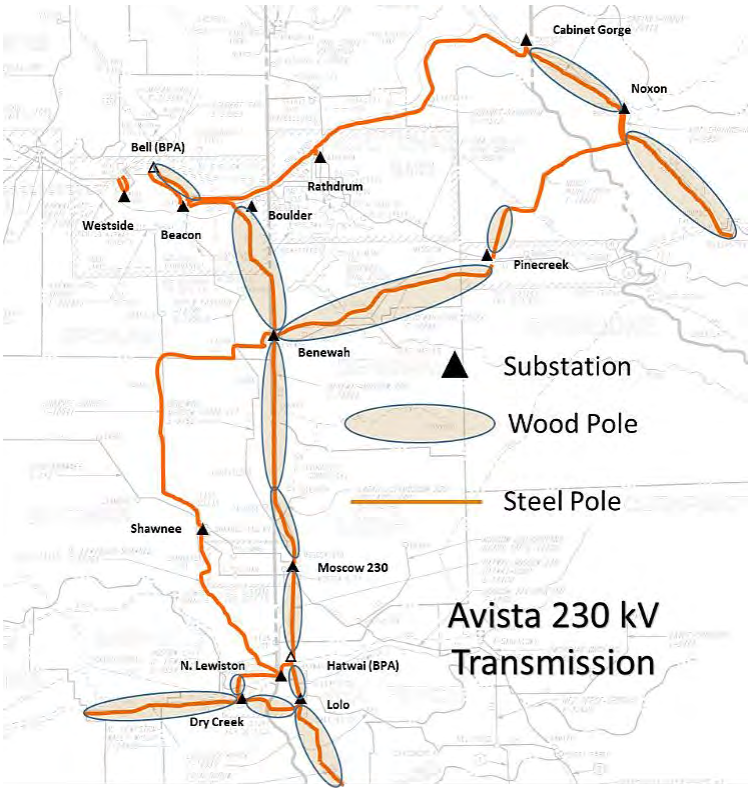
Dry Land Operating Program	2020-2029
Inherent Risk Exposure	$43-69.6 million
Managed Risk Exposure	$6.2-17.4 million
Risk Mitigation (average %)	83%
Total Operating Expense	$564,000
Total Capital Investment	$5.4 million

[18] Wildland Fire Assessment System (USFS), Missoula MT, wfas.net

ST-12 Transmission System Grid Hardening

Recommendation:	To convert wood poles to steel structures in elevated fire threat areas (20% System)
Cost:	$5,000,0000 Capital Investment ($44,000,000 total over 10 years)
Benefit:	Reduce the impact of wildfire on Avista's operating system.

Avista began installing tubular steel transmission poles in the late 1980's, with full adoption of steel as a standard material item in 2006. Since then, reconstruction projects have converted a number of circuits from wood to steel, and that trend will continue. Though Avista is committed to steel conversion, one of the objectives of the Wildfire Resiliency Plan is to accelerate that process in fire prone areas. The largest capital transmission investment in this Plan is wood to steel conversion, at a cost of $44 million dollars over a 10-year period. As noted, a significant risk to transmission lines is the impact from wildfires.



Avista's 230 kV system was initially built in the late 1950's and early 1960's, after the construction of the Noxon Rapids and Cabinet Gorge dams. In 2003, portions of the system were upgraded as part of the West of Hatwai agreement with Bonneville Power. Several wood lines were converted to steel during that time period including:

Beacon-Boulder-Rathdrum
Benewah-Shawnee (new line)
Beacon-Bell #5

The average age of transmission wood poles is 54 years (2020 data).

Risk Evaluation: Transmission Grid Hardening (Wood to Steel Pole Conversion)

ST-12: Transmission Grid Hardening	2020-2029
Inherent Risk Exposure (category %)	n/a
Managed Risk Exposure (category %)	n/a
Risk Mitigation (average %)	n/a
Total Capital Investment	$44 million

ST-10 Transmission Inspection Program

Recommendation:	To conduct annual fire threat assessments of the transmission system
Cost:	$200,000 Operating Expense ($2,000,000 total over 10 years)
	$300,000 Capital Investment ($3,000,000 total over 10 years)
Benefit:	Identify and repair system defects prior to failure.

Visual inspection of assets is a fundamental tenet of any preventative maintenance plan. This is a widely accepted process for generation power plants and electrical substations, but inspection of thousands of miles of powerlines presents unique challenges. Transmission Engineering has conducted annual aerial inspections for many years, and Avista will continue to leverage that experience. By identifying defects before they present as equipment failures, inspections help to minimize fire ignition events. While current programs are geared towards identifying reliability risks (e.g. Osprey nests, gunshot insulators, cracked crossarms, woodpecker damage, etc.), a wildfire based approach focuses attention on other factors:

A. Logging or other construction activities near powerlines
B. Excessive conductor sag over agricultural or roadway areas
C. Corroded attachment hardware
D. Disruptions or changes to the ground profile
E. Unauthorized attachments or encroachments
F. Thermal issues (e.g. hot splices or connectors)
G. Wood debris slash piles in right of way

This list is not intended to be a complete list, but rather to contrast the differences between conventional inspections based on reliability and those focused on preventing utility involved wildfires.

Increasingly, UAVs or Drones are being used to inspect powerlines. Avista plans to deploy this technology as part of Wildfire Resiliency.

Risk Evaluation: Transmission Inspection

ST-10: Transmission Inspection Program	2020-2029
Inherent Risk Exposure	$4-59 million
Managed Risk Exposure	$1.1-2.6 million
Risk Mitigation (average %)	94%
Total Operating Expense	$2 Million
Total Capital Investment	$3 Million

ST-6 Transmission Wood Pole Fire Retardant Protection

Recommendation:	Wrap wood poles with a fire-resistant material.
Cost:	$250,000 Operating Expense ($2,450,000 total over 10 years)
Benefit:	Protect wood poles in grassland areas from the impacts of fire.

Fire damage to the Lolo-Oxbow 230 kV line in the early 2000's prompted Transmission Engineering to initiate a fire retardant (FR) wood pole painting program. Wood transmission structures are painted near ground line, which is an effective means of preventing damage caused by ground fires. Though Avista has experience with Osmose 'Fireguard', the paint product must be reapplied every three to five years and the maintenance expense is on-going.

Avista has participated in a number of peer utility forums including Western Energy Institute's Wildfire Task Force.[19] At that meeting, Southern California Edison (SCE) discussed their work with Genics Corporation to develop a wire mesh product that is chemically reactive to extreme heat. As of this writing, SCE has installed Fire-Mesh on over 1,300 poles and plans to fire wrap 20,000 more poles in 2020. Avista will adopt this program as part of their effort to protect transmission system wood poles from the impact of grassland fires.

On March 3rd, 2020, Avista conducted a field test of the Genics Fire-Mesh product. An FR wrapped pole was subjected to a 30-minute fire and sustained only minor damage. Unlike FR paint, this mesh product does not require on-going maintenance and can be applied much more easily than paint.

Risk Evaluation: Wood Pole Fire Retardant Protection

ST-6: Wood Pole FR Mesh-Wrap Protection	2020-2029
Inherent Risk Exposure	$9.6-28 million
Managed Risk Exposure	$4.3-4.8 million
Risk Mitigation (average %)	76%
Total Operating Expense	$2.45 Million

[19] Western Energy Institute Wildfire Meeting, July 19-20,2019, SDG&E

Enhanced Vegetation Management

Vegetation management is an integral part of maintaining overhead electric distribution and transmission lines. Historically, utilities have trimmed and removed trees with a focus on improving reliability and reducing the frequency of outages. With the increasing threat of wildfires as a result of poor forest health, past fire suppression activities and periods of prolonged drought, Avista plans to enhance vegetation management practices especially in elevated fire threat areas.

2014 Windstorm Damage
North Spokane

For the five year period from 2014 to 2018, there were nearly 2,000 tree related events on Avista's electric distribution network.[20] Though tree induced fire outcomes are not specifically tracked, consensus among Avista operating personnel suggests that vegetation contacts with overhead powerlines represent a significant fire hazard. This is consistent with other utility risk assessments.

This Plan recommends the following enhanced vegetation management activities:

- Transmission and distribution system digital data collection (LIDAR)
- Fuel reduction partnerships
- Widening transmission rights of way
- Annual risk tree surveys
- Review and support of the Right Tree, Right Place customer safety initiative

The ten year cost forecast to implement a fire-informed, enhanced vegetation management program is approximately $51 million dollars and will supplement current maintenance activities. These wildfire specific vegetation management activities would be implemented in addition to, not in place of, the regular five-year vegetation management cycle to maintain system reliability. The forecast of risks and investments is summarized below.

Enhanced Vegetation Management	2020-2029
Inherent Risk (range %)	48.3-100
Managed Risk (range %)	3.2-14.5
Risk Mitigation (average %)	88%
Total Operating Expense	$51.2 Million
Total Capital Investment	$5.1 Million

[20] Avista Outage Management System, 2014-2018 dataset

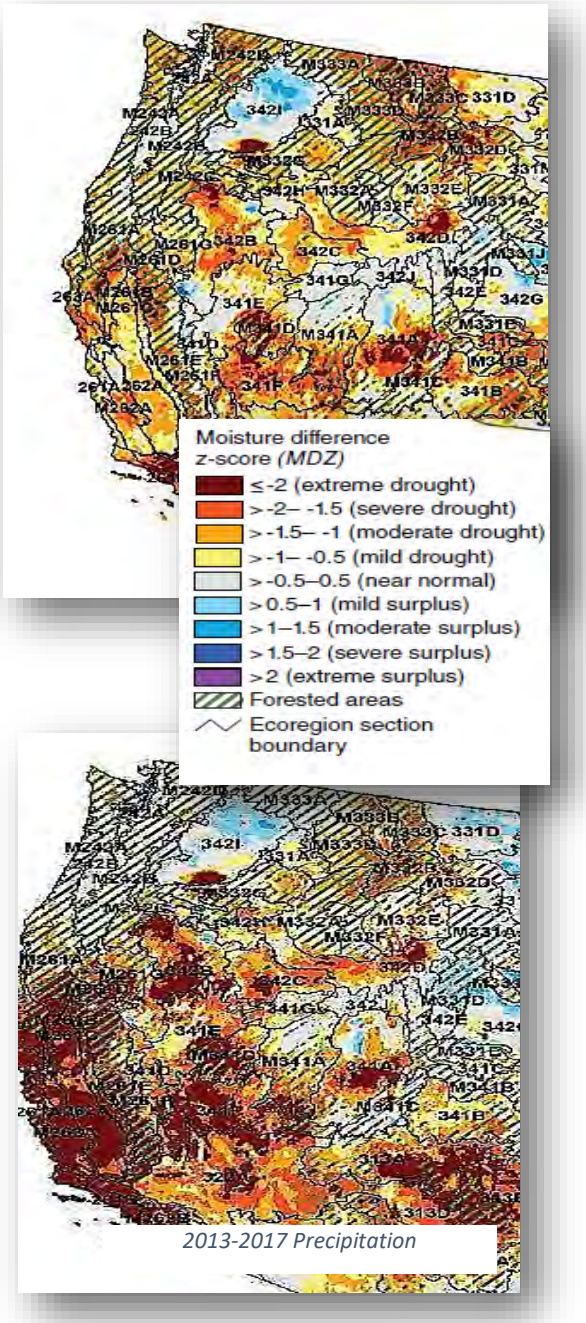
D-10 Electric Distribution Annual Risk Tree

Recommendation:	To identify and remove dead, dying, and diseased trees, or 'risk trees' adjacent to distribution lines. (100% System)
Cost:	$2,500,000 Operating Expense ($25,500,000 total over 10 years)
Benefit:	Reduce interaction between vegetation and Avista's distribution facilities.

In order to identify 'at-risk' trees, Avista plans to use a combination of traditional, ground-based inspections and aerial digital data collection. By identifying trees that are dying or diseased, Avista can remove those trees that represent a fall-in risk to nearby powerlines.

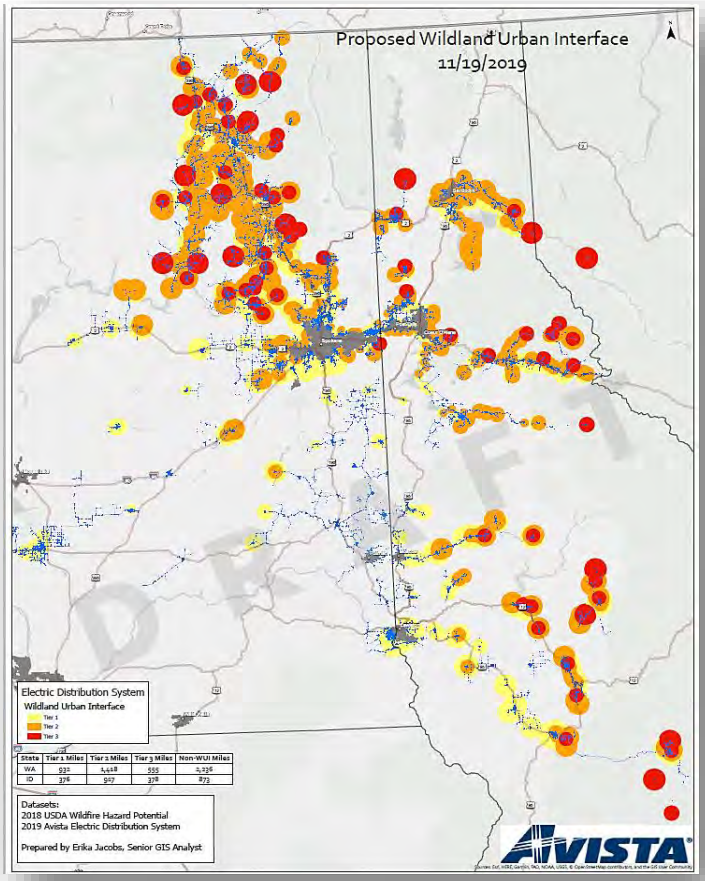
In total, 40% of Avista's distribution system is located in elevated fire risk areas (see the WUI map on the following page). During the five year period between 2014 and 2018, 603 trees fell into electric distribution lines during the late spring and summer months (May-September). In total, trees account for nearly 400 outages per year with fall-in events outnumbering grow-ins by nearly a 3 to 1 margin. In short, most tree related outages are caused by trees located outside of the right-of-way falling into powerlines. And, vegetation contacts during periods of moderate to high winds represent a significant contributor to the fire risk profile. This is a combination that the Wildfire Resiliency Plan aims to mitigate.

Forests face an increasing threat of insects, drought, and poor land management. A warming climate is contributing to these factors and there is general consensus among foresters that significant stem loss will occur over the next several decades. The 2017 USDA Forest Health report includes drought statistics that indicate wide-spread drought conditions from



2013-2017 Precipitation

2015 to 2017[21], with many areas rated as severe to extreme (see illustration). One might observe that this is only a 3-year period and not indicative of an underlying trend. However, data from the 5-year period from 2013 to 2017 indicates an even deeper drought, especially throughout California and the desert southwest.



Wildland Urban Interface (WUI)

Avista's WUI map indicates the potential for utility caused wildfires and their impact to homes and communities. It also represents where treatment plans will be targeted. Elevated fire threat is noted as the Tier 2 (orange) and Tier 3 (red) areas and encompasses 40% of Avista's electric distribution system.

Risk Evaluation

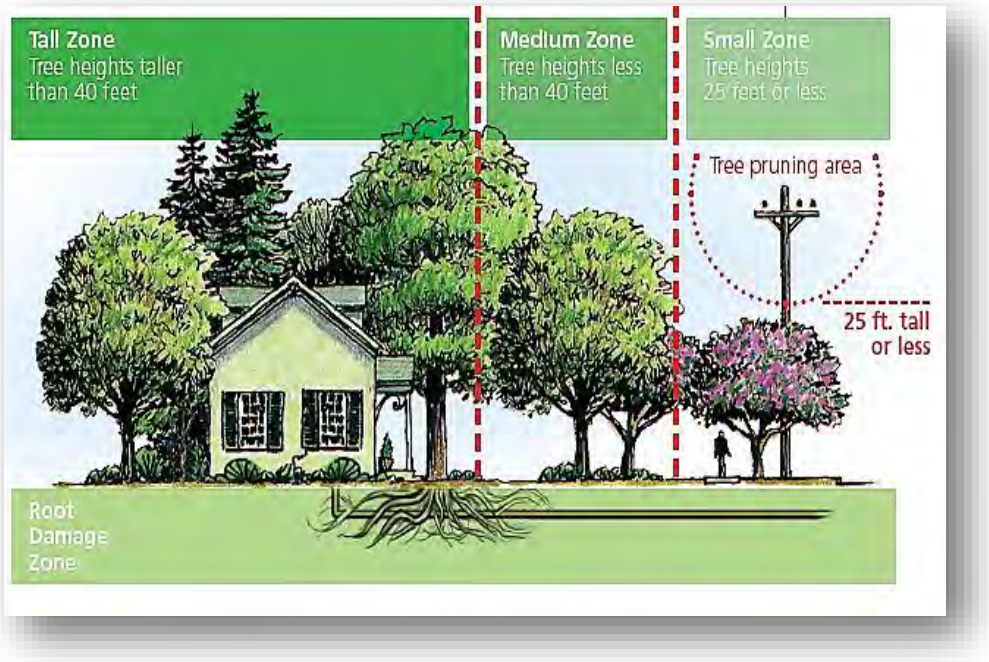
The risk of trees falling into powerlines represents a significant financial cost, with the 10-year inherent risk estimated that exceeds $2.8 dollars. The risk and cost-benefit estimates are indicated below.

D-10: 100% Annual Risk Tree Program	2020-2029
Inherent Risk Exposure (category %)	21.8-44.3
Managed Risk Exposure (category %)	2-9.5
Risk Mitigation (average %)	83%
Total Operating Expense	$25.5 Million

[21] U.S. Department of Agriculture, fs.fed.us/foresthealth/publications/conditionsreport_2017.pdf

D-11 Public Safety Initiative: "Right Tree, Right Place"

Recommendation:	To contact customers located in elevated fire threat areas and work with them to remove tall growing trees near powerlines (40% System).
Cost:	$1,000,000 Operating Expense ($9,600,000 total over 10 years)
Benefit:	Reduce interaction between vegetation and Avista's operating system.



"Right Tree, Right Place"

Avista currently supports an approach to vegetation management called "right tree, right place." Through this approach, Avista seeks to educate landowners about utility-compatible trees, and publishes a brochure, which states, "*Avista provides a no-cost inspection and mitigation to make the following certain tree-related situations safe*." The brochure includes a graphic (above) indicating that only Type I, low growing, trees should be planted near powerlines.

In the five year period from 2014 to 2018, there were 322 tree 'grow-in' incidents during the fire season (May-September). Like tree fall-ins, these incidents tend to happen during windy days and thus elevate the risk of starting and spreading a fire.

From a wildfire resiliency perspective, there is opportunity to build on and reshape this program, which may include additional agency partnerships and public outreach, to minimize the fire-related risks presented by trees coming into contact with Avista's electric system.

By partnering with fire agencies, such as Washington Department of Natural Resources and the Idaho Department of Lands, Avista can reach residents living in elevated fire threat areas and work with them

to remove incompatible trees. By incentivizing owners to remove tall growing trees, Avista can reduce the risk of fire and the need to trim trees in the future.

It is recommended that a "right tree, right place" program be established similar to Avista's energy efficiency rebate program. It would allow customers to submit a request and select from a list of qualified contractors. This would ease the burden on internal resources and encourage local tree trimmers to become line clearance certified. In this Plan, the recommendation would focus on areas associated with elevated fire risk. An additional element of this program would be partnership with fire agencies, such as Washington Department of Natural Resources and the Idaho Department of Lands, and to work with agency partners to create fire-adapted communities.

Type 1 low growing trees are compatible with utility overhead powerlines and pose little or no threat to their operation.

Risk Evaluation

Trimming customer owned trees is a known dissatisfier. Customers sense a loss of control and perceive the activity as 'happening to them' rather than 'occurring for them'. By providing customers with a choice about removing trees, we promote a partnership focused on fire prevention rather than utility operations.

D-11: Right Tree, Right Place Campaign	2020-2029
Inherent Risk Exposure	$563-1,145 million
Managed Risk Exposure	$2.3-28.2 million
Risk Mitigation (average %)	98%
Total Operating Expense	$9.6 Million

D-14 Distribution Digital Data Collection

Recommendation:	Annual digital surveys of the elevated fire threat areas. Includes computer post processing (40% System).
Cost:	$1,000,000 Operating Expense ($7,750,000 total over 10 years)
Benefit:	Identify conflicts between vegetation and system structural defects.

This element is similar in scope and function to ST-5 “Transmission Digital Data Collection” whereby LIDAR surveys, high resolution photography, and infrared images would be collected on Avista’s overhead distribution lines. The project scope is limited to elevated fire threat areas.

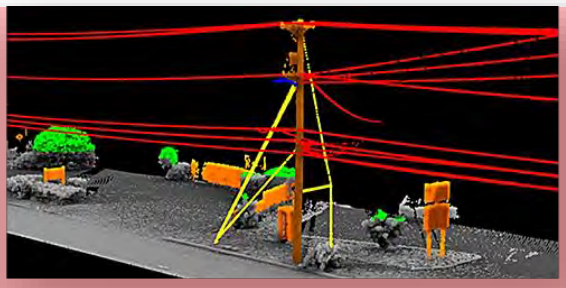
Avista operates 7,600 miles of overhead primary distribution lines, and nearly 40% of those facilities are located in elevated fire threat areas. However, unlike transmission, distribution lines have lateral, branch circuits that make aerial surveys difficult. Ground based techniques, similar to Google Earth’s Street View Project, may be deployed in combination with conventional and drone aircraft.

Electric Distribution Outage Rates (Events/Year)

10%	*600 Overhead Equipment Failures*
6.5%	*400 Tree Related*
3%	*200 Underground Equipment*
50%	*3,100 Wind & Weather*
30.5%	*1,890 Other Sources*

(Source data: Avista outage management system 2014-2018)

Avista maintains distribution vegetation on a five year cycle, or about 20% of the system per year. This includes trimming trees and removing trees. This is a reliability-based approach generally known as ‘routine maintenance’. By deploying annual digital inspections, Avista will transition towards a more ‘risk-informed’ approach combining elements of fire threat risk (i.e. WUI Map and Infrastructure Health Index) with the volume of vegetation and the proximity to energized lines and equipment. Though this treatment is justified solely on its ability to identify potential vegetation conflicts, high resolution photography and infrared imagery also support structural inspections. A number of use cases have been identified.



LIDAR Survey

LIDAR USE CASES:

- Vegetation Volume & Proximity (Grown-in Risk)
- Danger Tree (Fall-in Risk)
- R/W Encroachment (buildings, roads, utilities)
- Joint Use Inventory (billing)
- Conductor Line Clearance (NESC Violations)

Hi Res Photo

Infrared Image

IMAGERY USE CASES:

- Equipment Damage (broken x-arms, leaking transformers)
- Change Detection (open fuse bank, bird nest, attachment)
- Hot Spot Detection (splices, connectors, insulators)
- Equipment Inventory (added to GIS system of record)

Risk Evaluation

Annual risk tree and digital data collection rank at the top of treatment options to reduce the opportunity for powerline fire ignitions. Maintaining an accurate inventory of both infrastructure and vegetation in the elevated fire threat areas is a critical component of fire resiliency.

D-14: Distribution Digital Data Collection	2020-2029
Inherent Risk Exposure (category %)	21.8-44.3
Managed Risk Exposure (category %)	1.0-4.4
Risk Mitigation (average %)	92%
Total Operating Expense	$7.75 Million

ST-5 Transmission System Digital Data Collection

Recommendation:	Annual digital survey of the transmission system (100%).
Cost:	$750,000 Operating Expense ($6,825,000 total over 10 years)
Benefit:	Identify potential conflicts with vegetation and structure defects.

Avista operates 700 miles of 230 kV and 1,570 miles of 115 kV transmission lines throughout eastern Washington, northern Idaho, and western Montana.[22] Vegetation management of the transmission grid is subject to NERC regulation FAC-003-4 which requires that all 230 kV and select 115 kV circuits be patrolled annually to assess vegetation growth both in the right-of-way (encroachment) and adjacent to the right-of-way (fall-in risk). Since 2006, Avista has conducted annual aerial patrols as part of the Company's Transmission Vegetation Management Plan (TVMP).[23] The regulatory focus on transmission has helped reduce conflicts between vegetation and powerlines, and adding fire-informed, risk-based elements to existing programs, Wildfire Resiliency aims to build upon that success.

Increasingly, utilities are using LIDAR (light detection and ranging) to assess vegetation encroachment of overhead powerlines. The ability to collect survey data via an aerial platform is a significant advantage over ground-based techniques. This technology is helping vegetation managers identify, prescribe treatments, and audit field work using machine learning computer algorithms.

Since transmission lines are linear features and located within established corridors, data can be collected via fixed wing aircraft equipped with multiple instruments including LIDAR, Hi-Resolution cameras, and near-infrared detectors.

By collecting data annually, Avista vegetation and asset managers can detect changes from year to year, including unauthorized encroachments, as well as assess the proximity to vegetation, and quantify the risk of tree fall-ins. Transitioning from human based inspections to digital data collection will have a substantial impact on data accuracy, work processes, productivity, and record keeping.

