Linking Forests to Airsheds: Investigating Public Support and Willingness-to-Pay for Reducing Wildfire Smoke Exposure

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Executive Summary

Background

- Wildfire activity in the western United States (US) has intensified. The result is smoke plumes traveling far beyond ignition sites and imposing health, visibility, and recreation costs on down-wind communities.
- Forest-fuel treatments (i.e., prescribed fire paired with mechanical thinning) offer the most effective means of reducing future smoke, yet implementation lags because of: (1) funding constraints; and, (2) public unease with short-term smoke exposure and risk of prescribed fire escape.
- New Mexico (NM) illustrates these risks: major 2022 wildfires in NM emitted 152,000 tons of $PM_{2.5}$ pollution and were linked to 171 excess asthma emergency-department visits (Maji et al., 2024). Additionally, the 2022 Calf Canyon/Hermits Peak wildfire in northern NM began as a prescribed fire that escaped control, becoming the largest and most destructive wildfire in NM state history.

Study Design

- A web-based contingent valuation referendum (July 2021) surveyed 1,023 households in the 11 contiguous western US states (n=41 in New Mexico).
- A hypothetical *Wildfire Smoke Reduction Program* was framed as requiring an annual federal tax. The program would yield one fewer wildfire smoke day per year for 20 years through increased use of prescribed fire and mechanical thinning.
- *Ex-ante* incentive-compatibility features and *ex-post* "preference-purification" procedures (uncertainty recoding; consequentiality splits) were applied to obtain estimates that reflect choices made under epistemically favorable conditions (Lades et al., 2025).

Key Findings

Scope	Preferred median WTP*	Revenue potential**
Western US	\$94 hh^{-1} yr^{-1}	\$2.7 bn yr^{-1}
New Mexico	\$47 hh^{-1} yr^{-1}	\$40 m yr^{-1}

Notes: *payment amount yielding majority (>50%) support for the Wildfire Smoke Reduction Program. **Across 29 million western US households; across 0.86 million NM households. These estimates are conservative as they adjust for uncertain respondents and only consider those who believe the referendum results would affect policy outcomes. WTP=willingness-to-pay; hh=household; yr=year.

- Median WTP results align with adjusted estimates from earlier smoke-valuation studies (e.g., Richardson et al., 2013; Jones, 2018).
- Majority of New Mexican households (68%) are accepting of more prescribed fire and mechanical thinning in order to reduce future wildfire smoke exposure.
- Smoke trade-offs matter: Only about 15% of survey respondents reject any short-term prescribed-fire smoke and report near-zero WTP.
- First valuation evidence that people support prescribed fires because they can potentially reduce their future exposure to wildfire smoke.

Policy Implications

- "Forests-to-Airsheds" finance loop: A modest levy could close current fuel-treatment funding gaps while matching beneficiaries with payers.
- Trust lever: Transparent smoke monitoring could shift uncertain households into higher-valuation categories.
- Communication on smoke trade-offs: Targeted outreach explaining how prescribed fires are planned and monitored can mitigate the 15% "rejectors" effect that threatens political feasibility.

1. Introduction

Wildfires in the western United States (US) have escalated in both frequency and intensity, propelled by overabundant forest fuels, changing climate conditions, and the expansion of the wildland-urban interface (Crockett & Westerling, 2018; Mockrin et al., 2022). Although large blazes ignite locally, the smoke they generate disperses widely, crossing state and even national borders (Bruce et al., 2025). Thus, wildfire damages are not confined to the flame zone.

Recent evidence from New Mexico (NM) illustrates the breadth of the externality: major 2022 fires released an estimated 152,000 tons of $PM_{2.5}$ pollution, contributing to 171 excess asthma related ER visits statewide (Maji et al., 2024). Such smoke episodes illustrate a risk externality dilemma (whose reduction provides a public good): local ignition sites produce costs (e.g., respiratory health burdens, reduced visibility, and degraded recreation opportunities) borne by households scattered across multiple states and counties.

Forest managers typically address the risk of severe wildfires, and thus future smoke, through forest fuel treatments, particularly prescribed fire paired with mechanical thinning (Stephens et al., 2012). Yet prescribed fire remains well below recommended levels in the western US (Schultz et al., 2019). Two principal barriers explain this shortfall: (1) insufficient financing to plan and conduct large-scale burns, and; (2) limited public acceptance of intentionally introduced smoke (Miller et al., 2020). This "smoke today vs. smoke tomorrow" tradeoff (Jones et al., 2022) is significant, as decision makers must weigh the localized, but short-term, emissions from prescribed fire against cross-continental and severe wildfire smoke.

Research emphasizes that public support depends on both trust in the agencies conducting prescribed fires and acceptance of short-term smoke (Lambrou et al., 2023). When communities doubt an agency's safety record or ability to manage emissions responsibly, they tend to oppose the policies and funding needed for large-scale fuel treatments (Rogers et al., 2025). Although research has quantified various non-market damages of wildfire smoke (Crowley et al., 2023), no study has explored how households' willingness-to-pay (WTP) for fewer smoke days could finance fuel treatments. This approach treats smoke reduction as a regional public good to be financed through contributions from downwind households.

This study investigates whether households in the western US, and in New Mexico (NM), in particular, are prepared to fund a *Wildfire Smoke Reduction Program* designed to reduce future smoke episodes through large-scale fuel treatments. It addresses two critical questions: (1) How does support for forest fuel treatments and trust in federal agencies influence WTP? (2) Does resistance to short-term prescribed fire smoke undermine the feasibility of a regional financing mechanism? To address these questions, we conducted a contingent valuation (CV) referendum survey of 1,023 households across eleven western US states, including in NM. Our analysis incorporates *ex-ante* measures promoting incentive-compatibility in the survey design, and *ex-post* measures for preference "purification." The *ex-post* measures include a rational consistency check, recoding low-certainty votes, and applying the discrete knife-edge approach of Mohr et al. (2023) to split the sample based on perceived survey consequentiality. Based on the "purified" preferences, the study aims to derive welfare estimates that reflect choices made under *epistemically favorable conditions* (Lades et al., 2025).

Results indicate that the median annual household WTP to avoid one day of wildfire smoke ranges from about \$35 to over \$200, depending on the strictness of uncertainty recoding and perceptions of consequentiality. Even under conservative assumptions, WTP estimates cluster around \$90 to \$120.[i] These valuations, when aggregated across western US households, suggest that \$2.7 billion to \$3.6 billion could be raised for proactive fuel treatments. For New Mexico alone, the conservative median WTP of roughly \$47 per household yields \$40 million in potential revenue for increased fuel treatments. However, across the full survey sample, roughly 15% of respondents reject any short-term prescribed fire smoke and report near-zero WTP. This group highlights the risk that a lack of public acceptance can pose to large-scale efforts to deploy fuel treatments. Our findings have important implications for both public policy and forest management, particularly in identifying how households' trust in implementing agencies, and their tolerance for short-term smoke, shape the potential for regionwide or broader financing solutions.

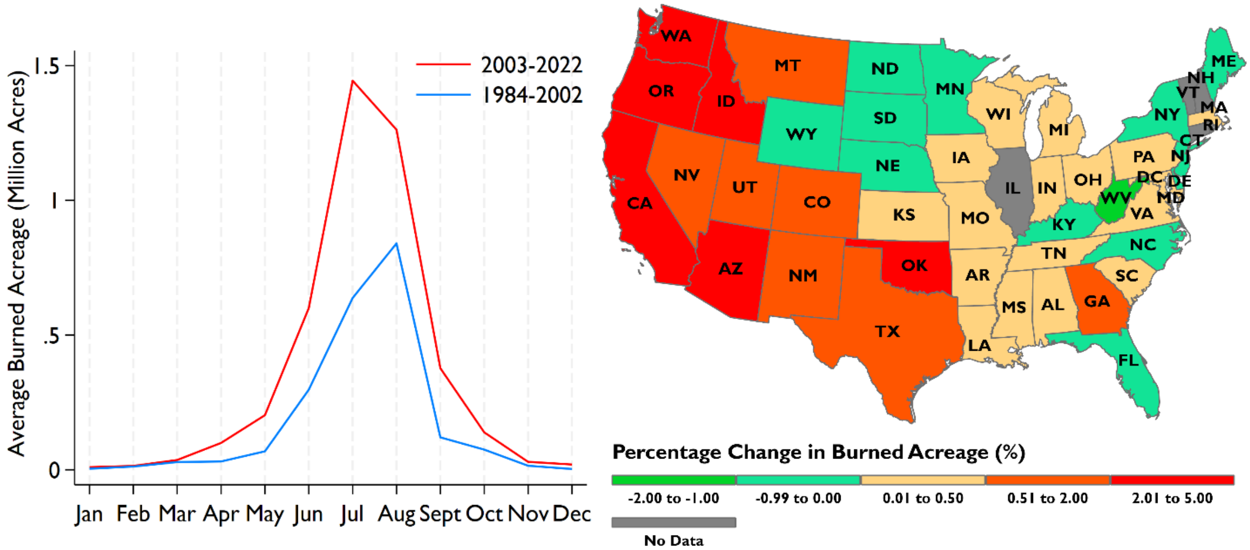
2. Background: Prescribed Fire, Wildfire, and Economic Values

2.1. From Forest Fuels to Regional Airsheds

Excess forest fuels translate directly into regional airshed pollution once fire ignitions occur. Historically, natural wildfires have supported ecosystem health. However, the legacy of fire suppression has disrupted natural fire cycles, leading to an overabundance of forest fuels (Parks et al., 2018). Rising temperatures and prolonged droughts have created favorable conditions for severe and harder-to-control wildfires (Figure 1a; Crockett & Westerling, 2018). Although large fires ignite in local forested areas, monitors show that their smoke routinely crosses state and even national borders, turning a local ignition into a regional airshed problem (Jaffe et al., 2020; Bruce et al., 2025). Evidence shows that western US states and New Mexico bear the largest share of the growing burned acreage in the country, making their downwind populations especially vulnerable to wildfire smoke (Figure 1b).

Figure 1: Wildfire Burned Acreage in the US between 1984-2002 and 2003-2022.

(a) Average Monthly Burned Acreage (western US). **(b)** Average Annual Burned Acreage.



Notes: The figures compare US wildfire burned acreage between 1984-2002 and 2003-2022. (a) displays monthly averages in million acres from the MTBS (Monitoring Trends in Burn Severity; US Geological Survey). (b) illustrates the percentage change in annual burned acreage. Adapted from US EPA (2024).

Smoke pollutants degrade air quality, leading to severe respiratory health damage and increased all-cause mortality (Gould et al., 2024). Vulnerable populations, especially the elderly, face heightened health risks (Liu et al., 2015; 2017). Damages extend beyond health. Wildfire smoke reduces households' quality-of-life by affecting scenery visibility, outdoor recreation, wildlife health, and habitats (Gellman et al., 2022; Sanderfoot et al., 2022). These affected amenities hold significant value, although not typically traded in markets (Segerson, 2017).

