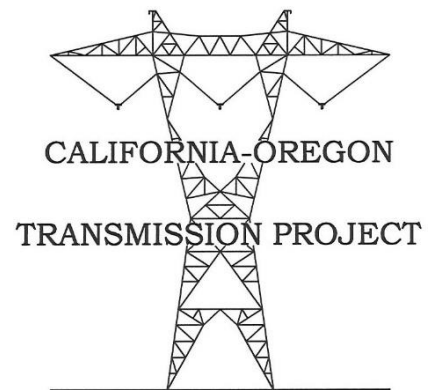


**TRANSMISSION AGENCY OF NORTHERN
CALIFORNIA**

**WILDFIRE MITIGATION PLAN FOR THE
CALIFORNIA-OREGON TRANSMISSION PROJECT**



JULY 2023

Executive Summary and Readers Guide to this 2023 Comprehensive Revision

Executive Summary

This is the 2023 comprehensive revision of the Transmission Agency of Northern California (TANC) Wildfire Mitigation Plan (WMP or Plan) for the California-Oregon Transmission Project (COTP or Project). We have revised each of the seven sections of the WMP and have added an Appendix to “show our work” in monitoring and auditing the wildfire risk reduction effectiveness of this Plan from 2020 through 2022.

This 2023 Plan demonstrates how TANC intends to continue to build on the established operations, maintenance, vegetation management, access roads, situational awareness, interagency collaboration, and other reliability centered programs to reduce the wildfire risks associated with the COTP. We extensively monitored and audited fifteen wildfire prevention, mitigation, and response strategies (Wildfire Strategies) from 2020 through 2022. That process resulted in valuable lessons learned that have been documented herein. Nine of those Wildfire Strategies have been integrated into our established programs for their wildfire risk reduction benefits. The other six have been completed; each having contributed valuable lessons learned that will inform future WMPs and related COTP reliability programs. That process also provided valuable information regarding the validity of our metrics.

The development process for the six new Wildfire Strategies to be evaluated from 2023 through 2025 relied in part on those lessons learned and the need to continue to improve the reliability and situational awareness along the entire COTP right of way (ROW).

This revision also relied on and is appreciative of the recommendations received from the independent evaluation (IE) of our 2020 Plan, and from the California Wildfire Safety Advisory Board in 2022.

Reader’s Guide

This Reader’s Guide has been prepared to assist the reader in understanding the extent of revisions that have been made in each of the seven sections of this WMP, and the reasoning for the addition of the new Appendix.

1. Statutory Compliance and Advisory Recommendations

This comprehensive revision has been prepared in compliance with Section 8387 of the California Public Utilities Code (PUC). It was also guided by recommendations received on previous versions of this WMP.

The IE prepared for the 2020 version of this Plan included three recommendations, as follows:

- *IE Recommendation No. 1: Ensure data collection for evaluating Plan performance;*
- *IE Recommendation No. 2: Evaluate need for additional situational awareness tools (anemometers, cameras, third party fuel/fire modeling); and*
- *IE Recommendation No. 3: Obtain weather forecast specific to potential impacts to the COTP.*

Finally, this version responds to four comments that were made to TANC by the California Wildfire Safety Advisory Board (WSAB) in the November 16, 2022, Guidance Advisory Opinion for the 2023 Wildfire Mitigation Plans of Electric Publicly Owned Utilities and Rural Electric Cooperatives (2023 WSAB GAO). Those comments include:

- *WSAB Comment No. 1: The WSAB encourages TANC to include including the context-setting template from the informational response within the WMP itself in the 2023 comprehensive revision WMP as they consider the proposed template in Appendix 1 for that document.*
- *WSAB Comment No. 2: The WSAB expects that there may be more dramatic changes in the 2023 comprehensive revision WMP [regarding wildfire mitigation strategies] and encourages TANC to consider appropriate aspects of the template in Appendix 1 [of the 2023 WSAB GAO], while recognizing that TANC has developed a good WMP framework already.*
- *WSAB Comment No. 3. Editorial corrections pertaining to Objective 5 and the ‘Contact by Foreign Object’ bullet. These editorial issues have been corrected.*
- *WSAB Comment No. 4: the WSAB notes that although TANC has a good set of WMP metrics they have included no tracking results information for those metrics to help understand their value and TANC’s mitigation progress. The WSAB expects that TANC will resolve these issues in the 2023 comprehensive revision WMP.*

2. Summary of Revisions

In addition to adding this Executive Summary and Reader’s Guide, making editorial corrections and consistencies throughout the Table of Contents and the entire Plan, we have made the following substantive content revisions by Section:

Section I- Plan Overview and Objectives: We have clarified Plan Objective No. 5 in response to WSAB Comment No. 3, and revised Table I-1 to be consistent with updates to PUC Section 8387. Plan Section and page references have also been updated to reflect their locations in this 2023 WMP.

Section II- Plan Context: We have refreshed Figure II-2 for accuracy and ease of reading. We have also inserted a new Figure II-3, which is the Context-Setting Template requested in WSAB Comment No. 1.

Section III - Plan Implementation Roles and Responsibilities: We have updated Table III-1, to provide additional information on wildfire mitigation roles and responsibilities.

Section IV - Wildfire Risk and Risk Drivers Associated with the COTP: We have added subsections IV (B) (1) (b) and (c) titled “WAPA Transmission Line Software Business Rule and Maintenance Priorities” and “2022 Maintenance Software Update” respectively. These additions respond to IE Recommendation No. 1 regarding data collection, and to better explain how data is collected to support COTP reliability and the wildfire prevention, mitigation, and response strategies set forth in Section V.

Section V - Wildfire Prevention, Mitigation, and Response Strategies: We have made Plan effectiveness improvements while responding to WSAB Comment No. 2 as follows:

- Inserted six new wildfire prevention, mitigation, and response strategies (Wildfire Strategies) as Figures V-1 through V-6 that will be evaluated from 2023 through 2025.
- Completed the evaluation of the 15 Wildfire Strategies presented in Tables V-1 and V-2 of the 2020 through 2022 versions of this Plan (as described in Section VII revisions, below), and moved those final tables to Appendix A for reference purposes.
- Incorporated the Strategy Descriptions for nine of the 15 prior Wildfire Strategies into Section V (C) “TANC’s Established Wildfire Prevention, Mitigation, and Response Strategies” to document their integration into our established programs from 2023 forward. These additions are located under the subheadings titled: ‘2022 Inspection Program Additions’ and ‘Annual High Fire Threat District (HFTD) Tier 2 and Tier 3 Road Brushing’.

Section VI – Wildfire-Related Communications Protocols Regarding COTP Deenergization, Recloser Disabling and Service Restoration: We have added an explanation of Western Area Power Administration’s (WAPA) use of the Fire Mappers, Alert Wildfire, and Ventusky and Zoom Earth tools in response to IE Recommendation numbers 2 and 3, and to continue to improve our situational awareness.

Section VII – Plan Evaluation and Metrics: We have rearranged Section VII for improved logic flow regarding the prior and current metrics being used to evaluate the effectiveness of the Wildfire Strategies and the Plan as a whole while simultaneously responding to WSAB Comment No. 4. We explain Plan and inspections monitoring and auditing. Those explanations are followed by the addition of Table VII-2, which provides a detailed evaluation of the 15 Wildfire Strategies that were monitored and audited from 2020 through 2022. It includes information on wildfire risk reduction lessons learned for each of those 15 Wildfire Strategies, and the metrics that were informed or improved through our monitoring and auditing. Nine of those Wildfire Strategies have been integrated into TANC’s established programs from 2023 forward because of their wildfire risk reduction benefits. The remaining six Wildfire Strategies evaluated from 2020 through 2022 are deemed completed. We have also updated this Section to reflect the IE process conducted in 2023.

Appendix A – Descriptions, Approaches, and Progress for Wildfire Strategies Monitored and Audited from 2020 Through 2022: Appendix A includes the information regarding the monitoring and auditing of the fifteen Wildfire Strategies evaluated from 2020 through 2022. It is for reference purposes in support of the process described in Section VII.

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List of Acronyms

ASOS	Automated surface observation stations
BES	Bulk electric system
CA	California Air Resources Act
CAISO	California Independent System Operator
CEATI	Centre for Energy Advancement through Technological Innovation
COI	California-Oregon Intertie
COTP	California-Oregon Transmission Project
CPUC	California Public Utilities Commission
E&O	Engineering and Operations
EPRI	Electric Power Research Institute
GIS	Geographic information system
GPS	Global Positioning System
GRIP	Guides, Requirements, Instructions, and Procedures
HFTD	High Fire Threat District
IE	Independent evaluation
IR	Infrared
LiDAR	Light Detection and Ranging
LOR	Laws, orders, and regulations
MPR	Maintenance priority rating
MW	Megawatts
NERC	North American Electric Reliability Corporation
O&M	Operations and Maintenance
PG&E	Pacific Gas and Electric
PM	Preventive Maintenance
POU	Publicly owned utilities
PUC	Public Utilities Code
RCM	Reliability- centered maintenance
ROW	Right of way
RPF	Registered Professional Forester
SMUD	Sacramento Municipal Utility District
SNR	Sierra Nevada Region
STNF	Shasta-Trinity National Forest
TANC	Transmission Agency of Northern California
TMIP	Transmission Maintenance Inspection Program
TWOMA	TANC-Western Operation and Maintenance Agreement
UAV	Unmanned Aerial Vehicle
USFS	United States Forest Service
VTP	Vegetation Treatment Program
WAPA	Western Area Power Administration
WECC	Western Electricity Coordinating Council
WMP	Wildfire Mitigation Plan
WSAB	Wildfire Safety Advisory Board

I. Plan Overview and Objectives

A. Policy Statement

The Transmission Agency of Northern California (TANC or Agency) is a joint powers agency comprised of 15 publicly owned utilities (POUs) and irrigation districts (Members) located throughout northern and central California. TANC's mission is to assist its publicly owned utility Members in providing cost-effective energy supplies to their customers, through long-term ownership or contracts for service over its high-voltage transmission line within California and the western United States.

To support this mission, TANC constructed, maintains, and operates the California-Oregon Transmission Project (COTP or Project), a 340-mile 500 kilovolt (kV) transmission line and related facilities, that extends from the California-Oregon border to central California. The COTP is the newest component of the 500 kV California – Oregon Intertie (COI), a critically important electrical transfer path between California and the Pacific Northwest. As a component of the COI, the COTP plays a key role in fulfilling the energy and reliability needs of California and the Pacific Northwest. The COTP provides an additional 1,600 megawatts (MW) of power exchange capability between California and the Pacific Northwest. It also provides a third transmission path between the two regions, thus significantly reducing the chances and effects of major power outages across the electric grid. Because of its importance to the electric grid, the COTP has always been operated and maintained to ensure its full availability and reliability.

TANC contracts with the Western Area Power Administration (WAPA) to provide operations and maintenance services for the COTP. As the primary owner and Project Manager for the COTP, TANC manages the Project in a safe and reliable manner that minimizes the risk of catastrophic wildfire that its electrical lines, substations, communication sites, compensation station and related equipment may pose. Other COTP Participants include WAPA, the City of Redding, Pacific Gas and Electric Company (PG&E), San Juan Water District, and the Carmichael Water District.

B. Plan Purpose

The purpose of this Wildfire Mitigation Plan (WMP or Plan) is to document the practices, procedures, processes and communications required, with the goal of minimizing the probability that TANC infrastructure might be the original or contributing source of a wildfire. It is subject to direct oversight by the TANC Commission and COTP Management Committee and is implemented by TANC, as the primary owner and Project Manager for the COTP. This Plan also complies with the requirements of Public Utilities Code (PUC) Section 8387 for publicly owned electric utilities to prepare a WMP by January 1, 2020, and annually thereafter followed by its submittal to the California Wildfire Safety Advisory Board (WSAB).

C. Plan Objectives

TANC's objectives for minimizing the threat of catastrophic wildfire attributed to its facilities and complying with applicable laws and regulations include the following:

1. Minimizing Sources of Wildfire Ignitions from the Project;
2. Minimizing Wildfire Spread Rates;
3. Maintaining the Resiliency of the Bulk Transmission Grid;
4. Progressively Applying the Most Effective Wildfire Prevention and Mitigation Strategies;
and
5. Annually Improving Overall Plan Effectiveness.

Each of these objectives is described below.

1. Minimizing Sources of Wildfire Ignitions from the Project

Effective implementation of this Plan has the primary objective of minimizing the probability that the design, operations, maintenance, and related activities and best practices conducted in support of the safe and reliable operation and maintenance of the COTP may be the origin of or a contributing cause of the ignition of a wildfire.

2. Minimizing Wildfire Spread Rates

This objective seeks to proactively implement fire prevention and mitigation strategies and activities that minimize the spread of wildfires near the COTP that could become catastrophic if they spread rapidly and damage lives, property, and natural resources.

3. Maintaining the Resiliency of the Bulk Transmission Grid

This objective seeks to establish and maintain consensus and communications among bulk transmission grid operators regarding: 1) whether the COTP would be deenergized in response to an existing wildfire threat, and if so; 2) the communications and operational protocols that could be implemented to maintain grid resiliency.

4. Progressively Applying the Most Effective Wildfire Prevention and Mitigation Strategies

This objective is intended to progressively apply the most effective wildfire prevention and mitigation strategies. These strategies may include but are not limited to expanding effective on-the-ground maintenance, vegetation management and fuels inspections, potential risk and equipment failure detection technologies, aerial inspection methods and adding technology to improve situational awareness.

5. Annually Improving Overall Plan Effectiveness

This objective sets forth an annual review process for this Plan. It is intended to evaluate and improve the Plan's effectiveness in serving the compliance requirements and wildfire risk reduction needs and obligations of the TANC Members and COTP Participants.

D. Plan Organization and Compliance with Public Resources Code Section 8387

The implementation activities and compliance requirements are organized in the following sections:

- I. *Plan Overview and Objectives;*
- II. *Plan Context;*
- III. *Plan Implementation Roles and Responsibilities;*
- IV. *Wildfire Risks and Risk Drivers Associated with the COTP;*
- V. *Wildfire Prevention, Mitigation, and Response Strategies;*
- VI. *Wildfire-Related Communications Protocols Regarding COTP Deenergization, Recloser Disabling, and Service Restoration; and*
- VII. *Plan Evaluation and Metrics.*

This Plan was developed from in 2019 and updated in 2020, 2021, and 2022 prior to this 2023 comprehensive revision. This updated Plan complies fully with applicable sections of California PUC Section 8387, including the requirement that each POU comprehensively revise its WMP at least once every three years. Table I-1 indicates applicable requirements and the corresponding Section of this Plan that addresses each applicable Section 8387 requirement.

Table I-1. Public Utilities Code Section 8387 Compliance Requirements and Corresponding Plan Sections and Pages	Plan Section & Page
PUC § 8387. (a) Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.	All
(b) (1) (1) The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, prepare a WMP. After January 1, 2020, a local publicly owned electric utility or electrical cooperative shall prepare a WMP annually and shall submit the plan to the California WSAB on or before July 1 of that calendar year. Each local publicly owned electric utility and electrical cooperative shall update its plan annually and submit the update to the California WSAB by July 1 of each year. At least once every three years, the submission shall be a comprehensive revision of the plan.	Entire Plan
(2) The WMP shall consider as necessary, at minimum, all of the following:	See Below
PUC § 8387 (b)(2) (A) An accounting of the responsibilities of persons responsible for executing the plan.	III, 17
PUC § 8387 (b)(2) (B) The objectives of the WMP.	I, 2
PUC § 8387 (b)(2) (C) A description of the preventative strategies and programs to be adopted by the local publicly owned electric utility or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.	Entire Section V
PUC § 8387 (b)(2) (D) A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the WMP's performance and the assumptions that underlie the use of those metrics.	VII, 47-49
PUC § 8387 (b)(2) (E) A discussion of how the application of previously identified metrics to previous WMP performances has informed the WMP.	VII, 47

Table I-1. Public Utilities Code Section 8387 Compliance Requirements and Corresponding Plan Sections and Pages	Plan Section & Page
<p>PUC § 8387 (b)(2)(F) Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.</p>	<p>VI, 41-42</p>
<p>PUC § 8387 (b)(2) (G) Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.</p>	<p>VI, 43</p>
<p>PUC § 8387 (b)(2) (H) Plans for vegetation management.</p>	<p>V, 28,30,33, 37-39</p>
<p>PUC § 8387 (b)(2) (I) Plans for inspections of the local publicly owned electric utility’s or electrical cooperative’s electrical infrastructure.</p>	<p>V, 34-36</p>
<p>PUC § 8387 (b)(2) (J) A list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the local publicly owned electric utility’s or electrical cooperative’s service territory. The list shall include, but not be limited, to both of the following:</p>	<p>IV, 20-25</p>
<p>(i) Risks and risk drivers associated with design, construction, operation, and maintenance of the local publicly owned electric utility’s or electrical cooperative’s equipment and facilities.</p>	<p>IV, 21</p>
<p>(ii) Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the local publicly owned electric utility’s or electrical cooperative’s service territory.</p>	<p>IV, 21</p>
<p>PUC § 8387 (b)(2) (K) Identification of any geographic area in the local publicly owned electric utility’s or electrical cooperative’s service territory that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the Commission should expand a HFTD based on new information or changes to the environment.</p>	<p>II, 9-10</p>
<p>PUC § 8387 (b)(2) (L) A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk.</p>	<p>IV, 24-25</p>
<p>PUC § 8387 (b)(2) (M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.</p>	<p>VI, 41-43</p>
<p>PUC § 8387 (b)(2) (N) A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:</p>	<p>See Below</p>
<p>(i) Monitor and audit the implementation of the WMP.</p>	<p>VII, 49-50</p>
<p>(ii) Identify any deficiencies in the WMP or its implementation and correct those deficiencies.</p>	<p>VII, 49-50</p>
<p>(iii) Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes, or commission rules.</p>	<p>VII, 44</p>

Table I-1. Public Utilities Code Section 8387 Compliance Requirements and Corresponding Plan Sections and Pages	Plan Section & Page
(3) The local publicly owned electric utility or electrical cooperative shall present its WMP in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its WMP from the public, other local and state agencies, and interested parties, and shall verify that the WMP complies will all applicable rules, regulations, and standards, as appropriate.	VII, 57
PUC § 8387 (c) The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its WMP. The independent evaluator shall issue a report that shall be made available on the Internet Web site of the local publicly owned electric utility or electrical cooperative and shall present the report at a public meeting of the local publicly owned electric utility or electrical cooperative’s its governing board.	VII, 57

II. Plan Context

A. Introduction

California PUC Section 8387 requires in part that “Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.”

This Section establishes the context of this Plan for complying with Section 8387. The context focuses on the location and structural characteristics of the COTP physical assets. The Project assets include a single 500kV transmission line, three substations, one compensation station, and ten supporting microwave communication sites. This Section also frames the regulatory context that has been established by the California Public Utilities Commission (CPUC) High Fire Threat Districts (HFTDs) and their importance for prioritizing Plan implementation activities associated with these physical assets.

B. COTP Physical Assets

1. Project Transmission Line and Right of Way

TANC’s transmission assets represent its ownership in the COTP, which consists of a 340-mile, 500kV high-voltage transmission line extending from the California-Oregon border¹ to the Tracy Substation in central California. The COTP also includes a substation in Olinda, California, and a voltage compensation station near Maxwell, California. The COTP began operation in March 1993, represents a portion of the bulk electric system (BES²) in northern California, and provides 1,600 MW of scheduled transmission capacity between California and the Pacific Northwest. Plan implementation and development are framed by the physical extent of the Project and supporting resources as noted below:

- The COTP consists of only one 500kV right of way (ROW);
- There are no additional transmission facilities within the COTP ROW;
- The COTP includes no distribution facilities;
- All Project transmission and microwave towers are comprised of steel;
- All switching (i.e. reclosing) equipment is located within the COTP substations; and
- The substations and compensation station are surrounded by managed agricultural land uses with low-growing vegetation.

This Plan applies to all COTP facilities, including the transmission towers, conductors, right of way, substations, compensation station, communication sites, and all associated equipment. TANC does not own any transmission facilities below 500kV, or any distribution level facilities that serve retail customers. The COTP was designed and is maintained to always be in full compliance with applicable CPUC General Order (GO) 95 Rules for Overhead Electric Line Construction.

¹ The COTP originates at the Captain Jack Substation in southern Oregon. The first six miles of the line – from the Captain Jack Substation to the California border - is managed by the Bonneville Power Administration.

² The definition of the bulk electric system (BES) can be found at: 2014. North American Electric Reliability Corporation. Bulk Electric System Definition Reference Document. Version 2, April 2014.

2. Project Communication Sites

There are ten remote microwave communication sites that support COTP operations (Figure II-1). These sites range in size from one to two acres, and include microwave and other communication systems, towers, equipment shelters, power systems, antenna and antenna support systems and cables and all necessary and proper foundations, footings, crossarms, guys, anchors, radios and associated equipment, appliances and fixtures. The COTP communications sites' power supplies are delivered by local distribution level power service providers.

