



TRANSMISSION AGENCY OF NORTHERN CALIFORNIA

## WILDFIRE MITIGATION PLAN

FOR THE

CALIFORNIA-OREGON TRANSMISSION PROJECT



NOVEMBER 2019

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## **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 339-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 (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; and to comply with all applicable provisions of Senate Bill 901 (Statutes 2018; Ch. 626: SB 901) as it applies to TANC as a publicly-owned utility (POU). 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 section 8387 for publicly owned electric utilities to prepare a Wildfire Mitigation Plan by January 1, 2020, and annually thereafter.

### **C. Plan Objectives**

TANC's objectives for minimizing the threat of catastrophic wildfire attributed to its facilities and complying with SB 901 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 is intended to annually review this entire Plan to evaluate and improve its 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 Senate Bill 901**

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*
- VII. *Plan Evaluation and Metrics.*

This Plan was developed from December 2018 to November 2019. It complies fully with applicable sections of SB 901. Table I-1 indicates applicable SB 901 requirements and the corresponding section of this Plan that addresses each requirement.

<b>Table I-1 Senate Bill 901 Compliance Requirements and Corresponding Plan Sections</b>	<b>Plan Section</b>
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) The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, and annually thereafter, prepare a wildfire mitigation plan.	Entire Plan
(2) The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:	See Below
(A) An accounting of the responsibilities of persons responsible for executing the plan.	III
(B) The objectives of the wildfire mitigation plan.	I
(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.	V
(D) A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan's performance and the assumptions that underlie the use of those metrics.	VII
(E) A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.	VII
(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.	VI
(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.	VI
(H) Plans for vegetation management.	V
(I) Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.	V
(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:	IV
(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.	IV
(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.	IV

<b>Table I-1 Senate Bill 901 Compliance Requirements and Corresponding Plan Sections</b>	<b>Plan Section</b>
(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 high fire threat district based on new information or changes to the environment.	II
(L) A methodology for identifying and presenting enterprisewide safety risk and wildfire-related risk.	IV
(M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.	VI
(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:	See Below
(i) Monitor and audit the implementation of the wildfire mitigation plan.	VII
(ii) Identify any deficiencies in the wildfire mitigation plan or its implementation and correct those deficiencies.	VII
(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.	VII
(3) The local publicly owned electric utility or electrical cooperative shall present its wildfire mitigation plan in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its wildfire mitigation plan from the public, other local and state agencies, and interested parties, and shall verify that the wildfire mitigation plan complies with all applicable rules, regulations, and standards, as appropriate.	VII
(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 wildfire mitigation plan. 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

**II. Plan Context**

**A. Introduction**

California Senate Bill 901 requires 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 SB 901. 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 339-mile, 500kV high-voltage transmission line extending from the California-Oregon border<sup>1</sup> 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 (BES<sup>2</sup>) in northern California, and provides 1,600 megawatts 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 to be in full compliance with applicable California Public Utilities Commission (CPUC) General Order 95 Rules for Overhead Electric Line Construction.

### **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, radio and associated equipment, appliances and fixtures. The COTP communications sites' power supplies are delivered by local distribution level power service providers.

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<sup>1</sup> 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.

<sup>2</sup> 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.

### C. The California Public Utilities Code Fire Safety Regulations and High Fire Threat District

The CPUC adopted the boundaries of a new High Fire Threat District (HFTD) in 2017.<sup>3</sup> 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 Map”); and
- The “CPUC” Fire-Threat Map<sup>5</sup>.

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, substations, compensation station, and communication sites on the respective Zone 1, Tier 2, and Tier 3 HFTD area boundaries. It presents the COTP ROW and communication site locations and ROW percentages that are mapped for each of these areas. This is the context within which this Plan addresses applicable SB 901 requirements.

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

<sup>2</sup> 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.

<sup>5</sup> Decision 17-01-009 and Decision 17-06-024 refer to the CPUC Fire-Threat Map as “the Shape B Map” and/or “the Shape C Map.” Decision 16-05-036 refers to the CPUC Fire-Threat Map as “Fire Map 2.”