The growth in wildfires in the western US and New Mexico and their attendant external effects has meant an increasing need for mechanisms to scale and finance smoke reduction (Jones et al., 2022). More generally, various sources have argued for managing air pollution from a regional airshed perspective, accounting for prevailing wind and weather patterns (Zirnhelt et al., 2014; Guttikunda, 2024), including with respect to wildfire smoke (Schweizer et al., 2017; Wen et al., 2023). Although regional airsheds are not used for Clean Air Act attainment standards in the

US, where the geographic resolution is the county level (Cropper et al., 2025), they are being pursued in other countries (e.g., Tripathi et al., 2024; Basumatary et al., 2025). Such an approach could reduce wildfire smoke more effectively while better targeting payments from downwind beneficiaries.

Watersheds and airsheds do not always align geographically, but experiences with forested watersheds and downstream drinking water protection illustrate feasible solutions. Funding models that span large regions are increasingly applied in the arid western US to support water-source protection of forested areas (e.g., Adhikari et al., 2017; Hjerpe et al., 2024). Because effective forest treatments often cross ownership boundaries- federal, tribal, state, municipal, and private- collaborative programs and cost-sharing are needed. The core argument is that delineating prevailing airsheds, just as with watersheds, and looking beyond the wildland-urban interface (WUI), could become a central part of financing wildfire-risk mitigation and smoke reduction.

2.2. Valuing Cleaner Airsheds: Use and Non-Use Benefits

Assigning a monetary value to each avoided smoke day converts a diffuse airshed benefit into a potential revenue stream that can be recycled into upstream fuel treatments. Non-market valuation captures the worth of goods not traded in markets, such as clean air, lower health risks, and clearer vistas (Boyle, 2017). These values are essential for conducting cost-benefit analyses of wildfire management policies. Non-market values fall into two primary classes. Use values reflect direct gains such as fewer hospital visits or better recreation days, plus indirect gains like climate regulation. Nonuse values reflect satisfaction from knowing ecosystems and future generations are spared smoke (Segerson, 2017). Even reasonable per-household willingness-to-pay (WTP) scales up quickly: with 29 million households under western smoke plumes, a median

WTP of just $100 per year would raise about $3 billion annually, enough to treat 4 million acres at an average treatment cost of $747 per acre (US Census, 2023; Wibbenmeyer et al., 2025).

Existing studies confirm that households value smoke avoidance but have not linked that value to any fuel-treatment actions behind it. Richardson et al. (2013) found southern Californians would pay $95 per day to avoid smoke from the Station Fire, but the data pre-date today's larger fires and omit hypothetical bias controls. Jones et al. (2016) estimated a $130 WTP in Albuquerque, New Mexico, using a defensive-behavior approach, yet the result is site-specific. Shrestha et al. (2021) is the lone study to mention prescribed fire explicitly, reporting $41 per acre in Mississippi, a state with minimal recent wildfire growth (Figure 1b). The study focuses solely on private forests. Its results may not apply to western US states, where most forests are publicly owned (Nelson et al., 2010). No study has yet measured what western states' households would pay for a program that reduces smoke by scaling prescribed fire and thinning on public lands.

2.3. The "Smoke Today" vs. "Smoke Tomorrow" Dilemma: Economic Valuation and Barriers to Scaling Prescribed Fire

Forest managers typically reduce future wildfire severity and thereby total smoke by combining prescribed fire with mechanical thinning (Stephens et al., 2012). Despite its proven benefits, the use of prescribed fire in the western US remains well below recommended levels. Schultz et al. (2019) revealed two primary obstacles explaining this shortfall: (1) insufficient financing and human resources, and; (2) lack of public support. Surprisingly, their study showed that air quality standards are not barriers to implementation. We argue that these obstacles reinforce each other because broader public acceptance can shape legislative priorities and, consequently, funding allocations for fuel treatments.

A key challenge is the "smoke-today" against "smoke-tomorrow" tradeoff (Jones et al., 2022). Prescribed fire releases short-term smoke, which can provoke health concerns and community pushback; however, by reducing fuel loads, it has the potential to substantially lower the smoke burden from future catastrophic wildfires. Empirical findings diverge on the extent of short-term health impacts: some studies find no statistically significant link between prescribed fire and hospitalizations (Raab et al., 2023), while others report associations with asthma, cardiovascular outcomes, and adverse births (Huang et al., 2019; Jones & Berrens, 2021). The US EPA (2021) acknowledges that prescribed fire smoke is less intense than smoke from uncontrolled wildfires yet emphasizes the need to weigh these short-term emissions against the long-term public-good benefits of potential reductions in future wildfire smoke.

The present study takes an important first step towards addressing the financing gap and the "smoke-today" against "smoke-tomorrow" dilemma by gauging households' public support and WTP for a program that scales up fuel treatments. If households accept some short-term smoke to avoid more severe future smoke episodes, their aggregated WTP could justify efforts to expand revenue sources for scaling up prescribed fire. Quantifying this tradeoff, and how trust in government or attitudes toward fuel treatments shape valuation, is important admissible information for designing effective "Forests to Airsheds" financing solutions.

3. Wildfires and Prescribed Fires in New Mexico (NM)

New Mexico's wildfire history over the past decade shows a steady transition from infrequent, episodic fire events to near-annual wildfire seasons. The state has become a focal point in the western wildfire story. The chronology in Table 1 and the seasonal acreage pattern in Figure 2 together document how: (1) wildfire incidents in NM have grown larger, (2) the core burn window in NM has shifted earlier into spring; and, (3) the burned acreage in NM over the last two decades quadrupled contrasted to the prior decades.

The immense shift in burned acreage in the state would also extend the potential $PM_{2.5}$ air pollution exposure for New Mexicans as well as for neighboring states' residents. Maji et al. (2024) estimated that the major NM wildfire events of 2022 alone have emitted 152,000 tons of $PM_{2.5}$ pollution in addition to other toxins, thus negatively impacting the health and well-being of New Mexican households. The same paper has associated the $PM_{2.5}$ from NM wildfires to an excess of 171 asthma ER visits among the NM public.

New Mexico's recent fire seasons have catalyzed a rapid policy response, although there is unquantified public resistance against forest fuel treatment tools, mainly prescribed fire. New Mexico's Senate passed the Wildfire Prepared Act (SB 33, 2025) allocates around US $20 million to fund community outreach, and dedicated fire-planning staff in the state. In the same legislative session, the state's House of Representatives amended the Forest and Watershed Restoration Act to broaden fund eligibility for fuel-reduction projects in WUIs and to prioritize buffers around high-probability ignition zones (HB 175, 2025).

Concurrent federal actions have complicated the local policy landscape. After the Hermit's Peak/Calf Canyon fire escape, the US Forest Service imposed a nationwide 90-day hold on prescribed fires to review risk protocols. This event has made the public even skeptic about what is considered by experts to be the most cost-effective tool for large-scale fuel management (Stephens et al., 2012).

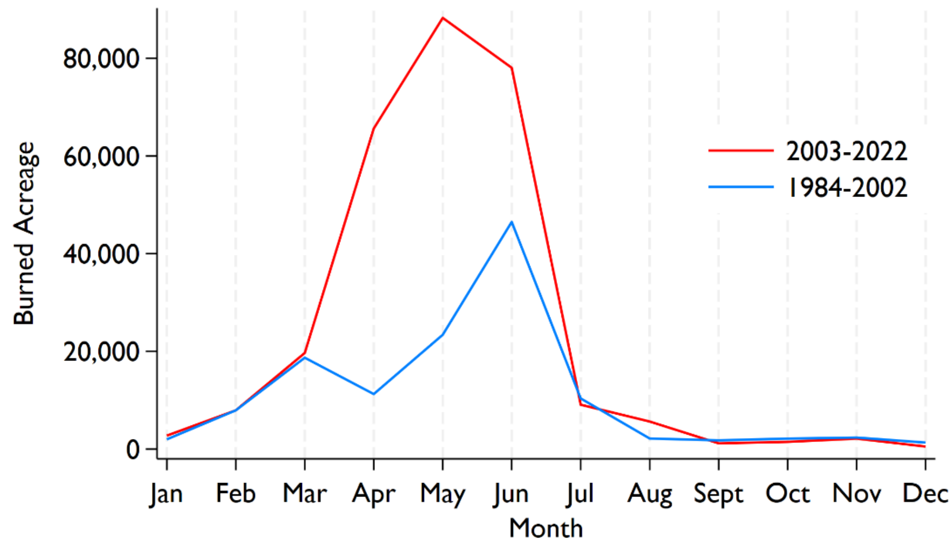
Taken together, these initiatives place New Mexico at a policy crossroads: the state possesses both capital and legal authority to scale the use of forest fuel treatments. However, its social license to employ prescribed fires remains fragile. Quantifying households' WTP for smoke-reduction through fuel treatment programs, and identifying the design attributes that rebuild public trust, therefore becomes fundamental. Although this study's dataset covers all 11 western contiguous US states (n=1,023), we use the modest number of New Mexican observations (n=41) to test whether local respondents exhibit preferences that diverge from those of the broader western sample (see sections 5.3, and 7.3.2 for more on the NM context).

Table 1: Chronology of major wildfire incidents in New Mexico from 2018-2025.

Year	Incident (County/Region)	Final Area Burned
2018	Ute Park Fire (Colfax County)	36,740 ac*
2020	Medio Fire (Santa Fe National Forest)	3,775 ac*
	Luna Fire (Mora/Taos)	10,142 ac*
2022	Black Fire (Gila NF; Sierra/Grant/Catron)	325,133 ac*
	Calf Canyon/Hermit's Peak Fire (San Miguel-Mora)	341,735 ac**
2024	South Fork & Salt Fires (Lincoln/Otero)	25,508 ac**
2025	Trout–Buck Complex (Gila National Forest; Grant/Catron)	38,682 ac (Trout) **
		57,753 ac (Buck) **

Notes: This table only presents major wildfire events (>10,000 ac) in the state of New Mexico. Medio Fire is included despite modest acreage because it led to repeated smoke advisories for Santa Fe. Data originate from *nmfireinfo** and from *InciWeb***. ac=acres.

Figure 2: Wildfire Burned Acreage in New Mexico between 1984-2002 and 2003-2022.



Notes: The figure compares NM wildfire burned acreage between 1984-2002 and 2003-2022. It displays monthly averages in acres from the MTBS (Monitoring Trends in Burn Severity; US Geological Survey).

