

Igniting a Culture of Change: Evaluating the Los Trancos Community Maintenance District Home Hardening and Defensible Space Incentive Program

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Table of Contents

| | |
|---|-----------|
| Executive Summary | 4 |
| Introduction | 6 |
| Methodology and Sources | 8 |
| Qualitative Analysis | 10 |
| Homeowner Survey | 10 |
| Stakeholder Interviews | 11 |
| Quantitative Analysis | 11 |
| Data Sources | 11 |
| Analytical Strategy | 14 |
| Findings | 16 |
| Criteria I: Program Demand | 16 |
| Criteria II: Effectiveness of Projects Funded | 20 |
| Criteria III: Reaching the Right People | 26 |
| Comparison to Alpine Hills | 28 |
| Criteria IV: User Experience | 29 |
| Criteria V: Home Improvements Caused by Program | 34 |
| Hypothetical Analysis: Data Issues & Limitations | 34 |
| Recommendations | 35 |
| Education and Outreach | 36 |
| Program Implementation | 40 |
| Conclusion | 42 |
| Bibliography | 43 |
| Technical Appendix | 45 |
| Risk Assessment Models | 45 |
| Homeowner Alterations, Risk Assessments, and Property Characteristics | 51 |
| Survey Report | 56 |

Executive Summary

The state of California has experienced an increase in catastrophic wildfires in recent years, impacting our homes, environment, and economy. Wildfires, like the Tubbs Fire that burned in Northern California in 2017, are difficult to prevent, but as community members, we can ensure our homes are equipped to reduce wildfire risk and minimize destruction of our communities. Considering the particularly dry winter of 2019-2020, there is concern of an intensified wildfire season this year; additionally, because communities have focused their efforts on addressing COVID-19 instead of wildfire prevention, western states are more vulnerable to wildfires.¹ For these reasons, it is crucial that cities address wildfire risk through education and accountability.

In San Mateo County, an incentive program exists for homeowners who proactively mitigate wildfire risk by pursuing vegetation management and home hardening measures. Residents of two hillside communities, Los Trancos and Vista Verde, are eligible for an annual rebate of up to \$5,000 for approved wildfire mitigation measures. The program is administered by the Woodside Fire Protection District (WFPD), which conducts home risk assessments for eligible properties within the program area and makes specific risk mitigation recommendations for homeowners. The program is funded by property tax revenue collected by the Los Trancos County Maintenance District (LTCMD), which was repurposed after the dissolution of a water district.

At the request of the WFPD and the Town of Portola Valley (PV), we undertook an evaluation of the effectiveness of the LTCMD incentive program in encouraging homeowners to adopt wildfire prevention measures. To do so, the project analyzes: (1) home risk assessments performed by Fire Marshal Don Bullard, (2) home-hardening measures adopted by homeowners through the incentive program, (3) interviews with stakeholders, and (4) surveys sent to homeowners who have participated in the program. The report also includes an overview of existing literature on the effectiveness of wildfire prevention programs and social psychology to provide recommendations on how the incentive program can be improved.

There are five key findings from our analysis:

1. A significant share of homeowners **have participated** in the program
2. Homeowner project choices **could be significantly more aligned** with their risk assessment priorities, particular in home hardening
3. **Outreach can be improved** for high risk homes and people most in need of the financial incentive
4. Opportunities for **more education and peer influence** exist
5. **Limited evidence** available to determine amount of additional mitigation occurring

¹ Chris Field and Eric A. Appel, “Will the Pandemic Make the West More Vulnerable to Wildfires?”, *The New York Times*. 2020.

because of the incentive program

Based on our analysis, our team identified recommendations for the program that can be categorized into improvements and enhancements to the WFPD's **Education and Outreach** and **Program Implementation**.

For **Education and Outreach**, we recommend that the WFPD:

- Develop digital resources showing a home in the community which has undertaken home hardening and defensible space projects to reduce wildfire risk, to provide homeowners a model for what their home should look like after adopting such measures.
- Build a participant network of community liaisons to provide easier access to information within the community, without having to rely solely on Fire Marshal Don Bullard.

For **Program Implementation**, we recommend that the WFPD:

- Alter the spending cap per household based on the total risk of the property, providing more funds for homes that have a higher risk score.
- Implement different spending caps for projects to encourage homeowners to pursue home hardening measures instead of vegetation management; moreover, homeowners who receive high-risk scores for particular parts of their homes are currently not pursuing alterations in those categories, and implementing different spending caps might encourage them to do so.

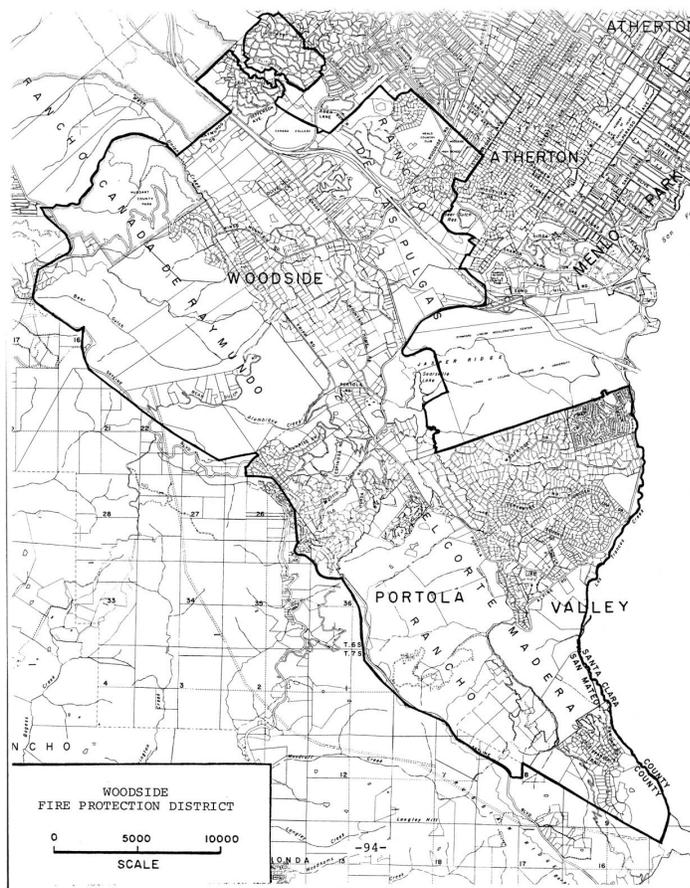
We recommend that the WFPD expand past their existing educational campaign to begin focusing on explicitly facilitating community networks surrounding fire safety and the incentive program, and that there be more community outreach through visual materials of what home hardening and defensible space measures can look like; along with having targeted outreach to community members who can then disseminate information to the community. Above all, as with any wildfire prevention program or policy, community-wide adoption is imperative; as even one high-risk property can put a whole neighborhood at risk. Therefore, the WFPD should ensure that residents understand the importance of wildfire prevention measures not only for their own homes but for the community as a whole.

Regarding possible replication of the program in the Town of Portola Valley, it is not only important to recognize the demographic differences between it and the Los Trancos County Maintenance District, but also the difference in the institutional support for something like an incentive program. Given the differences in demographics, it is entirely possible that the results we have seen in the maintenance district would not be necessarily comparable to the ones potentially seen in PV.

Furthermore, Portola Valley is currently undergoing a wildfire policy and program upgrade process, and while there is a good deal of potential for wildfire protection related programs, it is not yet necessarily clear enough that the impact of an incentive program in PV would be enough to justify the effort of creating a new tax or funding source for such a program.

Introduction

With the growing risk of wildfires in San Mateo County and the concerns of economic and ecological devastation caused by wildfires, there is an urgency for determining and identifying the appropriate policies and programs that effectively reduce wildfire risk in this area. San Mateo County, like much of California, faces an increased risk of wildfire due to low precipitation, higher average temperatures, and increased development in the wildland-urban interface (WUI).² Communities like Los Trancos, Vista Verde, and Portola Valley are situated in the WUI (see map below for reference of the geographic location of these communities)³, an area where undeveloped wildland vegetation and development meet, placing these communities at an even higher risk for wildfires.



As a way of addressing the increased wildfire risk in the area, the Woodside Fire Protection District (WFPD) began administering the Los Trancos County Maintenance District (LTCMD) Incentive Program for Defensible Space and Home Hardening. LTCMD was originally formed to carry out enhanced fire safety, storm drain and road improvements, and land stewardship in the locales of Los Trancos Woods and Vista Verde, which are neighborhoods in unincorporated San Mateo County. The program is funded through the property tax revenue collected by LTCMD, so only residents of Los Trancos Woods and Vista Verde qualify for the program. Residents are eligible for a 50% reimbursement on out-of-pocket costs incurred for pre-approved projects and can receive up to \$5,000 each year.

Our team worked with the WFPD and the Town of Portola Valley to evaluate the incentive program, provide recommendations on how it can be improved, and to help determine whether a similar program should be replicated in other communities in the WFPD, like Portola Valley. Our policy question is: ***How has the incentive***

² San Mateo County Civil Grand Jury, “Wildfire Risk and Response in San Mateo County”, 2018.

³ San Mateo Local Agency Formation Commission, “Woodside Fire Protection District Map”.

program affected homeowner behavior for adopting home hardening measures and vegetation management, and how might the program be improved?

To evaluate the incentive program and provide recommendations, our team analyzed data provided by WFPD and Portola Valley, such as home risk assessments, permit data, and invoices submitted by homeowners for reimbursements. Additionally, we interviewed stakeholders and compiled qualitative data from a survey of homeowners who participated in the program.

In this report, we first discuss our sources and methodology, beginning with an outline of five evaluative criteria our team developed to address our policy question. The evaluative criteria are used to determine the success of the program by separating the incentive program into different components for our analysis, such as program demand and experience of homeowners who use the program. For each evaluative criteria, we describe what constitutes success and how the incentive program can be improved. We then describe our methodology for qualitative and quantitative analysis, providing an overview of our data sources, stakeholder interviews, and an original survey for homeowners who participated in the program. Next, we provide our findings with respect to each of the five evaluative criteria. We conclude our report with eight recommendations that cover education and outreach and program implementation.

Methodology and Sources

Given the evaluative nature of our policy question— measuring the effect the incentive program had in affecting homeowner behavior and determining how the program could be improved— it was necessary to first determine what aspects of the program we needed to analyze. As a team, we outlined the different aspects of the program we would be analyzing to determine the success of the program; we will refer to these aspects as our *evaluative criteria*. These evaluative criteria shape our recommendations by highlighting the parts of the program that can be improved.

Based on meetings with our clients and team discussions, we used the following questions to narrow our project scope, which informed the creation of our team’s evaluative criteria to assess the program’s effectiveness:

- I. **Program Demand— *Is there a demand for the program, as indicated by the number of homeowners who have participated in the program and trends in participation over time?*** To better understand program use by residents of Los Trancos and Vista Verde, we look at program demand. A high percentage of participation will indicate that homeowners are making use of the program; additionally, a high percentage of homeowners who participate in the program will indicate that homeowners are finding the program helpful to complete the home hardening and defensible space projects they want to complete. As a way to also measure the use of the program, we look at resource usage. If all the funds available are being used each year that the program is offered, this could indicate that homeowners are finding the program useful and that funding should increase to ensure that more homeowners who need the program are able to access the reimbursements offered.
- II. **Effectiveness of Projects Funded— *Are the projects being funded the most effective at reducing wildfire risk, based on the distribution of projects and dollars by project type compared to the evidence regarding their relative contributions to risk reduction?*** In an ideal world, we would want homeowners to use their home risk assessment to guide their decision-making when choosing which home hardening and defensible space projects to complete; in other words, if a homeowner has a high risk score for a particular category such as their roof, we would want them to change their roof to one that is made of non-flammable materials. By evaluating the effectiveness of the projects funded, we are able to look specifically at how well aligned the projects pursued by homeowners are with the risk assessment made by Fire Marshal Bullard as well as general information about comparative risk mitigation strategies from background research. Additionally, we are able to determine if the program has been successful in helping homeowners reduce their wildfire risk by looking at the specific types of projects that are completed.
- III. **Reaching the Right People— *Is the program being used by homeowners who are most in need of the incentive, based on homeowner and property characteristics?*** The

mission of the program is to “collectively protect the entire community of the LTCMD while developing a fair program that allows every resident to participate”.⁴ By providing reimbursements for homeowners, the program addresses the potential financial barrier that homeowners have when completing home hardening and defensible space projects not budgeted ahead of time. To ensure the program is fair, it is necessary to look at whether homeowners who would benefit most from the incentive program— those which have high wildfire risk and those with higher financial need — are actually using the incentive program.

- IV. **User Experience— *Is the program producing a satisfactory user experience for participating homeowners, and how might the process be improved?*** This evaluative criteria specifically analyzes the experience of homeowners who participate in the program as a way to improve the program. We look specifically at homeowners’ experience in the program through a survey we distributed to participants of the program; moreover, it is important to analyze the wildfire risk education homeowners receive and what homeowners think of the home risk assessment to determine areas of improvement for the program.
- V. **Home Improvements Caused by Program— *Is the incentive program causing homeowners to undertake mitigations that they would not have undertaken in the absence of the program?*** By focusing on Los Trancos and Vista Verde (which do have access to the incentive program) and Portola Valley, specifically Alpine Hills (which does not have access to the incentive program), our goal was to do a comparison of LTCMD with Alpine Hills to determine whether or not the incentive program caused improvements that would not have otherwise occurred. However, due to our data limitations, we were unable to make this comparison. We will discuss our data limitations as well as possible paths forward for future research.

Our findings in the following section correspond to each of the evaluative criteria that we have outlined.

In evaluating the LTCMD incentive program, we used a mixed methods strategy, which refers to a research approach whereby both qualitative and quantitative data is collected and analyzed within the same study. The quantitative data about program engagement and participation made available to us from WFPD contains rich information, but does not tell the complete story of community behaviors and attitudes towards fire risk management. Furthermore, the quantitative data was not collected as part of a formal scientific study evaluating the program, making qualitative insights from interviews and surveys especially critical for supplementing the data analysis. These qualitative methods can also often provide more insight into *why* we observe certain trends in the data, as opposed to just identifying trends and patterns.

⁴ Woodside Fire Protection District, “Los Trancos & Vista Verde Incentive Program for Defensible Space”.

Qualitative Analysis

When looking at the data provided to us by WFPD, it seemed that while we could organize and synthesize the data, causal interpretation was going to be difficult. Our quantitative analysis would allow us to show directional impacts and to show trends within the program, but would lack the ability to dive into the human behavior aspect of preventing wildfires. To understand how homeowners were interacting with the program, to understand the strengths of the program, and to generate recommendations, our team conducted primary and secondary research.

To build out our qualitative analysis we began with a literature review and then conducted an original homeowner survey along with interviews of key program stakeholders. Our literature review focused on research concerning comparable incentive programs, community culture, and homeowner behavior. The survey was emailed by Chief Fire Marshal Don Bullard to past program participants in order to hear about their experience with the program, and to understand driving factors behind their own behavior. Lastly, our team also conducted interviews with key stakeholders associated with the WFPD, the San Mateo County Fish and Wildlife Advisory Committee, and the city of Portola Valley. Additionally, we sought out local resident perspectives on the program to better understand effective ways to work with homeowners.

Homeowner Survey

In collaboration with the WFPD, we created and sent out an original survey to past participants in the incentive program. Sent to 106 email addresses, our survey had 36 responses, a 34% response rate. The survey consisted of 10 questions, and primarily focused on fire risk understanding, the fire risk assessment, participant characteristics, and project choice. The full list of questions and relevant results/responses are in the [appendix](#).