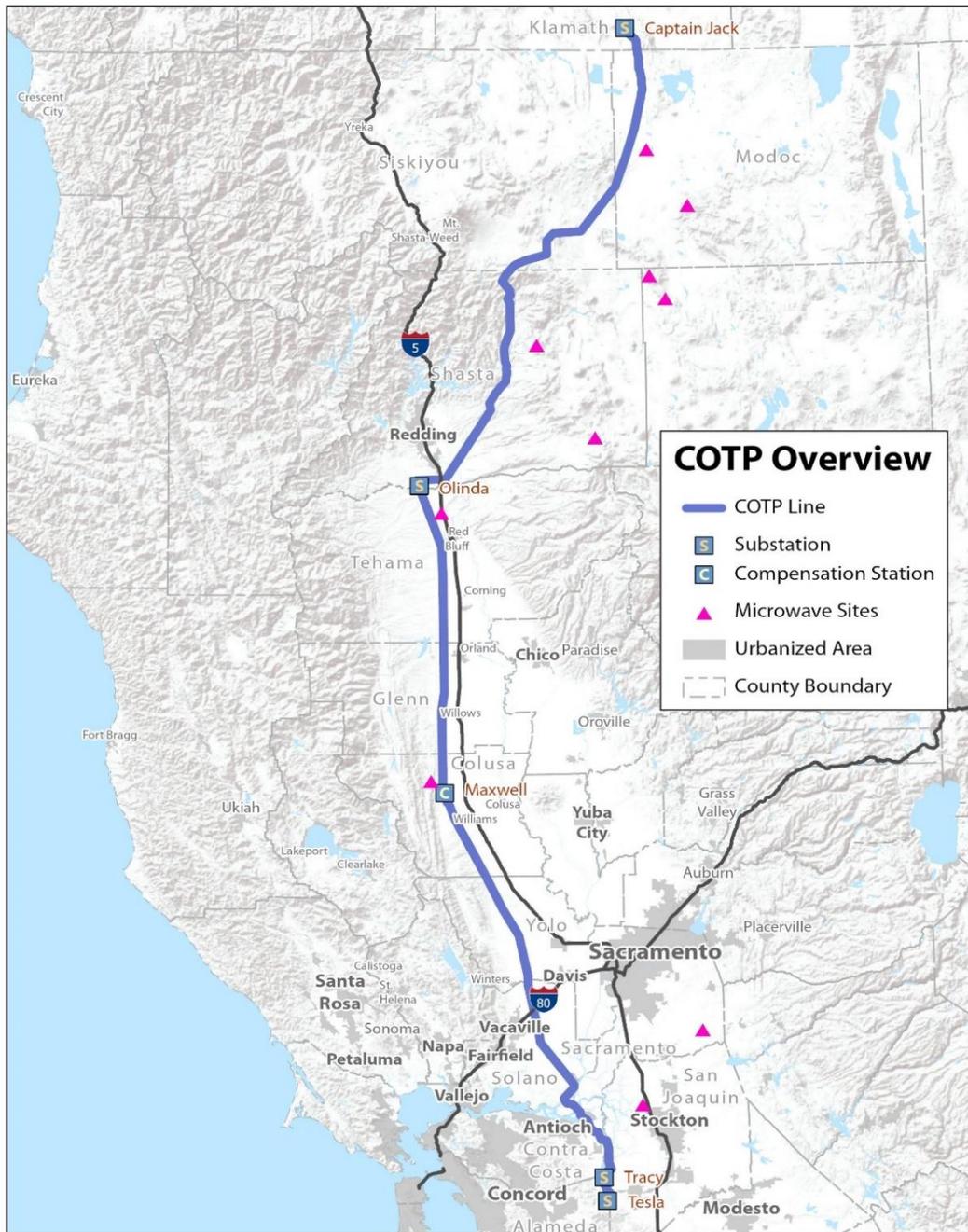


Figure II-1. COTP Overview

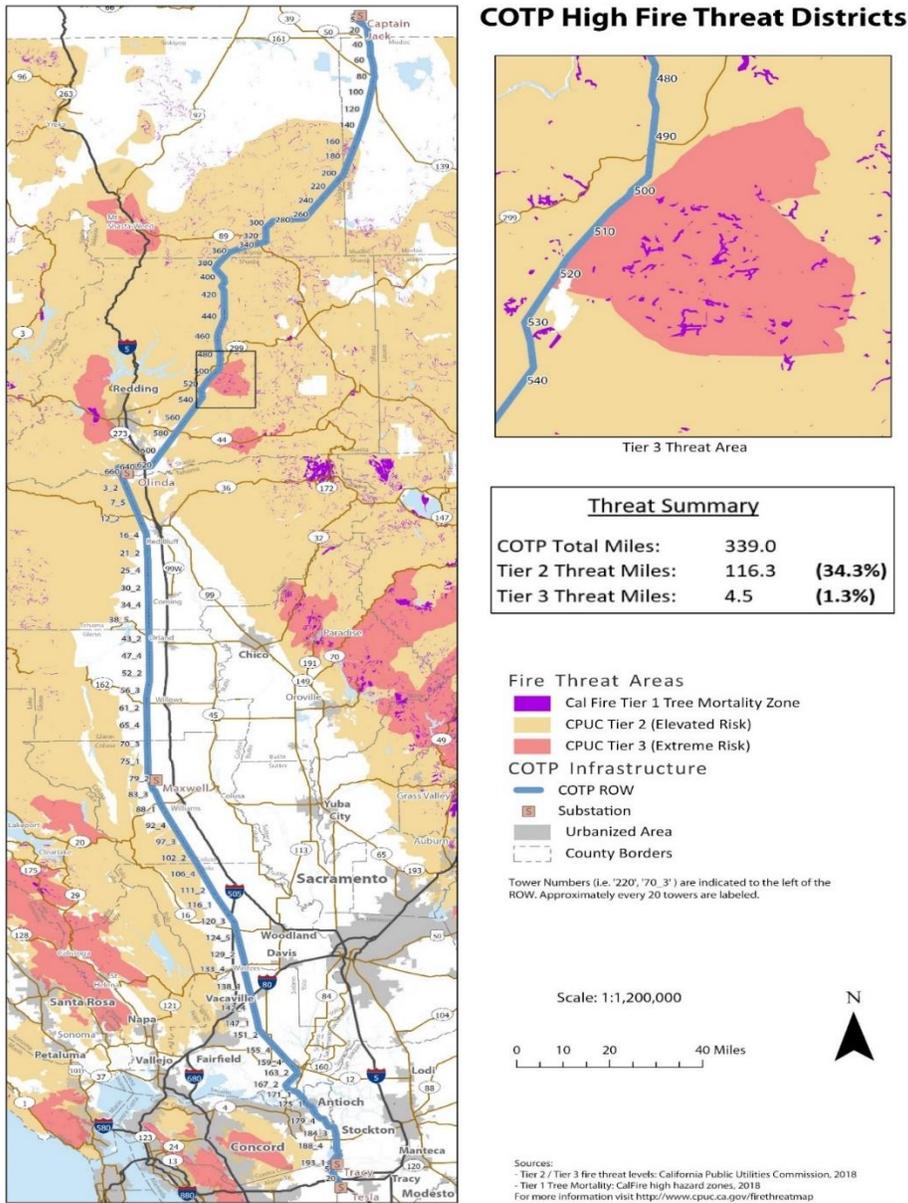


Figure II-2. COTP High Fire Threat Districts

**D. Changes to CPUC Fire Threat Map**

California Public Utilities Code 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 is therefore prioritizing enhanced COTP inspections and maintenance activities as wildfire risk prevention, mitigation and response strategies in those Tier 3 and Tier 2 areas. 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 routine facility 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.