4. Theoretical Considerations

Downstream households across the regional airshed benefit from wildfire smoke reduction as it introduces improvements to health, outdoor recreation, scenery visibility, wildlife habitats, and future climate impacts (Liu et al., 2015; 2017; Gellman et al., 2022; Sanderfoot et al., 2022; Gould et al., 2024). Let $Q = (q_1, q_2, \ldots, q_{\mathrm{m}}, q_{\mathrm{pf}})$ be a vector of environmental attributes affecting the household's utility, where q_{pf} represents short-term smoke from prescribed fire (higher means more exposure). In the status quo, these attributes are at levels $Q^0 = (q_1^0, q_2^0 \ldots, q_{\mathrm{m}}^0, q_{\mathrm{pf}}^0)$. The *Wildfire Smoke Reduction Program* that we study in our contingent valuation survey would shift the environmental attributes to Q^1.

In economic theory, the household's maximum WTP to reduce wildfire smoke is defined as the Hicksian Compensating (HC) Surplus measure of welfare change:

$$WTP_{\mathrm{HCS}} = \mathrm{e}(p, Z, Q^1, U^0) - \mathrm{e}(p, Z, Q^0, U^0) \tag{1}$$

where $e(.)$ is the household's expenditure function, p is the price vector for market goods, Z is a vector of exogenous household attributes, and U^0 is the baseline utility level. Paying WTP_{HCS} leaves the household at U^0 while enjoying the net environmental change $(Q^1 - Q^0)$. Although prescribed fire may introduce some short-term smoke in the treatment areas, the referendum question in our survey instructs households to disregard this effect ($\Delta q_{\text{pf}} \approx 0$). The rationale is to isolate the benefits of the long-term reduction in wildfire smoke across the regional airshed. This assumption aligns with evidence that prescribed fire smoke is more localized and short-lived than wildfire smoke (Navarro et al., 2018). However, it is possible that some households can reject this net-positive framing because of their latent aversion to smoke from prescribed fire. Let

$$d_{\text{i}} = \begin{cases} 1 \text{ if household } i \text{ rejects the smoke tradeoff,} \\ 0 \text{ otherwise.} \end{cases} \tag{2}$$

The survey elicits d_{i} in a follow-up question (Section 5.2), and the study leverages it to explore heterogeneity in WTP by acceptance of the "smoke-today" against "smoke-tomorrow" tradeoff (Section 7.4).

A well-known critique of stated preference valuations in the economics literature is hypothetical bias, the divergence between hypothetical and actual behavior. Experimental evidence shows the bias is largest when respondents doubt that survey outcomes will guide real policy or payments; credible policy and payment links significantly reduce it (Haab et al., 2020). Behavioral-welfare economics offers three complementary safeguards: (1) preference "purification", which removes answers demonstrably driven by framing or cognitive error; (2) restriction of welfare analysis to responses given under *epistemically favorable conditions*- that is, when respondents are informed, attentive and free of obvious biases; and, (3) adoption of the Bernheim-Rangel framework, which treats only such bias-free responses as "welfare-relevant choices" (Bernheim & Rangel, 2009; Lades et al., 2025).

The present study implements these safeguards through the *ex-ante*/*ex-post* framework of Loomis et al. (2014). *Ex-ante* measures promote incentive-compatibility and consequentiality in the survey design (Section 5.1). *Ex-post* measures purify responses by testing for rational consistency, adjusting for uncertainty, and survey consequentiality (Section 6.1). Together, these measures allow for a robust estimation of welfare change.

5. Survey Design and Data

This study used a public advisory referendum administered using an online Qualtrics panel. The survey instrument was reviewed and approved by the Institutional Review Board (IRB) at the University of New Mexico. The survey was launched in July 2021 after a pilot test (n=100, June 2021) to refine clarity and technical quality. Each respondent answered the survey for their entire household. Quota sampling ensured representativeness by age, gender, race, and state-of-residence across the 11 contiguous western US states (Table 2). In total, n=1,023 respondents completed the survey, of which 41 reside in New Mexico.[ii]

Participants began with an eligibility screener confirming residence in the western US and age≥18. They next received information on wildfire smoke's health and environmental impacts, followed by a description of the proposed *Wildfire Smoke Reduction Program* and its potential benefits. The program would use prescribed fire and mechanical thinning on public forests to reduce each household's smoke exposure by one day annually for 20 years. To isolate long-term public benefits of airshed-wide smoke reduction, participants were instructed to assume no direct exposure to prescribed fire smoke. From the survey:

> *We ask that you assume that you would not be directly exposed to smoke or dust from any of the newly implemented prescribed fires or mechanical thinning activities used as part of this program.*

Table 2: Representation of the Survey Sample (n=1,023) Compared to the Western US Adult Population (≥18).

Demographics	Target population % (western US adults, Age 18+)	Survey Sample (%)	T-statistic for difference in proportions
Gender			
Female	50.23	50.54	0.20
Age and gender			
Age 18-24 male	12.38	5.14	-4.94
Age 18-24 female	11.56	10.83	-0.52
Age 25-34 male	19.75	18.18	-0.89
Age 25-34 female	18.45	20.12	0.98
Age 35-59 male	42.29	37.55	-2.16
Age 35-59 female	41.00	39.46	-0.71
Age 60+ male	25.58	39.13	6.99
Age 60+ female	28.98	29.59	0.31
Race and ethnicity			
White, Non-Hispanic	69.33	73.64	2.57
Black, Non-Hispanic	6.46	5.70	-0.85
American Indian, Alaskan Native	1.21	1.86	1.90
Hispanic	30.66	26.20	-3.09
Household income			
$0-50,000	32.4	36.46	2.77
$50,000-100,000	29.1	35.97	4.84
$100,000-150,000	17.50	17.99	0.41
$150,000 and above	21.00	9.56	-8.98
States			
Arizona	9.36	15.15	6.36
California	51.75	42.62	-5.84
Colorado	7.56	9.09	1.85
Idaho	2.42	2.54	0.25
Montana	1.42	1.27	-0.41
Nevada	4.06	5.87	2.93
New Mexico	2.77	4.01	2.42
Oregon	5.55	5.77	0.31
Utah	4.28	2.93	-2.13
Washington	10.09	9.87	-0.23
Wyoming	0.76	0.88	0.44

Notes: This table compares the sample proportions with the western US population proportions as reported in the US Census (2021). The T statistic is calculated such that $T = \frac{sample\% - Population\%}{\sqrt{Population\% * (1 - Population\%)/N}}$, where N is the size of group being compared in the sample.

5.1. Two-Stage Advisory Referendum

Respondents then answered a two-stage referendum. First, they voted 'Yes,' 'No,' or 'Not Sure' on a no-cost referendum for the program, which would reduce household smoke exposure by one day per year at zero monetary expense. Next, a cost-inclusive closed-ended (CE) referendum introduced a randomly assigned annual federal tax t_i to fund the program:[iii]

> *The Wildfire Smoke Reduction Program would be costly to operate and requires financing [...]*
>
> *Q: Would you vote for or against [...] in an advisory referendum if adoption of this program reduced your exposure to wildfire smoke by an average of 1 day per year and would cost your household {$\$t_i$} in increased Federal taxes every year for the next 20 years?*

The survey design promoted incentive-compatibility *ex-ante* through various measures. The survey implemented a CE valuation format, consistent with evidence from Hanemann et al. (2025), to elicit valid welfare-change measures. The referendum was framed as advisory to federal agencies. It was linked to a coercive federal tax if it passed with a 50% majority rule. The survey also reminded respondents to consider household budget constraints and alternative uses of income (Carson et al., 2014). These elements promote policy and payment consequentiality in the sense of Carson and Groves (2011) and conform to best practice for consequential CV (Harrison 2007; Loomis 2014; Lades et al., 2025).

Full voting results are provided in Table 3 (n = 1,023); about 78% of respondents supported the program at zero cost, but support plummeted to 47% when a positive payment amount (t_i) was introduced. This sharp decline underscores votes' sensitivity to cost, consistent with theoretical expectations for valid welfare estimates in contingent valuation surveys.

Table 3: Voting Results for the Wildfire Smoke Reduction Program (n=1,023).

Referendum Type	Yes (%)	No (%)	Not Sure (%)
No cost $0	78.30	6.06	15.64
Cost $ t_i	46.72	28.05	25.22

Notes: This table presents the trichotomous voting results for the two-stage referendum: at no cost, and then when a cost (payment amount) is introduced.

5.2. Follow-up Questions

Immediately after the valuation question, the survey gathered three follow-ups that are used *ex-post* to purify responses. First, respondents rated their certainty in payment decisions on a discrete zero (*not at all certain*) to 10 (*completely certain*) scale. Second, following Mohr and colleagues' (2023) discrete knife-edge approach, participants answered two questions probing perceptions of policy and payment consequentiality:

Q: Do you believe this survey results will affect Federal wildfire policy and reduce the level of wildfire smoke?

Q: Do you believe that your Federal taxes will actually increase to pay for the proposed Wildfire Smoke Reduction Program, if implemented?

Third, they were asked to consider the "smoke-today versus smoke-tomorrow" tradeoff:

We ask you to consider the tradeoff between using prescribed burning to reduce future wildfire activity with the fact that prescribed burning, like any type of fire, creates smoke.

Q: […] Indicate agreement or disagreement to the statement: I am willing to accept some exposure to smoke from prescribed burns as a tradeoff for reducing future wildfire activity in the US

This question relaxes the initial assumption of "no direct treatment smoke," revealing whether respondents would still accept short-term smoke to achieve long-term benefits across the regional airshed. Approximately 85% accepted, while 15% rejected the tradeoff (Table 4). The vote-certainty scale, the two consequentiality prompts are applied as *ex-post* validity filters in the econometric analysis described in Section 6.1.

5.3. Descriptive Statistics

Table 4 summarizes the characteristics of the 1,023 respondents who completed the survey. The average age was 49 years, and half the sample identified as female. Around 76% of respondents reported White race, 46% held at least a bachelor's degree, and 14% lived in rural areas. Households averaged 2.6 members, with an average annual income of $77,000 (2020 USD) but a sizable standard deviation of $49,000, indicating broad economic diversity. Most respondents (77%) believed they had smelled wildfire smoke at their current home and outdoors, and 38% felt that smoke had negatively affected their health; 11% had visited a doctor for smoke-related issues, and 14% had missed work. Nearly a quarter (25%) used a portable air filter, and 73% lived with individuals considered especially vulnerable to smoke (e.g., children, seniors, or people with medical needs). Knowledge and attitudes about wildfire management were also prevalent: 74% were aware of prescribed fire or mechanical thinning prior to the survey, 75% supported expanding these practices, and 62% expressed confidence in the federal government's ability to implement the proposed *Wildfire Smoke Reduction Program* effectively. Overall, these statistics highlight that wildfire smoke is a familiar concern for most households in the western US, and there is substantial openness to proactive fuel treatments as a means of mitigating future smoke episodes.

Table 4: Survey Summary Statistics for Relevant Variables (n=1,023).