Survey Process

After receiving feedback on the survey from both the WFPD and the Stanford Public Policy Program, our team finalized our survey on May 18th. Chief Fire Marshall Don Bullard sent the survey to the email addresses he had collected through the program on the morning of the 19th. Our team collected and synthesized responses on May 28th, giving homeowners 10 days to complete the survey.

Survey Intentions

While our data sources helped our team analyze trends within the program, and stakeholders interviews allowed us to gain perspectives from those in local government, the survey allowed our team to hear from the participants themselves. We believed that the survey would help us better understand community dynamics, issues with the program, and how to drive further

utilization. We later took these responses and compared them to both insights gained from data analysis and stakeholder interviews to seek out misalignment and broader themes.

Survey Limitations

We included a question to ask those who fill out the survey for their address, in case we decided to link their responses to the broader dataset, but did not make this question mandatory to respect privacy concerns.

Additionally we believe that our survey, voluntary and without an incentive/reward, is more likely to get responses from those who had positive experiences with the program. While about 40% of participants have used the program multiple times, indicating that general experience has been positive, understanding negative experiences is equally insightful.

Our team recognizes that those who used the program and filled out the survey is not a perfect representation of the larger community.

Stakeholder Interviews

Alongside our participant survey, we conducted a series of interviews to better understand the perspective of different stakeholders. Consulting with a mix of community entities, such as Michael Tomars and the Ad Hoc Wildfire Preparedness Committee, and with experts such as Denise Enea and Jerry Hearn, we ran a round of personal Zoom interviews to gain key insights on the working mechanisms of the programs as well as how issues of wildfire preparedness were treated by the community at large. Pairing this with independent research on compliance and marketing psychology and integrating it with information from program usage and survey questions, we formed a cohesive lens of analysis to best break down how exactly the incentive program was being implemented, and how it could potentially be improved.

Quantitative Analysis

Data Sources

In any quantitative analysis, synthesizing insights from data requires first gathering and assessing what data is available. For the purposes of this analysis, we gathered and analyzed data from the following sources:

LTCMD Home Hardening and Defensible Space Incentive Program Records

Through WFPD, we received access to records pertaining to each homeowner that participated in the incentive program during the years 2016-2020. "Participation" in this sense also includes individuals who received risk assessments without receiving reimbursement for any work done on their properties.

For the purposes of our analysis, we organized these records into two separate categories: risk assessments and reimbursements. In order to participate in the incentive program and be eligible for a reimbursement, homeowners must first contact WFPD to have a fire risk assessment performed on their property. Risk assessments contain ignition risk scores across about 20 categories, including roof assembly, chimney, windows, etc. According to Fire Marshal Don Bullard, the risk assessment template employed by WFPD is based on a National Fire Protection Agency (NFPA) template, with Bullard’s modifications to the point system. Notably, risk scores capture not only ignition risk, but levels of difficulty in suppressing fire. For example, some vegetation surrounding a home may present difficulty for firefighters attempting to enter the home to suppress a fire and thus result in a higher risk score.

Wildfire Home Risk Assessment
Are You Ready?
READY! SET! GO!

Directions: Answer each question using assigned point values as it applies to the home. If the question does not apply, score it as a zero. Total the points to determine the risk level for the home.

| Home | | | |
|--|--|--------|----|
| Condition found | Recommendation | Points | 35 |
| Home Access: | | | |
| The home has good emergency vehicle Access. The address is visible, reflective and noncombustible and property has adequate turnaround space. | | 0 | 5 |
| The home has no visible address from the street. | Ensure property is clearly marked with reflective non-combustible material and | 5 | |
| The home has a locked gate blocking emergency vehicle access. | Provide local fire department and/or emergency responder with gate access. | 5 | |
| The home has overgrown vegetation obstructing the driveway. | Make sure driveway is clear of overhanging trees and vegetation is cleared at least 5 feet on each side of the driveway. | 5 | |
| The home does not have an adequate turnaround. | Consider creating a turnaround for emergency vehicles. | 5 | |
| The home has a bridge that is not rated/posted. | Consider having the bridge rated/posted by an engineer. | 5 | |
| Roof Assembly: | | | |
| The roof material is noncombustible(metal, composition, tile) with no areas for fire embers to intrude (i.e. has bird stops, flashing at valleys, and blocking). | | 0 | 0 |
| The roof has wood shakes or areas for fire embers to intrude. | Replace wood shake with Class A roof assembly with approved "blocking material". Eliminate intrusion areas. | 20 | |
| Chimneys: | | | |
| All chimneys have spark arrestors. | | 0 | 0 |
| Some chimneys do not have spark arrestors. | Install spark arrestors with 1/4 in. noncombustible mesh screening. | 5 | |
| Gutters: | | | |
| All gutters and roof are clear of combustible debris. | | 0 | 0 |
| Some gutters and/or roof have combustible debris present. | Clear all combustible debris from roof and gutters. Install screens on gutters to reduce the accumulation of combustible debris. | 5 | |
| Eaves: | | | |
| All eaves are boxed to prevent ember collection and intrusion underneath the | | 0 | 0 |
| Some eaves are not boxed | Plug openings in open-eave areas with durable caulking. Install a noncombustible covering over blocking to eliminate openings | 5 | |
| Exterior Walls and Siding: | | | |
| The home has all noncombustible siding (brick, stucco, metal). | | 0 | |

Figure 1. A partial view of an example of a completed WFPD risk assessment.

After receiving a risk assessment, homeowners are eligible to receive reimbursement for alterations approved by the WFPD. The reimbursement records in our dataset contained information about how much reimbursement homeowners received from the WFPD. Reimbursement invoices also recorded the category of risk mitigation that homeowners were spending funds on. The five categories of risk mitigation in the reimbursement records combine a large number of risk assessment categories and are as follows: “Ember Resistant Defensible Space Zone (Within 0-10 Feet of Structures)”, “Hazardous Fuel Removal (Within 0-100 Feet of Structures),” “Exterior Walls, Siding and Windows (Improve and/or Replace with Non-Combustible

Materials),” “Vents (Ember Resistant Installation),” “Attached Structures (Balcony, Carport, Decking and Fencing Replaced with Non-Combustible Materials).” It’s important to acknowledge that these reimbursement records may not capture the totality of homeowner home hardening behavior; homeowners may be performing alterations that are not captured in the reimbursement program records. Fire Marshal Don Bullard mentioned in interviews that he has observed this phenomenon in the past.

To provide a sense of the scale of the data we were dealing with, we received a total of 186 reimbursement records that corresponded to 100 unique homes in LTCMD. This comprises nearly 40% of all 259 homes in Los Trancos Woods and Vista Verde. We also had access to a total of 190 risk assessments. The larger number of risk assessments reflects the fact that if a homeowner repeats participation after a certain amount of time, a new risk assessment is required, and to a lesser degree, that some risk assessments never lead to reimbursements. On average, each household that participated in the program spent \$4,700 on home improvements.

San Mateo County Tax Assessor Records

San Mateo County maintains tax assessment records for every property in order to determine how much property tax is owed on each property. These records contain granular information about particular properties, including the number of bedrooms and bathrooms, the assessed value of the land and any improvements made to it, the square footage of the parcel, and more. We were able to obtain these records for a total of 252 homes in Alpine Hills and 181 homes in LTCMD.⁵ For an estimate of current market value, we supplemented this data with the predicted market value from Zillow.

Building Permit Records

Finally, we also obtained data for all permits sought on properties in PV and LTCMD. We received data for the prior from Portola Valley Town Manager Jeremy Dennis, while the records for the latter were manually obtained from the San Mateo County Online Permit Center.⁶ PV permit data came in two forms: permits from 2017-2019 were disaggregated (i.e., information for each individual permit), while permits from 2010-2013 were aggregated by project type. In contrast, all LTCMD permit data from the years 1970-2020 was disaggregated. Each PV building permit has a status, work class, address, and issue date; permit data for LTCMD homes is very similar. Data was given to us in PDF format in the case of Portola Valley and in Excel spreadsheet for each street, so we first had to unify the data into one spreadsheet document before performing analysis. (See *Figure 2* for an example of cleaned permit data from PV).

⁵ Based on records received from WFPD, the total numbers of homes in AH, LTW, and VV are 340, 146, and 114. Therefore, not all homes are represented in the records pulled from the tax assessor. While we were not able to obtain records for all homes in both regions, we assume the properties not represented in the dataset were missing-at-random and thus do not substantially skew the results of the following analysis.

⁶ <https://aca.accela.com/SMCGOV/Default.aspx>

| Permit Type | Permit Number | Work Class | Issue Date | Status | Address | Project | District |
|------------------------|---------------|------------|------------|----------|---|------------|----------------------|
| Building (Residential) | BLDR0231-2018 | Alteration | 01/04/2019 | Expired | ██████████ Portola Valley, CA 94028 | No Project | |
| | BLDR0001-2019 | Alteration | 01/07/2019 | Complete | ██████████ Portola Valley, CA | No Project | |
| | BLDR0004-2019 | Alteration | 01/18/2019 | Complete | ██████████ Portola Valley, CA 94028 | No Project | |
| | BLDR0220-2018 | Alteration | 01/18/2019 | Expired | ██████████ Portola Valley, CA 94028 | No Project | Creek Park PUD |
| | BLDR0008-2019 | Roof | 01/24/2019 | Complete | ██████████ | No Project | Westridge |
| | BLDR0006-2019 | Alteration | 01/29/2019 | Complete | ██████████ | No Project | Portola Valley Ranch |

Figure 2. Example of cleaned PV permit data. (Addresses redacted for privacy.)

Data Harmonization

It is important to note that the data we received from various sources was in varying formats. For example, the reimbursement invoices for the incentive program were stored in PDF or Word document format, while risk assessment data was stored in separate Excel spreadsheets. In order to convert data from the above sources into a common format that we could then analyze, we made use of automated computer programs to merge these datasets. We assigned each address in our data a unique identifier, which we then used to pull all risk assessments, invoices, and tax assessor data associated with that address. This allowed us to perform complex analyses that used all of our data sources. For example, we were able to use combined risk assessment and tax assessor data to investigate the relationship between the year a home was built and the accompanying level of risk across the different categories evaluated in the home risk assessment.

Analytical Strategy

The criteria by which we evaluate the incentive program prompted us to approach quantitative analysis in two main ways, which we'll term *descriptive data analysis* and *hypothetical data analysis*.

Descriptive data analysis requires us to analyze the incentive program as it occurred, producing insights into how it was utilized and understanding trends in the data. The tools we used to perform our descriptive analysis ranged from data visualizations and charts to statistical modelling, such as logistic regression and linear regression. We used these tools to investigate the relationships between different aspects of risk assessments, invoices, and tax assessor data.

Hypothetical data analysis asks whether the incentive program caused residents to perform home hardening measures who would not otherwise have done so.⁷ (This is also known as "causal inference" in academic research.) We know what happened in Los Trancos and Vista Verde in terms of home hardening and vegetation management in the presence of the incentive program. However, we don't know what "hypothetically" (or counter-factually) would have

⁷ See **Criteria V, Hypothetical Analysis: Data Issues & Limitations** section below for additional information.

happened in the absence of the program, yet the difference in the outcome had the program not existed is an important aspect of the program's success.

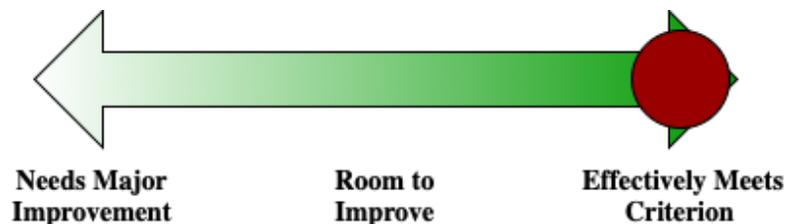
Our planned quantitative strategy for identifying this hypothetical effect of the incentive program relied upon the permit data from AH and LTCMD. Assuming that homeowners typically seek out building permits for every home hardening-related property alteration, we can theoretically compare trends in permit data between AH and LTCMD to identify the effect of the incentive program. Much like a classical scientific experiment, AH is considered the control group because homeowners in that community were not eligible for the incentive program, while LTCMD is considered the treatment group. If the number of permits sought in LTCMD increases after the incentive program is made available, but the number of permits sought in AH remains the same, then we may conclude that the existence of the incentive program was the cause of increased home hardening.

Findings

As outlined previously in the methodology section, we organize our findings according to the following five evaluative criteria:

- I. **Program Demand**
- II. **Effectiveness of Projects Funded**
- III. **Reaching the Right People**
- IV. **User Experience**
- V. **Home Improvements Caused by Program**

Criteria I: Program Demand



For any incentive program to be judged successful, there must be significant demand for the program. The following four items represent indicators of success from a program demand point of view:

- What share of eligible homeowners have participated in the program? (If the program is desired, a high percentage should make use of it.)
- Do participants who have used the program once use it again? (If participants like it, they should reuse it.)
- Is use of the program increasing over time? (As the community becomes more familiar with it, use should increase.)
- How does the demand for reimbursement dollars compare to the supply? (If the program is sufficiently popular, it is more likely to be constrained by funds available; excess funds indicate relevant opportunity for improvements that make the program more attractive.)

Nearly 40% of all eligible homeowners in LTCMD have participated in the program (Figure 4a). Overall, our analyses indicate that demand for the program is high and increasing. In Figure 3, we observe a generally upward trend of reimbursements paid out by the incentive program from 2016-2020. (Note that the data from 2020 is incomplete and only includes reimbursements from

the first third of the year; we use a conservative 2.5x multiplier⁸ to project reimbursements through the end of the year under the assumption that 2020 would have been a typical year, excluding COVID-19.⁹ Both total expenditures in the program and the number of projects pursued by homeowners are increasing, indicating that increased expenditures are due to growing numbers of home hardening and defensible space alterations. While our purpose here is not to identify the cause of increased demand, we conjecture that increasing awareness of wildfire risk due to events like the 2017 Tubbs fire or the 2018 Camp fire may have been driving forces behind increased participation in the program.

In Figure 4(b), we also see that approximately 40% of homeowners who have participated in the program use the program more than once. Thus, we conclude that there is substantial demand for the program not only for one-off projects, but also for ongoing risk mitigation practices.