C. The California Public Utilities Code Fire Safety Regulations and HFTD

The CPUC adopted the boundaries of a new HFTD in 2017.³ The boundary of the HFTD is based on two maps, which are:

- The United States Forest Service ("USFS") and California Department of Forestry and Fire Protection's ("CAL FIRE") joint map of Tree Mortality High Hazard Zones ("Tree Mortality Map⁴"); and
- The "CPUC" Fire Threat Map.

The HFTD has three fire threat areas; Zone 1, Tier 2 and Tier 3.

- Zone 1 consists of Tier 1 High Hazard Zones ("HHZs") on the Tree Mortality Map. Tier 1 HHZs are in direct proximity to communities, roads, and utility lines, and are a direct threat to public safety.
- Tier 2 consists of areas on the CPUC Fire Threat Map where there is an elevated risk from wildfires associated with overhead utility facilities.
- Tier 3 consists of areas on the CPUC Fire Threat Map where there is an extreme risk from wildfires associated with overhead utility facilities.

The CPUC also adopted significant new regulations to enhance the fire safety of overhead electric power lines and communications lines in the HFTD. Those new fire safety regulations modified existing California General Orders (GO) 95 (Rules for Overhead Electric Line Construction), GO 165 (Inspection Requirements for Electric Distribution and Transmission Facilities), and GO 166 (Standards for Operation, Reliability, and Safety During Emergencies and Disasters).

Figure II-2 illustrates the physical and regulatory contexts for this Plan by overlaying the COTP transmission ROW on the respective Zone 1, Tier 2, and Tier 3 HFTD areas. It presents the COTP ROW percentages that are mapped for each of HFTD Tiers 2 and 3. This is the geographic context within which this Plan addresses applicable PUC Section 8387 requirements.

³ Decision 17-01-009 at 39, 48, and Ordering Paragraph 1.m.m.

⁴ The Tree Mortality Map may be updated from time-to-time by the USFS and CAL FIRE. Any such updates will be incorporated into the HFTD Map in accordance with the procedures set forth in Decision 17-01-009 at Ordering Paragraph 9.

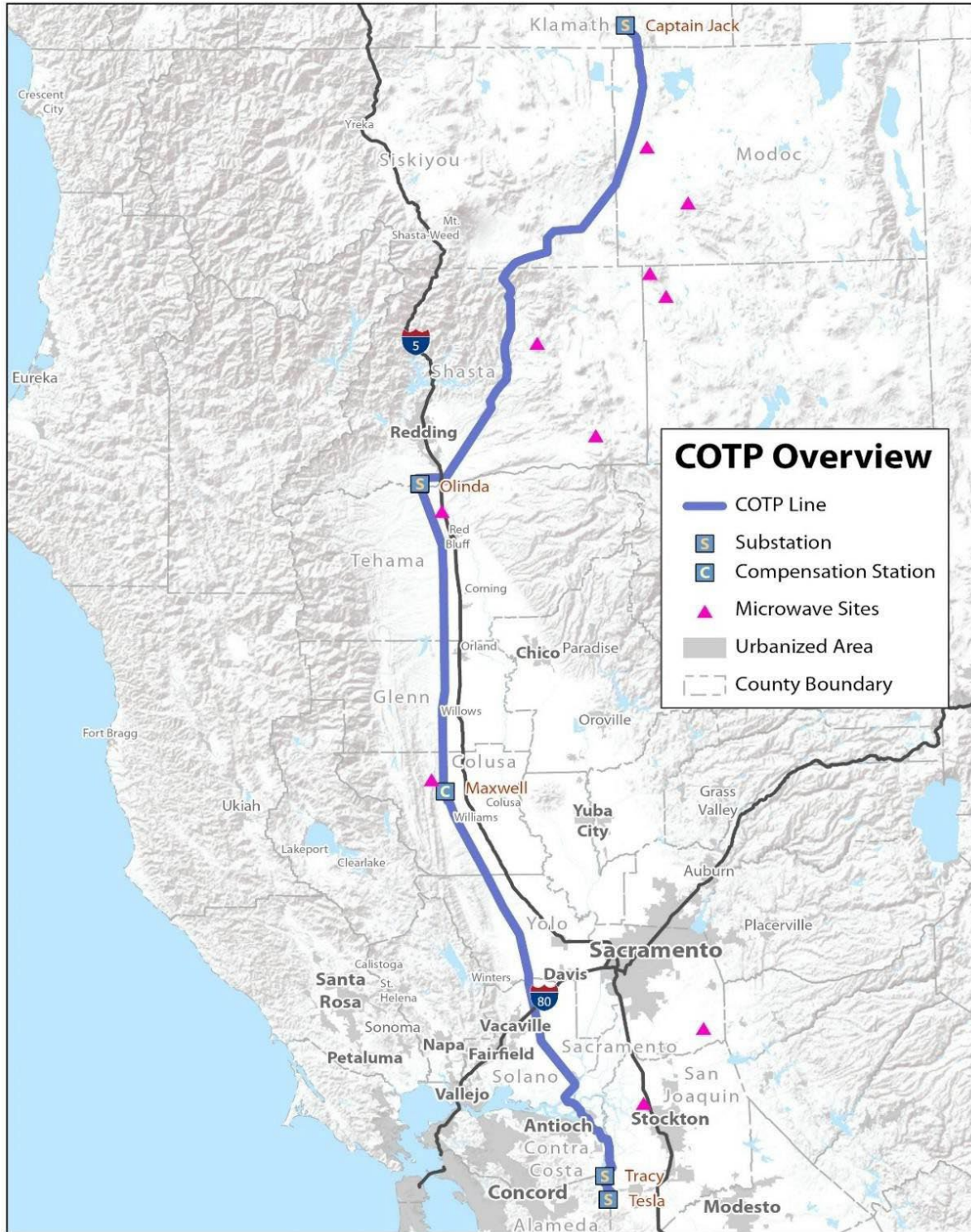


Figure II-1. COTP Overview

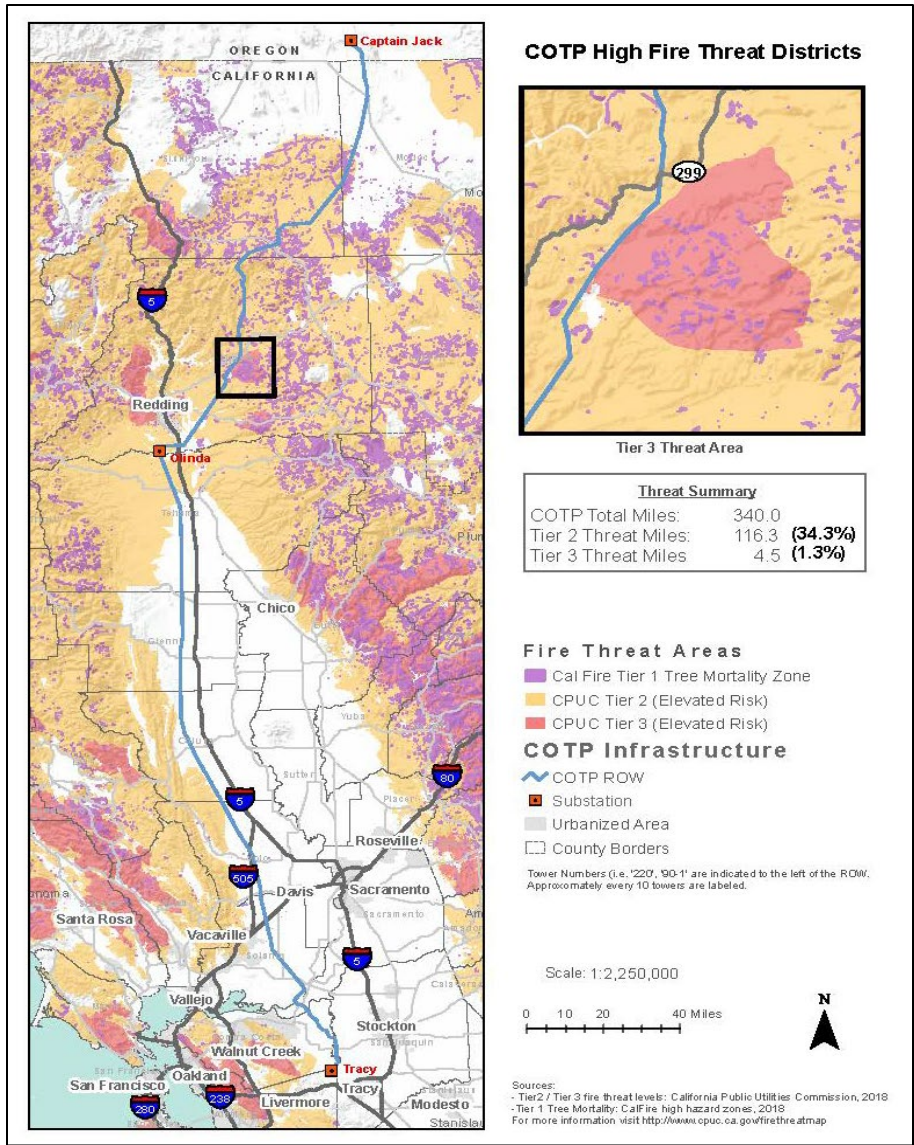


Figure II-2. COTP High Fire Threat Districts

D. Changes to CPUC Fire Threat Map

California PUC Section 8387(B)(2)(K) directs POU's to identify any geographic areas in their respective service territories that are "a higher wildfire threat than is currently identified in the Commission's fire threat map, and where the CPUC should expand the HFTD based on new information or changes in the environment."

TANC does not have an electric service territory or serve end-use electric customers. The geographic areas covered by the COTP are represented by a single ROW and related physical assets, including substations and communication facilities. TANC recognizes the importance of minimizing the potential for those COTP physical assets to ignite wildfires in those geographic areas where they are located.

Accordingly, TANC closely monitored the rulemakings that resulted in the development of the Commission’s fire threat map and HFTDs. That monitoring was followed by a detailed mapping of where the HFTDs intersect the COTP ROW. The mapping indicates that 4.5 miles of the COTP ROW intersects with Tier 3 areas, and 116.3 miles of the COTP ROW intersects with Tier 2 areas (Figure II-2). TANC therefore prioritizes enhanced COTP inspections and maintenance activities as wildfire risk prevention, mitigation and response strategies in those Tier 3 and Tier 2 areas as appropriate. TANC is also maintaining a high level of awareness of potential wildfire risks in all other geographic areas covered by the COTP ROW and assets through established and routine inspections and maintenance activities.

Based on the results of TANC’s ongoing routine and enhanced COTP inspections and maintenance activities in all fire threat areas, TANC has not identified any geographic areas associated with the COTP ROW and assets that may be a higher wildfire threat than is currently identified in the commissions’ fire threat map and agrees that the HFTD map has properly identified the level of wildfire risk in close proximity to the COTP.

E. Context-Setting Information Template, Prevailing Wind Speeds, and Average Weather Conditions

In order to assist the California WSAB in their review of this Plan, we have provided the following context-setting information template followed by tables that summarize prevailing wind speeds and average weather conditions by season at selected locations. The information in this Section is provided within the context of the COTP ROW as the predominant area to which this Plan applies.

Figure II-3. Context-Setting Information Template

Utility Name	Transmission Agency of Northern California	
Right of Way Size	The COTP ROW is 6,795 acres; 340 miles long.	
Owned Assets	√Transmission □ Distribution □ Generation	
Number of Customers Served	[0] customer accounts. Not Applicable; TANC Markets Wholesale Electricity to its Members and to the COTP Participants.	
Population Within Service Territory	[0] people. Not Applicable. TANC’s Members have Service Territories and are responsible for their respective territories and wildfire mitigation plans.	
Joint Powers Agency Member Makeup	<i>Number of Accounts</i>	<i>Share of Total Load (MWh)</i>
	[]% Residential; [100]% POUs []% Agricultural; []% Small/Medium Business; []% Commercial/Industrial	[]% Residential; []% Government; []% Agricultural; []% Small/Medium Business; []% Commercial/Industrial

Utility Name	Transmission Agency of Northern California
Right of Way Location/Topography¹⁵	[32]% Agriculture [.2]% Barren/Other [8]% Conifer Forest [1]% Juniper Sage [30]% Grassland [2]% Hardwood Forest [8]% Hardwood Woodland [.4]% Herbaceous [17]% Shrub [.5]% Urban [.9]% Water
Right Of Way Wildland Urban Interface¹⁶ (Based On Total Area)	[1.2]% Wildland Urban Interface; [4.3]% Wildland Urban Intermix;
Percent of Right of Way in CPUC HFTDs (based on total area)	<input type="checkbox"/> Includes maps Tier 2: [34.3]% Tier 3: [1.3]% See Figure II-2
Prevailing Wind Directions & Speeds by Season	<input type="checkbox"/> Includes maps Please see tables II-1 and II-2, where we have included brief descriptions of prevailing wind speeds and average weather conditions at selected locations by season.
Miles of Owned Lines Underground and/or Overhead	Overhead Dist.: [0] miles Overhead Trans.: [340] miles Underground Dist.: [0____] miles Underground Trans.: [0] miles
	Explanatory Note 1 – Line Miles
Percent of Owned Lines in CPUC High Fire Threat Districts	<i>Overhead Distribution Lines as % of Total Distribution System (Inside and Outside Service Territory)</i>
	Tier 2: [0]% Tier 3: [0]%
	<i>Overhead Transmission Lines as % of Total Transmission System (Inside and Outside Service Territory)</i>
	Tier 2: [34.3]% Tier 3: [1.3]%
	Explanatory Note 4
Customers have ever lost service due to an IOU PSPS event?	<input type="checkbox"/> Yes <input type="checkbox"/> No Not Applicable - TANC does not directly serve retail customers.

Utility Name	Transmission Agency of Northern California
Customers have ever been notified of a potential loss of service to due to a forecasted IOU PSPS event?	<input type="checkbox"/> Yes <input type="checkbox"/> No Not Applicable – TANC does not directly serve retail customers.
Has developed protocols to preemptively shutoff electricity in response to elevated wildfire risks?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No See Section VI.
Has previously pre-emptively shutoff electricity in response to elevated wildfire risk?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, then provide the following data for calendar year 2020: <i>Number of shutoff events: []</i> <i>Customer Accounts that lost service for >10 minutes: []</i> <i>For prior response, average duration before service restored: []</i>
This data is based on the total COTP ROW area using 2010 data from http://silvis.forest.wisc.edu/data/wui-change as a replacement for the WSAB-recommended website, which was not functioning.	

Prevailing Wind Directions and Speeds

Tables II-1 and II-2 provide information on representative monthly wind directions and speeds along the COTP.

Table II-1. Prevailing Wind Direction for Selected Locations Along the COTP ROW

Station	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Ann
Mt. Shasta City	SE	SE	SE	NW	N	N	N	NE	NE	N	NE	SE	N
Redding AP	N	N	N	N	N	N	S	S	N	N	N	N	N
Red Bluff AP	NNW	SSE	N	NNW	SSE	N	S	S	NNW	NNW	NNW	NNW	NNW
Vacaville AP	NNW	S	SSW	SSW	SSW	SSW	S	SSW	SSW	SSW	SSW	NNW	SSW
Sacramento Int. AP	SSE	SSE	S	S	S	S	S	S	S	S	NW	SSE	S

AP: Airport

Prevailing wind direction is based on the hourly data from 1992-2002 and is defined as the direction with the highest percent of frequency. Many of these locations have very close secondary maximum which can lead to noticeable differences month to month. All directions are where the wind blows from.

Source: Western Regional Climate Center. Comparative Table Prevailing Wind Directions. 2021.

Table II-2. Prevailing Wind Speeds for Selected Locations Along the COTP ROW

Station	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Ann
Mt. Shasta City	2.3	3.0	3.7	3.8	3.4	3.7	1.8	1.5	2.3	2.5	2.3	2.9	2.7
Redding AP	5.2	6.8	6.4	6.9	6.6	6.9	5.7	5.4	5.7	5.7	4.9	6.2	6.0
Red Bluff AP	7.4	8.9	8.7	8.9	8.5	8.8	7.2	7.0	7.5	7.7	7.5	8.7	8.0
Vacaville AP	4.4	5.5	6.3	7.1	7.0	7.5	7.3	6.7	5.9	5.5	4.4	4.9	6.0
Sacramento Int. AP	6.9	8.0	7.9	8.7	8.6	9.4	9.0	8.4	7.6	7.3	6.4	7.7	8.0

AP: Airport

Average wind speeds are based on the hourly data from 1996-2006 from automated surface observation stations (ASOS) at reporting airports unless otherwise noted.

Source: Western Regional Climate Center. Comparative Table Average Wind Speeds (miles per hour) 2021.

Average Weather Conditions by Season – Representative Locations

The COTP ROW proceeds southward from the Oregon-California border where average weather conditions are well-represented by the following temperature ranges in Tulelake, McCloud, Redding, Sacramento, and Tracy, California.

- In Tulelake, the summers are warm, dry, and mostly clear and the winters are cold and somewhat dry. Over the course of the year, the temperature typically varies from 20°F to 85°F.
- In McCloud, the summers are warm, dry, and mostly clear and the winters are long, very cold, wet, and partly cloudy. Over the course of the year, the temperature typically varies from 28°F to 86°F and is rarely below 19°F or above 94°F.
- In Redding, the summers are sweltering, dry, and mostly clear and the winters are cold, wet, and partly cloudy. Over the course of the year, the temperature typically varies from 37°F to 99°F and is rarely below 28°F or above 107°F.
- In Sacramento, the summers are hot, arid, and mostly clear and the winters are short, cold, wet, and partly cloudy. Over the course of the year, the temperature typically varies from 39°F to 94°F and is rarely below 31°F or above 102°F.
- In Tracy, the summers are hot, arid, and clear and the winters are short, cold, wet, and partly cloudy. Over the course of the year, the temperature typically varies from 40°F to 92°F and is rarely below 31°F or above 101°F.

III. Plan Implementation Roles and Responsibilities

This Section establishes the roles and responsibilities for implementing this Plan as noted below:

- TANC and COTP Governance, Organization, and Management Responsibilities;
- WAPA Organization and Implementation Responsibilities; and
- TANC Responsibilities for Compliance with All Applicable Laws, Orders, and Regulations.

A. TANC and COTP Governance, Organization, and Management Responsibilities

TANC is a joint powers agency created consistent with California Government Code Section 6500 et. seq. It is governed by a Commission consisting of representatives of each TANC Member. Members of TANC include the Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara and Ukiah; the Modesto and Turlock Irrigation Districts; the Sacramento Municipal Utility District (SMUD); and the Plumas-Sierra Rural Electric Cooperative. Each Member appoints its Commissioner and Alternates. The Joint Powers Agreement signed by TANC Members in 1984 set specific guidelines for the organization and governance of the Agency.

Among other items, TANC must abide by the provisions of the California Government Code and specifically the Ralph M. Brown Act, which governs the meetings of local legislative bodies.

TANC is also required to prepare and adopt an annual budget adequate to meet its operation and maintenance costs as well as its debt service obligations.

The Commission has organized the Agency, as shown in Figure III-1 - TANC Organization Chart, to provide for the governance, management, and conduct of TANC's activities. All decisions are made by the Commission except for those specifically delegated to TANC Chair, TANC General Manager, TANC and COTP Committees, or other officers of the Agency. The decision to adopt this Plan will be made by the TANC Commission and the COTP Management Committee. TANC also designates a representative to the COTP Management Committee, the governing body for the Project. The COTP Management Committee provides managerial and policy direction, cooperation, the interchange of information, and decisions and consultation among those entities that constructed, own, operate, and have transmission entitlements on the Project (i.e. COTP Participants). TANC is the Project Manager, and is responsible for all the direction, conduct, coordination, management, and completion of all Project work. As the Project Manager, TANC chairs the COTP Management Committee. The Management Committee oversees and approves all Project work on behalf of the COTP Participants and includes representatives from each of the six Project Participants:

- TANC
- San Juan Water District
- Carmichael Water District
- WAPA
- City of Redding
- PG&E

TANC is the primary owner and Project Manager for the COTP, and is responsible for providing for the overall management, operation and maintenance of the COTP, and approval of this Plan.

The TANC General Manager will have the overall management responsibility for overseeing implementation of this Plan. TANC's General Manager directs and manages the professionals

engaged by the Agency to carry out its activities in accordance with the direction provided by the TANC Commission and COTP Management Committee.

B. WAPA Organization and Implementation Responsibilities

WAPA is one of four Federal Power Marketing Administrations within the United States Department of Energy whose role is to market and transmit wholesale electricity from multi-use water projects. WAPA also has extensive experience in the operation and maintenance of high-voltage transmission facilities in the Western United States.

The COTP is located and operated within WAPA's Sierra Nevada Region (SNR) and WAPA SNR serves under a contractual agreement with TANC as the operations and maintenance agent for the COTP. The SNR is one of five WAPA regional offices. TANC has full responsibility for compliance with and implementation of this Plan. Acting on behalf of TANC, WAPA supports the implementation of several wildfire-related preventative strategies implemented as part of this Plan under long-standing contractual arrangements with TANC. The contracts include the following:

- The Project Operation and Maintenance Agreement (POMA);
- The TANC-Western Operation and Maintenance Agreement (TWOMA); and
- The TANC-Western Agreement for the Provision of Services Related to the COTP (TANC/Western COTP Agreement).

