2021 General Rate Case

Amended Testimony on
Vegetation Management

Before the
Public Utilities Commission of the State of California

Rosemead, California
November 22, 2019
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I.

INTRODUCTION

A. Content and Organization of Volume

There are two discrete sets of Vegetation Management-related activities and programs at issue in this proceeding for review and cost recovery purposes. First, consistent with SB 901 (as confirmed by D.19-05-038), in a future track of this proceeding SCE will set forth a reasonableness review for the 2018-2020 expenses related to incremental vegetation management activity in High Fire Risk Areas (HFRA) \( i.e., \) amounts above those that are authorized in D.19-05-020, or will be authorized by a final decision in A.18-09-002 (SCE’s Grid Safety & Resiliency Program (GSRP))—costs that are currently tracked in SCE’s Fire Hazard Prevention Memorandum Account (FHPMA) and Wildfire Mitigation Plan Memorandum Account (WMPMA).\(^1\) The Application that this testimony supports sets forth a procedural proposal and schedule detailing how SCE believes those costs should be reviewed for reasonableness. The specific amounts recorded in the relevant memorandum accounts for 2018, 2019, and 2020, as well as the justification of their reasonableness and a demonstration of how those amounts are incremental to costs authorized in the 2018 GRC and other related-memorandum accounts, will be set forth pursuant to that procedural schedule, and are therefore not included in this Volume.

Second, as is done in traditional GRC ratemaking, in this Volume, SCE has set forth its forecast of the 2021-2023 costs for Vegetation Management programs and activities that SCE proposes to be included in customer rates starting in 2021 and continuing throughout the 2021-23 GRC cycle.

Because most (but not all) of the Vegetation Management-related programs and activities for the 2018-2023 period overlap, in this Volume SCE has put forth the detailed descriptions, rationales, and justifications for those programs and activities (and the specific levels at which they were/will be executed in the 2018-2020 period). SCE’s proposed forthcoming testimony for those historical costs will be dedicated solely to the review of the specific incremental costs (and the reasonableness of those costs) for those historical costs. To the extent that pre-2021 costs are set forth in this Volume, it is not done for cost recovery purposes; rather, those costs are shown to compare to the forecast costs (like for any other non-wildfire-related program or activity in typical GRC ratemaking support).

\(^1\) Historical Catastrophic Event Memorandum Account (CEMA) costs, including certain vegetation management costs tracked in the Drought CEMA, are being reviewed in a separate application (A.19-07-021) (2017-2018).
Additionally, in this GRC, SCE is requesting that all costs for the Vegetation Management Program be consolidated in a two-way balancing account. These costs comprise not only the routine work that has now been increased as a result of regulatory requirements and SCE’s risk-based analysis, but also going-forward costs that have historically been tracked through non-GRC balancing and memorandum accounts (i.e., Drought CEMA, GSRP memorandum account, WMPMA, and FHPMA). Additionally, the transfer of all costs into a single account will allow for administrative ease in the process of running the Vegetation Management Program and the ability to execute on any identified operational efficiencies.

This volume includes analysis of (1) O&M funding authorized in the 2018 General Rate Case (GRC) compared to recorded amounts in 2018, and (2) the 2021 Test Year O&M labor and non-labor forecast relative to historical spending.

B. Summary of O&M Request

This volume presents SCE’s request for $216.935 million in constant 2018 dollars in O&M expense for the 2021 Test Year to effectively execute the Vegetation Management Program. As noted above, SCE is proposing to recover costs for its Vegetation Management Program through a two-way balancing account. In the following testimony, we describe that the changes required to maintain adequate vegetation clearance around utility equipment have greatly increased the amount of vegetation that needs to be removed. SCE is requesting the funding necessary to perform this work based on current estimates, but also recognizes there may be more or less work to perform in order to ensure regulatory compliance and to mitigate risk for customers. The actual complexity of the work and the conditions we find in the field will impact the costs necessary to prevent vegetation contact with SCE’s infrastructure and are factors in our request for balancing account ratemaking treatment for vegetation management costs. Finally, consolidating Vegetation Management Program costs into a single balancing account reduces potential confusion necessitated by reporting each recovery mechanism separately. For example, SCE could have the same third party under contract that may perform work for Drought and Compliance in different months of the year. SCE has opportunity to eliminate operational overlap by streamlining regulatory funding mechanisms.


Historical CEMA costs are being reviewed in a separate application (A.19-07-021) (2017-2018), historical incremental GSRP costs above settled amounts will be reviewed in this proceeding (2018-2020), and historical FHPMA costs will be reviewed in this proceeding (2018-2020).
Figure I-1 shows SCE’s test year forecast for Vegetation Management relative to the total request for SCE-02 - Grid Activities.

**Figure I-1**

*Vegetation Management O&M Expenses*
*(Total Grid Activities Constant $Million)*

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**Total SCE-02 Grid Activities 2021 O&M Request = $712**

- **Distribution Grid (Vol. 1 Pt. 2) - Dist. O&M and Capital-Related**: $161 million (23%)
- **Transmission Grid (Vol. 2)**: $43 million (6%)
- **Substation (Vol. 3)**: $122 million (17%)
- **System Augmentation (Vol. 4 Pt. 1) - Grid Mod., Grid Tech., and Energy Storage**: $22 million (3%)
- **System Augmentation (Vol. 4 Pt. 2) - Load Growth, Tens. Projects and Engineering**: $13 million (2%)
- **Vegetation Management (Vol. 6)**: $217 million (30%)
- **Poles (Vol. 5)**: $4 million (1%)
- **Other Costs and OOR (Vol. 7)**: $93 million (13%)
II.

VEGETATION MANAGEMENT

A. Overview

SCE’s Vegetation Management Program has been in place for many years with the objective of meeting the requirements of GO 95 and other compliance requirements. These activities help to minimize faults and their resulting ignitions and outages when vegetation contacts energized electrical facilities. The program includes pre-inspection and trimming that focuses on maintaining compliance clearances on trees located in proximity to our electric facilities. In addition, the program implements activities such as tree removal, pole brushing, commercial orchard topping, and in more recent years, weed abatement. In response to recent regulatory direction and the recent increased wildfire risk California is experiencing, SCE’s Vegetation Management Program has evolved to include additional and expanded mitigation activities that focus on reducing ignition risk that might result in wildfires. SCE has implemented new processes, procedures, and guidelines to respond to changes in vegetation management-related regulatory direction and increasing wildfire risk. This includes technological advances and operational improvements. In addition, SCE has implemented risk evaluation methods that enable SCE to assess the risks of individual trees to prioritize work based on relative risk.

SCE’s Vegetation Management Program forecast includes expenses associated with vegetation trimming and removal in proximity to transmission and distribution high voltage lines, as well as the removal of trees that are hazardous or incompatible with utility infrastructure. It also includes costs to perform weed abatement around overhead structures in HFRA and associated activities. In addition, SCE’s Vegetation Management Program includes the costs for performing work historically recorded in SCE’s Drought CEMA as well as the Hazard Tree Management Program (HTMP) as originally proposed and described in the GS&RP proceeding and SCE’s 2019 Wildfire Mitigation Plan (WMP) (as approved in D.19-05-038). The majority of the vegetation management work is forecast to be performed under unit contracts with SCE’s vegetation trimming contractors, which require them to perform work recommended by pre-inspectors for the more than 900,000 trees that exist in proximity to energized conductors throughout SCE’s territory.

1. Risk Factors, Safety, Reliability and Connection with RAMP

The Vegetation Management Program is discussed in two risk chapters in SCE’s 2018 RAMP report: Chapter 5 – Contact with Energized Equipment, and Chapter 10 – Wildfire. Compliance-driven vegetation management activities, as described in Section II.C.1 of this testimony, are discussed
in both chapters. HTMP, discussed in Section II.C.3 of this testimony, was evaluated as part of Chapter 10 – Wildfire of SCE’s 2018 RAMP report. Further discussion on how the RAMP report evaluated SCE’s Vegetation Management Program is found in Section II.D. Table II-1 shows the mapping of GRC activities to the associated RAMP risk chapter.