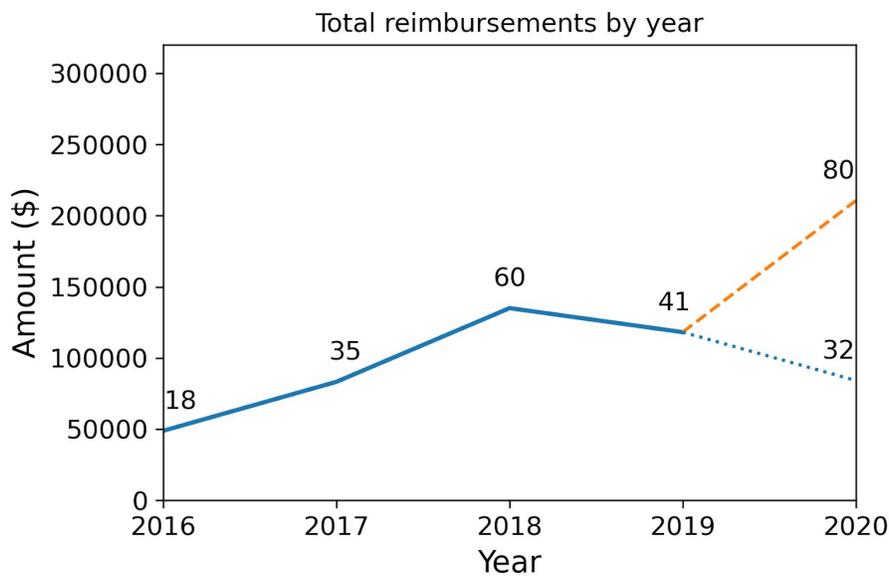
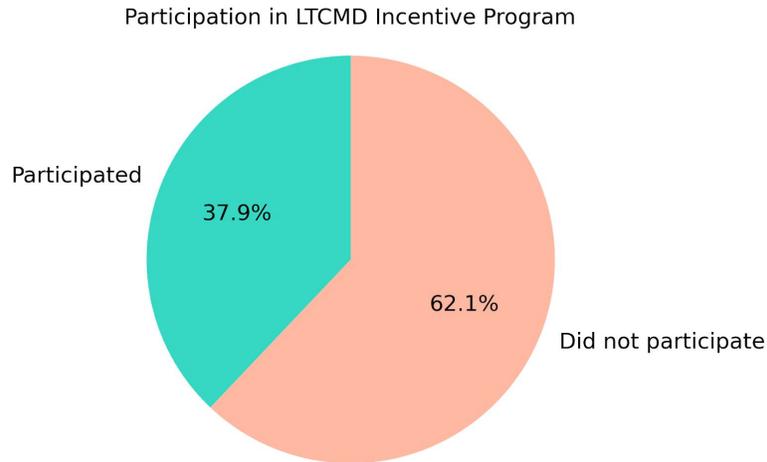


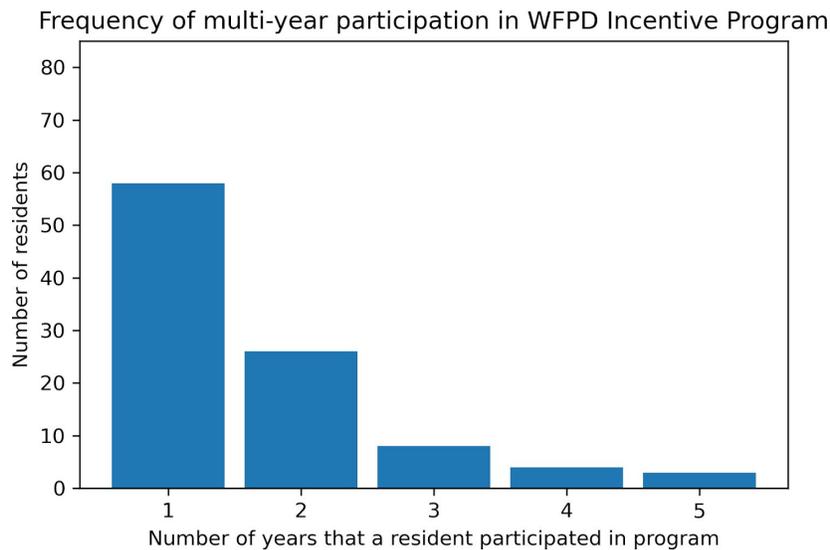
Figure 3. Total amount of funds reimbursed by the WFPD through the incentive program. The numbers above each year represent the total number of projects pursued in that year. The dashed line represents the projected amount of reimbursements through the end of 2020, if 2020 were to be a “typical year”; we expect that COVID-19 may slow the pace of home renovations.

⁸ A reasonable projection would be to take the number of reimbursements we have from the first 4 months and multiply by 3 in order to estimate the total reimbursements for the whole year. We use a conservative multiplier of 2.5x to reduce the risk of overestimating total demand for the year.

⁹ According to Fire Marshal Bullard, risk assessments have continued during shelter in place. It is not yet known whether the pace of risk assessments and/or reimbursements has slowed thus far.



(a)



(b)

Figure 4. (a) The share of eligible LTCMD residents who have participated in the incentive program at least once. (b) The distribution of multi-year participation in the incentive program. More than 40% of residents participated in the incentive program over multiple years. Note that we have reason to believe that people who first participated in the program in 2019 or 2020 would participate in more years beyond that.

Interviews with Jerry Hearn, a member of the Community Advisory Board for LTCMD, and Fire Marshal Don Bullard confirm that funding available for the program has been used up almost completely every year. In Figure 5, we show WFPD’s yearly budget available for fire safety enhancement objectives and the amount it spent on the LTCMD incentive program.

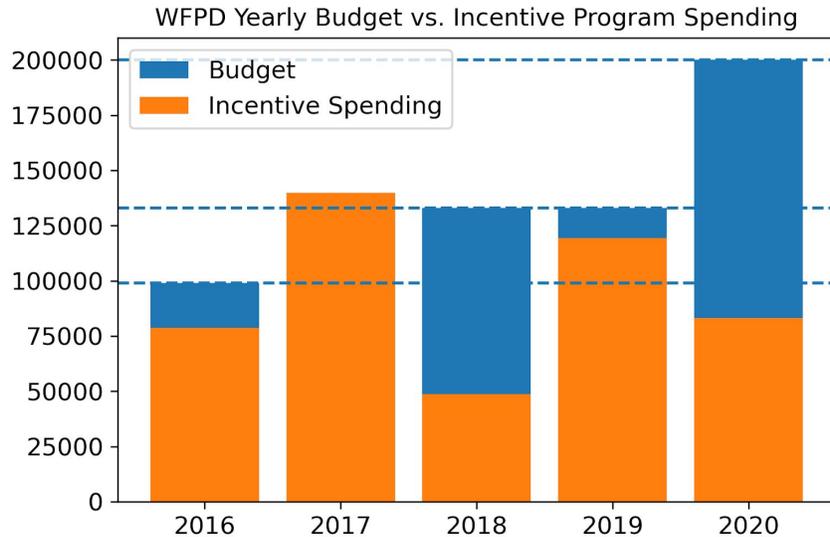


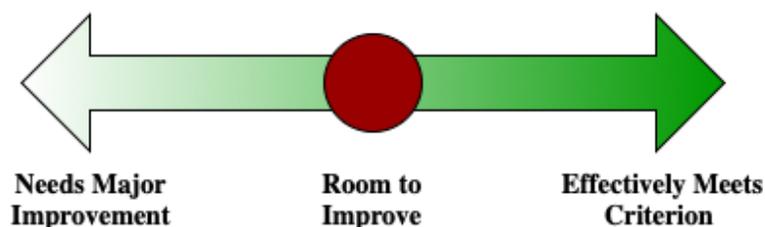
Figure 5. This graph shows the total budget available to the WFPD each year for fire safety enhancement objectives and how much of the budget was spent on the incentive program. (Note that this graph captures spending in each *fiscal* year, not each calendar year, so the amounts may differ from Figure 3.) In 2017, the incentive program spending exceeded the intended budget for the entire . Dashed lines at \$100,000, \$133,000, and \$200,000 represent the total WFPD yearly budget for 2016, 2017, and 2018, respectively. Again, FY 2020-21 is not complete.

Note that the total budget for WFPD’s fire safety enhancement objectives started at \$100,000/yr for FY 2016-17, then was raised to \$133,000/yr for FY 2017-18, 2018-19, and 2019-20, and then was raised again to \$200,00/yr for FY 2020-21 and 2021-2022. This budget includes money not only for the incentive program, but also other initiatives, such as Chipper Days, shaded fuel break, administrative costs, mailers, etc carried out by the district itself. The actual amount estimated for the incentive program’s costs was \$45,000 for FY 2016-17, then \$80,000/yr for FY 2017-18, 2018-19, and 2019-20, and then \$100,00/yr for FY 2020-21 and 2021-2022. Spending for the program exceeded projected costs in FY 2016-17, and the average spending for the program per year across FY 2017-18, 2018-19, and 2019-20 exceeded the projected costs as well (\$80,000/yr).

In FY 2017-18, spending on the incentive program actually exceeded the entire budget for fire safety enhancement objectives. We hypothesize that this may have led to fewer reimbursements in FY 2018-19; since the program is “first-come, first-serve,” the WFPD may have chosen to serve fewer individuals to honor budgetary constraints. As a result, the decrease in reimbursements observed sometime during FY 2018-19 may not be because of decreased demand, but rather WFPD ensuring that it did not run out of funds for fire safety enhancement objectives.

In summary, demand for the incentive program is generally trending upwards, and the budget for the program has consistently increased year over year. Our conclusion is that the program is excelling in regards to our evaluative criteria of program demand.

Criteria II: Effectiveness of Projects Funded



In determining whether the incentive program has been successful thus far, it is critical to determine not only the number of people who have used the program, but also how people utilize funds from the program. For example, we would expect that a successful incentive program would result in a greater number of improvements for homes which receive higher overall risk scores, and that participating homes will alter parts of their house for which they have been rated as high-risk. For homes in the WUI, like those in the WFPD, airborne embers or firebrands are the leading cause of home ignitions, so home hardening should be prioritized by homeowners to reduce their wildfire risk, though defensible space is also important.¹⁰

In order to evaluate whether the program was effective at funding projects that had the highest potential to mitigate wildfire risk, we first examined the breakdown of program spending across various project categories. Out of all categories, defensible space improvements (i.e., those in the “Defensible Zone” or “Fuel Removal” categories) were the most popular, comprising a total of 151 projects funded through the program (Figure 6). In contrast, very few homeowners chose to pursue projects related to vents or attached structures such as balconies or fencing; only 8 projects were pursued in the attached structures category and only 19 projects were pursued in the vents category. We also observe stark differences in the relative costs of projects across categories. For example, the ratio of the number of exterior walls, siding, and windows projects to defensible space projects was approximately 1:5, yet the ratio of *total expenditures* in the exterior walls, siding, and windows category to the defensible space category was only 1:1.6.

Furthermore, we analyzed the number of projects in these categories over time. We observe that increases in the number of projects funded through the program are mostly driven by increases in the number of projects in the fuel removal category (Figure 7). The number of projects in other categories has mostly remained stagnant over time.

¹⁰ Firewise Madera County, “Harden Your Home”.

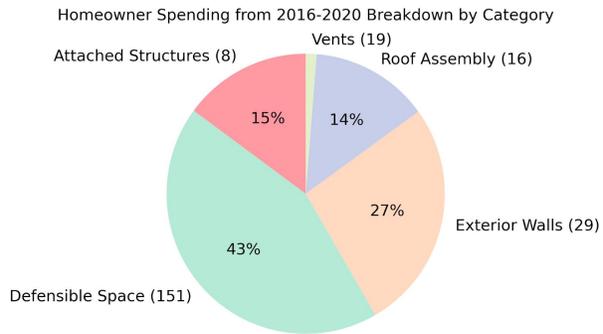


Figure 6. Homeowner spending throughout 2016-2020, broken down by category. The number of projects pursued in that category is shown in parentheses next to the category name.

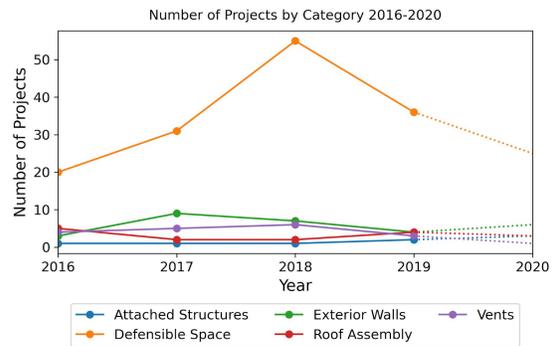


Figure 7. Number of projects funded from 2016 to 2020, broken down by category of home hardening / defensible space. Note that the project count in 2020 only captures projects from the first third of 2020.

We have established that defensible space projects appear to be the most popular category of improvement for homeowners who participate in the program and that fuel removal appears to be driving increased utilization of the program over time. Fuel removal seems to be an important issue for many of the homes participating in the program; 85.3% percent of assessed homes had significant risk associated with the presence overhanging limbs within 10 feet of roofs and home structures (Table 8). These findings align with literature about wildfire risk mitigation measures homeowners may prioritize; several studies find homeowners have an interest in vegetation management for reducing their wildfire risk, especially if there is a cost-sharing program that makes paying for vegetation management more accessible (Meldrum et al. 2014 and Kuang 2019); moreover, the study by Meldrum et al. analyzing a cost shared wildfire risk mitigation program in Log Hill Mesa, Colorado found there is “widespread, positive willingness to pay for vegetation removal, with the amount associated negatively with property size and positively with [homeowner] income”.

However, a large percentage of homes appear to be risky in other categories as well, yet we observe far fewer improvements in those categories. For example, 72.8% of participating homes had significant fire risk associated with decks, yet only 5.6% of participating homes performed any type of home hardening associated with an attached structure (Figure 9). Similarly, 72.8% of participating homes had significant risk associated with eaves and/or vents, yet only 11.2% of participating homes actually performed an alteration in that area (Figure 9). Some studies have highlighted the effectiveness of and homeowner preference for vegetation management (Kuang 2019; Meldrum et al. 2014; and Syphard et al. 2014) while others have stressed the effectiveness of home hardening measures like enclosed eaves or non-combustible roofing material (Kuang 2019 and Syphard et al. 2019). Furthermore, the study by Syphard et al. focused on California wildfires from 2013-2018, analyzed the different factors associated with damage from a fire and found that fireproofing eaves (having enclosed eaves as opposed to open eaves), provides

homes with a significant protective effect compared to other home hardening projects like installing multiple pane windows; thus, it is an important intervention for mitigating ignition risk (Syphard et al. 2019). Even among studies analyzing the efficiency of different home hardening projects for reducing wildfire risk, there are varying viewpoints; for example, a study “comparing 1,000 destroyed and 1,000 surviving structures for fires where home burned in San Diego County” found that the two key determinants of a home’s ability to survive a wildfire were the home’s roofing materials and vegetative space surrounding the home” (Kuang 2019).

Percentage of Homes Assessed with Non-Zero Risk vs. Risk Category

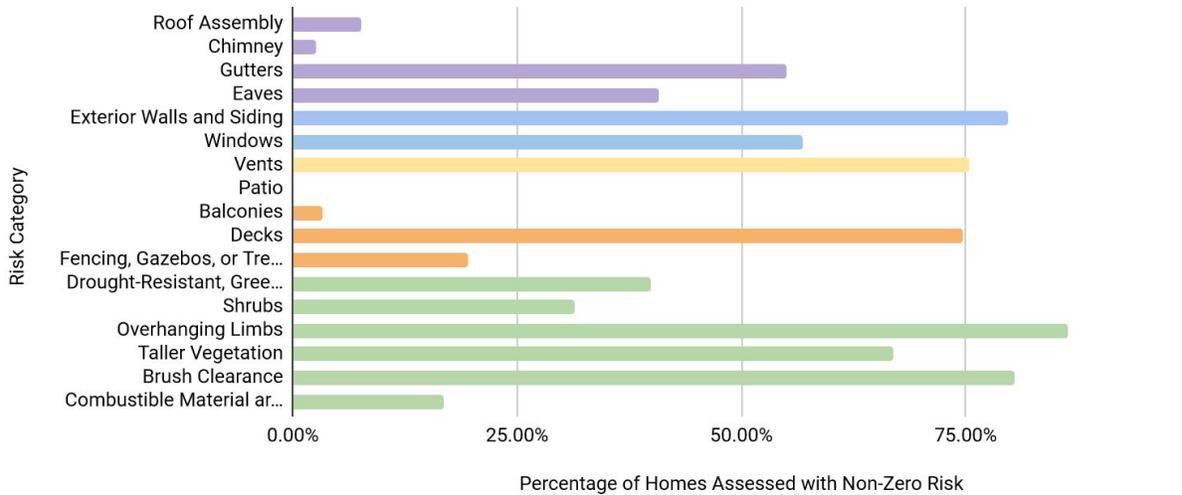


Figure 8. Percentage of participating homes that had non-zero risk in the above categories. Risk categories are color-coded by the overall project category they correspond to as follows: Roof Assembly (including chimney, gutters, and eaves), Exterior Walls, Siding, and Windows, Ember-Resistant Vents, Attached Structures, Defensible Space (includes “Defensible Zone” and “Hazardous Fuel Reduction”). Cells in the rightmost column are color-coded by value; higher percentages of homes with risk correspond to cells with more intensely red-colored backgrounds.