### **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 (Commission). 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.

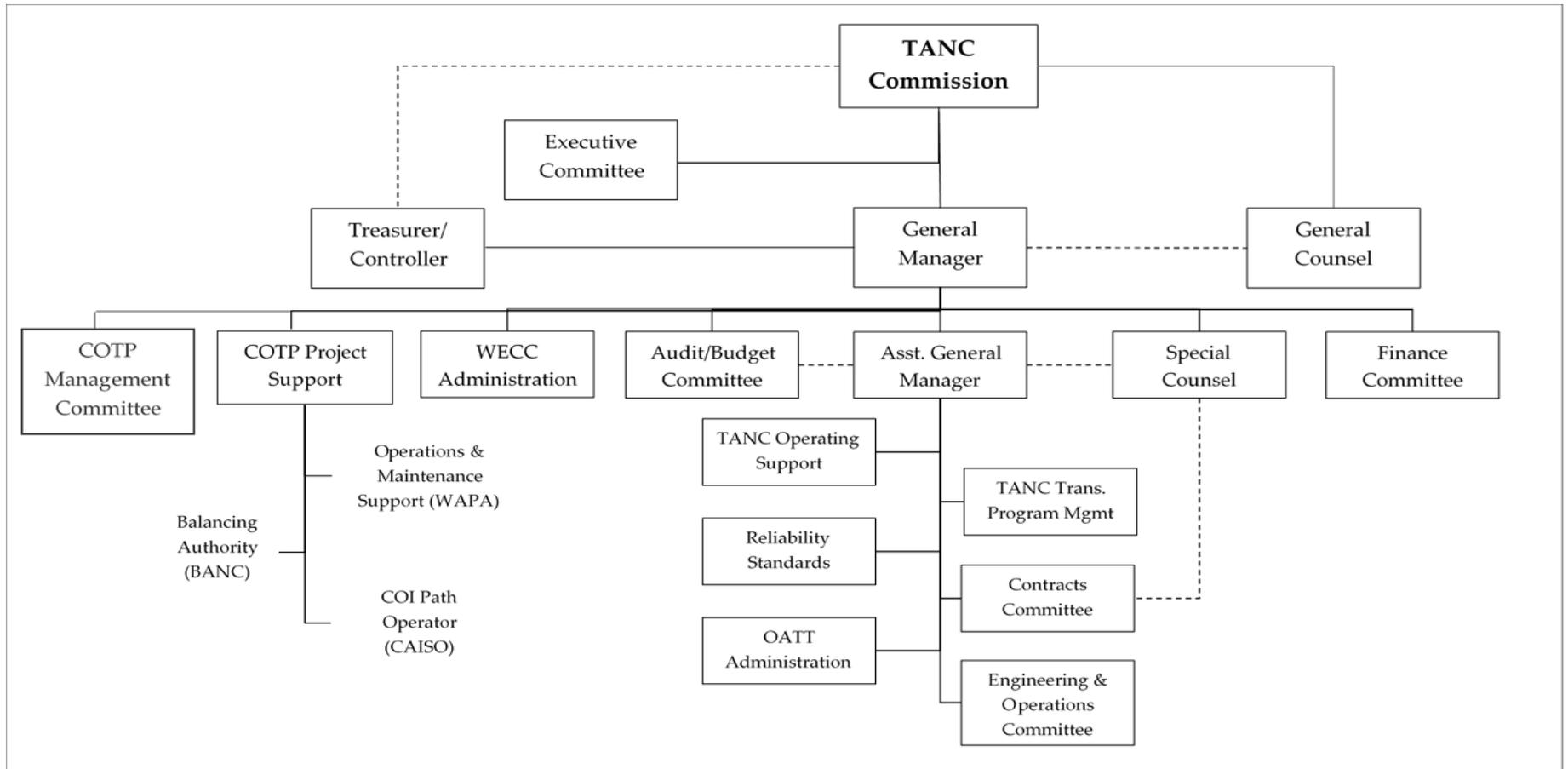
The Commission has organized the Agency, as shown in Figure III-1 - TANC Organization Chart, to provide for the governance, management, and conduct of TANC's activities. All decisions are made by the Commission except for those specifically delegated to TANC Chair, TANC General Manager, TANC Assistant General Manager, TANC 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 Project Participants and includes representatives from each of the six Project Participants:

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

TANC is the primary owner and Project Manager for the COTP, and as a result, 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.

The TANC General Manager will be assisted by the TANC Assistant General Manager in overseeing implementation of this Plan. The TANC Assistant General Manager will provide leadership and exercise authority in connection with the management of professionals engaged by the Agency to implement this Plan.



**Figure III-1-TANC Organization Chart**

BANC: Balancing Authority of Northern California; CAISO: California Independent System Operator; OATT: Open Access Transmission Tariff; WECC: Western Electricity Coordinating Council.

**B. WAPA Organization and Implementation Responsibilities**

WAPA is one of four Federal Power Marketing Administrations within the United States (U.S.) 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 operating 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.

<b>Table III-1. TANC-COTP Plan Roles and Responsibilities</b>	
Role	Wildfire Mitigation Responsibility
TANC Commission & COTP Management Committee	Responsibility for Plan Implementation TANC-COTP Plan Adoption & Governance
TANC General Manager	Plan Implementation Management
TANC Assistant General Manager	Plan Implementation Management
WAPA Sierra Nevada Senior Vice President & Regional Manager	WAPA Operating Agent and Maintenance Responsibilities

**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 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 General Orders (GO) 95 (Rules for Overhead Electric Line Construction, GO 165 (Inspection Requirements for Electric Distribution and Transmission Facilities), and 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).

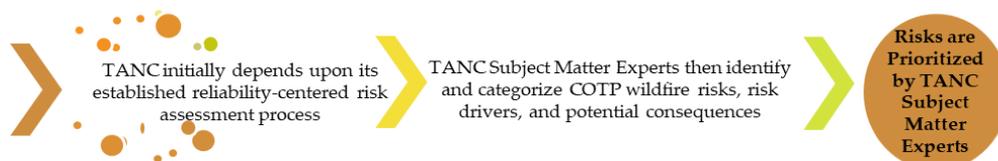


Figure IV-1. TANC Wildfire Risk Assessment Methodology.

Each of these three steps is described below.

### B. Risk Assessment Methodology

#### 1. Step 1 – Reliance on Established Risk Assessment Approach

TANC has an established reliability risk assessment approach. 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.

## 2. 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 with potentially catastrophic consequences. 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 a failure and 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 where vehicle access ranges from unsafe to inaccessible. 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 Plan adjustments that reduce wildfire risks.

*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 will 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 pole 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 devastating loss and financial instability for the COTP Project 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.