TANC will also coordinate with federal, state, and local fire management personnel as necessary or appropriate to implement this Plan. This includes, but is not limited to:

- Immediately reporting fires, pursuant to existing TANC and WAPA procedures and the requirements of this Plan;
- Complying with relevant federal, state, and industry standard requirements, including the industry standards established by the CPUC as applicable;
- Collecting and maintaining wildfire data necessary for implementing this Plan; and
- Providing opportunities for regular training programs for relevant personnel associated with Plan implementation responsibilities.

Table III-1 summarizes the TANC and WAPA roles and responsibilities for implementing Plan wildfire prevention strategies, mitigation practices, and related activities.

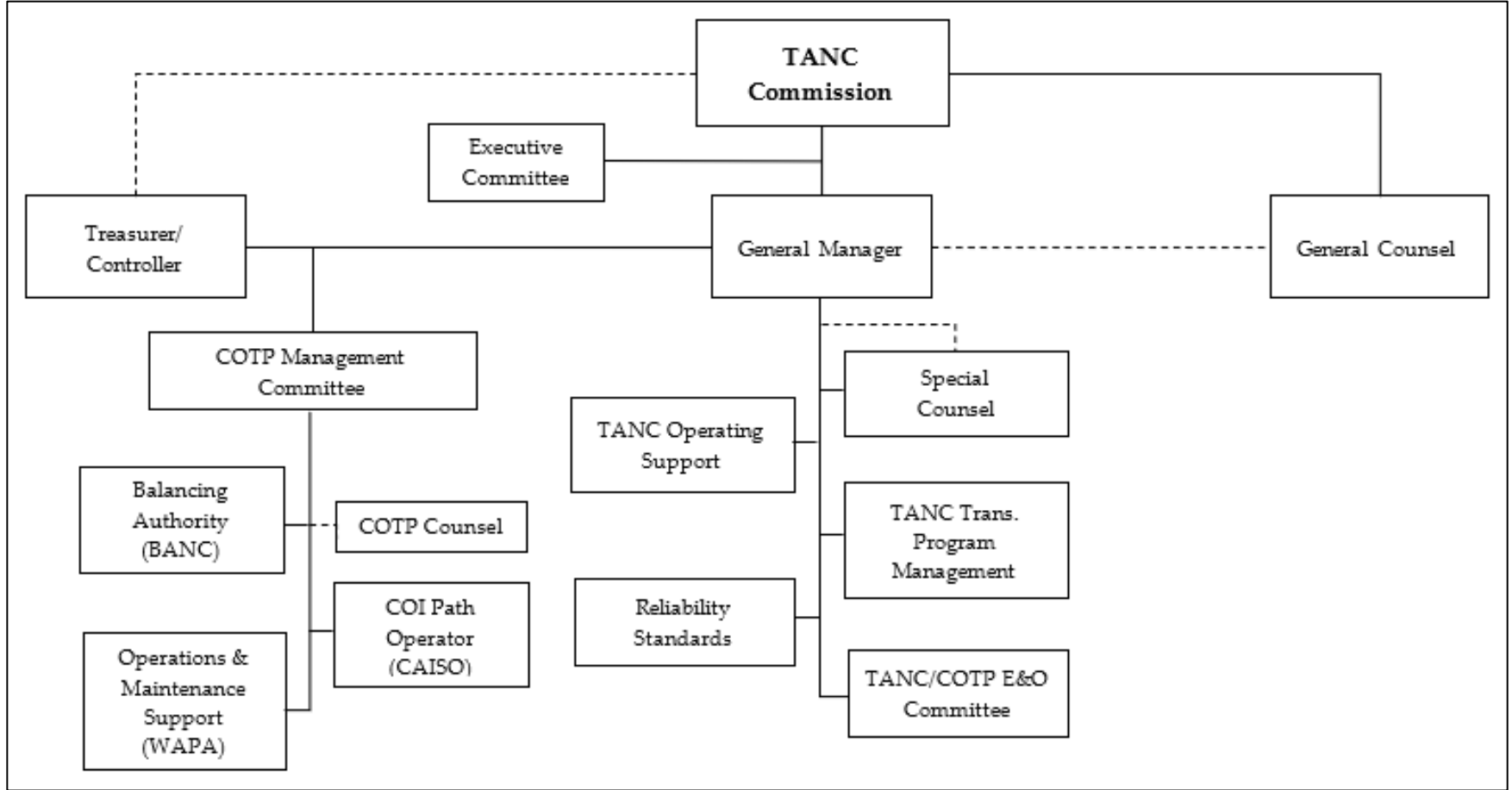


Figure III-1. TANC Organization Chart

BANC: Balancing Authority of Northern California; CAISO: California Independent System Operator. E&O: Engineering & Operations. WAPA: Western Area Power Administration

Table III-1. TANC-COTP Plan Roles and Responsibilities

Role	Wildfire Mitigation Responsibility
TANC Commission & COTP Management Committee	Responsibility for Plan Implementation TANC-COTP Plan Adoption & Governance
TANC General Manager	Plan Implementation Management
WAPA SNR Senior Vice President & Regional Manager	WAPA Operating Agent and Maintenance Responsibilities
WAPA SNR Vice President & Maintenance Manager	COTP Assets and Facilities Inspections
WAPA SNR Vegetation Management & Access Roads Manager	COTP Vegetation Management and Access Roads Management and Inspections
TANC& COTP Environmental & Lands Manager	Plan Implementation Management and Interagency Coordination and Collaboration

C. TANC Responsibilities for Compliance with All Applicable Laws, Orders, and Regulations

Most of the preventative strategies and activities implemented as part of this Plan will be conducted under existing maintenance and vegetation management rights and obligations within and adjacent to the COTP ROW and at Project communication sites. However, in the event that one or more Plan activities could potentially affect environmental and/or natural resources, applicable federal and state laws, orders, and regulations (LORs) will be followed. These LORs may include, but not be limited to:

- National Environmental Policy Act (42 USC 4321 *et seq.*: “NEPA”);
- National Historic Preservation Act (Public Law 89-665; 54 U.S.C. 300101 *et seq.*: “NHPA”);
- Federal Endangered Species Act (16 U.S.C. §1531 *et seq.* (1973): “FESA”);
- Clean Air Act (42 U.S.C. §7401 *et seq.* (1970));
- Clean Water Act (33 U.S.C. §1251 *et seq.* (1972));
- California Environmental Quality Act (Public Resources Code sections 21000 *et seq.*);
- California Air Resources Act (CA Health and Safety Code sections 39000 *et seq.*);
- Applicable Sections of the California Fish and Game Code;
- Porter-Cologne Water Quality Control Act (California Water Code sections 13300-13999 and Title 23 of the California Administrative Code); and
- Applicable Sections of the California Public Resources and Public Utilities Codes.

TANC will also follow applicable industry standards. The CPUC has established minimum overhead line, design, maintenance and inspection standards through GO 95 (Rules for Overhead Electric Line Construction), GO 165 (Inspection Requirements for Electric Distribution and Transmission Facilities), and GO 166 (Standards for Operation, Reliability, and Safety During Emergencies and Disasters).

IV. Wildfire Risk and Risk Drivers Associated with the COTP

A. Introduction

This Section summarizes the three-step process TANC used to assess, categorize, analyze, and prioritize COTP wildfire risks (Figure IV-1).



Figure IV-1. TANC Wildfire Risk Assessment Methodology.

Each of these three steps is described below.

B. Risk Assessment Methodology

1. Step 1 – Reliance on Established Risk Assessment Approach

a. Reliability Centered Maintenance

TANC has had an established reliability risk assessment approach since 1993. It is based on the reliability- centered maintenance (RCM) program provided by WAPA on behalf of TANC and the COTP. RCM is a systematic approach to evaluate equipment and resources. It results in a high degree of facility reliability and cost-effectiveness. RCM is highly dependent on monitoring predictive maintenance technologies, such as sensors that augment direct inspections and measurements that can detect the onset of potential equipment failures. The RCM system thereby allows causal stressors to be eliminated or controlled prior to any significant physical deterioration of COTP equipment.

b. WAPA Transmission Line Software Business Rule and Maintenance Priorities

As the Operating Agent under contract to TANC for COTP operations and maintenance, WAPA maintenance personnel rely on the “Western Area Power Administration – SNR Transmission Line Inspection Software Business Rules (Business Rule)”. It was implemented at WAPA SNR to record conditions found during inspections, follow-up corrective actions, and to store inventory data and other information useful in performing inspections. Information is reported at the structure level and enables SNR to meet North American Electric Reliability Corporation (NERC), Western Electricity Coordinating Council (WECC), and California Independent System Operator (CAISO) reporting requirements.

This Business Rule ensures that COTP inspection data is consistent, reports are accurate and justifiable, system performance is optimized, and ultimately that information obtained is beneficial to all users and supports the maintenance program and reliability standards requirements. It applies to transmission line mobile software used for maintenance structures vegetation, and ROW conditions. Users are required to use the Global Positioning System (GPS) functionality to meet compliance requirements demonstrating that the inspection was completed at the specified structure and/or location. Inspection findings are uploaded to the database every

time the user comes back to the office, preferably on a daily basis. Maintenance priorities for structure, vegetation, and ROW conditions are summarized below.

i) Maintenance Structures

All structure inspection findings are recorded and prioritized for severity using the maintenance priority rating (MPR) system. The following MPR codes are to be used for structure inspection findings:

A – Good or like new. No action required.

B – Minimal defect. Monitor degradation. The finding currently does not significantly impact system performance and/or reliability (e.g., wood pole twisting, rust on lattice steel structure or hardware, etc.), but the line crew will continue to observe during future patrols for further degradation.

C – Moderate defect. Rehabilitation recommended as scheduled maintenance. The finding, if left unresolved, may have a significant impact on system performance and/or reliability, but does not require immediate attention. These findings can be scheduled to be resolved as part of the annual work plan.

D – Severe defect. Repair, reinforce, or replace as soon as possible. The finding has a significant and immediate impact on system performance and/or reliability and must be resolved as soon as possible.

E – Emergency. Critical defect, repair, reinforce, or replace immediately.

ii) Vegetation Conditions

All vegetation inspection findings, including those related to orchards, are recorded and prioritized for severity using the MPR system. When considering MPR codes, the inspector considers the 500kv COTP voltage, required clearance from vegetation to conductors, location of vegetation, species, and temperature. The following MPR codes are to be used for Vegetation findings:

A – No encroachment. No action required.

B – Low Priority. The finding currently does not significantly impact system performance and/or reliability. Monitor condition in the field and incorporate into work plan as necessary.

C – Medium Priority. The finding may significantly impact system performance and/or reliability if not addressed within a reasonable timeframe. The condition is typically addressed within the current or the following annual work plan depending on site conditions.

D – High-Priority. The vegetation is in a location which creates a hazard to personnel in the performance of the line maintenance work effort or exceeds established threshold clearance from the conductor at the time of measurement.

The condition will be addressed as soon as possible within the current or next annual work plan.

E– Emergency. The vegetation has created a hazardous worksite condition for personnel or is preventing equipment set-up to facilitate emergency or urgent repairs to the transmission line, or trees or other vegetation exceeding the following threshold clearance from the conductor at the time of measurement. The condition will be addressed immediately.

iii) Right of Way Conditions

ROW inspection findings that include conditions involving non-vegetation encroachments, construction activities, material storage or dumping, structures built or relocated, and access road issues such as but not limited to erosion, obstructions, and locks are also recorded. The Maintenance Structure MPR codes are used for ROW findings.

c. 2022 Maintenance Software Update

In 2022, WAPA upgraded and improved their line inspections by deploying the IQGeo geospatial productivity and collaboration software to enhance the quality of equipment inspections data and information collected. The application was deployed in WAPA’s web services cloud that supports all of its storage, computational power, and functionality. Maintenance personnel can access location-specific maintenance records by structure and equipment while entering current inspection data and information. These records are accessible during ground and aerial patrols. IQGeo allows crews to capture information more quickly and easily, and is significantly faster than the software that had been in use for approximately ten years prior.

This database upgrade has made the collection of structure and equipment inspections data more holistic, more current by facilitating greater inspection efficiencies, and more flexible. Overall, it has strengthened the ability to preventatively detect equipment and facility stressors, and therefore maintain COTP reliability while simultaneously addressing potential wildfire ignition risks from COTP equipment and structures.

Step 2 – Identification and Categorization of Potential Wildfire Risks and Consequences

Based on their experience and expertise, TANC identifies and categorizes the wildfire risks, risk drivers, and potential consequences hypothetically associated with a COTP-caused wildfire ignition event, as summarized below.

a. Wildfire Risks and Risk Drivers

TANC has identified four categories of COTP-associated wildfire risks:

- Equipment, Structure, and Facility Failures;
- Topographic and Climatological Factors;
- Object-to-Equipment Contacts; and
- Wire to Wire Contacts.

Those failures capable of ultimately leading to heat, sparks, or flames — combined with flammable debris, litter, vegetation, wood waste, and other debris — could then result in a

wildfire. Brief descriptions of each of these identified risks and their respective drivers are provided below.

i) Equipment, Structure, and Facility Failures

- *Downed Conductor:* A downed conductor (or "wire down") occurs when a conductor drops or breaks from its designed attached or spliced location on or between towers and ends up on-the-ground, or free from its attachment point, sometimes in an energized mode. A wire down can result from a variety of factors. An energized conductor can ignite a fire or cause a shock hazard.
- *General Equipment Failure:* Electric equipment failure can be a source of a downed conductor or ignition. Failure of components such as tower failure, conductor splices, connector, hot line clamps, and insulators can result in wire failure and end up in a wire down situation, sometimes in an energized mode that could ignite a fire.
- *Communication Site Ignition:* Wildfire ignitions associated with communication site equipment could result in a wildfire.
- *Weather-Related Equipment Failure:* Weather conditions may play a large part in the potential failure of COTP equipment. Excessive wind, lightning, and exposure to weather over time can degrade the integrity of the electrical components and lead to failure of one or more of the electrical parts causing an ignition.

The primary risks therefore associated with the design, construction, and operation of the Project towers, conductors, and all associated structural components, facilities, and equipment is the extent to which long-term metal fatigue and structural integrity degradation results from repeatedly applied loads. Metal fatigue is directly related to the number of stress cycles undergone by a part and the level of stress imposed on the part. Fatigue failures increase if parts have stress raising contours or if stress raisers such as notches, holes and keyways are put into the part. There is also a relationship between a metal's ultimate tensile strength and hardness and its ability to handle fatigue loads. The higher the tensile strength and hardness, the more likely it will fatigue if it is subject to high fluctuating loads.

ii) Topographic and Climatological Risk Factors

- *Topographic Factors:* The COTP crosses several miles of remote, variable, and often rugged topography and terrain. COTP towers are located at elevations ranging from sea level or slightly below near the Sacramento- San Joaquin Delta to over 6,000 feet in Shasta County. The terrain ranges from flat, cultivated agricultural lands to the Sierra Nevada foothills to steep mountain slopes and lava formations. Lee-side mountain slopes can be prone to strong downslope wind gusts under certain weather conditions. These gusts can cause increased risk of wires down and/or contacts between conductors in that area, leading to potential wildfire ignitions. Winds can also be funneled through canyons and mountain passes, resulting in similar effects.
- *Climatological Factors:* The highest fire danger occurs under weather conditions with very low humidity and strong winds. High temperatures, fuel loading, fuel type, and dead- and live-fuel moisture content are also important factors.

Climatological risk drivers that may affect the climatic loading and associated stressors on the COTP may include:

- Higher temperature fluctuations and wind speed impacts;
- Changing seasonal weather patterns associated with long-term climate change; and
- Extended drought that may accelerate wear and tear on COTP facilities and equipment.
- *Climate Change Adaptation Risks:* Climate change is a multi-year, long-term risk factor with variable local effects that are not possible to reliably project for the COTP over shorter time frames. This Plan will be implemented to annually account for, document and address the effects of such weather-related factors through annual Plan inspections, monitoring and adjustments directed towards actively reducing wildfire risks on an ongoing basis as they are detected.

iii) Object-to-Equipment Contacts

- *Vegetation Contact:* Vegetation such as falling or leaning trees, windblown branches, and trees growing in the ROW can contact powerlines under a variety of conditions. The contact can cause sparks or arcs. In some instances, the tree or branch may contact the powerline for a prolonged period and continue sparking or ignite due to resulting sparks.
- *Contact by Foreign Object:* Foreign objects coming into contact with COTP facilities can also introduce sources of ignition. For example, drones or light aircraft contacting the conductors may be highly conductive and could result in phase-to-phase faulting. In the worst-case, this can cause the conductor to fail and land in an energized mode, causing arcing and sparking in dry conditions.
- *Arcs Caused by Unauthorized Burn/Smoke:* Intentional brush and debris pile burning can lead to smoke that can form a low impedance conductive path between high-voltage conductors. The resulting arc can in some cases spark fires on-the-ground below.
- *Insulator Contamination:* Contamination on insulators can create a path for electricity to flow. This unintended path can track and cause a fault. Typical causes are ash, dust, debris and bird excrement on the insulator. High-voltage insulator cleaning paired with monthly inspections is necessary to ensure service is not unintentionally interrupted through a flashover. A proactive contamination prevention and maintenance program removes any material that settles on the surface and retains its insulating properties.
- *Vandalism.* COTP equipment may also be vandalized and damaged, which may cause sparks and fires.

iv) Wire to Wire Contacts

When two or more energized conductors get within close proximity of one another, they could cause sparks and possible material to be ejected. There are many factors that could lead to such an occurrence. Any type of shaking of the tower or high winds may cause powerlines to sway and touch. Certain types of faults (short circuits) down the line can cause powerlines to gallop

(i.e. bounce and buck) that potentially leads to conductors getting within close proximity of one another.

b. Wildfire Risk Event

The risk event being addressed in this Plan is the risk associated with the ignition of a wildfire caused by or directly associated with the operations and maintenance of COTP facilities, assets, equipment, and/or personnel.

c. Wildfire Consequences

The impacts of a wildfire event can result in substantial loss and financial instability for the COTP Participants, TANC, and its Members. Worst-case scenarios present several consequences that are also particularly meaningful to COTP Participants and operators. Those severe impacts include:

- Injury / death of field crews and/or the public;
- Damage and loss of real and personal property/structures;
- Litigation, resulting in financial impacts to COTP Project Participants, TANC, and its Members;
- Impact to TANC's financial status and creditworthiness;
- Long-duration outages and grid reliability issues;
- Damage to TANC's reputation/erosion of public confidence;
- Environmental, ecosystem, and natural resources damages; acres burned;
- Compliance failures and/or penalties;
- COTP equipment damage; and
- Inability for TANC and the COTP to acquire adequate insurance.

d. Wildfire Risks, Risk Drivers, and Potential Consequences Bowtie Framework

TANC has framed COTP wildfire risks, risk drivers/root causes, risk event, and potential consequences in a bowtie diagram (Figure IV-2). The bowtie diagram supports the analysis and prioritization of TANC's wildfire risks by providing a visual representation that allows TANC to consider a range of potential consequences associated with one or more types of risk.