Risk Prevalence and Alterations Performed by Assessed Homes

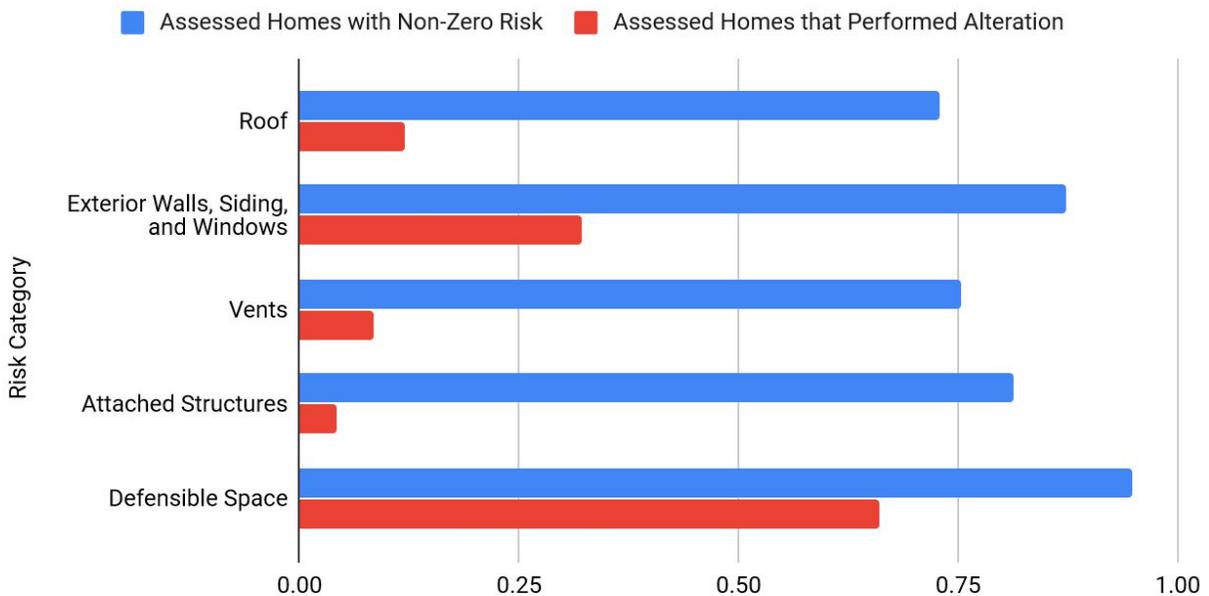


Figure 9. Fraction of assessed homes that had non-zero risk in the category listed (blue) and percentage of assessed homes that performed the alteration (red). In an ideal world with unlimited resources, the red bars would be at equal length with the blue bars.

Why do homeowners appear to be prioritizing hazardous fuel reduction above other forms of home hardening and defensible space improvements? There are a variety of plausible explanations that have relevant implications for the program itself. First, fuel reduction projects may be the most “convenient” type of project, in that homeowners can simply call a contractor to perform the vegetation reduction, without much homeowner interaction needed beyond that. In contrast, the installation of fireproof vents involves contractors entering the home to perform improvements, which may be viewed as more intrusive and requires the homeowner to be present.

Furthermore, certain kinds of defensible space projects are not “one-and-done.” The environment around a home changes more frequently as trees fall, plants grow each year, etc. There are likely more instances in which people will need to do routine upkeep of the property and therefore elect hazardous fuel reduction more frequently in comparison to a one-time alteration such as replacement of vents.

Other explanations pertain to the aesthetics of the home. Neighbors may observe hazardous fuel on a homeowner’s property, which may prompt that homeowner to prioritize hazardous fuel reduction over improvements that are less visible, such as alterations to eaves or vents. As LTCMD Community Advisory Board member Jerry Hearn noted, tree removal is very visible, and arborists often have business cards they hand out to interested individuals. Conversely, some categories improvements may be *too* visible. For example, exterior walls and siding

improvements may require converting wood siding to brick or stucco, which could substantially alter the aesthetic appeal of the home. Homeowners may thus be hesitant to perform exterior siding alterations, despite siding posing significant ignition risk to the majority of participating homes.

Finally, cost may also be a significant factor contributing to how homeowners pursue alterations in certain categories. The average cost of an exterior walls, siding, or windows project is nearly \$12,000, the average cost of installing ember-resistant vents is about \$900, and the average cost of a fuel removal is \$3,616 (Table 1). A homeowner considering what type of project to perform may conclude that \$12,000 is too much to spend out of pocket for an exterior siding project, especially since they would still incur \$7,000 of costs after reimbursements. Conversely, they might consider that spending \$900 on an ember-resistant vent would only provide \$450 worth of reimbursement. A fuel removal project might be in the “sweet spot” of cost in that homeowners in LTCMD can comfortably afford a project of that cost and still enjoy a sizable reimbursement of around \$1,800. Even if a homeowner could obtain a similar reimbursement for pursuing both ember-resistant vents and defensible space zone improvements, homeowners may have less time to pursue two projects instead of just one -- even if two projects combined would mitigate more risk.

| Category | Average Non-zero Expenditure |
|-------------------------------|------------------------------|
| Roof Assembly | \$11,133 |
| Exterior Walls/Siding/Windows | \$11,873 |
| Ember-Resistant Vents | \$858 |
| Attached Structures | \$24,087 |
| Hazardous Fuel Removal | \$3,616 |
| Defensible Space Zone | \$2,014 |

Table 1. Average expenditures per category among homeowners who pursued replacements in that category.

Finally, we sought to determine whether the number and type of alterations owners pursue for their properties through the incentive program are related to the risk scores and characteristics (such as year built, number of bedrooms, etc.) of those properties.. First, we examined whether total risk score is related to total spending on home alterations or the total number of projects pursued. Interestingly, we see **no statistically significant relationship between total risk score and total alteration expenditures**, but we see a **highly significant, positive relationship**

between total risk score and total number of projects pursued through the program (Technical Appendix, Table B4).¹¹ One possible explanation for these results is that regardless of their home's total risk, homeowners choose to pursue projects "up to" the spending cap; once they exceed the possible \$5,000 they can be reimbursed for, they do not pursue any more projects in that calendar year. However, the fact that there was a strong association between risk score and the number of projects pursued indicates that the incentive program is effective at informing or incenting homeowners whose homes are relatively risky.

After observing this relationship between total risk score and the number of projects pursued, we completed another set of analyses to determine whether there were statistical relationships between risk scores in particular categories and the number of projects pursued by homeowners in those categories. For example, the number of projects in the "Exterior Walls, Siding, and Windows" category had a positive relationship to the risk score in the windows category (Technical Appendix, Table B3(e)). In addition, the number of roof risk assembly projects a homeowner performed was highly positively related to the risk score they received in the roof category (Technical Appendix, Table B3(a)). In contrast, the number of ventilation projects taken on was not related to the risk score obtained in that category, nor were the number of attached structures projects related to the risk scores relevant to that category (Technical Appendix, Table B3(b,c)).¹² Out of all alteration categories, only the window risk score and the roof risk score had a significant relationship to the number of projects pursued in their corresponding alteration categories. This indicates that although total risk is related to the number of projects pursued by homeowners, the particular kinds of projects pursued are not always determined by the risk score received.

In conclusion, there is significant room for improvement in the effectiveness of projects performed through the incentive program. Homeowners seem to de-prioritize home hardening measures in favor of defensible space alterations (specifically, fuel management) in ways that are not explained by the risk assessment, despite home hardening being an essential part of reducing the risk of ignition. This suggests that the WFPD may want to seek to alter the way it communicates the results of risk assessments to more accurately describe the urgency of home hardening or even alter the structure of the reimbursement itself to incentivize home hardening, relative to defensible space measures.

Survey Analysis/Data

Our team, through the survey, aimed to gain insights into what was driving homeowner project choice. While vegetation management was by far the most popular project--which our team

¹¹ However, we caution that homeowners may be performing alterations that are not captured in the reimbursement program records; Fire Marshal Don Bullard mentioned in interviews that he has observed this phenomenon in the past.

¹² This may also be an issue of small sample sizes; only 8 homes out of 99 received reimbursement for an attached structures project.

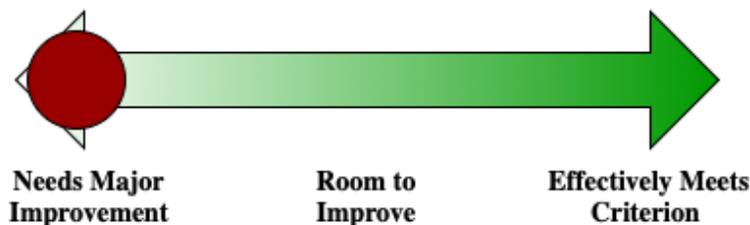
hypothesizes could be due to price, invasiveness, and aesthetics-- our survey tried to uncover additional influencing factors.

When asked how well a participant knew which project they were going to complete before the fire risk assessment, most respondents put a score of 3 out of 5 (i.e. 1 being had no idea and 5 being knew the specific project), indicating that while they had some concept of which projects they may have been interested and not interested in, the fire risk assessment was influential to their decision.

When further asked about which factors were most influential in their eventual project choice, Chief Fire Marshal Don Bullard's recommendation was far and away the most influential factor, then followed by project cost. We found that time to complete the project was an insignificant factor. This is contradictory to our data analysis which suggests that an individual's category risk score is not highly correlated with whether a specific project happens or not.

We hypothesize that while an individual risk score by Chief Fire Marshal Don Bullard does not have as much of an impact on project choice as respondents believe, his overall messaging is quite influential. In the feedback section of the survey, homeowners spoke highly about their interactions with Mr. Bullard. It seems that his walkthrough is significant to them, however, his individual risk scores are not driving specific behavior, as according to the data analysis. Our team is highlighting this as an area for further investigation and discussion, to best understand how to effectively communicate with homeowners so that they not only participate in the program, but that they chose the projects which are most effective and impactful from a fire risk reduction standpoint.

Criteria III: Reaching the Right People



In this section, we focus on whether the incentive program is reaching the “right” homeowners. First, we investigate whether the program is being utilized by people who are most likely to be relatively constrained by willingness to pay. If so, this could be interpreted as evidence that the program is causing these homeowners to perform alterations. Next, we examine whether people who may have the riskiest homes are the ones who choose to participate in the program. If so,

then the alterations pursued under the program may have the greatest risk reduction per dollar spent.

In this section, we characterize the relationship between characteristics of the property, risk scores, and whether homeowners participate in specific projects. We rely heavily on statistical models in this section, about which more details can be found in the Technical Appendix.

Our first set of models are based on relationships we found between home characteristics and the wildfire risk profiles of assessed homes, as measured by Don's risk assessment. Our models showed that the total risk score aggregated across all categories is positively related with the year the home was built (Technical Appendix, Table A2). As we expected, homes built in more recent years exhibit less overall risk in WFPD home assessments. We also observe that all else being equal, homes with more bedrooms and more stories also have lower overall risk. Moreover, risk tends to move in the same direction across categories, meaning that **homes that are high-risk in one category are likely to be risky in many other categories as well** (Technical Appendix, Table A3).

Next, we use the same data but instead build models to predict category-specific risk scores. All else being equal, more recently built homes and homes with more bedrooms and stories are typically at lower risk across a variety of categories (Technical Appendix, Figures A1(a)-(s)). All else being equal, homes with higher land & improvement values are typically at an *increased* risk in some vegetation-related categories. One explanation is that homes with higher land and improvement values may have more extensive landscaping with more shrubs and vegetation around the house perimeter. Thus, the contributing factors behind different risk categories vary: some home features are positively related to risk in some categories and negatively related to risk in others. Furthermore, some categories of risk had no statistical relationship to *any* home characteristics. This highlights the importance of every unique home to get examined for risk, since there is no rule of thumb that allows us to predict a home's risk in all categories based on property characteristics.

After examining what home characteristics of participating homes are predictive of their risk assessment scores, we then analyzed the relationship between home characteristics and whether homes participated in the program at all. Interestingly, even though our analysis above showed that older homes are at significantly higher overall risk, the year a home was built did *not* predict whether a homeowner participated in the program; the owner of a property built in 1950 was just as likely to participate in the program as the owner of a property built in 1980 after controlling for other variables, despite the prior owner likely having elevated risk (Technical Appendix, Table B4). This indicates a potential area for improvement for the incentive program in terms of reaching the homeowners who may be in most need of the program.

We also did not find that overall home value (as measured by popular site *Zillow*) was related to likelihood of participation, when controlling for other variables. If the financial incentive was causing homeowners to take on additional mitigation, we might expect that home value, which is

correlated with income and wealth, would be negatively related to the likelihood of participating in the program. Since we identified earlier that higher-valued homes may be at increased risk of vegetation-related issues, this could also be a potential area of improvement for targeting participation in the program.

| Year that LTCMD Home was Built | % of Homes that Participated in Incentive Program |
|--------------------------------|---|
| Prior to 1960 | 32.5% |
| 1960 or After | 49.3% |

Table 2. Comparison of incentive program participation rates for LTCMD homes built before 1970 and homes built in 1970 or after. Older homes actually participate in the incentive program at lower rates.

In sum, we obtained negative results when answering the question of *whether the “right” homeowners are participating in the program*, based on either home or homeowner characteristics. First of all, while older assessed homes tended to be more risky across many categories, owners of older homes do not participate in the program at significantly higher rates than owners of more recently built homes. Similarly, homes with higher assessed land values (and all other characteristics being equal) tend to have increased risk scores in vegetation-related categories, yet do not tend to participate in the incentive program at higher rates. Second, it is reasonable to expect that if the program was working effectively, homeowners with less ability to pay would be incentivized by the program’s cost sharing feature more than those with greater ability to pay. However, we found no relationship between the value of a home and the likelihood of program participation.

Comparison to Alpine Hills

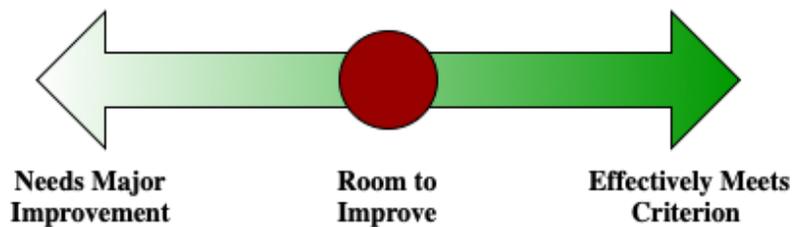
In considering how a similar incentive program might operate in Alpine Hills, we calculated the characteristics of the average home in LTCMD and the average home in Alpine Hills (Table 3).

| Home Characteristic | Average in LTCMD | Average in Alpine Hills |
|---------------------|------------------|-------------------------|
| Lot Size (sq. ft.) | 21,319 | 54,025 |
| Land Value | \$682,158 | \$1,461,617 |
| Improvements Value | \$480,785 | \$970,515 |
| # Bedrooms | 2.9 | 3.8 |
| Year Built | 1963 | 1971 |

Table 3. Comparison of average property characteristics between homes in Alpine Hills and homes in LTCMD. Land and improvements values are not adjusted for inflation and are measured by the tax assessor in different years; as such, these values are meant for purely comparative purposes.