[22] 2019 Avista Quick Facts
[23] Avista Transmission Vegetation Management Plan, see Addendum

Risk Evaluation

The relatively low risk of contact between vegetation and transmission lines reflects Avista's commitment to comply with NERC regulation FAC 003-4. Between 2014 and 2018, only 21 tree related outages were reported on the transmission system.[24] Though collecting digital data will improve our ability to identify both tree grow-in and fall-in risks, benefits extend beyond vegetation management and include the ability to automate the structure inspections, detect thermal hot-spots, and conduct field work audits.

ST-5: Transmission Digital Data Collection	2020-2029
Inherent Risk ($)	$9.6 - $17.7 Million
Managed Risk ($)	$0.9 - $2.4 Million
Risk Mitigation (average %)	88%
Total Operating Expense	$6.8 Million

ST-9 Conforming Transmission Rights-of-Way

Recommendation:	Widen transmission line rights-of-way in elevated fire risk areas (20% System)
Cost:	$500,000 Capital Investment ($5,000,000 total over 10 years)
Benefit:	Reduce interaction between vegetation and Avista's transmission facilities.

Typically, transmission line corridors are established via negotiations with private landowners and include a centerline description and specify width (e.g. 50-100 feet wide). Avista transmission lines have standard width requirements:

- 230 kV – 100 feet
- 115 kV H-frame (2 pole) – 60 feet
- 115 kV single pole – 50 feet

Although, variations exist in particular circumstances, standard corridor widths provide sufficient clearance between conductors and adjacent vegetation. However, some historic transmission line easements do not meet today's standards and elevate the risk of vegetation contacts. Likewise, transmission circuits located in public road rights-of-way do not necessarily allow Avista to manage vegetation on adjacent properties.

CDA-Rathdrum 115 kV along US Hwy 95

The photograph on the right shows a 115 kV line routed along US Highway 95 near Hayden, Idaho. Trees located on the adjacent property cannot be managed without

[24] Avista Outage Management System, 2014-2018 dataset

owner consent. By addressing these areas through easement acquisition, Avista reduces vegetation risks.

Risk Evaluation

At the time of this report, Avista has not conducted a complete inventory of corridor agreements. It is important to note that easements obtained prior to 1950 are generally 'non-width specific'. Although courts have interpreted these easements as conforming to current standards, the risk of disputes with adjacent landowners still exist. Likewise, circuits located on public road rights-of-way do not allow for vegetation management on adjacent properties.

While the cost-benefit ratio for this activity is relatively low, benefit calculations from the fire risk workshops did not take into account the ability to maintain and reconstruct facilities. Expanding corridor 'rights' drives benefits that go beyond the risk of wildfire.

ST-9: Conforming Transmission Rights-of-Way	2020-2029
Inherent Risk Exposure	$4.8 - $8.8 Million
Managed Risk Exposure	$0.2 - $1.4 Million
Risk Mitigation (average %)	88%
Total Capital Investment	$5 Million

ST-7 Fuel Reduction Partnerships

Recommendation:	Participate in annual fuel reduction efforts conducted by the local Fire Districts (e.g. Washington DNR, Idaho IDL)
Cost:	$167,000 Operating Expense ($1,500,000 total over 9 years)
Benefit:	Reduce fuel loading near operating facilities and strengthen working relationships with fire first responders.

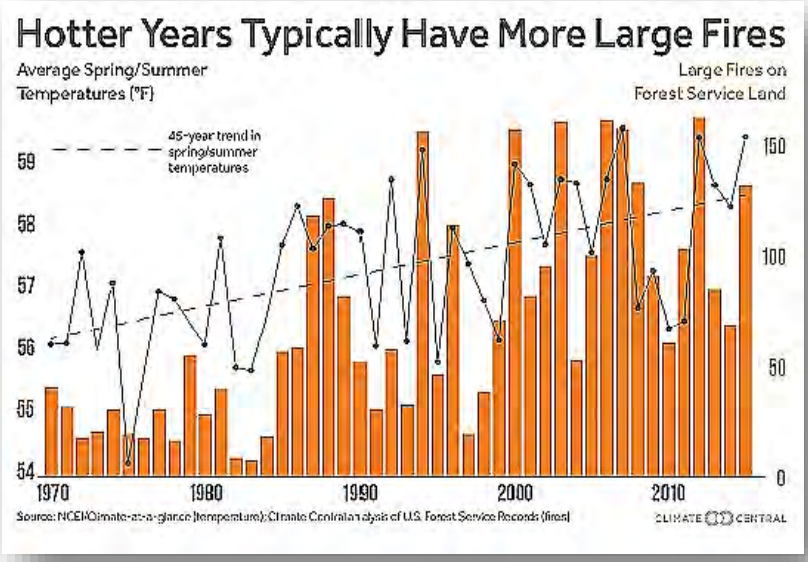
The Washington Department of Natural Resources (DNR) has embarked on a 20-year plan to improve forest health on 2.7 million acres of forest land in central and eastern Washington. As Hilary Franz, Washington Commissioner of Public Lands, states: ***"We have a forest health crisis in our state……. Hot, dry conditions coupled with diseased and dying forests are leading to explosive wildfires."***[25] In 2017, a record number of wildfires (1,850) cost Washington taxpayers over $150 million in suppression costs alone. Since 1970, both the number and size of wildfires has increased substantially. The United States Forest Service (USFS) estimates that large fires have tripled in number since 1970 and the length of the wildfire season is now 100 days longer.[26]

[25] Internet Website: dnr.wa.gov
[26] Climate Central, Western Wildfires, 2016

By partnering directly with fire protection agencies including the Washington Department of Natural Resources and the Idaho Department of Lands, Avista plans to work alongside forest thinning and brushing crews to remove excess fuels and to reduce the severity of future fires. Projects that remove fuels near critical infrastructure such as the Beacon Hill area (see photograph) are an opportunity to both reduce fire risk and to strengthen relationships between Avista and fire protection personnel. Over the course of Plan development, Avista has met with several fire protection agencies and a recurring theme has emerged: *It is important that Avista operating personnel maintain strong working relationships with local and state fire agencies*. This Plan contains opportunities to strengthen those relationships through joint training and simulation exercises, joint efforts to promote fire-adapted communities, and through fuel reduction projects.

In 2018, a fire erupted on Beacon Hill near Avista's main office building and threatened several transmission circuits. Residents were evacuated as the fire spread to over 100 acres. Over 50 fire engines responded to the blaze.

The following graph illustrates the correlation between hotter summers and large fires on federal lands.



IN IDAHO, THE NUMBER OF LARGE FIRES ON FEDERAL LANDS HAS INCREASED FROM 10 (1970) TO OVER 30 PER YEAR.

IN 2009, OVER 1.5 MILLION ACRES OF FEDERAL LANDS WERE IMPACTED BY WILDFIRES IN IDAHO.

While Federal and State efforts to improve forest health involve widespread thinning and prescribed burns, Avista's approach will target areas adjacent to critical infrastructure and be performed in conjunction with local fire districts. Recent work with local fire districts, together with the Idaho Department of Lands and Washington DNR, have already identified several potential projects.

Risk Evaluation

While Avista cannot reasonably marshal resources to impact forest health on a landscape level, it can support local efforts to conduct mechanical thinning and prescribed burns. Avista plans to invest $150,000 annually to assist with local efforts to reduce fuel loading.

ST-7: Fuel Reduction Partnerships	2020-2029
Inherent Risk Exposure	$15 - $29 Million
Managed Risk Exposure	$3 - $29 Million
Risk Mitigation (average %)	27%
Total Operating Expense	$1.5 Million

D-4 Incorporating Vegetation Management into Distribution Designs

Recommendation:	Incorporate vegetation clearing into distribution design packages (addition to work process)
Cost:	$10,000 capital labor ($100,000 total over 10 years)
Benefit:	Reduce interaction of vegetation with Avista's distribution facilities.

During the Avista Wildfire Risk Workshops, participants cited examples of electric distribution designs in conflict with existing vegetation. By incorporating vegetation treatment into the design process, potential conflicts are addressed prior to construction. This is largely a training exercise for the Construction Project Coordinator (CPC) department, but does add to the overall design effort and requires coordination between construction and vegetation management functions.

Risk Evaluation

D-4: Incorporating Vegetation Management into Distribution Designs	2020-2029
Inherent Risk Exposure	$20 - $278 Million
Managed Risk Exposure	$10 - $21 Million
Risk Mitigation (average %)	90%
Total Capital Investment	$100,000

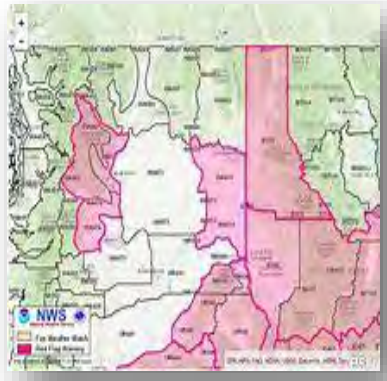
Situational Awareness

The ability to monitor and control electric transmission and distribution equipment is critical when responding to wildfires. This effort will leverage existing systems including Transmission SCADA (supervisory control and data acquisition), Distribution DMS (distribution management system), and AMI (automated meter infrastructure or "smart meters"). These systems are known technologies and offer scalable opportunities to enhance wildfire resiliency.

In addition to leveraging existing systems, Avista will develop a "Fire-Weather" dashboard, combining elements of weather forecasting and fire threat assessment. This computerized system will help system operators, district managers, and area engineers make informed decisions related to fire risk potential and estimated fire impact spread & severity.

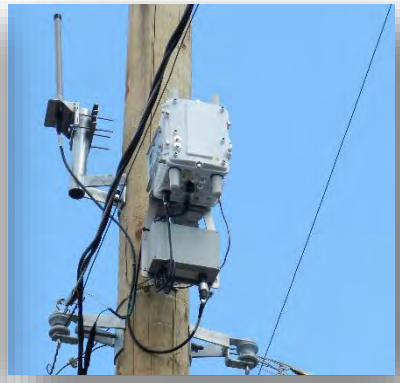
Avista's Wildfire situational awareness plan consists of three elements:

- Fire-Weather Dashboard
- Substation Supervisory Control & Data Acquisition (SCADA)
- Distribution Midline Equipment Communications



Fire-Weather Dashboard

Substation SCADA



Midline Communications

The 10-year cost to fully implement these treatments is $19 million dollars and may mitigate the current state categorical risk by as much as 98%. A summary forecast of costs and risks are shown below.

Situational Awareness	2020-2029
Inherent Risk Exposure	$151 – $585 Million
Managed Risk Exposure	$5 - $7 Million
Risk Mitigation (average %)	98%
Operating Expense 2020-2029	$1 Million
Capital Investment 2020-2029	$18 Million

D-15 Substation SCADA

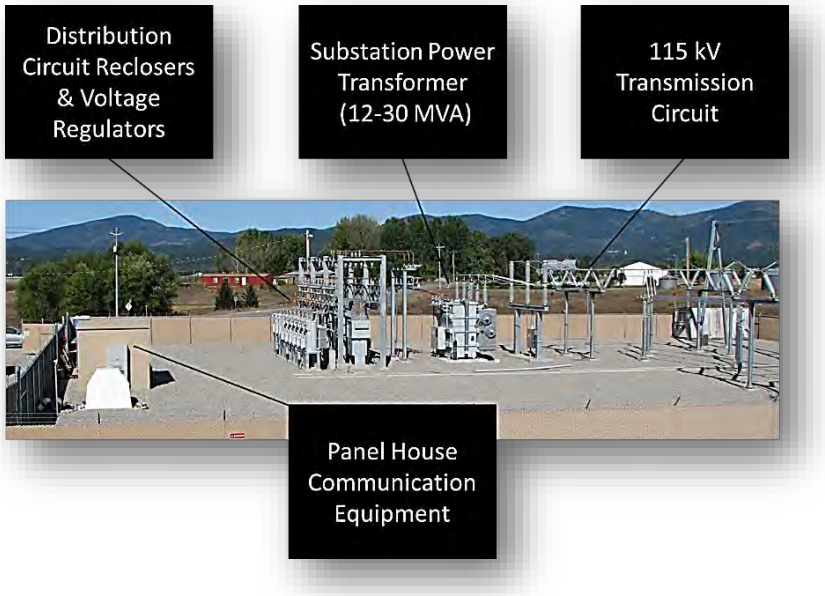
Recommendation:	To retrofit supervisory control and data acquisition systems (SCADA) into elevated fire risk area substations (40% Distribution System).
Cost:	$2,000,000 Capital Investment ($17,000,000 total over 10 years) $9,700 Operating Expense ($97,000 total over 10 years)
Benefit:	Provide ability to adjust protection equipment based on the imminent fire risk and weather conditions.

33 Avista Substations are not currently equipped with control and monitoring systems (SCADA)

Supervisory Control and Data Acquisition systems or SCADA, are used in many industries to monitor and control manufacturing plants, national defense systems, and utility infrastructure, including generation plant and transmission circuit infrastructure. These systems, originally deployed in the late 1960's and early 1970's, have matured to current 'fourth generation' web-based systems. Avista operates approximately 176 substations, ranging from very large, 500 MVA 230-115 kV transmission stations, to small, rural distribution stations. While Avista's transmission system is fully SCADA integrated, a number of distribution stations are not equipped with remote monitoring and control systems. A majority of these rural stations are located in elevated fire risk areas.

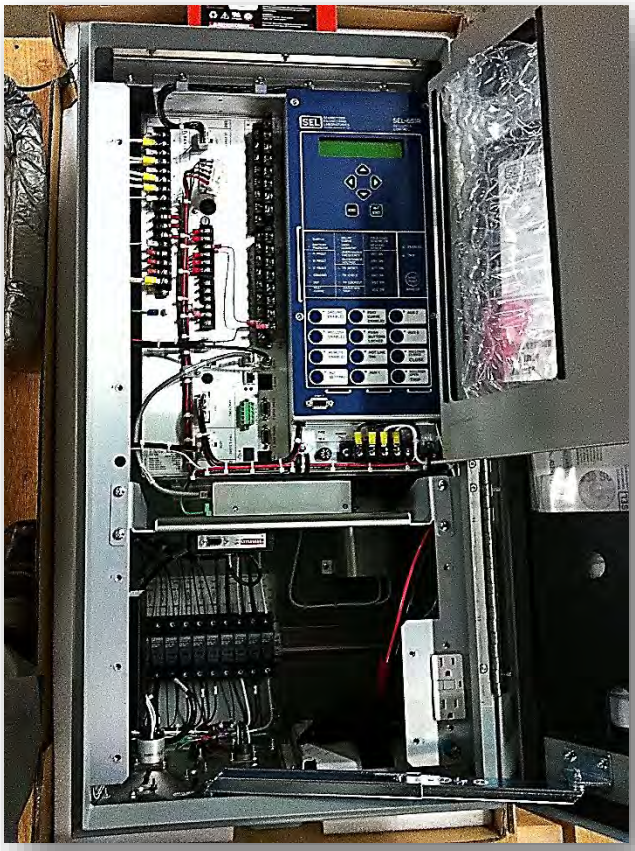
Avista operates 33 substations without SCADA. These stations are effectively 'dark', without any remote sensing, monitoring, or equipment control systems. Though substations are designed to operate autonomously, the inability to adjust protection systems based on weather conditions or de-energize electrical circuits in an emergency elevates the safety risk for emergency first responders.

One of the elements of Avista's strategy is to align circuit protection schemes with fire threat conditions (see Dry Land Mode). During the fire season, Avista operates a number of distribution lines in non-reclosing mode, which reduces fault energy by 40-50%. However, weather forecasts that indicate high temperatures and high winds may warrant a more sensitive protection regime, such as Trip-Reclose-Trip, where circuit reclosers rely on instantaneous rather than time-delay tripping. This could reduce fault energy by as much as 70-80%.



By adding SCADA, system operators can issue instructions to recloser units and effect changes. Without these systems, servicemen must be dispatched to the substations to manually effect the

change. In a dynamic system, manual intervention is not practical and may lead to prolonged customer outages and elevated risk.



Circuit Recloser Relays

Modern circuit reclosers are controlled via microprocessor relays. In this photograph, a Schweitzer SEL-351R relay is being tested prior to installation. Equipment connected to communication systems (SCADA & DMS) are continuously monitored and capable of remote operation. This functionality is an important element in Avista's wildfire strategy.

Risk Evaluation

Avista plans to install SCADA at 33 substations based on their location within the Wildland Urban Interface. Elevated fire threat areas (Tier 2/3) would be prioritized over non-WUI and WUI Tier 1 areas.

D-15: Substation SCADA	2020-2029
Inherent Risk Exposure	$132 - $547 Million
Managed Risk Exposure	$0 - $1.6 Million
Risk Mitigation (average %)	100%
Total Operating Expense	$97,000
Total Capital Investment	$17 Million

D-12 Distribution Management System (DMS) Communication

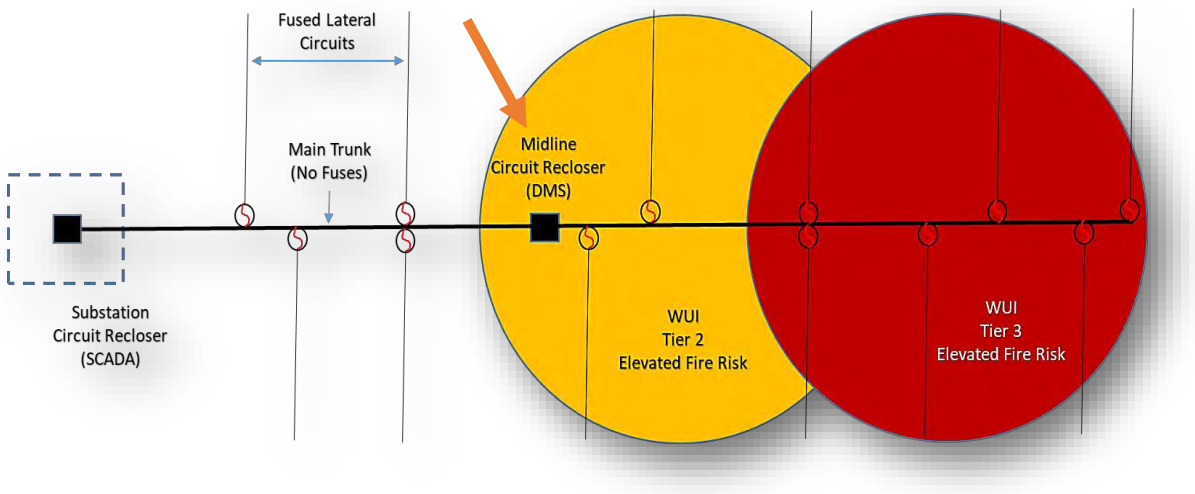
Recommendation:	To retrofit circuit reclosers with communication systems and enable control and monitoring of equipment in elevated fire threat areas (40% System).
Cost:	$60,000 Capital Investment ($540,000 total over 10 years)
	$30,000 Operating Expense ($272,000 total over 10 years)
Benefit:	Extending communications for circuit reclosers enables remote operation, and allows operators to align protection schemes with current fire threat conditions

As part of the 2010 Spokane and Pullman Smart Grid projects, Avista installed a Distribution Management System, or DMS, to collect data from circuit reclosers, voltage regulators, and capacitor banks. DMS is similar to SCADA, but is specific to distribution and can collect data from both substation and powerline devices. However, a number of circuit reclosers located in elevated fire risk areas lack communications and are not included in the DMS system. Extending communications to these devices is like the SCADA initiative and will enable remote monitoring and control of these devices.

Emergency first responders rely on Avista's ability to de-energize electric lines near wildfires

Electric Distribution Line Protection

Avista operates 7,600 miles of overhead distribution line and 40% of that system is located in elevated fire risk areas. This diagram indicates a typical distribution configuration, with a main trunk protected via circuit reclosers (substation and midline) and lateral circuits protected via fuse links. Circuit reclosers are similar to household breakers and operate (open) when fault overcurrent is detected. Faults that occur on lateral circuits are interrupted when a fuse link opens (thermal operation).
By adding communications to midline circuit reclosers, Avista adds monitoring and control functionality, including the ability to operate the device remotely.



Fuse Link Assembly Cutout

Midline Circuit Recloser

Risk Evaluation

Extending communications to circuit reclosers enables remote operation and allows operators to adapt protection schemes to align with current fire threat conditions. For example, Avista may install Hot Line Holds (one shot tripping, no automatic reclose) during red flag warnings. Reducing the potential for spark ignition is an important component of Avista's strategy and adapting system protection to fire threat conditions helps to achieve those goals.

D-12: DMS Communications	2020-2029
Inherent Risk Exposure	$14.6 - $29 Million
Managed Risk Exposure	$250,000 – 280,000
Risk Mitigation (average %)	99%
Total Operating Expense	$272,000
Total Capital Investment	$540,000

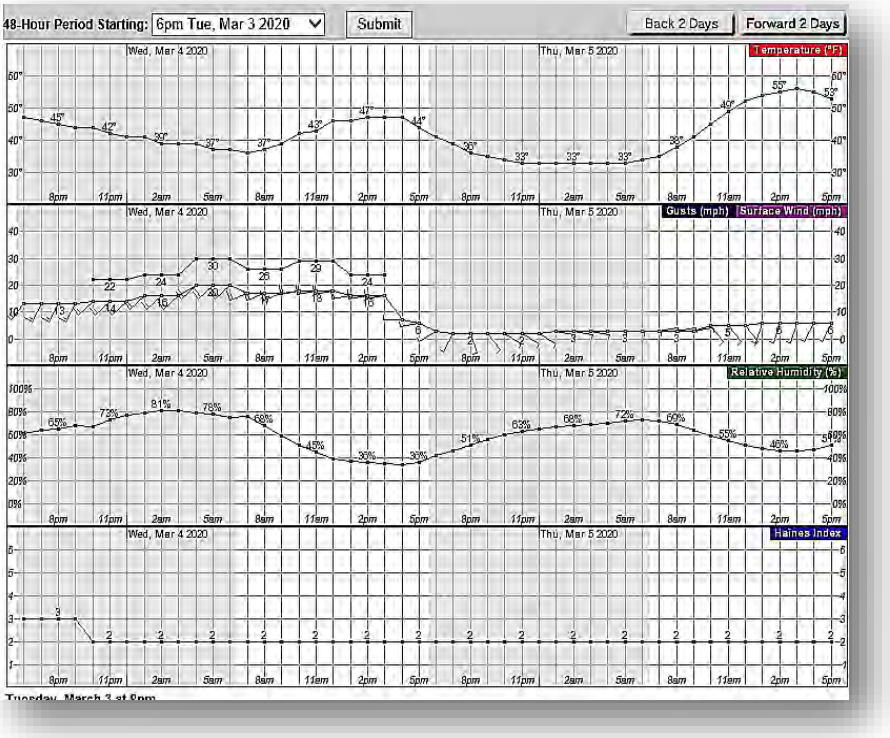
ST-2 Fire-Weather Dashboard

Recommendation:	Combine weather forecast and fire threat data into a fire predictive, web-based program.
Cost:	$150,000 Capital Investment ($425,000 total over 3 years)
	$75,000 Operating Expense ($650,000 total over 10 years)
Benefit:	Better understand and respond to the potential impact of weather conditions on Avista's operating system.

The Wildland Fire Assessment System (WFAS) operated by the USFS in Missoula, Montana, provides near real time information on fire threat conditions. This information is an important tool in determining both the probability and impact of wildfires.

Avista System Operations declared "Dry Land Operating Conditions" on July 23, 2019 based on data from the Wildland Fire Assessment System (WFAS).

The precision of weather forecasting and, especially, micro climate forecasting, has significantly improved over the last few decades. Advancements in forecasting, coupled with broadband communication has made weather information more available than ever before. Prevailing weather conditions, including temperature, humidity, and especially wind, are key factors in fire behavior. By combining fire threat information with forecasted weather, system planners, operators, and field personnel are better equipped to predict and respond to wildfires.



Data from the National Weather Service for Post Falls, Idaho (3/3/20). Temperature, humidity, and wind levels are important factors in predicting wildfires.

By combining information from the Wildland Fire Assessment System (WFAS) and the National Weather Service (NWS), Avista will be able to quantify fire risk by service territory. An example is shown below. *At the time of this report, a detailed scoping of the "Fire-Weather Dashboard" is not yet complete.*

July 16, 2020	48 Hour				96 hour			
Service Area	Temp F°	Wind mph	Fire Index	DLM	Temp	Wind	Fire Index	DLM
	Hi/Lo	Gust/Sust			Hi/Lo	Gust/Sust		
Sandpoint	82/54	12/4	M	NOM	95/78	52/22	EC	HLH
CDA	86/58	16/5	M	NOM	101/82	62/45	EC	HLH
Kellogg	80/50	12/5	H	NOM	92/68	51/20	EC	HLH
St. Maries	82/50	14/4	H	NOM	95/66	32/15	E	TRT
Lewiston	92/68	28/16	H	NOM	112/85	12/5	H	NOM
Grangeville	85/58	36/15	E	TRT	108/76	8/4	H	NOM
Colville	88/58	8/2	M	NOM	102/80	16/6	H	NOM
Deer Park	82/54	6/2	L	NOM	98/75	12/6	H	NOM
Spokane	86/54	4/2	M	NOM	99/74	16/9	H	NOM
Othello	88/62	12/2	M	NOM	100/78	5/2	M	NOM
Davenport	85/56	8/4	M	NOM	96/76	6/2	M	NOM
Pullman	78/55	22/14	H	NOM	95/69	12/8	H	NOM

*Legend: Fire Index (**L**ow, **M**oderate, **H**igh, **E**xtreme, **E**xtreme **C**atastrophic)*
Dry Land Mode (Nominal, Trip-Reclose-Trip, Hot-Line-Hold)

This is illustration indicates how fire threat indicators might be combined with weather forecasts to influence Avista's operating systems, such as Dry Land Mode. Other activities, including EOP pre-activation and staging first responders, may also be informed through this system.