Variables	Description	Mean	*SD*
Age	Respondent's age	49.28	18.33
Female	Respondent' gender (survey allows for a non-binary option)	0.50	0.50
White	Respondent of white race	0.76	0.43
College	Respondent has a bachelor's degree or higher	0.46	0.50
Liberal	Respondent self-identifies as liberal	0.40	0.49
Rural	Respondent's primary location being rural	0.14	0.35
Household size	Respondent's household size	2.63	1.21
Income ($1,000s)	Mid-point of the respondent's total household income range in thousands of dollars (2021 US dollars)	77.26	49.46
Sensitive groups	Household includes sensitive individuals	0.73	0.44
School miss	Child ever missed a school day due to wildfire smoke	0.18	0.38
Work miss	Respondent ever missed a workday due to wildfire smoke	0.14	0.34
Smoke home	Respondent thinks they smelled wildfire smoke at home	0.77	0.42
Smoke outdoor	Respondent thinks they smelled wildfire smoke outdoors	0.76	0.42
Health affect	Respondent thinks wildfire smoke affected their health	0.38	0.48
Doctor visit	Respondent ever visited a doctor due to wildfire smoke	0.10	0.31
Health concern	Respondent concerned about wildfire smoke health impacts	0.93	0.26
Air filter	Respondent is using an air filter	0.25	0.43
Forest visit	Respondent ever visited a National Forest, National Park, National Monument, or National Wilderness Area	0.89	0.32
Prior knowledge	Respondent has prior knowledge about using prescribed fire and mechanical thinning to reduce future wildfire	0.74	0.44
General support	Respondent generally supports expanding use of both prescribed fire and mechanical thinning	0.75	0.43
Accept Pburn	Respondent is willing to accept some exposure to smoke from prescribed burns as a tradeoff for reducing future wildfire	0.85	0.36
Confidence fed	Respondent is confident in the federal government implementing the Wildfire Smoke Reduction Program	0.62	0.49
Share	Respondent believes that survey results will be shared with Federal policymakers	0.79	0.40

Comparing New Mexican observations to those from the rest of the western US states in the sample shows little to no difference on most individual attributes, experience with wildfire smoke, and attitudes towards forest fuel treatments. New Mexican respondents were significantly less likely to have a college degree and more likely to reside in a rural area than the full western US sample, but were otherwise very similar along observable attributes (Table 5).

Table 5: Comparison between respondents from New Mexico and from the aggregation of western US states.

	New Mexico (n=41)		Rest of Western US (n=982)		Difference
Variables	Mean	SD	Mean	SD	T-test
Age	47.46	17.47	49.35	18.36	-0.68
Female	0.49	0.51	0.51	0.50	-0.25
White	0.78	0.42	0.76	0.43	0.30
College	0.31	0.47	0.47	0.50	-2.13**
Liberal	0.36	0.49	0.40	0.49	-0.51
Rural	0.27	0.45	0.14	0.35	1.83*
Household size	2.63	1.18	2.63	1.20	0.00
Income ($1,000s)	67.56	49.96	77.66	49.42	-1.27
Sensitive groups	0.68	0.47	0.74	0.44	-0.80
School miss	0.05	0.22	0.19	0.39	-3.84***
Work miss	0.07	0.26	0.14	0.35	-1.66
Smoke home	0.78	0.42	0.77	0.42	0.15
Smoke outdoor	0.68	0.47	0.77	0.42	-1.21
Health affect	0.34	0.48	0.38	0.48	-0.52
Doctor visit	0.10	0.30	0.11	0.31	-0.21
Health concern	0.93	0.26	0.93	0.26	0.00
Air filter	0.22	0.42	0.25	0.43	-0.45
Forest visit	0.93	0.26	0.88	0.32	1.19
Prior knowledge	0.73	0.45	0.74	0.44	-0.14
General support	0.68	0.47	0.76	0.43	-1.07
Accept Pburn	0.83	0.38	0.85	0.36	-0.33
Confidence fed	0.63	0.49	0.62	0.49	0.13
Share	0.83	0.39	0.79	0.41	0.64

*Notes: * p<0.1. ** p<0.05. *** p<0.01.*

6. Methodology

The proposed *Wildfire Smoke Reduction Program* in the survey can provide households with nonuse values (e.g., improved wildlife habitat, climatic impacts) as well as use values (e.g., improved health, scenery visibility, outdoor recreation). Thus, this study implements the contingent valuation (CV) method through a public referendum-style, trichotomous choice format contingent on a payment amount (t_i). Let the vote of respondent i be $Y_i = \{0,1,2\}$: 1 if they vote 'Yes' to support the program at cost t_i, 0 is they vote 'No,' and 2 if 'Not Sure.'

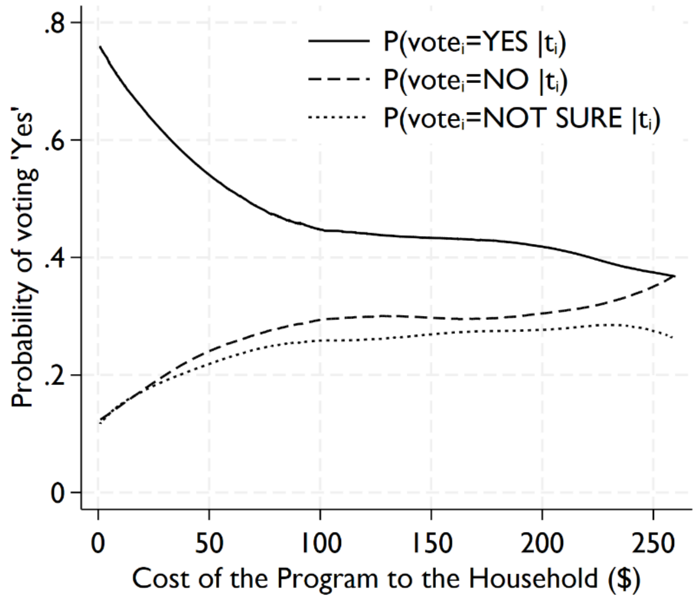
6.1. Choices Purification

Following Bernheim and Rangel's welfare-filtering paradigm from the economics literature and its operationalization by Lades et al. (2025), the analysis aims to identify choices given under *epistemically favorable conditions*. These include choices that are internally consistent, confident, and made by respondents who believe the survey could translate into real policy and payments. The choice purification proceeds in four *ex-post* steps.

First, to determine whether 'Not Sure' (n=258) responses could be pooled with 'Yes' or 'No' categories, we apply Cramer and Ridder's (1991) likelihood ratio test. The null hypothesis posited that estimated coefficients for 'Not Sure' responses were statistically identical to those of either 'Yes' or 'No,' implying no loss of fit when merging response categories. Two constrained multinomial logit models were estimated:[iv] one forcing 'Not Sure' coefficients to equal 'Yes' and another equating them to 'No.' These were compared to an unconstrained three-category model. The likelihood ratio tests rejected pooling 'Not Sure' with 'Yes' ($\chi^2(18) = 221.18,\ p < 0.01$). Merging 'Not Sure' with 'No' was not rejected at the same threshold ($\chi^2(18) = 33.13,\ p > 0.01$). Figure 3 reinforces this result. The predicted probability of 'Not Sure' responses aligns closely with 'No' votes across payment amounts, particularly at higher costs where uncertainty diminishes. We therefore recode 'Not Sure' as 'No,' effectively reducing the referendum to a dichotomous format ($Y_\mathrm{i} = \{0,1\}$) for all subsequent analyses.

Second, rational-consistency screening drops votes that violate monotonicity: eleven respondents who voted 'No' to the program at zero cost but supported it at a positive cost are excluded, leaving a final analytic sample of 1,012 households that we use for our analysis.

Figure 3: Predicted voting probability for the Wildfire Smoke Reduction Program by cost (US$).



Notes: This figure plots a locally weighted scatterplot smoothing (LOWESS) of the predicted probability of votes for the referendum valuation question as function of payment amount t_{i}.

Third, the analysis addresses vote uncertainty. Let $Y_{\mathrm{i}}^{\tau} = \{0,1\}$ take $Y_{\mathrm{i}}^{\tau} = 1$ when respondent i both approves the cost referendum ($Y_{\mathrm{i}} = 1$) and reports a certainty score $\geq \tau$ on the 0-10 scale, and $Y_{\mathrm{i}}^{\tau} = 0$ otherwise. Such that:

$$Y_{\mathrm{i}}^{\tau} = \begin{cases} 1, & Y_{\mathrm{i}} = 1 \text{ and certainty}_{\mathrm{i}} \geq \tau, \\ 0, & \text{otherwise.} \end{cases} \tag{3}$$

This asymmetric recoding rule (Champ et al., 2009) converts low-certainty 'Yes' votes to 'No' while leaving all 'No' votes intact. In the results that follow, we report results for the no-recoding baseline ($\tau = 0$), as well as for the $\tau = \{6,7\}$ thresholds that are shown empirically (e.g., Poe et al., 2002; Wang et al., 2016) to approximate actual payment behavior.

Fourth, we implement the discrete knife-edge consequentiality split of Mohr et al. (2023). Specifically, we define two binary indicators: $\mathrm{Affect}_{\mathrm{i}} = 1$ if respondent i believes the survey could affect federal wildfire policy, and $\mathrm{Payment}_{\mathrm{i}} = 1$ if they assign a non-zero probability to paying the suggested tax. The intersection of these beliefs yields three groups: the Completely Inconsequential who meets neither condition $(\mathrm{Affect_i} \cap \mathrm{Payment_i}) = 0$, the Weakly Consequential who meets a minimum of policy consequentiality ($\mathrm{Affect_i} = 1$), and the Strongly Consequential who meets both conditions $(\mathrm{Affect_i} \cap \mathrm{Payment_i}) = 1$).