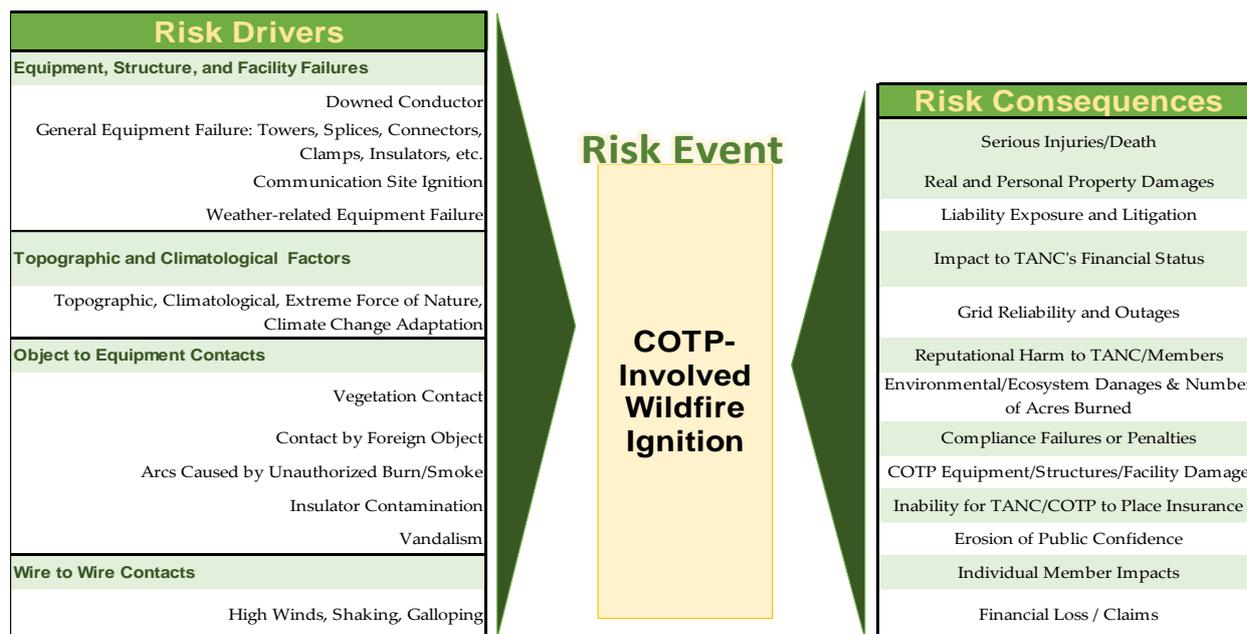


Figure IV-2. TANC Bowtie Wildfire Risk Assessment Summary Diagram

**3. 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, Assistant 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.



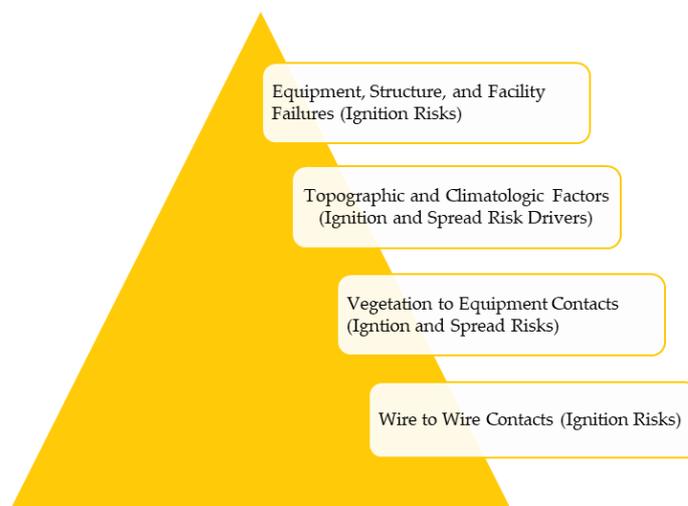
The TANC wildfire risks and consequences summarized in the bowtie framework (Figure IV-2) also fall into one or more of these risk categories.

TANC has initially prioritized these risks consistent with the intent of SB 901, CA Pub. Res. Code § 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” strategies. Enhanced 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 associated with the HFTD areas. Enhanced wildfire strategies complement established TANC wildfire prevention, mitigation, and response strategies, which are discussed below. Enhanced wildfire strategies are summarized in Tables V-1 and V-2. Brief descriptions of

TANC's established wildfire strategies follow those tables. The combined implementation of the established and enhanced wildfire strategies is the foundation upon which this Plan will be implemented.

**B. Enhanced Wildfire Prevention, Mitigation, and Response Strategies**

TANC's enhanced wildfire strategies will be implemented with respect to time, location, and risk priorities, as noted below:

- *Time Prioritization:* Strategies will be implemented either before June 1, or at any other time in 2020. For activities scheduled for implementation before June 1 of 2020, 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.
- *Location Prioritization:* Wildfire risk reduction 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. Wildfire risk reduction 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 within and/or outside of the COTP ROW, depending on the level of control TANC has in exercising existing ROW easement rights.
- *Level of Risk Priority:* 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.

Strategies scheduled for implementation, consideration, and evaluation for wildfire risk reduction are summarized in two separate tables:

- Strategies to be implemented before June 1 or before the end of 2020 (Table V-1); and
- Strategies to be evaluated and considered in the next three years (Table V-2).

The tables include brief descriptions of enhanced strategies and supporting activities.