Risk Evaluation

Developing a fire-weather dashboard will not reduce fire risk on a standalone basis, however, this information is vital to adapting operations and emergency response to the potential for wildfire.

ST-2: Fire-Weather Dashboard	2020-2029
Inherent Risk Exposure	$4.8 - $8.8 Million
Managed Risk Exposure	$4.3 - $4.8 Million
Risk Mitigation (average %)	33%
Total Operating Expense	$650,000
Total Capital Investment	$425,000

Operations & Emergency Response

The primary objective of Wildfire Resiliency is to reduce the number of utility involved ignition events and to minimize the damage of infrastructure due to wildfires. The bulk of that effort is rooted in long-term planning and implementation of methods to clear vegetation away from powerlines and to protect infrastructure from fire damage. Meeting these objectives requires a steadfast and committed approach to investing in the energy delivery system. Wildfires will continue to occur, and Wildfire Resiliency includes support elements such as first responder training, defining the role of engineering during major events, and establishing wildfire metrics.

Historically, Avista's response to wildfire has been similar to other large scale weather events, with a focus towards outage service restoration. Though major storms present employee and public safety challenges, wildfire is particularly acute with respect to safety. In addition to mitigating the risk of wildfire, Avista plans to:

1. Prioritize public and worker safety over customer restoration.
2. Recognize wildfire response as a shared responsibility with other emergency first responders.
3. Use performance metrics to adjust and align planned future actions.

Plan elements in this category include:

- Emergency Operating Program (EOP) document review & fire incident command representative
- Transmission design review of major events
- Wildfire performance metrics
- Emergency first responder training
- Expedited fire response (2020 pilot project)
- Comprehensive fuse coordination review
- Circuit recloser event reporting
- Fire ignition tracking system
- Fire suppression chemical additive
- Wildland urban interface layer in Avista's GIS data system
- ARCOS system wildfire notification operating procedure

The cost to align operating tactics with Wildfire Resiliency is $2.7 million over 10 years. However, this is projected to reduce risk exposure by several hundred million dollars.

Operations & Emergency Response	2020-2029
Inherent Risk Exposure (category %)	19.7-100
Managed Risk Exposure (category %)	5.3-23.4
Risk Mitigation (average %)	76%
Total Operating Expense	$2,378,000
Total Capital Investment	$300,000

Transmission & System Operations

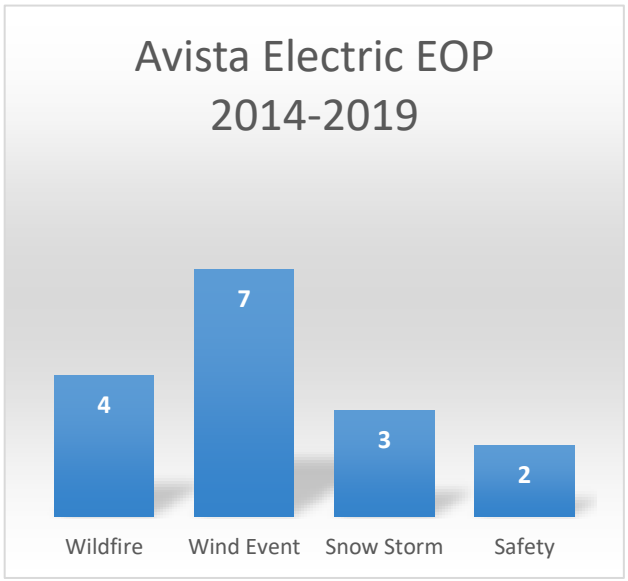
Recommendation:	ST-1 Formalize EOP response to large scale wildfire events ST- 3 Transmission engineering review after major events ST-4 Establish wildfire resiliency metrics ST-8 Conduct annual fire safety and electrical hazard training ST-11 Expedited fire district response following transmission line faults
Cost:	$160,000 Operating expense ($1,593,000 total over 10 years) $10,000 Capital investment ($100,000 total over 10 years)
Benefit:	Enhanced awareness and response to wildfire events.

Five treatments are described in this section which encompass the overall energy delivery operating environment. Those elements include:

- Emergency Operating Program Review & Fire Incident Command Representative
- Transmission Design Review of Major Events
- Wildfire Performance Metrics
- Emergency First Responder Training
- Expedited Fire Response (2020 Pilot Project)

ST-1 Emergency Operating Program (EOP)

Since 2014, Avista has activated the electric EOP, or incident command structure, 16 times, including the Company's largest event, the windstorm in November of 2015. By declaring an EOP, Avista operations shifts to emergency response, with service restoration as the primary objective.



Wildfires present a number of safety related challenges. In August of 2015, Avista activated an EOP in response to numerous wildfires across the service territory. The largest of these fires was the Carpenter Road Fire near Davenport, Washington which impacted 64,000 acres and involved over 1,000 firefighters. Evacuation orders were issued for residents throughout the Springdale-Hunters area and approximately 42 structures were damaged or destroyed by the blaze. Though Avista has a long history of responding to wildfire events, it recognizes wildfire as separate and distinct from storm events. Therefore, Avista plans to implement the following changes to its EOP program:

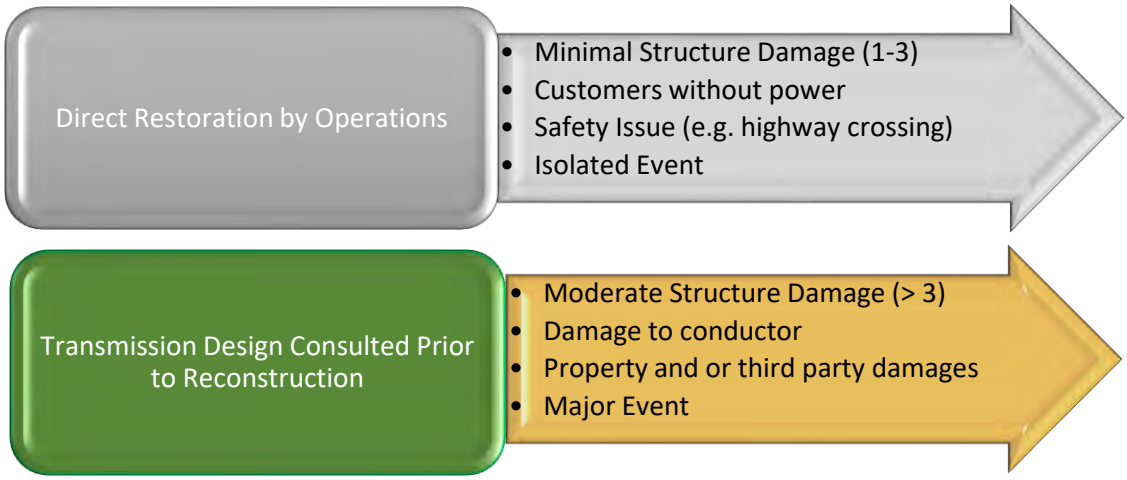
1. **Conduct an EOP document review to align with Wildfire Resiliency**
2. **Formalize resource commitments to Fire Incident Command (Avista Fire Representative)**

In most large wildfire situations, local response (city, county) is superseded by state and federal authorities. In Washington State, the Department of Natural Resources is responsible for most non-federal fire suppression, and in Idaho, the Department of Lands takes the lead. In either state, responses to fires larger than 100 acres triggers a Fire Incident Command Structure (ICS). While Avista has a long history of working closely with fire protection agencies, **divisional operations managers have committed to embed Avista field personnel into the Fire ICS**. A basic flow-process diagram is indicated below. The primary duty of the Avista representative is to serve as the liaison between the fire Incident Commander and Avista.

Embedding Avista Personnel into Fire Incident Command Structure

ST-3 Transmission Design's Role in Major Event Response

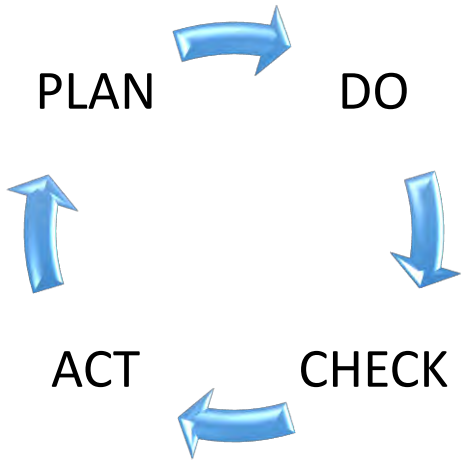
The reconstruction cost of overhead transmission lines ranges from $500,000 to over $1 million dollars per mile. This is in sharp contrast to electric distribution facilities which typically range from $150,000 - $250,000 per mile in rural areas. During the wildfire workshops, engineers and system operators estimated that wildfires impact transmission lines 2 to 4 times per year. Though electric operations is responsible for restoration, during large scale events, transmission design shall be consulted to conduct damage assessments prior to reconstruction.



ST-4 Wildfire Program Metrics

Electric reliability is determined through a series of metrics established by the Institute of Electrical and Electronics Engineers (IEEE), and includes outage frequency and duration. Indices such as MAIFI (momentary outage frequency), SAIDI (sustained outage duration), and CEMI (customers experiencing multiple interruptions) are commonplace throughout the industry. In contrast, fire metrics are characterized as the number of acres burned, suppression costs, structures damaged, and injuries. Though Avista does track some fire-related information, such as the number of pole fires, it does not have a systematic approach to quantify the effectiveness of wildfire resiliency measures.

It is recommended that Avista implement a set of performance measures to quantify and better understand the risk of wildfire on operating systems. The performance measures should allow for evaluation and continuous improvement.



The **Plan-Do-Check-Act** model is a continuous improvement technique also known as the Deming Circle or Shewhart Cycle. Establishing wildfire metrics partially fulfills the 'Check' component and drives adjustments to Plan strategies and tactics. Though the Plan must adapt to ever-changing climatic, social, and political influences, the objectives are clear: Emergency Readiness, Public Safety, and Financial Protection.

ST-8 Wildfire Training for Avista First Responders

Avista electric operations employees are located in 12 districts ranging from Colville to Grangeville and from Kellogg to Othello. Avista employs over 550 electric line workers who are trained as emergency first responders. As part of this Plan, divisional managers are responsible for conducting basic fire training at one of their monthly safety meetings. Where feasible, managers would involve a fire agency professional to conduct training in the April-May timeframe prior to start of fire season. Though there is consensus among division managers that Avista first responders should have basic firefighting and fire safety training, a core tenant of this Plan is to promote and strengthen relationships with fire agencies. By conducting joint training and emergency response simulations, Avista plans to support those key relationships.

ST-9 Expedited Fire Response

It is recommended that Avista implement expedited response for potential fire related disturbances on the transmission system.

Avista's outage management system (OMS) is used to track electric events on both the transmission and distribution networks. As noted, sustained distribution outages are 50 times more prevalent than transmission events. However, 80% of transmission events are characterized as momentary and generally involve the automatic reclosing of circuit breakers to restore power. Though distribution line faults may cause spark ignitions, distribution events generally involve Avista crew response. However, if a transmission line successfully trips and then recloses, no Avista response is triggered.

During the development of this Plan, Avista engaged fire agency professionals, including Washington DNR and Idaho IDL, together with Spokane County Fire Districts. It was through these conversations that the concept of **Expedited Fire Response** was developed. During dry land mode operations, Avista System Operator will initiate a 911 call whenever there is an isolated transmission fault. Subsequently, fire fighters will be dispatched to the scene.

At the time of this report, a Memorandum of Understanding (MOU) is under review with Spokane County Fire to conduct a 'pilot project' during the 2020 fire season. For purposes of the pilot, the program will extend only to the Spokane County boundaries, and will align with Avista's seasonal declaration of Dry Land Conditions (typical July-September).

Risk Evaluation

The following table summarizes the risks and estimated 10-year costs associated with the transmission system elements of wildfire operations and emergency response.

2020-2029 Risk & Costs (Transmission & System Operations)					
	Inherent Risk ($ Millions)	Managed Risk ($ Millions)	Risk Mitigation (%)	Capital Investment ($)	Operating Expense ($)
EOP & Fire ICS	$13.65	$13.65	0		$50,000
Engineering Design Review	$3.95	$1.65	58%	$100,000	
Wildfire Metrics	$13.8	$2.45	82%		$150,000
First Responder Training	$2.05	$0.6	71%		$1,300,000
Expedited Response	Not evaluated	--	--	--	$93,000
Total	**$33.5M**	**$18.3M**	**75%**	**$100,000**	**$1,593,000**

Electric Distribution Operations

Recommendation:	D-1 Conduct annual distribution fuse coordination assessment D-2 Evaluate circuit recloser event data to ensure nominal operation D-3 Track the number of powerline caused fire ignitions D-5 Add chemical additives to field crew 'water cans' D-7 Deploy the Wildland Urban Interface data-set to the GIS system D-9 Use ARCOS to notify key personnel in the event of wildfire
Cost:	$70,000 Capital Investment ($200,000 total over 3 years)
	$78,500 Operating expense ($785,000 total over 10 years)
Benefit:	Enhanced distribution operations and fire response.

Six elements are included in this section:

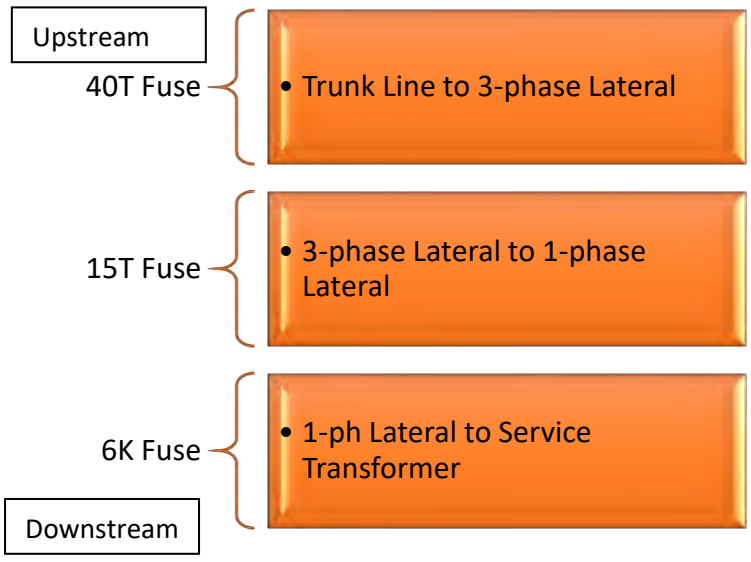
- Fuse Coordination Study
- Circuit Recloser Event Reporting
- Fire Ignition Tracking System
- Fire Suppression Water Additive
- WUI Layer in Avista GIS
- ARCOS Wildfire Notification System

As noted, electric distribution facilities account for 6,200 unplanned outages per year with a number of these events occurring during the fire season. Though the bulk of distribution risk reduction is associated with enhanced vegetation management and grid hardening, those treatments occur on a long term planning horizon. Elements described in this section inform the near-term operating horizon.

D-1 Fuse Coordination Study

It is recommenced that Avista ensure proper fuse sizing and coordination on an annual basis.

Fuses are an important element in the protection of electric distribution systems. Avista's distribution system is configured as a trunk and lateral system, with lateral circuits protected via fuse links and trunk lines protected via circuit reclosers. Avista's Area Engineers are accountable for ensuring that fuse sizes and types operate in a coordinated fashion. In simple terms, fuses closest to loads are smallest with increasing fuse size towards the trunk connection (see illustration).



D-2 Circuit Recloser Event Reporting

It is recommended to analyze recloser event reports to determine that protection systems are operating nominally.

Protection Engineering keeps a log of all transmission line circuit breaker operations and ensures that devices and relays are operating nominally. As communication systems become available to distribution devices, so does the ability to remotely access data from circuit reclosers. To ensure that reclosers are operating nominally and are coordinated with downstream fuse links, it is imperative that system events be analyzed by technical staff.

D-3 Fire Ignition Tracking System

It is recommended to implement a fire ignition tracking system to better understand and respond to fire events.

As noted, Avista's Outage Management System (OMS) is used to track electric outages, and includes information such as: tree fall-ins, car hit poles, wind, animal, underground cable, overhead equipment, and etc. ***Fire*** is listed as an outage category, but generally relates to structure fires. Also listed is ***Pole Fire***, which occurs when excessive electrical tracking leads to hot-spots between wood crossarms and poles. However, the OMS system does not include provisions for tracking outcomes beyond direct customer impacts (e.g. customer duration without power). Though still in development, Avista plans to extend mobile data collection devices (e.g. tablet computers) to field first responders. This would replace paper products, including Avista's damage response form. In order to determine if Wildfire Resiliency treatments are effective, it is important that utility involved fires are tracked by first responders.

Utility grade tablet computers are being deployed to conduct damage assessment and to document field repairs. This collection process will include provision to capture fire ignition events.

D-5 Fire Suppression Water Additive

It is recommended to use chemical additives in Avista fire suppression water cans to extend the efficacy of water blankets.

Electric line and vegetation field crews are often required to adhere to state and federal fire-related work restrictions. In many situations, field crews are required to spray their work area with water prior to activity. This helps prevent fire ignitions generated by spark emitting devices such as power drills and saws. Water evaporates rapidly during hot days, but there are a number of chemical additives that delay this process and extend the effectiveness of water blankets. The Fire Protection Research Foundation (www.nfpa.org/founation) conducted analysis in 2013 to determine the effectiveness of several chemical additives. By using one of the chemical additives, Avista plans to increase the effectiveness of water blankets and water based fire suppression tools.

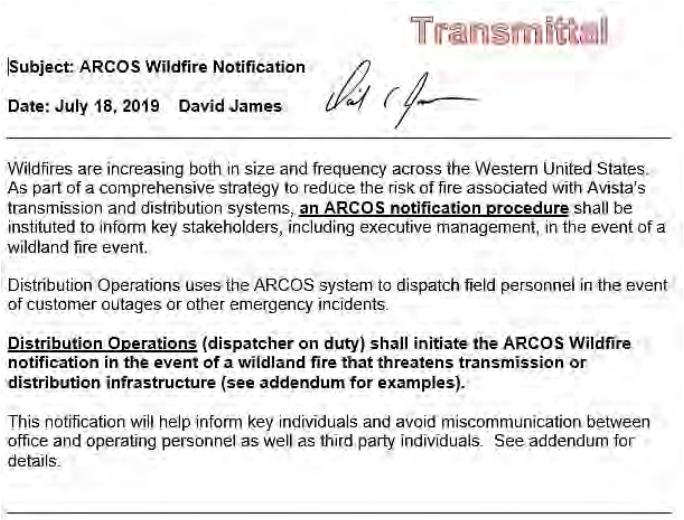
		Class A			
Product	UL Listed to NFPA 18	Structural	Wildland	Deep-Seated	Radiative Resistance
Biosolve		X			
Bioversal QF		X			
BlazeTamer			X		
Boldfoams		X			
Cold Fire	X	X			
Denko Emulsifier					
drench		X			
Emulsi Flash					
F-500	X	X		X	
First Class	X	X	X	X	
Fire Blockade	X	X			
Fire Cap Plus	X	X			
Fire Out!					
FireAde 2000	X	X			
FireIce			X		X
Flame Freeze		X			
Flameout	X	X			
Fomtec Foams		X			
Hi Combat A	X	X			X
Hydrex		X			X

D-7 WUI Layer in Avista GIS System

In September of 2019, Avista developed a Wildland Urban Interface map based on the USDA's 2018 Wildland Hazard Potential and Avista's distribution system. This map helps identify and prioritize the work required to clear vegetation hazards and to 'harden' electric lines. The WUI map was developed by Avista's GIS Technical Services group and as of this writing, the WUI map is being published to the Company's GIS applications. GIS Technical Services has the lead on this effort (see addendum D-7 Wildland Urban Interface for a more complete description).

D-9 Wildfire Notification System

In July of 2019, Avista Distribution Operations added provisions for wildfire notification to their ARCOS emergency call-out system. This system allows Distribution Operations to dispatch messaging to first responders and key stakeholders. The Wildfire Notification system sends SMS text messages and emails to a pre-determined list of recipients. The Wildfire Resiliency Plan manager is responsible for updating this list and coordination with the Distribution Operations Manager.



Transmittal

Subject: ARCOS Wildfire Notification

Date: July 18, 2019 David James

Wildfires are increasing both in size and frequency across the Western United States. As part of a comprehensive strategy to reduce the risk of fire associated with Avista's transmission and distribution systems, **an ARCOS notification procedure** shall be instituted to inform key stakeholders, including executive management, in the event of a wildland fire event.

Distribution Operations uses the ARCOS system to dispatch field personnel in the event of customer outages or other emergency incidents.

Distribution Operations (dispatcher on duty) shall initiate the ARCOS Wildfire notification in the event of a wildland fire that threatens transmission or distribution infrastructure (see addendum for examples).

This notification will help inform key individuals and avoid miscommunication between office and operating personnel as well as third party individuals. See addendum for details.

Risk Evaluation

The following table summarizes the risks and estimated 10-year costs associated with the electric distribution elements of wildfire operations and emergency response.

2020-2029 Risk & Costs (Electric Distribution Operations)					
	Inherent Risk ($ Millions)	Managed Risk ($ Millions)	Risk Mitigation (%)	Capital Investment ($)	Operating Expense ($)
Fuse Coordination	$74	$4.9	93%		$200,000
Recloser Event Reporting	$51.5	$4.85	91%		$400,000
Fire Ignition Tracking System	$339.5	$129.5	62%	$200,000	$100,000
Fire Suppression "Wetting" Agent	$317.5	$38.5	88%		$50,000
WUI Layer in GIS	Not evaluated	--	--	--	$30,000
ARCOS Wildfire Notification	Not evaluated	--	--	--	$5,000
Totals	**$783**	**$177.8**	**77%**	**$200,000**	**$785,000**

Conclusion

Summary of Risks, Benefits, and Costs

The risk and cost expenditures shown in the following table represent a 10-year planning horizon from 2020 to 2029. Note that the Plan includes both operating expense elements as well as capital improvements to infrastructure. Capital elements are planned to sunset after 2029 but the majority of the expense items are on-going and generally related to vegetation management.

While project/program cost estimates are normal and routine, assigning financial risk to these fire resiliency measures is new. Avista is committed to reducing the risk of wildfire by incorporating cost justified and prudent measures. Fire resiliency is an important element among many in determining capital and operating expenditures, and funds are not unlimited. It is not feasible to eliminate the fire risk to the electrical system.

The column labeled 'inherent risk' is based on the current state risk for each operating category and indicates the range of risk from optimistic (low) to pessimistic (high). The values are specific to each category with the high end of the range normalized to 100 basis points. The next column labeled as 'managed risk' indicates the risk reduction by adding wildfire resiliency defenses (future state). Note that defenses with a high confidence of success were selected and the cumulative impact of choosing 'the best of the best' is to drive the risk exposure downward. The column labeled 'risk mitigation' compares the midpoint of the inherent risk range to that of the managed risk range.

Wildfire Resiliency Risk Benefit and Cost Summary

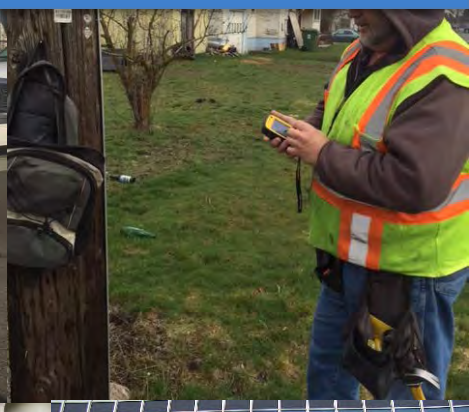
2020-2029 Operating Horizon	Inherent Risk (range %)	Managed Risk (range %)	Risk Mitigation (%)	Capital Investment ($)	Operating Expense ($)
Grid Hardening & Dry Land Mode	41-100	0.7-2.7	98%	$245,600,000	$5,014,000
Enhanced Vegetation Management	48.3-100	3.2-4.5	88%	$5,100,000	$51,175,000
Situational Awareness	25.9-100	0.8-1.1	98%	$17,965,000	$1,019,000
Operations & Emergency Response	19.7-100	5.3-23.4	76%	$300,000	$2,378,000

Addendum

This version is printed without addendum materials. A full report version will be available later and will include the following supporting materials:

1. Wildland Urban Interface Map (WUI), November 2019
2. Wildfire Risk Summary, Proposed Actions, September 2019
3. Wildfire Resiliency Cost Plan, January 2020
4. Wildfire Resiliency Plan, Project Charter, March 2019
5. Standard Operating Procedures, internal memos, various dates
6. Transmission Vegetation Management Plan (NERC, TVMP)
7. Transmission Maintenance Inspection Plan (NERC, TMIP)
8. Distribution Vegetation Management Plan

Avista Utilities
Wildfire Risk Analysis Summary
Actions under Consideration
September 2019



David James, Wildfire Resiliency Plan Mgr.