6.2. Willingness-to-Pay (WTP) Estimation

Following Cameron (1988), we employ a log-linear (exponential) specification for the underlying WTP, consistent with the net-positive framing of the program ($\mathrm{WTP_{HCV}} \geq 0$). We specify the WTP function as:

$$\log(WTP_i) = X_\mathrm{i}\beta + \eta_\mathrm{i} \tag{4}$$

where X_i is a vector of characteristics, β is a vector of coefficients to be estimated, and η_i is a stochastic term that follows a logistic distribution with mean zero and standard deviation σ. A respondent votes 'Yes' if $WTP_\mathrm{i} \geq t_\mathrm{i}$, such that:[v]

$$\Pr(Y_\mathrm{i}^\tau = 1|X, t_i) = 1 - \Pr\left(\frac{\eta_\mathrm{i}}{\kappa} \leq \frac{1}{\kappa}\ln(t_\mathrm{i}) - \frac{1}{\kappa}X_\mathrm{i}\beta\right) \tag{5}$$

which takes a censored logistic regression form with $\ln(t_i)$ as a covariate. The vector $(\beta_{\mathrm{payment}}, \beta^*) = (-\frac{1}{\mathrm{k}}, \frac{1}{\mathrm{k}}\beta)$ is identifiable and estimable with the log-likelihood function:[vi]

$$\log L(\beta^*) = \sum\left\{Y_\mathrm{i}^\tau \log\left(1 - \mathrm{F}(\beta_{\mathrm{payment}}, \beta^*, t_\mathrm{i}, X_\mathrm{i})\right) + (1 - Y_\mathrm{i}^\tau)\log\left(F(\beta_{\mathrm{payment}}, \beta^*, t_\mathrm{i}, X_\mathrm{i})\right)\right\} \tag{6}$$

We recover the vector of coefficients β, such that $\beta = \mathrm{k}\beta^*$. The exponential functional form (Eq. 4) allows interpretation of the estimated coefficients multiplicatively rather than assuming constant marginal effects; a marginal unit in the explanatory variable X_j correlates to a change in the underlying WTP by a factor of $\exp(\widehat{\beta}_\mathrm{j})$. The median (MD) WTP is adopted as the central tendency measure since it is less sensitive to extreme values and distributional assumptions

(Boman, 2022). In a public referendum, the payment amount yielding majority support (50%) is the MD WTP, which is defined as:

$$\widehat{\mathrm{MD}}(WTP|\bar{X}) = \exp(\bar{X}\hat{\beta}) \tag{7}$$

The Krinsky and Robb procedure (1986) constructs a 95% confidence interval for the estimated MD WTP.[vii]

7. Results

7.1. Baseline Estimates and Uncertainty

Table 6 presents the results of the $\log(WTP)$ regressions for the full analytic sample under the three uncertainty specifications. Regardless of specification, 'Yes' votes to the WTP eliciting question are decreasing in the payment amount, adhering to economic theory ($\kappa = -1/\beta_{\text{payment}}$). The baseline specification provides the least statistical power ($\chi^2(17) = 244.93$) compared to $\tau = \{6,7\}$. Nevertheless, all uncertainty specifications $\tau = \{0,6,7\}$ point to the same significant drivers of households' underlying WTP for wildfire smoke reduction. For brevity, we present the results of the strictest uncertainty specification ($\tau = 7$).[viii]

Among all the explanatory variables, policy attitudes and health-related factors emerge as the strongest determinants of WTP. Support for proactive fuel treatments *('General support')* shows a significant coefficient of $\beta = 2.800$ ($p < 0.01$), translating to a $\exp(2.800) \approx 16.4$- fold increase in the household's underlying WTP. Trust in federal government implementation (*'Confidence fed'*) is significantly ($p < 0.01$) associated with a 3.9-fold increase in WTP. The presence of sensitive groups (e.g., households with young children or seniors) is significantly ($p < 0.05$) associated with a 2.6-fold increase in the households' WTP. Expectedly, expressing health concerns about wildfire smoke significantly ($p < 0.01$) correlates with a 7.2-fold increase in WTP, which is almost identical to the effect of a recent doctor visit following exposure to wildfire smoke (proxy for need of medical care). The use of air filters as a mitigation strategy is also marginally ($p < 0.10$) linked to a higher household WTP.[ix]

Table 6: WTP Estimation Results for Full Analytic Sample by Uncertainty Recoding.

Log (*WTP*)	$\tau = 0$		$\tau = 6$		$\tau = 7$	
	Coef.	**T-stat.**	**Coef.**	**T-stat.**	**Coef.**	**T-stat.**
Intercept	-1.875	-1.15	-1.832	-1.24	-2.660*	-1.71
Age	-0.006	-0.55	-0.007	-0.70	-0.011	-1.21
Female	-0.278	-0.80	-0.320	-1.02	-0.295	-0.96
Non-white	-0.469	-1.17	-0.388	-1.09	-0.198	-0.57
Liberal	1.497***	3.29	1.438***	3.60	1.149***	3.16
College	-0.152	-0.41	-0.069	-0.21	0.153	0.47
Income ($1,000s)	0.008**	2.06	0.009**	2.46	0.010***	2.85
Sensitive groups	0.860**	1.99	0.661*	1.75	0.971**	2.51
School miss	-1.137*	-1.83	-1.155*	-2.06	-0.861	-1.62
Missed work	1.053	1.52	1.091	1.77	0.346	0.60
Health concern	1.242*	1.67	1.645**	2.28	1.979***	2.59
Doctor visit	1.703**	2.24	1.728**	2.55	1.974***	3.01
Air filter	1.201**	2.43	1.003**	2.35	0.694*	1.73
General support	2.885***	4.29	2.667***	4.61	2.800***	4.75
Forest visit	-0.550	-0.98	-0.702	-1.38	-0.381	-0.77
Confidence fed	1.871***	3.65	1.514***	3.60	1.372***	3.40
Share	0.437	0.97	0.565	1.38	0.230	0.58
κ (scale parameter)	2.333***	5.28	2.059***	5.87	2.016***	6.07
Sample Size	1,012		1,012		1,012	
McFadden R^2_{McF}	0.17		0.19		0.19	
LR test (χ^2)	244.93 (*df*=17)		267.92 (*df*=17)		253.85 (*df*=17)	
Median WTP	$65.02		$55.02		$35.26	
95% Confidence interval	[$40.83, $89.20]		[$35.12, $74.91]		[$19.61, $50.90]	

Notes: Logistic regression results for binary vote (Yes $=$ 1) for the *Wildfire Smoke Reduction Program*. WTP is modeled as $\log(WTP) = X\beta$, with coefficients scaled by $\kappa = (-1/\beta_{\text{payment}})$, where β_{payment} is the coefficient on the log payment amount. Specifications differ in treating uncertain 'Yes' votes: $\tau = 0$ (no recoding), $\tau = 6$, and $\tau = 7$ (recoding 'Yes' to 'No' if certainty $< \tau$ on a 0-10 scale).
* *p*<0.1. ** *p*<0.05. *** *p*<0.01.

Some socio-demographics, such as liberal orientation, show a strong positive effect on WTP, with an estimated coefficient of $\beta = 1.149$ ($p < 0.01$). Financially, a $1,000 USD increase in the household's total income is significantly ($p < 0.01$) associated with a 1% higher WTP for the *Wildfire Smoke Reduction Program*. In contrast, other demographic variables (age, gender, race, education) appear to have statistically insignificant effects under all three specifications.

Median (MD) WTP estimates, however, vary across uncertainty specifications. Under the baseline, the median household WTP to reduce wildfire smoke exposure by one day annually is

$65 (95% CI: $41-$81). MD WTP decreases to $55 per day under the stricter uncertainty specification ($\tau = 6$), and to $35 per day under the strictest specification adopted ($\tau = 7$).

7.2. Consequentiality Splits

Table 7 presents the results of $\log(WTP)$ regressions stratified by respondents perceived survey consequentiality. The analysis reveals heterogeneity in the drivers of underlying WTP and its median estimates across consequentiality groups.

The Completely Inconsequential group (Column 1) who doubts the referendum could affect policy or result in actual tax increase, shows poor fit: $R^2_{\mathrm{McF}} = 0.15$ and a statistically insignificant likelihood ratio test ($\chi^2(17) = 25.94$). No covariates, including typically influential variables such as *'Income,' 'Doctor visit,'* or *'General support,'* achieve significance ($p > 0.10$). This aligns with the group's statistically insignificant MD WTP of $1.87 per day, suggesting responses are noise-driven rather than reflective of structured preferences ($\kappa = 3.461,\ t = 1.33$).

In contrast, the Weakly Consequential (Column 2) and Strongly Consequential (Column 3) groups show robust model fits ($\mathrm{R}^2_{\mathrm{McF}} = 0.19$) and significant LR statistics ($p < 0.001$). The typical positive factors driving household WTP emerge again. MD WTP increases sharply with perceived consequentiality: $165 per day for Weakly Consequential respondents, and $207 per day for those who are Strongly Consequential. These findings show the potential downward bias introduced by including non-engaged inconsequential respondents.[x]

Table 7: WTP Estimation Results by Consequentiality Group.

Log (WTP)	Completely Inconsequential (Affect ∩ Payment) =0		Weakly Consequential (Affect = 1, Payment = 0,1)		Strongly Consequential (Affect ∩ Payment) =1	
	Coef.	**T-stat.**	**Coef.**	**T-stat.**	**Coef.**	**T-stat.**
Intercept	-8.948	-0.79	1.799	1.43	3.032**	2.08
Age	0.018	0.39	-0.005	-0.54	-0.018**	-1.84
Female	0.621	0.39	-0.123	-0.41	0.020	0.06
Non-White	-3.437	-1.28	-0.263	-0.77	-0.194	-0.53
Liberal	1.643	0.78	0.996***	2.84	0.829**	2.30
College	-0.189	-0.11	-0.251	-0.80	-0.351	-1.05
Income ($1,000s)	0.040	1.14	0.004	1.35	0.005	1.41
Sensitive groups	2.501	0.96	0.739*	2.01	0.712*	1.85
School miss	-0.357	-0.14	-0.800	-1.55	-1.016*	-1.81
Missed work	4.124	0.94	0.840	1.48	0.569	0.96
Health concern	1.365	0.52	-0.606	-0.74	-1.250	-1.21
Doctor visit	-0.556	-0.20	1.373**	2.09	1.990***	2.58
Air filter	2.312	0.89	1.046**	2.51	0.952**	2.17
General support	3.394	1.09	2.412***	4.43	2.505***	4.24
Forest visit	0.261	0.13	-0.588	-1.14	-0.466	-0.81
Confidence fed	0.701	0.35	0.860**	2.22	0.581	1.36
Share	-0.643	-0.34	0.488	0.77	0.727	0.94
κ (scale parameter)	3.461	1.33	1.553***	5.52	1.491***	5.12
Sample Size	145		623		511	
McFadden R^2_{McF}	0.15		0.19		0.19	
LR test (χ^2)	25.94 (*df*=17)		161.20 (*df*=17)		132.59 (*df*=17)	
Median WTP	$1.87		$165.11		$207.12	
95% C.I.	[$0.00, $24.59]		[$123.39, $250.43]		[$148.23, $361.48]	