<b>Table V-1. Wildfire Prevention, Mitigation, and Response Strategies to Be Implemented in 2020</b>					
<b>Category</b>	<b>Enhanced Wildfire Strategy</b>	<b>HFTD Tier(s)</b>	<b>COTP ROW/Off</b>	<b>Schedule</b>	<b>Risks Addressed</b>
One Additional Maintenance Patrolman	Increased personnel by adding one dedicated	All	ROW	Any	Structure and/or Equipment Failure

<b>Table V-1. Wildfire Prevention, Mitigation, and Response Strategies to Be Implemented in 2020</b>					
<b>Category</b>	<b>Enhanced Wildfire Strategy</b>	<b>HFTD Tier(s)</b>	<b>COTP ROW/Off</b>	<b>Schedule</b>	<b>Risks Addressed</b>
	Maintenance Patrolman				
WAPA has added one additional maintenance patrolman 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.					
Expanded Inspection Capacity	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
Long-term infrared and corona inspection contracts will be developed to ensure a reliable base of resources capable of augmenting existing inspection capabilities. Specialized infrared (IR) and ultraviolet (Corona) light cameras are either hand-held or mounted to helicopters and the COTP ROW is flown, with special imagery attention 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 need.					
Structural & Equipment Inspections	Acquisition of Aerial Mounted Infrared, Oblique Photography, High Definition Video and/or Corona Camera Inspection Equipment	2,3	ROW	June 1	Structure and/or Equipment Failure
Structural & Equipment Inspections	Detailed Aerial, Climbing and/or Ground-based Tower and Equipment Inspections	2,3	ROW	June 1	Structure and/or Equipment Failure
Specific inspection plans will be developed for HFTD Tier 2 and Tier 3 areas. These plans will be prioritized and implemented in response to Tier 2 and Tier 3 inspection information collected on an ongoing basis. WAPA Maintenance crews climb and inspect every tower for structural and equipment issues. A close visual inspection of the tower is done looking for any loose steel, bolts on the ground or any other aberrant condition. If they note that something is not right, they either correct it at that time or schedule it for repair.					
Access Road Maintenance	Brush and Grade Six Miles of COTP Access Roads	3	Both	June 1	Topographic/Climatological; Emergency and Wildfire Response Constraints

<b>Table V-1. Wildfire Prevention, Mitigation, and Response Strategies to Be Implemented in 2020</b>					
<b>Category</b>	<b>Enhanced Wildfire Strategy</b>	<b>HFTD Tier(s)</b>	<b>COTP ROW/Off</b>	<b>Schedule</b>	<b>Risks Addressed</b>
Six miles of COTP access roads in Tier 3 will be brushed and graded to improve access for maintenance, heavy equipment, and fire response vehicles.					
Vegetation Inspections & Management	Hazard Tree Mitigation Based on Most Recent LiDAR Analysis	All	Both	Any	Vegetation to Conductor Contact
This activity relies on LiDAR data to identify potential hazard tree issues within and adjacent to the COTP ROW. This is especially valuable in challenging terrain where vehicular access 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.					
Vegetation Inspections & Management	Brush and Fuels Control	3	ROW	June 1	Vegetation to Conductor Contact (Downed Conductor)
This activity includes mastication, mowing, and manually removing brush and other flammable vegetation within the COTP ROW to create fire-break like conditions intended to eliminate or minimize fire spread/propagation.					
<b>HFTD:</b> High Fire Threat District Tier areas 2, 3 or All (1-3) <b>ROW:</b> Right of Way or Off-Right of Way or Both <b>Schedule: June 1:</b> Completed by June 1 or <b>Any:</b> Any time in 2020					

<b>Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022</b>					
<b>Category</b>	<b>Enhanced Wildfire Strategy</b>	<b>HFTD Tier(s)</b>	<b>COTP ROW/Off</b>	<b>Risks Addressed</b>	
Enhanced Inspections	Research and Development of Drone Use for Structural, Equipment, and Right of Way Inspections	All	Both	Structure and/or Equipment Failure Vegetation to Conductor Contact Contact by Foreign Object	
This activity will focus 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. Drones 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 drones may also provide the opportunity to reduce costs, improve the accuracy and frequency of inspections and resulting records, and reduce potential safety hazards conventionally associated with transmission line climbing inspections.					
Vegetation Inspections & Management	LiDAR Surveys of the COTP ROW and Adjacent Lateral Areas	All	Both	Vegetation to Conductor Contact	
Light Detection and Ranging (LiDAR) surveys that cover the entire COTP ROW and an additional 300-foot wide lateral buffer will support the analysis of: <ul style="list-style-type: none"> <li>• Grow-in and fall-in hazard tree assessments;</li> </ul>					