Table II-1
GRC Activities Included in SCE’s 2018 RAMP Filing

<table>
<thead>
<tr>
<th>GRC Activity</th>
<th>RAMP Control / Mitigation Name</th>
<th>RAMP ID</th>
<th>Risk Addressed</th>
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<tr>
<td>Routine Vegetation Management</td>
<td>Vegetation Management</td>
<td>CM2</td>
<td>Contact with Energized Equipment</td>
</tr>
<tr>
<td>Routine Vegetation Management</td>
<td>Vegetation Management</td>
<td>CM1</td>
<td>Wildfire</td>
</tr>
<tr>
<td>Resiliency Vegetation Management</td>
<td>Expanded Vegetation Management</td>
<td>M5</td>
<td>Wildfire</td>
</tr>
</tbody>
</table>

For purposes of the 2018 RAMP report, SCE identified established compliance activities that modify or reduce the applicable risk. However, since these activities were generally compliance-driven, SCE did not risk score them in the 2018 RAMP report. Activities that fall within this category include the Routine Vegetation Management Programs. In addition, SCE’s RAMP report identified new activities and efforts that reduce risk, and that are not required by law or regulation. The HTMP falls under this category; accordingly, SCE included the emerging HTMP within the Expanded Vegetation Management mitigation activity in its RAMP report.

SCE evaluated the risks of wildfires associated with SCE by using a bowtie method. As discussed at length in SCE’s RAMP report, the bowtie helps to map the progression of the risk from the drivers of ignition, to discrete outcomes when an ignition occurs, which are then measured in terms of impacts to safety, reliability, and financial costs. SCE modelled the Expanded Vegetation Management activity as reducing the Contact from Object driver of ignitions. Specifically, SCE evaluated the ability for this mitigation to reduce the frequency of vegetation contact with electrical equipment, that could lead to an ignition.

2. Regulatory Background/Policies Driving SCE’s Request

The Vegetation Management Program’s goal is to help maintain the safety and reliability of SCE’s transmission and distribution system and to comply with regulatory requirements established by the CPUC, FERC, and other regulatory bodies. These requirements include GO 95 Rules 35 and 37 and modifications to Appendix E, PRC 4292 and 4293, FERC FAC-003-2, and Title 14 California Code
of Regulations (CCR), which require SCE to manage vegetation near its wires to prevent encroachment into the clearance zones under normal conditions. Multiple formal proceedings have led to the establishment of these regulatory rules and regulations. Those key proceedings are described below.

a) **Order Instituting Rulemaking (R.) 08-11-005 (Fire Safety OIR)**

In 2008, the Commission issued the Fire Safety OIR in response to dozens of wildfires resulting in more than 780 square miles of burned area. Several of these wildfires were reportedly ignited by power lines that burned a total area of 334 square miles. The OIR urged SCE “to consider and adopt regulations to reduce fire hazards associated with overhead power lines and aerial communication facilities in close proximity to power lines.”\(^4\) The OIR had three Phases, each described below in more detail.

(1) **Phase 1**

In August 2009, the Commission issued D.09-08-029 regarding the Phase 1 objective of reducing California’s wildfire hazard prior to the start of the 2009 fall fire season. The Commission adopted measures to expand the minimal radial vegetation clearances for electric lines in areas designated as “Extreme and Very High Fire Threat Zones” in the Southern California region. This was reflected in revisions to Rule 37, which imposed ground clearance requirements under all rated electrical operating conditions. Other measures included designating the Fire Threat Map published by the California Department of Forestry and Fire Protection’s Fire Resources Assessment Program as the tool to determine the Extreme and Very High Fire Threat Zones and replacing the term “tree trimming” with “vegetation management.” Overall, regulatory requirements increased by changing the minimum clearance from 12 inches to 48 inches between any vegetation and the energized conductor and equipment in Extreme and Very High Fire Threat Zones.

(2) **Phase 2**

In 2012, the Commission issued D.12-01-032 regarding the Phase 2 objective of addressing fire prevention matters that required more time and consideration. Phase 2 further clarified the minimum clearance requirement, and evaluated the costs associated with the requirements from Phase 1. The Commission confirmed the minimum clearance of 48 inches for primary conductors.

\(^4\) See D.14-02-015.
(3) **Phase 3 / Change in High Fire Maps**

In 2017, the Commission issued D.17-12-024, which established a new High Fire Threat Map, delineating three zones (or “Tiers”), in order to provide further guidance on required vegetation management activities. Among other things, this decision set forth a “compliance” clearance distance of 4 feet in High Fire Areas (HFA) and required that full compliance be achieved by June 30, 2019. The Decision also amended GO 95 to increase recommended clearance distances at time of trimming in HFRA (to 12 feet for 2.4kV to 72kV lines and to 30 feet for 110kv lines and above). Additionally, the Decision created a Fire Hazard Prevention Memorandum Account (FHPMA) to track costs incremental to authorized rates. SCE adopted the recommended clearance distance in HFA (and its corresponding HFRA) as part of the Commission-approved 2019 WMP.

**b) GSRP Application and Approval**

In September 2018, SCE filed an application for approval of a proposed Grid Safety and Resiliency Program (GSRP). As part of this filing, the Vegetation Management Program would “focus on proactively assessing and, as needed, mitigating trees that pose a blow-in/fall-in threat to electrical facilities but are located outside existing, required clearances and are not already dead, sick, or dying.” HTMP focuses on this mitigation activity. SCE and most of the parties in the GSRP proceeding jointly submitted a settlement agreement to the Commission settling all issues. As part of the settlement, SCE agreed to limit tree removals under the HTMP to its estimated removal targets. Further, SCE agreed to participate in a study that would evaluate the need and effectiveness of its current risk calculator in promoting tree removal that effectively reduces wildfire risks, considering other mitigation measures implemented by SCE. At the time of this filing, the settlement agreement is still pending before the Commission.

**c) Wildfire Mitigation Plan (WMP) / Senate Bill 901 (SB 901)²**

In February 2019, SCE filed its 2019 WMP in order to meet the requirement in SB 901 to submit a comprehensive wildfire prevention plan. The 2019 WMP contains both historical vegetation management practices built upon the current Vegetation Management Program activities designed to meet compliance requirements, as well as risk-based enhanced solutions designed to further

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² See page 7 in A.18-09-002 “Application of Southern California Edison Company (U 338-E) For Approval of Its Grid Safety and Resiliency Program.”

⁶ See page 55-60 in R.18-10-007 “Southern California Edison Company’s (U 338-E) 2019 Wildfire Mitigation Plan.”
reduce the wildfire risk related to utility assets. Vegetation management practices include annual inspections and trimming, taking into consideration the respective growth rates of different vegetation species; vegetation clearance of 10 feet from poles with non-exempt attachments in HFRA; canyon patrols and at-risk circuit patrols; joint patrolling efforts with state and local fire officials to facilitate knowledge sharing and cross-training opportunities; a program re-design focusing on expanded administrative controls and comprehensive Quality Control and Quality Assurance activities; increased focus on hazard tree removals/mitigation; and increased identification and removal of vegetation overhangs. SCE’s WMP (and the programs proposed herein) also go beyond existing prescriptive compliance requirements in order to provide additional wildfire risk mitigation. They include expanding the minimum clearance to the recommended 12 feet standard where it is feasible and practicable to do so for 2.4kV to 72kV lines in areas designated Extreme and Very High Fire Threat Zones, as well as an expanded pole brushing program, whereby an additional 25,000 poles will be inspected and if needed, cleared to a ten-foot radial clearance.

With regards to transmission assets, SCE’s 2019 WMP stated: “Directly under conductors, SCE will clear all trees and brush which could potentially grow into the compliance clearance space around the conductors. In addition, the area between the outer-most conductors and the Right-of Way (ROW) border will be cleared of brush and trees that can potentially strike electric facilities…SCE will [also] use LiDAR technology to identify trees along the ROW border that can potentially contact conductors during high wind events. Additionally, and where achievable, SCE plans to maintain a 30-foot clearance between conductors and vegetation for power lines 115kV and above.”

In the 2019 WMP, SCE also re-stated its intent to pursue the HTMP, in which SCE will assess trees that pose a fall-in/blow-in risk to electrical facilities. These trees, known as “hazard trees,” can be located up to 200 feet of the electrical facilities, otherwise known as the Utility Strike Zone. Trees will be assessed individually and any necessary mitigation to protect public safety and the resiliency of the electrical grid may include heavy topping, limb removal, or the removal of the entire tree.