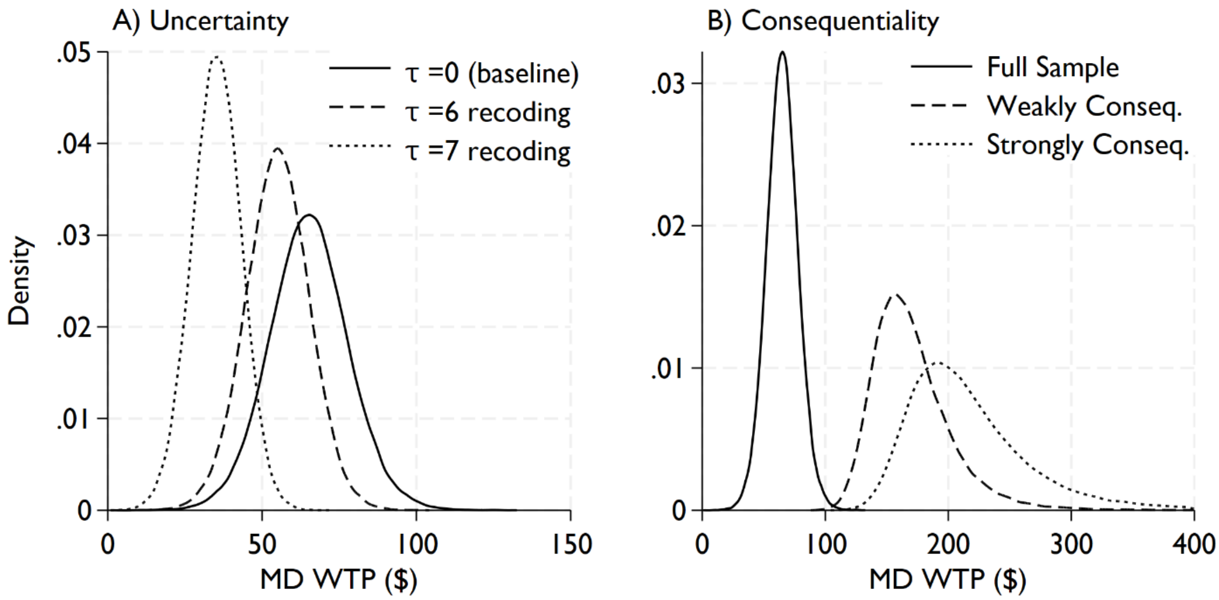
Notes: Logistic regression results for binary vote (Yes $=$ 1) for the *Wildfire Smoke Reduction Program*. WTP is modeled as $\log(WTP) = X\beta$, with coefficients scaled by $\kappa = (-1/\beta_{\text{payment}})$, where β_{payment} is the coefficient on the log payment amount. Sample is split using two indicators: Affect (1 = believe survey could influence policy) and Payment (1 = believe payment would be levied if referendum passes). No uncertainty recoding (τ=0) applied. * p<0.1. ** p<0.05. *** p<0.01.

7.3. Joint Uncertainty-Consequentiality Results

7.3.1. Western US States WTP Estimates

Table 8 and Figure 4 summarize MD WTP under the three levels of uncertainty recoding, $\tau = \{0,6,7\}$, and consequentiality groups. For the full analytical sample (n=1,012), MD WTP declines sharply from $65 ($\tau = 0$) to $55 ($\tau = 6$) and $35 ($\tau = 7$). Among the inconsequential group, MD WTP remains insignificant and near zero regardless of uncertainty recoding. In contrast, Weakly and Strongly Consequential respondents continue to express much higher MD WTP levels, even under strict uncertainty specifications $\tau = \{6,7\}$.[xi]

Figure 4: Distribution of Median WTP for a One-Day Reduction in Wildfire Smoke.



Notes: This figure plots the kernel density of MD WTP estimates. (A) compares distributions under the uncertainty thresholds ($\tau = 0,6,7$), where 'Yes' votes recode to 'No' if the certainty level is below τ (0-10 scale). $\tau = 0$ applies no recoding to votes. (B) classifies MD WTP by consequentiality group. Estimates derived from 100,000 Monte Carlo draws of regression coefficients (Eq. 6). $\mathrm{MDWTP}_j = \exp(-\bar{X}\beta^j/\beta^j_{\mathrm{payment}})$, where β^j and $\beta^j_{\mathrm{payment}}$ are drawn from their asymptotic normal distribution.

Table 8: Median WTP of Households to Reduce Wildfire Smoke Exposure by One Day Annually, Classified by Uncertainty Recoding and Consequentiality Groups.

		Uncertainty Recoding			Sample Size
		$\tau = 0$	$\tau = 6$	$\tau = 7$	
	Full Sample	$ 65.02 [$40.83, $89.20]	$ 55.02 [$35.12, $74.91]	$ 35.26 [$19.61, $50.90]	1,012
Conseq. Group	**Completely Inconsequential (Affect ∩ Payment) =0**	$ 1.87 [$0.00, $13.06]	$ 2.38 [$0.00, $24.77]	$ 1.47 [$0.00, $10.40]	145
	Weakly Consequential (Affect = 1, Payment = 0,1)	$ 165.11 [$111.16, $219.07]	$ 132.26 [$101.81, $181.17]	$ 94.13 [$69.40, $118.85]	623
	Strongly Consequential (Affect ∩ Payment) =1	$ 207.13 [$124.09, $290.16]	$ 168.67 [$125.86, $256.93]	$ 123.11 [$87.71, $158.50]	511

Notes: This table summarizes MD WTP estimates for reducing wildfire smoke exposure by one day using fuel treatments, classified by uncertainty recoding (columns) and consequentiality groups (rows). MD WTP is the payment amount eliciting 50% support in the referendum. $\widehat{\mathrm{MD}}(WTP|\bar{X}) = \exp(\bar{X}\hat{\beta})$, where $\bar{X}\hat{\beta}$ is the mean covariate vector multiplied by regression coefficients (95% Krinsky-Robb confidence intervals in brackets).

7.3.2. New Mexico WTP estimates

Median WTP for New Mexican households is obtained by evaluating the regional coefficient vector at the mean covariate profile of New Mexican respondents:

$$\widehat{\mathrm{MD}}(WTP|\overline{X_{NM}}) = \exp\left(\overline{X_{NM}}\hat{\beta}\right) \tag{7}$$

Eq. 7 estimates the annual tax that would secure 50% support from the average New Mexican household for averting one day of wildfire smoke. It embeds New Mexico's demographic and attitudinal profile in the same utility function used for the full western analytical sample. Given the modest number of state observations (n = 41), this approach provides the most statistically efficient way to infer a statewide median WTP while preserving comparability with the region-wide estimates.

Table 9 shows how New Mexico's valuations are modestly but consistently below the western-wide figures, yet they display the same directional sensitivity to uncertainty and perceived consequentiality. We employ a conservative and strict preference-purification rule to draw a preferred lower-bound median WTP estimate for New Mexicans: uncertainty recoding at $\tau = 7$ and restricting the sample to Weakly Consequential voters. Table 9 indicates a median of $47 per household (95 % CI: $28-$69). The $47 median is more than a funding figure; it is a composite non-market valuation of what one smoke-free day is worth to an average New Mexican household. The estimate embeds both use values (e.g., enjoying more days of cleaner air, avoiding respiratory complications, visible scenery) and nonuse values (e.g., knowing that wildlife and ecosystems are spared smoke stress). The $47 represents a lower-bound shadow price on the entire bundle of benefits that arise when a heavy-smoke day is avoided.

Table 9: Median WTP of New Mexican Households to Reduce Wildfire Smoke Exposure by One Day Annually, Classified by Uncertainty Recoding and Consequentiality Groups.

		Uncertainty Recoding			Sample Size
		$\tau = 0$	$\tau = 6$	$\tau = 7$	
	Full Sample	\$ 47.53 [\$24.87, \$71.40]	\$ 40.65 [\$21.98, \$59.93]	\$ 25.05 [\$11.61, \$39.42]	1,012
Conseq. Group	**Completely Inconsequential (Affect ∩ Payment) =0**	\$ 2.24 [\$0.00, \$41.22]	\$ 2.69 [\$0.00, \$39.27]	\$ 1.03 [\$0.00, \$23.91]	145
	Weakly Consequential (Affect = 1, Payment = 0,1)	\$ 82.65 [\$53.64, \$121.36]	\$ 64.91 [\$41.74, \$92.13]	\$ 47.34 [\$28.19, \$68.52]	623
	Strongly Consequential (Affect ∩ Payment) =1	\$ 102.06 [\$63.09, \$166.72]	\$ 75.70 [\$46.56, \$115.20]	\$ 58.45 [\$34.27, \$88.62]	511

Notes: This table summarizes MD WTP estimates (for New Mexico) for reducing wildfire smoke exposure by one day using fuel treatments, classified by uncertainty recoding (columns) and consequentiality groups (rows). MD WTP is the payment amount eliciting 50% support in the referendum. $\widehat{\mathrm{MD}}(WTP|\overline{X_{NM}}) = \exp(\overline{X_{NM}}\hat{\beta})$, where $\overline{X_{NM}}\hat{\beta}$ is the mean covariate vector of New Mexican residents multiplied by regression coefficients (95% Krinsky-Robb confidence intervals in brackets).

7.4. Prescribed Fire Smoke Tradeoff Segmentation

A majority of respondents in the full western US analytical sample (85%) accept short-term prescribed fire smoke to secure fewer and less intense wildfires in the future (which we term "Acceptors"), while 15% reject any additional smoke (which we term "Rejectors"). The heterogeneous preferences of these two groups shed light on whether the minority opposed to short-term smoke might still pay to reduce future wildfire emissions.[xii] Respondents are grouped based on their answer to:

Q: […] Indicate agreement or disagreement to the statement: I am willing to accept some exposure to smoke from prescribed burns as a tradeoff for reducing future wildfire activity in the US

Table 10 presents $\log(WTP)$ estimates for each group, based on the strictest uncertainty threshold ($\tau = 7$). Among "Acceptors," typical WTP drivers remain significant: higher household income ($\beta^{A} = 0.012$), general support for fuel treatments ($\beta^{A} = 2.633$), and confidence in government implementation ($\beta^{A} = 1.271$) all increase households' underlying WTP. These coefficients follow the same pattern observed in the full sample and in the consequential groups: ‘Yes’ votes decline with rising payment amounts ($\kappa = 2.038, p < 0.01$). The median WTP for “Acceptors” is $52 per day, which remains positive and significant across various uncertainty recoding and functional forms (Appendix Table A4).

Strikingly, none of the explanatory variables significantly affect “Rejectors’” WTP, even though this subset shows a higher model fit ($R^2_{McF} = 0.34$). Payment amount does not meaningfully predict their ‘Yes’ votes ($\kappa^R = 2.288, p > 0.10$), suggesting minimal interest in the program. The median WTP for “Rejectors” sits at $0.71 per day. This estimate is statistically indistinguishable from zero regardless of the functional form, indicating what appears to be protest behavior rather than a straightforward economic preference (see Appendix Table A6). This polarization implies that, beyond absolute WTP levels, the distribution of acceptance versus rejection of short-term smoke can determine whether a regionwide referendum on prescribed fire funding will pass.

Table 10: WTP Regression by Prescribed Fire Smoke Acceptance.