September 2019

Exhibit No. 12
Case Nos. AVU-E-21-01 & AVU-G-21-01
D. Howell, Avista
Schedule 2, Page 1 of 21

Report Summary

In June of 2019, a series of wildfire workshops were convened to evaluate opportunities to **reduce the risk of wildfire** associated with Avista's transmission and distribution systems. Those workshops together with consideration from the Wildfire Steering Committee and the broader Wildfire SME community serve to inform "**Avista's Wildfire Resiliency Plan"**. This document is a summary of the effort to date and includes preliminary recommendations for systems & practices along with modifications to existing maintenance & construction programs. The stated goals of the Wildfire Resiliency Plan are:

- **Enhance Emergency Operation Preparedness**: to recognize wildfire as a recurring threat to utility infrastructure, the communities we serve, and our customers.
- **Promote Safety**: to protect physical assets, property, and human lives. To manage the risk of wildfire through design-based, system operations, asset maintenance, and outreach activities.
- **Safeguard Company Assets**: to mitigate the impact of direct financial costs and liability exposure associated with large-scale wildfire events.

In addition to these objectives, a model-framework was identified to promote a comprehensive approach to wildfire risk. The elements of the model include:

Planning	System Operations & Maintenance	Weather & Fire Risk Monitoring	Regulatory & Industry
EOP Response	System Hardening	Situational Awareness	Utility Industry Engagement
Insurance Review	Vegetation Management	Performance Metrics	Partnering with Fire Protection Agencies
Risk Monitoring	Fire Resiliency "Ops Toolkit"		Legislative Opportunities
Communications Plan & Outreach			Commission Engagement

Plan Elements addressed in this report

The table below summarizes the risk cost reduction (risk savings) associated with transmission and distribution treatment options. A detailed listing is included in the report. Be advised, the risk savings and cost estimates are shown as 10 year costs. Most actions are recurring.

Electric Transmission	**10 Yr. Risk Cost Savings ($M's)**		**10 Yr. Cost Est.**
	Low	High	Implement
Base	8	23	$0.35M
Primary	27	40	$26.5M
Secondary	8	64	$55M
Future	20	112	$126M
Electric Distribution	**10 Yr. Risk Cost Savings ($M's)**		**10 Yr. Cost Est.**
	Low	High	Implement
Base	217	1,332	$1.1M
Primary	3,144	5,667	$31.1M
Secondary	4,131	8,826	192.5M
Future	3,187	6,904	$1,369M

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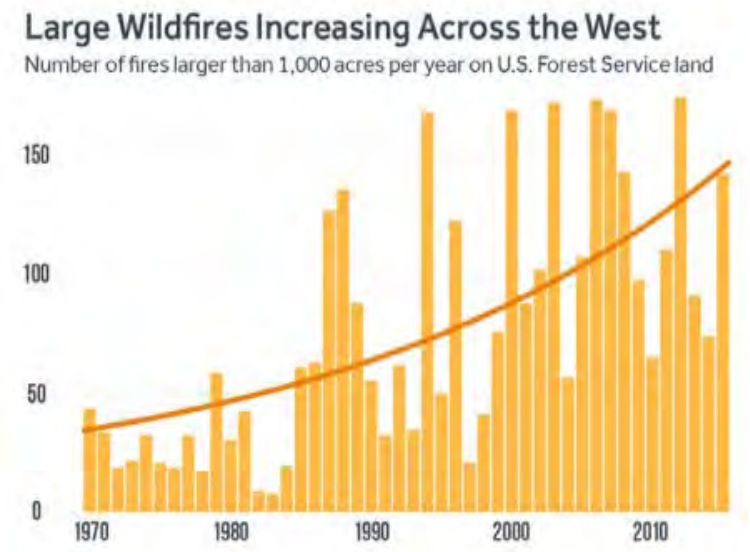
Wildfire Threat Increasing in the Western States

The number of large wildland fires continues to trend upward. Data from Climate Central's 2016 Western Wildfire Report suggests a 3-fold increase in large fires since 1970 and is particularly acute in several states including Wyoming, Idaho, and Montana where a 10-fold increase has occurred. In terms of total acres burned, there has been a 6-fold increase since the 1970's. Both the frequency and scope of wildfires are on the rise.



2016 Climate Central - Western Wildfires

"ANNUAL TOTAL ACRES BURNED HAVE INCREASED 6-FOLD SINCE 1970"

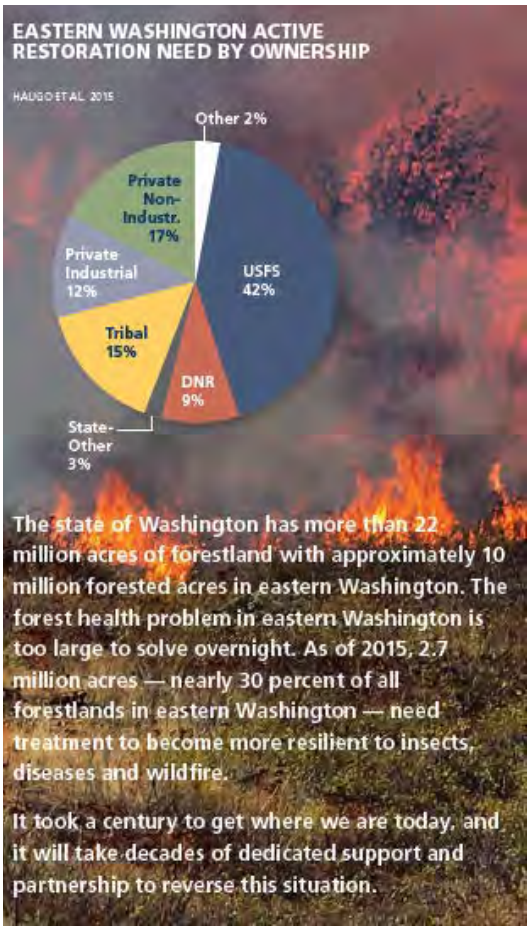
Rank	State	More High Wildfire Potential Days
1	Arizona	34
2	California	24
3	New Mexico	23
4	Utah	23
5	Nevada	20
6	Washington	18
7	Oregon	17
8	Idaho	15
9	Wyoming	8
10	Montana	6

Information from the 2016 Western Wildfires report also indicates that the number of days associated "*High Fire Danger*" or "*Red Flag*" is increasing. Though southwestern states are most at-risk, note that Washington and Idaho are ranked in the top ten. This increases the probability of fire starts and elevates the overall risk of fire impact.

Washington State Responds to Wildfire

In Washington State, the Department of Natural Resources (DNR) takes the lead on most large wildland fires outside of federal lands. In 2015, the DNR published a 20-year "Forest Health & Strategic Plan" for Central and Eastern Washington and identified 2.7 million acres (30%) as 'unhealthy forest'. In these areas, fuel loading and drought conditions have resulted in forests most at risk of catastrophic wildfire.

Treatment plans include, commercial logging activities, thinning, prescribed burning, and re-planting with native species.



2015 DNR 20-Year Forest Health Strategic Plan

An acronym has emerged in the fire vernacular to describe the interaction between forest land and human development: ***Wildland-Urban Interface*** *(WUI). Homes built in or near forest lands add to the costs of fire suppression. In Washington alone, 2.2 million homes are located in WUI areas (Washington DNR, 2018). Avista's fire resiliency plan will focus attention and treatment in these WUI areas.*

Reading this Report

The SME workshops and subsequent analysis has focused on understanding the risk exposure of wildfires in general, but also the opportunity to reduce risk through specific actions. Risk is quantified as the probability an event occurring times the financial impact of the event. (*Risk = Probability X Impact*) In this report, impact is characterized as the sum of:

1) Direct Financial Cost (replacement costs, fire suppression, 1st party damages) +
2) Customer (interruption cost estimate (ICE), 3rd party claims) +
3) Safety (public and employee injuries)

For example, if one considers the risk exposure associated with using fire retardant paint on wood transmission poles, the probability of a wildfire impacting a transmission line is generally 1-2 times per year. (*Probability of Occurrence = 1-2/year)*

The impact costs including the cost of replacement, fire suppression, public and worker safety, and customer disruption ranges between $961,000 and $1,378,000 per event. This translates into an accumulated **10-year inherent risk** value ranging from $9,610,000 to $27,560,000.

Inherent risk indicates the risk exposure before treatment.

Now consider what happens if fire retardant paint is used. In this scenario, the probability of occurrence remains unchanged (1-2/year) but the 10-year **managed risk** ranges between $4,285,000 and $4,830,000. The risk reduction or 'risk savings' is the difference between inherent and managed risk. This report includes both inherent and managed risk costs together with the treatment implementation costs. Again, all costs are indicated as 10-year accumulated amounts and are order of magnitude estimates. For the fire retardant (FR) paint example, the table on page 7 indicates:

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Wood Pole Fire Retardant	9.6	28	4.3	4.8	$2.5M

In the body of this report, proposed treatment actions are identified and grouped as:

- **Base Level** – efforts that support or enable other actions; or standalone actions that can be readily incorporated by the organization.
- **Primary** – actions that represent significant value (risk reduction) and are recognized as industry best-practices.
- **Secondary** – actions that represent the highest risk value but require significant human and or financial commitments.
- **Future** – identified as providing value but of lower priority and therefore, not considered in the initial phase of the Wildfire Resiliency Plan.

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Electric Transmission

In 2006, Avista adopted tubular steel poles as the 'standard installation' for 115 and 230 kV powerlines. Approximately 30% of Avista's transmission system is now steel and as circuits are reconstructed and poles replaced, that percentage will continue to increase. In 2009, NERC published the "*Transmission Vegetation Management*" standard FAC-003-2 which fundamentally reshaped the industry's approach to transmission line clearance activities. For Avista, the combination of system hardening and well maintained rights-of-way have increased the fire resiliency of the transmission system.

June 2019 WW-Wanapum Fire

Transmission fire ignition events are rare. From 2014 to 2018 there were 611 sustained outages but only 252 between May and September (fire season). However, there were over 3,000 momentary outages and nearly half of those (1,500) occurred during fire season. Eighty percent (80%) of transmission line faults are momentary (less than 5 minutes) and are generally the result of lightning, wind, and planned switching operations. Conversely, the impact of fire to transmission structures can be significant. The replacement cost of a single wood transmission structure ranges from $7,500 to over $25,000 and damages to conductor can escalate into the millions of dollars.

Transmission

2006 – Avista adopts steel structures as standard construction

2009 – NERC Vegetation Management Standards

2014-2018 System Performance

622 Sustained outages
3,000 Momentary outages

18 Tree Fall-In Incidents
59 Wind Related
89 Pole Fire (distribution underbuild ignitions)

2019 WW-Wanapum Fire Damage, $1.2M

Base Level Actions (transmission system)

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
EOP & Fire ICS	9.6	17.7	9.6	17.6	$50k
Fire Weather Dashboard	4.8	8.8	4.3	4.8	$50k
Engineering Review Post Major Event	1.0	6.9	0.9	2.4	$100k
Wildfire Compliance Tracking	9.6	18	2.2	2.7	$150k
Total	**25**	**51**	**17**	**28**	**250k OpX 100k CapX**

1. EOP and Fire ICS- fire events are distinct from other storm-outage scenarios and Avista's Emergency Operating Plan (EOP) should reflect that reality. In most fire situations, outage restoration should be **secondary to employee and public safety**. Restoring power in an active fire area may expose line personnel to unnecessary risks and draw evacuated residents back into homes and businesses. Also, there is broad consensus that Avista should have a **representative in all fire ICS situations**. The representative would serve as the liaison between fire command and utility personnel such as system operations, distribution dispatch, electric operations, and engineering. The division operations manager would serve in this capacity or delegate a staff member.

2. Fire Weather Dashboard- situational awareness is vital to decision making; especially in operations control rooms or emergency operations environments. Weather data is readily available in the public domain as is fire condition information. There is strong consensus that these **public information streams should be combined** to support decision making including public safety power shutoff (PSPS). Though PSPS is recognized as a 'deferred action', actions included in the resiliency plan will support a future deployment.

3. Engineering Review Post Major Event – transmission engineering requests time to conduct damage assessment following a significant event. The **EOP should include a 24-48 hour stand-down period** allowing engineering staff to determine the appropriate scope of reconstruction.

4. Wildfire Compliance Tracking – in order to monitor and measure the effectiveness of the Wildfire Resiliency Plan, the Committee recommends metric monitoring similar to NERC/CIP. This system would provide a clear record of performance and track modifications to the program.

Primary Actions (transmission system)

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Digital Data Collection	9.6	17.7	0.9	2.4	$7.5M
Wood Pole Fire Retardant	9.6	28	4.3	4.8	$2.5M
Fuel Reduction	15	29	3.0	29	$15M
1st Responder Training	1.8	2.3	0.3	0.9	$1.5M
Total	**36**	**77**	**9**	**37**	**$26.5M OpX**

1. Digital Data Collection – Laser Detection & Ranging (LIDAR) is widely recognized as an **industry best practice** and provides accurate locations of structures, vegetation, buildings, roads, and etc. Transmission Engineering currently uses this technology to monitor conductor ground clearance. That data can be used to determine vegetation management work plans and to assess the effectiveness of treatment. This system could become Avista's 'system of record' for both vegetation management and system integrity. LIDAR is quickly becoming the industry de-facto standard for transmission vegetation management due to its ability to quantify tree growth rates, tree fall-in risks, and to accommodate a variety of risk/benefit scenarios. *The tabular estimate reflects standalone data gathering and analysis costs. However, we anticipate cost savings by reducing the need for ground based activities and helicopter aerial patrols.*

2. Wood Pole Fire Retardant – fire resistant paint has been used on Avista's wood transmission structures since the late 1990's, and in most cases, paint is applied from ground-line up to 6-8 feet. This has proven to be an **effective treatment for transmission structures not subject to tree crown fire activity**. However, maintenance funding for this activity has been constrained and the recommended application frequency of once every three to five years has not been met. A new product in-use on SCE's system consists of a fire-activated pole wrap (GENIC Fire Mesh) and does not require follow-on maintenance. Transmission engineering is currently evaluating this product. *The June 2019 Walla Walla-Wanapum fire impacted approximately 17 miles of transmission line. These poles had been treated with FR paint in 2009 and many structures were protected as a result of this application. Total **repairs** associated with the fire totaled **$1.2M** however replacement costs of a 17 mile section of this facility ranges between $13M and $20M dollars.*

3. Fuel Reduction– though State and Federal agencies are actively pursuing fuel reduction strategies, most do not encompass electric transmission facilities nor do they involve local fire protection districts. The Steering Committee recommends that Avista participate with local fire districts to reduce the fuel loading in critical areas such as multi circuit corridors, critical infrastructure areas, and extreme risk fuel zones.

4. 1st Responder Training – line personnel respond to a variety of emergency situation including pole fires and must have basic fire suppression skills. During fire season, fire protection agencies often impose work-site restrictions that involve fire watch and area preparation. Conversely, fire fighters are often tasked with working around utility infrastructure and must have a basic awareness of electric hazards. Joint training with Avista line and fire district personnel currently occurs but only on an as-needed basis. The Steering Committee recommends that joint training occur annually.

Secondary Actions (transmission system)

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Conforming Transmission Rights-of-Ways	4.8	8.8	0.2	1.4	$50M
Engineering Line Patrols Construction follow-up	1.0	4.4	0.2	0.2	$3M
Fire Protection Expedited Response	-	-	-	-	UNK
Additional Line Patrols in WUI Areas	3.0	54	0.9	2.4	$2M
Total	**9**	**68**	**1**	**4**	**50M CapX 5M OpX**

1. Conforming Transmission Rights-of-Way – though, wholesale expansion of transmission corridors is well beyond the scope of this effort, conforming rights-of-ways to established engineering and vegetation management standards should be evaluated on a case by case basis. This effort would be constrained to **WUI areas** or circuits with known vegetation issues.

2. Engineering Line Patrols…. – transmission engineering conducts annual aerial patrols to ensure structural integrity and to monitor other direct hazards such as bird nests and building encroachments. Currently, this is an open loop process and by closing this process, a clear record of treatment is maintained.

3. Fire Protection Expedited Response – 80% of transmission line outages are temporary with the line first tripping and then automatically reclosing. In most scenarios, Avista crews are not dispatched to inspect these lines unless there is a secondary indication of a problem. Recent discussions with local fire districts indicates a willingness to investigate the potential for fire events after a trip-reclose event. This system would be deployed in conjunction with the distribution 'dry land condition' declaration and apply only to participating fire district areas. At this point, it is unknown whether local fire districts would seek compensation.

4. Additional Line Patrols in WUI Areas – a major theme in the California utility plans is the emphasis on structure inspections in fire prone areas. Investments in more frequent patrols would support both engineering and asset maintenance objectives.

Future Actions (transmission system)

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Minor Rebuild	0.5	1.0	0.2	0.8	$30M
T/R Patrols	0.9	2.4	0.8	2.2	$1.8M
Supervised 115 kV MOAS Operation	0.2	0.5	0.1	0.1	$40k
Splices & Obsolete Conductor	7.8	8.7	0.4	0.9	$7.5M
Fire-wise Education	3.8	57	1.0	6.9	$3M
R/W Road System	4.8	13.8	4.3	4.8	$40M
Inspect before re-energizing policy	0.2	0.5	0.4	0.5	$250k
Red Card Certification	4.8	13.8	4.0	4.8	$380k
Fire Prevention Grant Writer	1.8	6.9	0.9	2.4	$700k
In-house fire suppression crews	9.6	17.6	4.4	5.5	$1.5M
Fire training for pre-apprentice tree crews	0.9	2.4	0.4	1.0	$1.5M
Increase ground clearance standards	2.5	28	1.3	11.3	$25M
Dry Land Mode	0.2	0.9	0.4	1.0	$1.8M
Marker Balls on static lines	0.2	0.9	0.1	0.1	$2.5M
Advanced Line Protection	3.6	4.4	3.6	4.4	$10M
Total	**42**	**159**	**22**	**47**	**$126M**

1. Minor Rebuild – to supplement the existing pole replacement program with a focus on wood to steel conversions in the WUI areas.
2. T/R Patrols – similar to expedited fire response but would involve dispatching Avista personnel following an isolated trip-reclose event. Expedited response is a more targeted approach.
3. Supervised 115 kV MOAS – many 115 kV air switches can be remotely operated. If air switches operate incorrectly, arcing may result and could produce an ignition.
4. Splices & Obsolete Conductor – conductor splice failure is rare. From 2014 to 2018, only 4 conductor/connector outages were reported.
5. Firewise Education – combined with distribution 'right tree-right place' public outreach program.
6. R/W Road System – to construct permanent roads on transmission rights-of-ways.
7. Inspect before energizing – to expand existing field practices of ensuring personnel and equipment in the clear before re-energizing a circuit that was taken out of service for maintenance.
8. Red card certification – to provide 3-5 day training to line personnel effectively making them fire fighter qualified.
9. Fire prevention grant writer- paid staff writer to apply for federal and state grant monies.
10. In-house fire suppression crews – dedicated firefighting personnel and equipment.
11. Fire training for pre-apprentice tree crews – an addition to the existing program effectively making tree personnel firefighting qualified.
12. Increase ground clearance standards – to increase 115 and 230 kV ground clearance design standards.

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13. Dry Land Mode – to adapt the non-reclosing practice for electric transmission lines.
14. Marker Balls on Static Wires – In the 1990's, several aerial marker balls failed associated with electric field stress.
15. Advance line protection – adding line relays and communication equipment to existing transmission lines.

Electric Distribution

The vast majority of electric outages occur on the distribution system but the impact to customers is restricted by line fuse action (1-100 customers typical). To contrast this situation, transmission outages are infrequent (low probability) but often impact thousands of customers. The exact opposite is true in a majority of distribution outages where the fuse protection scheme limits the impact to outages to lateral circuits. However, from a fire prevention standpoint, the distribution system is the ignition source for most utility caused fires. Data from the Outage Management System (OMT) indicates that annually, one hundred (100) fire ignition events are associated with overhead distribution lines. In almost all cases, these fires are extinguished by 1st responders including Avista line servicemen. It is the distribution system that requires more focus with respect to fire ignition and this risk is especially acute in the wildland-urban interface (WUI).

Distribution

2000 – Fiberglass Xarms adopted system wide (reduces pole fires)

2003 – Dry Land Mode Protection developed

2014-2018 System Performance (outages)

873 Car Hit Poles (3%)
646 Public Fire (2%)
462 Pole Fire (1%)
2,785 Animal (9%)
1,933 Tree (6%)
8,108 Wind (26%)
3,248 Unknown (10%)
30,780 Total Contingency

Tussock Moth (attacks fir trees)

Fire ignition sources include tree contacts with powerlines but also include animal contacts, equipment failure, and electrical pole fires. Between 2014 and 2018 there were 1,933 tree related outages with 1,011 occurring during fire season. Over that time period there 462 reported pole fires (see inset). Though vegetation management spends $5-7M annually, there is a $3M work backlog and the number of danger trees continues to increase.

> *A warming climate and drought conditions have stressed trees resulting in widespread damage from insects and disease. In many cases, trees subject to insect damage die within six to eighteen months making it difficult to identify dead or dying trees with ground patrols.*

Whereas the risk profile of transmission is largely associated to the costs of fire impact to transmission lines, the risk profile of distribution is aligned with ignition. The 1991 Firestorm involved over ninety (90) ignition events. A majority of those fire starts were related to distribution lines.

Base Level Actions (distribution system)

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Comprehensive Fuse Coordination Study	41	107	1.6	8.2	$200k
Formalize event reporting	21	82	1.3	8.4	$400k
Fire ignition tracking system	132	547	46	213	$300k
Incorporate Veg Mngt in CPC designs	20	278	10	21	$100k
Fire Suppression Wetting Agent	53	582	11	66	$50k
Dry Land Mode 'effectiveness' study	21	57	.6	4.2	$50k
GIS WUI Design Layer	0	0.11	0	0.11	Complete
Dry Land Mode 'trigger'					Complete
ARCOS WF Notification					Complete
Total	**288**	**1,653**	**71**	**321**	**1.1M OpX**

1. Comprehensive Fuse Coordination – distribution faults are a known source of fire ignition. Miscoordination of fuses may transfer more energy to a fault and increase the probability of a fire start. Ensuring proper fuse sizing is an important component of the distribution protection system.

2. Formalize event reporting – protection engineering conducts analysis for all transmission breaker activity. This would extend that analysis to the distribution system and ensure that circuit breakers/reclosers are functioning properly. Again, fire ignition is directly related to line fault activity and ensuring 'as-designed' operation of equipment helps to reduce probability of fire ignition.

3. Fire Ignition Tracking System – to implement a computerized tracking system for fire ignition events.

4. Incorporate Veg. Mngt in CPC Design – trees are often overlooked during the distribution design process and subsequent unplanned treatment is often expensive and disruptive.

5. Fire Suppression Wetting Agent – additives are commercially available that extend the 'wetting' properties of water. During periods of high fire danger, crews often use water to spray down an area prior to performing work. Water additives such as Cold Fire significantly increase the effectiveness of this procedure.

6. Dry Land Mode 'effectiveness study – report by Protection Engineering on the overall effectiveness of DLM together with recommendations for future enhancements.

7. GIS WUI Design Layer- Engineering services has developed a Wildfire Urban Interface layer based on the national wildfire hazard potential (WHP – 2018). This layer will be used to identify fire risk areas and help prioritize maintenance and reconstruction efforts.

8. Dry Land Mode 'trigger' – the USFS publishes a daily 'fire threat index' ranging from low to extreme. This system is in use at Avista now determines when we reconfigure distribution circuits to operate without automatic reclosing.

9. ARCOS WF Notification – Distribution Dispatch uses a computerized notification system to call-out crew resources during outages. That system is now being used to notify key personnel, including senior management, in the event of a fire that threatens customers or infrastructure.

Primary Actions (distribution system)

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Annual Risk Tree	2,816	5,722	264	1,226	$5M
"Right Tree-Right Place"	563	1,145	2.25	28.2	$15.5M
Midline Recloser Communications	14.6	29	0.25	0.28	$600k
Additional Midline Reclosers	22.6	39	5.63	13.2	$10M
Total	**3,416**	**6,935**	**272**	**1,268**	**10.6M CapX 20.5M OpX**

1. Annual Risk Tree – to conduct annual inspections and treatment programs in WUI areas. Currently, hazard tree assessments are conducted as part of the 5-year routine maintenance program.

2. "Right Tree-Right Place" – this is an established program throughout the industry and promotes the planting of Type I trees near powerlines. Type I trees mature at heights less than 20 feet and pose no threat of fall-in or grow-in to electric lines. Avista has worked with city officials, arborists, developers, and individual landowners promoting this concept but has not conducted a wide-spread public campaign nor offered an incentive program to promote the removal of Type II/III trees. Right Tree-Right Place is a vehicle, a brand that we can broadly support and has the potential of drastically reducing the need for vegetation management maintenance in out-years.

3. Midline Recloser Communications – modern electronic circuit reclosers are capable of remote operation and monitoring via cell modem, 4-wire telephone, or fiber optic communications. Though our current standard includes communications, many existing units operate locally. Adding 'comms' is a cost effective solution to support various functions including emergency operations, system planning, and distribution system management functions such as integrated volt-var control.

4. Additional Midline Reclosers – the ability to limit fault exposure on the distribution system is a well-established risk mitigation technique. The fire ignition potential of a line fault is related to current and clearing times. By adding circuit breakers to the system, both quantities are reduced.