The average home in Alpine Hills has higher total property value, lot size, and bedrooms compared to the average home in LTCMD. This has important ramifications in terms of how the program might function differently if implemented in Alpine Hills. For example, homes in Alpine Hills tend to have been built more recently, indicating that they may be less risky overall than homes built in LTCMD. However, these speculations rely on the assumption that the statistical relationship between home characteristics in LTCMD and observed program participation also would hold true in Alpine Hills, which is impossible to verify given the data we have. What we can conclude is that Alpine Hills differs from LTCMD in numerous ways which should be taken into consideration before seriously considering program expansion or replication into the new community..

Criteria IV: User Experience



I. Survey Analysis/Data

User experience was a main evaluative criteria our team wanted to focus on with our original survey. To improve program efficiency and communication, we believed that by getting feedback from the actual users themselves could we better uncover pain points of the current process. We highlighted three main areas of focus for this evaluative criteria: fire risk education, community culture, and program marketing.

While most participants felt well informed about fire risk education, a large minority ($\approx 25\%$) indicated that they needed to learn significantly more. This serves as a reminder that even for a respondent population that is generally affluent/educated, participated in a wildfire incentive program, and filled out a survey, there is always room for more education.

Many respondents indicated that being a good community member was one of the driving factors behind participation in the program. Although ranked behind concern over fire risk as a

motivating factor for participation in the program, it seems that homeowners are aware that wildfire prevention is a community effort. Some participants, in the suggestions section, indicated a desire to have a sign or a physical display that they could put on their front lawn to promote the program and to encourage their neighbors to also participate.

From our literature review peer to peer interaction is a major factor in driving wildfire prevention action and accountability. It seems from the results of the survey that peer to peer interaction has so far been crucial to the success of the LTCMD incentive program, as $\frac{1}{3}$ of respondents indicated that they had heard about the program through a neighbor recommendation.

Respondents indicated that they had heard about the program in a variety of ways. The average respondent said that they had heard about the program through at least two different methods. Over half indicated that they had heard about the program through a postcard in the mail, the most successful marketing method. Full results about marketing are in the [appendix](#) for further review.

II. Interview/Further Qualitative Takeaways

In delineating areas for qualitative analysis, it was critical that we not just factor in the overall performance of the program, but also how each step of the program synthesized with one another to affect the overall user experience. To model this, we looked at how exactly the program has attempted to influence homeowner behavior thus far, and how these methods have/have not addressed the underlying difficulties and misconceptions surrounding issues of wildfire safety.

To accomplish this, we broke down the incentive program's implementation using two different models, which were: Sturtevant and McCaffrey's 5 characteristics of innovation adoption in "Encouraging Wildland Fire Preparedness: Lessons Learned from Three Wildfire Education Programs" and Markus and Connor's cultural cycle model as described in "Clash! How To Thrive In A Multicultural World". Using these models, we examined how effective the program has been at driving homeowner perception and behavior around incentive projects, along with how effective the program has been at affecting community culture and changing larger narratives about fire safety in the area.

In "Encouraging Wildland Fire Preparedness: Lessons Learned from Three Wildfire Education Programs", Sturtevant and McCaffrey describe 5 characteristics that affect adoption rates of particular wildfire innovations, being trialability, observability, compatibility, relative advantage, and complexity, as detailed in the table below:

| Innovation Adoption Characteristic | Definition |
|------------------------------------|---|
| Trialability | To what degree can someone test out an innovation? |
| Observability | How apparent are the benefits of adopting an innovation? |
| Compatibility | How consistent is the innovation with the needs, experiences, lifestyle, and values of the community? |
| Relative Advantage | What is the benefit of this innovation compared to the status quo? |
| Complexity | How difficult is the innovation to understand and use? |

Table 4. A breakdown of Sturtevant and McCaffrey’s 5 characteristics of innovation adoption, by category

Utilizing these characteristics as a set of criterion, it became fairly evident in our stakeholder interviews that the program has done quite well in arguing the relative advantage and compatibility of different mitigation projects in accordance with homeowner interests. While, as shown in our survey results, residents do indicate that they still have points they would like to be educated on, the program’s educational campaign has done well to teach people about the overall fire risk that they are exposed to in the area, as well as common contributors to this risk factor. By identifying homeowner’s personal risk factors through his risk assessments, Fire Marshal Bullard has set up strong building blocks showing homeowners that there is a great deal of room for improvement compared to the current status quo. However, moving past that initial consultation, homeowners articulate feeling lost, as illustrated by the following quote from our stakeholder interviews, “*People don’t know what to do and who to do it with, or even who to hire*”. Even with the recommendations provided by Fire Marshal Bullard, residents are looking for more guidance and modeling around what addressing the fire risk present on their properties, and in their larger neighborhoods, looks like in the **long-term**. Moving the educational campaigns of the WFPD past this initial stage of purely disseminating information to begin focusing on community interfacing is critical for building long-term success and normative community pressure around wildfire protection projects.

Further drawing from our survey results and stakeholder interviews, many homeowners articulated that they do not have much access to ways in which they can test out or explore what recommended mitigation measures might look like. This ties explicitly into the lack of facilitation around the adoption of innovation characteristics like trialability and observability. Several studies highlighted the importance of this kind of education to achieve individual compliance among homeowners, with homeowners being more likely to take steps to reduce their risk the more

familiar they felt with the process of how to adopt **specific** mitigation measures on their properties (Kuang 2019; Stidham 2014; and McCaffrey 2015).

As noted by Karen Vahtra of Portola Valley's Ad Hoc Wildfire Preparedness Committee, educating people about the dangers of wildfire isn't the current primary concern among many of these communities. Rather, unless they schedule a risk assessment with Fire Marshal Bullard or another authoritative source, many don't really know what the "next steps" are to tackle wildfire preparedness as it pertains to their properties. This also extends beyond the initial risk assessment, as homeowners are often uncertain of the relative length, cost, and difficulty of different projects, how much they contribute to "fire-proofing" their properties, and don't have many models to look to in terms of making gradual, incremental changes. This is similarly echoed when we look at the program's observability. By and large, people only see the vague benefit of being "protected from a wildfire" should they choose to enact some of these preventative projects. While they have information on the dangers of living in that particular area, they do not have many concrete examples of what home-hardening and defensible space projects look like (and the specific advantages different types of projects may bring), unless they have a personal connection to someone else who has undertaken a similar project.

Consequently, it may be difficult for residents and the overall community to weigh the compatibility of the program with their own values. As noted by both our clients and other stakeholders, the area around Portola Valley, Vista Verde, and Alpine Hills are generally affluent communities with a strong libertarian streak. As a result, homeowners may be resistant to being "policed" by their neighbors or by a particular government actor/agency. Even though there is much mutual benefit to be had in undertaking these preventative efforts as a community (and a great deal of potential risk should certain homeowners not participate), the simple knowledge of this fact is not enough to outweigh the potential misconceptions or misunderstandings that residents may have regarding preventative projects/the incentive program.

This ties into our second model, being Markus and Connor's cultural cycle model as described in "Clash! How To Thrive In A Multicultural World" (as modeled in the graphic below):

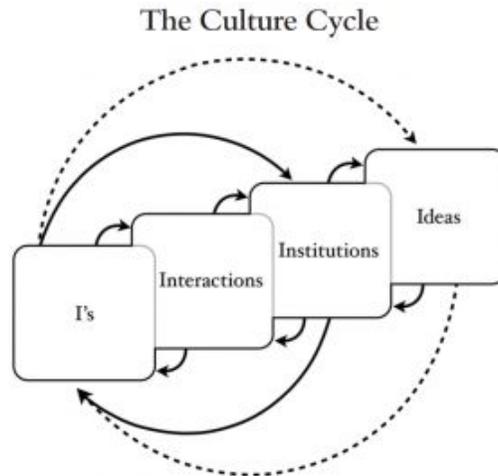


Figure 10. An illustration of Markus and Connor's cultural cycle

This model argues that there are four levels to consider in driving social change, being --I's (Individuals), Interactions, Institution, and Ideas-- all requiring interplay with one another for a change movement to be successful. As a one person team, Fire Marshall Bullard has facilitated the connection between himself as an institution and individual homeowners via the risk assessments. However, there is not much facilitation in the ways in which residents interact with **one another** about the program. **Were the WFPD to facilitate networks of interaction between residents, it would strengthen its overall influence as an institutional driver of cultural change.** This was supported in a variety of studies in our background literature, which argued that having particular community members or groups that homeowners can go to for information on reducing wildfire risk serves as one of the most impactful ways to increase overall interest and adoption of mitigation practices (Stidham et al. 2014; McCaffrey 2015; and McCaffrey et al. 2012). As information dissemination is currently primarily focused between the WFPD as an institution and the individual, a large burden is being placed on Fire Marshal Don Bullard to address issues that could either be clarified in much simpler ways or offset to other involved parties. Tactics to begin facilitating this, as well as to build up different adoption characteristics, will be further detailed in our recommendations below.

To conclude, as Sturtevant and McCaffrey note, you can provide as much education on an issue as you want, but if you aren't simultaneously establishing two-way networks of communication to clear up misconceptions about said issue, you are not making a homeowner more likely to act on it. To get a homeowner to a point where they are willing to implement a preventative project, you must first get them to believe that doing said project aligns with their own goals and is not in major conflict with their ideals or belief systems. To do this, residents should have comparative examples as to why these actions would benefit them. Although the academic context behind these issues are vast, bombarding residents with more information about the issue won't incentivize them to take actionable preventative steps. Rather than taking a full top-down approach on these issues by relying on Fire Marshal Bullard, the WFPD, and different government stakeholders to talk with the community and address their concerns individually, simultaneously building bottom-up forums and networks for people to discuss these preventative projects and

explain them in simple ways from the perspective of another homeowner is crucial for the survival and growth of the program.

Criteria V: Home Improvements Caused by Program

Although we see significant levels of demand for the program, this does not necessarily mean that the incentive program is resulting in additional home fire hazard mitigation that would not have otherwise occurred. For example, homeowners may be using the program to get “free money” for alterations they would have performed even if the program had not existed. In this section, we explored various avenues for examining whether the program caused additional mitigation activity, ranging from survey responses to statistical modeling.

Survey Analysis/Data

Results from our survey indicate that the financial incentive may only be having a moderate effect on the number of projects being undertaken. From our survey, responses show that most participants were already doing wildfire risk mitigation before the program, have done projects outside of the program, and intend to undertake more improvements in the future. The average respondent indicated that they intended to do at least two projects in the future. Additionally, the financial incentive was ranked as a major motivating factor for participation by only a third of respondents.

Hypothetical Analysis: Data Issues & Limitations

As mentioned in our Analytical Strategy section, the quantitative approach to answer this question would require us to compare trends in permits between AH and LTCMD before and after the incentive program was made available. Our plan initially was to treat AH as a “control” group and LTCMD as a “treatment” group, much like a classical scientific experiment, and examine the differences in homeowner behavior between the two groups. However, after examining the data made available to us, we recognized that certain aspects of the data constrain the types of analysis that we could conduct..

First, we only had access to detailed information about home hardening behavior for households in LTCMD who participated in the program, extracted from the invoice system used to administer the program. In contrast, the data from AH was building permit data, which provides a coarse overview of general modifications individuals made to their homes. Furthermore, permits are not required for a variety of home hardening practices, such as hazardous fuel management or window replacements. Finally, the permitting system did not contain information pertaining to whether a particular permit was specifically related to home-hardening; for instance, a permit for “Roof” could refer to a homeowner replacing a roof that was already fire-resistant.

While we had access to building permit data for LTCMD as well, which in theory enabled an “apples-to-apples” comparison between LTCMD and AH, the fact remained that there was not enough information in the permit records for us to confidently conclude that any difference in permitting trends between the two areas was driven by the incentive program’s impact on residential home hardening practices. In addition, we had no way of knowing whether compliance with permitting requirements differs between LTCMD and AH.

As a result, the question of "Is the incentive program causing homeowners to undertake mitigations that they would not have undertaken in the absence of the program?" will likely have to be answered by using other types of analysis. In the future, a long-term study that had more precise measures of homeowner fire risk mitigation behavior in the program neighborhoods and a comparison area could enable researchers to better answer the question of whether an incentive program was the cause of increased/decreased home hardening alterations.

Recommendations

We present our recommendations in the following table to provide an overview of how each recommendation will affect the outcome of the program as measured by our evaluative criteria. We split our recommendations into two main subcategories, recommendations 1-6 focusing on education and outreach, and 7-8 focusing on program design.

| Rec. # | Program Demand | Project Effectiveness | Reaching the Right Homeowners | User Experience | Improvements Caused by Program |
|--------|----------------|-----------------------|-------------------------------|-----------------|--------------------------------|
| 1 | | + | | + | + |
| 2 | + | + | + | + | |
| 3 | + | + | + | + | |
| 4 | | | | + | + |
| 5 | | | | + | + |
| 6 | | | | + | + |
| 7 | | + | + | | |
| 8 | | | + | | |

Table 5. Recommendation Matrix. Here we evaluate each recommendation against our evaluative criteria. A “+” indicates that this recommendation will improve the outcome of the program for evaluative criteria which corresponds to that column. Note that we already consider the program to be effective in terms of

program demand; however, certain recommendations may still increase demand for the program even further. Recommendations shaded in light red correspond to Education and Outreach, while those shade in light blue correspond to Program Design.

Education and Outreach

First, examining short-term improvements that could be made concerning the incentive program, we wanted to highlight a few simple ways in which the resources currently made available to residents could be expanded upon to better encompass the previously articulated indicators of cultural change. Recognizing the limited personnel and budgetary restrictions of the Fire Protection District, these recommendations are tailored to minimize potential time and monetary costs.

1. Present risk assessment recommendations more strategically

This recommendation melds the work of Sturtevant and McCaffrey around information dissemination and the work of Robert Cialdini and Stanford psychologists Freedman and Fraser around decision-making and persuasion. As noted in our survey results, residents noted the direct recommendations of Fire Marshal Bullard in his risk assessments to be one of the most influential factors in their choice of project pursued. As an authority figure, Fire Marshal Bullard has a unique opportunity to influence how residents not only perceive the risk present on their properties, but also what they view as the most effective ways to counter it. To more strategically present his risk assessment findings, Fire Marshall Bullard can employ the following specific practices to increase the likelihood of residents pursuing larger home-hardening projects in the future.

