Application No.:	A.23-05-010
Exhibit No.:	SCE-02 Vol. 10
Witnesses:	K. Borngrebe T. Ohanian E. Torres

(U 338-E)

2025 General Rate Case

Vegetation Management

Before the

Public Utilities Commission of the State of California

Rosemead, California
May 12, 2023

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I.

INTRODUCTION

This volume presents SCE's forecast of O&M expenses for Test Year 2025, and capital expenditures from 2023-2028 for the Vegetation Management (VM) and Wildfire Management Business Planning Elements (BPE). In Section II.A below, SCE summarizes Vegetation Management's O&M and capital requests, as well as the regulatory background. In Section II.B, SCE provides an overview of the testimony that follows, highlighting major changes and notable accomplishments since the last GRC cycle, and describing various themes and trends that inform the Vegetation Management forecasts.

A. Summary of O&M and Capital Request

This volume compares O&M and capital amounts authorized in the 2021 General Rate Case (GRC) to recorded amounts in 2021, analyzes the 2025 Test Year O&M forecast relative to historical spending, and describes planned capital expenditures supporting Vegetation Management.

Figure I-1
Vegetation Management O&M Expenses 2025 Test Year
Total SCE-02 Grid Activities 2025 O&M Request = $1,208,955
(Constant 2022 $000)

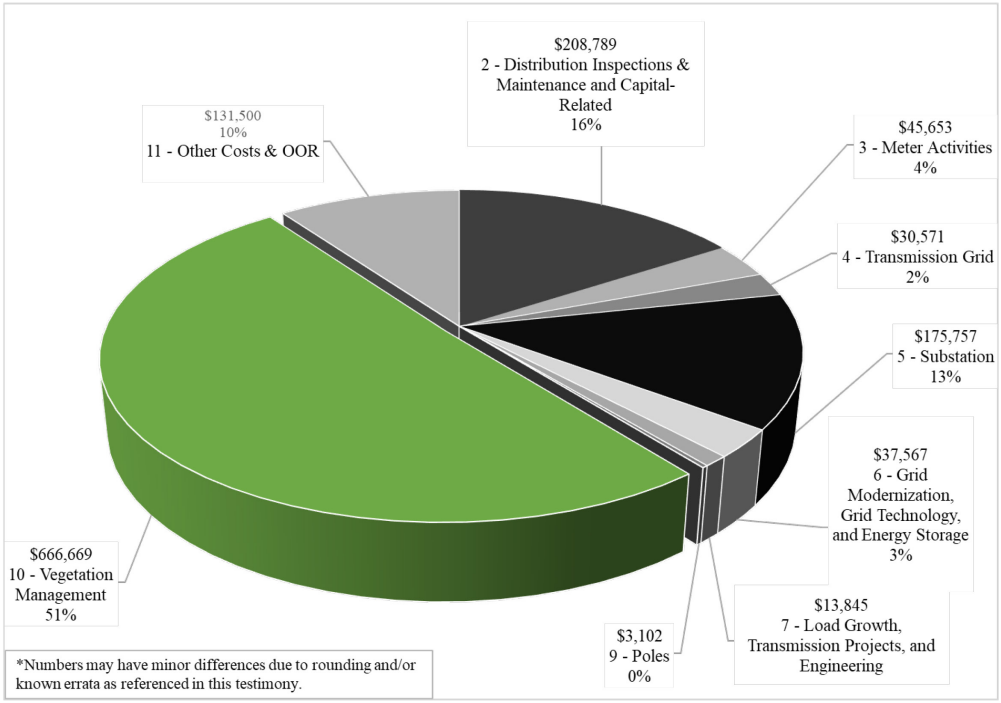
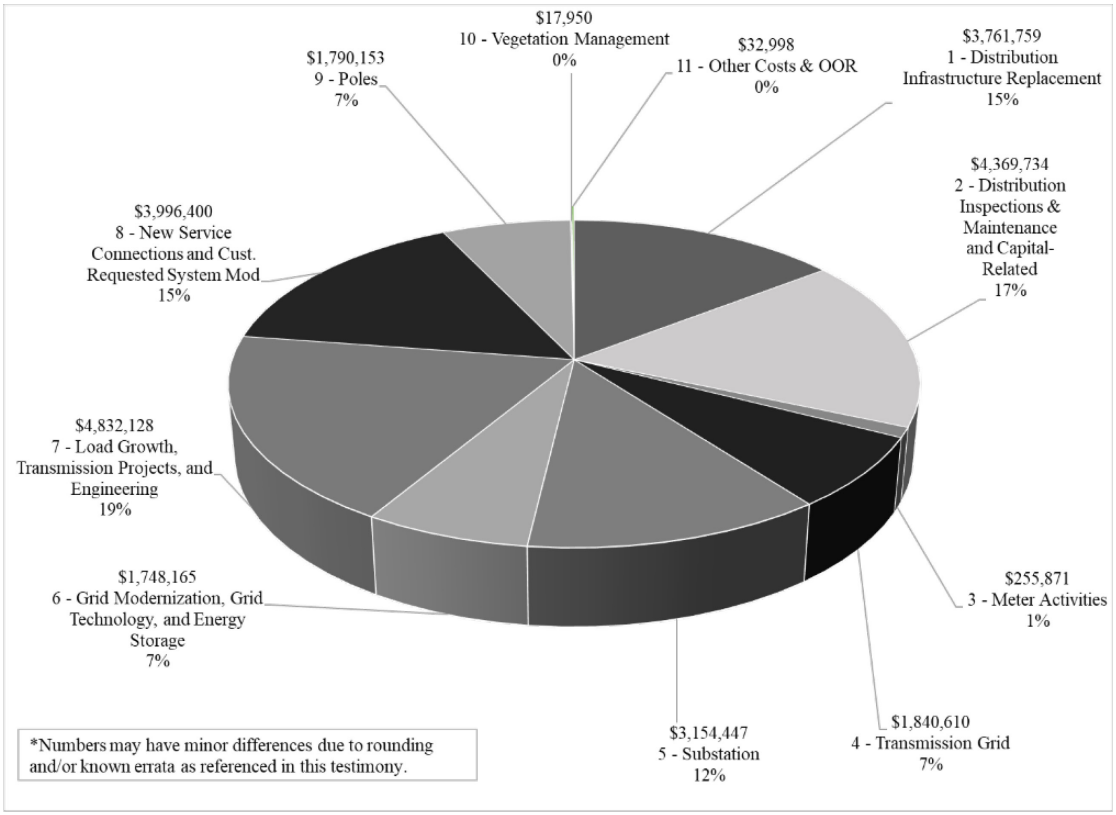


Figure I-2
Vegetation Management Capital Expenditures 2023-2028
Total SCE-02 Grid Activities Capital Request = $25,800,000
(Nominal $000)



1. Vegetation Management's O&M Request

Table I-1 shows SCE's historical O&M recorded costs from 2018-2022 and SCE's O&M forecasts for 2023-2025. In this testimony, SCE is requesting $666.669 million in normalized Vegetation Management O&M expenses for Test Year 2025.

Table I-1
Summary of O&M Expenses for Vegetation Management by BPE
Recorded O&M Expenses (2018-2022) and Forecast O&M Expenses (2023-2025)[1]
(Constant 2022 $000)

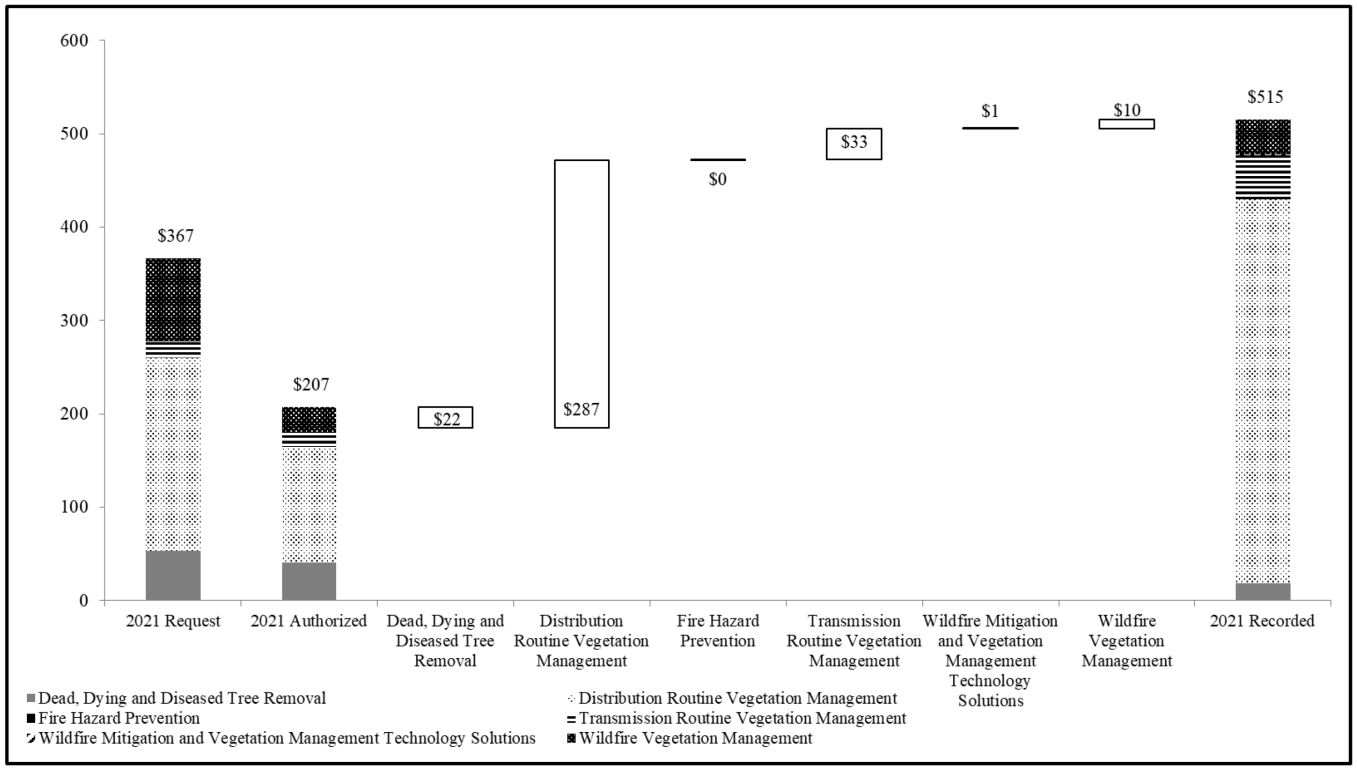
	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Vegetation Management	$144,769	$327,123	$439,544	$434,994	$416,795	$461,583	$492,824	$477,532
Wildfire Management	$45,689	$68,685	$128,743	$80,400	$79,787	$119,714	$140,478	$189,137
Totals	**$190,458**	**$395,808**	**$568,287**	**$515,394**	**$496,582**	**$581,297**	**$633,302**	**$666,669**

a) Comparison of 2021 Authorized to Recorded O&M Expenses

Figure I-3 below shows the incremental 2021 recorded O&M expenses incurred for various Vegetation Management GRC activities above SCE's 2021 authorized amount of $207 million. In addition, Table I-2 below compares the 2021 authorized amount to the 2021 recorded O&M expenses for Vegetation Management.

[1] *See* WP SCE-02, Vol. 10, pp. 1-3 – Workpaper for O&M and Capital Requests by Business Planning Elements (BPE).

Figure I-3
2021 Authorized to Recorded O&M Expenses Waterfall[2]
(Constant 2022 $ Millions)



[2] *See* WP SCE-07, Vol. 01, Authorized vs. Recorded.

Table I-2
Comparison of 2021 Authorized to Recorded O&M Expenses[3],[4]
(Constant 2022 $000)

	Requested Amount	Authorized Amount	Recorded Amount
Distribution Routine Vegetation Management	$206,816	$124,089	$410,944
Transmission Routine Vegetation Management	$17,684	$14,385	$47,302
Wildfire Vegetation Management	$89,591	$27,967	$37,501
Dead, Dying and Diseased Tree Removal	$52,850	$40,720	$18,589
Fire Hazard Prevention	$	$	$392
Wildfire Mitigation and Vegetation Management Technology Solutions	$	$	$666
Totals	**$366,941**	**$207,161**	**$515,394**

SCE recorded $515.394 million in O&M expenses in 2021, compared to $207.161 million authorized in the 2021 GRC Final Decision and $366.941 million requested in its 2021 GRC application. SCE's incremental spend above the 2021 authorized amount was driven by multiple factors, including higher direct and indirect contract labor costs resulting from Senate Bill (SB) 247, tight labor markets for vegetation management services, and higher volumes of work. These factors impacted all Vegetation Management GRC activities that comprised vegetation trimming and removal work.

For Distribution Routine Vegetation Management, which includes Routine Line Clearing for distribution assets, SCE recorded approximately $287 million above authorized levels in 2021. SCE attributes approximately $220 million above authorized levels for Routine Line Clearing primarily to higher contractor labor costs associated with SB 247 and tighter market conditions. SCE also performed more emergent work than forecast, incurring $27 million over authorized levels, due to higher-than-anticipated findings from Seasonal Patrols and the first full year of work related to Areas-of-Concern (AOC). For Structure Brushing (identified as Pole Brushing in the 2021 GRC), SCE performed work on higher-than-forecast volumes, incurring costs of approximately $11 million above authorized levels. The remaining additional costs in this GRC activity accrue to inspections, LiDAR, quality control, and environmental support.

For Transmission Routine Vegetation Management, SCE recorded O&M expenses of approximately $33 million above authorized amounts. Nearly $26 million of that

[3] The requested amount encapsulates SCE's request in the Update Testimony Exhibit SCE-24, which reflects SB 247's impact on Vegetation Management forecasts. *See* Section I.A.3.a) for more details on SCE's Update Testimony.

[4] *See* WP SCE-07, Vol. 01, Authorized vs. Recorded.

incremental amount related to Routine Line Clearing for transmission assets, also primarily due to higher contractor labor costs associated with SB 247 and tighter market conditions. The remaining amounts accrue to inspections, LiDAR, seasonal patrols, quality control, and environmental support.

For Wildfire Vegetation Management, SCE recorded O&M expenses of approximately $10 million above authorized amounts. SCE exceeded authorized levels by $3 million for Hazard Tree Management Program (HTMP) removals and by $7 million for HTMP inspections. For HTMP removals, the unit costs increased significantly as a result of SB 247, resource constraints, increased costs for traffic control, and a higher proportion of non-conifers (which have a higher unit cost than conifers). Inspection costs for HTMP increased in part due to sharp demand for ISA-certified arborists in reaction to the expansion of vegetation management programs nationwide, thereby allowing arborists to competitively re-negotiate their contracts with SCE.[5]

For Dead, Dying and Diseased Tree Removal, SCE recorded O&M expenses of approximately $22 million less than authorized levels. This was primarily due to lower volumes driven by resource constraints.

For both Wildfire Mitigation and Vegetation Management Technology Solutions (VM's work management tool Arbora), as well as Fire Hazard Prevention, SCE did not request any O&M expenses in the 2021 GRC Track 1. SCE ultimately recorded costs of approximately $0.7 million in 2021 for software licensing fees for the former and $0.4 million for the latter.

b) Continue VMBA and Increase Authorized Funding Eligible for Soft Cap

In this testimony, SCE requests the continuation of the two-way Vegetation Management Balancing Account (VMBA) for the 2025 GRC cycle and an increase of the soft cap from 115% to 120% of the authorized Test Year 2025 amount. The VMBA's continuation and increase are justified for several reasons.

First, since the expansion of its vegetation management activities in 2018 in response to catastrophic and more frequent wildfires, SCE has enhanced and improved its Vegetation Management programs to remain in compliance with longstanding regulatory requirements from General Order (GO) 95 and other statutes, and also to combat the threat of wildfire with comprehensive and risk-informed solutions. In doing so, SCE continues to incur costs that are impacted by upward

[5] *See* SCE's A.22-06-003 Wildfire Mitigation/Vegetation Management application for more details on HTMP recorded costs above authorized amounts in 2021.

pressures in the contract labor markets, as well as costs related to technology advancements which can benefit customers, both in the short- and long-term.

Second, as detailed in SCE's filing to recover incremental costs for 2021 above the current 115% soft cap of the VMBA,[6] SCE continues to encounter new and unpredictable events in the implementation of its Vegetation Management programs. For example, safety stand-downs in 2021 resulted in a pause for two contractors who performed work for SCE's Vegetation Management programs, requiring transfer of that work to other contractors. Other potential factors that add to the uncertainty of SCE's costs include persistent drought patterns and weather-related events that may result in, for instance, lengthy delays or less-than-optimal work conditions. Additionally, increasing timeframes to obtain agency and customer approvals and more extensive environmental reviews drive further uncertainties in work duration and costs. These factors may result in interim inspections, additional project management, more overtime and/or time and expense (T&E) charges, and other impactful conditions.

Finally, SCE seeks to continuously improve its Vegetation Management programs for the benefit of customers, innovating prudently as the opportunity arises. In this testimony, SCE requests funding to enhance its inspection programs with the use of more advanced technology, such as LiDAR and satellite. This would allow SCE to move away from ground inspections and rely more heavily on remote sensing and the associated data, which could be used in predictive models.

The continuation of the VMBA is essential to allow SCE the flexibility it requires as it continues to advance and improve its Vegetation Management programs in the face of unpredictable and challenging conditions, such as uncertain and highly competitive labor markets. Wildfire is a key threat to California, and SCE must be prepared to take advantage of new technologies and innovative best practices for the benefit of customers. In addition to continuing the VMBA, SCE requests an increase in the soft cap from 115% to 120% above the authorized amount.[7] An increased soft cap would afford further flexibility and facilitate additional efficiency in the regulatory process, while still requiring SCE to seek cost recovery authorization for amounts incurred beyond this reasonable threshold. It would also be consistent with other soft caps related to vegetation management

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[6] *See* A.22-06-003, Wildfire Mitigation/Vegetation Management (2021 WM/VM), SCE's application for cost recovery of incremental amounts for 2021 in the VMBA and other wildfire-related accounts.

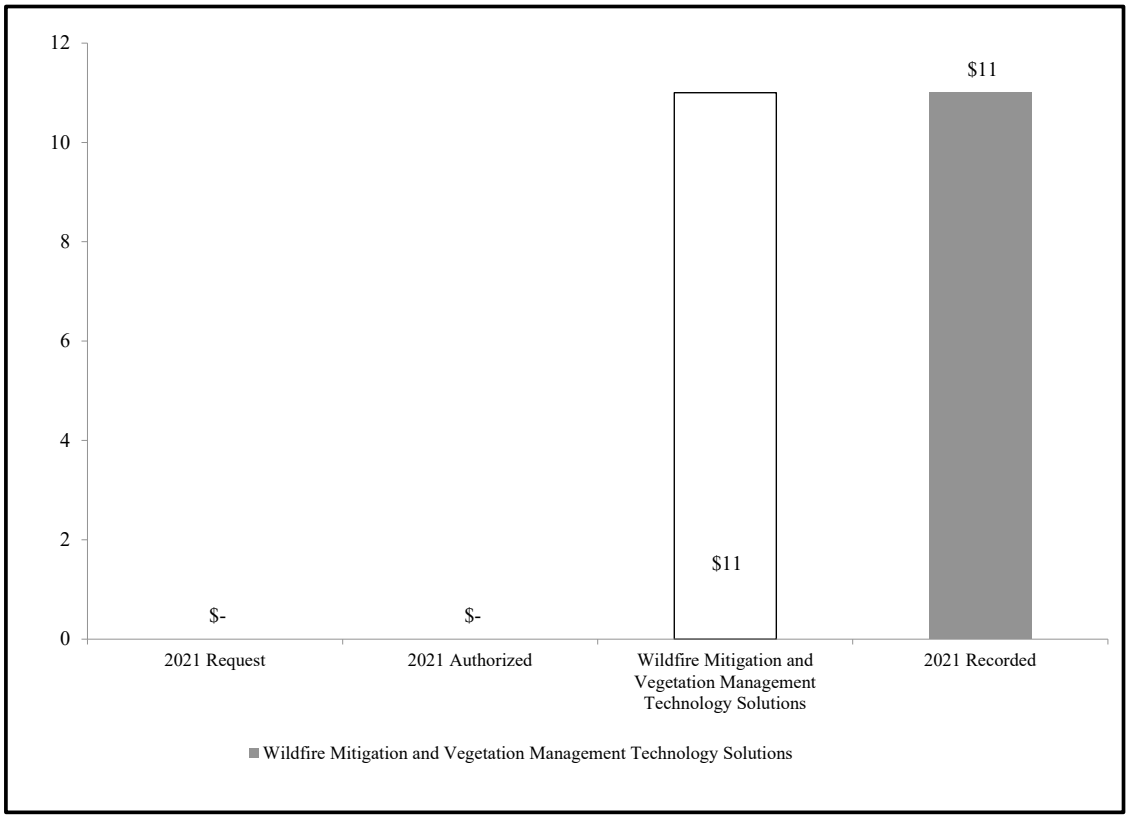
[7] The 2021 GRC Track 1 Final Decision currently requires SCE to seek recovery of costs in excess of 115% of the authorized amount by way of an after-the-fact reasonableness review application. *See* D.21-08-036, p. 656 (Conclusion of Law 70).

costs already approved by the Commission, such as PG&E's soft cap of 120% approved in D.20-12-005, Ordering Paragraph 1.a.

2. Vegetation Management's Capital Request

Figure I- 4 below shows SCE's capital expenditures for 2021, with no accompanying capital expenditure request or authorized amount, as SCE did not request capital expenditures for Vegetation Management-related activities in the 2021 GRC. Table I-3 shows SCE's recorded capital costs for Vegetation Management Technology Solutions from 2018-2022, as well as SCE's capital forecasts for 2023-2028. In this testimony, SCE is requesting a total of $17.95 million in nominal dollars for capital expenditures for Vegetation Management Technology Solutions for the six-year period from 2023 through 2028.

Figure I- 4
2021 Authorized to Recorded Waterfall for Capital Expenditure for Vegetation Management Technology Solutions[8]
(Nominal $ Millions)



[8] *See* WP SCE-07, Vol. 01, Authorized vs. Recorded.

Table I-3
Capital Expenditures for Vegetation Management Technology Solutions
Recorded Costs (2018-2022) and Forecast Costs (2023-2028)[9]
(Nominal $000)

	Recorded					Forecast					
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Wildfire Mitigation and Vegetation Management Technology Solutions	$0	$4,219	$16,147	$11,005	$7,125	$2,603	$2,747	$2,437	$4,769	$2,649	$2,746
Totals	**$0**	**$4,219**	**$16,147**	**$11,005**	**$7,125**	**$2,603**	**$2,747**	**$2,437**	**$4,769**	**$2,649**	**$2,746**

a) Comparison of 2021 Authorized to Recorded Capital Expenditures

For Vegetation Management-related Technology Solutions, SCE did not request any capital expenditures in 2021. During that year, SCE recorded $11.005 million in capital expenditures to continue the design and development of the Arbora work management tool for the Hazard Tree Program, as well as design for the Structure Brushing, Routine Vegetation Management, and Emergent Work activities.

Table I-4
Comparison of 2021 Authorized to Recorded Capital Expenditures[10]
(Nominal $000)

	Requested Amount	Authorized Amount	Recorded Amount
Technology Solutions	$	$	$11,005
Totals			**$11,005**

3. Regulatory Background

a) SCE's 2021 General Rate Case

In August 2019, SCE filed its 2021 GRC Track 1 Application. On January 1, 2020, the California Legislature implemented SB 247, which set a substantially higher pay rate for tree

[9] *See* WP SCE-02, Vol. 10, pp. 1-3 – Workpaper for O&M and Capital Requests by Business Planning Elements (BPE).

[10] *See* WP SCE-07, Vol. 01, Authorized vs. Recorded.

trimmers in California.[11] Because the 2021 GRC was filed in 2019, prior to SB 247's enactment, SCE did not and could not have foreseen or factored into its Vegetation Management forecasts the costs associated with SB 247.

In the Update Testimony phase of Track 1, SCE proposed to revise its 2021 Test Year forecast for all Vegetation Management activities (including SB 247-related and other higher costs resulting from contract renegotiations).[12] However, although the Commission acknowledged that "it is reasonable to expect some level of cost increase associated with the passage of SB 247,"[13] the Commission did not allow SCE to increase its forecasts in Update Testimony based on procedural objections.[14] Therefore, the amounts authorized in the 2021 GRC Track 1 Final Decision did not account for the significant cost impacts from SB 247.

Nevertheless, the Commission expressly allowed for recovery of incremental Vegetation Management costs (i.e., those recorded to the VMBA that exceed the soft cap of 115% of authorized costs) through separate filings.[15] Pursuant to the Commission's directive, SCE filed the

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[11] SB 247 raised the rates for tree trimmers to match the first period apprentice electrical utility lineman. *See* SCE's 2021 GRC Track 3 testimony for a detailed background of SB 247.

See also the codified language for SB 247 in the Public Utility Code, Division 4.1, Chapter 6:

8386.6(a): All electrical line clearance tree trimmers performing work to comply with the vegetation management requirements in an electrical corporation's wildfire mitigation plan shall be qualified line clearance tree trimmers, or trainees under the direct supervision and instruction of qualified line clearance tree trimmers, as provided in the High-Voltage Electrical Safety Orders (Group 2 (commencing with Section 2700) of Subchapter 5 of Chapter 4 of Division 1 of Title 8 of the California Code of Regulations) of the Department of Industrial Relations.

8386.6(b): All qualified line clearance tree trimmers shall be paid no less than the prevailing wage rate for a first period apprentice electrical utility lineman as determined by the Director of Industrial Relations.

(Added by Stats. 2019, Ch. 406, Sec. 2. (SB 247) Effective January 1, 2020.)

[12] *See* Exhibit SCE-24, Supplemental Testimony on Vegetation Management. SCE submitted this supplemental testimony on July 1, 2020.

[13] D.21-08-036 at p. 183.

[14] D.21-08-036*,* Conclusions of Law (COL) 68.

[15] D.21-08-036 at p. 183.

Wildfire Mitigation/Vegetation Management (2021 WM/VM) application in June 2022, which sought a reasonableness review of incremental costs above the 115% soft cap that were incurred in 2021.[16]

Additionally, in April 2020 the Commission increased the three-year GRC cycle to four years.[17] Pursuant to the Commission's ruling, in May 2022 SCE filed its 2021 GRC Track 4 Application (Track 4) to provide a forecast for 2024.[18] SCE's 2024 O&M forecast for Vegetation Management was approximately $445 million and was based on its last-recorded-year costs from 2021 rather than the 2021 funding levels authorized in Track 1. SCE contends that the Track 1-authorized amounts are insufficient to support Vegetation Management activities in 2024 as they do not reflect the implementation of SB 247, rising market labor rates, new wildfire mitigation activities, newly identified emergent work, expansion of the Structure Brushing program, and increased LiDAR activities, among other factors. Note that due to the use of dissimilar forecast methodologies, this GRC's 2024 forecast for Vegetation Management work activities differs to varying degrees from the 2024 forecasts in Track 4.

In this testimony, despite different underlying forecast methodologies, SCE's Vegetation Management forecast amounts for the 2025 Test Year more closely align with the requests in both the 2021 WM/VM filing (reflecting 2021 recorded costs) and the Track 4 Application (providing 2024 forecasts), compared to the amounts authorized in the 2021 GRC Track 1 Final Decision. These amounts more accurately reflect current market conditions as well as the program's development and maturation over time. Decisions on both the 2021 WM/VM and Track 4 are still pending as of the time of this 2025 GRC filing.

b) SCE's 2022 Risk Assessment Mitigation Phase

In May 2022, SCE filed its 2022 Risk Assessment Mitigation Phase (RAMP) application, which provides a detailed risk discussion and analysis concerning SCE's significant efforts to mitigate the risk of wildfires associated with SCE equipment. As part of the 2022 RAMP Application, SCE's Vegetation Management Program is discussed in Chapter 4 – Wildfire and PSPS.

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16 On July 3, 2022, the Commission approved Advice 4807-E dated June 3, 2022, for recovery of vegetation management costs in the VMBA up to 115% of the 2021 soft cap, as authorized in D.21-08-036 Ordering Paragraph (OP) 14. For SCE's cost recovery of vegetation management costs above 115% of the soft cap, see Footnote 6.

17 *See* the Amended Scoping Memo and Ruling of Assigned Commissioner and Assigned Administrative Law Judges, dated April 17, 2020.

18 *See* A.19-08-013 Tr. 4-02, SCE's 2021 GRC Track 4 direct testimony containing SCE's vegetation management cost recovery request for 2024.