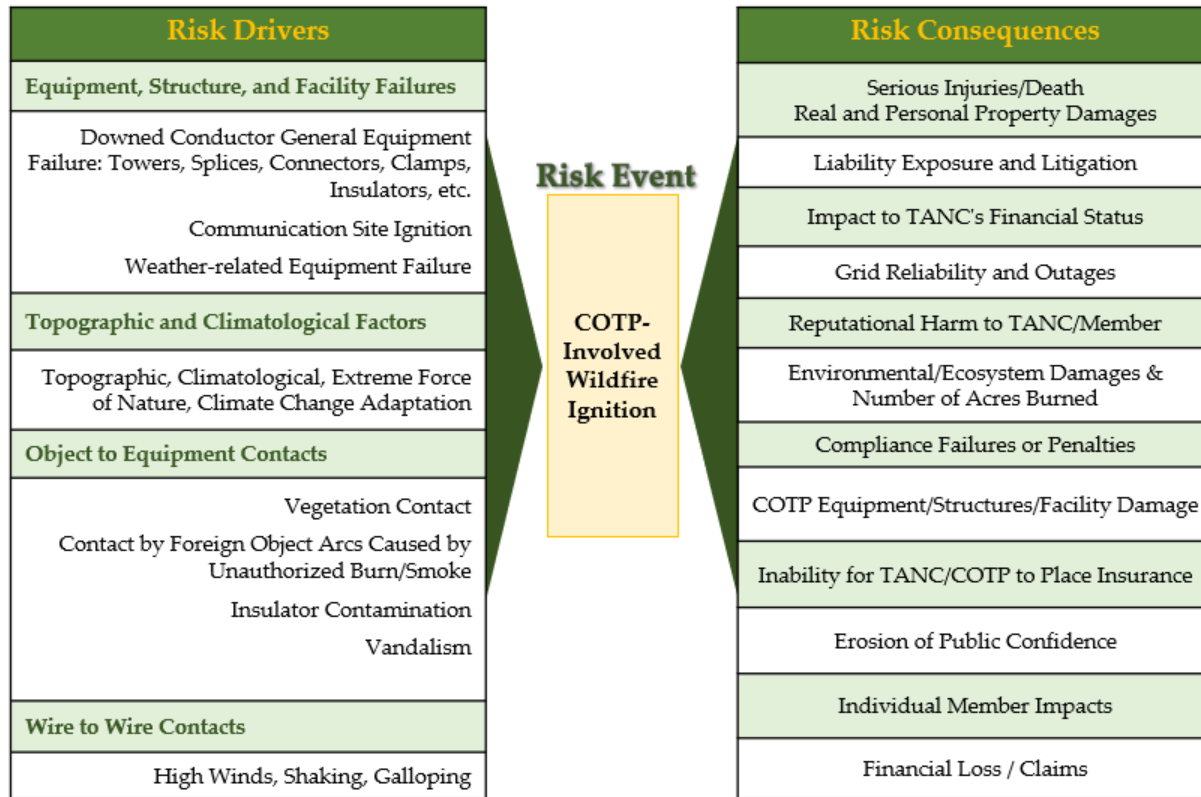


Figure IV-2. TANC Bowtie Wildfire Risk Assessment Summary Diagram

2. Step 3 - TANC and COTP Enterprise-Wide Wildfire Risk Prioritization

Wildfire risk prioritization is an enterprise-wide process for TANC because of the magnitude of the potential consequences. As described in Section III, TANC has several organizational controls in place to manage risks and their consequences. The TANC Commission, General Manager, and TANC and COTP committees meet several times annually to manage Agency risks that can be summarized into five general categories that include:

- Financial Risks;
- Legal Risks;
- Regulatory Risks;
- Security and Safety Risks; and
- Reputational Risks.

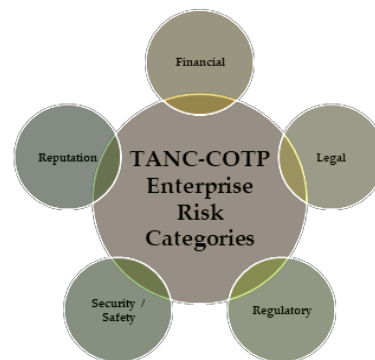


Figure IV-3. TANC Enterprise Risk Categories

The TANC wildfire risks and consequences summarized in the bowtie framework (Figure IV-2) also fall into one or more of these enterprise risk categories (Figure IV-3). TANC has initially prioritized these risks consistent with the intent of PUC Section 8387(a), which states that:

“Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.”

TANC recognizes that: 1) a fire ignition becomes a wildfire when it spreads beyond immediate containment; and 2) it becomes catastrophic when it spreads to result in consequences that damage lives, property, and other resources. Based on this recognition, TANC has initially prioritized COTP-associated wildfire risks based on those most likely to ignite a fire, and those most likely to cause it to spread to become a potentially catastrophic wildfire. Consistent with these precepts, and routine reviews of COTP reliability risk assessment data, TANC has prioritized potential wildfire risks as presented in Figure IV-4:

These wildfire risks form the basis for the development and implementation of TANC wildfire prevention, mitigation and response strategies presented in Section V.

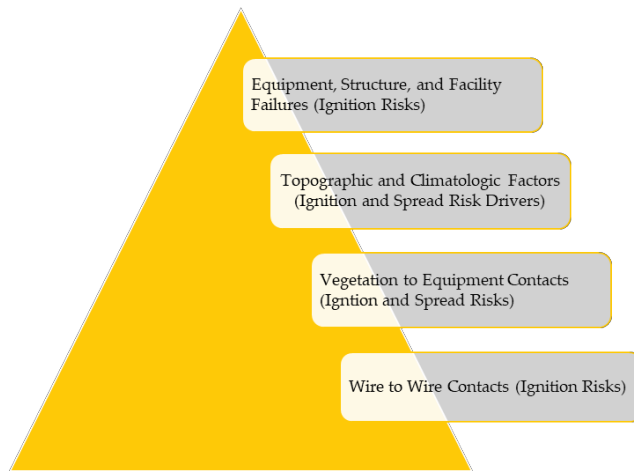


Figure IV-4. Prioritized List of TANC-COTP Wildfire Risks

V. Wildfire Prevention, Mitigation, and Response Strategies

A. Introduction

This Section presents the wildfire prevention, mitigation, and response strategies (Wildfire Strategies) to be implemented as part of this Plan. Two sets of mutually complementary TANC Wildfire Strategies are described below. The first set of strategies are referred to as “Enhanced” Wildfire Strategies. Enhanced Wildfire Strategies are those inspections, maintenance, vegetation and access roads management, and situational awareness activities that are being scheduled more frequently and augmented with technology to address potential wildfire ignition risks that may be associated with the HFTD areas and in specific compliance with PUC Section 8387.

Those Enhanced Wildfire Strategies are then complemented by the second set of established TANC wildfire prevention, mitigation, and response strategies discussed next. The combined implementation of the established and Enhanced Wildfire Strategies is the foundation upon which this Plan will continue to be implemented as it builds upon its lessons learned.

B. Enhanced Wildfire Prevention, Mitigation, and Response Strategies

TANC’s Enhanced Wildfire Strategies will be implemented with respect a reasonable balancing of time, location, and risk priorities as informed from lessons learned from 2020 through 2022. These time, location, and level of risk considerations to be balanced are described as:

- *Time Prioritization:* Enhanced strategies will be implemented either before the end of June or at any other time each year. For activities scheduled for implementation before the end of June, TANC will consider the forecasted critical fire weather conditions on a county-specific basis. The COTP crosses 12 counties, including (from north to south) Modoc, Siskiyou, Shasta, Tehama, Glenn, Colusa, Yolo, Solano, Sacramento, Contra Costa, San Joaquin, and Alameda. Time prioritization scheduling will always consider the associated fire risks.
- *Location Prioritization:* Enhanced Wildfire Strategies scheduled in HFTD Tier 3 areas are of the first, or highest priority, and strategies scheduled in HFTD Tier 2 areas are of the second highest priority. Enhanced Wildfire Strategies scheduled in all other areas are of the third highest priority. An additional location-related priority is the consideration of whether the strategy can be implemented depending on the level of control TANC has in exercising existing ROW easement rights.
- *Level of Risk Priority:* Enhanced Wildfire Strategies will be implemented consistent with the following risk priorities:
 1. Equipment, structure, and facility failure risks;
 2. Topographic and climatological factors;
 3. Vegetation to equipment contact risks; and
 4. Wire to wire contact risks.

Enhanced Wildfire Strategies scheduled for 2023 through 2025 implementation, consideration, and evaluation for their wildfire risk reduction values are presented in Figures V-1 through V-6. Each of the strategies will be evaluated from 2023 through 2025 and may be modified annually if location-specific or if they are intended to be implemented in high-priority areas along the COTP

ROW. Annual modifications will focus on location-specific activities where the highest priority locations are addressed earlier in the three-year evaluation period. The Figures will continue to include brief descriptions of enhanced strategies and supporting activities, followed by the approach and progress for each of years 2023 through 2025 to support annual monitoring.

Specifically, Figures V-1 through V-6 track the annual approaches and progress achieved for each of the Enhanced Wildfire Strategies to be considered from 2023 through 2025. For each year, the progress achieved becomes the basis for the subsequent years' approach. This is consistent with the monitoring and auditing of plan implementation discussed in greater detail in Section VII, below. New Enhanced Wildfire Strategies begin with number 16 in recognition that the 15 strategies monitored and audited from 2020 through 2022 (Appendix A) have been completed or integrated into established programs with appropriate lessons learned.

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Figure V-1. Wildfire Strategy 16 - Additional Utility Forester

Category: Enhanced Wildfire Strategy	Frequency: Ongoing
HFTD Tier(s): All	Location: In ROW; Outside ROW; Communication Site
Wildfire Risks Addressed: Structure and/or Equipment Failure	
<p>Strategy Description: This strategy supplements current field staff by adding one additional utility forester to provide vegetation management support services. It enables TANC to increase existing capacity to flexibly address vegetation management issues as they arise. The utility forester will be responsible for:</p> <ul style="list-style-type: none"> • Patrolling the COTP ROW, access roads, and communication sites to identify, document and track vegetation encroachments and routine vegetation management activities needed; • Identifying off-ROW and in ROW hazard and/or danger trees and fuel loads; • Preparing work sites by flagging off-ROW boundaries, sensitive resources, hazard and/or danger trees, sediment sources, and access routes; and • Documenting and tracking the progress of all scheduled vegetation and road maintenance projects in the field while maintaining frequent communications with affected landowners. 	
<p>2023 Approach: In 2023, WAPA and TANC will collaboratively focus preliminary efforts on:</p> <ul style="list-style-type: none"> • Documenting the scope of work and corresponding qualifications for the additional utility forester; • Requesting pricing quotes from vendor(s) who offer additional utility forester services and support; and • Determining and budgeting adequate funding needs for the additional utility forester. 	
2023 Progress:	
2024 Approach:	
2025 Approach:	
2025 Progress:	
Wildfire Risk Reduction Lessons Learned:	

Figure V-2. Wildfire Strategy 17 - COTP ROW Visual Coverage for Wildfire Detection

Category: Situational Awareness	Frequency: Ongoing
HFTD Tier(s): All	Location: In ROW; Outside ROW
Wildfire Risks Addressed: Topographic/Climatological, Emergency and Wildfire Response Constraints	
Strategy Description: This strategy will compile information on viewsheds from existing fire lookout stations, remote camera networks, and other sources with the intent of: 1) mapping the extent of existing visual coverage of the COTP ROW; and 2) identifying COTP segments where visual wildfire detection gaps exist. TANC may contract for additional viewshed analyses to determine how and where those visual wildfire detection gaps need to be filled with remote cameras or other related technologies. Based on the mapping efforts, TANC will then coordinate with the appropriate agencies and/or landowners regarding the feasibility of installing remote cameras to fill those visual wildfire detection gaps along the COTP ROW.	
2023 Approach: TANC will coordinate with WAPA, the USFS, CAL FIRE, representatives of the ALERT WILDFIRE system, PG&E, and others as needed to identify the extent of the COTP ROW that can currently be viewed for detecting wildfires. This will include requests for existing viewshed geographic information system (GIS) shapefiles from fire lookout stations and remote cameras, the development of COTP ROW viewshed maps using that data, and tentative identification of where ROW visual gaps exist.	
2023 Progress:	
2024 Approach:	
2025 Approach:	
2025 Progress:	
Wildfire Risk Reduction Lessons Learned:	

Figure V-3. Wildfire Strategy 18 - COTP ROW Fuels Accumulations & Fuel Breaks Assessment

Category: Situational Awareness	Frequency: Ongoing
HFTD Tier(s): All	Location: In ROW; Outside ROW
Wildfire Risks Addressed: Topographic/Climatological, Emergency and Wildfire Response Constraints	
<p>Strategy Description: This strategy will focus on the northern segment of the COTP ROW across forest and shrublands. It will be directed primarily towards four efforts, including:</p> <ol style="list-style-type: none"> 1. Mapping existing fuels accumulations along the COTP ROW to prioritize highest-risk areas using Light Detection and Ranging (LiDAR) and other available methods and information; 2. Characterizing the existing network of fire breaks and fuel breaks along the COTP ROW; 3. Identifying and prioritizing areas where expanded and/or additional fuel breaks would reduce flammable fuels adjacent to the COTP ROW; and 4. Coordinating with state and local agencies and landowners regarding the expansion of existing fuel breaks, or the development of new fuel breaks focused on reducing wildfire risks near the COTP. 	
<p>2023 Approach: TANC will focus on the first two efforts within this strategy:</p> <ol style="list-style-type: none"> 1. Mapping existing fuels accumulations along the COTP ROW to prioritize highest-risk areas using LiDAR and other available methods and information; 2. Characterizing the existing network of fire breaks and fuel breaks along the COTP ROW; GIS-based mapping of current fuels accumulations and existing fuel breaks locations, ownership, and environmental and natural resources layers will be augmented by site visits. This mapping and visits will serve as a basis for the identification and prioritization of candidate areas for expanded or new fuel breaks that can support wildfire response and risk reduction activities. 	
2023 Progress:	
2024 Approach:	
2025 Approach:	
2025 Progress:	
Wildfire Risk Reduction Lessons Learned:	

Figure V-4. Wildfire Strategy 19 - Expanded Collaboration with State & Local Agencies

Category: Vegetation Inspections & Management	Frequency: Ongoing
HFTD Tier(s): All	Location: In ROW; Outside ROW
Wildfire Risks Addressed: Topographic/Climatological, Emergency and Wildfire Response Constraints	
<p>Strategy Description: This strategy focuses on expanding COTP wildfire risk reduction collaboration activities to California state and local agencies who have identified wildfire risk reduction projects that may be mutually beneficial to the COTP and the surrounding local areas. Emphasis will be placed on prioritizing projects already identified by local agencies that are ready for implementation with respect to all environmental permitting. TANC will explore opportunities for entering into funding agreements with the appropriate local entities to implement fuels reduction activities that protect the COTP ROW and areas and communities adjacent thereto. This strategy may be used for fuels reduction, fuel breaks, or other fuels treatment and fire response projects where the wildfire risk reduction benefits are most advantageous to TANC and the potentially benefitting localities.</p>	
<p>2023 Approach: TANC will confer with CAL FIRE to identify specific CAL FIRE unit plans, battalions, and accompanying projects near the COTP ROW that may be candidates for funding. Additional efforts will include coordination with one or more California Fire Safe Councils to identify potential opportunities for fuels reduction projects of mutual benefit.</p>	
2023 Progress:	
2024 Approach:	
2025 Approach:	
2025 Progress:	
Wildfire Risk Reduction Lessons Learned:	

Figure V-5. Wildfire Strategy 20 - COTP Tier 3 & Tier 2 Access Road Maintenance & Brushing

Category: Access Road Maintenance	Frequency: Annual
HFTD Tier(s): All	Location: In ROW; Off-ROW; Communication Sites
Wildfire Risks Addressed: Topographic/Climatological, Emergency and Wildfire Response Constraints	
Strategy Description: This strategy will focus on the new herbicide and brushing master contract that WAPA will be implementing that streamlines the process for expediting road maintenance and improvement activities on an ongoing basis. The scope of work for road maintenance and related activities will include: 1) access road assessments and recommendations; 2) cutting roadway vegetation; 3) removing and disposing of deadfall from access roads; 4) vegetation mowing and brushing; and 5) herbicide applications.	
2023 Approach: In 2023, WAPA will target approximately five miles of access road maintenance and brushing in the Tier 2 HFTD.	
2023 Progress:	
2024 Approach:	
2025 Approach:	
2025 Progress:	
Wildfire Risk Reduction Lessons Learned:	

Figure V-6. Wildfire Strategy 21 - Microwave Sites Defensible Space

Category: Communication Site Inspections	Frequency:
HFTD Tier(s): All	Location: In ROW; Outside ROW; Communication Site
Wildfire Risks Addressed: Equipment, Structure, and Facility Failures	
<p>Strategy Description: This strategy is intended to fire harden the area immediately surrounding COTP microwave communication sites to protect those vulnerable facilities and: 1) reduce the risk of outward spread of a fire that has ignited from within the facility while also; 2) providing improved perimeter safety that protects the sites from approaching external-source fires. Microwave sites are currently cleared of vegetation within the fenced perimeter and 10 feet outside of that perimeter. This effort would extend that perimeter beyond the current 10 feet to a distance up to 100 feet if possible. The extent of the expanded hardened perimeter will depend on land ownership and land management restrictions. This strategy will follow Cal Fire’s defensible space guidelines using a defensible space zone approach to the extent possible given management and ownership limitations.</p>	
<p>2023 Approach: Staff will:</p> <ul style="list-style-type: none"> • Map the defensible space zones for each COTP communication site identified as wildfire-vulnerable; • Identify ownership and or management responsibilities for these sites and their projected zones; and • Reach out to affected owners and/or managers to collaboratively plan the approach for creating and maintaining defensible space, the associated benefits, and potential impacts. 	
2023 Progress:	
2024 Approach:	
2025 Approach:	
2025 Progress:	
Wildfire Risk Reduction Lessons Learned:	

C. TANC's Established Wildfire Prevention, Mitigation, and Response Strategies

The Project has been operated and maintained since energization in 1993 to maintain safety, reliability, resiliency and, among other things, to address three key considerations:

1. The potential for an outage of the COTP;
2. The potential for an ignition that could cause a wildfire; and
3. The need to rapidly and effectively respond to such an ignition to limit its spread and consequent damages to the transmission line, its ROW, and other potentially affected lives, property, and resources.

TANC's current, established operations and maintenance, vegetation and fuels management, and access road maintenance programs have been developed and refined in response to these three considerations. These activities form a strong foundation for maintaining Project reliability and reducing wildfire risks. They are complemented by ongoing fire response, fuels management, and access road activities funded through agreements with the USFS.

1. Operations and Maintenance Inspections and Activities

a. Tower and Equipment Inspections

i) Inspection Program Foundation

COTP tower and equipment maintenance inspections have been developed to maintain or improve upon the design criteria used for the Project. Development of the design criteria for the COTP was based on the requirements of GO 95 and the National Electrical Safety Code. Project design and construction relied on available weather and climatic data to calculate the climatic extremes and variabilities that would need to be withstood for the Project to operate properly. The key weather and climatic variables included ice build-up, wind speeds and temperature. Among a complex set of engineering considerations, conductor stringing also needed to comply with minimal horizontal and lateral clearance distances from the ground surface, certain crossings, and structures located near the ROW. COTP substation and communication site inspections focus on reliability and preventative maintenance.

On behalf of and under delegated contract to TANC, WAPA conducts the following aerial and ground transmission line structure and equipment inspections:

- Semi-annual aerial line patrols with intermediate patrols as needed. Patrol crews look for encroachments, new developments that may interfere with maintenance activities, and tower, conductor and hardware conditions.
- An aerial LiDAR patrol is performed typically every five years, with specific frequency being informed by a number of factors, including field conditions and regulatory requirements. LiDAR provides clearances between equipment and information on other items such as trees and structures.
- Maintenance crews conduct annual ground line patrols; scheduled year- round. Conditions are noted and scheduled for repair.
- Twenty (20) percent of all tower structures are subject to an annual detailed ground inspection. Every 5th tower is thoroughly inspected annually by the line crew which results in every COTP tower being ground-detailed-inspected every five

years. A close visual inspection of the tower is conducted. Crews look for any loose steel, bolts on-the-ground or any other aberrant condition. Towers are climbed as necessary to identify and schedule repairs.

- As a good utility practice, ground patrols are deployed to investigate line outages.

ii) 2022 Inspection Program Additions

The following tower and equipment activities were added in 2022 based on lessons learned from 2020 through 2022. These activities have become established to augment and strengthen the program foundation.

- *Additional Maintenance Patrolman:* WAPA added one additional maintenance patrolman in 2019. Performance was monitored from 2020 through 2022. The patrolman is dedicated to conduct transmission line ROW inspections and is responsible for observing and accurately reporting ROW conditions on all patrols to include but not be limited to danger trees, brush, and fire hazards and any other unsafe or damaged equipment. The added patrolman supports all of the line, structure, equipment, and vegetation inspections within and adjacent to the COTP ROW. This position has been integrated into all COTP ROW inspection programs on an ongoing basis.
- *Infrared and Corona Inspection Contracts:* Multi-year infrared (IR) and Corona inspection contracts for the COTP were negotiated and executed from 2020 through 2022. These contracts will ensure a reliable base of resources capable of augmenting existing inspection capabilities. Specialized IR and ultraviolet/Corona cameras are either hand-held or mounted to helicopters, the COTP ROW flown, and imagery then captured. Special imagery attention is paid to splices, conductor connection and attachment points and insulators. The IR scan detects temperature differences and heat signatures of components, which may indicate problems (not visible to the naked eye) that could result in component or conductor failure. The Corona scan detects the degree of electric discharge or 'leakage' due to the ionization of air surrounding high-voltage electric components, which, if substantial enough, could result in an arc flash or mechanical component failure. In addition, a high-definition camera takes pictures of anomalies found for review. A corrective action plan is developed for anomalies and integrated with any identified repair or replacement needs.
- *Detailed Tier 2 and Tier 3 Inspections:* Detailed aerial, climbing, and/or ground-based tower and equipment inspections were conducted in HFTD Tiers 2 and 3 from 2020 through 2022. These inspections have been integrated seamlessly into long-term established inspection programs and can usually be completed no later than June 30 of every year barring unforeseen circumstances.
- *Unmanned Aerial Vehicle (UAV) Inspection Program:* WAPA evaluated the feasibility of using Unmanned Aerial Vehicle (UAV or Drone) inspections of the COTP from 2020 through 2022. The evaluation and monitoring focused on research into the use of drones for inspections of all COTP, facilities, assets, equipment, and the ROW. It was found that drones offered several potential inspection capacity

improvements that have been integrated into established inspection programs. UAVs are capable of close-order aerial inspections of transmission towers and conductors, communication sites, and existing and potential ROW encroachments. Drones can also provide more precise, repeatable data based on Geographic Positioning System (GPS) coordinates. The use of UAVs may also provide the opportunity to improve the accuracy and frequency of inspections and resulting records and reduce potential safety hazards conventionally associated with transmission line climbing inspections. The addition of one additional maintenance patrolman under Wildfire Strategy No. 1 accelerated the development of a UAV inspection program. WAPA also trained and licensed three additional UAV pilots in 2022, with additional recruitment planned in the future. WAPA will move forward with expanding the UAV program to include additional drones and train candidates as UAV pilots become licensed.