As noted by Sturtevant and McCaffrey, framing information in an incremental, escalating way (similar to a time-line) provides residents with a model that encourages long-term thinking. We already know that residents have a high return rate year-by-year, but without a framework to model how they can reduce their risk long-term, they are likely to just repeat the projects that they already have knowledge around or are comfortable with. This practice closely mirrors the “foot-in-the-door” principle discovered by Cialdini, which is a behavioral phenomenon noting the likelihood of someone agreeing to something larger in the long-run if you get them to agree to something smaller first. By giving residents a timeline-based recommendation, Fire Marshal Bullard subtly gives residents a behavioral “push” to take on larger, more impactful preventative projects long-term rather than continually going to the same smaller ones. Similarly, if Fire Marshal Bullard runs into a resident he knows to be resistant to even mid-level projects, he could utilize the “door-in the face” principle. In this instance, Fire Marshall Bullard would emphasize larger, more costly projects first, and when the homeowner exhibits uncertainty, he would offer the option of cheaper/easier preventative projects. As they have rejected the larger proposal, the homeowner would be behaviorally inclined to take on the “smaller” project due to a desire to reciprocate Fire Marshal Bullards “backing down”. In either case,

strategically presenting the material of the risk assessment to residents would be a significantly impactful step in influencing their behavior.

2. Develop digital resources modeling home-hardening/defensible space

As noted both in our research and our stakeholder interviews, making a preventative measure simple, observable, and compatible with homeowner interests is crucial to getting them to adopt it. By providing easily accessible digital resources that model what typical mitigation projects might look like, the Fire Protection District would make these projects more triable and observable (see Table 4), increasing the likelihood of someone pursuing them in the long-run. This also increases the likelihood of residents taking the first step of the incentive process, being to contact Fire Marshal Bullard for a risk assessment, as they feel more informed about what these projects could look like on their properties ahead of time. This could be done in three actionable ways:

Firstly, a small portion of the budget could be devoted to developing video-based curricula for typical risk-factors and prevention projects. A direct example of this may be a video on the reasons why certain vents are dangerous (i.e. wind borne embers), and what the typical process to replace them might look like from start to finish.

Secondly, pictures of neighborhood improvements could be made available on the WFPD/town websites, giving residents direct, close-to-home, examples of what preventative projects look like on properties similar to their own. While making these projects more observable, this also frames preventative projects in a way that is more compatible with homeowner desires and values, as they have direct examples of how diverse these projects can be in execution and how they can fit in with the aesthetics of the neighborhood.

Lastly, providing physical examples of prevention projects in the larger community serves to provide concrete, in-personal models for what reducing fire-risk can look like. This can be done via something as large as a public fire-safe garden on town land, or having volunteers from the program showcase improvements that they've made on their properties. As evidenced by those who have participated in the "chipper-day" program, residents often discover they like the aesthetics of fire-safe vegetation management or construction once they see it for themselves (contrary to what they might initially believe). Having personal examples that they can physically interact with makes residents much more invested in pursuing similar projects.

3. Develop communication templates/guidelines for inter-resident conflict

Last in our resource-based recommendations, we would encourage the fire district to explore developing communication templates for inter-resident conflict when it comes to issues of fire-safety. An underlying theme that came up in **multiple** stakeholder interviews

was that there is a good deal of tension when most homeowners participate in preventative projects but one neighbor does not, thereby increasing risk for the whole neighborhood. This proves especially important in issues of insurance, as there have been instances where community members have lost their insurance coverage due to the proximity of a high-risk neighboring property (even if they had been taking on projects to reduce their fire-risk). Teaching residents how to navigate these situations in a productive way is important, as building positive, rather than negative, community accountability is crucial to building a culture of reciprocity. If residents name and shame one another, or consistently call law enforcement on one another, the offending resident in question is much less likely to change their behavior in the long term, and would only take on preventative measures when forced. A great, researched-based way to model these templates would be to use Non-Violent Communication (NVC) standards. These standards encourage the party writing a response to a damaging action to go through four steps in articulating the harm done to them, being observations, feelings, needs, and requests. A more detailed handout on the NVC process, along with examples of how to start writing a NVC-based response, will be included in the appendix (see *Handout 1*).

Second, examining more long-term improvements that could be made to the incentive program, we thought it important to highlight the value of building strong community networks to the growth of the program (as emphasized earlier in our findings). Recognizing that recommendations 5 and 6 are currently limited due to concerns about the spread of COVID-19, we would encourage the Fire Protection District to set up models around what these might look like in practice as preparation for when they are eventually able to be safely implemented.

4. Establish an online forum

Based on our research, one of the most critical factors for building strong community norms as an institution is through two-way communication (being that both ends of the conversation, homeowners and the WFPD, have opportunities to actively ask questions and clarify details with one another). By establishing an online forum where participants, Fire Marshal Bullard, and those interested in the program can regularly engage with one another, a facilitated medium exists where residents can begin forming their own community networks, taking the sole pressure of answering questions and sharing experiences off of WFPD staff. While neighbors and those in similar surrounding areas can talk about the issues particularly relevant to them, providing a broader forum of online communicate between residents, WFPD staff, and the broader community also gives Fire Marshal Bullard a greater tap on the attitudes, misconceptions, utilization, and inefficiencies present in the way people use the incentive program.

5. Hold scheduled community events

As iterated by Town Manager Dennis and many of the involved stakeholders we interviewed, oftentimes the hardest challenge facing local government is “getting the message out”. Referencing back to our survey results, we would like to again highlight the significant influence of peer interaction when it came to how residents heard about and became involved in the incentive program, with about a third of participants iterating that they heard about the program through a neighbor’s recommendation. Similar to our previous recommendation, providing community spaces in which participants (and those interested) can discuss and present information on their experiences with the program and how they’ve approached dealing with different risk factors on their properties helps nurture a positive behavioral loop between residents that is more likely to incentivize newcomers compared to one focused on accosting each other. By hosting specific in-person events, the Fire Protection District can create a group of people that are not only invested in fire safety as a community issue, but also one another, implicitly nurturing larger community networks outside of the space provided. Similarly, by creating a “social” aspect to participating in the program, the WFPD creates a greater potential for larger coalition building, allowing for the growth of positive accountability and normative pressure within the community, which is crucial to long-term social change.

6. Build a participant network of community liaisons

The previous two recommendations are even further extended by our last, and most important, long-term recommendation, being to reach out to participants to begin building a larger network of community liaisons for different neighborhoods. By diffusing the burden of two-way communication solely off Fire Marshal Bullard and the risk assessments, the WFPD is able to gain higher access to high-level information in different neighborhoods without significantly increasing the time-commitment usually necessary to obtain this information. In this way, specific insights for neighborhood-based issues are turned into larger, more digestible points. Furthermore, this network could be simply built off the pre-existing “emergency preparedness” community network should establishing a new one prove too demanding due to limited personnel. Rather than focusing on “emergency preparedness”, the network could be shifted to focus more generally on “emergency prevention” and have community liaisons specifically dedicated to accessing wildfire projects, issues, and concerns for their particular area.

Program Implementation

1. **Explore providing different cost sharing percentages or spending caps depending on the category of renovation.**

Our first suggestion is changing how reimbursement works depending on category of improvement. As a reminder, the program covers 50% of out-of-pocket costs up to \$5,000 reimbursed per year per household. But practically, because many of the project categories have an average cost well above \$5,000, the actual cost-share percentage borne by the homeowner varies by category. For an exterior siding project, \$5,000 is probably 20% of the total cost of the project, whereas fuel removal projects, which cost a few thousand dollars, are essentially guaranteed to be reimbursed at a 50% rate. If we want to motivate home hardening behaviors, then we might want to increase the effective cost sharing or reimbursement for home hardening categories relative to fuel management. This could be even be accomplished by decreasing hazardous fuel management reimbursements or limiting homeowners to one fuel management project through the program.

2. **Alter the spending cap per household based on total risk of the property.**

Based on the risk assessment data, we know that properties that have elevated risk in one category (such as combustible roofing) are likely to have elevated risk in many other categories. If the program aims to perform the greatest amount of risk mitigation per household, it may benefit from increasing the reimbursement cap for households that are particularly risky.

WFPD could choose to raise the effective spending cap for households without fundamentally changing the reimbursement structure. For example, WFPD could allow households above a certain risk threshold to “pool” their \$5,000/year reimbursement limit across multiple years. For example, a household that has elevated risk in all categories in 2020 might pool their eligibility for the program across the next 4 years to be eligible to be reimbursed for \$20,000 in 2020 for alterations across many different risk categories, forgoing eligibility for reimbursements in 2021-2023.

Note that alterations to the structure of reimbursements (such as in recommendations 7 and 8) may change how many clients can be served per year. For example, if the spending cap is altered such that on average, households are spending more than \$5,000/yr through the program, then the number of households served per year must decrease. Alterations should be performed carefully in light of budget constraints. For example, instead of solely increasing the spending cap for risky households, the spending

cap could also be decreased for less-risky households, potentially balancing out increases in spending.

Considerations for Portola Valley

In considering Portola Valley, it is not only important to recognize the demographic differences between it and the Los Trancos County Maintenance District, but also the difference in the institutional supports for something like an incentive program. Given the differences in demographics, it is entirely possible that the results we have seen in the maintenance district would not be necessarily comparable to the ones potentially seen in PV.

Furthermore, Portola Valley is currently undergoing a wildfire policy and program upgrade process, and while there is a good deal of potential for wildfire protection related programs, it is not yet necessarily clear enough that the impact of an incentive program in PV would be enough to justify the effort of creating a new tax or funding source for such a program.

Should Portola Valley choose to pursue a similar program, it is critical that they first build a political platform or stance on wildfire issues as a community. There are many individuals and organizations heavily invested in the issue in PV, but this is not necessarily reflected in how these issues are handled politically. In stakeholder meetings, there seemed to be a good deal of disconnect between different planning subcommittees and organizations/homeowners invested in the issue. To generate change in local ordinances and building codes, and to garner enough support to create new funding pathways for incentive based programs, those in power need to feel that to pursue these changes is in the best interest, and representative of the desires, of the larger community.

Conclusion

The results of our analysis can be framed as the answer to our original policy question: “How has the program affected homeowner behavior and how might the program be improved?” The introduction of the incentive program in 2016 has been followed by significant and increasing homeowner demand. The projects undertaken in part reflect the relative risks identified in the Fire Marshal's individual home risk assessments, but they appear to be overly concentrated in defensible space as compared to home hardening improvements. Homeowners report the risk assessment process is offering valuable information. The program could be a better job of reaching homeowners with more financial need for the incentives and riskier homes. With our data limitations, it is difficult to say how much the overall level of homeowner fire risk mitigation activity has increased due to the program.

Based on our findings from the homeowner survey and interviews with stakeholders, we offer several recommendations for improving the program, such as building a network of community liaisons and modifying the design of the incentive to encourage effective home hardening. Given the different limitations that exist, especially financial limitations that may be particularly relevant as communities address COVID-19 while preparing for wildfire season, we want to stress that many of our recommendations center around community education and outreach. Communities in the WFPD, like many across the western states, will continue facing wildfire risk due to the effects of climate change. By providing reimbursements for homeowners to complete home hardening and defensible space projects, the WFPD is a model for how fire districts can encourage their residents to be proactive in addressing their own wildfire risk; moreover, in combining education and the financial resources necessary, WFPD is igniting a culture of change. With the recommendations we provide, it is our hope that the WFPD can continue forward as a model not just for other fire districts, but also for local governments which often struggle with ensuring residents receive the information and resources they need to better their community.

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Technical Appendix

A. Risk Assessment Models

| VARIABLES | (1) roof |
|--------------------------------|-------------------------|
| year_built | -0.00477 (0.00901) |
| bedrooms | 0.214 (0.216) |
| stories | 0.282 (0.245) |
| gross_building_sqft | -0.000432 (0.000283) |
| land_value | 7.90e-08 (3.16e-07) |
| improvement_value | 4.22e-07 (5.68e-07) |
| sq_feet_usable | 4.69e-06 (5.18e-06) |
| Constant | 7.493 (17.49) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(a)

| VARIABLES | (1) shrubs |
|--------------------------------|--------------------------|
| year_built | -0.0203*** (0.00688) |
| bedrooms | -0.372** (0.163) |
| stories | -0.225 (0.164) |
| gross_building_sqft | 0.000426** (0.000210) |
| land_value | -4.28e-08 (2.29e-07) |
| improvement_value | 1.08e-06** (4.41e-07) |
| sq_feet_usable | -7.07e-06 (5.58e-06) |
| Constant | 39.25*** (13.37) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(b)

| VARIABLES | (1) taller_vegetation |
|--------------------------------|--------------------------|
| year_built | 0.00346 (0.00609) |
| bedrooms | -0.290** (0.144) |
| stories | -0.137 (0.144) |
| gross_building_sqft | 0.000370** (0.000183) |
| land_value | -1.06e-07 (2.02e-07) |
| improvement_value | -3.97e-07 (3.82e-07) |
| sq_feet_usable | 1.40e-06 (4.18e-06) |
| Constant | -6.126 (11.83) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(c)

| VARIABLES | (1) vegetation |
|--------------------------------|-------------------------|
| year_built | -0.0142** (0.00627) |
| bedrooms | -0.310** (0.153) |
| stories | -0.112 (0.151) |
| gross_building_sqft | 0.000317 (0.000199) |
| land_value | -2.34e-07 (2.12e-07) |
| improvement_value | 1.04e-07 (4.11e-07) |
| sq_feet_usable | -3.96e-06 (4.74e-06) |
| Constant | 28.09** (12.19) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

| VARIABLES | (1) vents |
|--------------------------------|---------------------------|
| year_built | -0.00746 (0.00674) |
| bedrooms | 0.0678 (0.154) |
| stories | -0.233 (0.153) |
| gross_building_sqft | 0.000331 (0.000205) |
| land_value | 6.89e-07*** (2.45e-07) |
| improvement_value | -8.71e-07** (4.14e-07) |
| sq_feet_usable | -7.81e-07 (4.25e-06) |
| Constant | 14.56 (13.08) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

| VARIABLES | (1) windows |
|--------------------------------|-------------------------|
| year_built | -0.0186*** (0.00648) |
| bedrooms | 0.301** (0.151) |
| stories | 0.0982 (0.146) |
| gross_building_sqft | -0.000270 (0.000192) |
| land_value | -2.03e-07 (2.07e-07) |
| improvement_value | -2.98e-07 (3.95e-07) |
| sq_feet_usable | 8.91e-06* (4.84e-06) |
| Constant | 36.26*** (12.60) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(d)

| VARIABLES | (1) balconies |
|--------------------------------|-------------------------|
| year_built | 0.00597 (0.0148) |
| bedrooms | 0.196 (0.350) |
| stories | 0.572 (0.429) |
| gross_building_sqft | 4.51e-05 (0.000530) |
| land_value | -2.31e-07 (4.99e-07) |
| improvement_value | -9.24e-07 (1.20e-06) |
| sq_feet_usable | -1.92e-05 (2.56e-05) |
| Constant | -14.29 (28.72) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(e)

| VARIABLES | (1) chimney |
|--------------------------------|-------------------------|
| year_built | -0.0610 (0.0399) |
| bedrooms | 1.579* (0.948) |
| stories | 0.452 (0.928) |
| gross_building_sqft | -0.000860 (0.000702) |
| land_value | 2.02e-06* (1.19e-06) |
| improvement_value | -2.93e-07 (1.46e-06) |
| sq_feet_usable | 5.83e-06 (1.84e-05) |
| Constant | 111.0 (74.49) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(f)

| VARIABLES | (1) decks |
|--------------------------------|-------------------------|
| year_built | -0.0151** (0.00699) |
| bedrooms | -0.111 (0.150) |
| stories | -0.459*** (0.155) |
| gross_building_sqft | 0.000317 (0.000197) |
| land_value | 1.90e-07 (2.09e-07) |
| improvement_value | -5.34e-08 (4.03e-07) |
| sq_feet_usable | -1.11e-06 (4.05e-06) |
| Constant | 30.30** (13.58) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(g)

| VARIABLES | (1) eaves |
|--------------------------------|-------------------------|
| year_built | -0.0164** (0.00652) |
| bedrooms | -0.0778 (0.154) |
| stories | -0.221 (0.152) |
| gross_building_sqft | 6.26e-05 (0.000196) |
| land_value | 2.77e-07 (2.14e-07) |
| improvement_value | -6.75e-07 (4.21e-07) |
| sq_feet_usable | 5.79e-06 (3.85e-06) |
| Constant | 32.22** (12.67) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(h)

| VARIABLES | (1) exterior_walls_siding |
|--------------------------------|------------------------------|
| year_built | -0.0160* (0.00819) |
| bedrooms | -0.214 (0.169) |
| stories | -0.343** (0.161) |
| gross_building_sqft | -0.000224 (0.000210) |
| land_value | 2.60e-07 (2.29e-07) |
| improvement_value | -1.71e-07 (4.49e-07) |
| sq_feet_usable | 1.00e-06 (4.52e-06) |
| Constant | 33.83** (16.01) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(i)

| VARIABLES | (1) gutters |
|--------------------------------|--------------------------|
| year_built | -0.0308*** (0.00715) |
| bedrooms | -0.345** (0.156) |
| stories | -0.000969 (0.147) |
| gross_building_sqft | 0.000393** (0.000197) |
| land_value | -9.75e-08 (2.09e-07) |
| improvement_value | -1.58e-07 (4.09e-07) |
| sq_feet_usable | -3.36e-06 (4.31e-06) |
| Constant | 60.82*** (13.94) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(j)