Secondary Actions (distribution system)

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Digital Data Collection	2,816	5,722	132	564	* $20M
100% Substation SCADA	132	547	0	1.6	$22.5M
WUI Grid Hardening	1,326	3,189	11	66	$150M
Total	**4,274**	**9,458**	**143**	**632**	**172.5M CapX 20M OpX**

1. Digital Data Collection – note that the values shown for inherent risk reflect the lack of a purely objective 'system of record' for trees near distribution lines. It is also indicates the constraints associated with public rights-of-way and the lack of property rights adjacent to most distribution lines. Although the inherent risk is likely overstated, vegetation management is the **largest risk element** associated with distribution lines. LIDAR imaging is commonly used on transmission lines and many utilities are now extending that practice to distribution circuits. Portland General is investing in distribution LIDAR as are most California Utilities including SMUD. ** The 10-year, $20M dollar cost does not include offset costs associated with fewer ground patrols and labor savings in the field.*

2. 100% Substation SCADA – Though we've slowly reduced the number on non-scada substations, there are several remaining stations without visibility. The inability to monitor or control equipment in these stations is a significant risk component. Substation scada is widely recognized as an industry best practice.

3. WUI Grid Hardening – during the workshops, several hardware components were singled out such as fiberglass x-arms, hot tap connections, steel poles, and obsolete copper wire. Rather than list them individually, the group consensus is to modify the **GridMod program to fire harden system in WUI areas**. For example, portions of the Colville 12F4 circuit route through WUI zones. Design scope in that area would include elements to mitigate fire ignition.

Future Actions

	Inherent Risk ($M)		Managed Risk ($M)		Implement
Description	**Low**	**High**	**Low**	**High**	**10-year**
Overhead Conversion to Underground	2,816	5,723	113	195	$500M
Develop Crew "Standby" System	332	797	66	282	$15M
Fiberglass pole top pin	11	26	.5	2.6	$65M
Video Surveillance in WUI	1.0	1.0	0.2	2.5	$1.35M
Arc Sensing Protective Relays	23	39	1.1	6.6	$6.5M
Scarify Poles Bases in WUI Zones	8.3	132	1.1	6.6	$14M
S&C Intellirupter	23	39	1.3	6.6	$13M
Create Internal Fire Work Restrictions	1.0	5.0	0	0.5	$750K
Non Expulsive Fuses	0.5	2.6	0.2	0.8	$10M
Full Length Treated Poles	41	164	16	82	$5M
Inset Poles Reduce Span Lengths	16	63	0.6	2.6	$250M
Insulated Primary Tree Wire	11.3	21	0.5	2.1	$30M
Avian Covers in WUI	0.3	2.7	0.13	0.17	$72M
50-CL1 Poles in WUI	3.3	16	2.3	11.3	$36M
Aerial Cable in WUI	11.3	26	0.1	1.1	$300M
Amend Forest Practice to remove powerline adjacent trees	132	613	41	164	$50k
FR 3 Oil Transformers	0.1	1	0.1	0.5	$50M
Total	**3,431**	**7,671**	**244**	**767**	**$1,369M**

1. Overhead to Underground Conversion –the systematic conversion of overhead facilities to underground. Virtually all new distribution construction is underground and GridMod is converting circuit segments when feasible and cost effective.
2. Develop Crew Standby – Avista's after-hours crew call-out is strictly voluntary. By paying for crew stand-by time, personnel would be pre-selected for call-out and reduce overall response during contingency events.
3. Fiberglass pole top pin – not included in the WUI GridMod proposal, current pole top pin assemblies are made from steel and are a possible source of fire ignitions. However, analysis of distribution pole fires indicates that the wood x-arm contact is the primary ignition point for most pole fires.
4. Video Surveillance – many California utilities are using video surveillance to detect fire starts but we believe the risk value proposition is low.
5. Arc Sensing relays – though pilot work is currently underway to develop the next generation of distribution relays, this technology is in its infancy.
6. Scarify pole bases - this is a common practice in dry scrubland environments (sage brush) but a majority of Avista's rural distribution lines route through forested and agricultural areas.

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7. S&C Intellirupter – an alternative device to a conventional circuit breaker. Adding conventional midline breakers is a recommended action.
8. Create internal fire restrictions – to mirror work restrictions issued by forest land managers. Deemed as low value by workshop attendees.
9. Non-expulsive fuses – though conventional fuse action does represent an ignition source, observational feedback does not support replacing them at this time.
10. Full length treated poles – treated poles offer some fire resistant characteristics but are not supported by engineering, supply chain, or field operations.
11. Inset poles – reducing span lengths increases overall circuit strength and minimize wire-wire contacts due to wind and storm events.
12. Insulated primary tree wire – focus will be on improved vegetation management.
13. Avian covers – extending avian covers in WUI would reduce ignition by animal contacts.
14. 50 Cl-1 poles – increases ground clearance
15. Aerial cable in WUI – Insulted OH cable provides significant insulation but is very expensive and presents hazards if supporting structures fail.
16. Amend Forest Practices… - when commercial timber harvest is conducted near powerlines, trees near electric facilities are often left. These become risk/danger trees to the facilities. Requiring that these trees be removed helps to minimize fall-in issues.
17. FR 3 Transformers – FR 3 oil does not support combustion but transformer tanks rarely fail during an electrical fault.

Addendum

Q & A:

Q: Why isn't Public Safety Power Shutoff listed?

A: Pre-emptive power shutoff (PSPS) is a system in-use in California (SDGE, SCE, PG&E, PAC, and others) and while it was discussed during the SME Workshops, it requires systems and processes not yet available at Avista. However, the concept will be addressed in the April 2020, Avista ***Wildfire Resiliency Plan*** and this plan does include recommendations that would support a future deployment of PSPS.

Q: Why is 100% Substation SCADA identified as a fire risk?

A: Supervisory control systems are common throughout substation and power generating facilities and allow for equipment monitoring, unit dispatch, and operational control over equipment including power circuit breakers, voltage regulators, power transformers, and generating equipment. The inability to de-energize a transmission or distribution circuit is a general safety risk and may prevent Avista system operations to de-energize circuits.

Core Logic Study

Return Period (Years)	Non-Exceedance Probability (%)	Damage ($)
500	99.8	68,727,712
250	99.6	47,317,308
100	99	23,969,406
50	98	12,137,863
25	96	5,360,076

In 2018, Avista hired the Core Logic Company to study the financial impacts of a large scale, utility-caused wildfire event. They estimate the property loss of a 100 year event at $24 million dollars and a 500 year event at $69 million. These values pale in comparison to the $30 billion dollar damage estimate associated with the 2018 'Camp Fire' in Paradise, CA. However, it should be noted that the Core Logic study **did not** consider loss of **human lives nor other indirect costs such as human displacement, economic disruption, or fire suppression**. The societal costs associated with catastrophic wildfire is difficult to forecast and subject to a number of factors.

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SME Wildfire Risk Workshops

In the Wildfire Resiliency Plan Charter, March 2019, it was noted that recommended actions would be based on risk-reduction whether directly financial, safety related, or related to customer impacts. A series of workshops were held to identify opportunities to reduce risk on the overhead transmission and distribution systems. The primary goal of the workshops were to:

1) Identify actions to reduce the probability of electric ignition
2) Quantify the consequence or impact of potential actions

The workshops were divided into three sub-sections:

1) Design based (material and construction standards)
2) Operations (control center and field operations)
3) Maintenance (programmatic asset maintenance and vegetation management)

During the course of the six (6) workshops, over one hundred and sixty (160) actions were identified. The Business Process Improvement (BPI) department assisted with the workshops and assisted with the exercises. An 'affinity exercise' was used to identify actions. During the affinity exercise, individuals are asked to use post-it notes to note individual actions such as (examples):

a) Widen transmission rights-of-ways
b) Use steel poles on distribution lines
c) Develop a non-reclosing program (DLM) for transmission
d) Employ a dedicated firefighting crew at Avista
e) Convert overhead distribution lines to underground facilities
f) Develop a fire-weather forecast and monitoring system

In many cases, workshop attendees had similar items and were asked to group and agree on a central idea. This provided an opportunity to discuss and clarify the proposed actions.

The group then identified the effort and benefit associated with each idea. Effort is associated with financial commitment, complexity, sustainability, and manpower requirements. Benefit was based on the relative risk reduction to reduce the likelihood and or impact associated with wildfire. Items with high benefit, low effort were noted as the most likely to produce cost effective results while low benefit, high effort items were discarded. Items deemed as cost effective and prudent, moved on to the risk evaluation exercise.

The risk evaluation was modeled after the Asset Management Risk Matrix and the Enterprise Risk Registry. In this treatment, a before and after probability was assigned along with the impacts:

a) Financial (e.g. direct impact to infrastructure, 1st party claims, fire suppression)
b) Customer (the disruption to customers as monetized by multiplying customer*hours by the interruption cost estimate (ICE, Avista $63/customer*hour) and 3rd party claims)
c) Safety (the potential for injury to both Avista employees, 1st responders, and the public)

For example, conversion to underground significantly reduces the probability of electric ignition with the before or 'inherent' risk associated directly to overhead distribution lines. Outage statistics indicate that Avista's distribution system is involved with approximately one-hundred fire ignition events per year. Subsequent impact is related to fuel loading and weather conditions. However, conversion of circuits in the wildland urban interface (WUI) virtually eliminates tree to wire contacts which is the majority of fire ignition events related to powerlines.

During the workshop, the inherent risk associated with "OH/UG Conversion" was 78 or 90 possible points and though the risk was reduced by 38 points, the costs of conversion was estimated at $500 million dollars over a 10-year period.

A subsequent 'scoring' exercise was conducted by indentifying items associated with:

1. Highest Inherent Risk --- items with significant risk should be considered for treatment
2. Highest Risk Reduction – opportunities that significantly reduce risk should be promoted
3. Lowest Overall Cost – low cost items should be considered before high cost alternatives

Scoring was based on the delineation of:

Gold – Best value (2 points)
Silver – Good value (1 point)
Bronze – Moderate value (0.5 points)

Scores were assigned based on the outcome of the "BPI" lead workshops. In addition, the Wildfire Steering Group were asked to identify their top three (gold, silver, bronze) opportunities for electric distribution. A subsequent employee workshop involving T&D subject matter experts was convened to gather feedback on opportunities. Again, a review exercise was conducted to ensure that recommended actions were supported by the broader engineering, operations, and maintenance communities. Indeed, this report is a summarized version of those outcomes with Low & No Cost items listed together with Recommended Actions (Should Do), while those identified as Advised or Deferred did not receive consensus support or are cost prohibitive.

The Legacy of Firestorm

The October 16, 1991 Firestorm is firmly etched into the minds of local residents and WWP employees. Though October is not generally considered 'high fire season', drought conditions prevailed and 60 mph winds caused trees to fall through powerlines. The majority of October-1991 fire ignitions were related to trees contacting powerlines.

Between 1970 and 1990, population growth in Spokane grew by 25% to 360,000 and during that time frame, homes were built in unincorporated areas 11 times faster than in cities for a total of 24,000 new homes in the wildland urban interface.

Firestorm Facts

- 114 homes destroyed
- 60 mph wind
- 42 days without rain
- 35,000 acres burned
- 90 fires
- 3,000 calls to 911, 24 hours
- 2 fatalities
- WWP Call Center – 11,000 calls in 2 hours
- WWP pays over $10 million in fire suppression costs, $50 million in infrastructure costs

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Avista has a long history of responding to fire events such as the 2005-06 fires that burned significant portions of the Benton-Othello line, the 2015 Carpenter Road Fire (Colville), and the 2019 fire that impacted seventeen (17) miles of the Walla Walla-Wanapum 230 kV line. Nearly every year there is a fire that impacts the Lolo-Oxbow 230 line. The 'Oxbow' line is Avista's interconnection with Idaho Power and is an important asset connecting north and south Idaho. The line routes through extremely rugged terrain in the Salmon and Snake River country. Many structures are accessed via jet boat while others require road building and hours of slow travel to reach. The impact of wildfire is an ever-present risk to Avista infrastructure, our employees, and customers.

However, fire is unlike other storms that disrupt power and utility experts recognize that service restoration must be in coordination with fire protection activities and in many instances, be postponed until it is safe to enter an area. One of the recommended actions is to delineate fire in Avista's Emergency Operations Procedure to ensure close coordination with fire incident command and to promote the safety of employees and 1st responders above service restoration.

Wildfire Resiliency Plan

Avista Utilities
Wildfire Resiliency Cost Forecast
January 2020

January 2020

David James, Avista Wildfire Plan Mgr.

Exhibit No. 12
Case Nos. AVU-E-21-01 & AVU-G-21-01
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This report details the 10-year cost forecast associated with Avista's 2020 Wildfire Resiliency Plan and is consistent with a risk analysis report published in September 2019: "**Wildfire Risk Analysis Summary**, ***Proposed Actions*, September 2019**". This report will focus on forecasted capital investments and operating expenses based on the recommendations from the Risk Analysis Summary. This report reflects a refinement in scope versus that of the Risk Analysis Summary and includes preliminary cost estimates. Several estimates are based on results of Avista's Subject-Matter-Expert Fire Workshops (June 2019), while others reflect parametric estimates based on subsequent efforts to develop the Wildland Urban Interface (WUI) map. Feasibility estimates generally reflect accuracy levels between 30 and 50%. Definitive cost estimates require final engineering design and contractual commitments for materials and labor.

PLAN LEVEL FORECAST

Consistent with the Risk Analysis Summary, this report is based on a 10-year planning horizon from 2020 to 2029, with activities grouped into four main categories:

1. **Enhanced Vegetation Management** – This includes actions in excess of Avista's current Vegetation Management program and reflects a focus on reducing fire ignition events. Plan elements include collecting vegetation data via digital hi-resolution photography and Light Imaging, Detection, and Ranging (LIDAR), increasing the frequency of the Risk Tree treatments in fire prone areas, and conducting a public outreach campaign associated with 'right tree-right place' concepts.

2. **Situational Awareness** – This category includes extending Supervisory Control and Data Acquisition (SCADA) systems to a portion of Avista's thirty-three non-communication substations (dark stations). Using SCADA to monitor and control powerlines is a fundamental tenant of utility wildfire plans across the western U.S. and Canada. Avista also plans to develop a web-based 'fire-weather dashboard'; combining publicly available weather and fire threat information to inform operational readiness and enable enhancements to the Dry Land Mode (DLM) distribution protection scheme.

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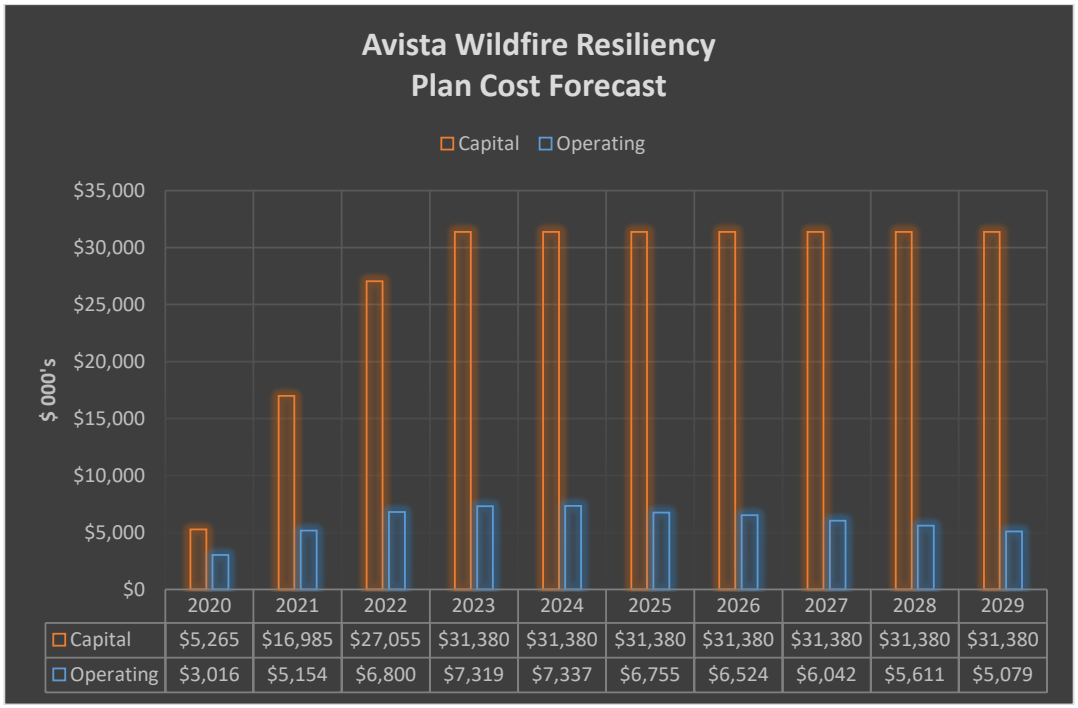
3. **Operations "Toolkit" & Metrics** – Avista has a number of existing work processes and programs aimed at reducing the impact of wildfire. Enhancements to existing programs and the addition of other 'operating' elements are included in this group.

4. **Grid Hardening & Dry Land Mode** – Avista developed a non-reclosing distribution protection scheme back in the early 2000's to mitigate fire ignitions. The protection scheme known internally as Dry Land Mode (DLM) will be updated to ensure alignment with program objectives. Additionally, infrastructure replacements or *grid hardening* will be implemented to reduce fire ignitions.

The total cost forecast of these efforts is depicted in the following graphs. The 10-year **capital cost forecast is $268,965,000** with a corollary **operating expense cost of $59,636,000**[1]. *By far, the largest capital investment is associated with electric distribution grid hardening ($193,200,000).*



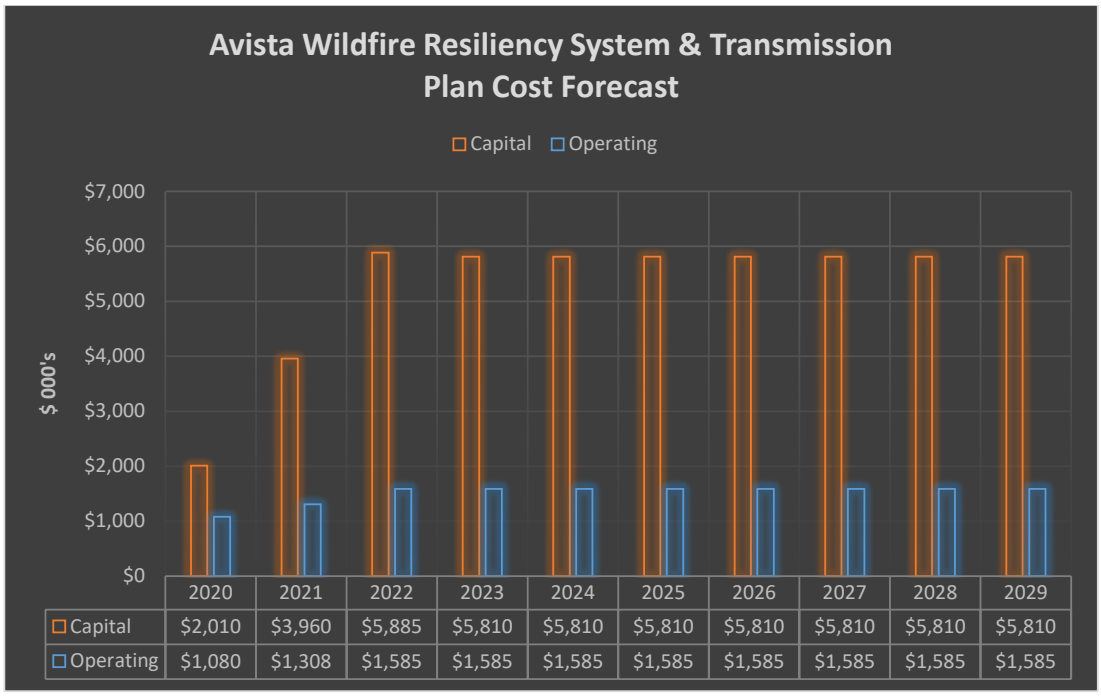
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	$5,265	$16,985	$27,055	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380
Operating	$3,016	$5,154	$6,800	$7,319	$7,337	$6,755	$6,524	$6,042	$5,611	$5,079

Significant operating expenses include enhancements to Avista's vegetation management program including annual risk tree removals in fire prone areas. These additional measures account for $48,600,000 of the 10-year operating expense forecast.

[1] All operating expenses provided in this report reflect incremental amounts above existing expense levels and are specific to the wildfire resiliency plan.

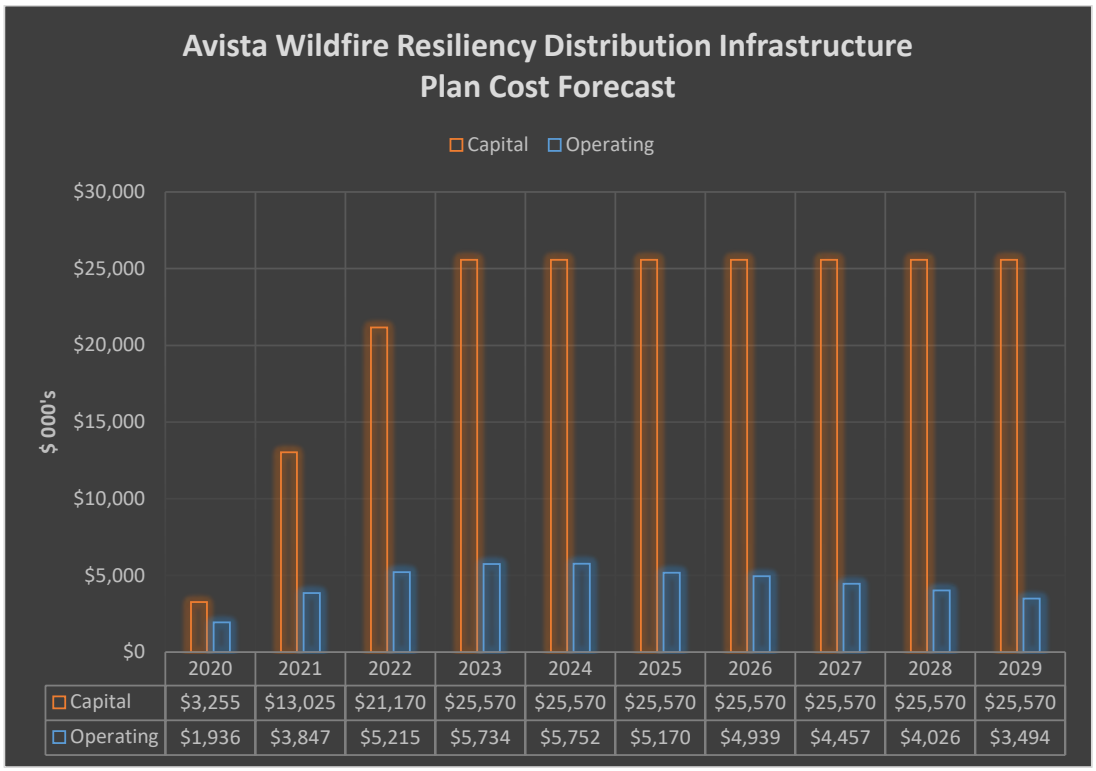
The following graphs reflect the 10-year cost forecasts of system and transmission level programs and those associated solely with electric distribution. System-wide elements include: personnel training, revisions to work processes, metrics tracking along with fire-protective pole wraps and widening transmission rights-of-way. As noted, the single largest investment element is the grid hardening of the electric distribution system.

Electric system outage history (2013-2018) indicates a **50:1 ratio** between **sustained distribution and transmission system outages**. Of particular note are the pole fires associated with the distribution system. From 2013 to 2018, there were over 90 pole fires on an annual basis. These fires generally follow periods of hot dry weather combined with a light rain which increases leakage current across insulators and wood cross-arms. Excessive leakage current produces pole fires. Also, the rate of vegetation contacts is higher on the distribution system yielding a **distribution to transmission vegetation contact ratio of 100:1**. Since the bulk of potential fire ignitions occur on distribution circuits, efforts to reduce vegetation contacts and equipment failures are aligned with those assets.



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	$2,010	$3,960	$5,885	$5,810	$5,810	$5,810	$5,810	$5,810	$5,810	$5,810
Operating	$1,080	$1,308	$1,585	$1,585	$1,585	$1,585	$1,585	$1,585	$1,585	$1,585

The 10-year cost forecast for capital investments and support systems on the transmission grid total $52,525,000 with an operating expense of $15,068,000.



As noted, the largest capital spend program is the effort to 'harden' the distribution grid by replacing wood cross-arms, removing small copper wire, replacing obsolete insulators, and installing wildlife guards. Operating expenses reflect efforts to enhance vegetation management including conducting public outreach to replace tall growing trees such as maples and pines with lower growing species like plums and dogwoods. The accumulated 10-year cost forecast for distribution system capital is $216,400,000 with an operating expense of $44,569,000.