SCE included four RAMP controls related to Vegetation Management: the Hazard Tree Management Program, Expanded Pole Brushing, Dead and Dying Tree Removal Program, and Expanded Line Clearing, as well as one foundational activity, Technology Solutions (Arbora).[19]

Table I-5 below shows the mapping of GRC activities to the associated RAMP risk chapter.[20]

Table I-5
Mapping of Vegetation Management GRC Activities to RAMP Control / Mitigation / Foundational Activity[21]

RAMP Risk	GRC Activity	2022 RAMP ID	2022 RAMP Control / Mitigation / Foundational Activity
Wildfire	Wildfire Vegetation Management	C16	Hazard Tree Management Program
Wildfire	Routine Vegetation Management	C17	Expanded Pole Brushing
Wildfire	Dead, Dying and Diseased Tree Removal	C18	Dead and Dying Tree Removal Program
Wildfire	Routine Vegetation Management	C19	Expanded Line Clearing
Wildfire	Wildfire Mitigation and Vegetation Management Technology Solutions	F2	Arbora

In this volume, SCE describes any variance in costs between the 2022 RAMP submission and the 2025 GRC in Section II.B.1.b)(3) for Expanded Line Clearing, Section II.B.2.a)(3) for Hazard Tree Management Program, Section II.B.2.b)(3) for the Dead and Dying Tree Removal Program, Section II.B.3.c) for Structure Brushing, and Section III.A.3 for Technology Solutions.

c) SCE's 2022 Wildfire Mitigation Plan

On July 20, 2022, the Office of Energy Infrastructure Safety (OEIS) approved SCE's 2022 Wildfire Mitigation Plan (WMP) Update. The 2022 WMP Update identified goals,

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[19] Safety Policy Division (SPD) requested that SCE's risk modeling include compliance-based programs. While SCE disagrees that this showing is required by the S-MAP Settlement Agreement, SCE provides the Risk Spend Efficiencies (RSE) for Distribution and Transmission Routine Line Clearing programs in WP SCE-04, Vol. 05 Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[20] For additional information on the Wildfire risk, please see Exhibit SCE-04, Vol. 05.

[21] SCE defines a RAMP Control as an activity that was undertaken prior to 2021 to address the RAMP Risk and which may continue through the RAMP period. SCE defines a RAMP Foundational Activity as an initiative that supports or enables two or more mitigation programs or two or more risks, but that does not directly reduce the consequences or likelihood of safety risk events. In accordance with D.21-11-009, Ordering Paragraph 1e, p. 11, RSE calculations for Foundational Activities are not required. However, the estimated budget, subject to certain thresholds, should be incorporated into the mitigation programs that the Foundational Activities enable.

presented risk analyses, and provided descriptions of several Vegetation Management initiatives used to mitigate wildfire risk. These initiatives include Routine Vegetation Management, the Hazard Tree Program (which encompasses both HTMP and the Dead and Dying Tree Removal Program), LiDAR, and Expanded Pole Brushing.[22] SCE discusses the goals and targets related to each of these initiatives in more detail in Section II below.

d) SCE's 2023 Wildfire Mitigation Plan

In March 2023, SCE filed its 2023-2025 WMP covering the period 2023 through 2025. This GRC testimony provides forecasts of the O&M expenses and capital expenditures necessary to achieve the goals, objectives, and targets set forth in SCE's 2023 WMP. SCE anticipates a draft decision from OEIS in Q3 of 2023.

B. Overview of Vegetation Management Testimony

Since the last GRC cycle, SCE has made significant progress in improving its Vegetation Management programs. At the same time, SCE faces numerous demands as the scale and scope continue to grow; higher labor costs and market forces exert upward pressure on prices; and emerging technologies present both opportunities and challenges.

Below, SCE highlights major changes to the Vegetation Management programs and notable achievements since the 2021 GRC application was submitted in August 2019. SCE then describes several overarching themes observed over the past few years, which are echoed in the testimony that follows and which help inform the assumptions, estimates, and trends that Vegetation Management incorporates into its forecasts.

1. Major Changes and Notable Achievements Since the Last GRC

Since the 2021 GRC application, SCE has continued to refine its foundational program of Routine Vegetation Management. In addition, SCE has adopted new wildfire mitigation-focused initiatives as part of the three-year WMP filed in 2020, as well as the subsequent 2021 and 2022 WMPs. SCE plans to build upon these efforts as reflected in the recently-filed 2023 WMP covering the 2023 through 2025 time period, and provides forecasts in this GRC of the costs required to continue this planned work over the 2025 through 2028 time period.

[22] In 2022, SCE renamed its Expanded Pole Brushing program to Structure Brushing as the program now encompasses both sub-transmission towers and distribution poles.

a) Major Changes

Additional Vegetation Management activities introduced in the past several years include: Expanded Line Clearing; Hazard Tree Assessments; Expanded Structure Brushing in High Fire Risk Areas (HFRA); Light Detecting and Ranging (LiDAR) inspections along transmission and distribution circuits; increased quality control processes; increased Seasonal Patrols, including Areas-of-Concern (AOC) during the summer and fall months; expanded Environmental Support Division (ESD) programs, and other measures. These actions exceed the scope of SCE's historical Vegetation Management operations and were approved by CPUC's Wildfire Safety Division and OEIS, its successor agency, as necessary to meet the ongoing threats of catastrophic wildfires. Increasing the scope and quality of these programs has been an important building block to SCE's success.

b) Notable Achievements

SCE's vegetation management programs have made significant contributions to the reduction in vegetation-related public safety incidents and ignitions. Several key components are highlighted below.

Tree-Caused Circuit Interruptions: As a primary illustration of SCE's progress, SCE has experienced a dramatic reduction in the number of Tree-Caused Circuit Interruptions (TCCIs) over the past several years. Since the advent of SCE's Expanded Line Clearing (seeking to achieve the expanded recommended clearance distances set forth in the HFTD Decision and Appendix E of GO 95, Rule 35) and the introduction of the HTMP in 2019, SCE has seen a significant decrease in outages associated with vegetation-caused events. This information was reported in the 2022 WMP Progress Report Working Group Update and is reflected in Table I-6, below.

Table I-6
TCCIs Pre- and Post-Expanded Line Clearing and HTMP[23]

	Pre-Expanded Line Clearing and HTMP Average of Annual TCCIs (2015-2019)	Post-Expanded Line Clearing and HTMP TCCIs in 2022	Difference
HFTD	141	66	-53%
Non-HFTD	320	160	-50%
All	461	226	-51%

At-Risk Species: Part of SCE's success in reducing TCCIs is due to adapting its approach to certain at-risk tree species as part of a larger effort to prioritize work based on risk. For example, both SCE personnel and contractor field crews are instructed to factor tree growth rates and tree risk attributes into the decision-making process when prescribing trims or removals. SCE has paid special attention to palms, which make up approximately 6% of SCE's overall inventory but are responsible for almost 45% of TCCIs and drive a significant portion of off-cycle trims and emergency work. In 2021, SCE introduced its Palm Removal Program to help further mitigate the risk of vegetation-related ignitions and faults. SCE currently has an inventory of approximately 95,000 palms and has removed over 20,000 palm trees posing potential blow-in or grow-in hazards since 2021.

Tree Risk Index (TRI): While the expansion of programs has been successful, further improvement will require increasing levels of sophistication and precision to understand and target the drivers of faults and ignitions caused by vegetation contact. Accordingly, SCE has laid the foundation for that through the development of the Tree Risk Index (TRI) model in 2021. As further described in Section II.B.2.a)(1)(a) below, the TRI model assigns risk categories to geographic locations based on the level of risk posed by vegetation contact to overhead equipment in that location. In 2022, SCE began using the TRI model to prioritize work for HTMP inspections, Routine Line Clearing inspections and quality control, and supplemental patrols. Starting in 2023, SCE plans to utilize an updated TRI model that aligns with the risk prioritization used in the Integrated Grid Hardening Strategy

[23] SCE provides TCCI data from its 2023 WMP. SCE's TCCI data includes grow-in, blow-in and fall-in events with six total fault type categories: Grow-In, Blow-In, Fall-In, Human Caused, No Cause/Not tree related, and Uncategorized. This data excludes Human Caused and No Cause/Not tree related recorded events. SCE has maintained data for annual outages since 2015 and for expanded line clearing since 2020. While SCE began implementing expanded line clearing in 2019, "post-expanded line clearing" is focused on 2022, in consideration of the time required to execute and advance expanded clearance work across SCE's HFTD. December 2022 TCCI data is subject to change pending final verification.

for other wildfire mitigation programs such as asset inspections and grid hardening. Going forward, SCE may be able to use risk-based analysis and prioritization to adjust the frequency of inspections, increase clearance distances, and/or increase resources in higher risk areas.

2. Recent Themes and Trends in Vegetation Management

Despite many accomplishments, SCE's successes have been hard won. Below we describe several of the broader trends and themes underpinning SCE's Vegetation Management activities over the past few years, and which will influence the direction going forward. Based on recent experience, SCE expects the Vegetation Management program to continue to face increased regulatory requirements, economic headwinds, and technological challenges as it seeks to constantly adapt and respond to competing demands and the adverse effects of climate change.

a) Expanded Scale and Scope

Many of the California IOUs' Vegetation Management programs have expanded over the past several years to address increased system risks. In the late 2010s, significant threats posed by wildfires and extended drought prompted SCE to act with urgency to improve and enhance its routine Vegetation Management practices, as well as to create new wildfire mitigation-focused initiatives.

In Section I.B.1.a) above, SCE identified several Vegetation Management programs that were newly introduced or that had expanded and evolved to become more comprehensive since the last GRC cycle. With larger programs and higher volumes, there is more work generated that needs to be risk-prioritized, scheduled, performed, and reviewed. An expanded scope also necessitates more environmental support, customer coordination, and agency engagement. In the testimony that follows, this overall trend can be seen in the historical variance analyses from 2019 to 2022, as well as the forecasts from 2023 to 2028. Although some programs start to level off or approach a steady state as they reach maturity, most experience expansion and growth over time as new initiatives are implemented and rolled out.

b) Increased Expenses

Alongside the higher volumes and increased workload associated with a larger program, SCE has experienced rising costs for Vegetation Management. SB 247, enacted in 2020, resulted in California utilities experiencing a significant increase to the hourly pay rate of their contract tree trimmers, and consequently the cost of all related contract personnel. In addition to the direct and indirect impacts of SB 247, increased demand for vegetation management services throughout the state has also raised wages. Due to the high cost of doing business, as well as potential wildfire liabilities,

many vegetation management contractors are reluctant to operate in California or have scaled back their services. On a macroeconomic level, record-high inflation and record-low unemployment mean SCE is competing with other utilities as well as employers in other industries for a limited labor supply. SCE pursues competitive bids to ensure the best possible value for customers.

All of these factors have driven up mitigation costs, which comprise the bulk of SCE's Vegetation Management forecasts. In addition, it can be difficult to attract and retain high quality vegetation management inspectors, particularly at the lower end of the pay scale. In this 2025 GRC testimony, many of the forecasts incorporate contractor wage rate increases in 2024 or 2025 to account for this new economic reality. SCE has also implemented a strategy to revise contractor requirements to promote upskilling and retention among the inspector workforces. This includes a structure that directly aligns pay with increasing inspector skills, qualifications, education, and experience. In addition to improving performance, this has the benefit of reducing turnover by creating meaningful career progression options, which lowers costs for hiring and training new inspectors on a regular basis.

c) <u>Process and Technology Transitions</u>

Finally, SCE continues to innovate and adapt new technologies and techniques for performing Vegetation Management. In this GRC cycle, SCE describes the consolidation of inspections for the Routine Vegetation Management and Hazard Tree Program (which comprises the Hazard Tree Management Program (HTMP) and Dead & Dying Tree Removal Program). This consolidated inspection strategy should help improve work efficiencies and lay the foundation for future improvements in the identification of hazards.

In addition, the consolidated inspection strategy sets the stage for all Vegetation Management programs to be conducted on a circuit-basis, which will allow for greater use of remote sensing technologies in future years. Currently, SCE relies primarily on ground-based inspections for its Vegetation Management programs. Distribution assets are primarily worked on a grid-basis, while Transmission assets are primarily worked on a circuit-basis. In the last GRC cycle, SCE began to fly LiDAR along certain Transmission circuits and began testing the use of LiDAR and other remote sensing technologies such as satellite for conducting inspections and developing mitigation prescriptions. In 2023, SCE plans to conduct all inspections for both Distribution and Transmission assets on a grid-basis, and then transition all inspections to a circuit basis by 2025. By consolidating the inspection strategy and transitioning all work to a circuit-based framework, SCE should be able to derive more value from remote sensing capabilities, and ultimately move toward more technology-oriented

inspections. In 2025, SCE plans to perform remote sensing inspections across the entire territory while continuing ground inspections side-by-side to validate the remote sensing inspection results and map them to tree inventory. If results are satisfactory, SCE intends to gradually reduce the level of ground inspections by 2028.

II.

VEGETATION MANAGEMENT O&M FORECASTS

A. Summary of O&M Forecasts

Table II-7 below shows the recorded and forecast O&M expenses for Vegetation Management activities from 2018 to 2025.

Table II-7
Summary of O&M Expenses for Vegetation Management
Recorded and Forecast O&M Expenses (2018-2022) and
Forecast O&M Expenses (2023-2025)
(Normalized Test Year 2025)[24]
(Constant 2022 $000)

	Recorded					Forecast		
	2018	2019	2020	2021	2022	2023	2024	Normalized 2025
Routine Vegetation Management								
Inspections								
Traditional Ground Inspections	$10,766	$46,101	$52,152	$45,924	$40,706	$54,947	$63,229	$37,337
Remote Sensing	$0	$5,340	$5,046	$5,616	$3,086	$5,994	$7,315	$55,713
Routine Line Clearing	$131,843	$278,425	$378,603	$348,807	$328,564	$333,911	$348,479	$347,778
Weed Abatement / Fuel Management	$0	$0	$0	$2,084	$3,921	$7,670	$8,788	$9,789
Seasonal Patrols / AOC / Emergent Work	$8,479	$16,073	$26,859	$29,073	$25,641	$38,780	$41,583	$49,588
Hazard Tree Program								
Hazard Tree Management Program	$6	$14,904	$54,127	$29,141	$15,366	$36,634	$50,088	$44,579
Dead, Dying and Diseased Tree Removal	$39,365	$29,743	$31,490	$11,949	$19,362	$24,775	$27,707	$30,204
Structure Brushing	$0	$3,986	$13,782	$14,650	$10,811	$23,859	$26,013	$26,254
Quality Control	$0	$1,237	$5,067	$3,710	$5,523	$10,832	$11,854	$12,718
Environmental Support for Vegetation Management Programs	$0	$0	$0	$23,774	$40,317	$40,171	$44,400	$48,978
Vegetation Management O&M Sub-Total	**$190,458**	**$395,808**	**$567,125**	**$514,728**	**$493,296**	**$577,572**	**$629,457**	**$662,939**
Technology Solutions O&M Sub-Total	**$0**	**$0**	**$1,162**	**$666**	**$3,286**	**$3,726**	**$3,845**	**$3,731**
GRAND TOTAL	**$190,458**	**$395,808**	**$568,287**	**$515,394**	**$496,582**	**$581,297**	**$633,302**	**$666,669**

[24] The respective recorded and forecast O&M expenses can be found in Figure II-5 for Ground Inspections, Figure II-6 for Remote Inspections, Figure II-11 for Routine Line Clearing, Figure II-12 for Fuel Management and Weed Abatement, Figure II-13 for Seasonal Patrols, Areas-of-Concern, and Emergent Work, Figure II-15 for HTMP, Figure II-16 for Dead and Dying Tree Removal, Figure II-19 for Structure Brushing, Figure II-20 for Quality Control, Figure II-21 for Environmental Support, and Figure III-22 for Technology Solutions.

In Section II.B below, SCE provides O&M forecasts for the following GRC activities: (1) Routine Vegetation Management;[25] (2) the Hazard Tree Program, which includes both the Hazard Tree Management Program (HTMP) and the Dead and Dying Tree Removal Program; (3) Structure Brushing; (4) Quality Control; and (5) Environmental Support. Within each program or sub activity, SCE sets forth the (a) Work Description and Need; (b) Historical Variance Analysis; (c) RAMP Integration (if applicable); and (d) Basis for Forecast.

In Section III below, SCE forecasts O&M expenses and capital expenditures for Vegetation Management Technology Solutions.

B. Vegetation Management O&M Forecasts

1. Routine Vegetation Management

SCE provides the summary of O&M expenses by work type for Routine Vegetation Management in Table II-8 below.

Table II-8
Summary of O&M Expenses for Routine Vegetation Management
Recorded O&M Expenses (2018-2022) and
Forecast O&M Expenses (2023-2025)[26]
(Constant 2022 $000)

	Recorded					Forecast		
	2018	2019	2020	2021	2022	2023	2024	Normalized 2025
Routine Vegetation Management								
Inspections								
Traditional Ground Inspections	$10,766	$46,101	$52,152	$45,924	$40,706	$54,947	$63,229	$37,337
Remote Sensing	$0	$5,340	$5,046	$5,616	$3,086	$5,994	$7,315	$55,713
Routine Line Clearing	$131,843	$278,425	$378,603	$348,807	$328,564	$333,911	$348,479	$347,778
Weed Abatement / Fuel Management	$0	$0	$0	$2,084	$3,921	$7,670	$8,788	$9,789
Seasonal Patrols / AOC / Emergent Work	$8,479	$16,073	$26,859	$29,073	$25,641	$38,780	$41,583	$49,588
GRAND TOTAL	**$151,088**	**$345,939**	**$462,660**	**$431,504**	**$401,918**	**$441,301**	**$469,395**	**$500,205**

SCE performs Routine Vegetation Management in its distribution and transmission networks to comply with regulatory requirements, such as CPUC GO 95, California Public Resources

[25] Routine Vegetation Management comprises (1) Inspections (including Ground Inspections and Remote Sensing); (2) Mitigations (Trims and Removals); (3) Weed Abatement and Fuel Management; and (4) Seasonal Patrols, Areas-of-Concern, and Emergent Work.

[26] The respective recorded and forecast O&M expenses can be found in Figure II-5 for Ground Inspections, Figure II-6 for Remote Sensing, Figure II-11 for Routine Line Clearing, Figure II-12 for Fuel Management and Weed Abatement, and Figure II-13 for Seasonal Patrols, Areas-of-Concern, and Emergent Work.

Code §4292 and §4293, and FERC-jurisdictional FAC-003-4, as well as to proactively mitigate wildfire risks.

Routine Vegetation Management is typically conducted on a planned annual cycle, and with respect to most activities, proceeds through the following stages: 1) first, an inspection, leading to a prescription for mitigation where necessary;[27] 2) second, completion of planned mitigation (e.g., trimming or removal,[28] weed abatement,[29] and/or fuel management);[30] 3) and third, quality control by both an internal SCE arborist and an independent contractor to verify that mitigations have been completed and conform to required standards.[31] Routine Vegetation Management also includes work that operates on a fluctuating schedule, such as seasonal patrols and Areas-of-Concern (AOC), commonly in advance of wildfire season in HFRA, or on an unplanned basis to mitigate emergent risks.[32]

In this Section II.B.1 encompassing Routine Vegetation Management, SCE describes the following activities: (1) Inspections, which includes both traditional Ground Inspections and Remote Sensing; (2) Mitigations, comprised of trims and removals for the Routine Line Clearing program; (3) Weed Abatement and Fuel Management; and (4) Seasonal Patrols, Area-of-Concern (AOC), and Emergent Work. This roughly mirrors the order in which work proceeds from the inspection stage to the mitigation stage in the field, including both pre-planned scheduled work and unplanned emergent work.

a) Routine Vegetation Management Inspections

In this section, SCE describes the inspection process for its Routine Vegetation Management programs during this GRC cycle. First, SCE discusses the Work Description and Need, Historical Variance Analysis, and Basis for Forecast for Traditional Ground Inspections. Next, SCE discusses the Work Description and Need, Historical Variance Analysis, and Basis for Forecast for Remote Sensing, which includes both LiDAR and satellite technologies. Last, SCE describes various improvements to its inspection process, including (a) the consolidated inspection strategy which integrates inspections across SCE's Vegetation Management programs (excluding Structure Brushing);

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27 *See* Section II.B.1.a) for more details on SCE's vegetation management inspections program.

28 *See* Section II.B.1.b) for planned trimming and removing and Section II.B.1.d) for unplanned emergent work.

29 *See* Section II.B.1.c) for weed abatement.

30 *See* Section II.B.1.c) for fuel management.

31 *See* Section II.B.4 for quality control.

32 *See* Section II.B.1.d) for seasonal patrols, Areas-of-Concern, and emergent work.

(b) inspector workforce development; (c) additional oversight of inspection work; and (d) the increased use of remote sensing and associated reduction in ground inspections.

For the purposes of the GRC forecast, SCE has assumed the use of remote sensing as the primary method for inspections for Routine Line Clearing, the Hazard Tree Program, and seasonal patrols with a gradual reduction in traditional ground inspections in 2025 through 2028. However, regardless of the primary inspection method to be used (either principally remote sensing or ground inspections), SCE forecasts overall costs for inspections of approximately $93 million annually.[33]

SCE provides a summary of O&M expenses for Routine Vegetation Management Inspections in Table II-9 below.

Table II-9
Summary of O&M Expenses for Routine Vegetation Management Inspections
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[34]
(Constant 2022 $000)

	Recorded					Forecast		
	2018	2019	2020	2021	2022	2023	2024	2025
Traditional Ground Inspections	**$10,766**	**$46,101**	**$52,152**	**$45,924**	**$40,706**	**$54,947**	**$63,229**	**$37,337**
Ground Inspections - Routine	$4,289	$31,803	$33,572	$30,924	$29,662	$54,947	$63,229	$37,337
Hazard Tree Inspections	$0	$4,596	$5,781	$8,359	$6,002	$0	$0	$0
Dead & Dying Tree Removal	$6,476	$9,701	$12,799	$6,640	$5,042	$0	$0	$0
Remote Sensing (LiDAR, Satellite)	**$0**	**$5,340**	**$5,046**	**$5,616**	**$3,086**	**$5,994**	**$7,315**	**$55,713**
Totals	**$10,766**	**$51,441**	**$57,198**	**$51,540**	**$43,792**	**$60,940**	**$70,545**	**$93,050**

Inspection costs for the Hazard Tree Management Program (HTMP) and the Dead and Dying Tree Removal Program are included here with Routine Vegetation Management to reflect

[33] If the full remote sensing strategy is not authorized, SCE provides an alternative normalized forecast of approximately $89 million annually for inspection costs. This alternative forecast would allow SCE to execute its inspection programs for compliance and wildfire mitigation purposes if full remote sensing is not authorized. In the alternative forecast, SCE includes an inspections program comprising primarily ground inspections supporting Routine Line Clearing, the Hazard Tree Program, and seasonal patrols, supplemented by remote sensing, in 2025 through 2028. The resulting normalized alternative Test Year forecast is $73 million for ground inspections, $11 million for remote sensing, and an incremental $5 million for inspections supporting seasonal patrols.

See WP SCE-02, Vol. 10, pp. 4-5 – Alternative Forecast O&M Expenses Workpaper for Inspections.

[34] The respective recorded and forecast O&M expenses can be found in Figure II-5 for Traditional Ground Inspections and Figure II-6 for Remote Sensing.

SCE's consolidated inspection strategy.[35] However, the Work Description and Need for HTMP inspections can be found in Section 2.a)(1)(a), and in Section 2.b)(1)(a) for the Dead and Dying Tree Removal Program, respectively. All aspects of the Structure Brushing program are discussed separately in Section II.B.3.c).

(1) Traditional Ground Inspections

(a) Work Description and Need

SCE's distribution and transmission lines have traditionally been inspected annually by ground-based inspectors for compliance with state and federal vegetation management requirements. During these Routine Vegetation Management inspections, the inspector identifies vegetation that requires trimming or removal to meet program requirements regarding vegetation clearance distances from the lines. In performing inspections and prescribing mitigations, inspectors consider a tree's anticipated growth over the ensuing twelve months. Additionally, inspectors investigate emergent vegetation concerns raised by customers and address inspection findings requiring immediate planning or schedule coordination to mitigate the work point.

In the second quarter of 2023, SCE began the implementation of its consolidated inspection strategy, further described in Section II.B.1.a)(3)(a) below. At that time, inspection costs for Routine Vegetation Management, HTMP, and the Dead and Dying Tree Removal Program will begin recording in the same account shown as "Traditional Ground Inspections" in Table II-9 above.

With the implementation of wide-scale remote sensing, SCE expects a reduced need for ground inspections. In 2025, the full scope of ground inspections will be used to begin validating the remote sensing results on tree-to-conductor clearance and mapping the remote sensing data to SCE's tree inventory. Thereafter, the ground inspections will be necessary primarily to identify hazard tree conditions, conduct ground inspections at locations that are blocked from aerial views necessary for remote sensing (e.g., overhanging tree limbs), and respond to emergent concerns raised by customers.

(b) Historical Variance Analysis

Table II-10 shows the recorded O&M expenses for each ground inspection program from 2018 through 2022.

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[35] *See* WP SCE-02, Vol. 10, pp. 6-8 – Recorded O&M Expenses Workpaper for Inspection for the Hazard Tree Program.

Table II-10
Recorded O&M Expenses for Ground Inspections[36]
(2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Ground Inspections					
Routine Line Clearing	$4,289	$31,803	$33,572	$30,924	$29,662
Hazard Tree Inspections	$0	$4,596	$5,781	$8,359	$6,002
Dead & Dying Tree Removal Inspections	$6,476	$9,701	$12,799	$6,640	$5,042
Totals	**$10,766**	**$46,101**	**$52,152**	**$45,924**	**$40,706**

For Routine Line Clearing, traditional ground inspection costs grew from 2018 to 2019, then remained relatively flat. In 2018, SCE inspected approximately 990,000 trees. In 2019, SCE inspected approximately 1.2 million trees. The increased costs in 2019 reflect a higher-than-expected level of work being charged to time and expense (T&E) rates; however, the increase also reflects some 2018 work recording in 2019. In 2020, routine inspection costs increased primarily due to the commencement of a new contract cycle, as well as emergent work paid on T&E rates. In 2021 and 2022, SCE inspected volumes of approximately 1.4 and 1.5 million trees, respectively. SCE's routine inspection costs leveled off as most of the work performed was covered under lump sum contracts.

For HTMP, SCE began performing inspections in 2019, with costs charged on T&E rates. Because inspectors only record inspections for those trees with the potential to strike SCE's equipment, and both terrain and tree density can vary, there is not a direct correlation between the number of inspections and the amount paid via the T&E rates. In 2019, SCE conducted approximately 126,000 HTMP inspections. In 2020, SCE conducted approximately 96,000 HTMP inspections due to a constrained supply of inspectors. However, recorded costs increased due to the use of additional contracting companies who had higher contract rates and incremental requirements added to each assessment. SCE required additional contracting companies in 2020 because the existing

[36] *See* WP SCE-02, Vol. 10, pp. 6-8 – Recorded O&M Expenses Workpaper for Inspections for the Hazard Tree Program and Footnote 4139 for the reference to the standard workpaper for Traditional Ground Inspections recorded costs.

contractors were not able to staff the number of certified inspectors required to meet the schedule requirements. In 2021, SCE conducted approximately 129,000 HTMP inspections. During that year, the program operated in mountainous areas with a large volume of trees having the potential to strike SCE's lines. Each tree with potential to strike was assessed, necessitating high numbers of inspectors and total hours.[37] In 2022, SCE conducted approximately 26,000 HTMP inspections and substantially completed a first pass of all of SCE's HFRA. Costs decreased slightly as the program was scheduled to inspect lower risk, lower tree density areas that year.

For the Dead and Dying Tree Removal Program, inspection costs varied due to changes in scheduling and volume. From 2018 through 2020, the inspection schedule was structured such that that each circuit was patrolled at least three times annually. During this time, inspection costs fluctuated based on the total number of inspection cycles, contractor rates, and staffing requirements. Additionally, the increase in 2020 is attributed to SCE onboarding an additional inspection vendor. In 2021, SCE's inspection schedule for the Dead and Dying Tree Removal Program shifted to all circuits being inspected at least once per year. SCE was able to reduce its inspection volume based on the number of dead trees identified in previous patrols and/or exposure to wildfire.[38]

(c) Basis for Forecast

For Traditional Ground Inspections, SCE forecasts normalized O&M expenses of $37.337 million for Test Year 2025.[39] SCE utilizes an itemized forecast methodology to develop this forecast.

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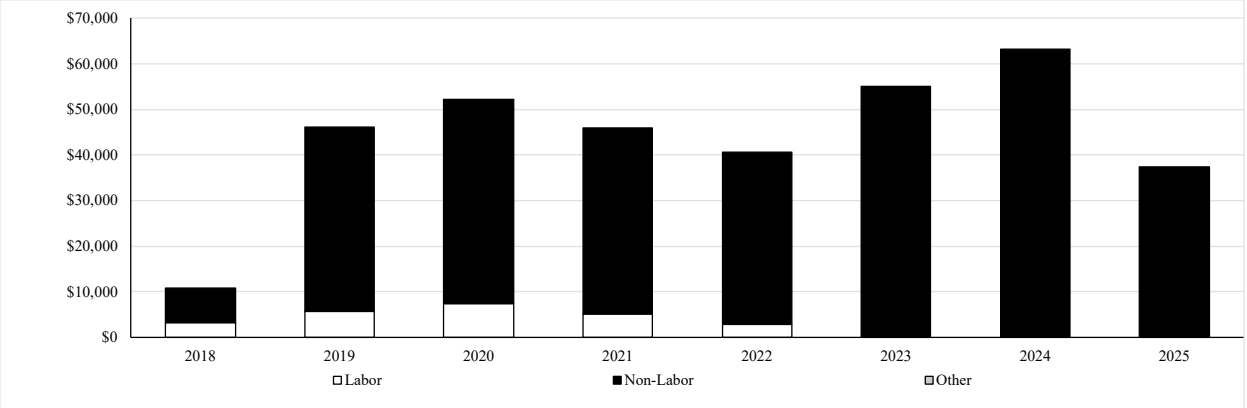
[37] Rates in this labor market were impacted by the unionization of PG&E's inspectors.