TANC and WAPA will continue to research ways to supplement or improve on the current available mapping resources with the use of new technologies or wildfire risk mitigation services, including but not limited to information, tools, and resources that are available through the Wildfire Forecast & Threat Intelligence Center and other developing risk modeling applications. We will continue to explore opportunities to participate in demonstrations and initiate pilot projects that use these new tools to reduce wildfire risks associated with the COTP.

b. Substations Inspections

Inspection activities associated with substation maintenance at Olinda Substation, Maxwell Compensation Station, and Tracy Substation expansion include:

- Perform monthly substation inspections at Olinda, Tracy, and Maxwell.
- Perform annual infrared survey of substation equipment.
- Conduct facility and site security inspections and assessments at the Olinda, Maxwell, and Tracy stations in accordance Critical Infrastructure Protection requirements.

c. Communication Sites Inspections

Communication site maintenance inspections include, but are not limited to:

- Performing semi-annual site inspections.
- Inspecting, adjusting, cleaning, and repairing communication equipment, batteries and chargers, antenna towers and wave guides, and auxiliary power supplies, as needed.
- Repeater site inspection, adjustment, and cleaning, and repair of station service-related equipment, including the building, batteries and charger, heaters and air conditioners, antenna towers and waveguides, and auxiliary power supplies, as needed including weed control, fence and gate, etc.

2. Vegetation, Fuels Management, and Access Road Maintenance Inspections and Activities

a. ROW Vegetation Management Inspections

i) Inspection Program Foundation

TANC uses inspection and recordkeeping tools that integrate existing GIS and computer maintenance management system databases in support of the following inspections.

- Line vegetation management inspections are conducted annually with no more than 18 calendar months between inspections.
- Aerial patrols are typically flown quarterly and can be scheduled to capture changes in ground conditions, a full season of vegetative growth and flight visibility.
- Ground patrols are conducted annually and can be scheduled to consider access restrictions, fuel hazards and winter conditions.
- Inspections may also be conducted more frequently if site conditions such as vegetation growth warrant them to prevent an encroachment.
- Utility arborists and registered professional foresters monitor COTP ROW conditions year-round.

ii) 2022 Inspection Program Additions

From 2020 through 2022, TANC and WAPA evaluated the use of four separate types of aerial imagery for their individual and mutually complementary capabilities in improving vegetation management inspections within and adjacent to the COTP ROW. These included:

- LiDAR surveys covering the entire COTP ROW and an additional 300-foot-wide lateral buffer;
- Aerial photography and streaming video of the 200-foot wide COTP ROW and a 50-foot wide lateral, adjacent buffer zone on either side of the ROW edges for a total width of 300-feet of photographic coverage; and
- A one-mile-wide-path of ortho-rectified photography extending along the COTP ROW.

LiDAR, Oblique photography, Ortho-rectified photography and high-definition video are of limited value, with each type of imagery providing some initial information on areas with potential ROW encroachments and/or hazards. Regardless of these initial values, utility arborists and line patrolmen still need to visit all of those areas and sites to confirm access, slope and soil stability, terrain, and other conditions on-the-ground.

Based on these lessons learned, TANC and WAPA have adopted a general vegetative fuel reduction and fall-in hazard tree abatement strategy for the COTP using all available tools. This “all available tools” strategy is not tied to any specific inspection or remote sensing tool. It instead uses each and all of these tools—individually and in combination as applicable—to reduce vegetation-related wildfire risks on a case-by-case, site specific basis. From 2023 forward, We will continue to focus on identifying in ROW and off-ROW issues using all available data. We will shift to using photo-imagery to preliminarily identify areas of heavy vegetation and excessive fuel for planning and completing fuel reduction work followed by site visits to verify conditions

on-the-ground. We will continue to use LiDAR and conventional aerial, ground and supporting inspection-related data to plan and prioritize wildfire risk reduction work.

From 2023 forward, priorities will again be in ROW fuel reduction through tower base clearing and ROW mastication, and off-ROW hazard tree mitigation. Off-ROW fuel reduction efforts will be developed as opportunities arise through collaboration and partnerships with other agencies and/or landowners and managers.

b. Vegetation Management Within the COTP ROW

TANC has a well-established integrated vegetation management program for managing vegetation within the COTP ROW that relies upon annual identification of danger trees and hazard trees⁵ that could either grow or fall into COTP conductors, and potentially hazardous fuels accumulations. Identified trees are either removed or trimmed on a prioritized basis to Minimum Vegetative Clearance Distances consistent with the most current version of NERC Standard FAC-003-4 for Transmission Vegetation Management. Fuels are maintained to a low-growing status.

Routine assessments are used to evaluate site conditions and determine the extent of work needed, treatment method, priority, schedule and re-treatment interval. Some of the factors that may influence prescriptive treatment decisions are:

- Safety;
- Line voltage (which determines conductor clearances);
- Treatment objective;
- Type and density of vegetation - target and non-target species;
- Expected growth rates;
- Size of treatment area;
- Anticipated costs and equipment limitations;
- Effectiveness of possible treatments;
- Landowner or land managing agency;
- Contractual rights;
- Accessibility;
- Climate/meteorological conditions at time of treatment;
- Herbicide use regulations;
- Site conditions – soils, slope, and drainage; and
- Presence of sensitive species and/or sensitive cultural resources.

Based on these assessments, all of the vegetation management work planned for the year is inventoried for:

- The location of work;
- Landowner restrictions;
- Clearance distances; and
- Current work status.

⁵ Hazard trees and danger trees are defined in American National Standards Institute (ANSI) standards (ANSI 300 Part 7). A danger tree is any tree on or off the right of way that could contact electric supply lines. A hazard tree is a structurally unsound tree that could strike electric supply lines when it fails.

All vegetation work is tracked in databases supporting maintenance and vegetation management work activities. The work is only considered complete when verified on-the-ground. All contractors are required to follow strict fire safety precautions that include work site fire requirements, water supply for firefighting, engines equipped with spark arrestors, and supporting communications, equipment, and fire prevention and mitigation related instructions. Contractors also follow all appropriate fire restrictions on USFS lands, and fully comply with USFS fire plans for construction and service contracts.

The process of communicating an imminent vegetation-related threat is based on established guidelines. Those guidelines require the reporting of all electrical events, including imminent threats, to the WAPA Transmission Switching and Operations Dispatcher, who has the authority to direct field personnel and contracted crews during emergencies. Any situation identified as an imminent threat is mitigated as soon as possible, regardless of land ownership, access, environmental issues, or any other work constraints.

Orchard trees grow rapidly and represent potential vegetation to conductor risks that could ignite a wildfire. The orchard removal and land rights acquisition program is focused on removing existing orchards growing within the COTP ROW and preventing vegetation that could grow within required Minimum Vegetation Clearance Distances from conductors. This program compensates orchard owners for foregone crop revenues in exchange for the removal of existing orchards and placing future limitations of the rights of landowners to grow crops above a 12-foot height limit. Other rights that further reduce wildfire and related liability risks are also incorporated into the upgraded easement rights.

c. Vegetation Management Outside the ROW

TANC and WAPA also inspect and manage for danger and hazard trees located outside of the COTP ROW. Trees are identified for removal by utility arborists and/or registered professional foresters. Rights of entry and the terms and conditions associated with the cutting and removal and/or disposition of danger and hazard trees is agreed-upon with the potentially affected landowners. This program is scheduled as needed based on the proximity of trees to the edges of the ROW, growth rates, and utility arborist field observations.

d. COTP Access Road Inspections and Maintenance

i) Program Foundation

The COTP Access Road Maintenance Program is an ongoing program that identifies access roads requiring erosion and drainage control and other improvements to ensure that maintenance crews always have access to the COTP ROW. Access road maintenance activities are conducted on a routine or emergency/as needed basis to ensure that heavy equipment and wider and heavier-track transport vehicles also have access as needed for maintenance and repair of the COTP towers and conductors. This level of access also maintains and improves fire response capabilities for fire engines and crews that may be needed to respond to wildfires.

ii) Annual HFTD Tier 2 and Tier 3 Road Brushing

From 2020 through 2022, TANC and WAPA evaluated our ability to integrate the brushing and grading of approximately six miles of COTP access roads in HFTD Tier 3. Although landowner

concerns, permitting, and inaccessibility remain as obstacles to increased mileage being completed expeditiously, brushing and grading five to six miles of HFTD Tier 2 and/or Tier 3 access roads can be completed annually using WAPA resources.

e. Communication Site Defensible Space Activities

COTP communication sites located in rural and forested areas may be surrounded by thick tree and shrub growth. This growth represents a risk to wildfire response activities and may prevent adequate wildfire defense resources from accessing the site. These activities are directed towards the development of adequate defensible space surrounding forested communications sites. TANC is working with the underlying landowners and other tenants at these sites to implement forest thinning, fuels management, access road maintenance, and other best practices to achieve long-term site defensible space.

f. TANC-USFS Collaborative Fuels Treatments

The COTP ROW crosses 58 miles of National Forest System lands that include the Lassen, Modoc, and Shasta-Trinity National Forests. TANC and the USFS jointly collaborate on fuels treatment and shared access road maintenance work in an area of northeastern California where the COI lines are parallel and in close proximity. The COI is a corridor of three roughly parallel 500 kV alternating current power lines connecting the electric grids of Oregon and California. Their combined power transmission capacity is 4,800 MW. The goal of these joint activities is to maintain electric transmission system reliability by: 1) Sufficiently reducing the fuel loads between the lines to eliminate the potential for a forest fire-caused simultaneous outage of all three 500 kV transmission lines; and 2) Ensuring prompt and correct action in the event an accidental fire should occur. These objectives are met through the use of management practices designed to create low fuel hazard conditions between the COTP and the other COI lines.

g. TANC-USFS Collaborative Access Road Maintenance and Improvement

TANC and the USFS annually develop a list of priorities for shared road maintenance activities based on the need to reduce the wildfire risks to the COTP and other COI lines, including improved access and staging. These activities are implemented near the COTP or other COI rights of way where fire response to the transmission infrastructure is important.

3. Wildfire Response Capabilities-TANC-Funded Fire Station

TANC annually provides funds for a fire station (Long Bell Fire Station), engine, and firefighters in the Modoc National Forest in northeastern California where the COI lines run near one another. The Long Bell Fire Station includes a garage for housing fire engines, an office and barracks. The engine is staffed with five wildland firefighters. Standard Operating Procedure requires that an engine be assigned to Long Bell or “on order” throughout the fire season, generally May through late November. This ensures a rapid response to fires occurring near the COTP and other COI lines. The Long Bell Fire Station is staffed throughout the fire season with USFS personnel.

VI. Wildfire-Related Communications Protocols Regarding COTP Deenergization, Recloser Disabling and Service Restoration

A. Introduction

This Section discusses TANC communications protocols regarding COTP deenergization, recloser disabling and service. These protocols have been developed for two scenarios that include:

1. the threat of an imminent wildfire that may be advancing on the COTP ROW; or
2. high fire threat weather conditions (e.g. sustained high-speed winds, high temperatures, low humidity, etc.) that may necessitate COTP deenergization.

WAPA Operations staff uses a combination of tools to assess and keep track of fire and weather events that could impact system reliability. They can quickly view and determine the distance and threat to the TANC/WAPA transmission system. The following is an overview of some of these resources:

- **Fire Mappers** – GIS-based mapping system with incident data and live feeds of current wildfire events. Operations can see location of any new fires, receive real-time information from participating wildfire systems, including federal, state, and local agencies, view estimated burned areas, and hot spot detection.
- **Alert Wildfire** – Network of cameras that offer partial coverage of TANC/WAPA infrastructure and their proximity to active fires.
- **Ventusky and Zoom Earth** – Web-based weather apps that provide real-time weather event information, including wind, precipitation, smoke and more.

Protocols for disabling reclosers are summarized first, followed by protocols for deenergizing BES elements. The COTP is a BES element. This Section also includes a discussion of the public safety communications responsibilities as they relate to a potential COTP deenergization.

B. Protocols for Disabling Reclosers Under Imminent Fire and/or Smoke Threat Conditions

1. Recloser Disabling

- Upon notification of an imminent fire and/or smoke threat to an element of the BES - including the COTP, COTP reclosers will be turned off for safety of personnel and the possibility of fire ignition

2. Enabling Reclosers After Threat De-escalation

- Upon the de-escalation of fire and/or smoke threat activity, reclosers will be restored to their original states.

C. Protocols for Disabling Reclosers Pre-emptively Based on High Fire Threat Weather Activity

1. Recloser Disabling

The decision to preemptively disable reclosers prior to a high fire threat weather event requires consideration of many complexities both known and unknown. Disabling reclosers is therefore ultimately based on the following considerations:

- Red Flag Warnings issued by the National Weather Service for fire weather zones containing the COTP in the HFTD;
- Ongoing fire activity throughout the service territory and California in general;
- Assessments of known local conditions, including wind speeds (sustained and gusts), humidity and temperature, fuel moisture and fuel loading; and
- Input from real-time observations from vegetation management personnel or field craftsman as appropriate.

2. Enabling Reclosers After Pre-emptive Disabling

Upon de-escalation of high fire threat weather activity, reclosers will be returned to their normal states for affected BES elements.

D. Protocols for Deenergization Under Imminent Fire and/or Smoke Threat Conditions

1. Deenergization

Upon an immediate fire and/or smoke threat to the COTP, deenergization will occur following sound utility practice.

2. Service Restoration or Reenergization

Upon de-escalation of fire and/or smoke activity and when safe to energize the COTP will be returned to service.

E. Protocols for Pre-emptive Deenergization Based on High Fire Threat Weather Activity

1. Deenergization

The decision to preemptively deenergize BES element(s) prior to a high fire threat weather activity and events requires consideration of many complexities both known and unknown. Deenergization is therefore ultimately based on the following considerations:

- Red Flag Warnings issued by the National Weather Service for fire weather zones containing the COTP in the HFTD;
- Assessments of known local conditions, including wind speeds (sustained and gusts), humidity and temperature, fuel moisture and fuel loading;
- Real-time situational awareness information from personnel positioned in high fire threat areas identified as potentially at risk, areas located near circuits identified for inclusion on the circuit monitoring list, and in other areas identified during the incident as at risk of being subject to extreme weather conditions;
- Ongoing fire activity throughout the service territory and California in general;
- Input from real-time observations from vegetation management personnel or field craftsman as appropriate;
- Potential impacts to customers and communities;

- Input from local and state fire authorities with specific concerns regarding the potential consequences of wildfires in select locations;
- Real-time system studies and expected impact of deenergizing circuits on the BES and essential services;
- Awareness of mandatory or voluntary evacuation orders in place; and
- Ongoing notifications to local agencies and officials.

2. Service Restoration or Reenergization

Upon de-escalation of high fire threat weather activity, the COTP will be returned to service following sound utility practices.

F. Public Safety Communications Responsibilities

TANC does not have an electric service territory or serve end-use electric customers. TANC provides wholesale transmission service to its member electric utilities and other companies that purchase transmission capacity on the COTP. During a public safety power shutoff, as a result of a deenergization of the COTP, TANC will use existing and well-established operating and communications procedures to notify entities that are utilizing the COTP. The existing operating procedures provide a framework for communicating with entities that are directly utilizing the COTP, so that those entities can make the necessary accommodations to minimize the impact to any end-use electric customers that may be affected due the public safety power shutoff. In many instances, a public safety power shutoff or deenergization of the COTP may not result in any service interruption to end-use electric customers. However, to the extent that end-use electric customers may be adversely impacted due to a public safety power shutoff of the COTP, the entities utilizing the COTP that have end-use electric customers are responsible for notifying their respective customers of potential electric service interruption and restoration activities.

VII. Plan Evaluation and Metrics

Introduction

This Section presents the process TANC is using to evaluate the effectiveness of this Plan, including descriptions of:

- A review of how TANC and WAPA monitor and audit the effectiveness of transmission line and equipment inspections;
- A discussion of how the application of previously identified metrics have informed this Plan;
- The metrics that are being used to measure the effectiveness of Wildfire Strategies in reducing wildfire ignition and spread risks and their contributing risk drivers;
- The process for annually monitoring progress achieved for Wildfire Strategies and auditing the 2020 through 2022 implementation of this Plan;
- Activities to annually evaluate the effectiveness of COTP structure and equipment inspections and other Wildfire Strategies; and
- Methods for identifying and correcting any Plan deficiencies as part of this comprehensive Plan revision.

This Section also reviews the process that TANC has used in 2023 to contract for the services of an Independent Evaluator, to accept public comments, and to otherwise comply with applicable PUC Section 8387 requirements.

A. Monitoring and Auditing Transmission Line and Equipment Inspections Effectiveness

WAPA, on behalf of and under contract to TANC for operations and maintenance of the COTP, actively and continuously monitors and audits the effectiveness of the COTP transmission line, equipment, and associated facilities inspections. Effectiveness is generally defined as fully supporting the RCM approach that emphasizes preventative maintenance. The three primary elements of these activities include:

1. Inspections conducted by qualified electrical workers;
2. Multiple inspection resources, methods, and frequencies; and
3. The use of advanced inspection data collection, reporting, and management platforms and practices.

Each of these elements are summarized below.

1. Qualified Inspectors

COTP facility and equipment inspections are conducted by qualified electrical workers and linemen who have undergone rigorous apprenticeships, education and training for inspecting, repairing, and maintaining high-voltage transmission towers, conductors, and all associated equipment and facilities. This is a key first step in ensuring that these inspections are conducted by professionals who understand how to inspect the COTP, what to look for with respect to potential preventative maintenance issues, and how to appropriately document and prioritize those issues.

2. Multiple Inspection Resources, Methods, and Frequencies

WAPA conducts multiple facility and equipment inspection methods on the COTP. Each of these inspections is intended to provide a unique and important means of detecting potential maintenance needs. These include longstanding routine inspections that have been conducted since the construction and energization of the COTP in 1993, and those enhanced inspections that have been evaluated from 2020 through 2022 that we have integrated into our established inspections program.

a. Longstanding Routine Inspections

As discussed in Section V, above, three facility and inspection methods have been conducted on the COTP since 1993. These include:

- Semi-annual aerial line patrols with intermediate patrols as needed;
- An aerial LiDAR patrol is performed typically every five years; and
- Annual ground line patrols; scheduled year-round; twenty (20) percent of all tower structures are subject to an annual detailed ground inspection.

b. Enhanced Inspections and Resources Added in 2022

Seven of the 15 Wildfire Strategies evaluated in this Plan from 2020 through 2022 provided additional facility and equipment inspections methods, resources, and frequencies. These COTP wildfire risk reduction program additions allow WAPA to use one inspection method to “cross-check” and verify the reliability of the data resulting from one or more *other* types of inspections to confirm and/or verify identified maintenance needs and priorities. These cross-checking and verification activities are essential to monitoring the effectiveness of inspection programs by comparing the results from one inspection to the results of another. Each of these inspection program additions are briefly summarized below with examples of how they provide inspection effectiveness capacity improvements and inspection program verification “cross-checks” within the broader facility and equipment inspection program.

i) Adding One Dedicated Maintenance Patrolman:

Increases the number of facility and equipment inspections and provides an additional resource supporting infrared, Corona, and UAV inspection programs.

ii) Multi-Year Infrared and Corona Inspection Contracts with Oblique Photography and High-Definition Video

Augments existing inspection capabilities. Infrared and Corona scans detect temperature differences and heat signatures of components not visible to the naked eye, thereby cross-checking and reinforcing visual inspections. High-definition cameras photograph anomalies for further review, which improves inspection data quality.

iii) Acquisition of Aerial Mounted Infrared, Oblique Photography, High-definition Video and/or Corona Camera Inspection Equipment

The addition of WAPA-owned inspection equipment allows the conduct of inspections using photography, video, and Corona methods on an as-needed basis by WAPA maintenance staff. This increases facility and equipment inspections’ effectiveness by allowing flexible inspection

schedules, locations, and frequencies that can complement contract inspections that are on pre-established schedules.

iv) Detailed Aerial, Climbing and/or Ground-based Tower and Equipment Inspections in HFTD Tiers 2 and 3

Inspections focused in HFTD Tiers 2 and 3 increase the number and frequency of facility and equipment inspections which increase the effectiveness of the overall COTP inspection program.

v) Drone (UAV) Inspection Program

UAVs are capable of close-order aerial inspections of transmission towers and conductors, communication sites, and existing and potential ROW encroachments. Drones can also provide more precise, repeatable data based on Geographic Positioning System (GPS) coordinates. The use of UAVs may also provide the opportunity to improve the accuracy and frequency of inspections and resulting records and reduce potential safety hazards conventionally associated with transmission line climbing inspections.

vi) Oblique Photography and High-Definition Video

WAPA uses all available photo-imagery data to supplement aerial and ground inspection data to help identify additional hazard trees that may not be easily identifiable due to terrain, ground access, or other limiting factors. This information was especially useful in approximately 10 miles along the Captain Jack – Olinda transmission line segment as an important means of cross-checking imagery-generated data with ground-verification.