2020-2029 Avista Wildfire Resiliency Plan Cost Forecast

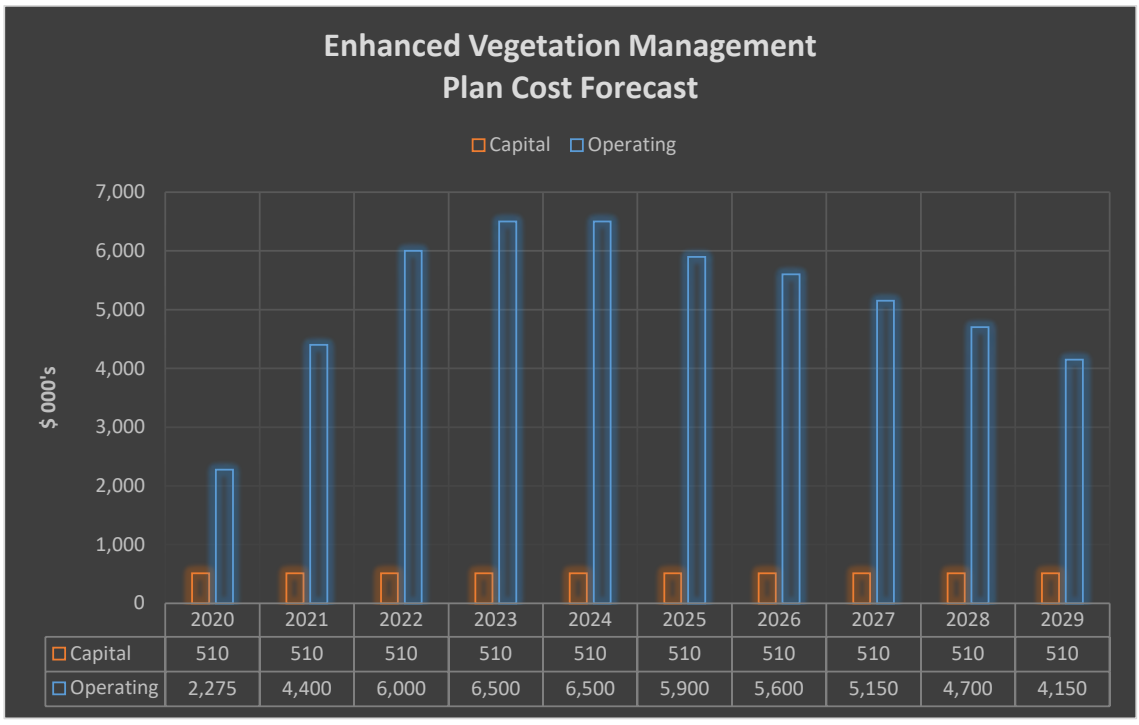
2020-2029	Capital Investment	Operating Expense
System & Transmission	$52,525,000	$15,068,000
Electric Distribution	$216,400,000	$44,569,000
Plan Total	$268,965,000	$59,636,000

1.0 ENHANCED VEGETATION MANAGEMENT

The single largest contributor to possible fire ignition events on Avista's T&D system is electrical contact between energized powerlines and vegetation. Between 2013 and 2018, there were nearly 2,000 vegetation contacts to the electric distribution system. Though many of these contacts occur during winter storm events, nearly 40% of contacts occur during the summer months. Adapting and innovating Avista's vegetation management system is a primary objective of the Wildfire Resiliency Plan. One element of the plan is to collect digital data for 100% of Avista's transmission system (2,270 miles) and approximately 40% of the distribution system (3,040 miles).

Information in this section reflects findings from the "Wildfire Risk Analysis Summary, September 2019". Individual plan elements are coded with an alphanumeric such as ST-2 or D-3. "ST" indicates System & Transmission and reflects elements such as the fire-weather dashboard and others specific to the transmission grid like protective FR mesh wraps for wood poles. "D" indicates elements specific to the electric distribution system such as midline recloser communications (D-12) where communication systems will be added to circuit reclosers.

The 10-year cost forecast for enhanced vegetation includes a capital investment of $5,100,000 and operating expenses of $51,175,000. This is the largest operating expense category.



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	510	510	510	510	510	510	510	510	510	510
Operating	2,275	4,400	6,000	6,500	6,500	5,900	5,600	5,150	4,700	4,150

	Enhanced Vegetation Management	Capital 10-yr	Operating 10-yr
ST-5	Transmission Digital Data Collection	0	6,825
ST-7	Fuel Reduction Partners (DNR, IDL, USFS)	0	1,500
ST-9	Widen Transmission Rights-of-Way	5,000	0
D-4	Vegetation Management included in distribution designs	100	0
D-10	Distribution Annual Risk Tree in WUI areas	0	25,500
D-11	Public Outreach 'Right Tree-Right Place'	0	9,600
D-14	Distribution Digital Data Collection	0	7,750
	Vegetation Total	**$5,100**	**$51,175**

$ shown in 000's

Enhanced Vegetation Management Plan Elements

ST-5 & D-14 Digital Data Collection – This includes aerial surveys and post flight processing of high resolution photography and laser imaging (LIDAR) to identify structure integrity issues (i.e. broken cross-arms, hot splices, code clearance violations, and unauthorized attachments) and vegetation encroachments including conductor clearance to the vegetation undergrowth and identification of risk/danger trees.

ST-7 Fuel Reduction Partners – Avista plans to partner with County Fire Districts and State agencies including the Department of Natural Resources (WA) and Idaho Department of Lands to reduce fuel loading near critical infrastructure sites such as major substations and transmission corridors.

ST-9 Transmission Rights-of-Way – Many of Avista's transmission easements do not specify width nor do they provide clear language to remove danger trees. Modernizing these transmission rights-of-way is a significant effort to reduce the risk of vegetation contact.

D-4 Vegetation Management embedded in design – This acknowledges the need to include vegetation clearing associated with both greenfield new construction and brownfield reconstruction efforts.

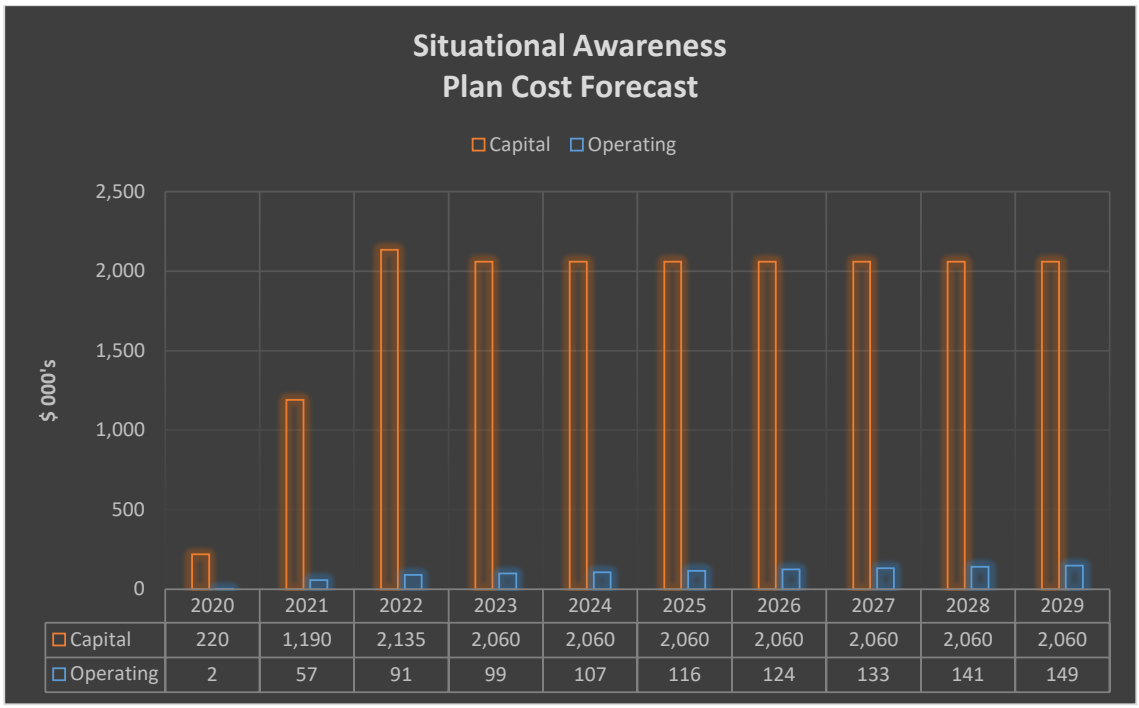
D-10 Annual Risk Tree – To conduct annual assessments and removal of risk trees associated with overhead distribution circuits.

D-11 Public Outreach "Right Tree-Right Place" – For many years Avista has encouraged property owners to plant low growing trees near powerlines. This effort would pair a public media campaign with field efforts to remove and replace trees.

2.0 SITUATIONAL AWARENESS

The ability to monitor and control transmission and distribution systems is a fundamental tenant to effective risk mitigation. Avista operates 165 substations. Thirty-three of those substations are not connected to transmission SCADA or the distribution management system (DMS). Adding SCADA and/or DMS capability aligns with the Dry Land Mode protection scheme and allows system operators to remotely configure substation reclosers. In addition, Avista plans to develop a fire-weather heads-up display that combines current weather forecasts with fire threat indices.

The 10-year cost forecast for situational awareness includes a capital investment of $17,965,000 and operating expenses of $1,019,000.



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	220	1,190	2,135	2,060	2,060	2,060	2,060	2,060	2,060	2,060
Operating	2	57	91	99	107	116	124	133	141	149

	Situational Awareness	Capital 10-yr	Operating 10-yr
ST-2	Fire-Weather Dashboard	425	650
D-12	Midline Recloser Communications	540	272
D-15	100% Substation SCADA	17,000	97
		17,965	**1,019**

$ shown in 000's

Situational Awareness Plan Elements

ST-2 Fire-Weather Dashboard – Develop a web-based display combining near term weather forecasts with prevailing fire threat conditions. This dashboard will be used to inform operational posture and manage the Dry Land Mode program.

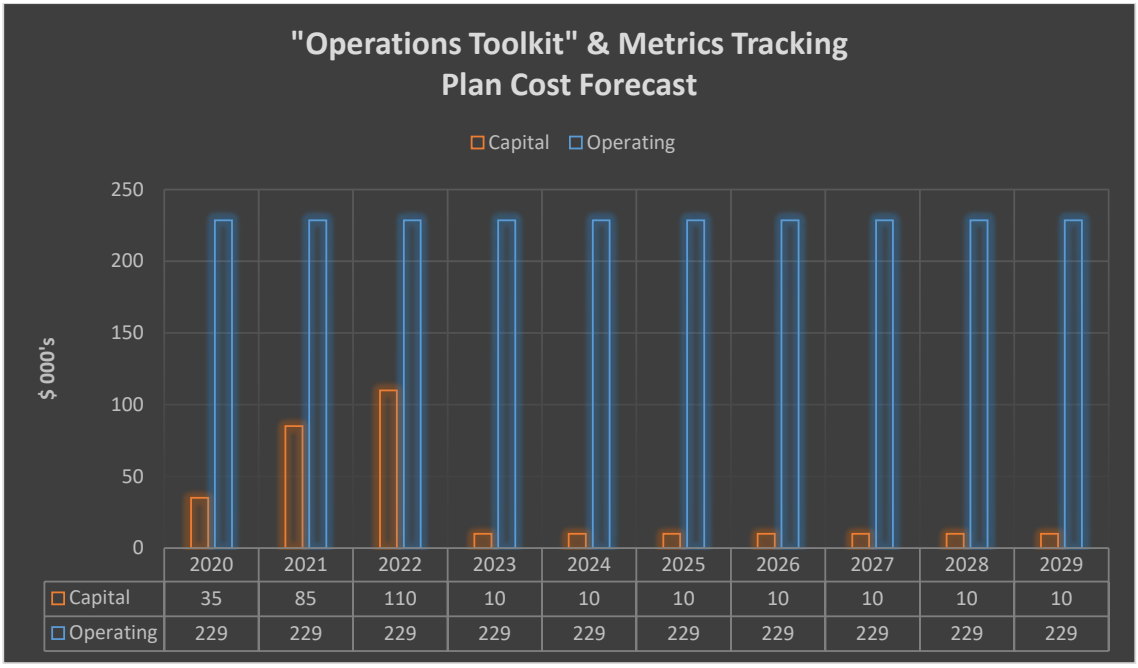
D-12 Midline Recloser Communications – Retrofit modern distribution midline reclosers with cellular modems to enable remote operation, configuration, and monitoring of distribution circuits in WUI Risk Tiers 2 and 3.

D-15 100% Substation SCADA – Add substation communication systems to non-com stations located in or near WUI Tier 2 and 3 areas.

3.0 "OPERATIONS TOOLKIT" & METRICS TRACKING

During the Wildfire Risk Workshops conducted in June of 2019, a number of opportunities were identified to elevate the Avista's operational readiness during fire season. Avista has a long history of working within highly regulated compliance environments such as the Federal Department of Transportation for natural gas operations, the Federal Energy Regulatory Commission for the transmission system, and Environmental Protection Agency's clean air and water requirements to name a few. The Wildfire Plan elements will also be held to compliance level oversight.

The 10-year cost forecast for the operations toolkit includes a capital investment of $300,000 and operating expenses of $2,285,000.



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	35	85	110	10	10	10	10	10	10	10
Operating	229	229	229	229	229	229	229	229	229	229

	"Operations Toolkit" & Metrics Tracking	Capital 10-yr	Operating 10-yr
ST-1	EOP & Fire ICS Representative	0	50
ST-3	Engineering Review Major Events	100	0
ST-4	Wildfire Compliance Tracking	0	150
ST-8	Emergency Responder Training	0	1,300
D-1	Fuse Coordination Study	0	200
D-2	Recloser Event Reporting	0	400
D-3	Fire Ignition Tracking System	200	100
D-5	Fire Suppression 'wetting' agent	0	50
D-7	WUI layer in GIS	0	30
D-9	Arcos Wildfire Notification	0	5
	Ops Toolkit & Metrics Total	**300**	**2,285**

$ shown in 000's

"Operations Toolkit" & Metrics Tracking Plan Elements

ST-1 EOP & Fire ICS Representative – Aligns Avista's Emergency Operating Plan (EOP) with the Wildfire Resiliency Plan to account for the labor costs of embedding Avista personnel in 100% of all County, State, and Federal Incident Command Structures (ICS).

ST-3 Engineering Review Major Events – Require a 24-48 hour stand-down period following major transmission events to allow for an engineered reconstruction plan.

ST-4 Wildfire Compliance Tracking – System level metric tracking of the Plan elements.

ST-8 Emergency Responder Training – Provide annual fire safety training for electric operating personnel as well as electric hazard safety training delivered to fire protection personnel.

D-1 Fuse Coordination Study – This is an annual effort to ensure proper coordination of distribution system fuses.

D-2 Recloser Event Reporting – To conduct engineering review of recloser events in WUI areas.

D-3 Fire Ignition Tracking System – Adapting Avista's Outage Management System (OMS) to capture fire ignition outcomes.

D-5 Fire Suppression 'wetting' agent – Use of chemical additives such as 'cold fire' to maintain the 'wetting' action of water.

D-7 WUI Layer in GIS – Annual maintenance of Avista's Wildland Urban Interface system.

D-9 Arcos Wildfire Notification – Provide annual dispatcher training on the use and implementation of the Arcos call-out system to provide real time fire updates to key personnel; including executive management.

4.0 GRID HARDENING AND "NEXT GEN" DRY LAND MODE

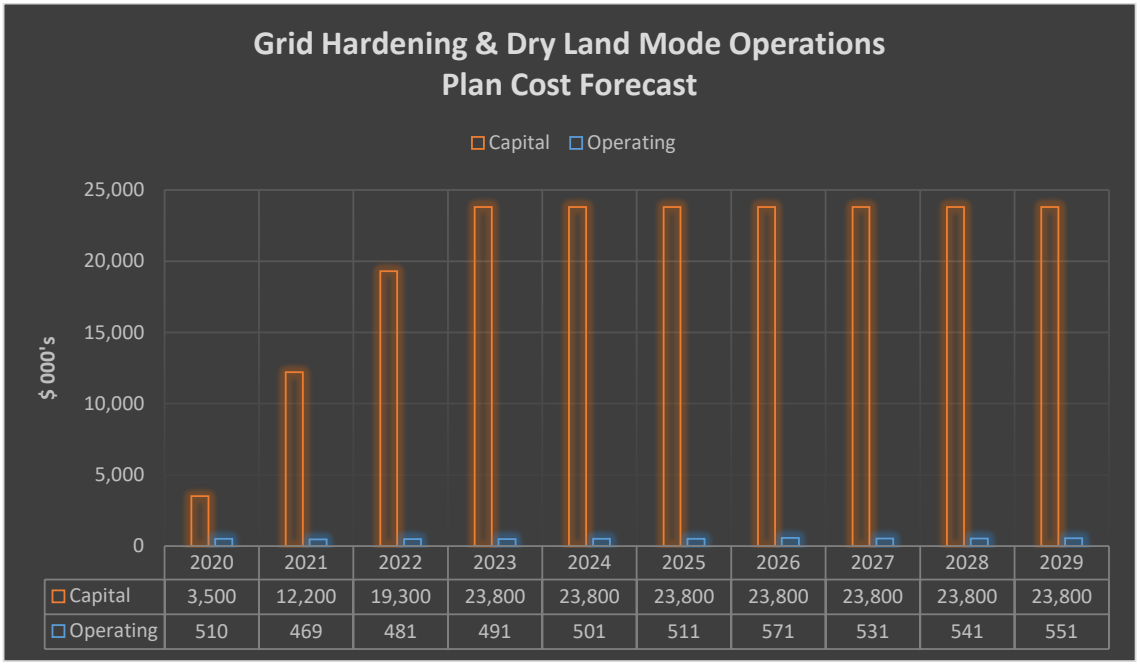
Since the early 2000's, Avista has adapted the protection of distribution circuits in fire prone areas. Internally, this program to disable both instantaneous tripping and automatic reclosing is known as "Dry Land Mode". Avista will conduct a holistic review of this program and will recommend program changes including adding midline reclosers.

In order to reduce ignition events and to effectively 'harden' the system against the impacts of fire, a number of programmatic measures are recommended to replace wood structures, remove small copper wire, add wildlife guards, and to protect wood poles with fire-retardant (FR) mesh wrap. This is by far the largest capital investment of the plan and represents alignment with other regional utilities including Northwestern, Idaho Power, Chelan PUD, Portland General Electric, and PacifiCorp.

The 10-year cost forecast for grid hardening and dry land mode includes a capital investment of $245,600 and operating expenses of $5,157,000.

Efforts to Harden the distribution grid include the replacements of wood with steel poles. "High-Value Poles" in fire prone areas will be systematically replaced with steel to mitigate damage and outages during wildfire events.

Distribution midline reclosers will play an important role in Avista Next Generation Dry Land Mode program. The ability to quickly detect and de-energize circuits is paramount to reducing fire ignition events.



	Grid Hardening & DLM	Capital 10-yr	Operating 10-yr
ST-6	Wood Pole Fire Retardant Mesh Wrap	0	2,500
ST-10	Structure Integrity Line Patrols	3,000	0
ST-11	Expedited Fire Response	0	93
ST-12	Additional Transmission Patrols in WUI	0	2,000
ST-13	Transmission Grid Hardening	44,000	
D-6	Dry Land Mode 'Effectiveness' Study	0	100
D-8	Dry Land Mode 'Trigger'	0	20
D-13	Additional Midline Reclosers	5,400	444
D-16	WA Grid Hardening in WUI Tiers 2-3	120,000	0
D-17	ID Grid Hardening in WUI Tiers 2-3	73,200	0
	Grid Hardening & DLM Total	**245,600**	**5,157**

$ shown in 000's

Grid Hardening and Dry Land Mode Plan Elements

ST-6 Wood Pole Fire Retardant Mesh Wrap – This is a program to add fire retardant mesh wraps on transmission poles subject to ground level fires (e.g. channeled scablands, agricultural areas, and dry grasslands.) *Avista is currently using fire retardant pole paint and is considering moving to a more permanent mesh wrap*.

ST-10 Structure Integrity Line Patrols – Provides additional funds for capital follow-up work to ensure that defects likely to produce ignition are treated prior to fire season.

ST-11 Expedited Fire Response – This is an agreement with fire protection agencies to patrol transmission fault events during fire season.

ST-12 Additional Patrols in WUI – An annual line inspection patrol specific to fire ignition and fire impact hazards.

ST-13 Transmission Grid Hardening – To convert existing transmission wood to steel Structures in WUI Tiers 2 & 3.

D-6 Dry Land Mode 'Effectiveness Study' – Review Avista's summer operating mode including electric circuits in WUI Tier 2 & 3 areas.

D-8 Dry Land Mode 'Trigger' – Monitor US Forest Service Fire Threat Index to implement DLM. This is a GIS based system.

D-13 Additional Midline Reclosers – Enhance DLM to require the installation of several circuit reclosers and communications systems.

D-16 WA Grid Hardening in WUI Tier 2-3 – The Washington component of distribution grid hardening includes replacing wood cross-arms with fiberglass, replacing small copper conductor, installing select steel poles, and adding wildlife guards to fuses, arrestors, and transformer bushings.

D-17 ID Grid Hardening in WUI Tier 2-3 – The Idaho component of the above element.

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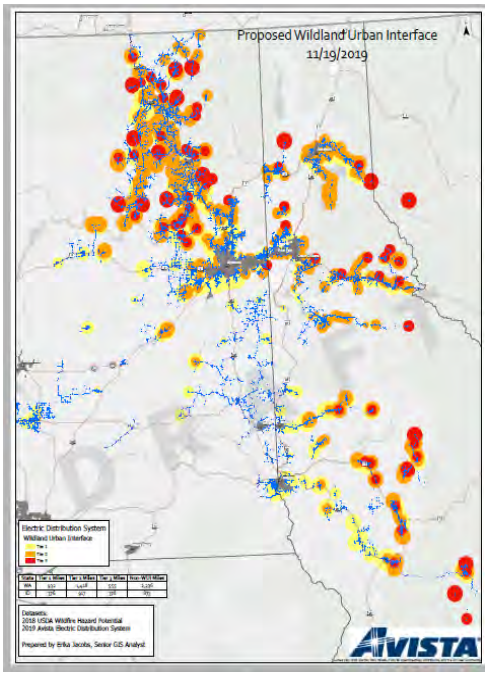
ADDENDUM

Wildland Urban Interface

Assessing the risk of wildfire and aligning treatments to reduce that risk is the objective of Avista's Wildfire Resiliency Plan. The concept of Wildfire Urban Interface (WUI) has emerged as a widely adopted method for quantifying that risk. At Avista, we recognize that our T&D facilities are both vulnerable to the impact of fire (consequence of fire) and are a potential source of fire ignition (probability of fire). Avista's Plan is squarely focused on reducing both fire consequence and probability. Jake Jacobs, GIS Specialist, has developed a WUI map based on Avista's electric distribution system, housing density, and Wildfire Hazard Potential data as provided by the U.S. Department of Agriculture. As referenced in "Wildfire Risk Analysis Summary, September 2019" and in this report, the WUI risk map allows Avista to target treatments to reduce fire risk to our customers, the communities that we serve, and to safeguard our employees. The importance of aligning actions with risk cannot be overstated.

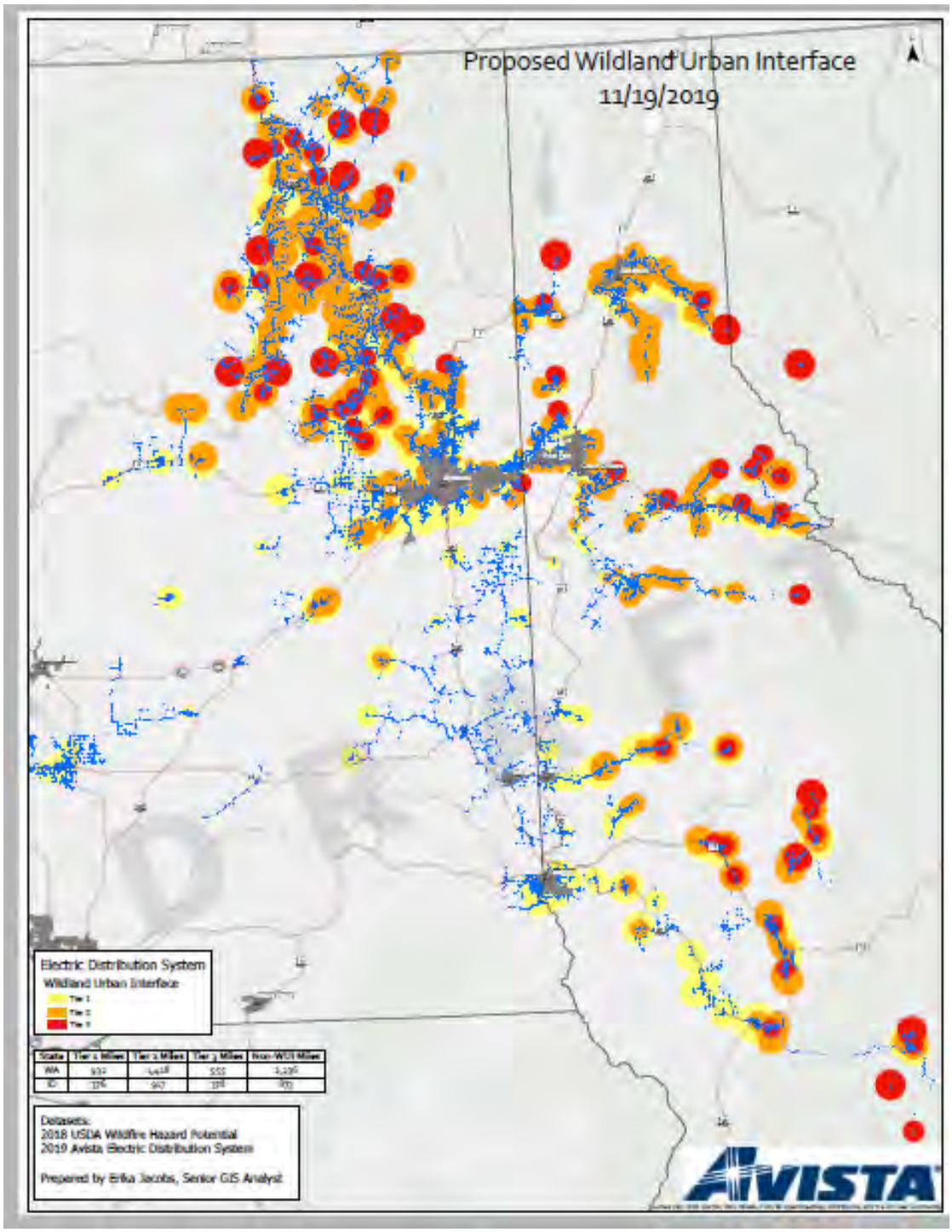


A larger version of the WUI map is reprinted on the following page. The WUI is divided into three tier levels:

Tier 1 (Low) – *Yellow Highlight* – Geographic areas with <10% of Wildfire Hazard Potential (WHP) rated at moderate fuel levels or higher.
Tier 2 (Elevated) – *Orange Highlight* – Geographic areas with 10-50% of WHP rated at moderate fuels levels or higher.
Tier 3 (High) - *Red Highlight* – Geographic areas with 50-100% of WHP rated at moderate fuel levels or higher.