[38] However, multiple passes may still be performed based on increased mortality and/or if potential wildfire risks are identified by SCE's Senior Specialists.

[39] *See* WP SCE-02, Vol. 10, pp. 9-10 – Forecast O&M Expenses Workpaper for Traditional Ground Inspections.

Figure II-5
Forecast O&M Expenses for Traditional Ground Inspections
Recorded Costs (2018-2022)[40] and Forecast Costs (2023-2025)[41]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$3,244	$5,687	$7,427	$5,148	$2,848			
Non-Labor	$7,521	$40,414	$44,725	$40,775	$37,858	$54,947	$63,229	$37,337
Other								
Total Expenses	**$10,766**	**$46,101**	**$52,152**	**$45,924**	**$40,706**	**$54,947**	**$63,229**	**$37,337**

In 2022, SCE requested contractors submit bids in the form of a lump sum by geographic zones, sized by an estimated number of inspections, and taking into consideration inspector workforce development (described in Section II.B.1.a)(3)(b)) and the new centralized inspection strategy (described in Section II.B.1.a)(3)(a)). For this GRC cycle, SCE does not apply a unit cost to develop the forecast, but rather a lump sum cost for all Traditional Ground Inspection work, with an 8% T&E adder cost based on the historical average. In both 2024 and 2025, SCE forecasts a 15% market rate increase to reflect costs required to retain and upskill its inspector

[40] This table shows recorded costs for inspections supporting Routine Line Clearing, Dead and Dying Tree Removal Program and HTMP.

[41] A $4.0 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to Exhibit SCE-06, Vol. 04.

Also, *see* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 17-22 – O&M Detail for Transmission Routine Vegetation Management, and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activity "Pre-Inspection".

workforce.[42] In 2026, the Traditional Ground Inspections forecast reduces to 50% of 2025 levels. In 2027, the forecast reduces to 35% of 2025 levels, and in 2028, the forecast reduces to 20% of 2025 levels. This decrease in Traditional Ground Inspection costs is associated with an increase in Remote Sensing activities over the same period, as SCE anticipates the use of more remote sensing to begin replacing ground inspections for clearance distance starting in 2026. If SCE's Remote Sensing Test Year request shown below in Section II.B.1.a)(2) is not fully approved, SCE would require approximately $89 million annually (constant 2022 dollars) for Traditional Ground Inspections.[43]

(2) Remote Sensing

(a) Work Description and Need

Remote sensing differs from traditional ground inspections in that it relies on technology to determine the distance between SCE's electrical equipment and the nearby vegetation. SCE initially identified remote sensing as useful to facilitate accurate inspections of areas that are difficult or time-consuming for "boots on the ground" crews to access, such as hard-to-reach mountainous areas or remote parts of the desert. Given remote sensing's historically high cost-per-mile and the need to couple it with ground inspections, SCE has limited its use to where it is necessary to supplement the limitations of the human eye. However, as the technology improves and the costs are reduced, its high accuracy warrants consideration as the primary form of inspection for clearance requirements.

SCE has currently operationalized the use of remote sensing in the form of LiDAR technology to inspect select transmission and sub-transmission lines to maintain appropriate clearances between SCE's lines and vegetation in accordance with FAC 003-4, GO 95, Rule 35, and PRC § 4293. SCE also uses LiDAR technology in limited instances for distribution where the work can be bundled by circuit, such as for AOC. Finally, SCE is testing the use of satellite technology as a supplement or alternative to LiDAR.

[42] *See* Section II.B.1.a)(3)(b) for more details on the development of SCE's inspector workforce.

[43] *See* WP SCE-02, Vol. 10, pp. 4-5 – Alternative Forecast O&M Expenses Workpaper for Inspections.

(i) LiDAR for Transmission

Implementation of LiDAR for Bulk Transmission Lines was a 2019 WMP initiative, and the use of LiDAR was operationalized using the class ranking system.[44] The success of the initiative demonstrated the effectiveness of using LiDAR for transmission inspections.

LiDAR is a surveying inspection 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 are then used to make digital three-dimensional representations of field conditions at the time of survey. For transmission lines, SCE models the data against engineering information to calculate the maximum sag and sway of conductors (modeled conditions under maximum current load and maximum wind load) and compares the resulting conductor positions under those "worst case scenarios" to existing vegetation as determined by LiDAR for the purposes of determining where mitigation is required. SCE provides LiDAR data to ground inspectors conducting foot patrols on circuits, when available, to assist them in identifying potential encroachments and help them validate that right of way clearances fully account for conductor dynamics.

In 2022, SCE inspected approximately 3,700 transmission circuit miles using LiDAR and used the data in two different ways: 1) first, as described above and used since 2019, the LiDAR data aided traditional ground inspections by identifying trees with grow-in and fall-in potential under all conditions of conductor dynamics; and 2) second, the LiDAR data was used as the inspection itself, with ground inspectors deployed only to LiDAR-identified points on low inventory circuits (in lieu of inspecting entire circuits) to write prescriptions on specific trees or groups of trees. The latter method was a first step toward testing the implementation of the planned reduction in ground inspections.

In 2023, SCE continues to use LiDAR in the two ways described above, enabling more efficient use of resources. In 2024 and thereafter, SCE plans to re-evaluate the use of the class ranking system and develop a decision framework to leverage the strengths of the different types of remote inspections across the territory using quality and price tradeoffs. In 2025,

[44] The class ranking system is a schedule based on criteria for LiDAR surveys to be performed and the frequency that LiDAR is used on impacted Right of Ways within the SCE System, as described in SCE's UVM-06, Section 3.1.

although subject to the decision framework, SCE expects to collect LiDAR data on all transmission circuits as the basis for inspection.

(ii) LiDAR for Distribution

In 2022, SCE inspected approximately 1,600 distribution circuit miles using LiDAR, as LiDAR was successfully deployed to support AOC for the first time. This method was used as a quicker way to identify abnormal growth and unexpected risks. Inspectors were deployed to verify LiDAR points on the ground, and as a result of the accuracy of LiDAR measurements, did not have to inspect the entire circuit. In 2023 and 2024, SCE plans to continue using LiDAR for distribution assets in AOC.

The larger scale deployment of distribution LiDAR is dependent on SCE's transition of its inspection and mitigation schedule to align with circuits, as they would be flown for LiDAR, which is expected in 2024 - 2025. In 2025, subject to the decision framework using quality and price tradeoffs discussed above, SCE expects to collect LiDAR data on all distribution circuits as the basis for inspection. Further steps necessary to support the transition to distribution LiDAR are discussed in Section II.B.1.a)(3)(d) below.

(iii) Satellite

In 2022, SCE launched a pilot program to test the use of satellite technology in confirming the accuracy of vegetation clearances and identifying trees near overhead lines. This program also evaluated satellite's ability to identify the need for remediation on lower risk circuits using hyperspectral imaging to identify vegetation health, density, and species. A variety of transmission circuits were selected for this effort and results were validated against ground inspection data as well as LiDAR data.

Satellite technology is still evolving, and the imagery obtained can vary when it comes to quality and timing. While satellite has demonstrated some positive findings, the current centimeter resolution is not accurate enough to use the tool independent of ground verification at a wide scale. Market research has indicated higher resolution satellites will be launched by 2024, but SCE plans to continue conducting satellite-based inspection pilots to determine success against other technologies.

Based on the pilot program results, satellite technology is currently a viable solution for evaluating lower risk circuits and would prove less expensive than LiDAR for a single round of data collection based on current cost comparisons, because it would not require

helicopters. Satellite technology also promises the benefits of hyperspectral imagery, which can assess tree health based on patterns in leaf color. SCE plans to continue testing the facets of hyperspectral imagery to help inform future sequencing of inspection activities. Potential results may also determine viability as a companion to LiDAR or as a stand-alone solution.

(b) Historical Variance Analysis

Table II-11
Recorded O&M Expenses for Remote Sensing
(2018-2022)[45]
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Remote Sensing	$0	$5,340	$5,046	$5,616	$3,086
Totals	$0	**$5,340**	**$5,046**	**$5,616**	**$3,086**

SCE began incurring expenses related to remote sensing starting in 2019 for LiDAR. SCE did not incur expenses related to satellite during the historical period.

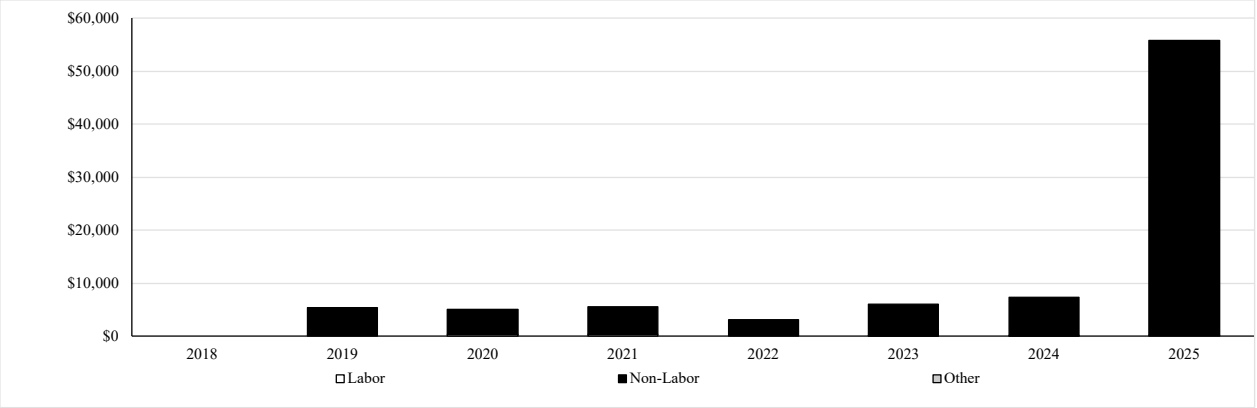
The historical variance year to year for LiDAR expenses is primarily due to changes in volume as determined by the class ranking system, which determines the frequency of surveys for circuits. Under the class ranking system, A circuits are flown every year, B circuits are flown every other year, C circuits are flown every three years, D circuits are flown every five years, and E circuits are flown every ten years. Between 2019 and 2022, SCE surveyed approximately 6,500, 1,500, 3,000, and 5,000 miles, respectively.

In 2020, SCE incurred higher unit costs for LiDAR as a result of increasing the LiDAR contractor base to respond to scheduling constraints. These additional contractors cost more on a per unit basis. In 2021, Vegetation Management's LiDAR scope was performed by dedicated contractors, lowering the unit costs. In 2022, SCE realized additional efficiencies that contributed to lower costs, such as improved project management coordination and consistent LiDAR technical collection and processing requirements across the company.

[45] *See* Footnote 4647 for the reference to the standard workpapers for Remote Sensing.

(c) Basis for Forecast

Figure II-6
Forecast O&M Expenses for Remote Sensing (2023-2025)
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[46]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$0	$179	$265	$281	$150	$1	$3	$178
Non-Labor	$0	$5,161	$4,781	$5,335	$2,936	$5,993	$7,312	$55,535
Other								
Total Expenses	$0	**$5,340**	**$5,046**	**$5,616**	**$3,086**	**$5,994**	**$7,315**	**$55,713**

For Remote Sensing, SCE forecasts normalized O&M expenses of $55.713 million for the Test Year.[47] SCE utilized an itemized forecast methodology to develop the forecast.

(i) Volume of Work

For LiDAR, SCE forecasts surveying 1,600 circuit miles for distribution assets in 2023. This is based on the 2022 AOC Seasonal Patrols volume, which was the

[46] A $3.1 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04.

Also, *see* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 17-22 – O&M Detail for Transmission Routine Vegetation Management, and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "LiDAR - D" and "LiDAR – T".

[47] *See* WP SCE-02, Vol. 10, pp. 32-35 – Forecast O&M Expenses Workpaper for Remote Sensing.

first time SCE utilized LiDAR extensively for distribution assets.[48] In 2024, SCE anticipates adding 500 miles for a total of 2,100 circuit miles.[49] For the transmission network, SCE forecasts surveying 6,900 circuit miles for each of 2023 and 2024. The transmission scope includes circuits scheduled according to the class ranking system, low inventory circuits, and primarily desert-located circuits.

For satellite, SCE forecasts surveying 1,000 circuit miles in 2023 as part of our ongoing pilot, with plans to expand by another 1,000 miles for a total of 2,000 miles in 2024. Additionally, SCE forecasts using satellite to evaluate conditions at approximately 100 sites for the Structure Brushing program in 2023 and 150 sites in 2024.

Starting in 2025, SCE forecasts using remote sensing for inspections on its entire network, comprising 60,000 circuit miles.[50] These remote sensing inspections will be based on a portfolio of technologies potentially including both LiDAR and satellite.[51] By 2025, SCE anticipates completing its transition from scheduling and performing Vegetation Management work on a grid-basis to a circuit-basis in order to enable the use of remote sensing on its entire network.

In 2026 and thereafter, SCE plans on maintaining remote sensing for inspection of its network, with an accompanying gradual reduction in traditional ground inspections.[52] SCE forecasts using remote sensing technologies to annually survey 60,000 circuit miles for each of the years 2026 through 2028.

(ii) Unit Cost Basis

In 2023 and 2024, SCE forecasts a unit cost of approximately $625 per circuit mile based on 2022 contract rates for LiDAR surveys, which comprises flight and data integration, processing, and analysis costs. For satellite costs, SCE bases its unit costs on

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[48] See Section II.B.1.d) for more details on AOC Seasonal Patrols.

[49] SCE plans to transition from a grid-based to circuit-based framework for inspections starting in 2024, with one of the results being the facilitation of the use of LiDAR and other remote sensing technology for inspecting SCE's network.

[50] SCE's network comprises approximately 48,000 distribution circuit miles and approximately 12,000 transmission circuit miles, for a total of 60,000 circuit miles.

[51] SCE is exploring advancements in both LiDAR and satellite technology in order to optimize its remote sensing portfolio. As LiDAR imagery and satellite accuracy improve, SCE will consider its use of both technologies.

[52] The circuit mile volume for remote sensing in 2025 in this GRC forecast differs from SCE's compliance-based target for 2025 in its 2023 WMP. SCE may provide target updates for 2025 in its 2024 WMP to incorporate further knowledge of remote sensing's potential to replace ground inspections.

recorded costs and volume as of third quarter 2022, which results in approximately $200 per circuit mile and $1,700 per site for structure brushing.[53]

In 2025 and thereafter, SCE forecasts a unit cost of approximately $811 per circuit mile for LiDAR, which includes flight costs, data processing costs, data analysis, project management, and other supporting activities. Some variability may result due to SCE potentially executing its own LiDAR work in-house, specifically for processing and data acquisition, which may reduce overall unit cost.

(3) Improvements to SCE's Inspection Program

(a) Consolidated Inspection Strategy

In 2023, SCE will introduce a new centralized tree inspection schedule for its two largest inspections programs: Routine Vegetation Management and Hazard Tree Program (which includes the Hazard Tree Management Program[54] and Dead & Dying Tree Removal Program). Inspection contracts will include all types of inspections within each vendor's scope.

Historically, SCE would hire different inspection contractors to conduct inspections for a specific Vegetation Management program (e.g., Routine Vegetation Management, HTMP, or Dead & Dying Tree Removal). As a result, in practice, when a contracted inspection company was conducting routine inspections in a particular area, the inspector would not specifically inspect tree populations that fell within another program's scope, such as hazard or dead and dying trees, even if those trees were located in the same area.[55]

In 2023, SCE will be consolidating the different inspection types into a single program to improve effectiveness and efficiency. With the centralized inspection schedule, SCE can hire a single contractor to inspect an entire designated area and apply the criteria for all three inspection programs, as needed. In addition to creating a more efficient deployment, the inclusion of multiple scopes in a single contract can lead to overall improvement in the skill set (upskilling) of SCE's inspector workforce because inspection visits will require a range of experience up to ISA-certified arborists to address multiple scopes. Deploying these resources together can help facilitate knowledge

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[53] *See* WP SCE-02, Vol. 10, pp. 32-35 – Forecast O&M Expenses Workpaper for Remote Sensing.

[54] For HTMP, inspectors will still be required to be Certified Arborists. The Hazard Tree Management Program (HTMP) and Dead & Dying Tree Removal Program have now been combined under the Hazard Tree Program (HT Program).

[55] Although the inspector would not formally assess all trees, if a concerning issue was observed, the inspector would escalate their finding to SCE personnel.

transfer from more experienced inspectors to entry-level inspectors. For example, a routine inspector should be better able to discuss a specific concern with a fellow inspector who is knowledgeable about hazard trees. Additionally, this team network creates the potential for career growth and encourages the retention of inspectors to improve their knowledge and skill. Also, performing the inspections for these different programs at the same time increases the opportunity to perform resulting mitigations at the same time, optimizing work performance scheduling.[56] SCE had been contemplating a consolidated inspection strategy and was encouraged to consolidate its inspection programs following an independent evaluator's feedback on SCE's 2022 WMP Update.

(b) Inspector Workforce Development

In order to ensure that this upskilling remains within the broad inspector population and improves inspection quality, SCE developed new contractor requirements. The new requirements reflect the increased knowledge SCE hopes to facilitate in its inspector population and the development of a career ladder that would encourage retention. In 2022, SCE revised the Statement of Work (SOW) for Vegetation Management inspectors to include an experience- and education-based classification structure. Although SCE cannot set the wages paid to employees of its contractors, this structure reinforces the need to align wages to specific experience and education levels for individuals performing various inspection activities. By doing so, SCE's intent is that the pay structure will promote retention and the advancement of inspection-related skills and experiences.

(c) Additional Oversight of Inspections

In 2022, SCE began implementing a process to provide additional oversight of contractor inspections. This process is performed by SCE Senior Specialists, who are ISA certified arborists, and is performed after an inspection has been completed. The purpose of this oversight is to ensure quality of work, create more accurate prescriptions released to tree trimmers, reduce missed trees, and provide general guidance to contractors for compliance with SCE requirements. Since the implementation of this process in 2022, SCE has seen a reduction in its overall prescription and missed tree discrepancy. This oversight process is distinct from the Quality Control work described in Section II.B.4.

[56] The new centralization of both the inspections strategy and inspection costs is discussed in Section II.B.1.a)(1).

(d) Increased Use of Remote Sensing

Table II-12
Forecast O&M Expenses for Ground Inspections and Remote Sensing (2023-2028)[57]
(Constant 2022 $000)

	Forecast						
	2023	2024	2025	2026	2027	2028	Normalized 2025
Traditional Ground Inspections	$54,947	$63,229	$72,720	$36,430	$25,543	$14,656	$37,337
Remote Sensing (LiDAR and Satellite)	$5,994	$7,315	$55,713	$55,713	$55,713	$55,713	$55,713
Total	**$60,940**	**$70,545**	**$128,433**	**$92,143**	**$81,256**	**$70,369**	**$93,050**

As shown in Table II-12 above, SCE anticipates reducing traditional ground inspections while increasing the use of remote sensing technology in this GRC period. SCE is considering the use of both LiDAR and satellite technology at present but may include other technologies that prove to be effective and financially justifiable.

Starting in 2025, SCE intends to begin the transition from primarily ground inspections to primarily remote sensing. In this first year, SCE would perform both remote sensing and traditional ground inspections systemwide. The dual effort is needed to establish the relationship between the remote sensing results and the existing Vegetation Management inventory. For example, the relationship can be established by mapping the specific light points generated by remote sensing to new or existing tree inventory points. After 2025, ground inspections would be used to verify the accuracy of remote sensing data and in areas where remote sensing does not provide sufficient data such as a dense tree canopy or more involved environmental assessments. As described in Section II.B.1.a)(1)(c) above, SCE forecasts traditional ground inspection costs to decrease from 2026 to 2028 as SCE's use of remote sensing matures. Because SCE is technology-agnostic, it plans to continue piloting satellite along with any other comparable remote sensing technology as a comparison with LiDAR, to optimize its remote sensing capabilities.

In the near-to-long term, SCE needs to develop its processes further to eventually enable the generation of tree prescriptions and the collection of environmental and vegetation data through remote sensing technology. Currently, prescriptions require a ground crew

[57] *See* WP SCE-02, Vol. 10, pp. 9-10 – Forecast O&M Expenses Workpaper for Traditional Ground Inspections and WP SCE-02, Vol. 10, pp. 32-35 – Forecast O&M Expenses Workpaper for Remote Sensing.

inspector to record certain information including species, environmental considerations, and specifics regarding tree structure and health. To obtain this information through remote sensing technology, the use of multispectral and hyperspectral imagery along with artificial intelligence/machine learning (AI/ML) may become necessary. Even with these technologies in place, other information currently required for prescriptions may not be obtainable with remote sensing. To address these challenges and support the ability to issue prescriptions via remote sensing, SCE plans on exploring the following:

- Employing the use of multispectral and hyperspectral imaging data processing through various mediums such as satellite;
- Augmenting various data types (multispectral and LiDAR) with AI/ML technologies to perform optimized remote vegetation inspections;
- Employing the use of AI/ML technologies on SCE's in-house software platform for inspections;
- Potentially reducing the amount of information required for prescriptions;
- Creating "hybrid" trim crews comprised of one or more individuals capable of generating prescriptions at the same time trim work takes place without a separate inspection visit;
- Generating initial prescription via remote sensing with final prescription completed by trim crew;
- Leveraging personnel in environmentally sensitive areas who pre-field, or examine site conditions, prior to trim work taking place; and
- Generating initial prescription via remote sensing with final prescription completed by pre-fielding personnel.

b) Routine Line Clearing (Trims and Removals)

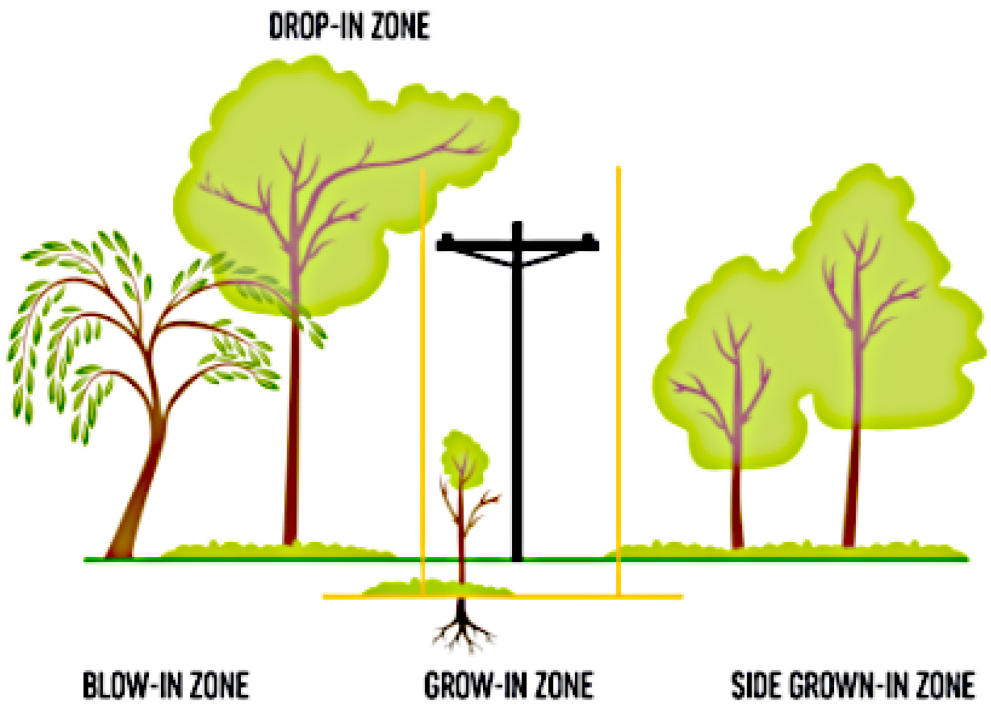
(1) Work Description and Need

Routine Line Clearing comprises SCE's largest Vegetation Management program and consists primarily of its compliance-based line clearing activities across its distribution and transmission networks. In this program, SCE endeavors to prevent vegetation from encroaching into its electrical assets by maintaining respective clearance zones as stated in regulatory requirements

established by the CPUC GO 95 Rule 35 (Case 13 and 14) and Rule 37, PRC Sections 4292 and 4293, CCR Sections 1250-1258 and FAC-003-4.

Figure II-7 below depicts various scenarios where a risk of encroachment exists and mitigation would be required. For distribution lines, the zones are illustrated as "blow-in", "grow-in", "side-grown in", and "drop-in" zones and inform SCE's mitigation.[58]

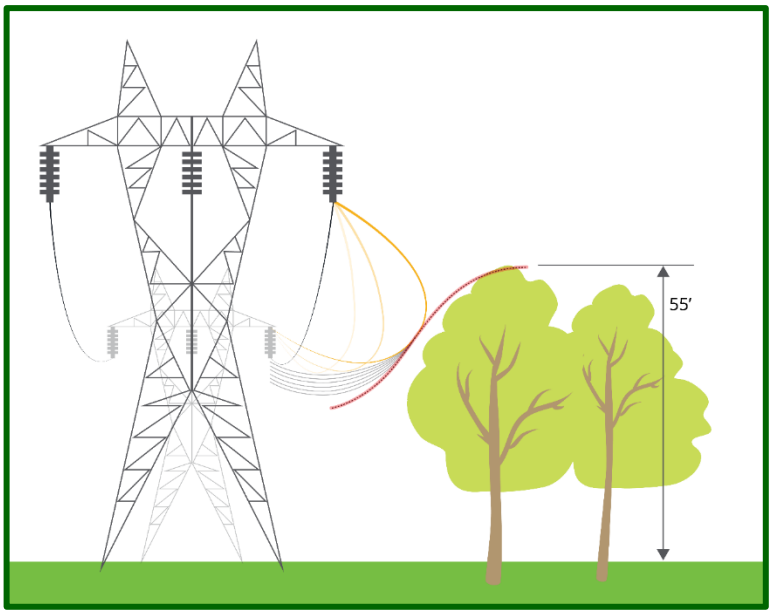
Figure II-7
Distribution Line Drop-in, Blow-in, Grow-in, and Side Grown-in Zones



[58] These zones are defined as follows: (1) grow-in zone is a clearance zone between the outside phases on a distribution tower or pole, to the horizontal plane defined by the top of the tower or pole; (2) side grown-in zone is a clearance zone on either side of a distribution line where vegetation can grow into the conductors; (3) blow-in zone is a clearance zone outside the grow-in zone on a distribution line which only considers tree dynamics for line clearance; (4) drop-in zone is a clearance zone above the high-voltage conductors.

Figure II-8 below depicts the Utility Strike Zone (USZ)[59] for SCE's transmission lines, factoring in sag and sway of the circuits.

Figure II-8
Transmission Line Utility Strike Zone



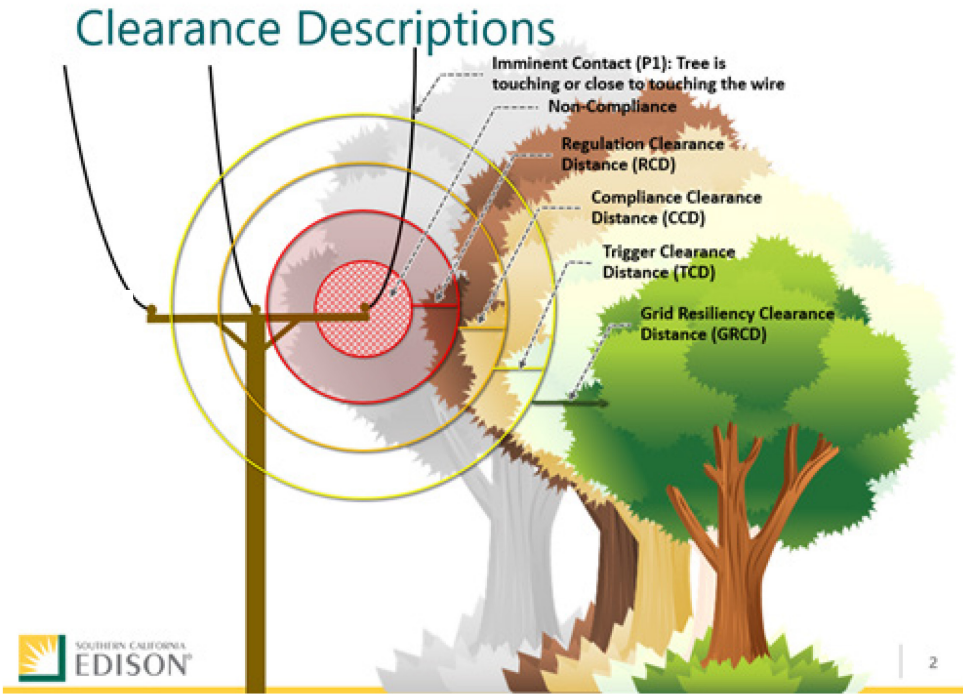
(a) Clearance Distances

In its maintenance of clearance zones, SCE categorizes the zones from the least to the greatest distance requirement: (1) Regulation Clearance Distance (RCD); (2) Compliance Clearance Distance (CCD); (3) Trigger Clearance Distance (TCD); and (4) Grid Resiliency Clearance Distance (GRCD). The RCD reflects the distance required by the respective regulations. CCD means Compliance Clearance Distance and is SCE's internal minimum clearance standard which is 1.5 times the RCD. TCD means Trigger Clearance Distance and is an additional 3 feet beyond the CCD. TCD is the distance that triggers the need for a mitigation (based on voltage and tree species). GRCD is the Grid Resiliency Clearance Distance, which aligns with the GO95 Rule 35, Appendix E recommended clearance. To support SCE's wildfire mitigation strategy and the OEIS-approved WMP, SCE pursues Expanded Line Clearing activity within the broader Routine Line Clearing program, which entails striving to achieve GRCD whenever maintenance is required.