(k)

(l)

| VARIABLES | (1) limbs |
|--------------------------------|--------------------------|
| year_built | -0.0117 (0.00762) |
| bedrooms | -0.283* (0.167) |
| stories | -0.169 (0.171) |
| gross_building_sqft | 0.000218 (0.000208) |
| land_value | -3.60e-07 (2.31e-07) |
| improvement_value | 9.87e-07** (4.78e-07) |
| sq_feet_usable | -4.22e-06 (4.31e-06) |
| Constant | 24.49* (14.82) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(m)

| VARIABLES | (1) misc_fencing |
|--------------------------------|-------------------------|
| year_built | -0.00582 (0.00702) |
| bedrooms | 0.0515 (0.166) |
| stories | -0.0925 (0.174) |
| gross_building_sqft | -0.000112 (0.000216) |
| land_value | 8.13e-08 (2.36e-07) |
| improvement_value | 2.27e-07 (4.46e-07) |
| sq_feet_usable | -5.66e-06 (6.06e-06) |
| Constant | 10.64 (13.60) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(n)

| VARIABLES | (1) outbuilding |
|--------------------------------|--------------------------|
| year_built | -0.00513 (0.00710) |
| bedrooms | 0.228 (0.176) |
| stories | -0.162 (0.178) |
| gross_building_sqft | -0.000210 (0.000216) |
| land_value | 5.38e-07** (2.40e-07) |
| improvement_value | -7.73e-08 (4.56e-07) |
| sq_feet_usable | -3.35e-06 (5.80e-06) |
| Constant | 8.794 (13.79) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(o)

| VARIABLES | (1) patio |
|--------------------------------|------------------|
| year_built | -0.190 (0) |
| bedrooms | -12.29 (0) |
| stories | 3.975 (0) |
| gross_building_sqft | 0.0308 (0) |
| land_value | 1.07e-05 (0) |
| improvement_value | -0.000110 (0) |
| sq_feet_usable | -3.66e-06 (0) |
| Constant | 331.8 (0) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(p)

| VARIABLES | (1) perimeter_brush |
|--------------------------------|-------------------------|
| year_built | -0.0109* (0.00661) |
| bedrooms | -0.0947 (0.150) |
| stories | -0.153 (0.150) |
| gross_building_sqft | 0.000137 (0.000188) |
| land_value | -3.10e-07 (2.08e-07) |
| improvement_value | 4.21e-08 (3.98e-07) |
| sq_feet_usable | 4.25e-06 (4.83e-06) |
| Constant | 22.31* (12.85) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(q)

| VARIABLES | (1) perimeter_combustible |
|--------------------------------|------------------------------|
| year_built | -0.0248*** (0.00818) |
| bedrooms | -0.0479 (0.207) |
| stories | -0.244 (0.214) |
| gross_building_sqft | 0.000363 (0.000265) |
| land_value | 7.57e-07*** (2.58e-07) |
| improvement_value | -6.06e-07 (5.73e-07) |
| sq_feet_usable | -8.52e-06 (8.45e-06) |
| Constant | 47.09*** (15.85) |
| Observations | 175 |
| Standard errors in parentheses | |
| *** p<0.01, ** p<0.05, * p<0.1 | |

(r)

| VARIABLES | (1) raised_decks |
|---------------------|--------------------------|
| year_built | -0.0128* (0.00686) |
| bedrooms | -0.0898 (0.151) |
| stories | -0.388** (0.157) |
| gross_building_sqft | 0.000414** (0.000201) |
| land_value | 2.03e-07 (2.16e-07) |
| improvement_value | 9.46e-08 (4.09e-07) |
| sq_feet_usable | -8.19e-07 (4.17e-06) |
| Constant | 25.40* (13.32) |
| Observations | 175 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(s)

Table 1. Regression results for modeling scores in specific risk categories on various characteristics of the property being assessed. To understand more about the specific risk categories, refer to an example risk assessment. The following is a legend for the predictor variables: “year_built” - the year the home was built, “bedrooms” - the number of bedrooms in the home, “stories” - the number of stories of the house, “gross_building_sqft” - the sum of all areas on all floors of a building, “land_value” - the value of the land on which the home is built, “improvement_value” - the value of the home and any improvements, “sq_feet_usable” - the total number of square feet of the lot.

| VARIABLES | (1) total_score_bin | (2) lns1_1_1 | (3) lnsig_e |
|---------------------|-------------------------|---------------------|----------------------|
| year_built | -0.0653*** (0.0142) | | |
| bedrooms | -0.578* (0.327) | | |
| bathrooms | 0.244 (0.429) | | |
| stories | -0.805** (0.348) | | |
| first_floor_area | -0.000350 (0.000516) | | |
| garage_area | -0.000388 (0.000767) | | |
| gross_building_sqft | 0.000827 (0.000559) | | |
| land_value | 5.34e-07 (4.30e-07) | | |
| improvement_value | -1.49e-07 (8.46e-07) | | |
| sq_feet_usable | 2.20e-06 (8.25e-06) | | |
| Constant | 136.6*** (27.51) | 0.637*** (0.105) | 0.422*** (0.0915) |
| Observations | 175 | 175 | 175 |
| Number of groups | 118 | 118 | 118 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2. Regressing total risk score on property attributes.

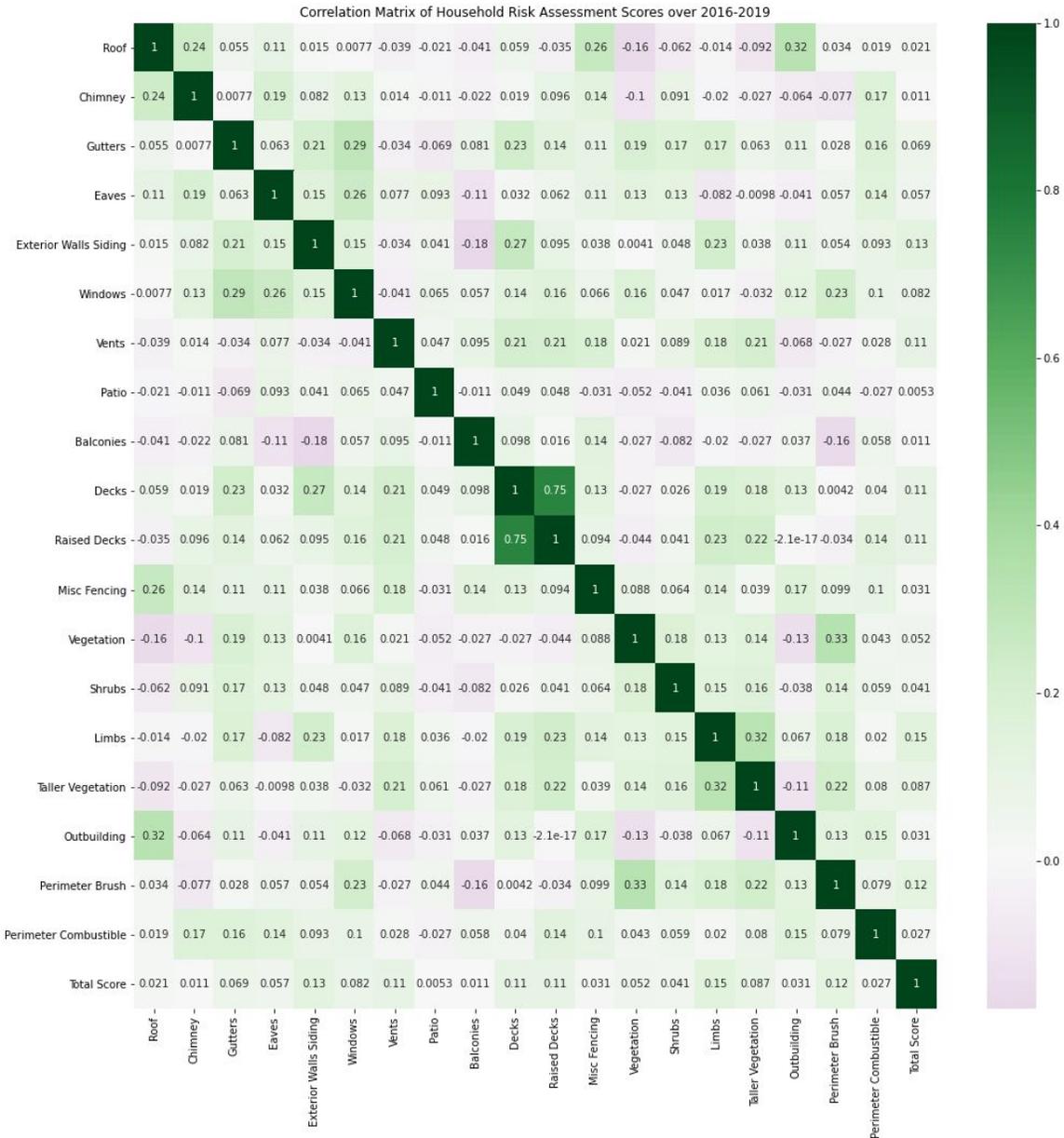


Table 3. Correlation matrix of risk by category. A green box indicates a positive correlation in risk scores between the two categories that make up the row and column, while a purple box indicates a negative correlation.

B. Homeowner Alterations, Risk Assessments, and Property Characteristics

| VARIABLES | (1) total_spent | (2) total_spent | (3) total_spent | (4) total_spent |
|---------------------|--------------------|--------------------|-----------------------|-----------------------|
| total_score_bin | 712.6 (763.2) | | 1,088 (823.3) | |
| year_built | | | 2.265 (143.6) | -20.77 (145.6) |
| bedrooms | | | 5,742* (3,090) | 5,760* (3,132) |
| stories | | | 960.7 (3,085) | 576.8 (3,119) |
| sq_feet_usable | | | -0.0394 (0.115) | -0.0187 (0.115) |
| gross_building_sqft | | | -1.502 (4.174) | -1.980 (4.213) |
| land_value | | | -0.00304 (0.00439) | -0.00288 (0.00444) |
| improvement_value | | | 0.0114 (0.00881) | 0.0119 (0.00887) |
| total_score | | 27.83 (99.02) | | 63.07 (105.2) |
| Constant | 7,791 (6,511) | 11,777* (6,639) | -17,091 (281,521) | 33,498 (285,667) |
| Observations | 89 | 89 | 89 | 89 |
| R-squared | 0.010 | 0.001 | 0.098 | 0.082 |

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 1. Regressing total homeowner expenditures on raw total risk score, property characteristics, and/or total binarized risk score.¹³

¹³ In the original risk assessment score format, risk “points” are assigned at certain fixed levels, such as 0, 5, 10, or 20. The “raw total risk score” refers to the total of these points assigned across categories. Because it may be difficult to mathematically interpret the sum of these subjective risk points, we introduce binarization, where we change the risk score in every category to be 0 (if the original score was 0) or 1 (if the original score was greater than 0). The total binarized risk score is the sum of these indicator variables across all categories.

| VARIABLES | (1) | (2) |
|---------------------|---------------------|--------------------------|
| | total_projects | total_projects |
| total_score_bin | 0.154** (0.0670) | 0.156** (0.0737) |
| year_built | | 0.00700 (0.0129) |
| bedrooms | | 0.101 (0.277) |
| stories | | -0.0827 (0.276) |
| sq_feet_usable | | 3.76e-06 (1.03e-05) |
| gross_building_sqft | | -0.000338 (0.000374) |
| land_value | | -6.90e-07* (3.93e-07) |
| improvement_value | | 8.67e-07 (7.89e-07) |
| Constant | 1.060* (0.571) | -12.25 (25.21) |
| Observations | 89 | 89 |
| R-squared | 0.057 | 0.106 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2. Regression for the number of projects a participating homeowner pursues, based on total binarized risk score and property characteristics.