Areas not highlighted fall below the criteria for WUI either because they are heavily populated (cities) and have well developed fire defense mechanisms or they are so sparsely populated that the consequence of fire is low. Do not confuse the WUI map with fire probability. Most national forest lands fall outside of the WUI because human development is low or non-existent. The WUI map indicates where human development is most at-risk from the impact of wildfire.

Note that most of Avista's vegetation and system hardening efforts will be targeted in the WUI Tier 2 and 3 areas.

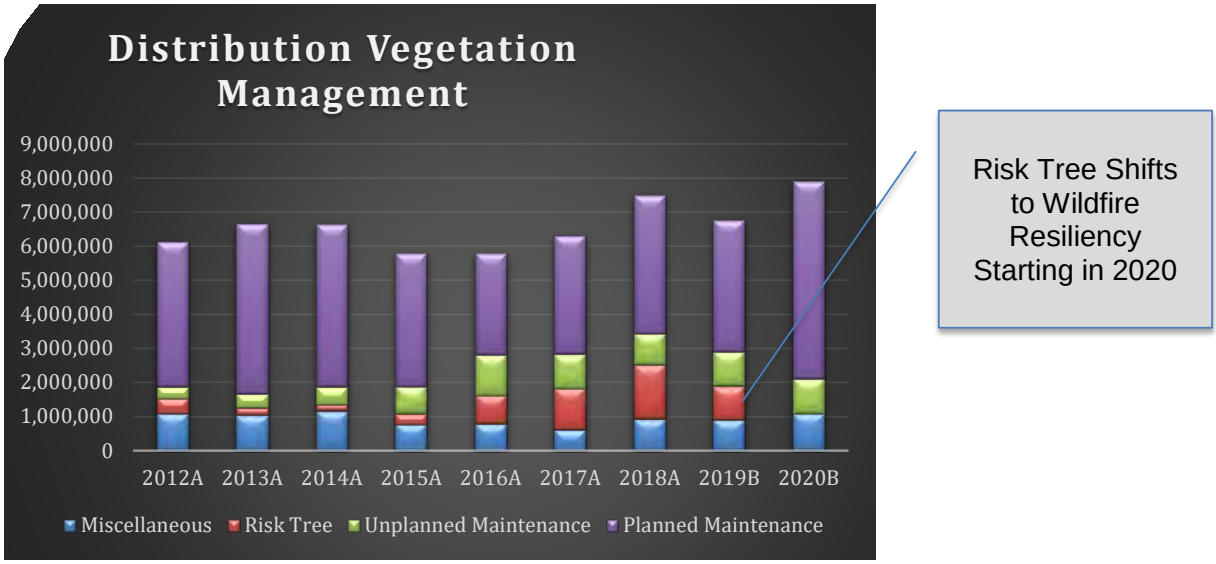

Proposed Wildland Urban Interface
11/19/2019
Electric Distribution System
Wildland Urban Interface
Tier 1
Tier 2
Tier 3
Datasets:
2018 USDA Wildfire Hazard Potential
2019 Avista Electric Distribution System
Prepared by Erika Jacobs, Senior GIS Analyst
AVISTA

Enhanced Vegetation Management

Historically, utility vegetation management systems were focused at maintaining reliability service levels. However, over the past decade, utility trends are shifting towards a more risk-based approach with fire risk mitigation as a primary factor.

The following chart and table indicates actual spend in Avista's distribution vegetation program. The program has three main elements:

1. Planned Maintenance – to systematically trim and remove vegetation growing underneath or directly adjacent to primary distribution circuits (13.2-34.5 kV). This program covered approximately 20% of the system per year resulting in a 5-year rotation cycle.
2. Unplanned Maintenance – Avista responds to customer requests for tree trimming including 'internal' customers. The upward trend of unplanned work presents a significant resource challenge and oftentimes erodes planned maintenance.
3. Risk Tree – in addition to proximity trimming, dead and dying trees within the strike distance of the line are slated for removal. This oftentimes requires property owner consent as most of these trees are located outside of established easement areas.

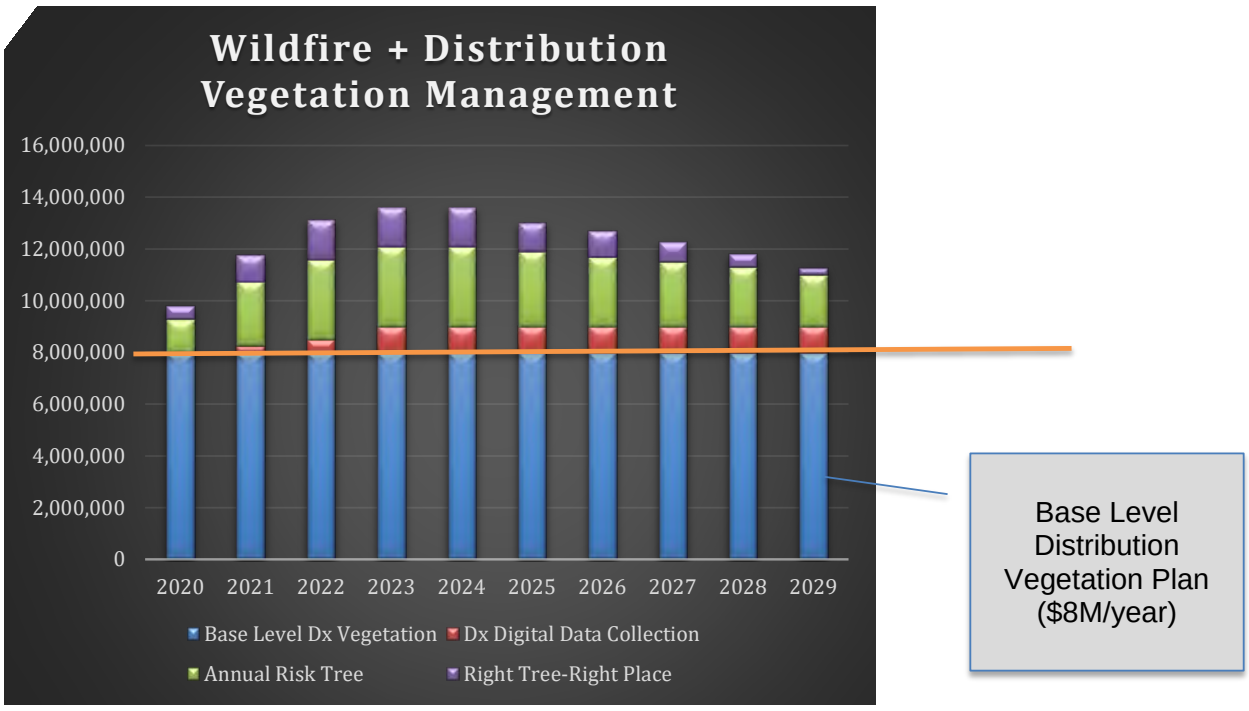


2012-2018 – actual program spend indicated
2019-2020 – budget forecast amounts

Adding wildfire risk mitigation to the base vegetation program results in three actions:

1. Digital Data Collection – The industry is trending away from cadence based programs and towards risk based programs. Avista plans to collect LIDAR data in the elevated fire risk areas (WUI Tiers 2&3). This data will be used to design line clearance prescriptions, it will also serve as an audit of prior work.
2. Annual Risk Tree- By separating the risk tree activities from planned maintenance, Avista will prioritize risk tree removals on a risk-cost basis.
3. Right Tree-Right Pace – Avista plans to conduct a customer outreach program and encourage the removal of tall growing trees with more compatible species. Tree that mature at a crown height of 20-25 feet typically do not require trimming and do not pose a hazard for powerline operation or maintenance.

If one assumes a base vegetation spend of $8M/year, adding fire resiliency to the base plan results in a cost forecast as shown below. This graph simply reflects the addition of wildfire efforts to Avista's existing program with the exception of transitioning the risk tree element to the wildfire plan.



Cost Forecast Data

The bulk of this report identifies the forecasted annual costs associated with the Wildfire Plan. As with any forecast, these values are subject to revision and should not be conflated as definitive cost estimates. However, they do convey the scope and breadth of Avista's commitment to promoting public safety and to safeguarding homes, property, and infrastructure. The various charts and graphs included in this report are based on this dataset.

		Capital											Operating										
	System & Transmission	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr
ST-1	ECP & Fire ICS Representation											0	5	5	5	5	5	5	5	5	5	5	50
ST-2	Fire-Weather Dashboard	200	150	75								425		50	75	75	75	75	75	75	75	75	650
ST-3	Engineering Review Major Events	10	10	10	10	10	10	10	10	10	10	100											0
ST-4	Wildfire Compliance Tracking											0	15	15	15	15	15	15	15	15	15	15	150
ST-5	Digital Data Collection											0	325	500	750	750	750	750	750	750	750	750	6,825
ST-6	Wood Pole FR Mesh Protection											0	250	250	250	250	250	250	250	250	250	250	2,500
ST-7	Fuel Reduction Partner											0	150	150	150	150	150	150	150	150	150	150	1,500
ST-8	Emergency Responder Training											0	130	130	130	130	130	130	130	130	130	130	1,300
ST-9	Conforming Rights-of-Way	500	500	500	500	500	500	500	500	500	500	5,000											0
ST-10	Structure Integrity Line Patrols	300	300	300	300	300	300	300	300	300	300	3,000											0
ST-11	Expedited Fire-Response											0	5	8	10	10	10	10	10	10	10	10	93
ST-12	Additional Patrols in WUI											0	200	200	200	200	200	200	200	200	200	200	2,000
ST-13	Transmission Grid Hardening	1,000	3,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	44,000											
	Annual Total	**$2,010**	**$3,960**	**$5,885**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$52,525**	**$1,080**	**$1,308**	**$1,585**	**$1,585**	**$1,585**	**$1,585**	**$1,585**	**$1,585**	**$1,585**	**$1,585**	**$15,068**

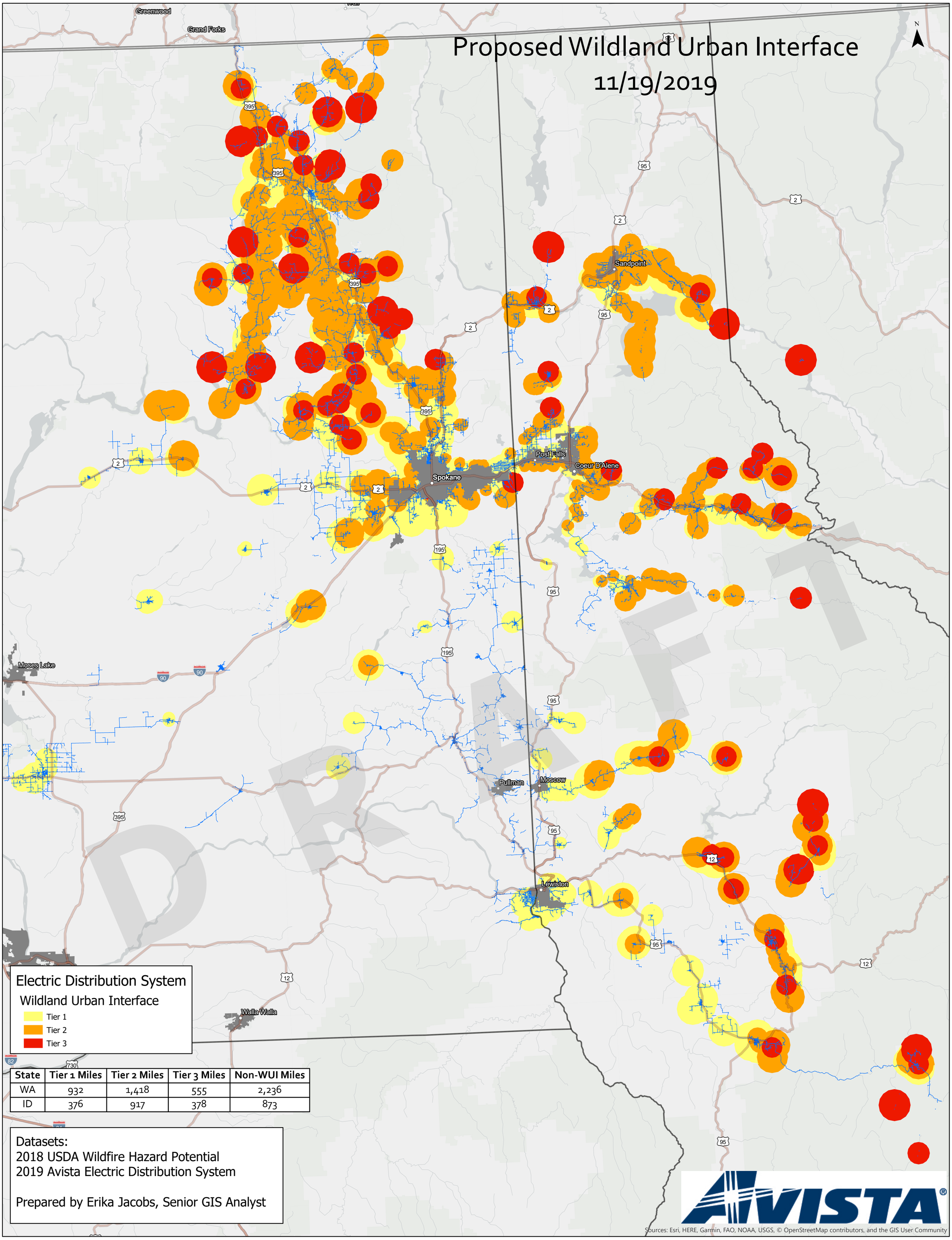
		Capital											Operating										
	Electric Distribution	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr
D-1	Fuse Coordination Study											0	20	20	20	20	20	20	20	20	20	20	200
D-2	Recloser Event Reporting											0	40	40	40	40	40	40	40	40	40	40	400
D-3	Fire Ignition Tracking System	25	75	100								200	10	10	10	10	10	10	10	10	10	10	100
D-4	Veg Mngt in CPC designs	10	10	10	10	10	10	10	10	10	10	100											0
D-5	Fire Suppression 'wetting' agent											0	5	5	5	5	5	5	5	5	5	5	50
D-6	Dry Land Mode 'effectiveness' study											0	50						50				100
D-7	WUI layer in GIS											0	3	3	3	3	3	3	3	3	3	3	30
D-8	Dry Land Mode 'trigger'											0	2	2	2	2	2	2	2	2	2	2	20
D-9	Arcos Wildfire Notification											0	1	1	1	1	1	1	1	1	1	1	9
D-10	Distribution Annual Risk Tree											0	1,300	2,500	3,300	3,300	3,100	2,900	2,700	2,500	2,300	2,000	25,500
D-11	Public Outreach 'Right Tree-Right Place'											0	500	1,000	1,500	1,500	1,500	1,100	1,000	750	500	250	9,600
D-12	Midline Recloser Communication	20	40	60	60	60	60	60	60	60	60	540	2	6	12	18	24	30	36	42	48	54	272
D-13	Additional Midline Reclosers	200	400	600	600	600	600	600	600	600	600	5,400	3	9	19	29	39	49	59	69	79	89	444
D-14	Digital Data Collection											0	0	250	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,750
D-15	100% Substation Scada	0	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	17,000	0	1	4	6	8	11	13	16	18	20	97
D-16	WA Grid Hardening in WUI Tier 2-3	2,000	6,500	10,000	14,500	14,500	14,500	14,500	14,500	14,500	14,500	120,000											0
D-17	ID Grid Hardening in WUI Tier 2-3	1,000	5,000	8,400	8,400	8,400	8,400	8,400	8,400	8,400	8,400	73,200											0
	Annual Total	**$3,255**	**$13,025**	**$21,170**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$226,440**	**$1,936**	**$3,847**	**$5,215**	**$5,734**	**$5,752**	**$5,170**	**$4,939**	**$4,457**	**$4,026**	**$3,494**	**$44,569**
	Plan Total	**$5,265**	**$16,985**	**$27,055**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$278,965**	**$3,016**	**$5,154**	**$6,800**	**$7,319**	**$7,337**	**$6,755**	**$6,524**	**$6,042**	**$5,611**	**$5,079**	**$59,636**

This table is reprinted on the following page.

		Capital											Operating										
	System & Transmission	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr
ST-1	EOP & Fire ICS Representation											0	5	5	5	5	5	5	5	5	5	5	50
ST-2	Fire-Weather Dashboard	200	150	75								425		50	75	75	75	75	75	75	75	75	650
ST-3	Engineering Review Major Events	10	10	10	10	10	10	10	10	10	10	100											0
ST-4	Wildfire Compliance Tracking											0	15	15	15	15	15	15	15	15	15	15	150
ST-5	Digital Data Collection											0	325	500	750	750	750	750	750	750	750	750	6,825
ST-6	Wood Pole FR Mesh Protection											0	250	250	250	250	250	250	250	250	250	250	2,500
ST-7	Fuel Reduction Partner											0	150	150	150	150	150	150	150	150	150	150	1,500
ST-8	Emergency Responder Training											0	130	130	130	130	130	130	130	130	130	130	1,300
ST-9	Conforming Rights-of-Way	500	500	500	500	500	500	500	500	500	500	5,000											0
ST-10	Structure Integrity Line Patrols	300	300	300	300	300	300	300	300	300	300	3,000											0
ST-11	Expedited Fire Response											0	5	8	10	10	10	10	10	10	10	10	93
ST-12	Additional Patrols in WUI											0	200	200	200	200	200	200	200	200	200	200	2,000
ST-13	Transmission Grid Hardening	1,000	3,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	44,000											
	Annual Total	$2,010	$3,960	$5,885	$5,810	$5,810	$5,810	$5,810	$5,810	$5,810	$5,810	$52,525	$1,080	$1,308	$1,585	$1,585	$1,585	$1,585	$1,585	$1,585	$1,585	$1,585	$15,068

		Capital											Operating										
	Electric Distribution	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr
D-1	Fuse Coordination Study											0	20	20	20	20	20	20	20	20	20	20	200
D-2	Recloser Event Reporting											0	40	40	40	40	40	40	40	40	40	40	400
D-3	Fire Ignition Tracking System	25	75	100								200	10	10	10	10	10	10	10	10	10	10	100
D-4	Veg Mngt in CPC designs	10	10	10	10	10	10	10	10	10	10	100											0
D-5	Fire Suppression 'wetting' agent											0	5	5	5	5	5	5	5	5	5	5	50
D-6	Dry Land Mode 'effectiveness' study											0	50						50				100
D-7	WUI layer in GIS											0	3	3	3	3	3	3	3	3	3	3	30
D-8	Dry Land Mode 'trigger'											0	2	2	2	2	2	2	2	2	2	2	20
D-9	Arcos Wildfire Notification											0	1	1	1	1	1	1	1	1	1	1	6
D-10	Distribution Annual Risk Tree											0	1,300	2,500	3,100	3,100	3,100	2,900	2,700	2,500	2,300	2,000	25,500
D-11	Public Outreach 'Right Tree-Right Place'											0	500	1,000	1,500	1,500	1,500	1,100	1,000	750	500	250	9,600
D-12	Midline Recloser Communication	20	40	60	60	60	60	60	60	60	60	540	2	6	12	18	24	30	36	42	48	54	272
D-13	Additional Midline Reclosers	200	400	600	600	600	600	600	600	600	600	5,400	3	9	19	29	39	49	59	69	79	89	444
D-14	Digital Data Collection											0	0	250	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,750
D-15	100% Substation Scada	0	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	17,000	0	1	4	6	8	11	13	16	18	20	97
D-16	WA Grid Hardening in WUI Tier 2-3	2,000	6,500	10,000	14,500	14,500	14,500	14,500	14,500	14,500	14,500	120,000											0
D-17	ID Grid Hardening in WUI Tier 2-3	1,000	5,000	8,400	8,400	8,400	8,400	8,400	8,400	8,400	8,400	73,200											0
	Annual Total	$3,255	$13,025	$21,170	$25,570	$25,570	$25,570	$25,570	$25,570	$25,570	$25,570	$216,440	$1,936	$3,847	$5,215	$5,734	$5,752	$5,170	$4,939	$4,457	$4,026	$3,494	$44,569
	Plan Total	$5,265	$16,985	$27,055	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380	$268,965	$3,016	$5,154	$6,800	$7,319	$7,337	$6,755	$6,524	$6,042	$5,611	$5,079	$59,636

Proposed Wildland Urban Interface
11/19/2019



Electric Distribution System
Wildland Urban Interface
- Tier 1
- Tier 2
- Tier 3

State	Tier 1 Miles	Tier 2 Miles	Tier 3 Miles	Non-WUI Miles
WA	932	1,418	555	2,236
ID	376	917	378	873

Datasets:
2018 USDA Wildfire Hazard Potential
2019 Avista Electric Distribution System

Prepared by Erika Jacobs, Senior GIS Analyst

Exhibit No. 12
Case Nos. AVU-E-21-01 & AVU-G-21-01
D. Howell, Avista
Schedule 4, Page 1 of 1

AVISTA'S WILDFIRE RESILIENCY PLAN

Communications Plan

Overview

Wildfires pose a large and growing risk to millions of Americans. In recent years, public focus on this significant risk – and the role that power providers play – has intensified and the stakes for utilities have never been higher.

To that end, Avista is taking its role and responsibilities seriously and has developed a comprehensive Wildfire Resiliency Plan involving both strategic investments to mitigate risk, as well as a set of processes and responses that can be deployed in case of a wildfire.

Avista's comprehensive Wildfire Resiliency Plan builds on and enhances Avista's emergency operation preparedness; promotes public safety and protection of physical assets and property; and safeguards company assets to mitigate financial and liability risks. In addition, the Wildfire Resiliency Plan emphasizes collaboration with land-management and fire response agencies. It includes the following goals:

1. **Promote Public & Worker Safety**: Protect Avista employees and customers from the impact of wildfires.
2. **Emergency Preparedness:** Minimize service disruptions caused by wildfires and other extreme weather events.
3. **Financial Protection:** Protect the Company from financial and reputational liability.

To meet these goals, the plan's recommendations are focused in four key areas:

1. **Vegetation Management**- Implement actions above and beyond traditional, reliability-based approaches with the goal of reducing contact between vegetation and utility powerlines in targeted geographic areas.
2. **Situational Awareness**- Implement tools and systems that enhance Avista's capabilities and knowledge in weather forecasting, fire prediction, and equipment control to inform operational decision-making.
3. **Operations and Emergency Response**- Recognize wildfire as separate and distinct from other significant weather events, and utilize training and simulation for Avista personnel to better prepare them to work with fire professionals during an event.
4. **Grid Hardening**- Replace and strengthen infrastructure in fire-prone areas, reducing the likelihood of a spark-ignition source and protecting critical infrastructure from the impacts of fire.

A key element of this Wildfire Resiliency Plan is ensuring that Avista stakeholders know the plan is in place, buy into it, and take pride in the fact that the Company is taking the right precautionary steps to reduce the potential for and impact of wildfires. A strong and effective strategic communications campaign is critical to the Company to ensure broad awareness and demonstrate Avista's commitment to preventing wildfires—a plan directed at all of Avista's key

stakeholders, including: customers, employees, state and local government officials and regulators, law enforcement/fire departments, local media, and shareholders.

The following is the framework for communicating about the Wildfire Resiliency Plan.

Communications Objectives

- Ensure awareness among all key stakeholders of the significant actions and investment Avista is taking to prevent or mitigate the risk of wildfires.
- Instill confidence in Avista as a proactive and responsible corporate citizen.
- Get "buy-in" support and recognition from key stakeholders that Avista is taking wildfire safety seriously and has a Wildfire Resiliency Plan in place.
- Help generate support and recognition for Avista as a leader that is doing all it can to help avoid wildfires and has in place a strong wildfire prevention and safety program.
- Demonstrate Avista's focus on prioritizing the safety and well-being of its customers and the communities it serves.