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2 See SCE’s 2019 WMP at p. 57. For LiDAR work related to distribution assets, see SCE-04, Vol. 5A - Wildfire Management.
d) **FERC FAC-003-2, 3, and 4**

FERC FAC-003-2, 3 and 4, developed as a result of the August 14, 2003 Northeast blackout, is enforced by FERC, the North American Electric Reliability Cooperation (NERC), and the Western Electricity Coordinating Council (WECC), and generally applies to all transmission lines greater than 200kV and, in certain instances, to lines less than 200kV. As a result of this rule, SCE is required through its Vegetation Management Program to maintain the Minimal Vegetation Clearance Distance (MVCD)\(^8\) according to voltage, document maintenance strategies, procedures, and processes to prevent the encroachment of vegetation, and perform vegetation inspections of all transmission lines at least once per calendar year and with no more than 18 calendar months between inspections on the same ROW. Finally, SCE is required by the regulatory requirement to complete 100% of its annual vegetation work plan to ensure no vegetation encroachments occur within the MVCD.

e) **Catastrophic Emergency Memorandum Account (CEMA) for Bark Beetle Infestation and Drought Remediation Efforts**

In 2003, SCE activated its CEMA account to request rate recovery for remediation activities associated with the bark beetle infestation in Riverside, San Bernardino, and Los Angeles Counties. Beginning in 2004, cost recovery for this activity was requested and recovered through various CEMA applications. As part of the 2015 GRC, SCE requested to eliminate the bark beetle balancing account and continue to remEDIATE the small amount of work related to bark beetle remediation as part of the GRC request.

In 2014, as a result of Governor Brown’s declaration of a state of emergency regarding drought mitigation in Resolution ESRB-4, SCE began taking measures to increase vegetation inspections and remove hazardous, dead, and sick trees and other vegetation near our power lines and poles. Other work included sharing resources with CalFire to staff lookouts adjacent to SCE property and clearing access roads under power lines for fire truck access. Recovery of these 2015-16 costs was approved in D.19-01-006.

3. **Compliance Requirements from the 2018 GRC Final Decision**

There are no relevant compliance requirements resulting from the 2018 GRC final decision.

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\(^8\) See FAC 003-4 Transmission Vegetation Management, pp. 4-5, for the definition and requirements of the MVCD and pp. 17-18 for Table 2 displaying the MVCD requirements by line voltage.
4. **Program Re-Design**

SCE is committed to complying with laws and regulations that govern its operations. The Vegetation Management Organization underwent a comprehensive program re-design to enhance oversight and reporting capabilities required by the new regulatory requirements. In addition, the Vegetation Management Program has steadily evolved from a primarily compliance-oriented operation to one that also incorporates risk management practices to evaluate vegetation management issues and prioritize work. As part of this, SCE has established governance plans and management processes, which govern the practices of SCE employees, contractors, and consultants. In this re-design, SCE also added enhanced functions to support the processes defined in these plans, including protocols and requirements for pre-inspections, contract management, public outreach, safety, post-work verification, and managing events.

5. **Summary of Program Standards and CPUC-Required Minimum Clearance Distances**

Table II-2 below indicates the regulation and recommended clearances established by the Commission, as well as the standards adopted by the Vegetation Management Program.

![Table II-2](image)

### Table II-2

**CPUC Regulations, CPUC Recommendations, and Program Standards**

<table>
<thead>
<tr>
<th>Activity / HFRA</th>
<th>CPUC Compliance Minimum Clearance Distance (feet)</th>
<th>CPUC Recommended Minimum Clearance Distance (feet)</th>
<th>Vegetation Management Program Standard (feet)</th>
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<tr>
<td>Distribution - High Fire Area</td>
<td>4.0</td>
<td>12.0</td>
<td>12.0</td>
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<tr>
<td>Distribution - Non High Fire Area</td>
<td>1.5</td>
<td>4.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Transmission - High Fire Area</td>
<td>10.0</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Transmission - Non High Fire Area</td>
<td>9.6</td>
<td>30.0</td>
<td>30.0</td>
</tr>
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</table>

6. **2018 Decision**

1. **Comparison of Authorized 2018 to Recorded**

SCE spent $149.262 million in 2018, compared to the $76.140 million requested and authorized in the 2018 GRC final decision. SCE’s 2018 forecast costs therefore did not include certain

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2 For transmission assets, the regulation and recommended clearance distances are dependent on nominal voltage. The distances shown in the table reflect assets with nominal voltage of 500kV. For distances related to assets of other voltages, refer to WP SCE-02 Vol. 06A, pp. 1 - 2 – Transmission Clearance Distances.
categories of costs that SCE recorded in 2018, specifically $35.120 million recorded in the Drought CEMA and $30.824 million recorded in the Fire Hazard Prevention Memorandum Account. In addition, SCE’s 2018 request was developed using 2015 costs based on the last year recorded forecast methodology, which was insufficient to meet the program needs in 2018. Additionally, in 2018, SCE also encountered operational challenges associated with the performance of existing contractor resources. As a result, SCE incurred additional expenses to move crews outside their previously-designated areas, retain incremental contractor trimmers in SCE’s service territory, and have them work increased hours. Additionally, it would have been impractical for SCE to transition away from time-and-expense-based contracts in 2018 as we incorporated new trimming distances and worked through the transition to a new software system.

Figure II-2
2018 Request, Authorized and Recorded
(Nominal $Million)

C. O&M Forecast – Vegetation Management Program
The O&M forecast for the Vegetation Management Program is presented in three major groupings: (1) Routine Vegetation Management, which includes the costs to comply with current regulations and Commission recommendations for maintaining clearances around poles and equipment;
(2) Dead, Dying and Diseased Tree Removal, which includes costs to perform removal of dead, dying, or diseased trees in compliance with Catastrophic Event formal declarations; and, (3) Wildfire Vegetation Management, which includes costs to support hazard tree removal through the Hazard Tree Management Program (HTMP) as proposed by SCE in its GSRP and WMP filings.

The largest incremental cost driver over the 2018-2020 period for the Vegetation Management Program is SCE’s adoption of the Commission’s recommended expanded clearance distances in HFRA and non-HFRA for Distribution and Transmission. Going forward in 2021, maintaining the recommended clearance distances will become SCE’s standard across its operations, and thus those forecast O&M costs are categorized as “routine” in Table II-3 below.

Across all three categories, the core vegetation management work remains similar. It consists of pre-inspection, trim and/or remove activity, post-inspection, and program level compliance reviews or quality checks. This testimony describes the proposed work in more detail.

1. **Routine Vegetation Management in HFRA and non-HFRA**

   **Table II-3**

   **O&M Forecast – Routine Vegetation Management**\[1\]

   *(Constant 2018 $000)*

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<thead>
<tr>
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<tbody>
<tr>
<td>Distribution Routine Vegetation Management</td>
<td>$66,795</td>
<td>$66,615</td>
<td>$61,564</td>
<td>$71,992</td>
<td>$103,257</td>
<td>$141,547</td>
<td>$137,704</td>
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<td>$10,765</td>
<td>$9,000</td>
<td>$12,927</td>
<td>$10,379</td>
<td>$29,984</td>
<td>$22,063</td>
<td>$12,705</td>
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<td><strong>Totals</strong></td>
<td>$75,519</td>
<td>$77,380</td>
<td>$70,564</td>
<td>$84,918</td>
<td>$113,637</td>
<td>$171,531</td>
<td>$159,766</td>
<td>$122,878</td>
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</tbody>
</table>

\[1\] 2018 recorded amounts include approximately $30.824 million for expanded clearance work for Tier 3 due by September 1, 2018 (per D.17-12-034) recorded in FHPMA. The forecast for 2019 and 2020 include amounts that will be recovered through the FHPMA. Refer to WP SCE-02 Vol. 06C, pp. 1 - 91 - Distribution Routine Vegetation Management – Trim and Remove Trees – Confidential / WP SCE-02 Vol. 06A, pp. 3 - 1013 – Distribution Routine Vegetation Management – Distribution Trim and Remove Trees, WP SCE-02 Vol. 06A, pp. 102 - 103 – Substations (Distribution and Transmission Routine Vegetation Management), and WP SCE-02 Vol. 06A, pp. 104 – 105 – T&E Factor (Distribution and Transmission Routine Vegetation Management).
Distribution Routine Vegetation Management is designed to maintain minimal required clearance distances (and in cases of HFRA, expanded recommended clearance distances) as noted in Section II.A.2.a)(3) between vegetation and lines in the SCE service territory. The program is designed on an annual cycle and follows the following cadence: a pre-inspection leading to a prescription (i.e., a mitigation), the completion of the prescription (i.e., trimming and other measures), a job-related quality assurance function performed by an internal SCE arborist, and a program-wide quality control function performed by an independent contractor. In cases where the prescription poses significant changes from previous maintenance activities, a contracted customer coordinator will obtain customer approval. Vegetation management activities in Distribution Routine Vegetation Management include those impacting poles with non-exempt assets and substations.