Log (*WTP*)	"Acceptors"		"Rejectors"	
	Coef.	**T-stat.**	**Coef.**	**T-stat.**
Intercept	-2.415	-1.45	-2.829	-0.45
Age	-0.013	-1.33	-0.061	-0.97
Female	-0.403	-1.21	-0.044	-0.03
Non-White	-0.085	-0.22	-0.024	-0.02
Liberal	1.304***	3.14	-0.193	-0.13
College	-0.046	-0.13	3.288	1.18
Income ($1,000s)	0.012***	2.95	-0.014	-0.72
Sensitive groups	1.041**	2.47	2.219	0.97
School miss	-0.607	-1.06	-3.972	-1.11
Missed work	0.566	0.91	-4.308	-0.98
Health concern	2.023**	2.46	1.124	0.41
Doctor visit	1.446**	2.17	12.814	1.32
Air filter	0.527	1.23	3.445	1.23
General support	2.633***	4.17	2.943	1.20
Forest visit	-0.541	-0.99	0.484	0.24
Confidence fed	1.271***	2.97	2.897	1.19
Share	0.528	1.19	-1.961	-0.96
κ (scale parameter)	2.038***	5.60	2.288	1.42
Sample Size	859		153	
McFadden $R^2_{\mathbf{McF}}$	0.18		0.34	
LR test (χ^2)	207.25 (*df*=17)		50.43 (*df*=17)	
Median WTP	$ 52.23		$ 0.71	
95% Confidence interval	[$31.16, $72.96]		[$0.00, $14.02]	

Notes: This table presents log (WTP) regression results for "Acceptors" and "Rejectors" of some prescribed fire smoke as a tradeoff for less wildfire smoke in the future. Sample is split using the indicator 'Accept Pburn.'
* p<0.1. ** p<0.05. *** p<0.01.

8. Discussion

8.1. Main Findings

This study explores whether households in the western US and New Mexico, whose air quality is threatened by increasingly severe wildfires, express financial support for expanding fuel treatments to reduce wildfire smoke. By framing wildfire smoke reduction as a public good transcending county or state lines (Bruce et al., 2025), this study explores how fuel treatments such as prescribed burning and mechanical thinning might receive broader funding if downstream beneficiaries paid for one fewer day of wildfire smoke each year. The results provide support that such "Forests to Airsheds" financing could help bridge long-standing resource gaps for proactive forest management (Schultz et al., 2019); but this is conditional on the public supporting fuel treatment methods and trusting the government to implement them. The feasibility of this potential financing also relies on general public acceptance of the tradeoff between "smoke today" and "smoke tomorrow" (Jones et al., 2022).

Across multiple specifications addressing hypothetical bias (i.e., uncertainty recoding and split samples by perceived consequentiality), the median WTP for a western US household to avoid one day of wildfire smoke annually ranges from \$35 to over \$200. We derive our conservative estimate using the stricter uncertainty threshold ($\tau = 7$) among the Weakly Consequential group (Table 8), yielding a median WTP of \$94 per household per day. New Mexico-specific analysis confirms the broader pattern (Table 9). Using the strict uncertainty rule ($\tau = 7$) within the Weakly Consequential subsample, the median WTP for a one-day smoke reduction is \$47 per household, roughly half of the region-wide benchmark of \$94. This estimate shows that benefits from a clean air can be levied even within the state to raise significant amounts. At an \$47 per household, New Mexico could raise about \$40 million annually, more than the yearly \$20 million appropriation for the Wildfire Prepared Fund by the NM Senate starting fiscal year 2025 (SB 33).[xiii]

What would a region-wide airshed fund look like? Extrapolating this cautious valuation across the 29 million western US households reveals \$2.7 billion in annual funding potential, sufficient to treat 3.7 million acres at a cost of \$747 per acre (US Census, 2023; Wibbenmeyer al., 2025). [xiv]After adjusting estimates from previous studies to 2021 dollars using the Consumer Price Index (CPI), our findings align with past work: Richardson et al. (2013) reported \$123 per day for smoke avoidance, and Jones (2018) estimated \$146 per day.

The analysis also revealed significant heterogeneity. Households who viewed the survey as inconsequential reported near-zero WTP, which reflects skepticism that the referendum would lead to an actual program or tax. This heterogeneity illustrates the influence of perceived policy realism on stated values, mirroring the pattern reported by Mohr et al. (2023), who also found that more consequential groups provide higher and more consistent WTP estimates. Another source of heterogeneity emerged in the "smoke today" against "smoke tomorrow" dilemma (Jones et al., 2022): while 85% of respondents agreed to tolerate some short-term smoke from prescribed fire to reduce wildfire smoke episodes, a minority (15%) rejected any short-term smoke tradeoff. That minority's MD WTP remained statistically indistinguishable from zero, reflecting protest behavior. Hence, the distribution of acceptance against rejection of prescribed fire smoke could determine the political and economic feasibility of a *Wildfire Smoke Reduction Program*.

8.2. Policy Implications

From a policy perspective, these findings show the potential for an airshed-wide financing mechanism to raise substantial revenues. In a "Forests to Airsheds" finance loop, expected downwind households, from prevailing wind patterns, would pay to avoid future wildfire smoke, while agencies receive dedicated funds for fuel treatments needed to reduce the severity of wildfires. This structure addresses the public-good nature of smoke abatement: even a single ignition sends plumes far beyond local boundaries, creating benefits for multiple states when fuel loads are managed proactively. Our results illustrate broad public support for such financing both across the larger western US and in New Mexico.

To make such financing viable, two main factors emerge. First, trust in federal agencies shapes households' WTP; respondents who believe agencies can successfully implement fuel treatments exhibit valuations up to 16 times higher than those who do not. Second, public acceptance of short-term smoke as a tradeoff is critical. The minority rejecting the tradeoff can influence local opposition and erode the political support needed to scale up fuel treatments. Outreach efforts clarifying how prescribed fires are conducted, monitored, and mitigated (US EPA,

2021) may help convert some “Rejectors”; otherwise, their opposition could undermine policy adoption at local or state levels. Reassuringly, US government agencies are taking steps to address these concerns. For instance, the Government Accountability Office (2024) has published a report advocating reforms to strengthen prescribed fire programs while managing their inherent risks.

It is worth noting that data were collected in July 2021, capturing preferences at that specific time period. Since then, wildfire conditions and public awareness could have shifted. For example, the 2022 Hermit’s Peak/Calf Canyon Fire- a controlled burn that became New Mexico’s largest wildfire- sparked national media attention and led to a four-month suspension of US Forest Service prescribed fires. Thus, the importance of regular sensing of public preferences on this matter.

8.3. Limitations and Future Research

This study has several limitations. CV applications risk hypothetical bias, although several *ex-ante* and *ex-post* procedures are adopted to mitigate it. Unless we conduct a real-setting, perfectly consequential public referendum, we cannot eliminate the possibility of hypothetical bias. However, given the composite nature of the benefits (use and nonuse) associated with reducing wildfire smoke, CV remains the best available approach to monetize welfare changes. Additionally, the use of quota sampling increases demographic representativeness, yet it may introduce selection bias if respondents and non-respondents differ on relevant characteristics (Cumming, 1990). Arguably, a carefully designed quota sample yields estimates as good as those of a probability sample (Deville, 1991; Groves et al., 2011).

The survey design has some potential limitations. First, the possibility of an anchoring effect from the two-stage referendum, which presents the program at no cost first, then at a monetary cost second. Second, the net-positive framing of the survey assumes no direct exposure to prescribed fire smoke. A follow-up question allowed for relaxing that assumption, showing that a small minority of respondents can carry a latent aversion to prescribed fire smoke.

Future research could explore how major wildfire events shift the public's support for forest fuel treatments, especially in regions where the wildfire was attributed to prescribed fires getting out of control. Additionally, future research can explore whether actual levels of exposure to wildfire smoke affect households' valuation for fewer smoke days.

9. Conclusions

As the western US and New Mexico witness increasingly intense wildfires, communities living with the effects of those wildfires find themselves caught in a struggle for cleaner air and a sustainable quality of life. Each year, smoke clouds drift over cities and towns, obscuring the skies and increasing health risks for millions of western US residents. This study examined whether downwind households whose air quality is compromised by distant wildfires would financially support expanded forest fuel treatments through prescribed fire and mechanical thinning.

The findings indicate that large segments of the public place substantial value on reducing their wildfire smoke exposure vis-à-vis forest fuel treatments, suggesting that an airshed-wide financing system could potentially generate billions of dollars for proactive fuel management. In particular, we find that a majority of western US households are accepting of more prescribed fire and mechanical thinning in order to reduce future wildfire smoke exposure. This is the first rigorously documented evidence of this tradeoff, answering calls for research on wildfire smoke and prescribed fires in Jones et al. (2022). However, trust in federal agencies emerged as a key determinant of WTP; when that trust is lacking, valuations plummet. In parallel, acceptance of short-term smoke from prescribed fire proves critical: while 85% of western US households are willing to tolerate short-term emissions, the remaining 15% reject them entirely, contributing negligible funding support. Similarly for New Mexico, 83% are accepting of the smoke trade-off (n=41). Descriptive statistics show that New Mexico does not differ much from other western states regarding past experiences with wildfire smoke, as well as their attitudes towards forest fuel treatments.

These results highlight the dual challenge of financing and public acceptance. Where confidence in agencies is strong, households show robust WTP, offering a promising route to address the underfunding of large-scale fuel treatments. Yet even a small but vocal minority can hinder adoption if it is unwilling to accept prescribed fire smoke.

The New Mexico break-out supports these conclusions. Using the same conservative approach applied to the regional sample, the median New-Mexican household is willing-to-pay about $47 annually for one fewer smoke day. Scaled to roughly 860,000 households, this amounts to $40 million per year, a sum that matches and potentially doubles the initial $20 million allocated by the 2025 Wildfire Prepared Act (SB 33).

Appendix

Table A1: Sampling quota controls.

Sampling demographics	Quota
Sex	
Female	~ 51%
Male	~ 49%
Age category	
Age 18-34	~ 33%
Age 35-55	~ 31%
Age 55+	~ 35%
Race and ethnicity	
White, Non-Hispanic	~ 66%
Black, Non-Hispanic	~ 12%
Hispanic	~ 12%
Other	~ 10%
States	
ARIZONA	Natural Fallout
CALIFORNIA	Maximum of 533 Observations
COLORADO	Natural Fallout
IDAHO	Natural Fallout
MONTANA	Minimum of 8 Observations
NEVADA	Natural Fallout
NEW MEXICO	Natural Fallout
OREGON	Natural Fallout
UTAH	Natural Fallout
WASHINGTON	Maximum of 111 Observations
WYOMING	Minimum of 8 Observations

Notes: This table presents the only quotas used to collect the sample. Natural fallout states mean that no constraint was specified for them; the sample's composition in those states is random, just like any variable that does not figure in this table.

Table A2: WTP regression results of baseline model (log-linear) with state fixed-effects.