Phase 1 Communications

The first phase of communications about the Wildfire Resiliency Plan will be focused on the plan's launch and the communications objectives noted above. The timing and implementation of the tactics will be aligned with when the plan is finalized. No communications will begin until the organization is ready from an operational and regulatory standpoint.

The second phase of communications would support specific strategies included within the plan, such as enhanced vegetation management. Each initiative that requires customer or external stakeholder behavior change would have its own communications plan with objectives, tactics and timelines associated, as appropriate.

Recommended materials for development of phase one include:

Item	Description/Details
Fact sheet	• Overarching description of the Wildfire Resiliency Plan that is simple and easy to understand • Provides key highlights and elements of the plan • Designed piece that aligns with Avista brand • Can be used internally and externally
News release	• Announces launch of plan • Sent nationally over the wire

Page on myavista.com	• Serve as home base for information about the plan • Provides information about Avista's approach and commitment to wildfire resiliency • Would include a link to the plan, the fact sheet, the news release, Avista's vegetation management and right tree right place web pages • Provide customers information they need about wildfire, including links to partners and community resources
Customer email	• Use key messages • Educate customers about steps Avista is taking to keep them safe and provide reliable energy
Customer handout	• Collateral piece that can be provided to customers to give them information on emergency preparedness and wildfire safety
Presentation	• Tell Avista's Wildfire Resiliency Plan story • Align with communications objectives • For use with media, community groups, business leaders, etc.
Visual assets	• Identify and/or develop visual assets that can be used in the fact sheet, on the web, on social, in customer communications, in media engagements, etc.
Internal communications materials	• Leader communication • Employee communication • E.view EXTRA • Additional TBD

Public Relations Activities by Audience

Below are the tactics per audience that should be put in place.

1. **Communications Targeted to All Audiences**

    - Broadly issued press release
    - Media outreach and coordination
    - A dedicated section on Avista's website which will serve as a repository of resources on prevention, preparedness and support. Content should be continuously updated and eventually include content mentioned above:

    - Wildfire Plan fact sheet
    - Advice on what customers can do to be prepared
- Social media posts with links to wildfire safety web page, content about upcoming inspections and repairs, tips during wildfire season, and other wildfire related announcements.
- Provide Avista wildfire links to state Commissions for use on state sites.

2. Employees

- All leader communication, all employee communication, E.view EXTRA to align with news release distribution.

3. Customers (business and residential)

- Communicate the Avista Wildfire Resiliency Plan through customer email(s).
- Highlight the plan and include timely information in customer newsletters.

4. Local communities

- Identify appropriate/relevant opportunities for communications with key stakeholders, which could include newsletter articles, community leader meetings and/or presentations, town hall meetings, etc. in targeted communities served by Avista.
- Engage with media as appropriate in cities/towns across the service area to coincide with any community presentations or engagement.
- Add information and FAQs about wildfire safety related work to web page.
- Include tips on how to avoid wildfires, how to prepare for outages, what to put in an emergency kits, and other resources to help get people informed.

EXECUTIVE SUMMARY

The threat of wildfires poses a significant risk to utilities across the western United States. In May of 2020, Avista published its "**2020 Wildfire Resiliency Plan**" which details twenty-eight actions to mitigate the risk of wildfire. The Plan includes upgrades to infrastructure aimed at reducing spark-ignition events and protecting critical infrastructure from the threat of wildfires. The Plan details a 10-year time horizon. The $268,965,000 Plan includes investments in the four categories:

Enhanced Vegetation Management

Widen Transmission R/Ws ($5,000,000)
Vegetation management incorporated into CPC designs ($100,000)

Situational Awareness

Fire-Weather Dashboard & TROVE risk analysis ($425,000)
Midline Reclosers Communications ($540,000)
100% Substation SCADA ($17,000,000)

Operations and Emergency Response

Transmission Design Review of Major Events ($100,000)
Fire Ignition Tracking System ($200,000)

Grid Hardening & Dry Land Mode

Transmission Fire Inspection ($3,000,000)
Transmission Grid Hardening ($44,000,000)
Midline Reclosers ($5,400,000)
Distribution Grid Hardening (193,200,000)

Wildfire Plan (CapX 2020-2029) $268,965,000

The 10-year accumulated inherent risk of wildfire is estimated between $8.05 and $18.2 billion dollars. The mitigated risk (with controls) is estimated between 0.5 and $2.3 billion dollars. Again, accumulated over a 10-year period. The risk reduction is estimated at between 8X and 16X with a cost – benefit ratio between 22.9 and 48.6 including $60 million dollars of O&M expense.

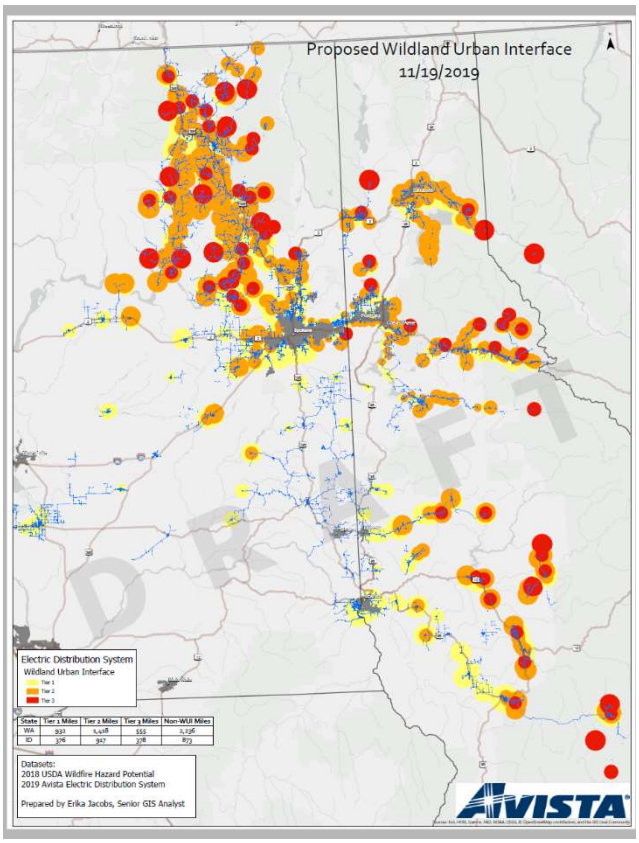
VERSION HISTORY

Version	Author	Description	Date	Notes
0	David James	Initial Submission to Capital Planning	April 1, 2020	Initial submission
1	David James	Refresh using 2020 BC narrative template	July 29, 2020	No revision to capital requirements

Exhibit No. 12
Case Nos. AVU-E-21-01 & AVU-G-21-01
D. Howell, Avista
Schedule 6, Page 1 of 10

GENERAL INFORMATION

Requested Spend Amount	$268,965,000 (2020-2029) CAPX $59,586,000 (2020-2029 OPX) *for information*
Requesting Organization/Department	Electric Operations
Business Case Owner	David Howell
Business Case Sponsor	Heather Rosentrater
Sponsor Organization/Department	Electric Operations
Category	Program
Driver	Customer Service Quality & Reliability



1. BUSINESS PROBLEM

1.1 What is the current or potential problem that is being addressed? The risk of wildfires is increasing throughout the western United States. Data from the U.S. Forest service indicates a 300% increase in the number of wildfires since 1970 Data specific to fires in Washington and Idaho fires suggest that fire size has increased 400-500% over the last several decades. Though the number of powerline involved wildfires remains relatively low (5-7% WA DNR statistics, 1990-2015), wildfire is differentiated from natural disasters in that 'cause and origin' investigations often lead to claims for fire suppression costs, property damage, timber loss, and personal injury. In the fall of 2018, a small team of Avista employees was assembled to assess the risks, develop defensive strategies, and implement a Wildfire Resiliency Plan. This business case reflects the 10-year strategy to build defense strategies against wildfire.

1.2 Discuss the major drivers of the business case and the benefits to the customer? Wildfire does not align well with the existing business case drivers. Unlike most asset replacement programs, Wildfire Resiliency is a risk-based, not a condition-based program. Therefore, it is best aligned with Customer Service Quality & Reliability and is expected to reduce risk exposure by at least $7.5 billion dollars over a 10-year period.

1.3 Identify why this work is needed now and what risks there are if not approved or is deferred – Avista has published a "2020 Wildfire Resiliency Plan" and have committed to implementation at the highest levels of the Company including the Board of Directors. It is a Tier 1 Enterprise Level risk.

1.4 Identify any measures that can be used to determine whether the investment would successfully deliver on the objectives and address the need listed above – As part of Wildfire Resiliency, performance metrics will be tracked including, fire ignition events, to measure the efficacy of the program. Transmission and Distribution Operations tracks system outages including cause-code, duration, and impacted customers. The primary goal of the program is to limit the number of spark-ignition events and the reduction in outages will enhance customer experience.

1.5 Supplemental Information

1.5.1 Please reference and summarize any studies that support the problem

Several supporting documents are available for review:

2020 Avista Wildfire Resiliency Plan (June 2020)
Wildfire Resiliency Cost Plan (January 2020)
Wildfire Risk Assessment (September 2019)
Wildfire Plan Charter (May 2019)

1.5.2 For asset replacement, include graphical or narrative representation of metrics associated with the current condition of the asset that is proposed for replacement.

Wildfire Resiliency is a comprehensive, risk-based program and includes targeted equipment replacement. Condition based metrics are not considered.

In May and June of 2019, a series of risk workshops were held to identify potential defensive strategies to reduce the risk of wildfire. These workshops were facilitated by the Business

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Process Improvement team with support from Senior Risk Manager, Bob Brandkamp, and Asset Management Analyst, Jeff Smith. Over the course of 6-workshops, 160 mitigation strategies were identified. 60 of those were analyzed in detail and ultimately, 28 strategies were adopted into the plan including transmission and distribution grid hardening, a comprehensive review of dry land mode operating strategies, and systems to actively monitor fire-risk. In addition to internal processes, Avista participated in several utility forums sponsored by the Western Energy Institute including the Wildfire Planning & Mitigation workshop. In general, the approach to fire mitigation is consistent throughout the utility sector.

Option	Capital Cost	Start	Complete
Wildfire Resiliency Plan	*$268,965,000*	*07 2020*	*12 2029*

2.1 Describe what metrics, data, analysis or information was considered when preparing this capital request.

Wildfire Resiliency is a risk-based plan. Inherent (existing) and mitigated (future) risks were assessed in three categories:

- Financial (the cost of replacing T&D infrastructure associated with wildfire events and response to third party and other claims for fire suppression and damages)
- Customer (the cost impact to customers including outage duration and societal disruption)
- Safety (costs associated with worker and public injuries)

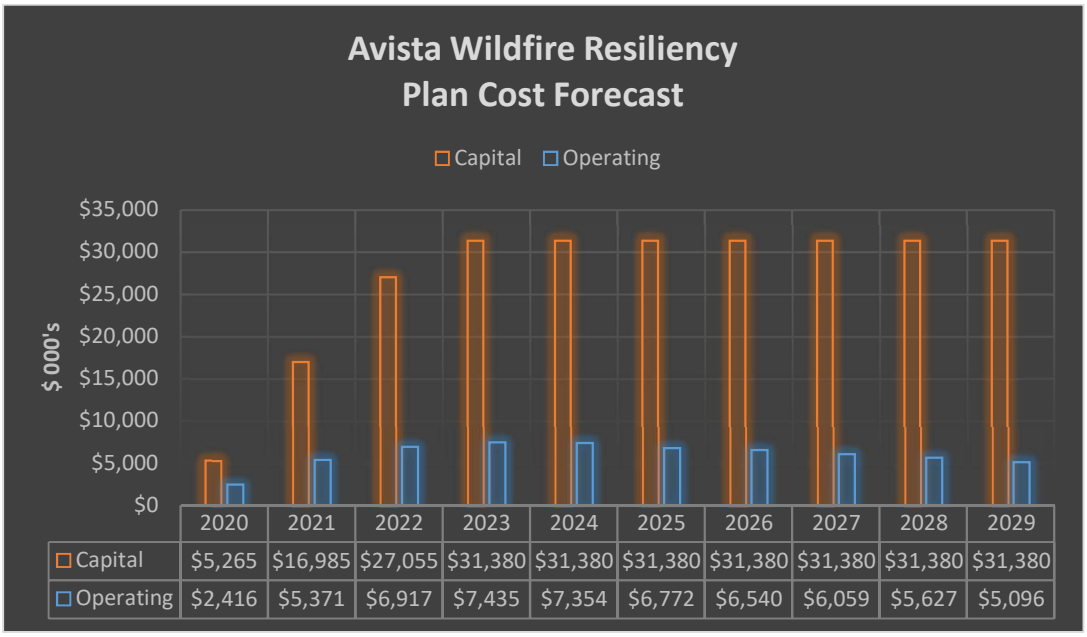
The following is a list of the 28 recommended actions indicating a range of inherent and mitigated risk costs. Note that not all the actions reflect capital investments (e.g. vegetation management). Monetized risk values represent a 10-year operating time horizon.

	Inherent Risk ($M)		Managed Risk ($M)		Cost: Benefit		Risk Red
System & Transmission	Low	High	Low	High	Low	High	%
EOP & Fire ICS Representation	9.6	17.7	9.6	17.6	0.0	2.0	0%
Fire-Weather Dashboard	4.8	8.8	4.3	4.8	0.5	3.7	33%
Engineering Review Major Events	1	6.9	0.9	2.4	1.0	45.0	58%
Wildfire Compliance Tracking	9.6	18	2.2	2.7	49.3	102.0	82%
Digital Data Collection	9.6	17.7	0.9	2.4	1.3	2.2	88%
Wood Pole FR Mesh Protection	9.6	28	4.3	4.8	2.2	9.5	76%
Fuel Reduction Partner	15	29	3	29	8.0	0.0	27%
Emergency Responder Training	1.8	2.3	0.3	0.9	1.2	1.1	71%
Conforming Rights-of-Way	4.8	8.8	0.2	1.4	0.9	1.5	88%
Transmission Inspection Pym	4	59	1.1	2.6	0.6	11.3	94%
Expedited Fire Response	-	-	-	-			n/a
Transmission Grid Hardening							n/a
Transmission Total	**$70**	**$196**	**$27**	**$69**	**0.6**	**1.9**	**64%**

	Inherent Risk ($M)		Managed Risk ($M)		Cost: Benefit		Risk Red
Electric Distribution	Low	High	Low	High	Low	High	%
Fuse Coordination Study	41	107	1.6	8.2	197.0	494.0	93%
Recloser Event Reporting	21	82	1.3	8.4	49.3	184.0	91%
Fire Ignition Tracking System	132	547	46	213	286.7	1113.3	62%
Veg Mngt in CPC designs	20	278	10	21	100.0	2570.0	90%
Fire Suppression 'wetting' agent	53	582	11	66	840.0	10320.0	88%
Dry Land Mode 'effectiveness' study	21	57	0.6	4.2	204.0	528.0	94%
WUI layer in GIS	0	0.11	0	0.11	0.0	0.0	0%
Dry Land Mode 'trigger'	-	-	-	-			n/a
Arcos Wildfire Notification	-	-	-	-			n/a
Distribution Annual Risk Tree	2,816	5,722	264	1,226	100.1	176.3	83%
Public Safety Initiative 'Right Tree-Right Place'	563	1,145	2.25	28.2	58.4	116.3	98%
Midline Recloser Communication	14.6	29	0.25	0.28	17.7	35.4	99%
Additional Midline Reclosers	22.6	39	5.63	13.2	2.9	4.4	69%
Digital Data Collection	2,816	5,722	132	564	346.3	665.5	92%
100% Substation Scada	132	547	0	1.6	7.7	31.9	100%
WA Grid Hardening in WUI Tier 2-3	823.6	1980.75	6.83	41	6.8	16.2	98%
ID Grid Hardening in WUI Tier 2-3	502.4	1208.25	4.17	25	6.8	16.2	98%
Distribution Total	**$7,978**	**$18,046**	**$486**	**$2,220**	**28.7**	**60.6**	90%

2.2 Discuss how the requested capital cost amount will be spent in the current year (or future years if a multi-year or ongoing initiative). (i.e. what are the expected functions, processes or deliverables that will result from the capital spend?)**. Include any known or estimated reductions to O&M as a result of this investment.**

The illustration indicates the estimated capital and operating investments. Though we do expect outage rates associated with vegetation and equipment failures to trend downward, O&M 'offsets' are not a significant factor. The primary focus of this plan is risk reduction and to protect the financial viability of the Company.



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	$5,265	$16,985	$27,055	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380	$31,380
Operating	$2,416	$5,371	$6,917	$7,435	$7,354	$6,772	$6,540	$6,059	$5,627	$5,096

Capital cost breakdown by year and project (values in $000's).

		Capital										
	System & Transmission	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr
ST-1	EOP & Fire ICS Representation											0
ST-2	Fire-Weather Dashboard	200	150	75								425
ST-3	Engineering Review Major Events	10	10	10	10	10	10	10	10	10	10	100
ST-4	Wildfire Compliance Tracking											0
ST-5	Digital Data Collection											0
ST-6	Wood Pole FR Mesh Protection											0
ST-7	Fuel Reduction Partner											0
ST-8	Emergency Responder Training											0
ST-9	Conforming Rights-of-Way	500	500	500	500	500	500	500	500	500	500	5,000
ST-10	Transmission Inspection Pgm	300	300	300	300	300	300	300	300	300	300	3,000
ST-11	Expedited Fire Response											0
ST-12	Transmission Grid Hardening	1,000	3,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	44,000
	Transmission Total	**$2,010**	**$3,960**	**$5,885**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$5,810**	**$52,525**

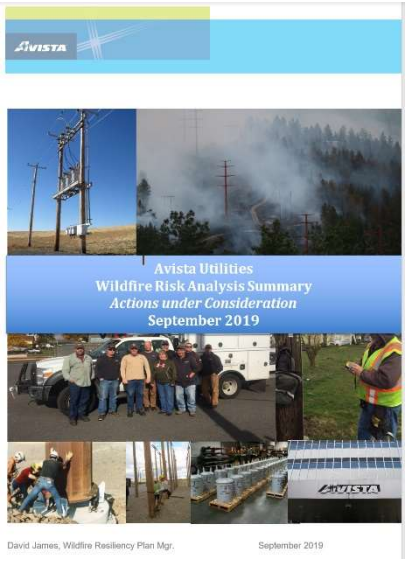
		Capital										
	Electric Distribution	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr
D-1	Fuse Coordination Study											0
D-2	Recloser Event Reporting											0
D-3	Fire Ignition Tracking System	25	75	100								200
D-4	Veg Mngt in CPC designs	10	10	10	10	10	10	10	10	10	10	100
D-5	Fire Suppression 'wetting' agent											0
D-6	Dry Land Mode 'effectiveness' study											0
D-7	WUI layer in GIS											0
D-8	Dry Land Mode 'trigger'											0
D-9	Arcos Wildfire Notification											0
D-10	Distribution Annual Risk Tree											0
D-11	Public Safety Initiative 'Right Tree-Right Place'											0
D-12	Midline Recloser Communication	20	40	60	60	60	60	60	60	60	60	540
D-13	Additional Midline Reclosers	200	400	600	600	600	600	600	600	600	600	5,400
D-14	Digital Data Collection											0
D-15	100% Substation Scada	0	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	17,000
D-16	WA Grid Hardening in WUI Tier 2-3	2,000	6,500	10,000	14,500	14,500	14,500	14,500	14,500	14,500	14,500	120,000
D-17	ID Grid Hardening in WUI Tier 2-3	1,000	5,000	8,400	8,400	8,400	8,400	8,400	8,400	8,400	8,400	73,200
	Distribution Total	**$3,255**	**$13,025**	**$21,170**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$25,570**	**$216,440**
	D-10 - $500k/per year added to the above for budget											
	Plan Total	**$5,265**	**$16,985**	**$27,055**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$268,965**

2.3 Outline any business functions and processes that may be impacted (and how) by the business case for it to be successfully implemented.

Implementation has and will impact many areas of the Company including electric operations, engineering, supply chain, IT, asset management, finance and accounting. However, great care has been taken to leverage existing workflow processes and technologies to minimize disruption to the organization. This is an enterprise level program.

2.4 Discuss the alternatives that were considered and any tangible risks and mitigation strategies for each alternative.

A complete list of alternatives is included in the September 2019 publication entitled, "Wildfire Risk Analysis Summary – actions under consideration". This document focuses on the risks and costs of viable alternatives and laid the groundwork for actions adopted in the Resiliency Plan.



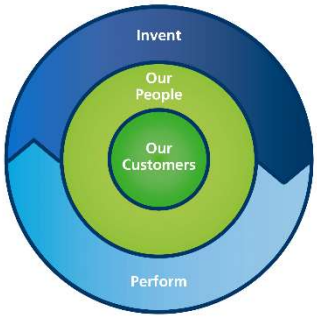
2.5 Include a timeline of when this work will be started and completed. Describe when the investments become used and useful to the customer.

The scope of this plan is considerable. Both transmission and distribution grid hardening projects will be ramped from 2020 through 2023 and then levelized through 2029. Other efforts including technology projects such as the fire-weather dashboard and the TROVE risk analysis will be conducted on the front end of the ten-year horizon. The following table indicates the capital spend levels, by year. This is a surrogate for activity.

Capital										
2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-yr
$5,265	**$16,985**	**$27,055**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$31,380**	**$268,965**

Values in $000's.

2.6 Discuss how the proposed investment aligns with strategic vision, goals, objectives and mission statement of the organization.



The stated goals of the resiliency plan are:

- Protect lives and property
- Ensure emergency preparedness and align operating practices with fire threat conditions
- Protect Avista's energy delivery infrastructure

The effort to develop a comprehensive wildfire mitigation strategy has been fully embraced by Avista's Board of Directors and executive management. The Board has requested quarterly updates since early 2020 and will receive another briefing on August 5, 2020 (D. Howell and D. James).

2.7 Include why the requested amount above is considered a prudent investment, providing or attaching any supporting documentation. In addition, please explain how the investment prudency will be reviewed and re-evaluated throughout the project

Prudency is a fundamental tenant of cost recovery. Avista has engaged directly with Idaho and Washington Utility Commissioners and their staffs. Avista's rates department recently petitioned the IPUC for deferral treatment of all wildfire related costs (capital and O&M). Discussions continue with Washington Commissioners. Events surrounding the November 2018 'Camp Fire' lead to the bankruptcy of PG&E and served as the catalyst for many utilities to assess their systems and defenses associated with wildfire.

2.8 Supplemental Information

2.8.1 Identify customers and stakeholders that interface with the business case

Avista electric customers located in Wildland Urban Interface zones 2 & 3 will be directly engaged via the process. Grid hardening and enhanced vegetation management strategies will be focused in those areas. In addition, Avista is coordinating with local and regional stakeholders including fire protection agencies, electric utilities, the Washington department of natural resources (DNR), the Idaho department of lands (IDL), and groups with an interest in or impacted by Avista's plan.

2.8.2 Identify any related Business Cases

N/A

3.1 Steering Committee or Advisory Group Information

Since February of 2019, a Wildfire Steering Committee has actively engaged in the formation and adoption of the Plan. That committee remains active and will guide efforts throughout the life of the program. Members include:

Name	Title
David Howell	Director, Electric Operations (Business Case Owner)
Bruce Howard	Sr. Director, Environmental Affairs and Real Estate
Greg Hesler	Vice President, General Counsel & Chief Compliance Officer
Alicia Gibbs	Manager, Asset Maintenance
Elizabeth Andrews	Sr. Manager, Revenue Requirements
Bob Brandkamp	Sr. Manager, Risk
Annie Gannon	Manager, Communications
Casey Fielder	Manager, Corporate Communications

3.2 Provide and discuss the governance processes and people that will provide oversight

The Wildfire Resiliency Plan will adapt and evolve to align with risk conditions and available technologies to mitigate those risks. Governance and oversight will be a consistent element throughout the life of the Plan including direct involvement by senior management and oversight via the Board of Directors.

3.3 How will decision-making, prioritization, and change requests be documented and monitored

Program management is a prescribed function of the Wildfire Plan Manager position. Monthly status reports will include status of costs, production, and forecasts including resource requirements. This plan will adapt over time as we gain experience with new elements including risk-based vegetation management, digital data collection, grid hardening, and emergency operations tactics specific to fire response.

The undersigned acknowledge they have reviewed the ***Wildfire Resiliency Plan business case*** and agree with the approach it presents. Significant changes to this

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will be coordinated with and approved by the undersigned or their designated representatives.

Signature:	David Howell	Date:	8/2/20
Print Name:	David Howell		
Title:	Director, Electric Operations		
Role:	Business Case Owner		
Signature:		Date:	
Print Name:	Heather Rosentrater		
Title:	Sr Vice President, Energy Delivery & Shared Services		
Role:	Business Case Sponsor		
Signature:		Date:	
Print Name:	David Howell (on behalf of WFRES Steering Group)		
Title:			
Role:	Steering/Advisory Committee Review		

will be coordinated with and approved by the undersigned or their designated representatives.

Signature:		Date:	
Print Name:	David Howell		
Title:	Director, Electric Operations		
Role:	Business Case Owner		
Signature:	Heather Rosentrater	Date:	10/7/2020
Print Name:	Heather Rosentrater		
Title:	Sr Vice President, Energy Delivery & Shared Services		
Role:	Business Case Sponsor		
Signature:		Date:	
Print Name:	David Howell (on behalf of WFRES Steering Group)		
Title:			
Role:	Steering/Advisory Committee Review		