(1) Work Description and Need

SCE’s distribution lines are inspected annually for compliance with state and federal vegetation management requirements. The person performing the inspection is referred to as a pre-inspector. During these inspections, the pre-inspector identifies vegetation that requires trimming or removal to meet program requirements designed to maintain required clearances from the lines. Pre-inspectors perform comprehensive inspections by also taking into consideration a tree’s anticipated growth over the ensuing twelve months. Additionally, pre-inspectors investigate vegetation concerns raised by customers, assess vegetation adjacent to electrical line work, and address inspection findings requiring immediate planning or schedule coordination.

The CPUC-required minimal vegetation clearance distance is 4 feet in HFRA and 1.5 feet in non-HFRA. SCE has historically trimmed trees at the time of maintenance to a greater distance than the minimal required distance, when feasible, in order to stay in compliance for the full upcoming year. Under SCE’s revised vegetation management program and consistent with Commission recommended guidance in D.17-12-024, SCE has expanded the standard for clearance

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12 Non-exempt asset: The minimum clearance requirements are based on the type of asset affixed to the line at the pole or tower. Some asset examples include Universal Fuses, Enclosed Cutouts, Open Link Fuses, Solid Blade Switches, In-line Disconnect Switch, Hot Line Clamps, and Split Bolts Connectors. For a full list of exempt and non-exempt asset, see the CAL FIRE Powerline Fire Prevention Field Guide http://cdfdata.fire.ca.gov/pub/fireplan/fupload/fpguidepdf126.pdf.

13 Fast-growing species, or trees in HFRA, may need additional inspections, trimming, or removal to maintain regulatory compliance. For a list of tree growth by species, refer to WP SCE-02 Vol. 06A, pp. 106 - 107 – Tree Species Growth Rate.
distance in HFRA at time of maintenance to 12 feet for line voltages between 2.4kV and 69kV. Additionally, SCE has developed a standard of 6 feet in non-HFRA at time of maintenance for line voltages between 2.4kV and 69kV.¹⁴

In some cases, it may be necessary to trim vegetation to a distance greater than the program standard to manage the growth of the tree or to meet ANSI 300 standards for tree trimming. A certified arborist will decide on a case-by-case basis. At times, the customer is reluctant for SCE to trim to the recommended distances and opts for a tree removal. In these instances, SCE will offer a replacement tree to the customer.¹⁵ Figure II-3 illustrates the SCE-adopted clearance distances in HFRA.

¹⁴ For CPUC-recommended clearance distances, refer to WP SCE-02 Vol. 06A, pp. 108 - 109 - Distribution Clearance Distances.

¹⁵ This is also referred to as “right tree, right place.” Refer to WP SCE-02 Vol. 06A, pp. 110 - 113 – Right Tree, Right Place.
SCE approved pre-inspection prescriptions are passed to trimming/removal contractors. The contractor will perform proper directional trimming techniques and crown reductions to minimize any adverse tree health and/or structural integrity conditions and encourage future tree growth away from SCE overhead lines. The contractor is responsible for cleanup and disposal of all debris generated from line clearing activity. In the course of physically performing maintenance work, the contractor may identify trees not prescribed by pre-inspection within the applicable regulatory clearance distance. In this situation, contractors will trim or remove any additional vegetation meeting the required conditions after receiving SCE approval to do so. In most occurrences, trimming will conclude 30 days after the pre-inspection prescriptions are provided.

SCE performed two key program elements within Distribution Routine Trim and Remove Trees: (1) supplemental patrols and (2) pole clearance/weed abatement. Both programs are related to existing regulatory requirements that have been expanded to address wildfire

\[16\text{ SCE has adopted the CPUC recommended 12 feet clearances in high fire areas to ensure annual growth will not encroach on the compliance requirement of 4 feet.}\]
efforts. Supplemental patrols are treated as verifications to ensure PRC 4293 – Reliability and PRC 4293 – Clearances are maintained. The supplemental patrols take place during the summer months in areas where topography or vegetation conditions are known to pose a threat to SCE’s facilities during extreme weather events. Pole clearance is required for non-exempt assets in high fire areas. The activity involves maintaining clearances around distribution poles in a 10-foot radial area measured horizontally from the outer circumference of the pole from the ground to a height of 8 feet.

Post-work verification consists of two main activities: (1) an SCE representative evaluates whether the work was performed as prescribed, that all vegetation threats have been removed, and that the invoice is aligned with the work, and (2) an independent quality control/quality assurance contractor provides reasonable assurance that inspection and maintenance work has been effectively performed and meets program requirements. Quality control inspections are scheduled based on pre-determined sampling percentages and judgment of the risk profile of given circuits.

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\[17\] Refer to WP SCE 02 Vol. 06A, pp. 114 - 118 – Glossary of Terms.
\[18\] Refer to WP SCE-02 Vol. 06A, pp. 119 - 120 – Pole Clearance.
(2) **Scope and Forecast Analysis**

**Figure II-4**

*Distribution Routine Vegetation Management O&M Expenses*\(^{19}\)

 *(Constant 2018 $000)*

### (a) Historical Variance Analysis

Historical costs for this activity were relatively flat from 2014 through 2016. In 2017, costs increased as a result of more trims occurring as a percentage of total inventory. In addition, SCE removed a significant number of trees in response to the Big Creek self-report event, which drove costs upward.\(^{20}\) Costs rose slightly in 2018 due to the need to work down the backlog from the 2017 tree inventory, increased work to implement Tier 3 requirements per D.17-12-024, and challenges associated with a new vegetation software implementation.

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\(^{19}\) Refer to WP SCE-02 Vol. 06A, pp. 121 - 127 – O&M Detail for Distribution Routine Vegetation Management.

\(^{20}\) On August 17, 2017, a contract inspector identified a possible noncompliance with NERC’s Standard FAC-003. This possible non-compliance occurred when an oak limb breached the required Minimum Vegetation Clearance Distance (MVCD) specified in FAC-003, Requirement 2. This incident occurred on SCE’s Big Creek – Reactor No. 2 – 220 kV line.
(b) **Forecast Analysis**

SCE’s forecast for this activity is built on historical vegetation management experience and augmented to account for changing regulatory requirements and market forces affecting the current and future costs to perform this work. This section describes the general drivers of cost increases, followed by a description of how SCE developed the forecast for each of the primary cost components of this work.

(i) **General Drivers of Routine Vegetation Management Cost Increases**

There are three general drivers of cost increases related to distribution and transmission routine vegetation management. SCE describes these cost drivers in this section, but notes these exact same drivers apply to the Transmission Routine Vegetation Management program as well. As such, SCE provides this discussion here, but does not repeat this in the Transmission Routine Vegetation Management.

a. **Changes in Clearance Distances**

Changes in Commission recommendations for minimum clearance have significantly altered the Vegetation Management Program since the historical 2014-2018 period. The forecast for Test Year 2021 was developed in the context of these new requirements and recommendations as described in Sections II.A.2.a)(3), II.A.2.b), and II.A.2.c).

These requirements and recommendations have informed changes to SCE’s operational trimming practices to comply with the CPUC-recommended clearance distances. The costs associated with this increased work are incorporated into the forecast for Distribution Trim and Remove Trees, as described in Table II-4 below.

b. **Third Party Cost Increases**

SCE relies on third parties to perform much of the work related to trimming and removing trees and performing pre-inspection activities. SCE typically enters into multi-year term contracts with these third parties. The previously executed three-year contracts expired in 2018, and increased competition for skilled labor and productivity pressures have driven higher unit prices that are significantly greater than previous pricing. In addition to operating cost escalation, another significant reason for this increase stems from third parties procuring insurance in California, largely due to the wildfire risk exposure. SCE has attempted to mitigate these cost pressures by redefining the vegetation zones to consolidate high fire districts where possible and create a more
even distribution of inventory across zones, thus creating more consistent resource needs per zone and providing better oversight. This helped to isolate the unique nature of the high fire work and allow unit rates to align with the level of effort and risk associated with the work in that zone. Figure II-5 illustrates how SCE has changed its vegetation management zones.