In summary, the use of longstanding and new facility and equipment inspection resources, methods, and technologies on more flexible schedules supports an inspection program that effectively self-monitors its own effectiveness. This is achieved through the use of variable inspection types to cross-check and verify their maintenance data with that collected using other inspection methods on the same COTP assets.

3. Advanced Inspection Data Collection, Reporting, and Management Platforms and Practices

COTP facility and equipment inspections are audited by WAPA on an ongoing basis through the use of advanced inspection data collection, reporting, and management. This real-time auditing is generally based on the use of these tools for effectively supporting the RCM approach and timely, well-planned and prioritized preventative maintenance. The foundation for WAPA’s use of the advanced inspection data collection, reporting, and management platforms and practices is strict adherence to guidelines, standards, business rules and maintenance priorities integrated in a comprehensive inspection data collection, quality assurance, reporting, and recordkeeping system that is summarized in Section IV. WAPA applies best data practices by using a reporting system that verifies that planned maintenance is accomplished on time, reported accurately, and rescheduled as appropriate.

Asset records are set up in WAPA’s computerized maintenance database. Preventive maintenance (PM) records are set up against those asset records. The maintenance and testing tasks defined in job plans are then “linked” to the appropriate PM records, so that the appropriate maintenance tasks are accomplished at the right time. The PM records have the last completion dates and the next due dates.

Work orders are created from the PM records to schedule the maintenance. When the maintenance has been accomplished, the work order status is changed to “completed” and the completed date is reflected in the PM record. The PM next due date is automatically calculated based on the work order completed date (or the work order target start date depending on how the PM is set up) and the PM frequency.

The computerized database (now MAXIMO and soon to be IQGeo) has a reporting tool that provides reports to WASN maintenance staff monthly. This assists them in tracking maintenance which has been accomplished and work orders that are due.

All PM work orders must be completed by the last day of the month they are due. All PM work orders generated for the year are updated with the month and year they are due and this text is added to the end of the work order description. This helps for better tracking throughout the year. At the beginning of every month a report is run to show remaining work orders due for the year which is emailed to WAPA management and maintenance personnel for visibility. Work orders that are due during the month are checked on the 3rd Monday of the month. If there are still work orders due, an email will be sent to the responsible parties with a list of remaining work orders as a reminder and this continues until all work orders are completed for the month.

B. Metrics for Evaluating Plan Performance

1. How Previously Identified Metrics Have Informed this Plan

TANC’s established wildfire risk reduction programs and activities described in Section V have informed the development of several Plan metrics. COTP equipment inspections use a complex set of risk-related metrics that allow repairs to be prioritized according to potential probabilities of failure and associated consequences. Transmission vegetation management metrics required for compliance with NERC Standard FAC-003-4 have informed metrics that will be used in this Plan to focus on reducing vegetation-to-wire contact hazard tree risks in HFTDs. Metrics associated with the acres of fuels treated by the USFS near the COI lines in northeastern California have and will continue to inform the timing and location of fuels treatments designed to reduce wildfire ignition and spread rates, and metrics used in this Plan.

2. Metrics Being Used to Evaluate This Plan

Section 8387(b)(2) of the PUC includes the following requirements for POU WMPs:

The WMP shall consider as necessary, at minimum, all of the following:

- (D) A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the WMP’s performance and the assumptions that underlie the use of those metrics.*

TANC uses quantitative metrics that are results oriented and focused on the success of Wildfire Strategies at reducing the risk of catastrophic wildfires. Data collected through facility, equipment, and vegetation management related inspections is input directly into WAPA’s database that prioritizes maintenance activities on an ongoing basis.

Table VII-1 lists the 11 metrics that are being used to measure outcomes for this Plan within the context of its risk assessment framework. It includes the wildfire risk event and drivers, the corresponding annual metrics, and how those metrics are intended to focus on outcomes that

directly reduce wildfire risk events and/or drivers. It indicates that some metrics will provide insights regarding the effectiveness of maintenance and vegetation management inspections. It also provides insights and trends where additional situational awareness may be needed with respect to local meteorological conditions, security, or other mitigation or response strategies, and addresses continuous fire safety training as needed.

A. Monitoring and Auditing of Plan Implementation

Section 8387(b)(2) of the California Public Utilities Code also includes the following requirements for POU WMPs:

(N) A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:

- (i) Monitor and audit the implementation of the WMP.*
- (ii) Identify any deficiencies in the WMP or its implementation and correct those deficiencies.*
- (iii) Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes, or commission rules.*

This Section describes the process that TANC uses to monitor and audit the effectiveness of Plan implementation. Monitoring and auditing are ongoing annual processes. This Section also describes the process that we used to prepare this comprehensive revision of the Plan based on lessons learned from 2020 through 2022. The comprehensive revision process was used to evaluate the effectiveness of line, equipment, and vegetation management inspections conducted over the past three years. Further, each of the 15 Wildfire Strategies evaluated from 2020 through 2022 were monitored and audited for their importance in reducing wildfire ignition and spread risks. The comprehensive revision process allowed the identification of deficiencies or improvements in this Plan and supported the development of the six Wildfire Strategies to be evaluated from 2023 through 2025 presented in Figures V-1 through V-6.

Table VII-1. Metrics for Evaluating the TANC-COTP WMP

Wildfire Risk Event & Drivers	Annual Metric	Outcomes/Effectiveness
Wildfires ¹	1. Number of COTP-ignited wildfires and cause(s).	Provides an overall indicator of Plan effectiveness.
Equipment Failure		
Downed Wire	2. Number of downed wires.	Provides insights regarding maintenance inspections effectiveness.
Wire to Wire Contact	3. Number of wire to wire contacts/faults.	Provides insights regarding conductor and equipment design, quality, and lifecycle expectancy.
Clamps, Conductors, Insulators, Splices, Spacer-Dampers, Towers, Substation, Communication Site, Other unspecified	4. Number of equipment failures by facility.	Provides insights regarding conductor and equipment design, quality, and lifecycle expectancy.
Weather-driven	5. Number of weather-driven faults and cause(s).	Identifies trends where additional local real-time weather data may be needed.

Table VII-1. Metrics for Evaluating the TANC-COTP WMP

Wildfire Risk Event & Drivers	Annual Metric	Outcomes/Effectiveness
Object to Wire Contact		
Vegetation-Caused Outages	6. Number of vegetation-caused outages and cause.	Provides insights regarding vegetation inspections effectiveness.
Hazard Trees Removed	7. Number of hazard trees identified and removed.	Reduces the number of potential vegetation to wire contacts; a direct measure of effectiveness.
Fuels Reductions	8. Acres of fuels treatments completed– within and outside of the COTP ROW.	Reduces the flammability of fuels subject to ignitions from equipment failures, thereby reducing potential wildfire spread rates.
Bird Strikes	9. Number of bird strike incidents and operational and/or maintenance impact(s).	Increases awareness of where additional bird-repulsion measures may be needed.
High Fire Threat Conditions		
Local Weather & Meteorological Conditions	10. Date of each high fire threat day, and number of high fire threat days.	Allows daily correlation of weather and meteorological conditions with equipment failures. Allows daily correlation with conductor loading.
Third Party Contact		
Drone/Light Aircraft, Vandalism	11. Number of drone, light aircraft, or vandalism, incidents and operational and/or maintenance impact(s).	Increases awareness of where additional security measures may be needed.

1/A fire ignition is defined as follows:

- A COTP facility was associated with the ignition of a fire;
- The fire was self-propagating and of a material other than electrical and/or communication facilities;
- The resulting fire travelled greater than 100 feet from the ignition point; and
- TANC had knowledge that the fire occurred.

1. **Plan Monitoring**

TANC monitors the implementation of this Plan using data collected through implementation of the Wildfire Strategies. On behalf of TANC, WAPA maintains an extensive maintenance database of all COTP operational incidents and asset maintenance inspections and repairs. Operational incident information includes the date and time of the incident, its duration, incident weather conditions, identified cause, impact to the system, and comments pertaining to the incident investigation. Maintenance data includes:

- Information on the last date an inspection was completed and its findings;
- The status of repairs in progress or completed; and
- The next scheduled inspection.

TANC will categorize this information to support the metrics developed in Table VII-1. TANC will annually track each metric and correlate them with existing information on the type and frequency of maintenance and vegetation inspections. This tracking will provide insights regarding the effectiveness of those inspections, and future guidance on any adjustments to those inspections that may become apparent from the data collected. Other potential causal correlations

between high fire threat conditions and/or districts, equipment failures, and other incidents may also be developed.

2. Plan Auditing

TANC will internally audit the effectiveness of Plan implementation using the management organization presented in Section III. Metrics data will be compiled and evaluated annually. The risk assessment framework, Wildfire Strategies, and metrics will be analyzed with respect to providing needed information. These annual compilation and evaluation activities are captured in the format and content of the Wildfire Strategies presented in Section V of this Plan. The annual updating of each Wildfire Strategy with a chronological accounting of the progress achieved and the subsequent years' approach provide an ongoing and cumulative record of the lessons learned regarding each Wildfire Strategy's development and implementation. This record in turn supports a fully informed auditing of the Plan's effectiveness.

Under the supervision of the TANC General Manager, TANC and the COTP will then consider the data and review the effectiveness of the entire Plan. Based on this review, the Plan will be adjusted to increase its effectiveness. These adjustments may include, but not be limited to changes in the Wildfire Strategies and each Section of this Plan, as appropriate. Plan adjustments will be considered by the TANC Commission and the COTP Management Committee and reflected in subsequent versions of the Plan. It will also include any adjustments that are needed to identify and correct Plan deficiencies.

3. 2023 Comprehensive Plan Revision

We monitored and audited the 15 Enhanced Wildfire Strategies evaluated from 2020 through 2022. Each of those strategies, and the annual approaches and progress achieved for the full three-year period are presented in Appendix A. The progress achieved for each of those Wildfire Strategies was evaluated for their potential contributions to reducing TANC and COTP wildfire risks.

Table VII-2 summarizes the process used to evaluate the effectiveness of each of the 15 Wildfire Strategies evaluated from 2020 through 2022. Table VII-2 includes five columns, including:

Column 1-Assigned Numbers for the 15 Wildfire Strategies: Numbering was not included in the 2020 through 2022 versions of this Plan but was needed to support a well-organized evaluation as part of this comprehensive revision. The numbering matches the order of appearance of those Wildfire Strategies in Section V; Tables V-1 and V-2 of previous Plan versions.

Column 2- Corresponding Wildfire Strategy Titles: These are presented in their order of appearance in prior Plan versions.

Column 3-Wildfire Risk Reduction Lessons Learned from 2020-2022 Plan Monitoring and Auditing: Lessons learned document the wildfire risk reduction benefits, constraints, opportunities, and other issues and values associated with each of the Wildfire Strategies. These lessons learned are the basis for classifying each of the Wildfire Strategies from 2023 forward.

Column 4-Metrics Informed or Improved from Plan Evaluation: The 11 metrics presented in Table VII-1 were assigned numbers and added as a separate footer table on each page of Table VII-2. For each Wildfire Strategy, we then listed which metrics were either: 1) informed by the data collected during implementation of that strategy; or 2) improved in their application by the lessons learned from 2020 through 2022.

Column 5-Strategy Classification from 2023 Forward: Based on the lessons learned and the metrics' evaluation, each strategy was then classified in one of two ways:

- Six '*Completed*' strategies were accomplished and provided valuable lessons learned.
- The other nine strategies have been '*Added to TANC's Established Wildfire Prevention, Mitigation, and Response Strategies.*' Those additions have been integrated into Section V of this Plan under the headings titled "2022 Inspection Program Additions" and "Annual HFTD Tier 2 and Tier 3 Road Brushing."

Table VII-2. 2020-2022 Evaluation of Wildfire Prevention, Mitigation, and Response Strategies 1-15 for Plan Effectiveness

No.	Wildfire Strategy Title	Wildfire Risk Reduction Lessons Learned from 2020-2022 Monitoring and Auditing	Metrics Informed or Improved by Plan Evaluation	Wildfire Strategy Classification from 2023 Forward
1	Increased Personnel by Adding One Dedicated Maintenance Patrolman	<ul style="list-style-type: none"> Increased direct visual inspection data quantity and quality Advanced infrared and Corona inspection capacity Assisted in UAV program development. 	1,2,3,4,6,7	Added to Established Program – Tower and Equipment Inspections; One Additional Maintenance Patrolman
2	Development of Long-Term Infrared, LiDAR, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Service Contract	<ul style="list-style-type: none"> Contracting increases efficiencies in procuring infrared and Corona inspection services and improving abnormal equipment heat signatures and electrical discharges, particularly at splices, conductor connections, and attachment points and insulators. Contracting for long-term oblique photography and high-definition video data is of limited, short-term value. [LiDAR lessons learned are discussed under Wildfire Strategy No. 9, below]. 	1,2,3,4	Added to Established Program – Tower and Inspections; Infrared and Corona Inspection Services Contract
3	Acquisition of Aerial Mounted Infrared, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Equipment	<ul style="list-style-type: none"> WAPA equipment ownership provides opportunities for conducting work that is outside the scope of contracted services. Long-term interest in direct ownership is of interest to WAPA, but current internal operational skills result in less efficient data collection than more skilled contractors. 	1,2,3,4	Completed
4	Detailed Aerial, Climbing and/or Ground-based Tower and Equipment Inspections	<ul style="list-style-type: none"> HFTD Tier 2 and Tier 3 detailed tower and equipment inspections can be completed no later than June 30 of every year. Tier 2 and 3 segment inspections can be integrated seamlessly into long-term established inspection programs. 	1,2,3,4,9,11	Added to Established Program – Tower and Equipment Inspections; Detailed Tier 2 and Tier 3 Annual Inspections

No.	Annual Metric	No.	Annual Metric
1	Number of COTP-ignited wildfires and cause(s).	7	Number of hazard trees identified and removed.
2	Number of downed wires.	8	Acres of fuels treatments completed– within and outside of the COTP ROW.
3	Number of wire-to-wire contacts/faults.	9	Number of bird strike incidents and operational and/or maintenance impact(s).
4	Number of equipment failures by facility.	10	Date of each high fire threat day, and number of high fire threat days.
5	Number of weather-driven faults and cause(s).	11	Number of drone, light aircraft, or vandalism, incidents and operational/ maintenance impact(s).
6	Number of vegetation-caused outages and cause.		

Table VII-2. 2020-2022 Evaluation of Wildfire Prevention, Mitigation, and Response Strategies 1-15 for Plan Effectiveness

No.	Wildfire Strategy Title	Wildfire Risk Reduction Lessons Learned from 2020-2022 Monitoring and Auditing	Metrics Informed or Improved by Plan Evaluation	Wildfire Strategy Classification from 2023 Forward
5	Brush and Grade Six Miles of COTP Access Roads	<ul style="list-style-type: none"> Brushing and grading 5 to 6 miles of Tier 2 and/or Tier 3 access roads can be completed annually. Many access roads only need brushing; not annual grading or reconstruction. 	8	Added to Established Program – COTP Access Road Inspections and Maintenance; Road Brushing and Grading in Tiers 2 and 3
6	Hazard Tree Mitigation Based on Most Recent LiDAR Analysis	Please see Lessons Learned for Strategy No. 9, below to avoid redundancy in stating LiDAR lessons learned.	Please see Strategy No. 9, below.	Please see discussion under Strategy No. 9, below.
7	Brush and Fuels Control	<ul style="list-style-type: none"> Post-completion contractor evaluations include assessment of acreage of fuels treatments completed Contractors’ efficiencies can be assessed based on the type of equipment used, the experience of equipment operators and hand crews, road crew readiness and responsiveness in mobilizing and expending the work. 	8	Completed
8	Research and Development of Drone Use for Structural, Equipment, and Right of Way Inspections	<ul style="list-style-type: none"> The addition of one additional maintenance patrolman under Wildfire Strategy No. 1 accelerated the development of a UAV inspection program. WAPA trained and licensed three additional UAV pilots in 2022, with additional recruitment planned from 2023 forward. 	1,2,3,4,6,7	Added to Established Program – Tower and Equipment Inspections; Drone Inspection Program

No.	Annual Metric	No.	Annual Metric
1	Number of COTP-ignited wildfires and cause(s).	7	Number of hazard trees identified and removed.
2	Number of downed wires.	8	Acres of fuels treatments completed– within and outside of the COTP ROW.
3	Number of wire-to-wire contacts/faults.	9	Number of bird strike incidents and operational and/or maintenance impact(s).
4	Number of equipment failures by facility.	10	Date of each high fire threat day, and number of high fire threat days.
5	Number of weather-driven faults and cause(s).	11	Number of drone, light aircraft, or vandalism, incidents and operational/ maintenance impact(s).
6	Number of vegetation-caused outages and cause.		

Table VII-2. 2020-2022 Evaluation of Wildfire Prevention, Mitigation, and Response Strategies 1-15 for Plan Effectiveness

No.	Wildfire Strategy Title	Wildfire Risk Reduction Lessons Learned from 2020-2022 Monitoring and Auditing	Metrics Informed or Improved by Plan Evaluation	Wildfire Strategy Classification from 2023 Forward
9	LiDAR Surveys of the COTP ROW and Adjacent Lateral Areas	<p>LiDAR was evaluated for its benefits in reducing vegetation-related wildfire risks within and outside of the COTP ROW, with the following lessons learned:</p> <p>In ROW Tree Hazards - Continue using LiDAR to identify encroachment issues within the ROW. Current LiDAR inspection data has proven useful over the last three years in identifying potential grow-in and fall-in hazards.</p> <p>In ROW Fuels - Current LiDAR data set does not identify potential fire conditions and areas of greater risk. An effort will be made to use LiDAR data to map out areas along and adjacent to the COTP that represent wildfire risk. These can be based on the characterization of surface fuels and canopy structure and be used to estimate wildfire intensity, flame length and spread rate. Wildfire risk can be quantified and be used to prioritize mitigation activities.</p> <p>Off-ROW Tree Hazards - LiDAR inspection of off-ROW conditions must be adjusted to distinguish between healthy trees and fall-in hazard trees. Current LiDAR data set identifies all trees that can strike but only trees that are dead, dying, diseased, or structurally unsound should be identified as a hazard and mitigated. Next set of LiDAR inspections will identify both in ROW and Off-ROW hazard trees.</p> <p>Off-ROW Fuels - The same approach used for in ROW fuels mapping can be used for Off-ROW areas. These areas can be prioritized for collaborative efforts with adjacent property managers to reduce the risk for both TANC and neighbors.</p>	7,8	Added to Established Program – ROW Vegetation Management Inspections; LiDAR for Potential Off-ROW Encroachments

No.	Annual Metric	No.	Annual Metric
1	Number of COTP-ignited wildfires and cause(s).	7	Number of hazard trees identified and removed.
2	Number of downed wires.	8	Acres of fuels treatments completed– within and outside of the COTP ROW.
3	Number of wire-to-wire contacts/faults.	9	Number of bird strike incidents and operational and/or maintenance impact(s).
4	Number of equipment failures by facility.	10	Date of each high fire threat day, and number of high fire threat days.
5	Number of weather-driven faults and cause(s).	11	Number of drone, light aircraft, or vandalism, incidents and operational/ maintenance impact(s).
6	Number of vegetation-caused outages and cause.		

Table VII-2. 2020-2022 Evaluation of Wildfire Prevention, Mitigation, and Response Strategies 1-15 for Plan Effectiveness

No.	Wildfire Strategy Title	Wildfire Risk Reduction Lessons Learned from 2020-2022 Monitoring and Auditing	Metrics Informed or Improved by Plan Evaluation	Wildfire Strategy Classification from 2023 Forward
10	Oblique Photography and High-Definition Video	<ul style="list-style-type: none"> Oblique photography and high-definition video are of limited initial value for prioritizing fuels treatments based on site inaccessibility and imagery resolution; ground-truthing is always needed for verification. 	8	Added to Established Program – Right of Way Vegetation Management Inspections; Optimize All Available Imagery and Applicable Data
11	Orthophotography	Please see lessons learned - Wildfire Strategy No. 10.	8	Added to Established Program – ROW Vegetation Management Inspections; Optimize All Available Imagery and Applicable Data
12	Expanded Collaboration with Other Public and Private Agencies	<ul style="list-style-type: none"> The long-term collection agreements with the U.S. Forest service are established and successful for limiting wildfire ignitions and wildfire spread rates through aggressive annual fuel treatments, responsive fire suppression capabilities, and supporting wildfire readiness support activities. Expanded collaboration with non-federal agencies and landowners needs to be targeted for reducing higher-priority fuels accumulations. 	1,7,8	Completed
13	Technology Application Reviews	<ul style="list-style-type: none"> Evaluation of new technologies such as satellite-based wildfire risk mitigation technologies, frequency harmonics and ultrasonic dish did not appear to significantly enhance our current abilities to detect potential issues that would justify their costs. 	None	Completed

No.	Annual Metric	No.	Annual Metric
1	Number of COTP-ignited wildfires and cause(s).	7	Number of hazard trees identified and removed.
2	Number of downed wires.	8	Acres of fuels treatments completed– within and outside of the COTP ROW.
3	Number of wire-to-wire contacts/faults.	9	Number of bird strike incidents and operational and/or maintenance impact(s).
4	Number of equipment failures by facility.	10	Date of each high fire threat day, and number of high fire threat days.
5	Number of weather-driven faults and cause(s).	11	Number of drone, light aircraft, or vandalism, incidents and operational/ maintenance impact(s).
6	Number of vegetation-caused outages and cause.		