<b>Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022</b>				
<b>Category</b>	<b>Enhanced Wildfire Strategy</b>	<b>HFTD Tier(s)</b>	<b>COTP ROW/Off</b>	<b>Risks Addressed</b>
	<ul style="list-style-type: none"> <li>• Maximum tree height calculations; and</li> <li>• Vegetation classification for fuels assessments.</li> </ul>			
Vegetation Inspections & Management	Oblique Photography and High Definition Video	All	Both	Vegetation to Conductor Contact Situational Awareness/Risk of Spread
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.				
Vegetation Inspections & Management	Orthophotography	All	Both	Situational Awareness/Risk of Spread
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.				
Vegetation Inspections & Management	Expanded Collaboration with other public and private agencies.	All	Both	Vegetation to Conductor Contact Situational Awareness/Risk of Spread
TANC will explore expanding its current relationships with the USFS to increase the extent of joint fuels management, access road maintenance, and related activities that reduce wildfire risks. TANC will also expand wildfire risk reduction collaboration with the California Department of Forestry and Fire Protection (CAL FIRE) and other local fire agencies. TANC will also explore mutually beneficial vegetation management projects with private landowners as appropriate and feasible.				
Enhanced Situational Awareness	Technology Application Reviews	All	Both	All
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: <ul style="list-style-type: none"> <li>• Installation of meteorological stations for localized, real-time temperature, wind speed, and related weather data generation and/or sharing;</li> <li>• Expanded use of infrared cameras for early identification of potential structural, equipment and related failures;</li> <li>• 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;</li> <li>• Hyperspectral imagery obtained from rotary and fixed wing aircraft that measures vegetation clearance distances from the conductor as flown;</li> <li>• Wildfire simulation modelling that assesses the consequences of wildfires that may escape from the COTP ROW and affect populations, property, natural resources, and other potential exposures; and</li> <li>• 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.</li> </ul>				
Enhanced Recordkeeping	Upgrade Ground and Aerial Line Inspection Software for More Refined Data and Analyses	All	Both	All

Table V-2. Wildfire Prevention, Mitigation, and Response Strategies to Be Evaluated and Considered From 2020 through 2022				
Category	Enhanced Wildfire Strategy	HFTD Tier(s)	COTP ROW/Off	Risks Addressed
Upgrade and refine 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.				
Continuous Training	Review Fire Safety Guidelines and Precautions	All	Both	All
Review fire safety guidelines and precautions. Evaluate whether elevated high fire threat conditions require revisions of those guidelines and precautions.				
HFTD: High Fire Threat District Tier areas 2, 3 or All (1-3) ROW: Right of Way or Off-Right of Way or Both				

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

The Project has been operated and maintained since energization in 1993 to maintain Project 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 U.S. Forest Service (USFS).

#### 1. Operations and Maintenance Inspections and Activities

##### *a. Tower and Equipment Inspections*

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 California General Order 95 (G.O. 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. On a scheduled basis, every 5<sup>th</sup> tower is thoroughly inspected annually by the line crew resulting 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.

***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.
- Security activities include facility inspections and site 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*

TANC uses inspection and recordkeeping tools that integrate existing geographic information system (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 it to prevent an encroachment; and
- Utility arborists and registered professional foresters monitor COTP ROW conditions year-round.

### *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 trees<sup>6</sup> 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;

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<sup>6</sup> 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.

- Contractual rights;
- Accessibility;
- Climate/meteorological conditions at time of treatment;
- Herbicide use regulations;
- Site conditions – soils, slope, and drainage; and
- Presence of sensitive species 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;
- Land owner restrictions;
- Clearance distances; and
- Current work status.

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 (Dispatcher). The Dispatcher 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 also inspects and manages 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***

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. This level of access also maintains and improves fire response capabilities for fire engines and crews that may be needed to respond to wildfires.

***e. Communication Site Defensible Space Activities***

COTP communication sites located in 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, 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 megawatts (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**

***a. TANC-Funded Fire Station***

TANC annually provides funds for a fire station (Long Bell Station), engine, and firefighters in the Modoc National Forest near the northeastern California area 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 fire engine is typically staffed with five wildland firefighters. Standard Operating Procedure for the Modoc National Forest 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 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. 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 pre-emptively 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 De-energization Under Imminent Fire and/or Smoke Threat Conditions**

#### 1. De-energization

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

#### 2. Service Restoration or Re-energization

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 De-energization Based on High Fire Threat Weather Activity**

#### 1. De-energization

The decision to pre-emptively de-energize BES element(s) prior to a high fire threat weather activity and events requires consideration of many complexities both known and unknown. De-energization 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;
- On-going 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 de-energizing 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 Re-energization

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 de-energization 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 de-energization 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**

### **A. Introduction**

This section presents the annual process TANC will use to evaluate the effectiveness of this Plan, including descriptions of:

- The metrics that will be used to measure the effectiveness of wildfire prevention, mitigation, and response strategies in reducing wildfire ignition and spread risks and their contributing risk drivers;
- Activities to monitor the effectiveness of COTP structure and equipment inspections;
- The process that will be used to monitor and audit the implementation of the plan;
- Methods for identifying and correcting any Plan deficiencies; and
- A discussion of how the application of previously identified metrics has informed this Plan.

This section also reviews the process that TANC used to contract for the services of an Independent Evaluator, to receive public comments, and to otherwise comply with related SB 901 requirements.

### **B. Metrics for Evaluating Plan Performance**

TANC uses metrics that are results oriented and focused on the success of wildfire prevention, mitigation, and response strategies at reducing the risk of catastrophic wildfires. Metrics are quantitative or qualitative for strategies scheduled annually for implementation. Annual progress will be monitored and reported to the appropriate TANC and/or COTP committees for those strategies to be evaluated and considered from 2020 through 2022.