**Figure II-5**  
**SCE Vegetation Zones**

![SCE Vegetation Zones](image)

c. **New Program Enhancements**

As discussed previously, SCE has redesigned the program to enhance compliance, quality assurance, and scheduling related activities. Redesign steps include standardizing approaches and building a robust compliance and support office with personnel that handle work scheduling, event expediting, quality assurance, LiDAR analysis, and analytical support for reporting and performance management. Collectively, these enhancements allow for greater oversight and control of the end-to-end process. In addition, the program is expanding to implement a more structured vegetation management practice around the immediate vicinity of SCE substations. Finally, during SCE’s HFRA Distribution pilot program, SCE identified the need to have dedicated personnel to explain program changes to customers who have grown accustomed to SCE’s past clearance practices. Accordingly, SCE added a new role to the tree trimming crew statement of work—the customer coordinator—who performs this function after pre-inspection and before trimming. This program addition increases efficiency of the trim crews by reducing the amount of time required to
schedule trimming work. It also segregates the cost of this function from the unit rate associated with the trimming, allowing for unit rates that are not diluted by contractors’ estimates of how much time is required to engage with customers.

Another program enhancement resulted from enhanced patrols performed in early 2019, where SCE identified concerns related to vegetation in SCE easements near the point of connection to electrical facilities such as substations. SCE will inspect and trim or remove vegetation in these areas, prioritizing work within HFRA first. SCE plans to perform inspections in 2019 and mitigate in 2020 and 2021.

(ii) **Basis of Cost Forecast**

The primary cost components of this activity are summarized in Table II-4 and described in detail thereafter.

<table>
<thead>
<tr>
<th>Table II-4</th>
<th>Distribution Routine Vegetation Management O&amp;M Expenses for Test Year 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>(Constant 2018 $000)</em></td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td><strong>Test Year 2021</strong></td>
</tr>
<tr>
<td>Distribution Trim and Remove Trees</td>
<td>97,814</td>
</tr>
<tr>
<td>Pre-Inspection</td>
<td>10,840</td>
</tr>
<tr>
<td>Quality Assurance</td>
<td>1,519</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>110,173</strong></td>
</tr>
</tbody>
</table>

**a. Distribution Trim and Remove Trees**

The forecast for the work related to trimming and removing trees is based on work volume and the costs to perform that volume of work. For the reasons discussed above, SCE forecasts a higher volume of work, measured by the number of trees needing to be trimmed, in accordance with the 12-foot standard at time of trim. The forecast was created using different modeling assumptions for HFRA and non-HFRA based on differences in clearance standard. Table II-5 below summarizes the assumptions for increased volumes and depths of trims, for both HFRA and non-HFRA. The volume increase incorporates estimates from three of SCE’s prime trimming contractors’ estimates.

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21 This activity includes vegetation clearance for substations and poles as well as weed abatement and other activities.
SCE conducted a pilot for the first two quarters of 2019 to validate the financial modeling assumptions and results were in line with the forecast. For Tier 1, the forecast assumes all work will be conducted in 2020. SCE modeled a 12.5% tree inventory increase and resulting 1.25 times increase in work scope for this area.

SCE estimates trimming costs based on the trim count multiplied by the unit cost. Unit costs were developed using executed contract rates and considerations for cost increases described above. Once the initial deeper trims are complete in 2019-2020, trimming activities are expected to decrease in 2021 because there is less effort involved in maintaining already established trims. For general guidance, SCE summarizes the expected amount of distribution tree trimming work by year in Table II-6. Additional detail on the specific build-up of forecast components, unit rates, locations, etc. is can be found in workpapers.

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22 Refer to WP SCE-02 Vol. 06A, pp. 128 - 129 – Distribution Routine Vegetation Management – Distribution Pilot

23 Ibid.

Table II-6

Distribution Trim Forecast Work Volume

<table>
<thead>
<tr>
<th></th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>Total Trim Work</td>
<td>824,323</td>
</tr>
</tbody>
</table>

b. **Pre-inspection**

SCE forecasts the costs to perform pre-inspection work using 2018 recorded costs as a baseline assumption. To that baseline, SCE added forecast costs to reflect the new drivers explained in Section b.26

c. **Quality Assurance / Quality Control**

There are two assessments performed related to the overall quality of the program. In the first assessment – quality assurance – the SCE specialist provides assurance that the trimming job fulfilled the pre-inspector’s prescription.

Second, due to increasing risks around contractor performance and program assurance, SCE added an independent quality assurance check to the program. This provides reasonable and independent assurance that inspection and maintenance work has been effectively performed and meets program requirements.

For this GRC, SCE forecasts on average approximately $1.5 million per year for distribution quality assurance / quality control activities. This forecast was developed based on the number of inspectors required to adequately and independently inspect distribution vegetation management work. SCE will initially prioritize inspections to HFRA.27

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25 Total trim work consists of the number of tree trims while also accounting for the work scope of those trims. For example, as discussed above, we expect initial trims in HFRA to require more work than an average maintenance trim. Refer to WP SCE-02 Vol. 06C, pp. 1 - 91 – Distribution Routine Vegetation Management – Trim and Remove Trees –Confidential / WP SCE-02 Vol. 06A, pp. 3 - 101 – Distribution Routine Vegetation Management – Trim and Remove Trees, WP SCE-02 Vol. 06A, pp. 102-103 – Substations (Distribution and Transmission Routine Vegetation Management), and WP SCE-02 Vol. 06A, pp. 104 - 105 – T&E Factor (Distribution and Transmission Routine Vegetation Management).

26 Refer to WP SCE-02 Vol. 06A, pp. 130 - 131 – Pre-Inspections (Distribution and Transmission Routine Vegetation Management).

27 Refer to WP SCE-02 Vol. 06A, pp. 132 - 133 – Quality Assurance Check (Distribution and Transmission Routine Vegetation Management).
b) **Transmission Routine Vegetation Management**

The Transmission Routine Vegetation Management program is designed to comply with regulatory requirements, support Commission recommendations, and support overall reliability. The scope of this work is driven by GO 95, Rule 35, PRC 4292, 4293 and heavily governed by FAC-003-4 which is enforced by FERC, NERC, and WECC for transmission lines under their jurisdiction. This program is designed to manage and prevent encroachments into the recommended vegetation clearance distance.

(1) **Work Description and Need**

The maintenance of vegetation in proximity to Transmission assets closely aligns with the work processes described within Distribution Routine Vegetation Management. During annual inspections, pre-inspectors identify vegetation that requires maintenance to meet program requirements designed to maintain required clearances from the lines. Those prescriptions are then handed off to the trimming/removal contractors to perform the maintenance.

One differentiating factor between Transmission lines and Distribution lines is that Transmission lines will sag lower in hot conditions and when more load is carried, and their weight will cause them to sway in windy conditions. This sag and sway movement is commonly referred to as “conductor dynamics.” Therefore, SCE’s program considers conductor dynamics when defining the location from which minimum clearance needs to be maintained.

Consistent with recommended guidance in D.17-12-024, SCE has expanded the standard for clearance distance in high fire areas at time of maintenance to 30 feet for power lines 115kV and above. This distance at time of maintenance represents an increase from 2018, when the program standard ranged from 10 to 25 feet and did not completely account for line dynamics.

To assure Right-of-Way clearances fully account for conductor dynamics, SCE utilizes light detection and ranging technology (LiDAR). LiDAR is a surveying method that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor. Differences in laser return times is then used to make digital three-dimensional representations of field condition at the time of survey. The data is then modeled against engineering information to show the maximum sag and sway of that line and where vegetation is in relationship to those points. SCE plans to conduct LiDAR inspections on bulk and sub transmission

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28 Refer to WP SCE-02 Vol. 06A, pp. 1 - 2 – Transmission Clearance Distances.
conductor miles in HFRA to help maintain minimum clearance distances and to identify potential Subject Trees for assessment under HTMP.