[59] USZ is the area on either side of SCE's electrical facilities from which a tree or a portion of a tree could strike or impact electrical facilities.

Figure II-9 illustrates the various types of clearance to be achieved, with RCD representing the required distance in accordance with GO 95 and GRCD representing Expanded Line Clearing.

Figure II-9
Clearance Descriptions



(b) Mitigation Methods

SCE's mitigation work aligns with International Society of Arboriculture (ISA) standards for pruning, such as ANSI A300. This may include revisiting each lateral branch and trimming to avoid sprouting and regrowth, which if left unattended, may trigger more frequent trims. In most occurrences, trimming/removal will conclude within 30-60 days after the inspection prescriptions are provided to the contractor.

In performing mitigation work, the contractor generally performs directional trimming and crown reductions to minimize any adverse tree health and/or structural integrity conditions and to encourage future tree growth away from SCE overhead lines. If a contractor is unable to trim the vegetation to maintain applicable clearances for the annual pruning cycle, then the contractor will pursue complete removal of the vegetation to ensure compliance. The contractor is also

responsible for cleanup and management of all debris generated from line-clearing activity. Contractors generally use a series of standard equipment (e.g., bucket trucks and/or rigging equipment for manual climbs). However, in certain environmentally sensitive areas that restrict off-road access to trucks, contractors may rely on ATVs or snowmobiles (in weather impacted areas) for access to these trees.[60] In these cases, SCE will work with the appropriate agency to ensure SCE complies with applicable requirements.

SCE performs mitigation for both Transmission and Distribution[61] in a similar fashion. However, with respect to Transmission assets, SCE also considers the line sag in hot conditions and when more load is carried, as well as the sway in windy conditions. This sag and sway movement is commonly referred to as "conductor dynamics." SCE's line clearing program for Transmission considers conductor dynamics when defining the clearance distances that need to be maintained.[62]

SCE continues to explore alternative methods of mitigation, such as bulk tree trimming by utilizing helicopters or goat-grazing for Vegetation Management on Transmission rights-of-way.[63] In this GRC cycle, SCE will continue to pilot these alternative methods to assess overall effectiveness and costs.

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[60] When evaluating the need for specialty equipment, SCE also considers if the equipment provides additional safety benefits or greater work efficiency. This additional cost for special equipment can provide a net benefit while also ensuring compliance, safety and wildfire risk reduction.

[61] One distinct function related to line clearing along distribution circuits, as opposed to transmission circuits, is that SCE performs supplemental patrols 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. These supplemental patrols provide additional verification of compliance with the clearance distances required by GO 95 and PRC §4293. This is discussed further in Section II.B.1.d).

[62] SCE also performs expanded clearance on legacy facilities with the goal of removing or clearing additional vegetation using the standard remediation methods of trims, removals, and/or weed abatement to render the defensible space around a facility even more vegetation-free. Legacy facilities comprise SCE's generation assets located in Tier 2 or 3 in HFRA that have a risk of ignition and include high voltage facilities such as powerhouses, switchyards, and substations. These energized facilities may also be low voltage facilities or assets such as weather stations, valves, pull boxes or other electrified equipment. SCE's Generation performs this vegetation management work.

For more information on expanded clearance for legacy facilities, see SCE's 2023-2025 WMP Update, Section 8.2.3.3.2, Expanded Clearances for Legacy Facilities (VM-3).

[63] *See* Section II.B.1.c)(1) for further discussion of Fuel Management pilot programs.

(c) Customer Engagement

SCE has multiple touchpoints with its customers during the mitigation process. The touchpoints begin at the time of inspection when the need for mitigation is identified. In certain instances, an increase in trim distances or the need for additional trees to be trimmed can require significant further engagement with property owners and cities before work can commence.

SCE anticipates continuing customer outreach to inform customers of the importance of mitigations, the need for timely tree trimming in wildfire mitigation efforts, and the impacts of any delays. For certain types of work (e.g., removals, initial Expanded Line Clearing), SCE requires customer approval before work can proceed. To reduce operational delay, SCE has implemented a step in the process whereby "notification consultants" are used to explain prescribed work and obtain approvals, when required, from individual property owners in advance of tree trimmers' mitigation work, as shown in Figure II-10 below.[64] Additionally, engagement may occur as SCE's contracted customer coordinators become involved to coordinate the mitigation activity and resolve any impediments or concerns.

Figure II-10 below illustrates SCE's customer engagement process, from the pre-work notification at the time of inspection through the QC inspection of the completed work. The two processes in the red box reflect the customer consultation and coordination work described above.

[64] SCE is exploring alternate ways to conduct notification consultant work, including utilizing SCE resources or incorporating this work into future contract negotiation cycles.

Figure II-10
Pre-Work Notification, Consultation, and Coordination

(2) Historical Variance Analysis

Table II-13
Recorded O&M Expenses for Routine Line Clearing (2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Routine Vegetation Management Mitigations	$131,843	$278,425	$378,603	$348,807	$328,564
Totals	**$131,843**	**$278,425**	**$378,603**	**$348,807**	**$328,564**

In 2019, SCE recorded $278.425 million in O&M expenses for Routine Line Clearing, an increase of $146.582 million over 2018. The increase was due to several factors, including: (1) a significantly higher work volume of approximately 200,000 mitigations above 2018 levels, in order to achieve initial Expanded Line Clearing distances;[65] (2) work management challenges stemming from the rapid ramp-up and increased work scope; and (3) increased contractor costs due to the tightening of the labor market for qualified tree trimmers across California.

[65] The initial round of Expanded Line Clearing increased both the number of trees requiring trimming and the associated complexities, such as trimming thicker branches (in continuance of compliance with the HFTD Decision).

In 2020, SCE recorded $378.603 million in O&M expenses for Routine Line Clearing, an increase of $100.178 million over 2019. SCE performed more than 1 million mitigations, including completion of initial Expanded Line Clearing as well as rollover work from 2019 of approximately 50,000 mitigations. Costs increased further largely as a result of the implementation of Senate Bill (SB) 247 (which became effective January 1, 2020) and its associated costs. Other pressures included the expansion and/or introduction of new Vegetation Management roles such as notification consultant and customer coordinator, and a large increase in environmental holds.

In 2021, SCE recorded $348.807 million in O&M expenses for Routine Line Clearing, a decrease of $30.648 million from 2020 due to lower total trim and removal volumes. SCE completed approximately 830,000 mitigations, which was partially impacted by safety stand-downs for two contractors, which reduced the availability of resources. Offsetting the decrease in volume were higher unit costs reflecting the re-direction of work and related costs, increased environmental controls to strengthen SCE's compliance with environmental regulations, and expansion of auxiliary functions such as customer notification and traffic control.[66]

In 2022, SCE recorded $328.564 million in O&M expenses for Routine Line Clearing, a decrease of $20.243 million from 2021 despite more work being performed in 2022 than in 2021. SCE completed approximately 900,000 mitigations, including rollover work from 2021 of approximately 60,000 mitigations. The overall decrease is attributed to a lower cost-per-trim in 2022 relative to 2021. Despite lower unit costs in 2022, SCE incurred new costs related to work performed for AOC programs (approximately $3 million) and an increased volume of traffic control and environmental coordination work.

[66] *See* A.22-06-003, SCE's Application for Recovery of Incremental Wildfire Mitigation and Vegetation Management Costs Recorded in 2021 (2021 WM/VM Filing).

(3) RAMP Integration

Table II-14
RAMP Control – Expanded Line Clearing
Forecast O&M Expenses and Risk Spend Efficiency (RSE)[67]
Comparison of 2022 RAMP vs. 2025 GRC (2022-2028)
(Nominal $000)

RAMP Risk	RAMP ID	RAMP Control / Mitigation Name	Filing	2022	2023	2024	2025	2025 - 2028 RSE
Wildfire	C19	Expanded Line Clearing	RAMP	$40,975	$42,204	$43,470	$44,774	282
			GRC	$60,461	$9,783	$10,762	$10,762	5
			Variance	$19,486	($32,421)	($32,708)	($34,012)	(277)

Table II-14 above shows a comparison between the forecast O&M expenses and RSE for the Expanded Line Clearing control evaluated in the 2022 RAMP Wildfire chapter and the forecast presented in this GRC request.

The variance between the 2022 RAMP forecasts and 2025 GRC forecasts is due to different modeling inputs. In the 2022 RAMP forecasts, SCE estimated a volume of approximately 185,000 trees for Expanded Line Clearing, with a unit rate equal to the difference between deeper trim rates and maintenance trim rates. For the 2025 GRC forecasts, SCE estimated a volume of 36,000 trees for Expanded Line Clearing, with no cost differential between deeper trim rates and maintenance trim rates.[68] In the GRC, SCE decreased the volume to more accurately represent the anticipated new inventory where Expanded Line Clearing is achieved.

The decrease in RSE is due to the level of risk reduction attributed to Expanded Line Clearing. In the 2025 GRC, SCE used a more conservative modeling approach for the level of risk reduction. Because the specific population of trees to be cleared was unknown, SCE used the median level of risk reduction as opposed to the highest level of risk reduction.[69]

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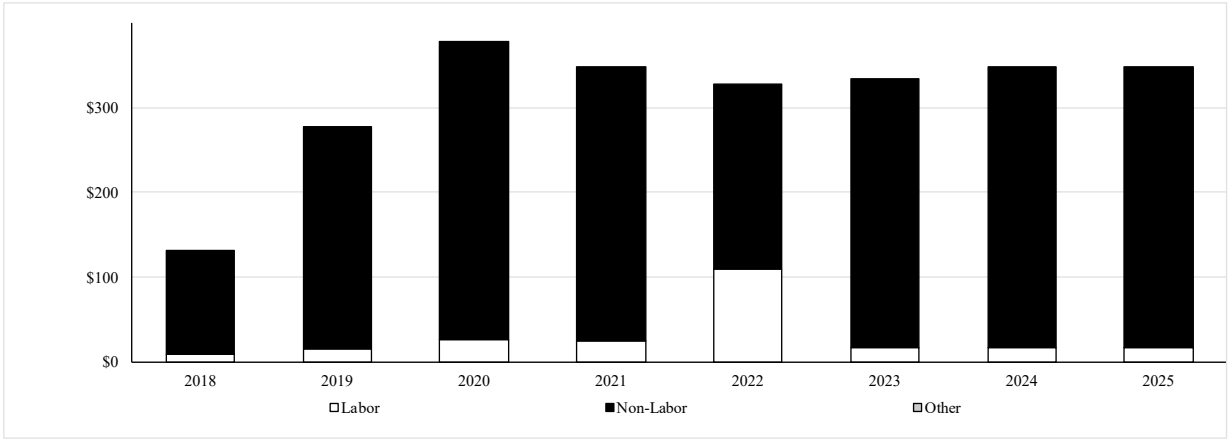
[67] *See* WP SCE-02, Vol. 10, pp. 36-42, Workpaper for Wildfire Vegetation Management RAMP to GRC Integration. Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[68] The forecast in Table II-14 is embedded in Routine Vegetation Management.

[69] Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

(4) Basis for Forecast

Figure II-11
Forecast O&M Expenses for Routine Line Clearing
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[70]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$9,623	$15,156	$26,916	$24,728	$109,995	$17,734	$17,269	$16,658
Non-Labor	$122,220	$263,269	$351,687	$324,079	$218,569	$316,177	$331,210	$331,120
Other								
Total Expenses	**$131,843**	**$278,425**	**$378,603**	**$348,807**	**$328,564**	**$333,911**	**$348,479**	**$347,778**

[70] A $22.2 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04. For Routine Line Clearing, SCE has a variance of approximately $11 million between the forecast and the RO Model; the RO Model contains a lower amount.

Also, *see* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 17-22 – O&M Detail for Transmission Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 43-48 – O&M Detail for Fire Hazard Prevention, and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "Routine Trims Unit", "Distribution Trim & Remove Trees", "Transmission Trim & Remove Trees", "Brush Removal", "Customer Program Support", "D-Substation Trim & Remove Trees", "T-Substation Trim & Remove Trees", "Routine Removals Unit", "Dist High Fire Inspection & Line Clearing", "Trans High Fire Inspection & Line Clearing", "High Fire Inspection & Line Clearing", "Traffic Control", "Trims + Removals (T&E)", and "Expanded Clearance".

For Routine Line Clearing, SCE forecasts normalized O&M expenses of $358.718 million for the Test Year.[71] SCE utilized an itemized forecast methodology to develop the forecast.

This forecast reflects work comprising routine trims and removals, substation-related mitigation, customer support, and traffic control. SCE also includes certain savings in its forecast. In 2024-2028, SCE anticipates annual operational savings of approximately $12.5 million related to efficiencies achieved as a result of the implementation of the Arbora work management tool.[72] SCE also anticipates normalized total savings of $1.160 million in the Test Year as a result of the reduction in SCE's Routine Line Clearing work due to SCE's Targeted Undergrounding capital program.[73] Both savings have been included in the forecast.

(a) Volume of Work

Table II-15
Number of Mitigations
2018-2028[74]

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Trims	514,797	726,597	979,947	713,973	785,058	748,421	748,421	748,421	748,421	748,421	748,421
Removals	5,002	26,508	79,662	60,249	58,230	41,579	41,579	41,579	41,579	41,579	41,579
Total Mitigations	**519,799**	**753,105**	**1,059,609**	**774,222**	**843,288**	**790,000**	**790,000**	**790,000**	**790,000**	**790,000**	**790,000**

SCE forecasts volumes for trimming and removal work, respectively, for Routine Line Clearing based on a forecast total mitigation volume of 790,000, which is based on the average of the 2021 recorded volume and an annualized 2022 recorded volume. To calculate the approximate annual volume of 750,000 trims and 40,000 removals, SCE applies the

[71] *See* WP SCE-02, Vol. 10, pp. 49-53 – Forecast O&M Expenses Workpaper for Routine Line Clearing and Confidential WP SCE-02, Vol. 10, pp. 1-5 – Forecast O&M Expenses Workpaper for Routine Line Clearing. For Routine Line Clearing, SCE has a variance of approximately $11 million between the forecast and the RO Model; the RO Model contains a lower amount.

[72] These benefits reflect an estimate of reduced hours per week on field data reconciliation, proper crew forecasting for more efficient scheduling, real-time resource shifting and improved visibility into future work. The Arbora tool's operational benefits result in a benefit-to-cost ratio of 1.0, as described more fully in Section III.

[73] *See* Exhibit SCE-04, Vol. 05, Part 2 for a more detailed description of Targeted Undergrounding.

[74] Trim and removal volumes in Routine Line Clearing exclude emergent work, which is forecast in Section II.B.1.d)(3).

historical average of 95% for trim volume and 5% for removal volume to the total mitigation volume.[75] SCE's forecast assumes a steady level of removal volumes throughout the GRC years, based on an annual 5% reduction[76] offset by new inventory resulting from the planting of new vegetation by customers as well as natural tree growth along SCE's ROW. Total mitigation count may be impacted by contractor availability, scheduling capabilities, weather, and other factors. Additionally, SCE assumes 85% of the mitigations would occur relative to its distribution network and 15% for its transmission network, in alignment with its tree inventory.[77]

(b) Unit Cost Basis

SCE's unit cost for Routine Line Clearing is based on SCE's most recent vendor rates. In order to calculate average unit costs of approximately $300 for trims and $1,600 for removals, SCE uses a base cost derived from the weighted average of vendor rates by volume and district, blended to account for unit and T&E rates as well as normal and premium time costs. SCE also adds cost components for roaming, late release, traffic control, environmental coordination, customer coordination, and equipment. These adder costs are described in more detail in Table II-16 below and were calculated using 2022 recorded activity.[78]

[75] The percentage split is supported by SCE's recorded activities from 2020 to 2022.

[76] Inventory reduction is highly dependent on SCE's continued customer education and outreach, especially regarding SCE's on-going palm removal efforts.

[77] From 2023 to 2028, SCE assumes a tree inventory for distribution and transmission of approximately 1.4 million trees, based on the 2022 recorded tree inventory. There is a larger ratio of high fire to non-high fire in SCE's distribution space, but transmission yields a 50/50 split for modeling purposes. The 2023 forecast assumes these allocations.

[78] SCE's forecast may differ from recorded costs in the forecast years as a result of the breakdown for work charged to T&E rates or during premium time. Other factors that could impact costs are geography, complexity, volume of trees with larger diameter at breast height (DBH) or requiring special equipment, and factors such as weather, legislation, or labor action.

Table II-16
Adder Costs for Routine Line Clearing

Roaming Support	A service whereby contractors provide mitigation assistance outside of their assigned service territory, which generally costs more for a contractor to move outside of their current crew placement
Specialized Equipment	Utilized typically to support rural areas where geographic conditions and agency restrictions require enhanced sensitivity and/or utilization of emerging technologies to support safer mitigations and increased production volume
Environmental Late Release	Utilized typically for mitigations previously placed on environmental hold for significant periods of time, when the rest of the geographic area proceeds with timely mitigation and the contractor must dispatch crews to complete mitigations in the same area
Traffic Control	Utilized in addition to base unit rates when third party traffic control is necessary based on geographic restrictions or to optimize the safety of crews
Environmental Monthly Coordinators	To perform additional scheduling and coordination of environmentally affected work, SCE has approved contractor resources to support administration.
Customer Coordinators	To support enhanced customer education and outreach, SCE approves customer coordinators to perform various work related to customer contacts and to obtain approval of prescribed mitigation work.

Finally, for 2023, SCE applies a cost escalation of 4% to the 2022 baseline unit rate due to on-going contract and rate negotiations initiated in the third quarter of 2022. SCE assumes an additional escalation rate of 10% to total mitigation costs in 2024 resulting from the re-negotiation of contracts that will cover services performed in 2024 through 2026, which is consistent

with experience from recent contract cycles. Following the contraction re-negotiation and escalation in 2024, SCE assumes rates remain constant in 2025 through 2028.[79]

c) Weed Abatement and Fuel Management

(1) Work Description and Need

In its Weed Abatement program, SCE manages vegetation on SCE transmission rights-of-way (ROW) and specific easement properties in accordance with California Public Resources Code (PRC) §4291 and §4292. To maintain compliance, SCE will typically abate the entire area and/or create fire breaks between one to four times per year, depending on re-growth. Methods used to abate weeds and dead/dying vegetation include mowing, pruning, weed whacking, and chemical treatment. Abatement distances differ by city and county and are generally 100 to 200 feet from structures and 10 to 50 feet from roadways and combustible fences. Contractor laydown yards are also treated for weeds on a quarterly basis. SCE manages vegetation on 1,500 unique parcels throughout the year as part of the Weed Abatement program, with an average parcel size of five acres. Annual rains and heat have an impact on parcel maintenance, as these factors traditionally affect weed growth.

Starting in 2023, SCE plans to develop a dedicated Fuel Management program.[80] This program focuses on the removal of live trees and trimmed/felled vegetation located under transmission and distribution corridors and ROW. Over the past several years, SCE's increased mitigation work to maintain compliance with CPUC GOs and statutory requirements and to reduce wildfire risks has increased the volume of trimmed/felled vegetation in SCE's network corridors. Additionally, SCE has identified vegetation inventory located outside of transmission wire corridors but that may fall into SCE facilities. Clearing these corridors helps to reduce vegetation inventory, limit wildfire propagation, and reduce wildfire threats to SCE's infrastructure.

Fuel Management activities also include innovative pilot programs using Integrated Vegetation Management (IVM)[81] methodologies. These methods can include a combination of chemical, biological, mechanical, and/or manual treatments, which help promote desirable vegetation and resist undesirable tree species. Current IVM pilot programs include: (1) goat grazing, an alternative

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[79] Total costs in 2027 and 2028 may be impacted by future rate negotiations.

[80] Prior to 2023, SCE performed fuel management work but combined it with its various mitigation programs.

[81] "IVM is generally defined as the practice of promoting desirable, stable, low-growing plant communities that will resist invasion by tall growing tree species through the use of appropriate, environmentally-sound, and cost-effective control methods." – www.epa.gov.

to manual trimming and mowing which reduces fuel load on SCE-owned parcels; (2) Tree Growth Regulators (TGR), which are growth-slowing chemicals that can increase the duration between pruning; and (3) ROW Low Growth, which involves the application of herbicides along SCE's Transmission ROW. Additionally, SCE is looking to partner with the U.S. Forest Service (USFS) to develop an acreage plan[82] for fuel management across four to five forests. While still preliminary and subject to an assessment of constraints and feasibility, in the long term, some of these methods may be able to provide cost efficiencies and reduce the risk of outages and fires while improving wildlife habitat.[83]

(2) Historical Variance Analysis

Table II-17
Recorded O&M Expenses for Weed Abatement and Fuel Management
(2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Weed Abatement	$0	$0	$0	$2,084	$3,897
Fuel Management	$0	$0	$0	$0	$23
Totals	$0	$0	$0	**$2,084**	**$3,921**

(a) Weed Abatement

For Weed Abatement, Table II-17 above shows costs recorded to this activity. This represents a lower amount than the total work performed as most of the costs were previously captured in Routine Line Clearing. Below, Table II-18 provides a more comprehensive view of historical costs based on internal analysis of vendor invoices. The variation in costs for Weed Abatement from 2018 through 2022 is attributed to vegetation growth and environmental constraints.

[82] The acreage plan is a proposal to the USFS for heavy fuel removal/debris management in areas identified as being within HFRA and having a high inventory of HT Program and/or Routine Line Clearing trees.

[83] In 2020, SCE partnered with Electric Power Research Institute (EPRI), an independent research institute, to document and provide insights into best practices for fuel management. This study identified several potential opportunities related to fuels management.

Table II-18
Recorded O&M Expenses for Weed Abatement Based on SCE's Cost Analysis (2018-2022)
(Constant 2022 $000)

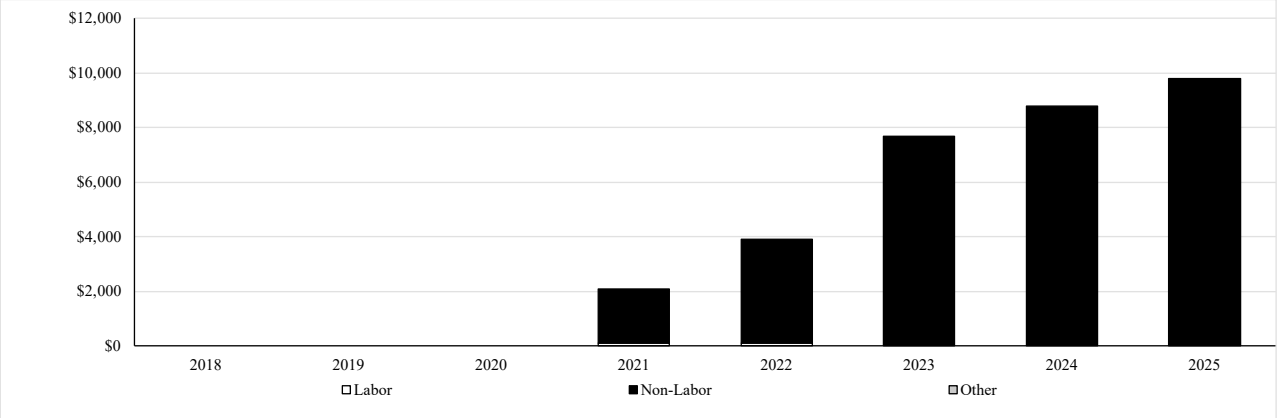
	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Weed Abatement	$4,423	$7,284	$9,232	$4,547	$3,096
Totals	**$4,423**	**$7,284**	**$9,232**	**$4,547**	**$3,096**

(b) Fuel Management

SCE designated Fuel Management as a new standalone activity starting in 2023, with costs previously recorded under multiple Vegetation Management programs. As shown in Table II-17 above, in 2022, SCE recorded a $23,000 accrual from October 2021 related to program support for the Tree Growth Regulator (TGR) pilot, such as periodic monitoring of growth reductions following treatment.

(3) Basis for Forecast

Figure II-12
Forecast O&M Expenses for Weed Abatement and Fuel Management
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[84]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$0	$0	$0	$114	$112	$0	$0	$0
Non-Labor	$0	$0	$0	$1,970	$3,808	$7,670	$8,788	$9,789
Other								
Total Expenses	**$0**	**$0**	**$0**	**$2,084**	**$3,921**	**$7,670**	**$8,788**	**$9,789**

	Forecast		
	2023	**2024**	**2025**
Weed Abatement	$3,883	$4,702	$4,286
Fuel Management	$3,788	$4,086	$5,503
Totals	**$7,670**	**$8,788**	**$9,789**

[84] A $0.9 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04.

Also, *see* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 17-22 – O&M Detail for Transmission Routine Vegetation Management, and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "Weed Abatement" and "Fuel Management – T".

Table II-19
Forecast O&M Expenses (2023-2025)
for Weed Abatement and Fuel Management
(Constant 2022 $000)

	Forecast		
	2023	**2024**	**2025**
Weed Abatement	$3,883	$4,702	$4,286
Fuel Management	$3,788	$4,086	$5,503
Totals	**$7,670**	**$8,788**	**$9,789**

Weed Abatement and Fuel Management are smaller programs within Routine Vegetation Management. SCE plans to deploy the Weed Abatement program in line with historical operations. The Fuel Management program is new for the 2025 GRC cycle and will be deployed strategically using various methods based on site conditions and inventory considerations.

(a) Weed Abatement

For Weed Abatement, SCE forecasts normalized O&M expenses of $4.286 million for the Test Year.[85] SCE utilized an itemized forecast methodology to develop the forecast.

SCE forecasts a total volume of 1,500 parcels targeted for weed abatement across three geographic regions (Eastern, Metro, and Northern), based on 2022 parcel inventory. SCE assumes these parcels will require one to four passes annually, comprising a total pass count of 3,330 as shown in Table II-20 below. For the unit cost, SCE forecasts spending approximately $1,021 for each pass based on average parcel size and total work area to be abated in each parcel (e.g., entire parcel, 100-foot firebreak). Some variability may occur due to agency requirements.

[85] *See* WP SCE-02, Vol. 10, pp. 54-55 – Forecast O&M Expenses Workpaper for Weed Abatement.

Table II-20
Annual Schedule of Total Passes for Weed Abatement

Parcel Passes per year		
1 pass	100%	1,500
2 pass	84%	1,260
3 pass	24%	360
4 pass	14%	210
Totals		3,330

(b) Fuel Management

For Fuel Management, SCE forecasts normalized O&M expenses of $5.503 million for the Test Year.[86] Table II-21 below shows the breakdown of activities for this program.

Table II-21
Forecast O&M Expenses (2023-2025) for Fuel Management by Activity
(Constant 2022 $000)

Activity	2023	2024	Normalized 2025
Grazing	$ 480	$ 540	$ 915
TGR	$ 75	$ 125	$ 344
ROW Low Growth	$ 665	$ 808	$ 1,416
Forestry Fuel Management	$ 2,000	$ 2,000	$ 2,000
Fuel Management Sub-Total	**$ 3,220**	**$ 3,473**	**$ 4,675**
Supporting Costs and Other Adj.	$ 568	$ 613	$ 829
Fuel Management Total	**$ 3,788**	**$ 4,086**	**$ 5,503**

Because Fuel Management was not separately tracked in the prior GRC, there were no recorded expenses for 2018 – 2022. SCE utilized an itemized forecast methodology to develop the forecast for each pilot program.

For goat grazing, a pilot phase on USFS land is planned for the Sierra National Forest and will consist of 80 acres for 2023. This area was selected because of the

[86] *See* WP SCE-02, Vol. 10, pp. 56-61 – Forecast O&M Expenses Workpaper for Fuel Management.

challenging terrain and the on-going brush removal needs that are currently performed by tree ground crews. After 2023, the forecast anticipates adding another 50 acres annually for program expansion into other areas. Acres being grazed for the first time will be visited twice annually, then once annually in subsequent years. The estimated cost of approximately $3,000 per acre is based on current pilot activities and includes program support, veterinary costs, and parcel preparation.