| VARIABLES | (1) | (2) |
|---------------------|----------------------|-------------------------|
| | roof_assembly | roof_assembly |
| roof_score | 1.045*** (0.134) | 1.055*** (0.138) |
| year_built | | -0.00103 (0.00245) |
| bedrooms | | 0.00860 (0.0533) |
| stories | | -0.0540 (0.0524) |
| sq_feet_usable | | -1.40e-07 (1.97e-06) |
| gross_building_sqft | | -1.74e-05 (7.20e-05) |
| land_value | | -7.49e-08 (7.57e-08) |
| improvement_value | | -9.04e-08 (1.53e-07) |
| Constant | 0.0976** (0.0376) | 2.285 (4.775) |
| Observations | 89 | 89 |
| R-squared | 0.412 | 0.462 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(a)

| VARIABLES | (1) | (2) |
|---------------------|--------------------|-------------------------|
| | vents | vents |
| vents_score | 0.123 (0.0976) | 0.167 (0.106) |
| year_built | | -0.000920 (0.00291) |
| bedrooms | | -0.0613 (0.0651) |
| stories | | -0.0158 (0.0641) |
| sq_feet_usable | | -4.00e-07 (2.37e-06) |
| gross_building_sqft | | 4.16e-05 (8.68e-05) |
| land_value | | -1.50e-07 (9.38e-08) |
| improvement_value | | 4.98e-08 (1.85e-07) |
| Constant | 0.0435 (0.0840) | 2.000 (5.674) |
| Observations | 89 | 89 |
| R-squared | 0.018 | 0.069 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(b)

| VARIABLES | (1) attached_structures | (2) attached_structures |
|---------------------|----------------------------|----------------------------|
| balconies_score | -0.0690 (0.214) | -0.0834 (0.227) |
| decks_score | 0.0658 (0.136) | 0.0677 (0.139) |
| raised_decks_score | 0.0419 (0.138) | 0.0465 (0.143) |
| misc_fencing_score | -0.0890 (0.0824) | -0.0909 (0.0849) |
| year_built | | 0.00251 (0.00215) |
| bedrooms | | 0.0402 (0.0482) |
| stories | | -0.00310 (0.0494) |
| sq_feet_usable | | -1.38e-06 (1.74e-06) |
| gross_building_sqft | | -4.92e-05 (6.44e-05) |
| land_value | | -6.96e-08 (6.75e-08) |
| improvement_value | | 7.42e-08 (1.35e-07) |
| Constant | 0.00589 (0.0635) | -4.890 (4.196) |
| Observations | 89 | 89 |
| R-squared | 0.036 | 0.087 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(c)

| VARIABLES | (1) defensible_zone | (2) defensible_zone |
|---------------------|------------------------|-------------------------|
| shrubs_score | -0.174 (0.127) | -0.175 (0.132) |
| limbs_score | 0.0883 (0.187) | -0.0128 (0.195) |
| year_built | | 0.00291 (0.00404) |
| bedrooms | | -0.0811 (0.0881) |
| stories | | 0.0190 (0.0862) |
| sq_feet_usable | | 4.74e-06 (3.26e-06) |
| gross_building_sqft | | -9.82e-05 (0.000121) |
| land_value | | -1.25e-07 (1.26e-07) |
| improvement_value | | 8.60e-08 (2.54e-07) |
| Constant | 0.235 (0.177) | -5.033 (7.864) |
| Observations | 89 | 89 |
| R-squared | 0.023 | 0.091 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(d)

| VARIABLES | (1) exterior_walls | (2) exterior_walls |
|-----------------------------|-----------------------|--------------------------|
| exterior_walls_siding_score | -0.0992 (0.145) | -0.0411 (0.164) |
| windows_score | 0.358*** (0.117) | 0.376*** (0.124) |
| year_built | | -0.00153 (0.00398) |
| bedrooms | | 0.0620 (0.0886) |
| stories | | -0.0499 (0.0870) |
| sq_feet_usable | | -5.81e-06* (3.25e-06) |
| gross_building_sqft | | 6.98e-05 (0.000120) |
| land_value | | 5.66e-08 (1.24e-07) |
| improvement_value | | 8.17e-08 (2.48e-07) |
| Constant | 0.174 (0.139) | 2.898 (7.799) |
| Observations | 89 | 89 |
| R-squared | 0.099 | 0.152 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(e)

| VARIABLES | (1) fuel_removal | (2) fuel_removal |
|-----------------------------|---------------------|-------------------------|
| perimeter_brush_score | 0.421 (0.292) | 0.297 (0.324) |
| perimeter_combustible_score | -0.464 (0.357) | -0.394 (0.391) |
| shrubs_score | | -0.0708 (0.272) |
| limbs_score | | -0.182 (0.405) |
| year_built | | 0.00241 (0.00850) |
| bedrooms | | 0.0544 (0.181) |
| stories | | -0.0247 (0.177) |
| sq_feet_usable | | 6.74e-06 (6.81e-06) |
| gross_building_sqft | | -0.000263 (0.000252) |
| land_value | | -1.86e-07 (2.65e-07) |
| improvement_value | | 5.10e-07 (5.28e-07) |
| Constant | 1.081*** (0.260) | -3.215 (16.56) |
| Observations | 89 | 89 |
| R-squared | 0.038 | 0.069 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(f)

Table 3. Regression for the number of projects a participating homeowner pursues in a particular category of alterations, based on binarized risk scores for relevant risk assessment categories and property characteristics. (a) Roof alterations (b) Ember-resistant vents (c) Attached structures (d) Defensible zone (0-10' of the structure) (e) Exterior walls, siding, and windows (f) Hazardous fuel removal (0-100' of the structure)

| VARIABLES | (1) participated |
|-------------------|-------------------------|
| year_built | 0.00205 (0.00706) |
| stories | -0.191 (0.193) |
| sq_feet_usable | 5.43e-07 (6.56e-06) |
| land_value | -4.20e-07 (2.68e-07) |
| improvement_value | 1.88e-08 (4.53e-07) |
| vv | 0.454 (0.357) |
| Constant | -4.172 (13.75) |
| Observations | 247 |

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 4. Regressing the likelihood of participation in the program on property characteristics. “vv” is an indicator variable for whether the property is in Vista Verde or Los Trancos Woods.

| | |
|---|---|
| Clearly expressing how I am without blaming or criticizing | Empathically receiving how you are without hearing blame or criticism |
| OBSERVATIONS | |
| 1. What I observe (<i>see, hear, remember, imagine, free from my evaluations</i>) that does or does not contribute to my well-being: "When I (see, hear) . . . " | 1. What you observe (<i>see, hear, remember, imagine, free from your evaluations</i>) that does or does not contribute to your well-being: "When you see/hear . . . " <i>(Sometimes unspoken when offering empathy)</i> |
| FEELINGS | |
| 2. How I feel (<i>emotion or sensation rather than thought</i>) in relation to what I observe: "I feel . . . " | 2. How you feel (<i>emotion or sensation rather than thought</i>) in relation to what you observe: "You feel . . . " |
| NEEDS | |
| 3. What I need or value (<i>rather than a preference, or a specific action</i>) that causes my feelings: ". . . because I need/value . . . " | 3. What you need or value (<i>rather than a preference, or a specific action</i>) that causes your feelings: ". . . because you need/value . . . " |
| Clearly requesting that which would enrich my life without demanding | Empathically receiving that which would enrich your life without hearing any demand |
| REQUESTS | |
| 4. The concrete actions I would like taken: "Would you be willing to . . . ?" | 4. The concrete actions you would like taken: "Would you like . . . ?" <i>(Sometimes unspoken when offering empathy)</i> |
| | |
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Handout 1. A process sheet developed by psychology researcher Marshall B. Rosenberg (Ph.D.) detailing the four-step NVC process

C. Survey Report

Q1 - Please indicate the importance of the following factors in your decision to use the program.

| # | Question | 1 | 2 | 3 | 4 | 5 | Total | | | | | |
|-------------------------------|-------------------------------|--------|---|--------|---|---------|-------|---------|----|---------|----|----|
| Program Financial Incentive | Program Financial Incentive | 0.00 % | 0 | 2.70 % | 1 | 24.32 % | 9 | 21.62 % | 8 | 51.35 % | 19 | 37 |
| Concern over Fire Risk | Concern over Fire Risk | 0.00 % | 0 | 0.00 % | 0 | 5.41 % | 2 | 13.51 % | 5 | 81.08 % | 30 | 37 |
| Being a Good Community Member | Being a Good Community Member | 5.41 % | 2 | 2.70 % | 1 | 10.81 % | 4 | 29.73 % | 11 | 51.35 % | 19 | 37 |

| # | Field | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|-------------------------------|---------|---------|------|---------------|----------|-------|
| 2 | Concern over Fire Risk | 3.00 | 5.00 | 4.76 | 0.54 | 0.29 | 37 |
| 1 | Program Financial Incentive | 2.00 | 5.00 | 4.22 | 0.90 | 0.82 | 37 |
| 3 | Being a Good Community Member | 1.00 | 5.00 | 4.19 | 1.09 | 1.18 | 37 |

Q2 - How did you hear about the Home Hardening and Defensible Space Incentive Program? Please check all that apply.

| # | Answer | % | Count |
|---|---|--------|-------|
| 1 | Email | 18.99% | 15 |
| 2 | Postcard in the Mail | 29.11% | 23 |
| 3 | Woodside Fire Protection District Website | 8.86% | 7 |
| 4 | Town Meeting | 2.53% | 2 |
| 5 | Street Banner Advertisement | 17.72% | 14 |
| 6 | Neighbor Recommendation | 16.46% | 13 |
| 7 | Other | 6.33% | 5 |
| | Total | 100% | 79 |

Q2_7_TEXT - Other

Los Trancos Woods/Vista Verde neighborhood meeting as well as postcard in the mail (1st).

Through being a member of the CAC of the LTCMD

Neighborhood Portola Valley Forum (like Next Door)

Q3 - Before participating in the incentive program, what types of home hardening and defensible space projects, if any, did you complete? Please check all that apply.

| # | Answer | % | Count |
|---|---|--------|-------|
| 1 | Brush Clearing | 34.41% | 32 |
| 2 | Roof Replacement with non-combustible materials | 16.13% | 15 |
| 3 | Exterior Wall/Siding Replacement with non-combustible materials | 3.23% | 3 |
| 4 | Vent Cover/Protection | 6.45% | 6 |
| 5 | Installation of Dual-Paned Windows | 18.28% | 17 |
| 6 | Driveway/Access Road Maintenance | 9.68% | 9 |
| 7 | Replacing Attached Structures (decks,fences,etc..) with non-combustible materials | 5.38% | 5 |
| 8 | Other | 4.30% | 4 |
| 9 | None | 2.15% | 2 |
| | Total | 100% | 93 |

Q3_8_TEXT - Other

We already had a house with non-combustible roof and siding, but we did move a woodpile away from the house wall.

trim overhead branches

removed trees close to the house and limbed trees off of the ground

Q4 - How well did you know what type of home improvement you wanted to do before your fire risk assessment?

| # | Field | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | Impact of Fire Risk Assessment on your Decision | 1.00 | 5.00 | 3.00 | 1.12 | 1.24 | 37 |

| # | Answer | % | Count |
|---|--------|--------|-------|
| 1 | 1 | 13.51% | 5 |
| 2 | 2 | 13.51% | 5 |
| 3 | 3 | 40.54% | 15 |
| 4 | 4 | 24.32% | 9 |
| 5 | 5 | 8.11% | 3 |
| | Total | 100% | 37 |

Q5 - What influenced your choice about the type of home improvement you pursued?

| # | Field | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|------------------------------|---------|---------|------|---------------|----------|-------|
| 1 | Cost of the Project | 0.00 | 5.00 | 3.49 | 1.37 | 1.87 | 37 |
| 2 | Time to Complete the Project | 0.00 | 4.00 | 1.97 | 1.37 | 1.86 | 37 |
| 3 | Fire Marshall Recommendation | 1.00 | 5.00 | 4.32 | 0.90 | 0.81 | 37 |

| # | Question | 0 | 1 | 2 | 3 | 4 | 5 | Total | | | | | | |
|------------------------------|------------------------------|------------|---|------------|---|------------|---|------------|---|------------|---|------------|---|----|
| Cost of the Project | Cost of the Project | 5.41 % | 2 | 5.41 % | 2 | 5.41 % | 2 | 29.7 3% | 1 | 27.0 3% | 1 | 27.0 3% | 1 | 37 |
| Time to Complete the Project | Time to Complete the Project | 18.9 2% | 7 | 18.9 2% | 7 | 27.0 3% | 1 | 16.2 2% | 6 | 18.9 2% | 7 | 0.00 % | 0 | 37 |
| Fire Marshall Recommendation | Fire Marshall Recommendation | 0.00 % | 0 | 2.70 % | 1 | 2.70 % | 1 | 5.41 % | 2 | 37.8 4% | 1 | 51.3 5% | 1 | 37 |

Q6 - How well educated do you feel about fire risk and how to mitigate risk at your own home?

| # | Field | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---------------------|---------|---------|------|---------------|----------|-------|
| 1 | Fire Risk Education | 2.00 | 5.00 | 3.97 | 0.75 | 0.57 | 37 |

| # | Answer | % | Count |
|---|--------|--------|-------|
| 2 | 2 | 2.70% | 1 |
| 3 | 3 | 21.62% | 8 |
| 4 | 4 | 51.35% | 19 |
| 5 | 5 | 24.32% | 9 |
| | Total | 100% | 37 |

Q7 - Other than improvements you undertook as part of the program, have you completed any other home hardening or defensible space improvements?

| # | Field | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | Other than improvements you undertook as part of the program, have you completed any other home hardening or defensible space improvements? - Selected Choice | 1.00 | 3.00 | 1.54 | 0.68 | 0.46 | 37 |

| # | Answer | % | Count |
|---|--------|--------|-------|
| 1 | Yes | 56.76% | 21 |
| 2 | No | 32.43% | 12 |
| 3 | Other | 10.81% | 4 |
| | Total | 100% | 37 |

Q7_3_TEXT - Other

We have made some other changes in yard maintenance and general attention to fire safety issues. Besides vent covers we also made window covers that we install over the lower windows in the summer..

Replaced wood deck with composite deck which had a system of metal supports instead of wood

on going process, depends on annual budget

Q8 - What types of home hardening and defensible space projects, if any, are you considering for the future? Please check all that apply.

| # | Answer | % | Count |
|---|---|--------|-------|
| 1 | Brush Clearing | 30.68% | 27 |
| 2 | Roof Replacement with non-combustible materials | 5.68% | 5 |
| 3 | Exterior Wall/Siding Replacement with non-combustible materials | 9.09% | 8 |
| 4 | Vent Cover/Protection | 13.64% | 12 |
| 5 | Installation of Dual-Paned Windows | 13.64% | 12 |
| 6 | Driveway/Access Road Maintenance | 5.68% | 5 |
| 7 | Replacing Attached Structures (decks,fences,etc..) with non-combustible materials | 11.36% | 10 |
| 8 | Other | 7.95% | 7 |
| 9 | None | 2.27% | 2 |
| | Total | 100% | 88 |

Q8_8_TEXT - Other

Tree removal

Tree trimming

Flashing (not sure if that is the correct name) that is applied where our wood house meets our wood decks).

Native gardener. My first book was The California Native Landscape by Greg Rubin and Lucy Warren, copyright 2013, especially Chapter 11. Fire .

We will be replacing roof and decks and will use non-combustible material on roof (replacing non combustible material) and considering for decks.

Q9 - What suggestions do you have for improving the program, if any?

None. It is a good program. We appreciate the chipping program very much.

Perhaps an annual flyer mailing... A sign on the road advertising the program...

Good assessment of fire risk. Recommendations by Don Bullard are straightforward and easy to understand. It's difficult to get an acceptable detailed receipt from private contractors.

If doing a \$\$\$\$large project, be able to use more than current year's funds if available.

Love the program! Thank you!

Excellent program. I'd like to see 100% reimbursement for removal of Eucalyptus and Monterey Pine on individual's properties to reduce fuel and fire hazard.

More funding for incentives

Great program Keep it up

I love the program! I do suggest adding removing knob and tube wiring to the program. So many of our houses have it and I hear it's bad for starting house fires.

Love this program. Wish that it could help with grass cutting as it can cost \$350-\$650 We have a lot of land.

I have no suggestions. I think it is quite good as it is.

Incentives are good to get homeowners to act but in addition to annual maximum there should be a household lifetime limit. More eucalyptus removal along roads and in open space.

I would like to understand if the incentives programs include the vent/cover protection?

One thing that may help some of us is "turn key" options to fulfill fire assessment recommendations. For example, you may want to have a "recommended provider" that we can contact to do X on our home.

No suggestions. Great program!

Great program!

1) Provide an incentive for installing flashing between the house and decks. 2) Consider a "custom" incentive for something that isn't on the current list but is recommended by the Fire Marshall and only could be funded with the approval of the Fire Marshall. 3) I would STRONGLY support a much more proactive approach to defensible space by the fire district, with warnings, and eventually fines, for households that do not keep brush and grasses cleared. Sonoma County requires weed whacking to be completed by all households by a specific date, and I would love to see that same approach around here.

On going information about the program, info on how to improve our properties in a fire safe manner.

None. Terrific outreach and response.

Program is good.

Put signs up when you do a project at a home to incentivize the neighbors to also partake of improvements

Great program. Informative home visits. Useful financial support.

Program is run very well. Always responsive, knowledgeable and helpful. Communication is clear, thoughtful and easy to follow.

Keep the inspections on the premises

It's great! I just have to actually submit the receipts!