Once SCE has mitigated or removed a large amount of vegetation along Rights-of-Way, revisiting this scope on an annual or bi-annual basis would put constraints on crew resources and budgets. To defend against this event, SCE is piloting a maintenance strategy that introduces integrated vegetation management practices around SCE owned Rights-of-Way and easements. Integrated Vegetation Management (IVM) is the practice of promoting desirable, stable, low-growing plant species that will resist invasion by tall growing tree species through the use of appropriate, environmentally sound, and cost-effective control methods. These methods can include a combination of chemical, biological, cultural, mechanical, and/or manual treatments. The use of these methods provides the ability to reduce grow-in risk while improving the wildlife habitat.

(2) **Scope and Forecast Analysis**

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**Figure II-6**

*Transmission Routine Vegetation Management O&M Expenses*[^3]

(2018 $000)

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[^3]: Refer to WP SCE-02 Vol. 06A, pp. 134 - 140 – O&M Detail for Transmission Routine Vegetation Management.
(a) **Historical Variance Analysis**

Costs decreased between 2015 and 2016 due to contractual changes from a lump-sum format to a fixed unit format. In addition, SCE increased efforts on Drought Remediation. In 2017, non-labor expenses increased as a result of a higher level of trimming activity over the compliance inventory than in the previous year. In 2018, non-labor spending decreased in part as SCE experienced difficulties contracting resources to perform trimming.

(b) **Forecast Analysis**

(i) **General Drivers of Routine Vegetation Management**

**Cost Increases**

There are three general drivers of cost increases related to distribution and transmission routine vegetation management. SCE describes these cost drivers in Section II.C.1.a)(2)(b)(i).

(ii) **Basis of Forecast**

The primary cost components of this activity are summarized in Table II-7 and described in detail thereafter.
Table II-7
Transmission Routine Vegetation Management O&M Expenses by Test Year 2021\(^{30}\)
(\textit{Constant 2018 $000})

<table>
<thead>
<tr>
<th>Activity</th>
<th>Test Year 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission Trim and Remove Trees</td>
<td>10,043</td>
</tr>
<tr>
<td>Pre-Inspection</td>
<td>1,894</td>
</tr>
<tr>
<td>Quality Assurance</td>
<td>769</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,705</strong></td>
</tr>
</tbody>
</table>

\(^{a}\). **Transmission Trim and Remove Trees\(^{31}\)**

Changes in compliance requirements and Commission recommendations for minimum clearance have significantly altered the Transmission Trim and Remove Trees since the 2014 through 2018 period. The forecast for Test Year 2021 was developed in the context of these new requirements and recommendations as described in Sections II.A.2.a)(3), II.A.2.b), and II.A.2.c).

In developing the forecast for this activity, SCE estimated the volume of work required in each tiered area based on work activity distinguished by High Fire Area, Tier 1 (also known as Non-High Fire Area), and Mixed. The forecast for work in 2019 and 2020 reflects a significant increase in the volume and scope of work. This is largely due to the change in operational trimming practices to adopt the Commission’s recommended trimming distances in all tiers. SCE applied these new assumptions to 2017 inventory counts, resulting in an increased forecast scope of work in HRFA Tiers 2 and 3. Specifically, SCE is forecasting approximately 25% increase in inventoried trees, and a resulting two-time increase in work scope. As the volume of work in 2019 and 2020 is completed, the forecast for the 2021 test year drops to levels generally more consistent with historical years. The majority of the work will be performed under a unit rate structure where base units are a function of the vegetation zones. Vegetation zones are defined by complexity of work, usually


\(^{31}\) Transmission Trim and Remove Trees activity includes vegetation clearance for substations and Pre- Inspection activity includes costs for LiDAR. Refer to WP SCE-02 Vol. 06A, pp. 158 – 160 – LiDAR.
related to high fire tier and geographical location. In Table II-8, SCE summarizes the required work by showing the overall tree trim and removal counts for this activity.

Table II-8

Forecast Trim and Removal Counts for Transmission

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Trims</td>
<td>82,856</td>
<td>122,766</td>
<td>122,341</td>
<td>36,702</td>
</tr>
<tr>
<td>Total Removals</td>
<td></td>
<td></td>
<td>24,468</td>
<td>12,234</td>
</tr>
</tbody>
</table>

b. **Pre-inspection**

For forecasting purposes, SCE estimated $1,000 per mile as the unit cost assumption. The cost per mile of LiDAR can vary based on available engineering data and translation methodologies. In terms of miles flown, SCE has defined a system baseline and assigned circuit “classes” for the frequency of LiDAR flights and data processing. Classes are subject to change based on flight findings.

Flying and translating LiDAR for field usage is forecast to cost $5.154 million dollars in 2019 to establish the baseline and $1.404 million dollars thereafter to maintain high risk ranking circuits. By nature, operationalizing the LiDAR technology has potential to expose a large amount of vegetation that is hard to measure with the human eye alone. Since SCE has not flown the bulk transmission lines, the Transmission Trim and Remove forecast reflects a higher tree removal forecast in 2020 as a response to the 2019 bulk power LiDAR flights.

c. **Quality Assurance / Quality Control**

The same activities performed for the Quality Assurance / Quality Control component of the Distribution Routine Vegetation Management activity also apply to this Transmission Routine Vegetation Management activity. Accordingly, SCE will perform two assessments as part of this function: (1) internal assurance that the trimming job fulfilled

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33 Refer to WP SCE-02 Vol. 06A, pp. 158 - 160 – Transmission Routine Vegetation Management – LiDAR.
the pre-inspector’s prescription; and, (2) independent assurance that inspection and maintenance work has been effectively performed and meets program requirements.

This forecast was developed based on the number of inspectors required to adequately and independently inspect distribution vegetation management work. SCE will initially prioritize inspections to HFRA.34

2. **Dead, Dying and Diseased Tree Removal (Bark Beetle and Drought Remediation)**

SCE removes trees that are dead, dying, or diseased as part of activities that historically comprised the Bark Beetle Infestation Remediation and Drought Remediation programs. Beginning in the 2015 GRC, SCE has sought cost recovery in base rates for bark beetle-related remediation activities.35 In SCE’s 2018 GRC, SCE did not seek recovery in base rates since the removal of dead, dying, and diseased trees from bark beetle and drought had greatly decreased since the filing of SCE’s 2015 GRC. In this GRC, SCE includes drought-related remediation, including bark beetle infested trees, work as part of forecast O&M costs, consistent with SCE’s request that all Vegetation Management Program costs be included in a single balancing account.

a) **Work Description and Need**

Since 2004, Southern California forests have been devastated both by a bark beetle infestation and persistent drought (which are interrelated). Accordingly, SCE has and continues to proactively remove dead, dying, and diseased trees that could fall on or contact SCE’s electrical facilities. Unlike trees located near power lines that must be trimmed to prevent encroachment, large dead or dying trees can be located outside of the Right-of-Way and fall into power lines. For example, a dead 100-foot-tall tree rooted 70 feet from SCE’s electrical facilities could fall into those facilities. SCE uses a contract workforce that surveys and identifies dead, dying, and diseased trees on an ongoing basis. Only trees identified as at risk to contact SCE’s electric facilities are added to an inventory for removal. Since trees continue to die as a result of drought, the same geographical areas are patrolled on a quarterly basis in support of drought remediation. SCE has multiple contractors working to remove the dead, dying, and diseased trees. Table II-9 shows the districts impacted by the drought.

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34 Refer to WP SCE-02 Vol. 06A, pp. 132-133 – Quality Assurance Check (Distribution and Transmission Routine Vegetation Management).