For the TGR pilot, the initial pilot phase in 2021 and 2022 consisted of 605 City-owned trees in Visalia, including a control group of 204 trees and a treated group of 401 trees. For 2023, the estimated costs are expected to double as SCE will be treating over 660 trees. After 2023, base costs are escalated by approximately $50,000 each year for additional program expansion. Re-treatment will be needed every three years.

For the ROW Low Growth pilot, the forecast volume is based on the scope of the current Weed Abatement Program[87] and assumes that roughly 200 of the parcels currently managed via mowing and manual efforts are transitioned to herbicide treatment. Costs are based on recent proposals from herbicide application vendors. SCE would target parcels that require two or more mowing passes per year or are otherwise cost-heavy. The use of pre-emergent herbicide requires two applications annually.

For the forestry fuel management pilot, SCE is targeting (1) circuits in its HFRA that are dense in both Routine Vegetation Management and HT Program subject trees, (2) circuits that have been previously threatened by wildfires and/or are observed as opportunities to create "enhanced fuel breaks" along the ROWs, and (3) circuits predominantly located on USFS agency land in order to streamline communication and approval processes. SCE forecasts the volume of work based upon Routine Vegetation Management and HT Program inventory and other factors, such as environmental constraints and overall site conditions.[88] The forecast unit costs for the forestry fuel management pilot are reflected in existing Vegetation Management contract rates for removals. The pilot program is anticipated to expand by 100 acres each year, starting in 2023 with a maximum of 500 acres in 2028.

[87] *See* Section II.B.1.c)(1) for more details on SCE's Weed Abatement activities.

[88] Removal costs may vary based upon annual forecast.

d) Seasonal Patrols, Areas-of-Concern, and Emergent Work

(1) Work Description

In this section, SCE describes seasonal patrols, Areas-of-Concern (AOC), and emergent work. Some of this work was embedded in Routine Vegetation Management in the prior GRC, and some of it is new work for this 2025 GRC cycle.

SCE conducts seasonal patrols in areas where topography or vegetation conditions are known to pose a threat to SCE's facilities during extreme weather events, such as peak fire season and periods of high wind conditions. Seasonal patrols include Canyon Patrols, At-Risk Patrols, and Operation Santa Ana. Canyon Patrols are performed annually, in areas where downslope, off-shore winds have greater potential to compromise trees conditioned to growing under primarily on-shore winds, in order to verify that certain circuits located in canyons are free from vegetation encroachments. At-Risk Patrols are typically performed on circuits that have a history of multiple vegetation-caused circuit interruptions or other risk factors. Operation Santa Ana is a joint patrol effort conducted in the late summer and fall with state and local fire authorities to perform patrols of overhead powerlines and poles in the HFRA.

In addition to the seasonal patrols described above, Vegetation Management conducts patrols and performs mitigation related to AOC in HFRA during the summer and fall, in accordance with the 2023 WMP. Fire Science identifies AOC through analysis of fire history, prior dates the area burned, current and future weather and fuel conditions, vegetation type and amount, community impact, and SCE infrastructure.[89] The summer AOC scope focuses on areas with potential for significant fuel-driven fire activity, while the fall AOC scope targets wind-driven events.

SCE also performs emergent work, which is the mitigation of vegetation-related threats that have been identified by customers, inspectors, and trimming crews, or which originates from other Vegetation Management programs (e.g., Quality Control) or other SCE operating groups (e.g., T&D electrical asset inspections). Unlike routine line clearing, this work is unplanned and usually occurs outside of the normal vegetation management cycle as a result of factors such as faster-than-anticipated tree growth or unpredictable weather events. In 2025, Vegetation Management will

[89] *See* Exhibit SCE-04, Vol. 05 for more details on AOC.

begin recording costs for vegetation-related emergent work related to Distribution Priority 2 (P2) work orders (which were previously recorded in Distribution Preventative Maintenance).[90]

(2) Historical Variance Analysis

Table II-22
Recorded O&M Expenses for Seasonal Patrols, Emergent Work, and AOC
(2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Emergent Work	$8,479	$16,073	$26,859	$26,532	$14,542
Seasonal Patrols	$0	$0	$0	$2,541	$10,689
AOC	$0	$0	$0	$0	$410
Totals	**$8,479**	**$16,073**	**$26,859**	**$29,073**	**$25,641**

(a) Seasonal Patrols

Vegetation Management has evolved since 2018. In 2018 through 2020, the cost of SCE's seasonal patrol work was embedded in the Routine Vegetation Management mitigation cost category. In 2021, SCE began segregating these costs for greater visibility, but some costs continued to be recorded in Routine Vegetation Management. Although not fully reflected in Table II-22 above, in 2018-2019, SCE estimates seasonal patrols costs of roughly $8 million dollars annually. In 2020-2022, SCE estimates costs increased to roughly $15 million annually due to revised contractor rates which were impacted by SB 247.

(b) AOC

Similar to seasonal patrols, the cost of SCE's AOC work was embedded in the Routine Vegetation Management mitigation cost category from 2018 through part of 2021. In 2021, SCE began segregating these costs for greater visibility, but some costs continued to be recorded in Routine Vegetation Management.

(c) Emergent Work

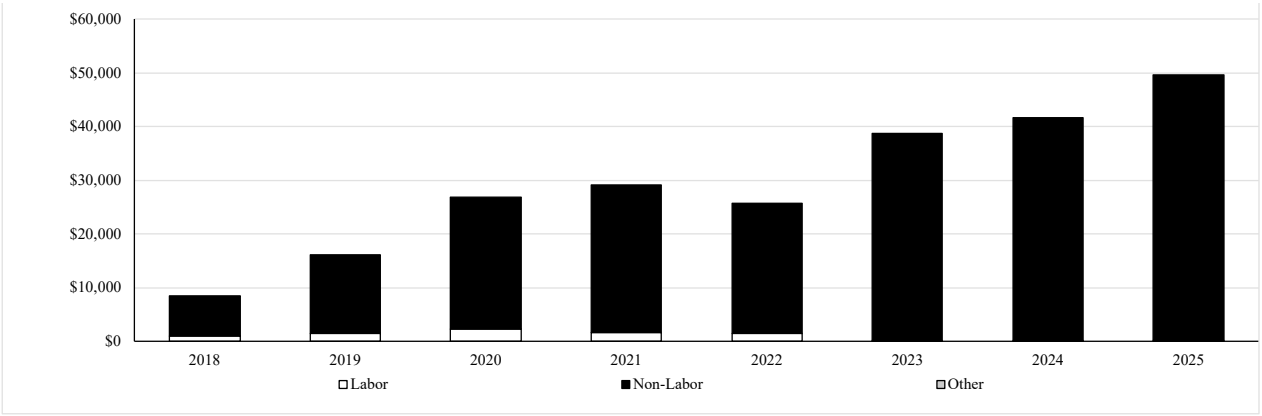
SCE's recorded costs for emergent work have fluctuated year-to-year, which reflects the unpredictable nature of this type of work. In 2018, SCE recorded $8.5 million in

[90] P2 work orders relate to any observed vegetation condition that is currently stable but where it appears that vegetation may cause a failure of electric facilities, as defined further in SCE's operational procedures UVM-08, Section 4.1.

O&M expense for a volume of approximately 5,500 P2 work orders. In 2019, recorded costs for emergent work increased to $16.1 million for a volume of approximately 17,000 P2 work orders due to greater focus on risk prioritization and off-cycle inspections. In 2020, SCE recorded costs of $26.9 million for a volume of 7,041 P2 work orders. In 2021, SCE recorded costs of $26.5 million for a volume of 8,199 P2 work orders. An increase in environmental holds impacting Routine Vegetation Management consequently led to an increase in emergent work. In 2022, SCE recorded $14.5 million for a volume of 7,919 P2 work orders. In that year, SCE faced less emergent work due to aggregating of schedules to integrate more of this work into routine line clearing, as well as absorption of some work in seasonal patrols and AOC.

(3) Basis for Forecast

Figure II-13
Forecast O&M Expenses for Seasonal Patrols, Areas-of-Concern, and Emergent Work Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[91]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$923	$1,395	$2,334	$1,669	$1,490	$31	$51	$95
Non-Labor	$7,557	$14,678	$24,525	$27,405	$24,151	$38,749	$41,532	$49,493
Other								
Total Expenses	**$8,479**	**$16,073**	**$26,859**	**$29,073**	**$25,641**	**$38,780**	**$41,583**	**$49,588**

	Forecast		
	2023	**2024**	**2025**
Seasonal Patrols	$20,192	$21,795	$17,097
AOC	$5,202	$5,640	$5,655
Emergent Work	$13,386	$14,148	$26,836
Totals	**$38,780**	**$41,583**	**$49,588**

[91] A $1.5 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04.
(*Continued*)

For seasonal patrols, AOC, and emergent work, SCE forecasts normalized O&M expenses of $38.420 million for the Test Year.[92,93] SCE utilized an itemized forecast methodology to develop the forecast. The increase in 2023 from recorded 2022 costs is primarily due to costs previously recorded in routine line clearing now being separately accounted.

Starting in 2023, SCE's forecasts include estimated annual operational savings of approximately $4.2 million for costs underlying seasonal patrols, AOC, and emergent work. These savings are attributable to the efficiencies anticipated to be gained from the Arbora work management tool and are based on an improved communication chain from general foremen to tree crews as well as the ability to re-allocate crews based on demand. SCE also anticipates Arbora will facilitate the automatic routing of emergent work to the appropriate vendor for the geographical area and recommend the use of the closest tree crew.

(a) Volume of Work

For seasonal patrols and AOC, forecast volumes are based on 2022 volumes. Seasonal patrols comprise 5,300 units. For AOC, the total scope comprises 22,000 units annually, with a summer scope of 12,000 units and a fall scope of 10,000 units.

For emergent work, SCE forecasts the volume in 2023 and 2024 based on total 2021 emergent work P1 and P2 work orders (e.g., overhead detailed inspection findings

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Also, *see* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 17-22 – O&M Detail for Transmission Routine Vegetation Management, and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "Seasonal Patrols", "AOC Repairs / Replacements – D", and "Non-Routine Trim & Remove T&E".

92 *See* WP SCE-02, Vol. 10, pp. 62-66 – Forecast O&M Expenses Workpaper for Seasonal Patrols, Areas-of-Concern, and Emergent Work and Confidential WP SCE-02, Vol. 10, pp. 6-10 – Forecast O&M Expenses Workpaper for Seasonal Patrols, Areas-of-Concern, and Emergent Work. The workpaper forecast reflects a lower volume of work than the Test Year forecast shown in Figure II-13. SCE will file errata to align the RO model with the workpaper.

93 If the Commission does not authorize SCE's forecast for full network remote sensing, SCE submits normalized O&M expenses of $42.465 million for the Test Year for seasonal patrols, AOC, and emergent work to include ground inspections supporting seasonal patrols. This alternative forecast would allow SCE to execute its inspection programs for compliance and wildfire mitigation purposes if full remote sensing is not authorized. *See* WP SCE-02, Vol. 10, pp. 4-5 – Alternative Forecast O&M Expenses Workpaper for Inspections, WP SCE-02, Vol. 10, pp. 62-66 – Forecast O&M Expenses Workpaper for Seasonal Patrols, Areas-of-Concern, and Emergent Work and Confidential WP SCE-02, Vol. 10, pp. 6-10 – Forecast O&M Expenses Workpaper for Seasonal Patrols, Areas-of-Concern, and Emergent Work.

and trouble order call outs). In 2025, Vegetation Management will begin incurring costs for Distribution P2 work orders previously recorded in Distribution Preventative Maintenance.

SCE provides Table II-23 below showing the forecast volume of work across the three programs.

Table II-23
Forecast Volume for Seasonal Patrols, AOC, and Emergent Work
(2023-2025)

	Forecast		
	2023	**2024**	**2025**
Seasonal Patrols	5,300	5,300	5,300
AOC	22,000	22,000	22,000
Emergent Work	26,173	26,173	32,073
VM Work Orders (1)	*26,173*	*26,173*	*26,173*
Distribution Prev Maint Work Orders (2)			*5,900*
Totals	**53,473**	**53,473**	**59,373**

(b) Unit Cost Basis

For seasonal patrols, the forecast includes costs for both inspection and mitigation. The inspection unit cost is approximately $114 per hour. Seasonal patrol mitigations include both trims and removals, unlike AOC which is mainly comprised of trims. The mitigation unit cost is approximately $218 per hour for trims, with each trim taking four hours, and approximately $410 per hour for removals, with each removal taking eight hours to complete. Both trim and removal unit costs are based on hourly rates and subject to change depending on the type of mitigation.

For AOC, SCE only forecasts trims for the mitigation response, which reflects historical patrol findings during past AOC events. The unit cost of approximately $221 per trim is based on average unit costs for SCE's two largest contractors.

For emergent work, the forecast applies a blended unit cost.[94] The unit cost of approximately $540 in 2023 is based on assuming each emergent work point takes an average of 2.25 hours to complete. This unit cost reflects an average T&E rate of roughly $240 per crew hour using 2020 average contractor rates, escalated 3% each year to 2022.[95] It also incorporates the

[94] Generally, emergent work patrols find uncharacteristic growth or encroachment potential, which is typically mitigated via trim rather than removal.

[95] The hourly rate is based on averages, which typically requires a two- to three-person crew with a bucket truck and includes contract labor hours as well as equipment, vehicle, fuel and other support costs.

anticipated Arbora savings of 0.5 hours per trim reflecting the decrease in communication time for tree crews to be made aware of the work order. Additionally, SCE anticipates that general foremen will have better crew visibility enabling more informed dispatch decision-making.

2. Hazard Tree Program

In this GRC cycle, SCE is consolidating theHazard Tree Management Program (HTMP) and Dead and Dying Tree Removal into a single program, the Hazard Tree (HT) Program. The purpose of the HT Program is to reduce ignition and wildfire risk by removing or trimming trees with the potential to strike electric lines and equipment. As part of the program, inspectors assess the site and structural condition of trees that could fall into or otherwise impact electrical facilities and potentially lead to ignitions and outages. These trees can be located up to a significant distance on either side of SCE's electrical facilities within the Utility Strike Zone (USZ).

The HT Program targets two categories of trees: (1) live trees, which have historically been a part of the Hazard Tree Management Program (HTMP); and (2) dead or dying trees, which historically have been a part of the Dead and Dying Tree Removal Program. Each of these programs is described separately below, in Section II.B.2.a) for HTMP and Section II.B.2.b) for Dead and Dying Tree Removal.

a) Hazard Tree Management Program

(1) Work Description and Need

HTMP entails more detailed inspection and evaluation of trees in the USZ and outside of the routine line clearing inventory in HFRA. The program is designed to help SCE identify trees not targeted by other vegetation management programs that may be hazardous to SCE's assets and that are not at risk of growing into the regulatory clearance distance (RCD) as defined in Routine Vegetation Management, Section II.B.1.b)(1)(a) (CPUC compliance zone). As part of HTMP, SCE mitigates ignition risk from live trees or parts of a live tree that could fall in or blow into SCE's lines.[96] SCE based completion of its initial HTMP inspection schedule on the Tree Risk Index (TRI) model described in more detail in Section II.B.2.a)(1)(a) below, which ranks and prioritizes the riskiest circuit miles in SCE territory.

[96] Vegetation can create a risk to SCE facilities when the vegetation is located in fall-in zones (i.e., fall-in energized equipment), grow-in zones (i.e., beneath the energized equipment), blow-in zones (i.e., within general blow-in proximity to energized equipment), drop-in zones (where tree limbs overhang energized equipment), and side grow-in zones (i.e., adjacent to energized equipment).

SCE developed HTMP, in part, in response to data indicating vegetation-caused faults are primarily caused by living trees. Additionally, based on SCE's tracking of Tree Caused Circuit Interruptions (TCCI), a significant portion of TCCI originate outside the CPUC compliance zones but within the broader USZ. The cause and origin of failure are often trees falling over and branches or palm fronds breaking off and blowing into lines. As a result, SCE assesses the condition and conducts mitigation of live trees and vegetation outside the CPUC compliance zone but within the broader USZ in HFRA that pose a threat to SCE facilities. As shown in Table II-24 below, a significant portion of the TCCIs between 2015 and 2022 were associated with living trees. This table also demonstrates a downward trend in TCCI since the establishment of the HTMP program in 2019.

Table II-24
Tree Caused Circuit Interruptions (TCCI)
(2015-2022)[97]

Years	2015	2016	2017	2018	2019	2020	2021	2022	Total
Fall In	**132**	**172**	**279**	**149**	**266**	**153**	**156**	**117**	**1,424**
Living Tree	132	172	246	121	241	138	138	109	1,297
Dead Tree	0	0	33	28	25	15	18	8	127
Blow In	**207**	**292**	**194**	**188**	**174**	**60**	**89**	**57**	**1,261**
Living Tree	207	292	190	185	173	60	89	57	1,253
Dead Tree	0	0	4	3	1	0	0	0	8
Other causes	**65**	**81**	**61**	**74**	**105**	**91**	**90**	**82**	**649**
Total	**404**	**545**	**534**	**411**	**545**	**304**	**335**	**256**	**3,334**

HTMP has been reviewed by OEIS and approved as one of SCE's wildfire mitigation strategies. SCE's 2022 WMP Update was approved by OEIS on July 20, 2022 with a target to complete HTMP tree assessments along approximately 1,700 circuits by December 2024.[98] In its 2023 WMP, SCE included annual targets for the completion of HTMP tree assessments of 412, 408, and 440 grids/circuits in 2023, 2024, and 2025, respectively.[99]

[97] SCE continues to validate TCCI volumes for 2022.

[98] *See* Resolution SPD-2 Ratifying Action of the OEIS on SCE's 2022 Wildfire Mitigation Plan.

[99] Grids are SCE-defined geographic boundaries that define a work area. SCE has approximately 3,000 grids systemwide, including roughly 1,100 in HFRA. SCE's HTMP also operates on a circuit basis for its transmission network. SCE plans to transition to a grid basis as the framework for all inspections in 2023 and 2024 and to a circuit basis beginning in 2024 with completion of the transition anticipated in 2025.

(a) Tree Risk Index Model

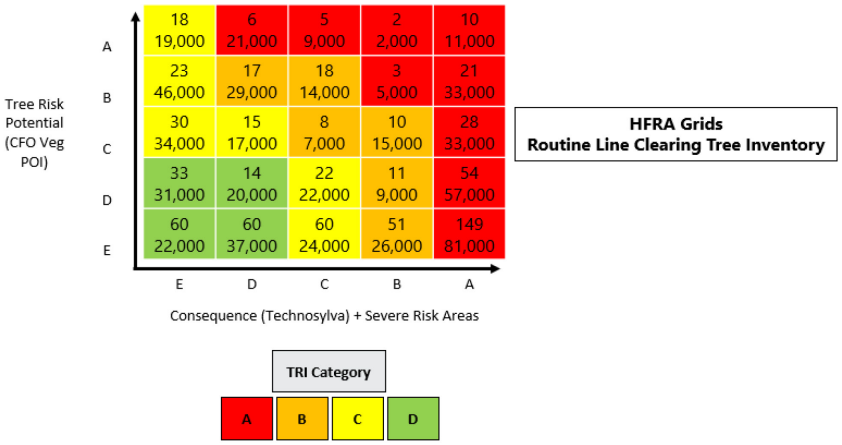
In 2021, SCE developed the Tree Risk Index (TRI) model to classify locations around its overhead equipment that have high vegetation contact risk. The TRI model utilizes a methodology similar to that used for High Fire Risk Informed (HFRI) inspections. On one axis, it factors in the probability of a fire starting from an SCE asset (i.e., Contact from Object and Probability of Ignition); on the other axis, it factors in the number of acres that would be affected by a fire (i.e., the Technosylva (TS) Consequence). The combination of the two factors results in a risk prioritization by grid, with TRI Category A representing the highest risk, and TRI Category D representing the lowest risk.

Figure II-14 below displays the most recent version of the TRI model. The higher risk grids are found in the upper right section of the matrix and the lower risk grids are found in the lower left section of the matrix. In addition to elevating grids with the highest proportion of Severe Risk Area[100] miles into consequence level A to align with SCE's Integrated Wildfire Mitigation Strategy, this version incorporates Vegetation Probability of Ignition (POI) model updates.[101]

[100] *See* Exhibit SCE-04, Vol. 05 for a more detailed discussion on Severe Risk Areas.

[101] The 2023 updated TRI may also eventually incorporate the most recent Technosylva version.

Figure II-14
Updated 5x5 TRI Model



In 2022, SCE began using the TRI model to prioritize risk for HTMP inspections, routine line clearing quality control, routine line clearing mitigation, and supplemental patrols. Specifically, TRI assists in the following vegetation management mitigation activities: (1) HTMP annual scope and reinspection frequency; (2) scheduling and timing of routine line clearing to align with peak wildfire season; (3) quality control inspections scope for routine line clearing; and (4) supplemental patrol inspections optimization.

SCE anticipates its TRI prioritization methodology will evolve over time to align with other SCE programs, such as asset inspections and grid hardening, and as new data becomes available. SCE intends to continuously improve and refine its prioritization methods to ensure risk-informed choices are incorporated within its Vegetation Management programs.

(b) <u>HTMP Inspections and the Use of the Tree Risk Calculator</u>

Since commencing HTMP inspections in 2019, SCE has largely completed initial inspection of all HFRA circuits. In this GRC period, SCE will re-commence with the inspection cycle using the TRI model as described above to prioritize locations by factoring in the probability of vegetation-caused ignitions and wildfire consequence.

HTMP requires inspectors, who are certified arborists,-[102] to inspect the USZ, which is the area on either side of SCE's electrical facilities from which a tree or a portion of a tree could strike or impact electric facilities. The USZ can vary significantly based on the height of the trees, slope conditions, and potential for wind driven vegetation. The HTMP inspectors complete a Level 2 assessment on subject trees.[103]

Typically, any tree in the USZ that is taller than its distance from SCE equipment can be a subject tree and is assessed by the inspector to identify either tree attributes or site conditions that could cause the tree to fail. After determining that a tree requires assessment, the inspector inputs data into the HTMP Tree Risk Calculator (TRC) to compute a risk score. The TRC was developed using the standards set forth by the ISA Tree Risk Assessment Qualification (TRAQ) to determine a risk score for each tree assessed and recommend a mitigation based on the risk score.[104] Inspectors also consider the distance from SCE's utility lines or equipment, as by definition, a tree only poses a risk if there is a target that the tree, or part thereof, can strike.

Ultimately, the TRC is a tool that assists in assessing the likelihood of failure and target impact. The inspector utilizes the TRC to determine a risk score based on six criteria: (1) Voltage Impact; (2) Fire Impact; (3) Likelihood of Impact; (4) Tree Lean; (5) Tree Height Factor; and (6) Site Condition Attributes. The final risk score can range from 1-100, with a score of 100 representing the highest level of risk, and helps inform inspectors in determining the appropriate mitigation.[105] In addition to the TRC risk score, the inspector uses professional experience and judgment in recommending a mitigation. In some instances, the inspector may recommend a mitigation different from that suggested by the TRC. SCE continues to improve the TRC based on field experience and understanding of best practices.

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[102] Unlike the Routine Vegetation Management inspection, HTMP requires an inspector to be a certified arborist. When referring to the HTMP inspection process, the term "inspector" refers to an inspector that is an ISA-certified arborist.

[103] A Level 2 assessment is comprised of a detailed 360-degree ground based visual assessment of the tree and its surrounding site. A Level 2 assessment includes walking completely around the tree, looking at the site, buttress roots, trunk and branches.

[104] *See* https://www.isa-arbor.com/Credentials/ISA-Tree-Risk-Assessment-Qualification for the International Society of Arboriculture's Tree Risk Assessment Qualification.

[105] *See* WP SCE-02, Vol. 10, pp. 67-71 – Workpaper for the TRC Template, including the six score criteria and the risk score calculation. This version of the TRC Template is scheduled to be implemented in the second quarter of 2023.

Finally, in Section II.B.1.a)(3)(a), SCE describes the consolidation of its inspection programs, including the HTMP inspection program. Beginning in Q2 2023, HTMP inspections will be included in the centralized inspection schedule to align with Routine Vegetation Management and the Dead and Dying Tree Removal Program. The centralized inspection schedule will provide the opportunity to perform inspections for routine line clearing and hazard trees at the same time. In other words, certified arborists will perform assessments of subject trees in the USZ (i.e., hazard inspections), alongside routine inspectors who are responsible for identifying clearance and hazard concerns within the routine inventory (i.e., routine inspections). As a result of the consolidation, SCE's forecast for HTMP inspections is included in Section II.B.1.a)(1)(c) above.

(c) HTMP Remediation

The majority of HTMP remediation involves tree removals. This contrasts with routine mitigation, which typically involves a mix of trims and removals. Removals are performed by contractors using a combination of industry-standard methods such as: (1) directional felling, (2) climb-sectionalize, (3) crane, and (4) high hazard. Contractors are also responsible for removing the resulting debris except where the tree location is 100 feet or more from the access road where USFS allows the debris to be cut up into smaller pieces and scattered along the forest floor.

Remediation timelines are informed by the assigned risk score from the TRC. Generally, trees with a risk score of 1-49 do not require immediate remediation, while trees with a risk score of 50-99 require remediation within 180 days of SCE's obtaining access and authority to complete the remediation.[106] Trees identified in a P1 work order[107] require remediation within 24 hours of observation.

(d) Property Owner Incentives

Since most trees to be remediated through HTMP are located on non-SCE property, property owner approval may be required to perform the remediation. SCE has authority to access properties to trim and remove trees under its easement rights and franchise rights, as well as certain authority in high fire threat districts (HFTD) and state responsibility areas (SRA). However, to minimize customer conflicts and impacts, reduce costs, and promote continued cooperation

[106] These TRC risk scores serve as a guide for the HTMP inspector for remediation considerations. In certain instances, having a lower risk score does not negate the necessity of remediation for that particular tree.

[107] P1 work orders comprise any vegetation that is expected to imminently fail and contact SCE's electrical facilities, as defined further in SCE's operational procedures UVM-08, Section 4.1.

within the community, SCE endeavors to contact property owners and seek approval 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 or negotiating with the property owner to overcome any opposition to removing the tree. Depending upon location, additional approvals may be required from homeowner associations or governmental agencies. Some property owners will oppose trimming or removing trees that are not currently dead or dying. In these cases, SCE will attempt to negotiate with property owners to provide incentives or reach mutually acceptable resolutions (e.g., providing replacement trees). When a property owner refuses, SCE's Event Expediating team coordinates communication, sends letters to customers notifying them a tree needs to be remediated on their property, and works within SCE's organization to obtain approval.

(2) Historical Variance Analysis

Table II-25
Recorded O&M Expenses for HTMP (2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Hazard Tree Mitigation	$6	$594	$851	$380	$1,553
Hazard Tree Removal	$0	$13,992	$51,004	$25,409	$12,988
Hazard Tree Program Management	$0	$317	$2,272	$3,313	$822
Hazard Tree Property Owner Incentives	$0	$0	$0	$40	$3
Totals	**$6**	**$14,904**	**$54,127**	**$29,141**	**$15,366**

In 2019, SCE first piloted and implemented HTMP, with most of the work performed in the latter part of the year. Approximately 6,000 trees were remediated for total recorded costs of $14.9 million.[108]

In 2020, HTMP recorded costs of $54.1 million, an increase of $39.2 million. Several factors contributed to the cost increase from 2019, including: (1) 2020 reflected the first full year of complete implementation with a remediation volume of12,000 trees, including rollover work from 2019 as a result of extreme weather conditions in 2019; (2) higher-cost removal work in dense forest areas with larger trees that generally require special equipment; and (3) the implementation of SB 247, which increased contractor costs for all vegetation management mitigation work.

[108] In this HTMP Section II.B.2.a), the term "remediate" refers to both trim and removal.

In 2021, SCE incurred lower recorded costs of $29.1 million, a decrease of $25.0 million, due to the removal of fewer trees than the previous year, with a remediation volume of 3,400 trees. The decrease in volume resulted from resource constraints following safety stand-downs. Removal costs simultaneously increased due to crew relocation, continued complexity of the work, and increased environmental controls.

In 2022, SCE recorded costs of $15.4 million, a decrease of $13.7 million. In that year, SCE performed almost 5,500 removals, comprising scheduled work and rollover work from 2021. The lower total cost in 2022 compared to 2021 was attributable to lower average unit costs, as SCE was able to complete more work using unit rates (as compared to T&E rates, which are generally higher than unit rates) due to better availability of tree crews.