Table VII-2. 2020-2022 Evaluation of Wildfire Prevention, Mitigation, and Response Strategies 1-15 for Plan Effectiveness

No.	Wildfire Strategy Title	Wildfire Risk Reduction Lessons Learned from 2020-2022 Monitoring and Auditing	Metrics Informed or Improved by Plan Evaluation	Wildfire Strategy Classification from 2023 Forward
14	Upgrade Ground and Aerial Line Inspection Software for More Refined Data and Analyses	<p>WAPA has upgraded its line inspection software to IQGeo.</p> <ul style="list-style-type: none"> This database upgrade has made the collection of structure and equipment inspections data more holistic, more current by facilitating greater inspection efficiencies, and more flexible. IQGeo has strengthened the ability to preventatively detect equipment and facility stressors. 	1,2,3,4,5,9,10	Completed
15	Review Fire Safety Guidelines and Precautions	WAPA training focused on enhanced wildfire risk reduction skills has expanded to other WAPA regions, and increased region-wide tools and skills related to LiDAR analysis, UAV inspections, vegetation inspections, worker safety, lone worker precautions, and first aid.	1,2,3,4,6,7,8	Completed

No.	Annual Metric	No.	Annual Metric
1	Number of COTP-ignited wildfires and cause(s).	7	Number of hazard trees identified and removed.
2	Number of downed wires.	8	Acres of fuels treatments completed– within and outside of the COTP ROW.
3	Number of wire-to-wire contacts/faults.	9	Number of bird strike incidents and operational and/or maintenance impact(s).
4	Number of equipment failures by facility.	10	Date of each high fire threat day, and number of high fire threat days.
5	Number of weather-driven faults and cause(s).	11	Number of drone, light aircraft, or vandalism, incidents and operational/ maintenance impact(s).
6	Number of vegetation-caused outages and cause.		

B. Independent Evaluation and Agency Presentation and Comments

1. Independent Evaluation

PUC § 8387 (c) states that:

“The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its WMP. The independent evaluator shall issue a report that shall be made available on the Internet Web site of the local publicly owned electric utility or electrical cooperative and shall present the report at a public meeting of the local publicly owned electric utility or electrical cooperative’s its governing board.”

TANC contracted for an independent evaluation (IE) of this 2023 Plan. The independent evaluator:

- Had experience in assessing the safe operation of electrical infrastructure;
- Was required to review and assess the comprehensiveness of this Plan;
- Issued a report that was made available on the TANC Internet Web site from May 22, 2023 through June 30, 2023; and
- Presented the report at the duly noticed May 17, 2023, TANC Commission meeting.

The IE Report is being posted as a separate document to the Office of Energy Infrastructure Safety, WSAB docket titled publicly-owned-utility-and-electrical-cooperative-wildfire-mitigation-plans; 2023 WMPs and related material.

2. Agency Presentation and Comments

PUC Section 8387 (b)(3) states that:

“The local publicly owned electric utility or electrical cooperative shall present its WMP in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its WMP from the public, other local and state agencies, and interested parties, and shall verify that the WMP complies will all applicable rules, regulations, and standards, as appropriate.”

TANC presented this WMP at the May 17, 2023 TANC Commission meeting. It was also posted on the TANC website from May 22, 2023 through June 30, 2023 for accepting comments from the public, local and state agencies, and other interested parties. The TANC Commission resolution adopting this Plan included verification that this WMP complies with all applicable rules, regulations, and standards as appropriate.

APPENDIX A

**Descriptions, Approaches, and Progress
for Wildfire Strategies Monitored and
Audited from 2020 through 2022**

Figure 1. Increased Personnel by Adding One Dedicated Maintenance Patrolman

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
One Additional Maintenance Patrolman	1. Increased Personnel by Adding One Dedicated Maintenance Patrolman	All	ROW	Any	Structure and/or Equipment Failure
<p>Strategy Description: WAPA added one additional maintenance patrolman in 2019. The patrolman is dedicated to conduct transmission line ROW inspections and is responsible for observing and accurately reporting ROW conditions on all patrols to include but not be limited to danger trees, brush, and fire hazards and any other unsafe or damaged equipment.</p> <p>2020 Progress: In 2020, the patrolman completed transmission line ROW inspections on all COTP Tier 2 and Tier 3 HFTDs, participated in infrared (IR) and ultraviolet (Corona) light camera inspections, and began assisting in the development of a UAV Program at WAPA to conduct ROW inspections more efficiently.</p> <p>2021 Approach: In 2021, although there were no anticipated increases in dedicated personnel to implement the Plan, WAPA planned on adding three certified UAV pilots within the line maintenance program. The current patrolman will continue to assist in the development of a UAV program intended to improve ROW inspections efficiencies.</p> <p>2021 Progress: In 2021, WAPA recruited three additional candidates for UAV training and made progress towards each of them earning their UAV licenses.</p> <p>2022 Approach: In 2022, WAPA will continue to pursue adding UAV pilots to the UAV Program by expanding the candidate pool to all Maintenance Craft personnel. WAPA remains committed to expanding their UAV Program in 2022.</p> <p>2022 Progress: WAPA trained and licensed three additional UAV pilots.</p>					

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 2. Development of Long-term Infrared, LiDAR, Oblique Photography, High-definition Video and/or Corona Camera Inspection Service Contract

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
Expanded Inspection Capacity	2. Development of Long-term Infrared, LiDAR, Oblique Photography, High-definition Video and/or Corona Camera Inspection Service Contract	2,3	ROW	Any	Structure and/or Equipment Failure

Strategy Description: Multi-year infrared and Corona inspection contracts are on schedule to be developed by December 31, 2022. These contracts will ensure a reliable base of resources capable of augmenting existing inspection capabilities. Specialized IR and ultraviolet/Corona cameras are either hand-held or mounted to helicopters and the COTP ROW is flown. Special imagery attention is paid to splices, conductor connection and attachment points and insulators. The IR scan detects temperature differences and heat signatures of components, which may indicate problems (not visible to the naked eye) that could result in component or conductor failure. The Corona scan detects the degree of electric discharge or ‘leakage’ due to the ionization of air surrounding high-voltage electric components, which, if substantial enough, could result in an arc flash or mechanical component failure. In addition, a high-definition camera takes pictures of anomalies found for review. A corrective action plan is developed for anomalies and integrated with any identified repair or replacement needs.

2020 Progress: The imagery contract was initially awarded to an aviation vendor for the 2020 inspections. It was subsequently withdrawn after the vendor was unable to meet agreed-upon deadlines. Ultimately all 2020 inspections were completed internally by WAPA linemen.

2021 Approach: In 2021, an imagery contract was to be awarded and IR and Corona inspections performed by June 30th, 2021.

2021 Progress: In 2021, a one-year imagery contract was awarded to an IR and Corona inspection vendor for the 2021 inspections. It was not awarded as a multi-year contract because of the shortage of available vendors. All 2021 IR and Corona inspections were completed before the end of June meeting the WMP time requirement.

2022 Approach: In 2022, the contract solicitation will be made available earlier in the year to allow more vendors to provide quotes. The multi-year contract will collect information on HFTD Tier 3 and 2 equipment annually and non-HFTD once every 5 years or more frequently based on annual evaluations of inspection results. Inspections will focus on abnormal heat signatures and electrical discharges from equipment, particularly, splices, conductor connection and attachment points and insulators.

2022 Progress: In 2022, WAPA awarded a 5-year contract to collect information on HFTD Tier 3 and 2 equipment annually and non-HFTD once every 5 years or more frequently based on annual evaluations of inspection results. Inspections will focus on abnormal heat signatures and electrical discharges from equipment, particularly, splices, conductor connections and attachment points and insulators.

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 3. Acquisition of Aerial Mounted Infrared, Oblique Photography, High-definition Video and/or Corona Camera Inspection Equipment

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
Structural & Equipment Inspections	3. Acquisition of Aerial Mounted Infrared, Oblique Photography, High-definition Video and/or Corona Camera Inspection Equipment	2,3	ROW	June 2021	Structure and/or Equipment Failure

Strategy Description: Acquisition of Aerial Mounted Infrared, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Equipment.

2020 Progress: WAPA acquired aerial mounted infrared and Corona cameras to conduct line inspections. WAPA also inspected all COTP Tier 2 and Tier 3 ROW segments. Those acquisitions and inspections were completed by May 31, 2020.

2021 Approach: In 2021, no new IR and Corona equipment acquisitions were scheduled. WAPA was developing market research and budget authorization for Aerial Mounted Infrared, Oblique Photography, High-Definition Video and/or Corona Camera Inspection Equipment in the next 2-5 yrs.

2021 Progress: In 2021, WAPA conducted market research on the availability of inspection equipment and the level of effort needed to service and maintain the equipment once acquired. Primary research focused on Corona equipment. There are few Corona equipment distributors and service centers within the U.S. The current Corona cameras must be sent to Israel for service. WAPA also discovered that all IR and Corona inspection vendors were only providing the aircraft and subcontracting to one specific vendor which then provided the equipment and personnel to use. In 2021, WAPA used this vendor on-board WAPA aircraft and reduced contract costs by almost 60%.

2022 Approach: In 2022, WAPA will conduct further market research on other equipment, such as IR, LiDAR, and photo-imagery to assess if it is more cost efficient to acquire or contract out.

2022 Progress: In 2022, WAPA awarded a 5-year contract to contractor that will utilize WAPA aircraft and personnel reducing overall costs for these inspections. Although IR scans were completed, the Corona scans were delayed due to Corona contractor camera malfunctioning and new cameras having incompatible mounts for WAPA aircraft. This situation reinforced benefits of having dedicated equipment for WAPA aircraft.

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 4. Detailed Aerial, Climbing and/or Group-based Tower and Equipment Inspections

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
Structural & Equipment Inspections	4. Detailed Aerial, Climbing and/or Group-based Tower and Equipment Inspections	2,3	ROW	June 2021	Structure and/or Equipment Failure

Strategy Description: Conduct detailed aerial, climbing, and/or ground-based tower and equipment inspections.

2020 Progress: Specific inspection plans were developed for HFTD Tier 2 and Tier 3 areas. All COTP HFTD Tier 2 and Tier 3 segment inspections were completed by June 30, 2020. Inspection plans were prioritized and implemented in response to Tier 2 and Tier 3 inspection information collected and evaluated on an ongoing basis.

2021 Approach: In 2021, the same job plan was to be performed by June 30. Based on those evaluations, WAPA Maintenance crews considered performing additional detailed ground inspections of COTP transmission towers. Tower inspections may involve climbing and inspecting every tower for structural and equipment issues as part of these enhanced inspections. A close visual inspection of the tower is conducted. Linemen look for any loose steel, bolts on-the-ground or any other aberrant condition. If they note that something requires correction, they either correct it at that time or schedule it for repair.

2021 Progress: COTP HFTD Tier 2 and Tier 3 ROW segment inspections were completed by June 30, 2021. There were four significant findings (three broken spacers and one hazard tree) identified and repaired.

2022 Approach: In 2022, the same job plan will be performed by June 30. If inspections reveal that structural and/or equipment repair issues are warranted, maintenance crews will either correct them at the time at which they are detected or schedule them for timely repair.

2022 Progress: In 2022, COTP HFTD Tier 2 and Tier 3 ROW segment inspections were completed by June 30, 2022. There were no issues identified.

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 5. Brush and Grade Six Miles of COTP Access Roads

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
Access Road Maintenance	5. Brush and Grade Six Miles of COTP Access Roads	3	Both	June 2021	Topographic/Climatological; Emergency and Wildfire Response Constraints

Strategy Description: Brush and grade six miles of COTP access roads.

2020 Progress: WAPA linemen graded approximately six miles of COTP access roads by May 31, 2020. Contract crews removed brush and trees throughout the COTP ROW to improve access for maintenance vehicles and crews, heavy equipment, and fire response vehicles.

2021 Approach: In 2021, WAPA targeted approximately five miles of access road grading in the Tier 2 HFTD with a completion deadline of December 31, 2021.

2021 Progress: Procurement delays resulted in the postponement of road improvements in the project area. The transmission line and towers remained fully accessible to crews in the project area.

2022 Approach: In 2022, WAPA will target approximately five miles of access road grading in the Tier 2 HFTD with a completion deadline of December 31, 2022. The procurement process for this effort has been prioritized and initiated earlier this year.

2022 Progress: In 2022, 6 miles of access road grading in the Tier 2 HFTD were completed.

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 6. Hazard Tree Mitigation Based on Most Recent LiDAR Analysis

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
Vegetation Inspections & Management	6. Hazard Tree Mitigation Based on Most Recent LiDAR Analysis	All	Both	Any	Vegetation to Conductor Contact
<p>Strategy Description: When implemented, this activity will rely on additional LiDAR data to identify potential hazard tree issues within and adjacent to the COTP ROW that have been identified aerially. This is especially valuable in challenging terrain where vehicular access for on-the-ground inspections may be limited. Information obtained from this analysis is usually followed by direct field inspection visits by utility arborists to directly assess the situation in the field.</p> <p>2020 Progress: All LiDAR, oblique photography, orthophotography and high-definition video was collected as of May 25, 2020. The data was calibrated and integrated onto WAPA’s GIS database after some minor delays related to the pandemic. WAPA used all conventionally available data to prioritize ground inspections and mitigation strategy implementation. That data included frequent, additional fire season on-the-ground inspections by utility arborists, existing aerial photography, and supporting inspection reports and data.</p> <p>2021 Approach: In 2021, WAPA continued to use the LiDAR and conventional aerial, ground and supporting inspection-related data to plan and prioritize risk reduction work.</p> <p>2021 Progress: LiDAR analysis identified 134 sites within the COTP ROW containing brush that represented potential minimum vegetation clearance distance encroachments that required follow-up during ground inspections. Three sites were expedited and removed in 2021.</p> <p>2022 Approach: In 2022, WAPA will continue to use the LiDAR and conventional aerial, ground and supporting inspection-related data to plan and prioritize risk reduction work. Of the 134 sites initially identified with potentially encroaching brush, three were expedited and removed in 2021. Another 22 such sites are currently on work specifications to be removed by mid-year. The remainder of the sites will be prioritized for removal by the end of 2022 and early 2023.</p> <p>2022 Progress: In 2022, WAPA conducted ground inspection of all sites and prioritized issues based on risks. Based on these inspections, the previously identified sites were considered low risk and were re-prioritized as routine maintenance. The trees were all in good health and would take extreme line sway movement to encroach with surrounding vegetation. These sites will be addressed in the 2023 annual work plan.</p>					

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 7. Brush and Fuels Control

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Schedule	Risks Addressed
Vegetation Inspections & Management	7. Brush and Fuels Control	3	ROW	June 2021	Vegetation to Conductor Contact (Downed Conductor)

Strategy Description: Conduct brush and fuels control activities in the COTP ROW.

2020 Progress: Contract crews removed brush and trees throughout the COTP ROW to minimize fire spread/propagation by May 31, 2020. This activity included mastication, mowing, and manually removing brush and other flammable vegetation within the COTP ROW to create firebreak like conditions intended to eliminate or minimize the potential for fire spread/propagation.

2021 Approach: In 2021, WAPA continued to prioritize brush and tree removals throughout the COTP ROW to minimize the potential for fire spread/propagation. Prioritization for such removals is ongoing at all times throughout the year.

2021 Progress: Contract crews removed brush and trees on approximately 60 acres within COTP ROW to minimize the potential for fire spread/propagation.

2022 Approach: In 2022, WAPA will continue to prioritize brush and tree removals throughout the COTP ROW to minimize the potential for fire spread/propagation in HFTD Tier 2 and 3 areas. WAPA plans to target 80 to 100 acres in 2022 for fuel reduction work.

2022 Progress: In 2022, contract crews removed brush and trees on approximately 162 acres within COTP ROW to minimize the potential for fire spread/propagation.

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 8. Research and Development of Drone Use for Structural, Equipment, and ROW Inspections

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Enhanced Inspection	8. Research and Development of Drone Use for Structural, Equipment, and ROW Inspections	All	Both	Structure and/or Equipment Failure Vegetation to Conductor Contact Contact by Foreign Object

Strategy Description: WAPA is currently evaluating the feasibility of using UAV inspections in the SNR. These inspections could be implemented for the COTP. This activity focuses on research into the use of drones for inspections of all COTP, facilities, assets, equipment, and the ROW as they offer several potential inspection capacity improvements. UAVs are capable of close-order aerial inspections of transmission towers and conductors, communication sites, and existing and potential ROW encroachments. Drones can also provide more precise, repeatable data based on Geographic Positioning System (GPS) coordinates. The use of UAVs may also provide the opportunity to improve the accuracy and frequency of inspections and resulting records and reduce potential safety hazards conventionally associated with transmission line climbing inspections.

2020 Progress: In 2020, these evaluations included the following discussions and milestones:

- WAPA evaluated the potential benefits of participating in energy research groups such as the Centre for Energy Advancement through Technological Innovation (CEATI) or the Electric Power Research Institute (EPRI) whose members contribute to research projects related to utility/energy technologies, including the use of drones.
- WAPA reached out to other internal regions to inquire how they are using UAVs in their maintenance programs.
- WAPA worked with an aviation vendor on a UAV pilot project to capture aerial imagery on four miles of transmission line. The project successfully captured the imagery (see photo insets), which is being evaluated for its abilities to augment and support ongoing inspections programs.
- WAPA has begun to establish a UAV program and is identifying potential uses.
- WAPA-SNR acquired a UAV in 2020 (Skydio 2).



2021 Approach: WAPA is using lessons learned from other regions, electric utilities, and pilot projects to move the UAV program forward. WAPA anticipated increasing the use of UAVs in 2021 as opportunities arose.

2021 Progress: WAPA successfully utilized UAVs to inspect equipment, ground conditions and tree health. Some of the benefits were:

- Safety – Patrolman can inspect equipment safely from the ground;
- Efficiency – UAVs can be quickly and safely deployed for inspections;
- Accuracy – Clear, close-up images of equipment and potential issues are provided; and
- Surveying – UAVs facilitate enhanced observations of ground and immediately surrounding areas for potential vegetation and other fuels accumulations issues.

2022 Approach: WAPA will move forward with expanding the UAV Program to include additional drones and train candidates as UAV pilots become licensed.

Figure 8. Research and Development of Drone Use for Structural, Equipment, and ROW Inspections

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Enhanced Inspection	8. Research and Development of Drone Use for Structural, Equipment, and ROW Inspections	All	Both	Structure and/or Equipment Failure Vegetation to Conductor Contact Contact by Foreign Object
<p>2022 Progress: In 2022, WAPA continues to utilize UAVs to inspect equipment, ground conditions and tree health. WAPA identified 4 locations of concern during IR inspections. The drones were used to take pictures of each and determine there were no obvious evidence of problems.</p>				

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 9. LiDAR Surveys of the COTP ROW and Adjacent Lateral Areas

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Vegetation Inspections & Management	9. LiDAR Surveys of the COTP ROW and Adjacent Lateral Areas	All	Both	Vegetation to Conductor Contact

Strategy Description: This activity focuses specifically on LiDAR surveys that would cover the entire COTP ROW and an additional 300-foot-wide lateral buffer.

2020 Progress: The WAPA contractor completed collecting LiDAR information by May 25, 2020 (Table V-1). The data was calibrated and underwent quality assurance and control throughout the summer of 2020. In the fall of 2020, WAPA received updated LiDAR data from the existing contract for those services. WAPA began comparing that data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial photography from commercial sources.

2021 Approach: In 2021, WAPA continued to compare LiDAR data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial photography from commercial sources. Those comparisons will help identify additional hazard trees that may not be identifiable from ground-based patrols due to terrain, ground access, or other limiting factors. Based on the comparison of LiDAR data from the 2020 contract and existing aerial photography and inspection reports, TANC and WAPA will evaluate from two to three years’ frequency for contracting for LiDAR inspections.

In 2021, WAPA Utility Arborists were also using the LiDAR deliverables to ground truth any potential vegetation encroachment issues. The data to date has proven to be accurate and useful in prioritizing and planning vegetation management and fuel reduction work. The plan is to continue testing the data and determining where the use of LiDAR can be expanded to areas outside the ROW. Moving forward, WAPA has started using the LiDAR data to determine vegetation density in and around the ROW, which can potentially be correlated with fuel loads. If successful, the data would be useful in planning and completing fuel reduction work.