35 A.13-11-003, SCE-03 Vol. 06, Pt. 1, p. 21 “Bark beetle activities have declined since the inception of this program as the number of affected trees have been controlled and stabilized.”
Table II-9
List of Districts Impacted by the Drought

<table>
<thead>
<tr>
<th>District No.</th>
<th>District Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Covina</td>
</tr>
<tr>
<td>27</td>
<td>Monrovia</td>
</tr>
<tr>
<td>34</td>
<td>Ontario</td>
</tr>
<tr>
<td>35</td>
<td>Thousand Oaks</td>
</tr>
<tr>
<td>36</td>
<td>Antelope Valley</td>
</tr>
<tr>
<td>39</td>
<td>Ventura</td>
</tr>
<tr>
<td>43</td>
<td>Saddleback</td>
</tr>
<tr>
<td>49</td>
<td>Santa Barbara</td>
</tr>
<tr>
<td>50</td>
<td>Shaver Lake</td>
</tr>
<tr>
<td>51</td>
<td>San Joaquin Valley</td>
</tr>
<tr>
<td>52</td>
<td>Tehachapi</td>
</tr>
<tr>
<td>53</td>
<td>Kernville</td>
</tr>
<tr>
<td>59</td>
<td>Valencia</td>
</tr>
<tr>
<td>72</td>
<td>Barstow</td>
</tr>
<tr>
<td>73</td>
<td>Victorville</td>
</tr>
<tr>
<td>85</td>
<td>Bishop/Mammoth</td>
</tr>
<tr>
<td>86</td>
<td>Ridgecrest</td>
</tr>
<tr>
<td>88</td>
<td>Wildomar</td>
</tr>
</tbody>
</table>
b) **Scope and Forecast Analysis**

**Figure II-7**

*Dead, Dying, and Diseased Tree Removal O&M Expenses*\(^{36}\)
*(Constant 2018 $000)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Recorded</th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor</td>
<td>$235</td>
<td>$4,163</td>
</tr>
<tr>
<td>Non-Labor</td>
<td>$4,464</td>
<td>$4,163</td>
</tr>
<tr>
<td>Other</td>
<td>$3,357</td>
<td>$31,248</td>
</tr>
<tr>
<td>Total</td>
<td>$5,653</td>
<td>$35,621</td>
</tr>
</tbody>
</table>

(1) **Historical Variance Analysis**

From 2014 to 2018, costs have increased as the impact of drought on tree mortality continued to worsen with each successive year of drought. In 2018, SCE exceeded the GRC authorized amount, moving the incremental Bark Beetle costs to Drought CEMA.

(2) **Forecast Analysis**

While SCE hopes that the severely dry conditions that afflicted much of the state over recent years are gone, damage from the drought will linger for years in many areas. Accordingly, work related to bark beetle and drought remediation is forecast to remain fairly level from 2019 through 2023, and therefore, SCE bases its 2021 test year forecast on 2018 recorded levels.

3. **Wildfire Vegetation Management / Hazardous Tree Management Program**

SCE expanded its efforts to mitigate vegetation-related wildfire risks by implementing a Hazard Tree Management Program (HTMP). HTMP assesses the site and structural condition of trees that could fall into or otherwise impact electrical facilities and potentially lead to ignitions and outages.

\(^{36}\) Refer to WP SCE-02 Vol. 06A, pp. 161 - 167 – O&M Detail for Dead, Dying, and Diseased Tree Removal.
These trees can be located up to 200 feet on either side of SCE’s electrical facilities (i.e., the Utility Strike Zone, as described in more detail in Section II.A.2.c)), which is significantly beyond the 4-foot clearance compliance requirement for HFRA. After an assessment is performed, SCE will remediate the risk, as applicable, and according to a risk-based approach that is consistent with industry practice.

This approach is discussed further below.

a) **Work Description**

HTMP performs a variety of activities leading up to and including the removal or mitigation of hazardous trees. These key activities are detailed below.

1. **Dedicated Tree Inspection Process**

   SCE has developed a detailed assessment process to identify subject trees that could potentially fall into or otherwise impact electrical facilities in HFRA, separate from its existing inspection processes. Tree assessors inspect the area on either side of SCE’s electrical facilities called the Utility Strike Zone (USZ) from which a tree or a portion of a tree could strike or impact electric facilities. The area inspected on either side of SCE’s electrical facilities can vary significantly (up to 200 feet) based on the height of the trees, slope conditions, and potential for wind-driven vegetation.

2. **Enhanced Efforts to Obtain Property Owner Approval**

   Since most trees to be mitigated through this effort reside on non-SCE property, property owner approval may be required to remove the trees. Although SCE has been granted authority to force a removal under PRC 4295.5, if the tree characteristics represent a risk to SCE facilities, the customer impact and costs associated with the escalation process make this the option of last resort. Therefore, SCE plans to take additional measures to contact property owners when tree removal is recommended. At times, the property owner differs from the occupants of the property, necessitating a public property records search to identify property owners and obtain contact information. Other steps may include making multiple efforts to contact the property owner and negotiating with the property owner to overcome their opposition to removing the tree. Depending upon location, additional approvals may be required from homeowner associations or governmental agencies.

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37 If during these inspections, a dead tree in HFRA is identified, it will be inventoried and removed with the associated removal costs recorded in the Drought CEMA in 2019 and 2020.
SCE anticipates that some property owners will oppose removing trees that are not currently dead or dying. In these cases, SCE will attempt to negotiate with property owners to reach mutually-acceptable resolutions (e.g., providing replacement trees).

(3) **Tree Mitigation and Removal**

Many of the trees that pose an expected threat to electrical facilities may be mitigated through removal. Other mitigation options include partial tree removal where major branches are removed; palm frond removal; and monitoring where the tree does not need removal or partial removal yet but may in the future. Tree mitigation and removals are generally performed by third-party contractors. Tree removal is performed using a combination of industry-standard methods such as: (1) directional felling, (2) climb-sectionalize, (3) crane, and (4) high hazard.\(^{38}\) Once the trees are felled, they are bucked and slashed, and the logs and debris are removed from the site. Given this work is all being done in HFRA, SCE will remove all debris over 18 inches in length and greater than one inch in diameter.

(4) **Program Management, Environmental Compliance and Quality Assurance**

Activities to support assessment and removal work described above include:

- Prioritize work (e.g., where inspections should be performed);
- Plan and schedule contractor work;
- Research property ownership and contact information;
- Manage property owner approval escalation process and negotiate with property owners, as needed;
- Interface with property owners and federal, state and local agencies and fire agencies;
- Perform community outreach;
- Provide accounting, invoicing, reporting, and project management support;
- Plan the inspection and tree removal work;

- Obtain required permits;
- Oversee the contractors who inspect, inventory, assess and remove trees; and
- Input tree inventory data.

SCE also uses biological and archaeological consulting firms to assess impacts to sensitive biological and cultural resources, as required, in areas where SCE will be removing trees. These consultants monitor and guide work in potentially sensitive environmental areas; conduct field surveys; develop special training for tree removal crews; and prepare documentation and reports. In addition, a Quality Assurance function independent from the program management function confirms that contractors have performed the required work in accordance with their contract and SCE internal standards, and verifies that the inspectors correctly identified subject trees and performed threat assessments, and the accuracy of the inventory of mitigated trees.

b) Need for Activity

Data shows that most vegetation-caused faults, also known as Tree Caused Circuit Interruptions (TCCI), are caused by living trees. As shown in Table II-10 below, a significant majority of the TCCIs in 2017 and 2018 are associated with living trees, many of which fell into SCE’s facilities.\(^\text{39}\)

<table>
<thead>
<tr>
<th>Tree Caused Circuit Interruptions (TCCI)</th>
</tr>
</thead>
<tbody>
<tr>
<td># of TCCIs caused by failure of a living tree or a portion of a living tree</td>
</tr>
<tr>
<td># of TCCIs caused by a living tree falling into SCE’s facilities</td>
</tr>
<tr>
<td># of TCCIs caused by dead, damaged, declining or deteriorated trees</td>
</tr>
<tr>
<td># of TCCIs caused by other causes</td>
</tr>
<tr>
<td>Total # of TCCIs</td>
</tr>
</tbody>
</table>

\(^\text{39}\) Of the 448 TCCIs caused by failure of a living tree or a portion of a living tree, 102 TCCIs comprise the subset caused by living trees and where it was clear from the incident description that a tree fell and connected with SCE’s facilities.
Further, SCE’s Vegetation Management organization performs field reviews and tracks TCCIs to determine the cause of vegetation failures and if the interruption resulted from vegetation within the GO 95 Rule 35-mandated clearance area (CPUC compliance zone). This data shows that approximately 90 percent of TCCIs originate outside the CPUC compliance zone resulting from trees that fall over, break off and blow into lines, or palm fronds that fly into SCE facilities. Therefore, removal of live trees and vegetation within the USZ that pose a threat to SCE facilities is critical to lowering the risk of these vegetation-related faults.  