Table VII-1 summarizes the metrics that will be 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 to be used, and how the metrics are intended to focus on outcomes that directly reduce wildfire risk events and/or drivers.

It indicates how 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.

<b>Table VII-1. Metrics for Evaluating the TANC-COTP Wildfire Mitigation Plan</b>		
<b>Wildfire Risk Event &amp; Drivers</b>	<b>Annual Metric</b>	<b>Outcomes/Effectiveness</b>
<b>Wildfires<sup>1</sup></b>	Number of COTP-ignited wildfires per HFTD and cause(s).	Provides an overall indicator of Plan effectiveness.
<b>Equipment Failure</b>		
Downed Wire	Number of downed wires per HFTD.	Provides insights regarding maintenance inspections effectiveness.
Wire to Wire Contact	Number of wire-to-wire contacts/faults per HFTD.	Provides insights regarding conductor and equipment design, quality, and lifecycle expectancy.
Clamps, Conductors, Insulators, Splices, Spacer-Dampers, Towers, Substation, Communication Site, Other unspecified	Number of equipment failures by facility and HFTD.	Provides insights regarding conductor and equipment design, quality, and lifecycle expectancy.
Weather-driven	Number of weather-driven faults per HFTD and cause(s).	Identifies trends where additional local real-time weather data may be needed.
<b>Object to Wire Contact</b>		
Vegetation-Caused Outages	Number of vegetation-caused outages per HFTD and cause.	Provides insights regarding vegetation inspections effectiveness.
Hazard Trees Removed	Number of hazard trees identified and removed per HFTD.	Reduces the number of potential vegetation to wire contacts; a direct measure of effectiveness.
Fuels Reductions	Acres of fuels treatments completed per HFTD – within and outside of COTP ROW.	Reduces the flammability of fuels subject to ignitions from equipment failures, thereby reducing potential wildfire spread rates.
Bird Strikes	Number of bird strike incidents per HFTD and operational and/or maintenance impact(s).	Increases awareness of where additional bird-repulsion measures may be needed.
<b>High Fire Threat Conditions</b>		
Local Weather & Meteorological Conditions	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.
<b>Third Party Contact</b>		

Table VII-1. Metrics for Evaluating the TANC-COTP Wildfire Mitigation Plan		
Wildfire Risk Event & Drivers	Annual Metric	Outcomes/Effectiveness
Drone/Light Aircraft, Vandalism	Number of drone, light aircraft, or vandalism, incidents per HFTD and operational and/or maintenance impact(s).	Increases awareness of where additional security measures may be needed.
<p>1/A fire ignition is defined as follows:</p> <ul style="list-style-type: none"> <li>• A COTP facility was associated with the ignition of a fire;</li> <li>• The fire was self-propagating and of a material other than electrical and/or communication facilities;</li> <li>• The resulting fire travelled greater than 100 feet from the ignition point; and</li> <li>• TANC had knowledge that the fire occurred.</li> </ul>		

### C. Monitoring and Auditing of Plan Implementation

#### 1. Plan Monitoring

TANC will monitor the implementation of this Plan using data collected through implementation of the wildfire prevention, mitigation, and response 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 correlate this information with the HFTDs and categorize it to provide 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, equipment failures, and other incidents may also be developed.

#### 4. Plan Auditing

TANC will internally audit the effectiveness of Plan implementation using the management organization presented Section III. Metrics data will be compiled and evaluated annually. The risk assessment framework, wildfire prevention, mitigation, and response strategies, and metrics themselves will be analyzed with respect to providing needed information. Under the supervision of the TANC General Manager and Assistant General Manager, the COTP E&O and Management Committees will 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 each section of this Plan, as appropriate. Plan adjustments will be considered by the TANC Commission and reflected in subsequent

versions of the Plan. It will also include any adjustments that are needed to identify and correct Plan deficiencies.

#### 5. 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.

#### 6. Plan Evolution

This Plan is a living document that will evolve annually. As new technologies that improve the effectiveness of COTP inspections, repairs, situational awareness, and other wildfire strategies become available and feasible, TANC intends to improve its wildfire risk prevention capabilities and thereby reduce potential wildfire risks and the potential for corresponding enterprise-wide consequences.

#### **D. Public Review**

TANC will annually present this Plan in an appropriately noticed public meeting and accept comments on this Plan from the public, other local and state agencies, and interested parties. TANC will annually verify that this Plan complies with all applicable rules, regulations, and standards, as appropriate.

#### **E. Independent Evaluation**

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

- Has experience in assessing the safe operation of electrical infrastructure;
- Was required to review and assess the comprehensiveness of this Plan;
- Will issue a report that will be made available on the TANC Internet Web site; and
- Will presented the report at a duly noticed TANC Commission meeting.