(3) RAMP Integration

Table II-26
RAMP Control – HTMP
Forecast O&M Expenses and Risk Spend Efficiency (RSE)[109]
Comparison of 2022 RAMP vs. 2025 GRC (2022-2028)
(Nominal $000)

RAMP Risk	RAMP ID	RAMP Control / Mitigation Name	Filing	2022	2023	2024	2025	2025 - 2028 RSE
Wildfire	C16	Hazard Tree Management Program	RAMP	$42,636	$45,575	$44,039	$46,056	17
			GRC	$24,171	$41,955	$56,878	$53,527	11
			Variance	($18,464)	($3,620)	$12,839	$7,470	(6)

Table II-26 above shows a comparison between the forecast O&M expenses and RSE for the HTMP control evaluated in the 2022 RAMP Wildfire chapter and the forecast presented in this GRC request.

The 2022 RAMP and 2025 GRC forecasts differ due to changes in the estimated HTMP removal volumes in 2023 through 2025, as well as the addition of certain costs to the GRC. For the GRC, SCE reduced approximately 500 trees removed in 2023 and added approximately 1,400 trees in 2024. For 2023 through 2025, SCE added costs for environmental support and property owner incentives to the GRC forecast. Despite the reduction in trees removed in 2025, the addition of

[109] *See* WP SCE-02, Vol. 10, pp. 36-42, Workpaper for Wildfire Vegetation Management RAMP to GRC Integration. Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

environmental support costs resulted in a net increase in that year. In addition, the RAMP forecast included inspection costs for HTMP, whereas the GRC forecast excludes these costs as SCE plans to consolidate inspection costs across the Routine Vegetation Management, HTMP, and Dead and Dying Tree Removal programs going forward.[110]

There was minimal change to the RSE input assumptions for HTMP between the 2022 RAMP and the 2025 GRC. However, the RSE did decrease slightly as a result of moving to the Weighted Average Cost of Capital (WACC) for future cost discounting, which was a global change to SCE's RSEs.[111] [112]

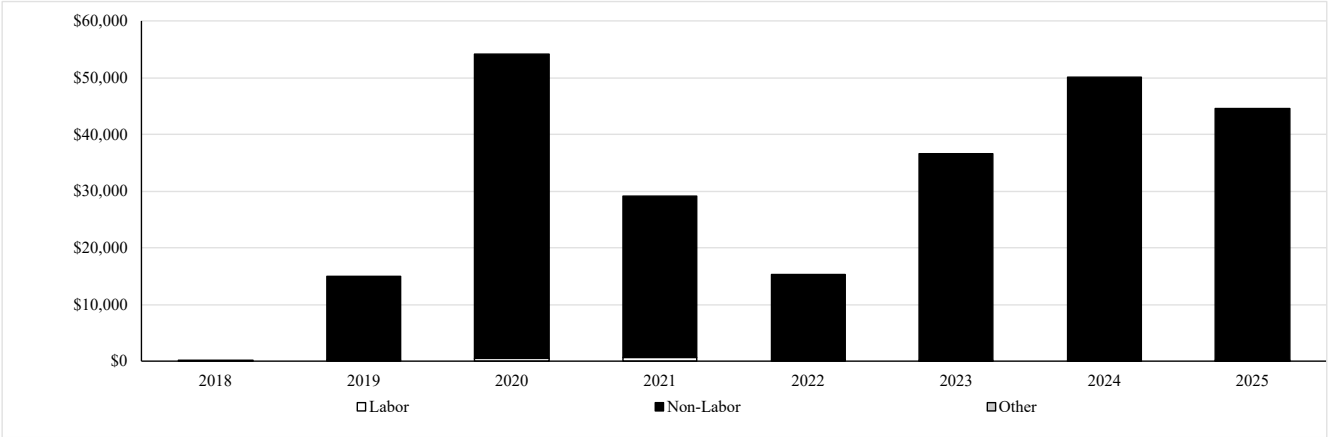
[110] *See* Section II.B.1.a)(1) for inspections for HTMP.

[111] Additional information on the risk modeling can be found in WP SCE-04 Vol. 0, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[112] For additional discussion please refer to SCE-01, Vol. 02.

(4) Basis for Forecast

Figure II-15
Forecast O&M Expenses for HTMP
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[113]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$0	$228	$448	$615	$146	$1	$2	$4
Non-Labor	$6	$14,676	$53,679	$28,527	$15,220	$36,633	$50,086	$44,575
Other								
Total Expenses	**$6**	**$14,904**	**$54,127**	**$29,141**	**$15,366**	**$36,634**	**$50,088**	**$44,579**

[113] A $2.5 million increase related to labor in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04. Also, in this forecast, SCE incorporates non-labor savings related to the Arbora tool and SCE's Targeted Undergrounding capital program. However, TUG savings are not currently reflected in the standard workpapers or the RO model for HTMP. SCE found this error late in the development of its 2025 GRC testimony and will submit errata to correct the errors in the standard workpapers and RO model.

Also, *see* WP SCE-02, Vol. 10, pp. 72-77 – O&M Detail for Wildfire Vegetation Management and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "Hazard Tree Inspection", "Hazard Tree Mitigation", "Hazard Tree Program Management", "Hazard Tree Property Owner Incentives", and "Hazard Tree Removal". This workpaper includes recorded O&M expenses for HTMP inspections, while Figure II-15 above excludes these recorded O&M expenses. Recorded O&M expenses for HTMP inspections reside in Figure II-5 for Traditional Ground Inspections.

Table II-27
Forecast O&M Expenses for HTMP by Activity (2023-2025)
(Constant 2022 $000)

	Forecast		
	2023	**2024**	**2025**
Hazard Tree Removal	$36,321	$49,653	$44,191
Hazard Tree Mitigation	$224	$312	$278
Hazard Tree Property Owner Incentives	$89	$123	$110
Totals	**$36,634**	**$50,088**	**$44,579**

For HTMP, SCE forecasts normalized O&M expenses of $44.203 million for the Test Year.[114] As shown in Table II-27 above, SCE includes individual forecasts for HTMP removals, HTMP mitigations (trimming), and Property Owner Incentives, and provides the basis for each forecast in the respective sections below. Also, for this GRC, in line with SCE's consolidated inspection strategy, SCE forecasts HTMP inspection costs as part of Traditional Ground Inspections, as detailed in Section II.B.1.a)(1)(c). Finally, SCE anticipates normalized total operational savings of

[114] *See* WP SCE-02, Vol. 10, pp. 78-84 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP) and Confidential WP SCE-02, Vol. 10, pp. 11-17 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP). TUG savings are not currently reflected in the standard workpapers or the RO model for HTMP. SCE found this error late in the development of its 2025 GRC testimony and will submit errata to correct the errors in the standard workpapers and RO model.

$0.377 million in the Test Year resulting from reduced HTMP work during the 2025 through 2028 period as a result of SCE's Targeted Undergrounding capital program.[115]

(a) HTMP Removal and Mitigation

Table II-28
Forecast Inspections and Removal and Mitigation Volumes for HTMP (2023-2028)[116]

	2023	2024	2025	2026	2027	2028
Inspections	137,000	178,000	154,000	137,000	178,000	154,000
% Prescription	5%	5%	5%	5%	5%	5%
Total Prescriptions	6,850	8,900	7,700	6,850	8,900	7,700
New Inventory (1)	1,000	1,000	1,000	1,000	1,000	1,000
Total HTMP Remediations	7,850	9,900	8,700	7,850	9,900	8,700
Total HTMP Removals	6,987	8,811	7,743	6,987	8,811	7,743
% of Removals	89%	89%	89%	89%	89%	89%
Total HTMP Mitigations	864	1,089	957	864	1,089	957
% of Mitigations	11%	11%	11%	11%	11%	11%

The Hazard Tree Program has two remediation types available when a prescription is generated: (1) removal and (2) mitigation (trim). SCE provides below the basis for forecast for each remediation type.

(i) HTMP Removal

For HTMP removals, SCE forecasts normalized O&M expenses of $44.191 million for the Test Year.[117] Based on an itemized forecast methodology, the Test Year forecast for HTMP removals is calculated using total volume of removals multiplied by a blended unit cost. The below section shows the total forecast and underlying volume and unit cost for the forecast years 2023 through 2025.

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115 *See* Exhibit SCE-04, Vol. 05, Part 2 for a more detailed discussion on Targeted Undergrounding.

116 HTMP follows a risk-prioritized inspection cycle to prioritize completion of HTMP work for higher risk locations in HFRA. As a result, there is no constant annual inspection volume. However, SCE estimates a three-year cycle to complete inspection of HFRA for HTMP.

117 *See* WP SCE-02, Vol. 10, pp. 78-84 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP) and Confidential WP SCE-02, Vol. 10, pp. 11-17 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP).

(a) Volume Of Work

In determining the volume of HTMP removals and mitigations (trims), SCE calculates the number of remediations by first assuming that 5% of total annual inspections identify tree failure and require remediation. The failure rate is based on historical data. Next, SCE assumes 1,000 additional remediations would be required over the course of each year due to new tree growth. Total remediation volume comprises both components. Based on historical averages, SCE then allocates 89% of the total remediation volume to removal work, and 11% to mitigation (trim) work. Using this calculation, SCE's forecast assumes an average annual volume of approximately 7,800 HTMP removals.

(b) Unit Cost Basis

Using the most recent vendor costs, SCE derives a blended unit cost of approximately $5,200 with a base cost and adder components. SCE calculates the base cost by assuming historical-based percentages for the use of unit and T&E rates, and conifer and non-conifer work. Adder components are calculated assuming 75% and 10% of removals require traffic control and crane use, respectively. Finally, SCE adds support activity costs to the sub-total. In line with market pressures for tree services work in recent years, SCE assumes a 10% increase in the blended unit cost in 2024.

(ii) HTMP Mitigation (Trim)

For HTMP mitigation work, SCE forecasts normalized O&M expenses of $0.278 million for the Test Year.[118] Based on an itemized forecast methodology, the Test Year forecast for HTMP mitigations (trims) is calculated using total volume of mitigations (trims) multiplied by a blended unit cost.

(a) Volume of Work

Similar to SCE's calculation for HTMP removal volume, SCE uses historical averages to allocate 11% of forecast total remediation volume to mitigations (trims). This results in approximately 960 average annual trims for HTMP. SCE details the calculation of the forecast total remediation volume in Section II.B.2.a)(4)(a)(i)(a) above.

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[118] *See* WP SCE-02, Vol. 10, pp. 78-84 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP) and Confidential WP SCE-02, Vol. 10, pp. 11-17 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP).

(b) Unit Cost Basis

For 2023, SCE determined a unit cost of approximately $227 for HTMP mitigation using weighted average costs as of August 2022.[119] In line with market pressures for tree services work in recent years, SCE assumes a 10% increase in the blended unit cost in 2024.

(b) Property Owner Incentives

SCE forecasts normalized O&M expenses of $0.111 million for property owner incentives for the Test Year.[120] SCE plans to mitigate risk by removing approximately 47,000 hazard trees from inventory between 2023 and 2028. In its calculation of the property owner incentives forecast, SCE assumes 7% of total forecasted removal volume requires a property owner incentive toward the cost of tree replacement. For the Test Year, SCE forecasts a unit cost of approximately $176 for property owner incentives.

b) Dead & Dying Tree Removal Program

(1) Work Description and Need

SCE's Dead & Dying Tree Removal Program was established in response to the epidemic of dead and dying trees brought on by climate change, years of drought, and bark beetle infestation. 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 power lines and poles. Additionally, GO 95 and PRC 4923 contain requirements that SCE mitigate the hazards posed by dead trees or those that are identified as significantly compromised. 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 fall into power lines from well outside of the CPUC compliance zone.

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[119] *See* WP SCE-02, Vol. 10, pp. 78-84 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP) and Confidential WP SCE-02, Vol. 10, pp. 11-17 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP).

[120] *See* WP SCE-02, Vol. 10, pp. 78-84 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP) and Confidential WP SCE-02, Vol. 10, pp. 11-17 – Forecast O&M Expenses Workpaper for Hazard Tree Management Program (HTMP).

Similar to HTMP, SCE's Dead and Dying Tree Removal Program has been reviewed by OEIS and approved as one of SCE's wildfire mitigation strategies. In its approved 2022 WMP Update covering 2022 through 2024, SCE set targets to inspect and prescribe mitigation for dead and dying trees with strike potential along 900 circuits annually. In its 2023 WMP covering 2023 through 2025, SCE's target for this program is to inspect and prescribe mitigation for dead and dying trees with strike potential within 509 grids/circuits for 2023, 485 grids/circuits for 2024, and 536 grids/circuits for 2025, all in HFRA.[121]

(a) Dead & Dying Tree Inspections

SCE prioritizes inspections for Dead and Dying Tree Removal in accordance with California's Task Force Tree Mortality Map.[122]

Under this program, SCE conducts patrols in HFRA beyond the CPUC compliance zone to identify and remove dead, dying, or diseased trees affected by drought conditions and/or insect infestation. SCE uses a contract workforce that identifies dead, dying, and diseased trees on an ongoing basis. In accordance with ANSI A300, the contractors perform a Level 1 visual assessment[123] which focuses on identifying obvious tree defects (e.g., dead branches, leaning) that are observable from the side of the tree nearest the electric facilities. This can be ground-based, vehicle-based, or aerial-based (e.g., fixed-wing, helicopter, drone, LiDAR), as appropriate for the site conditions, type of infrastructure, and tree population being considered.

During a typical inspection for this program, a tree is classified as dead when the canopy has declined by 75% or greater and/or is significantly infected with bark beetles

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[121] In 2023, SCE is transitioning to a grid-based inspection schedule for distribution under HTMP and Dead and Dying Tree Removal Program. However, in 2025, SCE plans to schedule inspections for those programs on a circuit-basis.

[122] The Dead and Dying Tree Removal Program targets trees for inspection and mitigation in HFRA that are identified in the California Mortality mapping inventory, *available at link* High Hazard Zones Map of Drought Related Tree Mortality.

[123] A Level 1 assessment is described as an assessment from one side of the tree (side nearest the electric facilities) and can be ground-based, vehicle-based, or aerial-based (e.g., fixed-wing, helicopter, drone, LiDAR), as appropriate for the site conditions, type of infrastructure, and tree population being considered. A Level 1 assessment focuses on identifying obvious tree defects (i.e., dead branches, leaning) that are observable from the side of the tree nearest the electric facilities. If a condition of concern is identified during the Level 1 assessment, recommendations are developed regarding possible mitigation. If the Level 1 assessment cannot sufficiently determine the severity of the condition, a Level 2 assessment is conducted.

or other invasive insects, which is apparent based on a visual assessment. This tree is subsequently assigned to the Dead and Dying Tree Removal Program.

As described in Section II.B.1.a)(3)(a) above, SCE plans to consolidate inspections for its three largest programs. As a result, vendor contracts and scheduling for inspections will be consolidated for Routine Vegetation Management, HTMP, and Dead & Dying Tree Removal.

(b) Dead & Dying Tree Removal

Removals for the Dead & Dying Tree Removal Program are conducted in the same manner as removals for HTMP. SCE describes HTMP removals above in Section II.B.2.a)(1)(c), HTMP RemediationII.B.2.a)(1)(c).

(2) Historical Variance Analysis

Table II-29
Recorded O&M Expenses for Dead and Dying Tree Removal Program[124]
(2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Dead and Dying Tree Removal	$39,365	$29,743	$31,490	$11,949	$19,362
Totals	**$39,365**	**$29,743**	**$31,490**	**$11,949**	**$19,362**

In 2018, SCE recorded $39.4 million in O&M expenses. That year, SCE, removed approximately 24,000 dead and/or diseased trees at a unit cost of approximately $1,650.

In 2019, SCE recorded $29.7 million in O&M expenses, a decrease of $9.6 million from 2018. The decrease was attributed to increased precipitation amounts and diminishing drought severity, which reduced the trees that needed to be mitigated in 2019. SCE removed approximately 13,000 dead and/or diseased trees at a unit cost of approximately $2,300. The higher unit cost was primarily due to mitigation of larger trees requiring special equipment and an increase in crew hours billed at a higher T&E rate.

[124] This table shows recorded costs for mitigation work for Dead and Dying Tree Removal. Inspection costs for this program reside in Table II-7, which shows recorded inspection costs for all Vegetation Management programs.

In 2020, SCE recorded $31.5 million in O&M expenses, an increase of $1.7 million over 2019. SCE removed approximately 11,000 dead and/or diseased trees at a unit cost of approximately $2,900. The increased costs reflect higher renegotiated rates as a result of SB 247.

In 2021, SCE recorded $12.0 million in O&M expenses, a decrease of $19.5 million from 2020. SCE removed approximately 3,000 dead and/or diseased trees at a unit cost of $3,983. SCE completed a lower volume of prescribed removals in 2021 due to resource constraints, lengthier environmental reviews, and more robust environmental controls.

In 2022, SCE recorded $19.4 million in O&M expenses, an increase of $7.4 million over 2021. SCE removed approximately 9,000 dead and/or diseased trees at a unit cost of $2,151. The higher volume reflected an increase in the availability of tree crews and included rollover work from 2021. The decrease in unit cost is primarily due to SCE performing removals in areas with lower tree density.

(3) RAMP Integration

Table II-30
RAMP Control – Dead & Dying Tree Removal
Forecast O&M Expenses and Risk Spend Efficiency (RSE)[125]
Comparison of 2022 RAMP vs. 2025 GRC (2022-2028)
(Nominal $000)

RAMP Risk	RAMP ID	RAMP Control / Mitigation Name	Filing	2022	2023	2024	2025	2025 - 2028 RSE
Wildfire	C18	Dead and Dying Tree Removal Program	RAMP	$31,258	$36,212	$39,419	$44,700	23
			GRC	$29,003	$28,946	$32,666	$38,377	16
			Variance	($2,255)	($7,266)	($6,753)	($6,323)	(7)

Table II-30 above shows a comparison between the forecast O&M expenses and RSE for the Dead and Dying Tree Removal control evaluated in the 2022 RAMP Wildfire chapter and the forecast presented in this GRC request. The 2022 RAMP and 2025 GRC forecasts differ due to a reduction in tree volume between the two forecast periods. In addition, the RAMP forecast included inspection costs for Dead and Dying Tree Removal, whereas the GRC forecast excludes these

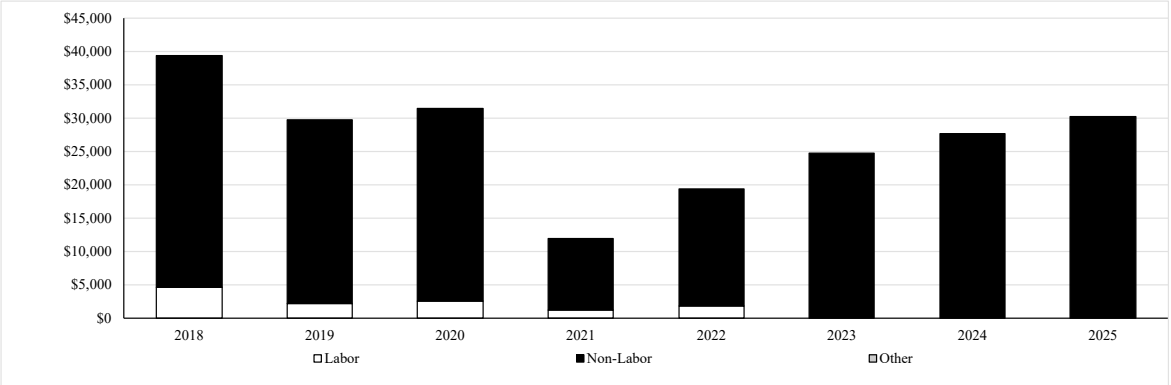
[125] *See* WP SCE-02, Vol. 10, pp. 36-42, Wildfire Vegetation Management RAMP to GRC Integration. Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

costs as SCE plans to consolidate inspection costs across the Routine Vegetation Management, HTMP, and Dead and Dying Tree Removal programs going forward.[126]

There was minimal change to the RSE input assumptions for Dead and Dying Tree Removal between the 2022 RAMP and the 2025 GRC. However, the RSE did decrease slightly as a result of moving to the WACC for future cost discounting, which was a global change for SCE's RSEs.[127] [128]

(4) Basis for Forecast

Figure II-16
Forecast O&M Expenses for Dead & Dying Tree Removal Program
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[129]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$4,615	$2,173	$2,616	$1,222	$1,788			
Non-Labor	$34,749	$27,570	$28,874	$10,727	$17,574	$24,775	$27,707	$30,204
Other								
Total Expenses	**$39,365**	**$29,743**	**$31,490**	**$11,949**	**$19,362**	**$24,775**	**$27,707**	**$30,204**

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[126] *See* Section II.B.2.b)(1)(a) for inspections for Dead and Dying Tree Removal.

[127] Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[128] For additional discussion please refer to Exhibit SCE-01, Vol. 02.

[129] A $1.5 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to Exhibit SCE-06, Vol. 04.

Also, *see* WP SCE-02, Vol. 10, pp. 85-90 – O&M Detail for Dead, Dying and Diseased Tree Removal and

(*Continued*)

For Dead and Dying Tree Removal, SCE forecasts normalized O&M expenses of $30.204 million for the Test Year.[130] SCE utilized an itemized forecast methodology to develop the forecast.

The Dead and Dying Tree Removal forecast includes costs for removals, disposal, use of cranes, and traffic control. For this GRC, in line with SCE's consolidated inspection strategy, SCE forecasts inspection costs for the Dead and Dying Tree Removal Program as part of Traditional Ground Inspections, as detailed in Section II.B.1.a)(1)(c).

(a) Volume of Work

To forecast the volume of removals for the Dead and Dying Tree Removal Program, SCE derived the 2023 forecast of 8,300 removals based on the average removals from 2020-2022. SCE assumed an annual increase of 300 units through 2028 to account for anticipated drought conditions.

(b) Unit Cost Basis

To forecast the unit cost for removals, SCE derived a blended cost of approximately $3,200 using the most recent vendor costs to calculate base costs and adder components. SCE calculates base costs by assuming a 90%/10% split between medium and large diameter at breast height (DBH) unit rates and a 75%/25% allocation between conifer and non-conifer unit rates. Adder components are calculated assuming 50% of removals require traffic control, and 10% require cranes. Finally, SCE adds support activity costs to the subtotal. In line with market pressures for tree services work in recent years, SCE assumes a 10% increase in the blended unit cost in 2024.

3. Structure Brushing

SCE's Structure Brushing program utilizes dedicated structure brushing crews to annually inspect, document, and clear vegetation surrounding distribution and transmission poles and

WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "Drought Tree Removal" and "Bark Beetle Remediation". This workpaper includes recorded O&M expenses for inspections for Dead, Dying and Diseased Tree Removal, while Figure II-16 above excludes these recorded O&M expenses. Recorded O&M expenses for inspections for Dead, Dying and Diseased Tree Removal reside in Figure II-5 for Traditional Ground Inspections.

130 *See* WP SCE-02, Vol. 10, pp. 91-93 – Forecast O&M Expenses Workpaper for Dead, Dying and Diseased Tree Removal and Confidential WP SCE-02, Vol. 10, pp. 18-20 – Forecast O&M Expenses Workpaper for Dead, Dying and Diseased Tree Removal.

towers in the HFRA and State Responsibility Areas (SRA)[131] in accordance with compliance requirements and as part of SCE wildfire mitigation efforts.

In SCE's 2021 GRC Track 1, this work was identified as Expanded Pole Brushing, a sub-activity within Routine Vegetation Management. Since the Track 1 filing in 2019, the program has expanded to include sub-transmission towers, in addition to distribution poles.[132] Because the Structure Brushing crews are different from the tree inspection and tree trimming crews used in Routine Vegetation Management, and because the program has grown substantially in recent years, Structure Brushing is forecasted separately in this GRC. Unlike other activities in Vegetation Management, inspections for the Structure Brushing program will not be consolidated with routine tree inspections because Structure Brushing's crews and maintenance cycles are different from those of other vegetation management programs.

The strategy and goals of SCE's Structure Brushing program are aligned with those SCE proposed in its 2022 WMP and have been reviewed and approved by the OEIS as one of SCE's wildfire mitigation strategies.[133] In SCE's 2022 WMP, SCE established targets to inspect and clear (where clearance is needed) 78,700 structures, with the exception of structures for which there are customer access or environmental constraints. SCE strove to inspect and clear (where clearance is needed) 170,000 structures, with the exception of structures for which there are customer access or environmental constraints. In SCE's 2023 WMP, SCE established targets to inspect and clear (where clearance is needed) 63,700 structures, with the exception of structures for which there are customer access or environmental constraints. SCE will strive to inspect and clear (where clearance is needed) 135,200 structures, with the exception of structures for which there are customer access or environmental constraints. The structures targeted for brushing under the WMP (expanded scope) are in addition to those structures subject to PRC 4292 (compliance scope).

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[131] State Responsibility Areas (SRA) are recognized by the Board of Forestry and Fire Protection as areas where Cal Fire is the primary emergency response agency responsible for fire suppression and prevention.

[132] In the third quarter of 2022, Vegetation Management took on sub-transmission compliance structures from Transmission to increase efficiency in routine maintenance.

[133] *See* SCE's 2022 WMP Update dated February 18, 2022.

a) Work Description and Need

The Structure Brushing program removes vegetation at the base of select distribution and sub-transmission structures[134] to reduce the chance of ignition and/or fire spread due to a spark or contact with failed equipment. PRC 4292 requires utilities in certain areas and at certain times to "maintain around and adjacent to any pole or tower which supports a switch, fuse, transformer, lightning arrester, line junction, or dead end or corner pole, a firebreak which consists of a clearing of not less than 10 feet in each direction from the outer circumference of such pole or tower." Specifically, the brushing program removes vegetation to create 10-foot radial (when attainable) and eight-foot vertical clearance.

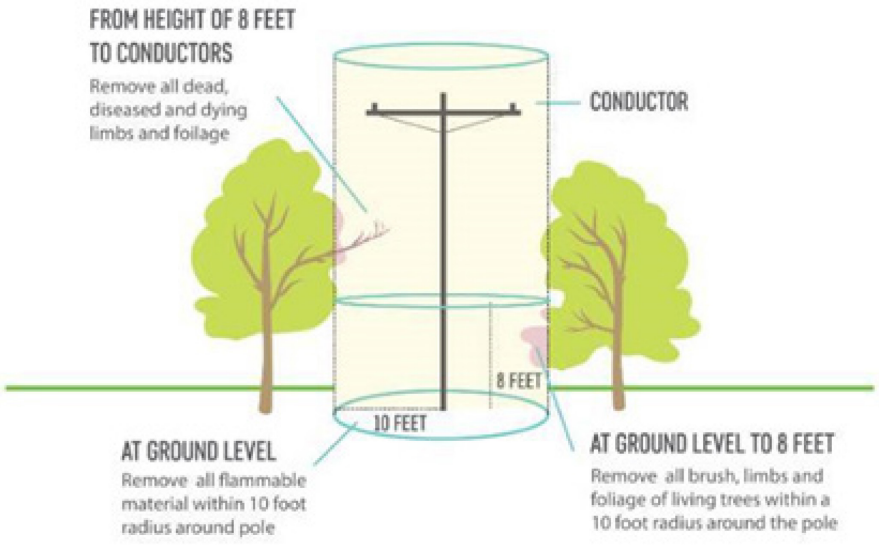
Structure Brushing mitigates the risk posed by vegetation at the base of poles and structures which can provide the fuel needed to convert a spark from equipment failure into a fire. This vegetation can also support fire propagation, especially during dry and windy conditions. Additionally, even where the equipment is not the source of the ignition, brush surrounding a pole may catch fire and damage electric assets, impeding power restoration and reconstruction efforts.

Figure II-17 illustrates the compliance requirements for clearances around structures subject to PRC 4292 (compliance scope).[135]

[134] Sub-transmission structures are typically lines with voltages that are at least 66 kV and less than 220 kV.

[135] The structure brushing program maintains clearance from the ground up to 8 feet. Clearances above 8 feet are maintained by Routine Vegetation Management.

Figure II-17
Brush Removal Near SCE Structures in Compliance with PRC 4292

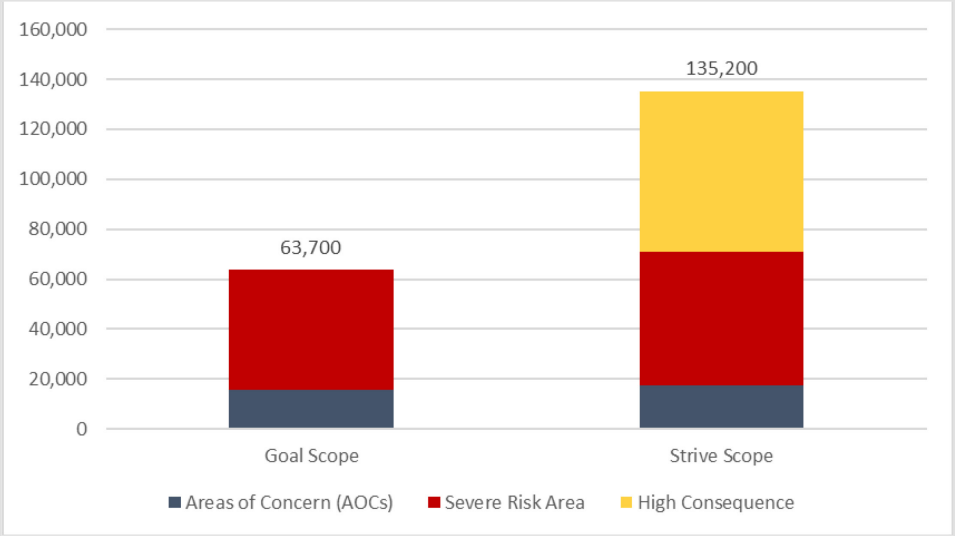


SCE maintains the same clearance distances for certain high-risk structures in HFRA as part of its expanded scope. The expanded scope includes high-risk structures that are incremental to the compliance scope, such as select structures that are in HFRA but exempt from PRC 4292, structures in AOC,[136] or structures with non-exempt equipment and highest potential wildfire consequence. All structures are prioritized using SCE's Integrated Wildfire Mitigation Strategy (IWMS), which targets distribution structures in AOCs, Severe Risk Areas, and High Consequence Segments.[137] Figure II-18 below depicts the breakdown of SCE's "goal scope" and "strive scope" for the expanded structure brushing program by AOC, Severe Risk Areas, and high consequence. The goal scope is SCE's minimum target for the expanded structure brushing program and is made up of AOC and Severe Risk Areas structures. The strive scope adds additional structures considered high consequence.