Log (WTP)	Baseline τ =0		τ =0 with states F.E.	
	Coef.	**T-stat**	**Coef.**	**T-stat.**
Intercept	-1.875	-1.15	-1.862	-0.78
Age	-0.006	-0.55	-0.005	-0.46
Female	-0.278	-0.80	-0.273	-0.75
Non-white	-0.469	-1.17	-0.260	-0.62
Liberal	1.497***	3.29	1.619***	3.34
College	-0.152	-0.41	-0.036	-0.10
Income ($ 1,000s)	0.008**	2.06	0.009**	2.11
Sensitive groups	0.860**	1.99	0.846*	1.88
School miss	-1.137*	-1.83	-0.939	-1.47
Missed work	1.053	1.52	0.825	1.17
Health concern	1.242*	1.67	1.270	1.64
Doctor visit	1.703**	2.24	1.878**	2.33
Air filter	1.201**	2.43	1.262**	2.44
General support	2.885***	4.29	2.952***	4.16
Forest visit	-0.550	-0.98	-0.538	-0.92
Confidence fed	1.871***	3.65	1.903***	3.54
Share	0.437	0.97	0.631	1.32
κ (scale parameter)	2.333***	5.28	2.390***	5.10
Sample Size	1,012		1,012	
Pseudo R2	0.17		0.19	
LR test (χ^2)	244.93 (*df*=17)		263.34 (*df*=17)	
Median WTP	$65.02		$63.38	
95% Confidence interval	[$40.83, $89.20]		[$38.49, $90.20]	

Notes: Logistic regression results for binary vote (Yes = 1) for the Wildfire Smoke Reduction Program. WTP is modeled as $\log(WTP) = X\beta$, with coefficients scaled by $\kappa = (-1/\beta_{\text{payment}})$, where β_{payment} is the coefficient on the log payment amount. No vote recoding is applied ($\tau = 0$). Column on the right is the specification with state fixed effects.
* p<0.1. ** p<0.05. *** p<0.01.

Table A3: Representation of the Consequential respondents (n=623) Compared to the Western US Adult Population (US Census data, 2021).

Demographics	Target population % (western US adults, Age 18+)	Survey Sample (%)	T-statistic for difference in proportions
Gender			
Female	50.23	52.17	0.97
Age and gender			
Age 18-24 male	12.38	4.36	-4.20
Age 18-24 female	11.56	10.77	-0.45
Age 25-34 male	19.75	22.15	1.04
Age 25-34 female	18.45	20.92	1.15
Age 35-59 male	42.29	38.59	-1.29
Age 35-59 female	41.00	37.54	-1.27
Age 60+ male	25.58	34.90	3.69
Age 60+ female	28.98	30.77	0.71
Race and ethnicity			
White, Non-Hispanic	69.33	74.01	2.16
Black, Non-Hispanic	6.46	3.52	-2.55
American Indian, Alaskan Native	1.21	1.77	1.28
Hispanic	30.66	27.13	-1.91
Household income			
$0-50,000	32.4	35.48	1.64
$50,000-100,000	29.1	36.76	4.21
$100,000-150,000	17.50	16.85	-0.43
$150,000 and above	21.00	10.92	-6.18
States			
Arizona	9.36	12.36	2.57
California	51.75	44.14	-3.80
Colorado	7.56	8.99	1.35
Idaho	2.42	2.57	0.24
Montana	1.42	0.64	-1.65
Nevada	4.06	5.94	2.38
New Mexico	2.77	4.49	2.62
Oregon	5.55	6.42	0.95
Utah	4.28	3.05	-1.52
Washington	10.09	10.11	0.02
Wyoming	0.76	1.28	1.49

Notes: This table compares Consequential group proportions with the western US population proportions as reported in the US Census (2021). The T statistic is calculated such that $T = \frac{sample\% - Population\%}{\sqrt{Population\% * (1 - Population\%)/N}}$, where N is the size the group being compared in the sample.

Table A4: Median WTP of Households to Reduce Wildfire Smoke Exposure by one Day Annually, Classified by Uncertainty Recoding and Consequentiality Groups with a *linear* WTP functional form ($WTP_i = X_i\beta + \eta_i$).

Consequentiality groups	Uncertainty recoding $\tau = 0$	Uncertainty recoding $\tau = 6$	Uncertainty recoding $\tau = 7$	Sample size
Full sample	\$ 90.11 [\$53.65, \$126.57]	\$ 75.75 [\$28.15, \$ 105.02]	\$ 37.69 [-\$4.41, \$79.79]	1,012
Completely Inconsequential (Affect ∩ Payment) =0	-\$ 40.64 [-\$206.61, \$125.32]	-\$ 32.79 [-\$457.40, \$56.60]	-\$ 53.35 [-\$228.80, \$122.09]	145
Weakly Consequential (Affect = 1, Payment = 0,1)	\$ 185.32 [\$145.81, \$224.84]	\$ 159.69 [\$131.98, \$ 197.58]	\$ 124.54 [\$98.38, \$150.70]	623
Strongly Consequential (Affect ∩ Payment) =1	\$ 205.01 [\$160.23, \$249.79]	\$ 182.65 [\$153.17, \$230.36]	\$ 150.96 [\$123.16, \$178.76]	511

Notes: This table summarizes MD WTP estimates for reducing wildfire smoke exposure by one day using fuel treatments, classified by uncertainty recoding (columns) and consequentiality groups (rows). MD WTP is the payment amount eliciting 50% support in the referendum. $\widehat{\mathrm{MD}}(WTP|\bar{X}) = \bar{X}\hat{\beta}$, where $\bar{X}\hat{\beta}$ is the mean covariate vector multiplied by regression coefficients (95% Krinsky-Robb confidence intervals in brackets).

Table A5: Differences between "Acceptors" and "Rejectors" of Prescribed Fire Smoke.

	"Acceptors" (n=866)	"Rejectors" (n=157)	Proportions difference
Variables	**Mean (SD)**	**Mean (SD)**	**T-statistic**
Age	50.02 (18.36)	45.14 (17.60)	3.17***
Female	0.49 (0.50)	0.56 (0.50)	-1.61
White	0.77 (0.42)	0.66 (0.48)	2.69***
College	0.46 (0.50)	0.42 (0.50)	0.92
Liberal	0.41 (0.49)	0.34 (0.47)	1.70*
Rural	0.14 (0.36)	0.12 (0.33)	0.69
Income ($ 1,000s)	78.32 (49.38)	71.36 (49.36)	1.62
Sensitive groups	0.73 (0.44)	0.73 (0.45)	0.00
School miss	0.18 (0.38)	0.17 (0.38)	0.30
Work miss	0.15 (0.35)	0.09 (0.29)	2.30**
Home smoke	0.78 (0.41)	0.70 (0.46)	2.04**
Smelled Elsewhere	0.77 (0.42)	0.74 (0.44)	0.82
Health affect	0.38 (0.48)	0.34 (0.48)	0.96
Doctor visit	0.11 (0.32)	0.05 (0.22)	2.90***
Health concern	0.93 (0.25)	0.91 (0.25)	0.92
Air filter	0.25 (0.44)	0.22 (0.41)	0.83
Forest visit	0.90 (0.30)	0.81 (0.39)	2.75***
Prior knowledge	0.78 (0.42)	0.54 (0.50)	5.66***
General support	0.80 (0.40)	0.50 (0.50)	7.12***
Accept Pburn	-	-	-
Confidence fed	0.63 (0.48)	0.52 (0.50)	2.55**
Share	0.80 (0.39)	0.72 (0.45)	2.09**

Notes: This table compares "Acceptors" and "Rejectors" in the sample. Sample is split using the indicator 'Accept Pburn.'
* p<0.1. ** p<0.05. *** p<0.01.

Table A6: Summary of MD WTP Results by Acceptance of the Prescribed Fire Smoke Tradeoff, WTP Function Specification, and Uncertainty Recoding.

Specification	Accept Tradeoff "Acceptors"	Reject Tradeoff "Rejectors"
Log-linear WTP		
No recoding	$ 106.03 [$70.99, $159.18]	$ 0.93 [$0.00, $16.91]
5+ recoding	$ 95.27 [$64.41, $136.72]	$ 2.00 [$0.00, $18.34]
7+ recoding	$ 52.23 [$31.16, $72.96]	$ 0.71 [$0.00, $14.02]
Linear WTP		
No recoding	$ 137.45 [$97.58, $180.18]	-$ 316.34 [-$858.95, $739.20]
5+ recoding	$ 127.03 [$88.59, $162.54]	-$ 221.18 [-$819.46, $555.51]
7+ recoding	$ 72.86 [$21.62, $103.36]	-$ 439.88 [-$891.17, $796.07]
Sample size	859	153

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Endnotes

[i] Note that our monetary estimates are in 2021 USD.
[ii] Quota sampling produces unbiased estimates comparable to those of probability sampling as long as respondents and non-respondents do not differ on relevant attributes (Cumming, 1990). Despite minor deviations, the sample aligns sufficiently with US Census benchmarks for analytical inference (Table 2).
[iii] The payment amount for each respondent is randomly drawn from a continuous uniform distribution ranging from $1 to $260.
[iv] Note: models are estimated with all covariates as in Table 6.
[v] η_{i} is normalized with the scale parameter $\kappa = (\sigma\sqrt{3})/\pi$ (see Cameron, 1988).
[vi] The logistic cumulative density function is expressed as $F\big(\beta_{\mathrm{payment}}, \beta^*, t_{\mathrm{i}}, X_{\mathrm{i}}\big) = \frac{\exp\{\beta_{\mathrm{payment}} \ln(t_{\mathrm{i}}) - X_{\mathrm{i}}\beta^*\}}{1+\exp\{\beta_{\mathrm{payment}} \ln(t_{\mathrm{i}}) - X_{\mathrm{i}}\beta^*\}}$.
[vii] $\widehat{\mathrm{MD}}(WTP|\bar{X})$ values are simulated by repeatedly drawing (100,000 times) from the asymptotic multivariate normal distribution of the coefficients. We then select the 2.5$^{\mathrm{th}}$ and 97.5$^{\mathrm{th}}$ percentiles (Haab & McConnell, 2002, p. 110).
[viii] Note that results are robust to state fixed-effects (see Appendix Table A2).
[ix] Having smelled smoke either indoors or outdoors does not statistically affect the households' underlying WTP under all uncertainty specifications.
[x] Similarly to the full sample, Consequential respondents (Affect = 1) are representative of the Western US population (see Appendix Table A3).
[xi] Our primary results are derived from a log-linear WTP specification (Eq. 3), a common choice in CV to address skewness in WTP distributions. We also perform robustness checks on the sensitivity of estimates to the functional form. A linear WTP functional form ($WTP_i = X_i\beta + \eta_i$) produces slightly higher and statistically significant MD WTP estimates for the full sample and the consequential groups (see Appendix Table A4).
[xii] Note that "Acceptors" and "Rejectors" differ in various aspects (age, political orientation, exposure to wildfire smoke, and support for forest fuels treatments). See Appendix Table A5 for details.
[xiii] According to the 2023 US Census data, 856,580 households reside in New Mexico.
[xiv] Theoretically, one could use the estimate of the Strongly Consequential sample to produce an even higher central estimate ($123 per day) that satisfies both policy and payment consequentiality conditions (Johnston et al., 2017). However, we favor a cautious baseline when extrapolating to large populations.