**c) Risk-Based Approach**

HTMP assesses any tree in the HFRA Utility Strike Zone (USZ), the area where there exists the potential for a tree to strike the conductors should the tree or portion of the tree fail. Fundamentally, any tree in the USZ that is taller than its distance from SCE equipment is assessed by a trained arborist to identify either tree attributes or site conditions that could cause the tree to fail. SCE utilizes a HTMP Tree Risk Calculator developed using industry standard methodology to determine a risk score for each tree assessed, and prioritizes the appropriate mitigation based on the risk score of each individual tree.

The development of the Tree Risk Calculator is based primarily on the standards set forth by the International Society of Arboriculture (ISA) Tree Risk Assessment Qualification (TRAQ). By definition, a tree only poses a “risk” if there is a target the tree, or part thereof, can strike. The target, in all cases, for HTMP are SCE’s utility lines or equipment. The bulk of the HTMP score is derived from site conditions (*i.e.*, history of failure, topography, site changes, soil conditions, common weather patterns) and tree defects (crown & branches, trunk, and root & root collar).

The Tree Risk Calculator assigns a risk score based on the individual tree’s “likelihood of failure” and an “Impact Strike Score.” The likelihood-of-failure determination takes tree height, site conditions, tree lean, and tree defects into account. The Impact Strike Score determination incorporates factors such as line voltage impact, fire impact, and likelihood of impact. Each of these factors requires detailed evaluation. The arborist also provides mitigation options based on their

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40 A living tree does not necessarily mean a healthy tree. Trees identified for removal or mitigation in HTMP may show signs of disease, root rot, cracks in its trunk, etc. In addition, palm fronds coming into contact with a line is a common cause of TCCIs. The source of these palm fronds is overwhelmingly from living trees, and removal of living palm trees located near power lines that pose a risk to the public is a necessary component of SCE’s program.
professional judgment and confirms or changes the priority of the mitigation that resulted from tree risk score. SCE’s HTMP has four levels of potential mitigations, which include complete tree removal, trimming to make-safe, monitoring, and reliance on the property owner to make-safe.

Additionally, SCE considers risk in determining areas or categories to prioritize for tree assessment. The strategy is designed to first target assessment and mitigation of trees that have a higher likelihood to strike SCE’s equipment. In prioritizing HTMP tree assessment and mitigation work, SCE utilizes a methodology that first considers areas posing the highest risk to public safety and property damage. The risk modeling tools used to perform this are discussed in SCE-01, Volume 2.

It does so by evaluating factors such as fire threat area tier, fuel loading surrounding SCE’s facilities, permit and environmental considerations, and population density. Those highest consequence areas are then considered against other factors such as tree density immediately adjacent to lines, known vegetation issues, deployment of other wildfire mitigations, and scheduling efficiency.

d) **Scope and Forecast Analysis**

**Figure II-8**

*Wildfire Vegetation Management O&M Expenses*

(1) Refer to WP SCE-02 Vol. 06A, pp. 170 - 176 – O&M Detail for Wildfire Vegetation Management.
(2) **Forecast Analysis**

The primary cost components of this activity are summarized in Table II-11 below.

**Table II-11**

*Composition of Hazard Tree Removal Management O&M Expenses*

*(Constant 2018 $000)*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Test Year 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Inspections</td>
<td>2,476</td>
</tr>
<tr>
<td>Tree Removals</td>
<td>40,661</td>
</tr>
<tr>
<td>Tree Mitigation</td>
<td>7,283</td>
</tr>
<tr>
<td>Property Owner Incentives</td>
<td>499</td>
</tr>
<tr>
<td>Program Management</td>
<td>8,017</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>58,937</strong></td>
</tr>
</tbody>
</table>

This forecast reflects the costs to perform the work activities described in Section II.C.3.a) above, and include expenses related to tree inspection, tree mitigation/removal, and property owner incentives. This forecast also reflects the levels of work agreed to by parties in the pending GSRP settlement agreement, as discussed in Section II.A.2.b).

Of the above costs, tree removals comprise a significant portion of the forecast. This forecast was developed based on the expected rate of tree assessments and anticipated failure rates, or the number of trees that require mitigation such as removal. Tree removals could be based on unacceptable site conditions and/or tree attributes that could cause the tree to fail, *i.e.* damage electrical assets and/or cause ignition risk.

SCE forecasts failure rates from tree assessments in its HFRA to range from 5% to 12%. This is in line with SCE’s California peer utilities who have or are implementing similar tree removal programs. As of June 30, 2019, SCE has performed approximately 37,077 tree

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assessments of which approximately 3,212 (9%) require removal. SCE is forecasting to perform a
minimum of 125,000 tree assessments in 2019 and upwards of 250,000 tree assessments in subsequent
years. At this rate, SCE anticipates that it will take approximately five to eight years to complete the first
pass of assessments and mitigation in HFRA.

Table II-11 summarizes the total removal costs for this program by
multiplying the total number of removals by the estimate cost per removal by year.

**Table II-12**

*Forecast Tree Removal Count and O&M Expenses* [43](#)
*(Constant 2018 $000)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Removals</th>
<th>Total Removal Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>7,500</td>
<td>$15,248</td>
</tr>
<tr>
<td>2020</td>
<td>15,000</td>
<td>$30,496</td>
</tr>
<tr>
<td>2021</td>
<td>20,000</td>
<td>$40,661</td>
</tr>
<tr>
<td>2022</td>
<td>25,000</td>
<td>$50,827</td>
</tr>
<tr>
<td>2023</td>
<td>30,000</td>
<td>$60,992</td>
</tr>
</tbody>
</table>

D. **RAMP Integration**

1. **RAMP and GRC Reconciliation**

Table II-13 below shows a comparison of the forecast for the RAMP Expanded
Vegetation Management mitigation evaluated in the RAMP Wildfire chapter to the forecast for the
HTMP, as presented in the GRC request.

**Table II-13**

*Expanded Vegetation Management – Wildfire Mitigation*
*RAMP vs. GRC O&M Forecast Comparison*
*(Nominal 2018 $000)*

<table>
<thead>
<tr>
<th>RAMP Risk</th>
<th>RAMP ID</th>
<th>RAMP Mitigation Name</th>
<th>Filing Name</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildfire</td>
<td>M5</td>
<td><strong>Expanded Vegetation</strong></td>
<td>RAMP</td>
<td>40,769</td>
<td>80,657</td>
<td>81,772</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management**</td>
<td>GRC</td>
<td>15,590</td>
<td>31,564</td>
<td>42,568</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Variance</strong></td>
<td>25,178</td>
<td>(49,092)</td>
<td>(39,204)</td>
<td></td>
</tr>
</tbody>
</table>

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III.

VEGETATION MANAGEMENT BALANCING ACCOUNT TREATMENT

In this proceeding SCE is proposing a two-way balancing account for all vegetation management activities known as the Vegetation Management Balancing Account. It is appropriate to establish that balancing account here because SCE’s vegetation management program has undergone a comprehensive transformation over the last few years. Accordingly, although vegetation management overall is not “new,” many of the specific programs and activities discussed in the Volume are (most prominently the new Hazard Tree Management Program (HTMP) and expanded clearance/pruning distances in HFRA). Because these programs and activities are new, and because SCE’s risk analysis methodologies continue to be refined, there is substantial forecast uncertainty surrounding both the final scope of work and its associated costs. In similar circumstances, the Commission has found it appropriate to record such costs in a two-way balancing account, and SCE proposes that it do so here.

Table III-14 summarizes the forecast expenses over the 2021 – 2023 period for each of the four vegetation management programs discussed in this testimony.

<table>
<thead>
<tr>
<th>Table III-14</th>
<th>Vegetation Management O&amp;M Expenses (Constant 2018 $000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forecast</td>
</tr>
<tr>
<td></td>
<td>2021</td>
</tr>
<tr>
<td>Distribution Routine Vegetation Management</td>
<td>110,173</td>
</tr>
<tr>
<td>Transmission Routine Vegetation Management</td>
<td>12,705</td>
</tr>
<tr>
<td>Dead, Dying and Diseased Tree Removal</td>
<td>35,120</td>
</tr>
<tr>
<td>Wildfire Vegetation Management</td>
<td>58,937</td>
</tr>
<tr>
<td><strong>Total Vegetation Management Costs</strong></td>
<td><strong>216,935</strong></td>
</tr>
</tbody>
</table>

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44 See Exhibit SCE-01, Volume 2.
45 See Exhibit SCE-07, Volume 1A.
46 Refer to WP SCE-02 Vol. 06A, pp. 189 - 190 – GRC Activity Summary.