[136] The AOC population aims to mitigate risk in areas identified by SCE's Fire Science team that pose intra-year increased fuel-driven and wind-driven fire risk.

[137] The approach of targeting structures in AOCs, Severe Risk Areas, and High Consequence Segments for inspection and clearing is similar to the High Fire Risk Informed Inspection Program scope prioritization. *See* Exhibit SCE-04, Vol. 05 for more details on IWMS.

Figure II-18
Breakdown of Structure Brushing Expanded Scope by AOC, Severe Risk Areas, and High Consequence (2023)[138]



b) Historical Variance Analysis

Table II-31
Recorded O&M Expenses for Structure Brushing (2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Structure Brushing	$0	$3,986	$13,782	$14,650	$10,811
Totals	$0	**$3,986**	**$13,782**	**$14,650**	**$10,811**

In 2018, costs for Structure Brushing activities were recorded within the Routine Vegetation Management accounts.

In 2019, SCE separated its pole brushing program from Routine Vegetation Management. SCE recorded $3.986 million in O&M expenses, brushing approximately 160,000 poles at an average unit cost of $16 per pole, in nominal dollars. The average unit cost was based on a

[138] The goal and strive scope are included in SCE's 2023 WMP and relate to expanded structure brushing. The volume shown relates to 2023 work only and therefore excludes 200 structures SCE proposes to add in 2025 to meet its Climate Adaptation Vulnerability Assessment (CAVA) requirements in accordance with D.20-08-046.

longstanding contract with a single contractor. Prior to this year, pole brushing costs were commingled with other mitigation costs.

In 2020, SCE recorded $13.8 million for Structure Brushing O&M expenses, an increase of $9.8 million over 2019. SCE cleared approximately 230,000 distribution poles at an average unit cost of $44 per pole. In addition, the scope of work for contracts increased to include individual environmental review and/or monitoring. Given the change in scope and exposure to more first-time clearances, SCE's prime contractor re-negotiated an increase in the unit cost. As a result of both increased volume and additional documentation and environmental coordination, SCE needed to procure additional contractors to complete the work on schedule.

In 2021, SCE recorded $14.7 million for Structure Brushing O&M expenses, an increase of $0.9 million over 2020.[139] SCE cleared approximately 163,000 distribution poles at an average unit cost of $47 per pole. In this year, SCE began targeting AOCs, or high-risk structures, which required some scheduling changes and re-alignment of resources. To support this program, SCE hired two additional contractors at a higher market rate, due to the larger and more complicated scope.

In 2022, SCE recorded $10.8 million for Structure Brushing O&M expenses, a decrease of $3.9 million from 2021. SCE cleared approximately 158,000 structures. SCE awarded four new contracts to competitive bidders with an average unit cost of $83 for the compliance scope and an average unit cost of $65 for the expanded scope. The increase of average unit costs was due to the inclusion of sub-transmission compliance structures for the first time.[140] These structures may be difficult to access and/or are first-time clearances.

[139] SCE's 2021 Structure Brushing activity should reflect $12.1 million in costs but was recorded as $14.7 million due to an overaccrual.

[140] SCE previously responded to sub-transmission structures through notifications and switched to a programmatic maintenance approach in 2022.

c) RAMP Integration

Table II-32
RAMP Control – Expanded Pole Brushing
Forecast O&M Expenses and Risk Spend Efficiency (RSE)[141]
Comparison of 2022 RAMP vs. 2025 GRC (2022-2028)
(Nominal $000)

RAMP Risk	RAMP ID	RAMP Control / Mitigation Name	Filing	2022	2023	2024	2025	2025 - 2028 RSE
Wildfire	C17	Expanded Pole Brushing	RAMP	$7,882	$7,754	$7,702	$7,739	2,221
			GRC	$10,811	$8,699	$9,569	$10,526	8,452
			Variance	$2,928	$945	$1,867	$2,787	6,231

Table II-32 above shows a comparison between the forecast O&M expenses and RSE for the Expanded Pole Brushing control evaluated in the 2022 RAMP Wildfire chapter and the forecast presented in this GRC request. The GRC forecast varies from the 2022 RAMP forecast due to an increase in scope as well as an increase in unit cost for the new contract cycle.

The GRC forecasts are higher than the RAMP forecasts due to updated inputs. Using more recent data, SCE found that expanded pole brushing activity has higher mitigation effectiveness, because poles that had been brushed within 12 months of ignition were found to have an even lower ignition rate than those that were never brushed, compared to previous data. In addition, SCE added SCE's Fire Investigation Preliminary Analysis (FIPA) data to its calculation of driver failure rates, which increased the annual frequency of ignitions.[142]

The RSE for Expanded Pole Brushing increased because of the inclusion of FIPA data as well as the review of which risk drivers Expanded Pole Brushing mitigates against. Because the inclusion of FIPA data increased the frequency of ignition from equipment failure, and because structure

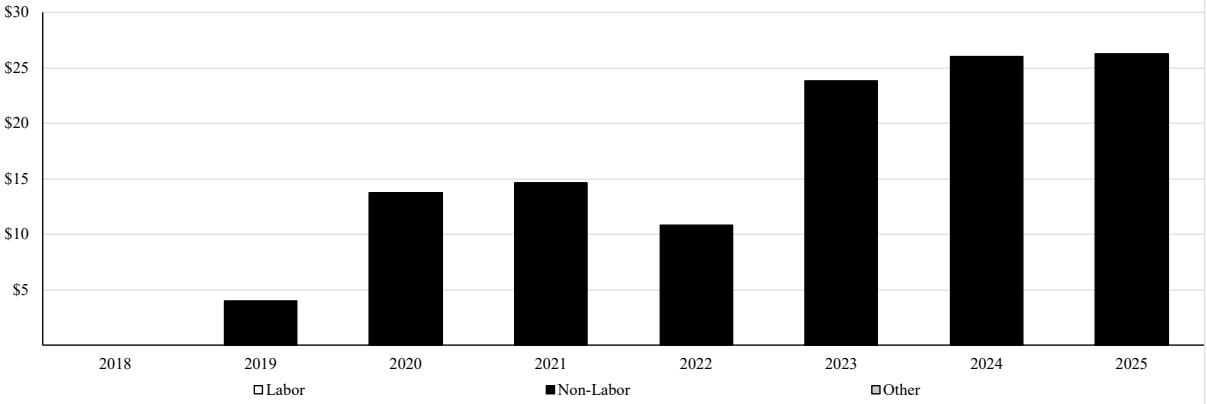
[141] *See* WP SCE-02, Vol. 10, pp. 36-42, Workpaper for Wildfire Vegetation Management RAMP to GRC Integration. Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[142] FIPA data represents SCE's detailed analysis of each ignition across its service territory.

brushing was shown to be even more effective at mitigating those risks, the resulting RSE was higher.[143] [144]

d) Basis for Forecast

Figure II-19
Forecast O&M Expenses for Structure Brushing
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[145]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor		$			$	$32	$54	$108
Non-Labor		$3,986	$13,782	$14,650	$10,811	$23,828	$25,959	$26,146
Other								
Total Expenses		**$3,986**	**$13,782**	**$14,650**	**$10,811**	**$23,859**	**$26,013**	**$26,254**

[143] Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[144] For additional discussion on the updated frequency of ignition, see SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[145] A $1.5 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04. Also, in this forecast, SCE incorporates savings related to SCE's Targeted Undergrounding capital program. However, TUG savings are not currently reflected in the standard workpapers or the RO model for Structure Brushing. SCE found this error late in the development of its 2025 GRC testimony and will file errata to correct the errors in standard workpapers and RO model.

Also, *see* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activity "Structure Brushing".

For Structure Brushing, SCE forecasts normalized O&M expenses of $25.766 million for the Test Year.[146],[147] SCE utilized an itemized forecast methodology to develop the forecast. SCE also anticipates normalized total operational savings of $0.488 million in the Test Year resulting from reduced Structure Brushing work during the 2025 through 2028 period as a result of SCE's Targeted Undergrounding capital program.

Using the 2022 recorded volume, SCE anticipates brushing over 238,000 structures (poles and towers) in 2023,[148] which includes the both the compliance and expanded scopes. SCE's forecast assumes all structures in scope are accessible and contemplates two visits to structures in the compliance scope in HFRA.

[146] *See* WP SCE-02, Vol. 10, pp. 94-99 – Forecast O&M Expenses Workpaper for Structure Brushing and Confidential WP SCE-02, Vol. 10, pp. 21-26 – Forecast O&M Expenses Workpaper for Structure Brushing. TUG savings are not currently reflected in the standard workpapers or the RO model for Structure Brushing. SCE found this error late in the development of its 2025 GRC testimony and will file errata to correct the errors in standard workpapers and RO model.

[147] SCE's Modeling, Forecasting, and Analysis O&M forecast presented in SCE-06, Vol. 03, Ch. V includes $0.119 million in the Test Year for Structure Brushing related to the Climate Adaptation Vulnerability Assessment (CAVA). SCE assumes approximately 200 structures require brushing for CAVA starting in 2025. *See* WP SCE-02, Vol. 10, pp. 100-102 – Workpaper on Climate-Informed Vegetation Management for Sub-transmission Assets, for additional discussion of incremental CAVA-informed structure brushing scope and WP SCE-02, Vol. 10, pp. 103-104 – Forecast O&M Expenses Workpaper for Structure Brushing of CAVA Structures.

[148] Distribution poles, Distribution & Transmission combination poles, and Sub-Transmission poles and towers (with less than 220kV) subject to PRC 4292 are currently maintained by Vegetation Management. Sub Transmission poles and towers may be identified by Transmission patrolmen in annual inspections.

Table II-33
Volume Breakdown for Structure Brushing in 2025

Work Category	2025 Volume
Compliance Poles, exc. Catalina	102,154
Compliance Towers	884
Catalina Compliance	559
Sub-Total (Compliance Scope)	***103,597***
Expanded Poles, exc. Catalina	135,234
Expanded Towers	63
Catalina Expanded	-
Sub-Total (Expanded Scope)	***135,297***
Structure Brushing Total	**238,894**

SCE applies a unit cost weighted by volume for each work category, with an average unit cost of approximately $70 per structure for the compliance scope and approximately $65 per structure for the expanded scope, varying depending on vendor and location. Based on 2021 compliance data, SCE also assumes that 3.1% of its compliance scope (excluding Catalina compliance work) will require a tree crew in 2023, with the percentage reducing to 0.5% in 2024 and thereafter.[149] SCE also assumes a 10% market escalation factor in 2024.

4. Quality Control

a) Work Description and Need

SCE performs quality control (QC) for Vegetation Management's three largest programs: (1) Routine Vegetation Management; (2) HT Program; and (3) Structure Brushing. In 2020 and 2021, SCE's 2020-2022 WMP risk-based target was to perform annual QC inspections on 3,000 HFRA circuit miles.

In the sections below, SCE provides more details on its QC work for the respective programs in Vegetation Management.

[149] Tree crews are generally required for the initial clearing of a structure.

(1) Quality Control for Routine Vegetation Management

The QC process is performed by independent, third-party inspectors who review recently trimmed trees to verify they were trimmed to the proper clearance distance.[150] This work includes identifying trees which should have had a prescription for trimming or removal that were not prescribed; confirming prescribed work was performed to obtain the required clearance (e.g., trimming crews may not prune enough of a tree to maintain the minimum clearance distance, thus presenting a risk of vegetation contact with energized conductors); verifying that American National Standards Institute (ANSI) A300 quality pruning standards were achieved; and confirming surrounding areas were free of debris created by the trimming, pruning, and/or removal work if required for the specific location being reviewed.

SCE performs Vegetation Management QC sampling on a circuit mile basis, and judgmental sampling is used with varying Confidence Levels (CL) and Confidence Intervals (CI). Judgmental, and not random, sampling is used because QC needs to sample work from all inspection and tree trimming contractors as well as all TRI risk categories in HFRA and non-HFRA.[151] If SCE used random sampling, it would most likely not provide adequate coverage across all contractors and risk categories for work performed.

In 2022, SCE began using the TRI model to inform the QC inspection scope.[152] Instead of focusing exclusively on HFRA, the TRI model ranks risk across the entire service area. Using the TRI model, which identifies four specific risk categories A, B, C and D (with A representing the highest risk category), Vegetation Management QC develops sample sets for distribution circuit mile inspections in accordance with the risk category,[153] inspecting 100% of

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[150] QC inspectors are independent and a separate function from the tree trimming crews and inspectors. SCE internal resources provide the work scope for the QC inspectors, which is based on the TRI.

[151] Judgmental sampling is a type of non-random sample that is selected based on the opinion of an expert. Results obtained from a judgment sample are subject to some degree of bias, due to the sampling frame and population not being identical.

[152] *See* Section II.B.2.a)(1)(a) for more details on the TRI model.

[153] SCE currently applies TRI to distribution circuit miles and anticipates applying this model to transmission assets in the future.

Category A High Fire Risk miles, when practical, and inspecting Categories B, C, and D sample miles with a CL/CI of 99/3%. Sampling for Transmission miles is performed using a CL/CI of 99/5%.

(2) Quality Control for the Hazard Tree Program

For HTMP, SCE performs two specific QC activities. First, the Quality Control Inspector (QI) performs an independent tree risk assessment using SCE's TRC to verify the accuracy of tree risk scores assigned by the HTMP inspector. Because trees with scores of 49 or below are not typically mitigated, the QCI typically reviews trees assigned a risk score between 35-49 to provide assurance that SCE did not miss a borderline tree for mitigation. QC samples these trees at a CL/CI of 99/2%. Finally, QC also verifies 100% of HTMP removals and mitigation to confirm completion of work.

For the Dead and Dying Tree Removal Program, QC performs 100% verification to confirm that all trees identified for removal have been removed and no new adjacent hazards have been created due to the tree's removal.

(3) Quality Control for the Structure Brushing Program

SCE anticipates starting QC work for Structure Brushing in 2023. For this program, QC focuses on confirming structures subject to PRC 4292 have been properly brushed. QC for Structure Brushing uses a CL/CI of 99/2%.

b) Historical Variance Analysis

Table II-34
Recorded O&M Expenses for Quality Control (2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Distribution Quality Control	$0	$1,069	$4,725	$3,192	$3,648
Transmission Quality Control	$0	$168	$341	$518	$1,875
Totals	$0	**$1,237**	**$5,067**	**$3,710**	**$5,523**

SCE recorded $1.237 million from April through December in 2019 for QC work. In this period, QC inspected nearly 96,000 trees and/or mitigations, with a Routine Vegetation Management RCD conformance rate of 97.9%.

In 2020, SCE recorded $5.1 million, an increase of $3.8 million over 2019, due to an increase in sample sizes based on the QC findings in 2019 and related overtime hourly rates.

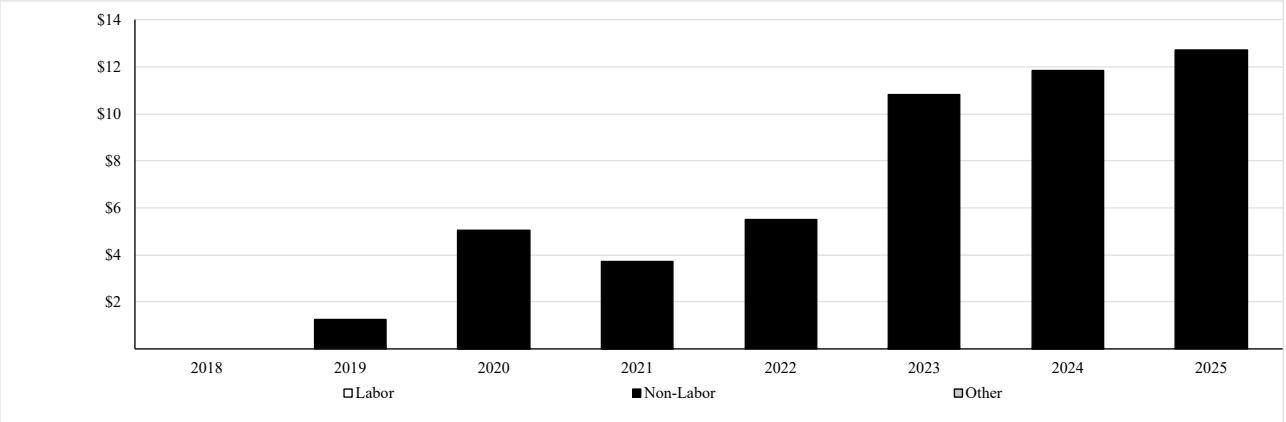
QC inspected over 295,000 trees and/or mitigations, with a Routine Vegetation Management RCD conformance rate of 98.6%. In 2020, SCE performed 78% of its QC inspections for Routine Line Clearing and 20% for the HT Program, with the remaining portion dedicated to other work.

In 2021, SCE recorded $3.7 million, a decrease of $1.4 million from 2020. In this year, SCE reduced overtime hourly rates by increasing QC resources. QC inspected more than 350,000 trees and/or mitigations, with a Routine Vegetation Management RCD conformance rate of 99.2%. The majority of inspections targeted Routine Line Clearing work, with 24% of inspections related to the HT Program, and a small remainder related to other QC work.

In 2022, SCE recorded $5.5 million, an increase of $1.8 million from 2021. This increase is primarily attributable to pay increases for QCIs who were promoted, and overall market pressures partially attributed to the unionization of this workforce in the utility industry. QC inspected nearly 480,000 trees and/or mitigations, with a Routine Vegetation Management RCD conformance rate of 99.6%. Similar to 2020 and 2021, the majority of the inspections targeted Routine Line Clearing work, with 20% of inspections for the HT Program, and a small amount for other QC work.

c) Basis for Forecast

Figure II-20
Forecast O&M Expenses for Quality Control (2023-2025)[154]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor		$83	$10	$11	$52	$9	$16	$35
Non-Labor		$1,153	$5,056	$3,699	$5,471	$10,822	$11,838	$12,683
Other								
Total Expenses		**$1,237**	**$5,067**	**$3,710**	**$5,523**	**$10,832**	**$11,854**	**$12,718**

SCE submits a normalized Test Year forecast of $12.7 million for Quality Control as shown in Figure II-20 above. SCE utilized an itemized forecast methodology to develop the forecast.[155]

SCE bases this forecast on total headcount across two roles – QCI and Area Supervisor – multiplied by 2,080 work hours annually and the average hourly rate for each position. Taking as a baseline the combined headcount of QCI and Area Supervisors in 2022, SCE increased the headcount from 41 to 51 resources between 2022 and 2023 due to the enlarged scope of work. The increase reflects more QC work for Routine Vegetation Management and the HT Program, with an

[154] A $0.2 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04.

Also, *see* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 17-22 – O&M Detail for Transmission Routine Vegetation Management, and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "Distribution Quality Assurance/Check" and "Transmission Quality Assurance/Check".

[155] *See* WP SCE-02, Vol. 10, pp. 105-106 – Forecast O&M Expenses Workpaper for Quality Control.

expanded scope for transmission inspections when SCE rolls out TRI for transmission assets. In addition, SCE also anticipates more scope for new Structure Brushing work. SCE's QC forecast also assumes a 10% increase in headcount for 2024 for a total of 56 resources, due to the need for more oversight of a larger number of vendors, as well as additional Structure Brushing work.

For the unit cost component, the forecast reflects SCE's new contract cycle related to this work, which calculates average competitive hourly rates for QCI and Area Supervisors based on 2022 rates and incorporates projected contract labor escalations in 2023 and 2025.

5. Environmental Support for Vegetation Management Programs

SCE's Environmental Services Department (ESD) provides environmental support for Vegetation Management Routine Line Clearing, Weed Abatement, Structure Brushing, HTMP, and Dead and Dying Tree Removal programs.

SCE's Vegetation Management program has evolved significantly since the issuance of the HFTD Decision in December 2017,[156] largely driven by SCE's efforts to mitigate wildfire risks as well as regulatory changes to clearance distance requirements and associated Commission recommendations. Support for environmental reviews and associated costs have grown due to an increase in the volume and intensity of Vegetation Management activities as a direct result of the enhanced clearance recommendations, causing increased permitting requirements and the need to strengthen environmental compliance controls. SCE has expanded its environmental screening tool, the Environmental Sensitive Area (ESA) GIS layer,[157] to incorporate additional areas of our service territory, address feedback from environmental and land management regulatory agencies, and to improve compliance with environmental laws and regulations. Going forward, ESD also anticipates increased Vegetation Management costs resulting from agency compensatory mitigation requirements.

a) Regulatory Background

In Track 1 of SCE's 2021 GRC, SCE forecasted in nominal dollars approximately $2 million in ESD costs associated with Vegetation Management Routine Line Clearing activities for 2021.[158] The Commission approved that forecast through a separate Business Planning Element (BPE)

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[156] D.17-12-024 adopted regulations to enhance fire safety in the high fire-threat district by expanding and providing clarification of various required and recommended vegetation clearance distances.

[157] *See* Section II.B.5.b) for additional details and description of the ESA layer.

[158] GRC Track 1, Exhibit SCE-06 V.04 Testimony, page 12, includes ESD's 2021 GRC total O&M request of $27.683 million. The approximately $2 million for environmental support of Vegetation Management resides within the $27.683 million in Figure II-5 Environmental Services Recorded 2014-2018/Forecast 2019-2021.

for Environmental Services, which was not tracked in the Vegetation Management Balancing Account (VMBA).[159] In contrast to Routine Line Clearing, environmental costs for Structure Brushing, HTMP, and Dead and Dying Tree Removal were not separately forecasted under ESD, but were instead charged to Vegetation Management and recorded under the VMBA.

In 2021, SCE recorded approximately $25 million[160] in nominal dollars for ESD costs associated with Vegetation Management activities, which was substantially higher than the Track 1-authorized amount.[161] As discussed in Track 4 of SCE's 2021 GRC, starting in 2024, SCE proposed adding all ESD costs that are directly related to supporting Vegetation Management activities (including Routine Line Clearing, Structure Brushing, HTMP, and Dead and Dying Tree Removal) to the VMBA.[162]

b) Work Description and Need

In this 2025 GRC, SCE is separating environmental work that supports Vegetation Management activities from environmental work that supports other areas of the company (as described in exhibit SCE-06, Vol. 6, Section II). Environmental support for SCE's Vegetation Management programs is critical to ensure compliance with federal and state environmental laws and regulations. The environmental laws and regulations that SCE is required to comply with include, but are not limited to:

- Federal Endangered Species Act (FESA)
- California Endangered Species Act (CESA)
- Migratory Bird Treaty Act (MTBA)
- California Fish and Game Code (FGC)
- California Environmental Quality Act (CEQA)
- National Environmental Policy Act (NEPA)
- California Fully Protected Species Regulations

[159] *See* D.21-08-036, p. 438.

[160] This amount included approximately $17.1 million for Routine Line Clearing (including Weed Abatement), $3.9 million for Structure Brushing, $1.5 million for HTMP, and $2.3 million for Dead and Dying Tree Removal.

[161] On June 3, 2022, SCE filed A.22-06-003 seeking recovery of 2021 recorded wildfire mitigation and vegetation management costs above authorized amounts. *See* SCE-01.II.B for more discussion on these costs.

[162] *See* A.19-08-013 SCE Tr. 4-02 for SCE's proposed forecast for ESD's O&M expenses in 2024. The proposal was not opposed by any party.

- Federal Clean Water Act
- Rivers and Harbor Act
- National Historic Preservation Act
- Archaeological Resources Protection Act
- Forest Service Organic Act of 1897
- California Coastal Act

ESD activities are non-discretionary to ensure environmental compliance and to meet agency permitting requirements. Failure to comply with environmental laws and regulations or to obtain required permits before engaging in Vegetation Management activities can result in violations, fines, penalties, work shut-downs, reputational damage, and/or revocation of Special Use Permits (SUP), which allow SCE to perform work on U.S. Forest Service and National Park Service lands.

Vegetation Management environmental support activities encompass environmental desktop review (e.g., intake, coordination, review, reporting, development and maintenance of geospatial data management and analysis tools using Geographic Information System (GIS), Special Use Permit (SUP) tasks, and agency permitting) and field support (e.g., coordinating and scheduling environmental surveys, field monitoring, and agency reporting). Starting in 2021, ESD activities also included providing environmental support for trouble orders and add-ons. Trouble orders are Vegetation Management work to remediate P1 emergency conditions related to vegetation. These include, for example, where an observed tree, or parts thereof, is expected to imminently fail and contact electric facilities, or where vegetation contact or arcing with bare-wire conductors is highly probable to occur in a high wind event due to the vegetation's proximity to the lines. Add-ons are instances where Vegetation Management crews identify additional work while in the field that was not prescribed by the inspectors. ESD facilitates environmental review and support for these add-on work points, which includes identifying the appropriate measures to take in the event a prescription changes in the field.[163]

SCE has also developed and implemented an ESA (Environmentally Sensitive Area) layer screening tool to target regulated environmental resources for review and to improve

[163] Appropriate measures include biological, archaeological, and waters desktop reviews and field support (e.g., surveys, monitoring, post assessment). For these types of activities, it may be the case that the identified "add on" work can proceed with standard environmental measures or can proceed using the same measures attached to the original work point. In other instances, the work may require additional environmental review, and work will not proceed until that review is performed.

compliance controls. The ESA screening tool is a GIS layer designed to identify locations where Vegetation Management activities may require site-specific environmental requirements or permitting. The ESA layer was enhanced in 2021 as part of SCE's continuous improvement in assessing trends in program compliance, incorporating additional agency data sources, and addressing feedback from regulatory agency consultations to ensure compliance with environmental laws and regulations. This resulted in additional geographic areas being included in the ESA layer, meaning that additional Vegetation Management work points were required to undergo environmental review before work could be performed. ESD experienced higher volumes of work based on expanded vegetation clearance scope, which significantly increased consultant support of these activities and associated costs. SCE anticipates environmental support for expanded clearance scope and higher volumes of work points will continue going forward.

c) Historical Variance Analysis

The recorded O&M expenses for environmental support of Vegetation Management programs are shown in Table II-35. Explanation of the yearly variances is included below.

Table II-35
Recorded O&M Expenses for Environmental Support of Vegetation Management Programs (2018-2022)[164]
(Constant 2022 $000)

	Recorded				
Vegetation Management Programs	**2018**	**2019**	**2020**	**2021**	**2022**
Environmental Support - Routine Line Clearing	$697	$701	$6,506	$19,248	$27,541
Environmental Support - Weed Abatement	$299	$191	$196	$493	$896
Environmental Support - HTMP		$1,470	$3,164	$1,771	$2,804
Environmental Support - Drought	$4,470	$4,226	$3,103	$2,626	$4,599
Environmental Support - Structure Brushing			$1,781	$4,526	$5,373
Totals	**$5,466**	**$6,587**	**$14,750**	**$28,664**	**$41,213**

(1) Environmental Support for Routine Line Clearing

Environmental costs in 2018 and 2019 were tracked under a separate BPE for Environmental Services and costs were recorded to this BPE. Environmental costs in 2020 were recorded partially to the Environmental Services BPE, and partially to the Wildfire Management and

164 *See* WP SCE-02, Vol. 10, pp. 107-110 – Recorded O&M Expenses Workpaper for Environmental Support of Vegetation Management Programs.

Vegetation Management BPEs. Starting in 2021, ESD recorded all costs for environmental support to the Vegetation Management BPE, and this will continue going forward.[165]

In 2019, SCE recorded $0.701 million in ESD O&M expenses for Routine Line Clearing. This included desktop reviews and field work primarily triggered by riparian alerts, public requests (e.g., by a city or landowner), and/or nesting bird issues. In that year, ESD improved the intake process to facilitate a higher volume of environmental reviews.