2021 Progress: LiDAR inspections have been very useful in identifying potential in ROW issues but less so for off-ROW hazards. The LiDAR data called-out all trees that were tall enough such that if they were to fall, they could fall into the line and contact and/or arc with the COTP conductors. Those results that directly correlated tree heights with fall-in potential resulted in hundreds of trees being misleadingly listed as potential fall-ins. Currently, we only address potential off-ROW fall-in trees as hazards if those trees are dead, in poor health (diseased or dying), leaning into the line, or compromised structurally (defective).

All the data was incorporated into the WAPA GIS database and is accessible to WAPA linemen and utility arborists to ground truth any potential hazards. LiDAR was not very effective for identifying excessive fuel loading in and adjacent to the ROW, particularly understory fuels.

2022 Approach: WAPA will continue to focus on identifying in ROW and off-ROW issues using all available data. WAPA will shift to using photo-imagery to preliminarily identify areas of heavy vegetation and excessive fuel for planning and completing fuel reduction work.

2022 Progress: In 2022, WAPA used photo-imagery and ground inspections to identify in ROW areas of heavy vegetation and excessive fuels. Approximately 162 acres were treated for excessive fuels in Tier 2 areas, another 100 acres will be targeted in 2023.

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 10. Oblique Photography and High-Definition Video

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Vegetation Inspections & Management	10. Oblique Photography and High-Definition Video	All	Both	Vegetation to Conductor Contact Situational Awareness Risk of Spread

Strategy Description: This activity includes aerial photography and streaming video of the 200-foot wide COTP ROW and a 50-foot wide lateral, adjacent buffer zone on either side of the ROW edges for a total width of 300-feet of photographic coverage. This wide-path photography will allow assessments of fuels and debris piles accumulations within and adjacent to the COTP ROW.

Based on the comparison of this imagery from the 2020 contract and existing aerial photography and inspection reports, TANC and WAPA will evaluate whether to pursue an interval of from two to three years’ frequency for contracting for oblique photography and high-definition video imagery in the future. Lessons will be learned regarding:

- The appropriate frequency, technical specifications, and performance work standards for contractors;
- The quality of the information received for hazard tree assessments and growth rates; and
- The appropriate buffer width lateral to the existing COTP ROW to account for fuels assessments that can reduce wildfire ignition and propagation risks.

2020 Progress: The WAPA contractor completed collecting oblique photography and high-definition video imagery by May 25, 2020 (Table V-1). The data was calibrated and underwent quality assurance and control in the summer and early fall of 2020. In the fall of 2020, TANC and WAPA received current oblique photography and high-definition video from the existing contract for those services and began comparing that data to existing inspection data.

2021 Approach: In 2021, WAPA continued to compare photography and video data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial photography from commercial sources. Those comparisons will help identify additional hazard trees that may not be identifiable from ground-based patrols due to terrain, ground access, or other limiting factors. In 2021, WAPA Vegetation Management staff and Utility Arborists are using the photography and video to identify vegetation management needs in the more difficult to access areas. This imagery is being used in conjunction with the LiDAR to provide a better overview of ground conditions and vegetation management needs.

2021 Progress: WAPA used all available photo-imagery data to supplement aerial and ground inspection data to help identify additional hazard trees that may not be easily identifiable due to terrain, ground access, or other limiting factors. This information was especially useful in approximately 10 miles along the Captain Jack – Olinda transmission line segment.

2022 Approach: WAPA will continue to use all available photo-imagery data to supplement aerial and ground inspection data to help identify additional hazard trees that may not be easily identifiable due to terrain, ground access, or other limiting factors.

2022 Progress: In 2022, WAPA used photo-imagery and ground inspections to identify in ROW areas of heavy vegetation and excessive fuels. Approximately 162 acres were treated for excessive fuels in Tier 2 areas, another 100 acres will be targeted in 2023.

HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3)

ROW: Right of Way or Off-Right of Way or Both

2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

2021 and 2022 Approaches: Schedules are limited to before the end of June, or by the end of that calendar year.

Figure 11. Orthophotography

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Vegetation Inspections & Management	11. Orthophotography	All	Both	Situational Awareness Risk of Spread

Strategy Description: This imagery includes a one-mile-wide-path of ortho-rectified photography extending along the COTP ROW. This higher-elevation, broader coverage of the ROW will allow wider fuels assessments and provide indications of potential property improvements, debris piles, and other wildfire risk reduction considerations adjacent to the ROW.

Based on the comparison of this wide-perspective imagery from the 2020 contract and existing aerial photography and inspection reports, TANC and WAPA will evaluate whether to pursue from two to three years’ frequency for contracting for this one-mile-wide oblique photography. Lessons will be learned regarding:

- The appropriate frequency, technical specifications, and performance work standards for contractors;
- The quality of the information received for hazard tree assessments and growth rates; and
- The appropriate buffer width lateral to the existing COTP ROW to account for fuels assessments that can reduce wildfire ignition and propagation risks.

2020 Progress: The WAPA contractor completed collecting oblique photography and high-definition video imagery by May 25, 2020 (Table V-1). The data was calibrated and underwent quality assurance and control in the summer and early fall of 2020. In the fall of 2020, TANC and WAPA received current oblique photography and high-definition video from the existing contract for those services.

2021 Approach: In 2021, WAPA continued to compare orthophotography data to current on-the-ground inspection data from WAPA utility arborists and existing and new aerial imagery and photography from commercial sources. Those comparisons will help identify additional hazard trees that may not be identifiable from ground-based patrols due to terrain, ground access, or other limiting factors. In 2021, WAPA Vegetation Management staff and Utility Arborists are using the orthophotography to identify vegetation management needs for broader areas outside of the ROW.

2021 Progress: In 2021, WAPA used orthophotography data to identify vegetation management needs for broader areas outside of the ROW that are not normally captured during aerial and ground inspections. This data will aid the planning and prioritizing of future off-ROW fuel reduction projects.

2022 Approach: In 2022, the priority will be in ROW fuel reduction through tower base clearing and ROW mastication, and off-ROW hazard tree mitigation. Off-ROW fuel reduction efforts will be developed as opportunities arise through partnership with other agencies and/or land managers.

2022 Progress: In 2022, WAPA prioritized in ROW fuel reduction through tower base clearing and ROW mastication, and off-ROW hazard tree mitigation. Off-ROW fuel reduction efforts will be developed as opportunities arise through partnership with other agencies and/or land managers.

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2020 Schedule: June 1: Completed by June 1 or Any: Any time in 2020

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Figure 12. Expanded Collaboration with Other Public and Private Agencies

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Vegetation Inspections & Management	12. Expanded Collaboration with Other Public and Private Agencies	All	Both	Vegetation to Conductor Contact Situational Awareness Risk of Spread
<p>Strategy Description: This strategy focuses on leveraging existing and new relationships with the U.S. Forest Service, the California Department of Forestry and Fire Protection, other transmission owners and operators, and local entities where mutually beneficial wildfire risk prevention, mitigation, and response strategies can be expanded and/or developed in areas where the COTP could be at risk. These are ongoing programs where completion is evaluated by annual progress in advancing on-the-ground risk reduction activities.</p> <p>2020 Progress: In 2020, TANC actively explored the expansion of its current relationships with the USFS to increase the extent of joint fuels management, access road maintenance, and related activities that reduce wildfire risks. These activities included:</p> <ul style="list-style-type: none"> • Advancing TANC’s program of identifying and removing hazard trees located outside of the COTP ROW that pose fall-in hazards to the transmission line conductors and/or towers. TANC contracted for 58 miles of surveys of dead, decaying, dying, or diseased trees located outside the COTP ROW on U.S. Forest Service managed lands. TANC’s Registered Professional Forester (RPF) identified approximately 290 hazard trees on the Modoc and Shasta-Trinity National Forests (Forests) by August. TANC then coordinated with staff representing each of these Forests throughout the remainder of the year with information that included estimated timber values, and potential removal effects on cultural, biological, and other natural resources. TANC received a formal notice to proceed with the removal of the 40 identified hazard trees on the Modoc National Forest in November. TANC paid approximately \$6,000 for the merchantable value of those trees in December. • Staff initiated discussions for the development of a new collection agreement with the Shasta-Trinity National Forest. The new agreement may focus on increasing the acreage of fuels treatment and access road improvement activities on STNF managed lands. <p>2020 Progress: The WAPA contractor completed collecting oblique photography and high-definition video imagery by May 25, 2020 (Table V-1). The data was calibrated and underwent quality assurance and control in the summer and early fall of 2020. In the fall of 2020, TANC and WAPA received current oblique photography and high-definition video from the existing contract for those services.</p> <p>2021 Approach: COTP staff continued to collaborate with the STNF to achieve the approvals needed to remove approximately 250 off-ROW hazard trees identified in 2020. Staff provided information that helped STNF technical specialists review the potential impacts to cultural and natural resources so that appropriate resource protection measures could become conditions of such approvals. Support also included providing information to assist in the administration of a timber sale for those trees with merchantable value to the STNF. TANC collaborated fully with the Modoc and Shasta-Trinity National Forests for the procurement of contract services for the removal of off-ROW hazard trees.</p> <ul style="list-style-type: none"> • TANC began the establishment of a relationship with the California Department of Forestry and Fire Protection (CAL FIRE) to better understand and therefore begin accessing the benefits of state forest management programs for projects consistent with procedures established in the CAL FIRE Vegetation Treatment Program (VTP) and similar state-sponsored programs. • Staff continued to explore opportunities for other California-Oregon Intertie (COI) transmission owners to support additional fuels treatment projects in those areas where they may be mutually beneficial. • COTP staff will accelerate the development of contract fuels reduction agreements with local entities that may include Fire Safe Councils, and towns and cities located near the COTP ROW. 				

Figure 12. Expanded Collaboration with Other Public and Private Agencies

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Vegetation Inspections & Management	12. Expanded Collaboration with Other Public and Private Agencies	All	Both	Vegetation to Conductor Contact Situational Awareness Risk of Spread
<p>2021 Progress: TANC and the COTP received the required approvals from the STNF to remove hazard trees previously identified adjacent to the COTP ROW. Those approvals included the flexibility to continue identifying additional trees in 2021 and 2022 that have become hazard trees since the original 2020 surveys were completed. TANC also entered into a contract for the removal of all identified off-ROW hazard trees.</p> <ul style="list-style-type: none"> • COTP staff continued to work with WAPA to identify those non-federal responsibility areas where the use of the CAL FIRE VTP — potentially in combination with local fuels agreements — could result in the greatest level of wildfire risk reduction. <p>2022 Approach: We anticipate removing all off-ROW hazard trees in the STNF by mid-2022 as ground conditions allow. The work will be substantially completed by contractors. COTP and WAPA staff will continue to coordinate the use of contract arborists and registered professional foresters to maintain an ongoing program of identifying and removing hazard trees on an ongoing basis.</p> <p>TANC will renew our collaborative fire response, fuels treatment, and access road maintenance and improvement collection agreement with the Modoc and Shasta-Trinity National Forests (13th Collection Agreement). The agreement provides five years of funding to support TANC’s share of costs to operate and maintain the Long Bell Fire Station and several mastication, prescribed burn, and manual vegetation management projects implemented by the USFS in areas that lie adjacent to the COTP and the other COI transmission lines. The agreement also funds access road maintenance and improvement work that improves responsiveness to wildfires near the COTP.</p> <p>The 13th Collection Agreement provides fire response and other wildfire risk reduction benefits to the other COI transmission owners. TANC will therefore continue to urge their additional participation in reducing wildfire risks in these national forests by collaborating with planned TANC and/or USFS wildfire risk reduction activities and projects.</p> <p>TANC will advance our efforts for developing local fuels agreements that would benefit from leveraging the environmental process efficiencies provided by the CAL FIRE VTP EIR. These efforts include but are not limited to considerations and ultimately the logistics pertaining to the identification of willing landowners, the appropriate management structure for such agreements, and related COTP and TANC asset and liability protections.</p> <p>2022 Progress: Hazard trees adjacent to the COTP ROW on the Shasta-Trinity National Forest were abated by June 30, 2022. Several additional trees – beyond the 250 originally identified in 2020 – would need to be abated because of high tree mortality rates. TANC's Registered Professional Forester (RPF) identified those additional trees in 2021 in parallel with the initiation of abatement activities. Ultimately 420 hazard trees were abated in the Shasta-Trinity National Forest. In late 2021, TANC contractors also abated 41 hazard trees adjacent to the COTP ROW in the Modoc National Forest. All told, the 2020 through 2022 off-ROW hazard tree abatement effort on lands managed by the U.S. Forest Service resulted in the identification of 477 hazard trees, of which 461 were abated by logging contractors. The sixteen other trees either fell naturally away from the COTP or degraded to the point that they no longer posed a hazard to COTP conductors or towers.</p> <p>The Eleventh Collection Agreement with the U.S. Forest Service expired on June 30, 2022. In the prior 18 months, the Modoc and Shasta-Trinity National Forests successfully completed the following wildfire risk reduction activities near the rights of way for the COTP and other COI transmission lines:</p> <p><u>Fuels Treatments</u></p> <ul style="list-style-type: none"> • Prescribed burns – 154 acres • Mastication – 446 acres 				

Figure 12. Expanded Collaboration with Other Public and Private Agencies

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Vegetation Inspections & Management	12. Expanded Collaboration with Other Public and Private Agencies	All	Both	Vegetation to Conductor Contact Situational Awareness Risk of Spread
<ul style="list-style-type: none"> • Logging/Timber Sales – 1,045 acres, and • Fuel Breaks (roadside mastication)– 261 acres. <p><u>Fire Suppression</u></p> <ul style="list-style-type: none"> • Modoc Engine 345 remained at full staffing and responded to fires on 70 days. • Two fires ignited by lightning within from 300 feet to one mile from the COTP were stopped before spreading more than 2.5 acres. • Ten miles of access road grading, brushing, realignment, reconstruction and surfacing for improved fire suppression responsiveness. <p>TANC and the U.S. Forest Service successfully entered into the 13th Collection Agreement as the successor to the Eleventh Collection Agreement, and continued fuels treatments and fire suppression work, which is ongoing consistent with this well-established long-term collaborative program.</p>				

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Figure 13. Technology Application Reviews

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Enhanced Situational Awareness	13. Technology Application Reviews	All	Both	All

Strategy Description: This activity will be used to evaluate the potential application of enhanced wildfire detection, inspection, situational awareness, and related tools that can improve the effectiveness of TANC’s wildfire risk reduction strategies, including but not limited to:

- Installation of meteorological stations for localized, real-time temperature, wind speed, and related weather data generation and/or sharing;
- Expanded use of infrared cameras for early identification of potential structural, equipment and related failures;
- A splice assessment program designed to assess the integrity of transmission conductor splices. The technology uses an x-ray machine that encompasses a splice and takes an x-ray image of the splice;
- Hyperspectral imagery obtained from rotary and fixed wing aircraft that measures vegetation clearance distances from the conductor as flown;
- Wildfire simulation modeling that assesses the consequences of wildfires that may escape from the COTP ROW and affect populations, property, natural resources, and other potential exposures; and
- Installation of high-definition pan-tilt zoom cameras to provide real-time information regarding locations within or near the COTP ROW where wildfire ignition and propagation detections.

2020 Progress: In 2020, TANC and WAPA initiated the review of new and/or improved technologies that can reduce COTP wildfire risks. These included the following discussions and milestones:

- Evaluated the potential benefits of participating in energy research groups such as the CEATI or the EPRI whose members contribute to research projects related to utility/energy technologies.
- Researching the use of radio frequency harmonics and ultrasonic dish for early identification of potential structural and equipment issues.
- Researching the use of satellite-based wildfire risk mitigation risk technologies and coordinating demonstrations to review new wildfire mitigation risk mapping services.

2021 Approach: In 2021, WAPA continued to research ways to supplement or improve on the current available mapping resources with the use of new technologies or wildfire risk mitigation services. WAPA will participate in demonstrations and initiate pilot projects that use these new tools on WAPA-maintained infrastructure and ROWs.

2021 Progress: WAPA did not participate in any energy research groups, deciding that the funding to participate in such groups would be better applied to our current Operations and Maintenance (O&M) efforts. Evaluation of new technologies such as satellite-based wildfire risk mitigation technologies, frequency harmonics and ultrasonic dish did not appear to significantly enhance our current abilities to detect potential issues that would justify the cost.

2022 Approach: In 2022, WAPA continued to research ways to improve on current available mapping resources with the use of new technologies or wildfire risk mitigation services. WAPA will continue to explore opportunities to participate in demonstrations and initiate pilot projects that use these new tools.

2022 Progress: In 2022, WAPA did not participate in any energy research groups, deciding that the funding to participate in such groups would be better applied to our current O&M efforts. Evaluation of new technologies such as satellite-based wildfire risk mitigation technologies, frequency harmonics and ultrasonic dish did not appear to significantly enhance our current abilities to detect potential issues that would justify the cost.

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Figure 14. Upgrade Ground and Aerial Line Inspection Software for More Refined Data and Analyses

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Enhanced Recordkeeping	14. Upgrade Ground and Aerial Line Inspection Software for More Refined Data and Analyses	All	Both	All

Strategy Description: This strategy focuses on upgrading and refining line inspection software to accommodate data and information collected through enhanced inspections. Software will be refined to more accurately categorize enhanced inspections and document their findings at the appropriate levels of detail. Additional upgrades may include but not be limited to capabilities that incorporate aerial imagery and the associated data collected through aerial inspections.

2020 Progress: In 2020, WAPA began upgrading line inspection software and the associated internal controls and situational awareness tools that are needed to accommodate more robust analysis and evaluations of enhanced inspections data. These upgrades included the following discussions and objectives:

- The upgraded line inspection system was upgraded to integrate more seamlessly with WAPA’s computerized asset management system.
- The software is now available for utility arborists to use in the field for more efficient recording, documenting, and sharing of information between vegetation management staff.

2021 Approach: In 2021, WAPA-wide coordination will continue on the procurement and implementation of new software.

2021 Progress: WAPA implementation is ongoing and being tested in the field by the linemen.

2022 Approach: WAPA will continue to test new software in the field.

2022 Progress: In 2022, WAPA upgraded and improved their line inspections by deploying the IQGeo geospatial productivity and collaboration software to enhance the quality of equipment inspections data and information collected. The application was deployed in WAPA’s web services cloud that supports all of its storage, computational power, and functionality. Maintenance personnel can access location-specific maintenance records by structure and equipment while entering current inspection data and information. These records are accessible during ground and aerial patrols. IQGeo allows crews to capture information more quickly and easily and is significantly faster than the software that had been in use for approximately ten years prior. This database upgrade has made the collection of structure and equipment inspections data more holistic, more current by facilitating greater inspection efficiencies, and more flexible. Overall, it has strengthened the ability to preventatively detect equipment and facility stressors, and therefore maintain COTP reliability while simultaneously addressing potential wildfire ignition risks from COTP equipment and structures.

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Figure 15. Review Fire Safety Guidelines and Precautions

Category	Enhanced Wildfire Strategy No. & Title	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Continuous Training	15. Review Fire Safety Guidelines and Precautions	All	Both	All
<p>Strategy Description: Enhanced inspections, the use of new inspection equipment, and a more intensive and frequent schedule for their implementation have emphasized the need for continuous fire safety training. This strategy focuses on continuous reviews of fire safety guidelines and precautions. Its purpose is to support evaluations of whether elevated high fire threat conditions require revisions of those guidelines and precautions.</p> <p>2020 Progress: In addition to existing fire safety training, WAPA added the following training for those responsible for implementing wildfire prevention, mitigation, and response strategies:</p> <ul style="list-style-type: none"> • WAPA staff are receiving training on the use of new technologies and tools experts from other WAPA regions, training materials, demonstrations, and on-the-job training through pilot projects. • Vegetation management crews maintain International Society of Arboriculture Utility Arborist certifications through extensive field and virtual learning events. • WAPA Vegetation Management staff are participating members in the North American Transmission Forum which allow members from other utilities to share best management practices. • WAPA Utility Arborists are required to complete hazard tree identification training. <p>2021 Approach: In 2021, WAPA staff will continue to receive the aforementioned training and training related to the use of LiDAR, UAVs, and wildfire mitigation tools and technologies through local resources, seminars, and on-the-job training.</p> <p>2021 Progress: WAPA Vegetation Management staff completed training for the updated line inspection software, LiDAR, Wildfire Risk Mitigation Business Case Development; Vegetation Program Management; Worker Safety–Escape Routes, Lone Worker, First Aid.</p> <p>2022 Approach: WAPA staff will continue to receive the aforementioned training and additional training related to the use of LiDAR, UAVs, and wildfire mitigation tools and technologies through local resources, seminars, and on-the-job training.</p> <p>2022 Progress: WAPA staff continued to receive training related to the use of LiDAR, UAVs, and wildfire mitigation tools and technologies through local resources, seminars, and on-the-job training.</p>				

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