In 2020, SCE recorded $6.506 million in ESD O&M expenses for Routine Line Clearing, an increase of $5.805 million over 2019. ESD was able to perform intake for higher volumes of environmental reviews with implementation of Survey 123 and the ESA Layer. In addition, ESD supported enhanced and deeper tree trims and tree removals to mitigate wildfire risks as required by CPUC regulations to enhance fire safety in high fire-threat districts. ESD performed environmental reviews for approximately 62,000 work points and provided field support for approximately 14,000 work points.[166]

In 2021, SCE recorded $19.248 million in ESD O&M expenses for Routine Line Clearing, an increase of $12.742 million over 2020. In addition to supporting enhanced and deeper tree trims to mitigate wildfire risks, SCE initiated stronger environmental controls and permitting reviews for Vegetation Management activities to address feedback from environmental and land management regulatory agencies and to improve compliance. ESD's work in improving its environmental controls, including the ESA layer expansion, resulted in a significant increase of work points requiring desktop reviews and field support. The number of Vegetation Management work points supported for desktop reviews increased from approximately 62,000 in 2020 to 168,000 in 2021. The number of work points requiring field support increased from approximately 14,000 in 2020 to

[165] As stated above, in SCE's WM/VM Application for recovery of 2021 recorded wildfire mitigation and vegetation management costs above authorized amounts, SCE is seeking cost recovery for the incremental amount of ESD costs for support of Vegetation Management Routine Line Clearing Activities through the FRRMA. If necessary, SCE will continue this ratemaking treatment in 2022 and 2023 as well. As discussed in Track 4 of SCE's 2021 GRC, starting in 2024, SCE proposed adding the specific ESD costs that are directly related to supporting Vegetation Management activities to the VMBA.

[166] ESD did not track the volume of work points for Vegetation Management Routine Line Clearing prior to 2020.

48,000 in 2021.[167] As stated above, implementation of processes for trouble orders and Vegetation Management add-ons also resulted in additional environmental support costs for 2021.

In 2022, SCE recorded $27.541 million in ESD O&M expenses for Routine Line Clearing, an increase of $8.293 million over 2021 due to a significant increase in Vegetation Management work requiring environmental surveying and field work. In 2022, the number of work points requiring field support increased from approximately 48,000 in 2021 to 95,000 in 2022. The increased volume of surveys was driven by work points located in waterways and work conducted during nesting bird season. Increased monitoring support was driven by work points located in waterways, and higher-cost specialized biologists required to perform work in sensitive areas (e.g., the Yosemite Toad presence in District 50, and the issuance of the Yosemite Toad Biological Opinion and associated permit conditions). ESD also incurred additional costs in 2022 due to a higher volume of requests from Vegetation Management crews for Priority 1s (P1s), trouble orders, and add-ons, many of which required environmental field work.

(2) Environmental Support for Weed Abatement

Environmental costs in 2018 through 2022 were tracked under a separate BPE for Environmental Services and costs were recorded to this BPE.

From 2018 through 2020, there were minimal costs for environmental support of Weed Abatement.

In 2021, SCE recorded $0.493 million in ESD O&M expenses for Weed Abatement, an increase of $0.297 million over 2020. This increase was due to increased environmental reviews and field work required for Weed Abatement parcels. ESD performed environmental reviews for approximately 2,100 parcels and field support for approximately 1,000 parcels.

In 2022, SCE recorded $0.896 million in ESD O&M expenses for Weed Abatement, an increase of $0.403 million over 2021. ESD reviewed a higher number of parcels and implemented enhancements to the ESA layer, which resulted in a higher number of parcels requiring field work. The number of parcels requiring field support increased from approximately 1,000 in 2021 to 2,400 parcels in 2022.

[167] ESD incorporated updates to the volume of work points (from Track 4) based on consultants' data extrapolated from Survey 123 and other trackers. The work points reported in this section are for Routine Line Clearing, whereas Track 4 combined work points for Routine Line Clearing and Structure Brushing.

(3) Environmental Support for HTMP

Environmental costs in 2018 through 2022 were recorded under the Wildfire Management BPE. The HTMP program was initiated in 2019.

In 2019, SCE recorded $1.470 million in ESD O&M expenses for HTMP, which was the first year ESD began providing support for that program.

In 2020, SCE recorded $3.164 million in ESD O&M expenses for HTMP, an increase of $1.694 million over 2019. There was a significant increase in the number of tree removals requiring environmental support. Additional costs included reviews, coordination support, and increased volume of trees requiring agency notifications and submittals (including trees in national forests).

In 2021, SCE recorded $1.771 million in ESD O&M expenses for HTMP, a decrease of $1.393 million from 2020. The number of tree removals requiring field support was reduced from approximately 4,000 in 2020 to 1,100 in 2021, and the number of tree removals requiring agency notifications was reduced from approximately 5,300 in 2020 to 1,200 in 2021.

In 2022, SCE recorded $2.804 million in ESD O&M expenses for HTMP, an increase of $1.033 million over 2021. The number of tree removals requiring environmental reviews increased from approximately 2,500 in 2021 to 2,700 in 2022. The number of tree removals that required field support increased from approximately 1,100 in 2021 to 2,100 in 2022. Additionally, in 2022 there were new permitting requirements (e.g., Yosemite Toad, Pacific Fisher) under SCE's Master Special Use Permit (MSUP) which impacted HTMP trees in national forest lands. These requirements increased costs for agency coordination and consultation, GIS analysis, environmental reviews and management, and field training and coordination.

(4) Environmental Support for Dead and Dying Tree Removal

Environmental costs in 2018 through 2022 were recorded under the Wildfire Management BPE.

In 2018, SCE recorded $4.470 million in ESD O&M expenses for Dead and Dying Tree Removal.

In 2019, SCE recorded $4.226 million in ESD O&M expenses for Dead and Dying Tree Removal, a decrease of $0.244 million from 2018. 2019 costs were similar to 2018 levels for environmental reviews and field support performed for tree removals.

In 2020, SCE recorded $3.103 million in ESD O&M expenses for Dead and Dying Tree Removal, a decrease of $1.123 million from 2019. ESD performed environmental

reviews for approximately 4,100 tree removals, provided field support for approximately 3,400 tree removals, and completed approximately 3,100 agency notifications.

In 2021, SCE recorded $2.626 million in ESD O&M expenses for Dead and Dying Tree Removal, a decrease of $0.477 million from 2020. The number of tree removals requiring field support was reduced from approximately 3,400 in 2020 to 1,300 in 2021, and the number of tree removals requiring agency notifications was reduced from approximately 3,100 in 2020 to 2,300 in 2021.

In 2022, SCE recorded $4.599 million in ESD O&M expenses, an increase of $1.973 million over 2021. The number of environmental reviews increased from approximately 4,300 in 2021 to 5,300 in 2022. The number of tree removals requiring field support increased from approximately 1,300 in 2021 to 6,000 in 2022, and the number of tree removals requiring agency notifications increased from approximately 2,300 in 2021 to 4,100 in 2022. ESD also provided support for District 50 work,[168] which included a significant volume of tree removals under the Dead and Dying Tree Removal program. Costs also increased due to the development of additional Yosemite Toad requirements, increased costs for agency coordination, GIS analysis, environmental reviews and management, and field training and coordination.

(5) Environmental Support for Structure Brushing

Environmental costs for Structure Brushing in 2020 and 2021 were recorded under the Vegetation Management BPE.[169] Starting in 2022, ESD recorded all costs for environmental support of Structure Brushing to the Wildfire Management BPE, and this will continue going forward.

In 2020, SCE recorded $1.781 million in ESD O&M expenses for Structure Brushing. Prior to 2020, brushing was limited to poles subject to Public Resources Code 4292. The scope was expanded in 2020 to include additional distribution poles in high fire areas as a grid resiliency measure.

In 2021, SCE recorded $4.526 million in ESD O&M expenses for Structure Brushing, an increase of $2.745 million over 2020. The number of environmental reviews increased from approximately 37,900 in 2020 to 49,400 in 2021. For Structure Brushing that included

[168] District 50 is home to several sensitive species, including Yosemite Toad and Pacific Fisher, with additional agency coordination and permitting requirements.

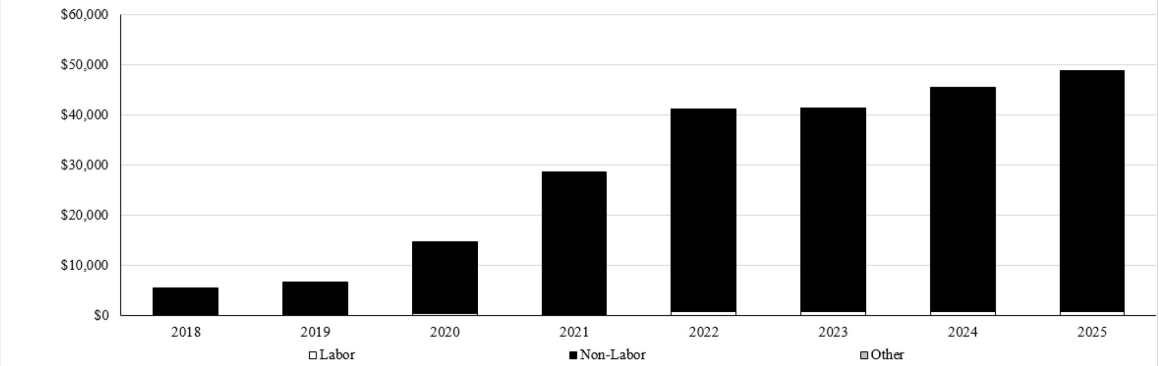
[169] ESD did not incur any environmental costs for structure brushing prior to 2020.

environmental reviews, those requiring field support increased from approximately 3,500 in 2020 to 9,100 in 2021. Agency notifications also increased from approximately 1,100 in 2020 to 3,600 in 2021.

In 2022, SCE recorded $5.373 million in ESD O&M expenses for Structure Brushing, an increase of $0.847 million over 2021. The number of environmental reviews increased from approximately 49,400 in 2021 to 146,200 in 2022. The number requiring field support increased from approximately 9,100 in 2021 to 19,400 in 2022. Agency notifications also increased from approximately 3,600 in 2021 to 3,800 in 2022.

d) Basis for Forecast

Figure II-21
Forecast O&M Expenses for Environmental Support of Vegetation Management Programs
Recorded Costs (2018-2022) and Forecast costs (2023-2025)[170]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	2019	2020	2021	2022	2023	2024	2025
Labor	$75	$138	$333	$121	$809	$636	$640	$668
Non-Labor	$5,392	$6,449	$14,417	$28,542	$40,404	$40,711	$44,936	$48,311
Other								
Total Expenses	**$5,466**	**$6,587**	**$14,750**	**$28,664**	**$41,213**	**$41,347**	**$45,576**	**$48,978**

[170] A $4.1 million increase in 2025 is primarily attributable to accounting adjustments, along with an adjustment to reflect certain changes made to SCE's employee compensation program. Please refer to SCE-06, Vol. 04.

Also, costs associated with Environmental Support for Vegetation Management Programs are included in four standard workpapers. For these costs, s*ee* WP SCE-02, Vol. 10, pp. 11-16 – O&M Detail for Distribution Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 17-22 – O&M Detail for Transmission Routine Vegetation Management, WP SCE-02, Vol. 10, pp. 72-77 – O&M Detail for Wildfire Vegetation Management, WP SCE-02, Vol. 10, pp. 85-90 – O&M Detail for Dead, Dying and Diseased Tree Removal, and WP SCE-02, Vol. 10, pp. 23-31 – Workpaper for GRC Activity to Sub-Work Activity Mapping for Sub-work Activities "Environmental Support", "Environmental Support – HTMP", "Environmental Support – Structure Brushing", and "Environmental Support – Drought".

Table II-36
Forecast O&M Expenses for Environmental Support
of Vegetation Management Programs (2023-2025)
(Constant 2022 $000)

	Forecast		
	2023	**2024**	**2025**
Vegetation Management	$28,266	$32,719	$34,098
Wildfire Management	$13,081	$12,857	$14,881
Totals	**$41,347**	**$45,576**	**$48,978**

The forecasted O&M expenses for environmental support of Vegetation Management programs are shown in Figure II-21. SCE forecasts normalized O&M expenses of $48.978 million for the Test Year.[171] SCE utilized the last year recorded plus adjustments forecast methodology to develop the forecast. This represents an increase of $7.765 million over the recorded base year spend of $41.213 million. SCE's 2025 Forecast of $48.978 million includes $32.9 million for Routine Line Clearing, $1.2 million for Weed Abatement, $4.3 million for HTMP, $4.9 million for Dead and Dying Tree Removal, and $5.7 million for Structure Brushing.

For Routine Line Clearing, ESD estimates an increase of $5.4 million over the recorded base year spend of $27.5 million, resulting in a 2025 forecast of $32.9 million. This forecast includes new agency compensatory mitigation fees expected for trees in jurisdictional waters and Western Joshua Trees (WJTs). Compensatory mitigation involves mitigation actions taken to offset unavoidable adverse impacts to species, wetlands, streams, and other aquatic resources authorized by permits issued by environmental agencies. ESD anticipates incurring mitigation costs starting in 2024, and expects these costs will be required going forward. The California Department of Fish and Wildlife (CDFW) has indicated that SCE will be required to purchase mitigation credits for tree removals in waterways as part of water permits requirements. SCE's 2025 forecast for waters mitigation is based upon an estimate of the volume of tree removals in jurisdictional waters, and ESD's review of the historical range of waters credits received. CDFW is also considering a proposal to list the Western Joshua Tree (WJT) as a California threatened species, and Vegetation Management's districts include areas where WJTs are present. SCE's 2025 forecast for WJT mitigation is based on Vegetation Management's forecast of WJTs to be trimmed or felled, and the mitigation fees stipulated in the state's

[171] *See* WP SCE-02, Vol. 10, pp. 111-115 – Forecast O&M Expenses Workpaper for Environmental Support of Vegetation Management Programs.

proposed Western Joshua Tree Conservation Act (WJTCA) as part of California's 2023 budget trailer bill.[172]

For Weed Abatement,[173] ESD estimates an increase in spend of $0.3 million over the recorded base year spend of $0.9 million, resulting in a 2025 forecast of $1.2 million. ESD's 2025 forecast aligns with the spending pattern in the second half of 2022, which included higher costs due to environmental reviews and field work performed for a higher number of parcels, and implementation of enhancements to the ESA layer.

For HTMP, ESD estimates an increase in spend of $1.5 million over the recorded base year spend of $2.8 million, resulting in a 2025 forecast of $4.3 million. Cultural resource surveys are required under SCE's Master Special Use Permit. The increase is primarily driven by costs for programmatic cultural resource surveys which are performed upfront and have a 30-year shelf life. These surveys reduce the need to perform surveys on a project-by-project basis on national forest lands, which should provide cost efficiencies over time.

For Dead and Dying Tree Removal, ESD expects the cost to remain relatively flat from the recorded base year spend of $4.6 million, resulting in a 2025 forecast of $4.9 million. ESD anticipates the 2025 forecast to be closely aligned with 2022 recorded spend for the Dead and Dying Tree Removal program.

For Structure Brushing, ESD expects the cost to remain relatively flat from the recorded base year spend of $5.4 million, resulting in a 2025 forecast of $5.7 million. ESD anticipates the 2025 forecast to be closely aligned with 2022 recorded spend for the Structure Brushing program.

[172] The terms of the WJTCA are subject to change as the bill works its way through the legislative process.

[173] ESD's spend in 2018 through 2022 recorded to the Environmental Services BPE. Starting in 2025, ESD will include costs directly related to supporting Weed Abatement activities in the Vegetation Management BPE.

III.

VEGETATION MANAGEMENT TECHNOLOGY SOLUTIONS

A. Summary of O&M and Capital Requests

SCE's O&M and capital requests for Vegetation Management Technology Solutions are presented in Figure III-22 and Table III-41 respectively. The O&M forecast of $16.3 million is based on an itemized forecast methodology.[174] The capital forecast of $12.6 million is developed using a budget-based methodology. As discussed in more detail below, a significant amount of the development and implementation work for SCE's integrated Vegetation Management platform occurred in 2022, with an expectation to complete the remaining work in 2023. The 2024 capital expenditure forecast is based on performing a required routine refresh for iPad devices used in the field and further advancement of capabilities on the common platform.

1. Regulatory Background

a) GRC Filings

The programs in this activity were not included in SCE's 2021 GRC Tracks 1 through 3. A broader Technology Solutions effort (that went beyond the Vegetation Management technology programs) was captured in SCE's Track 4 and 2021 WM/VM filings.

b) SCE's 2022-2023 WMP Initiatives

SCE's 2022 WMP Update includes an initiative for Vegetation Management Technology Solutions as stated below:

> "SCE is in the process of consolidating its Vegetation Management programs into a single digital tool to streamline its view and management of vegetation risks. Pursuant to the 2022 WMP decision, SCE has satisfied the requirements from OEIS and expects SCE to report on these targets in its Quarterly Initiative Updates."

In SCE's 2023 WMP, SCE's target is to enable supplemental Vegetation Management tree maintenance program capabilities (e.g., for emergent work) in Arbora by the end of 2023. In 2024 through 2025, SCE will monitor stabilization of the work management tool, and develop and begin execution of a plan to enable additional Vegetation Management maintenance programs.

[174] The IT cost estimation model is explained in further detail in SCE-06, Vol. 02 IT Capital Software.

2. Work Description and Need

As part of the 2020 WMP and our long-term strategy, SCE developed an integrated Vegetation Management software solution that aims at integrating programs across the organization to streamline vegetation-related work efforts that can overlap across large geographic areas. Built on the Salesforce platform, Arbora is a single, scalable, and easy-to-use system that allows SCE and its contract partners to manage and execute Vegetation Management efforts more effectively. Prior to Arbora, managing and monitoring work for each vegetation program required reliance on multiple systems, some requiring the use of Excel spreadsheets to create, update, and close work activities; manage schedules; and view up-to-date reports. As Vegetation Management programs expand in scope and user base, systems and processes become increasingly complex to scale and maintain.

Arbora was designed to support various Vegetation Management programs, such as the Dead and Dying Tree Removal Program (formerly known as Drought Relief Initiative (DRI)), HT Program (formerly HTMP and now combined with the Dead and Dying Tree Removal Program), Routine Vegetation Management and Emergent Work, and other vegetation activities such as Structure Brushing. In addition to the Dead and Dying Tree Removal Program capabilities deployed in 2020 and 2021, SCE deployed Arbora for use in the HT Program in 2022. Also, in 2022, SCE completed further development in Arbora to enable the Routine Vegetation Management program and deployed these capabilities to users. Design of the Emergent Work program was started in 2022, and the full rollout of the Emergent Work program in the Arbora work management tool to all users is anticipated for 2023.

3. RAMP Integration

Table III-37
Foundational Activity – Work Management System (Arbora)
Forecast O&M Expenses and Risk Spend Efficiency (RSE)[175]
Comparison of 2022 RAMP vs. 2025 GRC (2022-2028)
(Nominal $000)

RAMP Risk	RAMP ID	RAMP Control / Mitigation Name	Filing	2022	2023	2024	2025	2025 - 2028 RSE
Wildfire	F2	Arbora	RAMP	$3,500	$3,800	$4,000	$0	N/A
			GRC	$3,286	$3,800	$4,000	$4,200	N/A
			Variance	($214)	$0	$0	$4,200	N/A

Table III-38
Foundational Activity – Work Management System (Arbora)
Forecast Capital Expenditure and Risk Spend Efficiency (RSE)[176]
Comparison of 2022 RAMP vs. 2025 GRC (2022-2028)
(Nominal $000)

RAMP Risk	RAMP ID	RAMP Control / Mitigation Name	Filing	2022	2023	2024	2025	2026	2027	2028	2025 - 2028 RSE
Wildfire	F2	Arbora	RAMP	$0	$0	$0	$0	$0	$0	$0	N/A
			GRC	$7,134	$2,603	$2,747	$2,437	$4,769	$2,649	$2,746	N/A
			Variance	($7,134)	($2,603)	($2,747)	($2,437)	($4,769)	($2,649)	($2,746)	N/A

Table III-37 and Table III-38 above show a comparison between the respective 2022 RAMP forecasts and the 2025 GRC forecasts for O&M expenses and capital expenditures for the

[175] *See* WP SCE-02, Vol. 10, pp. 36-42, Workpaper for Wildfire Vegetation Management RAMP to GRC Integration. Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

[176] *See* WP SCE-02, Vol. 10, pp. 36-42, Workpaper for Wildfire Vegetation Management RAMP to GRC Integration. Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

Vegetation Management Work Management System (Arbora). The variance in 2025 for O&M expenses and all years for capital expenditure is the result of SCE's inadvertent omission of O&M and capital forecasts for Arbora in the 2022 RAMP. Arbora is considered a foundational activity[177] and therefore does not have its own RSE in the 2022 RAMP, consistent with the S-MAP Settlement Agreement framework.[178]

B. Vegetation Management Technology Solutions O&M Forecast

1. Historical Variance Analysis

Table III-39 provides 2018-2022 recorded O&M expenses for Vegetation Management Technology Solutions.

Table III-39
Recorded O&M Expenses for Technology Solutions (2018-2022)
(Constant 2022 $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Technology Solutions	$0	$0	$1,162	$666	$3,286
Totals	$0	$0	**$1,162**	**$666**	**$3,286**

SCE did not incur O&M costs for Vegetation Management Technology Solutions in 2019 because the programs in this activity were still in the planning and development stages.

In 2020, SCE recorded $1.2 million in O&M expenses related to licensing of the software after the first pilot go-live date.

In 2021, SCE recorded $0.7 million in O&M expenses, a decrease of $0.5 million from 2020. Pursuant to standard accounting rules, SCE capitalized a portion of the Salesforce licensing fees during the continued development of the software solution.

In 2022, SCE recorded $3.3 million in O&M expenses, an increase of $2.6 million over 2021 as SCE began operations and maintenance of the HT Program and Routine Vegetation Management ground inspection functionality in Arbora. The increased spend consisted of monthly enhancements and routine maintenance to the HT Program and Routine components of the application.

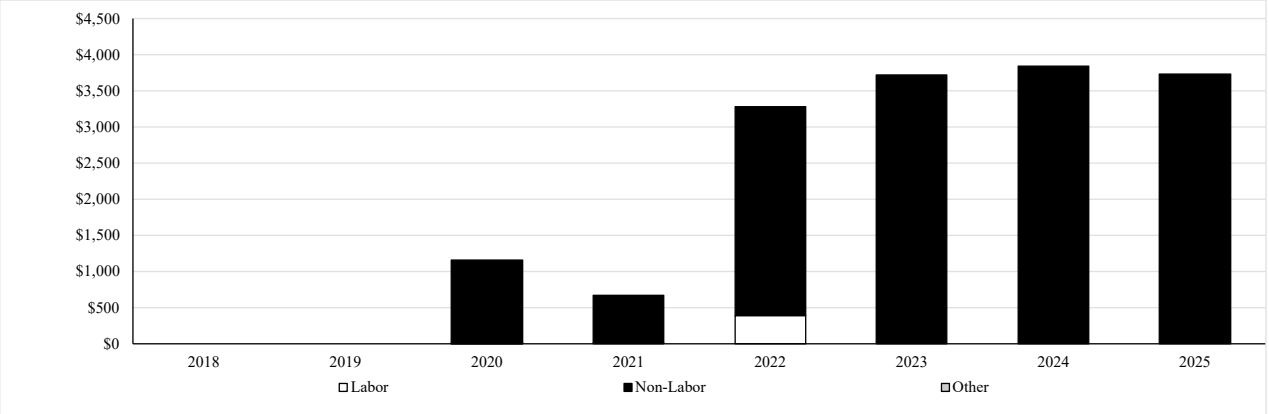
[177] *See* Footnote 21 for definition of foundational activity.

[178] Additional information on the risk modeling can be found in WP SCE-04, Vol. 05, Pt. 1, Wildfire and PSPS RAMP to GRC Integration.

The remainder of the O&M costs for Vegetation Management Technology Solutions consisted of Organizational Change Management (OCM), and field services support.

2. Basis for Forecast

Figure III-22
Forecast O&M Expenses for Technology Solutions
Recorded Costs (2018-2022) and Forecast Costs (2023-2025)[179]
(Constant 2022 $000)



	Recorded					Forecast		
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Labor	$0	$0	$3	$8	$386	$0	$0	$0
Non-Labor	$0	$0	$1,159	$658	$2,900	$3,726	$3,845	$3,731
Other								
Total Expenses	**$0**	**$0**	**$1,162**	**$666**	**$3,286**	**$3,726**	**$3,845**	**$3,731**

For Vegetation Management Technology Solutions, SCE forecasts normalized O&M expenses of $3.731 million for the Test Year.[180] SCE utilized an itemized forecast methodology to develop the forecast.

SCE's forecast can be classified into two primary components: licensing fees/subscriptions, and operational maintenance and support. Licensing fees and subscriptions include the application and platform licenses associated with the Arbora product. Operational maintenance and support include the labor costs related to the ongoing maintenance of the technology solutions, code

[179] *See* WP SCE-02, Vol. 10, pp. 116-121 – O&M Detail for Wildfire Mitigation and Vegetation Management Technology Solutions.

[180] *See* WP SCE-02, Vol. 10, pp. 122-123 – Forecast O&M Expenses and Capital Expenditures Workpaper for Technology Solutions.

maintenance, break/fix support, maintaining the integration with systems and applications, and field support services. SCE anticipates continuing to incur costs for these activities in this GRC cycle.

In addition, SCE is planning to complete the primary capabilities based on current requirements and anticipated needs in the Arbora tool in 2024 for all Vegetation Management programs. After implementation, the majority of these capabilities will be transitioning to the operational phase, adding to the existing O&M expenses related to its cloud-based Vegetation Management work management tool.

C. Vegetation Management Technology Solutions Capital Forecast

In 2025 through 2028, SCE will continue to enhance and evolve the Vegetation Management technology solutions to adapt to growing business needs and an increasingly complex set of data gathering, analysis, and reporting requirements, such as those imposed by the OEIS in the WMP process. The $12.6 million in forecasted capital expenditures will accommodate the routine refresh of iPad devices used in the field and further advancement of capabilities on the common Arbora work management tool. With the rapid advancement in new and emerging technologies, these capabilities include the potential for incorporating artificial intelligence, machine learning, and predictive and prescriptive algorithms to keep pace with the developing regulatory requirements as well as the utilization of additional types of data, such as LiDAR, to advance the overall inspection product.

1. Historical Variance Analysis

Table III-40
Recorded Capital Expenditures for Technology Solutions (2018-2022)
(Nominal $000)

	Recorded				
	2018	**2019**	**2020**	**2021**	**2022**
Technology Solutions	$0	$4,219	$16,147	$11,005	$7,125
Totals	**$0**	**$4,219**	**$16,147**	**$11,005**	**$7,125**

SCE began incurring capital expenditures for Vegetation Management Technology Solutions in 2019. In 2019, SCE recorded $4.2 million in capital expenditures for iPad devices in support of inspection and mitigation efforts and developed ArcGIS Survey123 to meet the compliance quality assurance requirements related to line clearance work.

In 2020, SCE recorded $16.1 million in capital expenditures, an increase of $11.9 million over 2019, to launch the first iteration of Arbora to a pilot user group to support the Dead and Dying

Tree Removal Program. The pilot was subsequently expanded to include development for HTMP, or the now combined HT Program.

In 2021, SCE recorded $11.0 million in capital expenditures, a decrease of $5.1 million from 2020 due to the completion of ArcGIS Survey123. SCE continued the design and development effort for Arbora for the HT Program, as well as design for Structure Brushing, Routine Vegetation Management, and Emergent Work programs.

In 2022, SCE recorded $7.1 million in capital expenditures, a decrease of $3.9 million from 2021, to complete development for the HT Program and Routine programs, as well as to finalize the minimum viable product (MVP) for the Emergent Work program.

2. Basis for Forecast

Table III-41
Forecast Capital Expenditures for Technology Solutions (2023-2028)[181]
(Nominal $000)

	Forecast					
	2023	**2024**	**2025**	**2026**	**2027**	**2028**
Technology Solutions	$2,603	$2,747	$2,437	$4,769	$2,649	$2,746
Totals	**$2,603**	**$2,747**	**$2,437**	**$4,769**	**$2,649**	**$2,746**

SCE forecasts total nominal capital expenditures of $17.950 million for Vegetation Management Technology Solutions for the six-year period from 2023 through 2028.[182]

The 2023-2028 capital forecast of $17.950 million for the projects within this activity was developed using SCE's budget-based IT cost estimation model. This cost estimation model was utilized to forecast SCE's IT capitalized software projects in previous regulatory filings, which the Commission adopted in its entirety. This model utilizes industry best practices and SCE subject matter expertise to estimate project cost components.

SCE's forecast for these projects includes costs for SCE labor, supplemental workers, and consultants, as well as software, vendor, and hardware costs. SCE labor represents the anticipated internal labor costs for the development and management of additional capabilities for the Vegetation Management Technology Solutions activities. Vendor Contract costs reflect the anticipated vendor

[181] *See* WP SCE-02, Vol. 10, pp. 124-126 – Capital Detail by WBS Element for Technology Solutions.

[182] *See* WP SCE-02, Vol. 10, pp. 122-123 – Forecast O&M Expenses and Capital Expenditures Workpaper for Technology Solutions.

development labor, support resources, and Salesforce platform specialists. Hardware costs include the anticipated iPads, associated parts, and set up fees for field users.