

# Kittitas County Air Quality Survey

**A Study of Community Beliefs, Behaviors & Attitudes**



**September 2014**



# Kittitas County Air Quality Survey

A Study of Community Beliefs, Behaviors & Attitudes

## TABLE OF CONTENTS

<b>List of Tables and Figures.....</b>	<b>3</b>
<b>Introduction.....</b>	<b>4</b>
<b>Background &amp; Objectives.....</b>	<b>4-6</b>
<b>Methods.....</b>	<b>7</b>
<b>Results.....</b>	<b>7-19</b>
Demographic Characteristics.....	8
Beliefs & Attitudes Regarding Air Quality.....	9
General Knowledge of Air Quality Related Items.....	10
Profile of Air Quality Related Behaviors.....	13
<i>Outdoor Burning Practices.....</i>	<i>13</i>
<i>Indoor Burning Practices.....</i>	<i>14</i>
Education and Outreach.....	18
Motivation for Cleaner Burning Practices.....	19
<b>Discussion.....</b>	<b>20</b>
<b>Conclusion.....</b>	<b>21</b>
<b>Appendices.....</b>	<b>22-43</b>
A. Kittitas County Air Quality Committee .....	22
B. Questionnaire with Data.....	23-41
C. Survey Distribution & Collection Map.....	42
D. Additional Data Sources.....	43

*This study was compiled by Amy Fuller, Assessment Coordinator, Kittitas County Public Health Department and funded by the **Washington State Department of Ecology, Air Quality Division.***

# Kittitas County Air Quality Survey

A Study of Community Beliefs, Behaviors & Attitudes

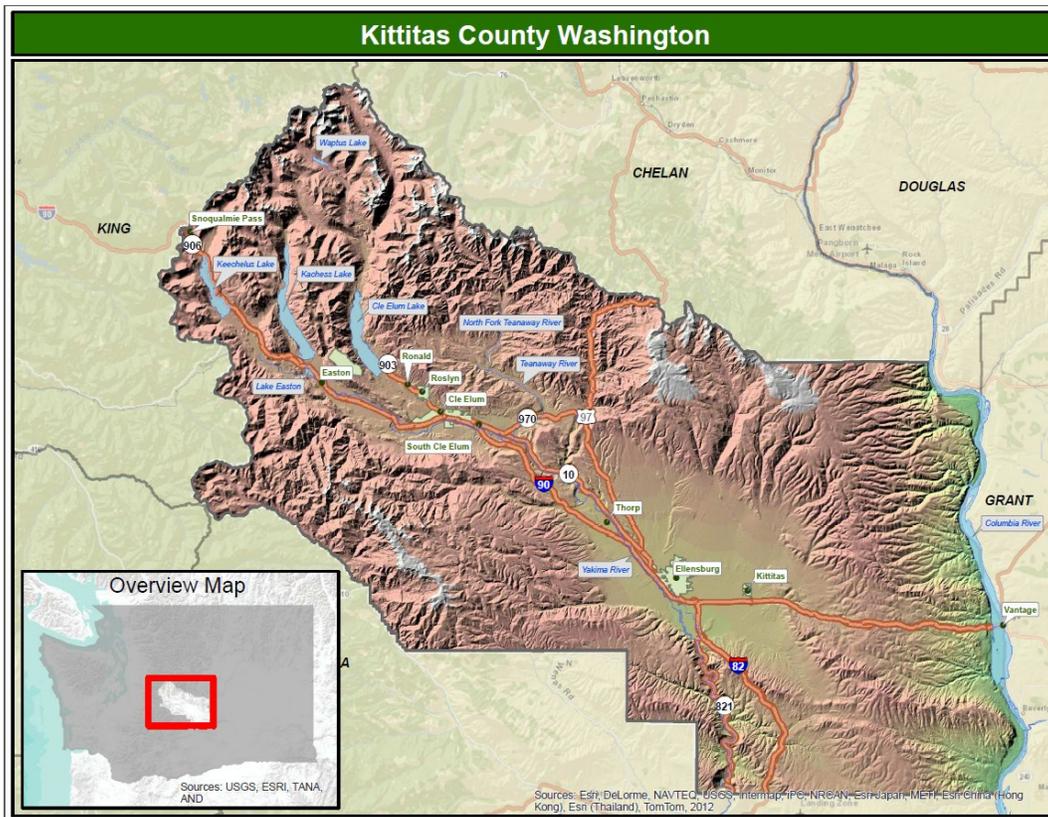
## LIST OF TABLES & FIGURES

FIGURE 1: Kittitas County Topography.....	4
FIGURE 2: Unhealthy Air Days for Kittitas County.....	5
FIGURE 3: KCPHD Logic Model for Assessment.....	6
FIGURE 4: Community Survey Likert Scale Results.....	9
FIGURE 5: Residents’ Understanding of PM2.5.....	10
FIGURE 6: Residents’ Ability to Check Air Quality Conditions.....	11
FIGURE 7: How Residents Hear About Burn Bans.....	11
FIGURE 8: Community Understanding of What’s Legal to Burn in Outdoor	12
FIGURE 9: Community Understanding of the Importance of “Seasoned” Wood.....	12
FIGURE 10: Frequency of Outdoor Burning by Season.....	13
FIGURE 11: Frequency & Type of Outdoor Burning Practices by Season.....	13
FIGURE 12: Frequency of Indoor Burning by Season.....	14
FIGURE 13: Solid Fuel as Primary or Secondary Heat Source.....	14
FIGURE 14: Types of Indoor Burning Practices.....	15
FIGURE 15: Uncertified Wood Stoves.....	16
FIGURE 16: Sources of Firewood for Kittitas County Residents.....	16
FIGURE 17: Residential Wood “Seasoning” Practices.....	17
FIGURE 18: Profile of Indoor Wood Burners.....	18
FIGURE 19: Motivation for Engaging in Cleaner Burning Practices.....	19
TABLE 1: Community Survey Demographic Results.....	8

## Introduction

The Washington State Department of Ecology Air Quality Division commissioned the Kittitas County Public Health Department (KCPHD) to conduct a county wide survey of Kittitas County residents. The purpose of the survey was to assess attitudes and beliefs around the issue of air quality in Kittitas County as well as to estimate the impact of community burning behaviors on fine particulate matter pollution. Fine particulate matter (PM2.5) is an air pollutant that is a concern for people's health when levels in air are high. This report provides the results and analysis of the data collected from this survey. The information contained in this report will be used to inform the creation of an education and outreach campaign for cleaner burning practices in Kittitas County.

**FIGURE 1: Kittitas County Topography**



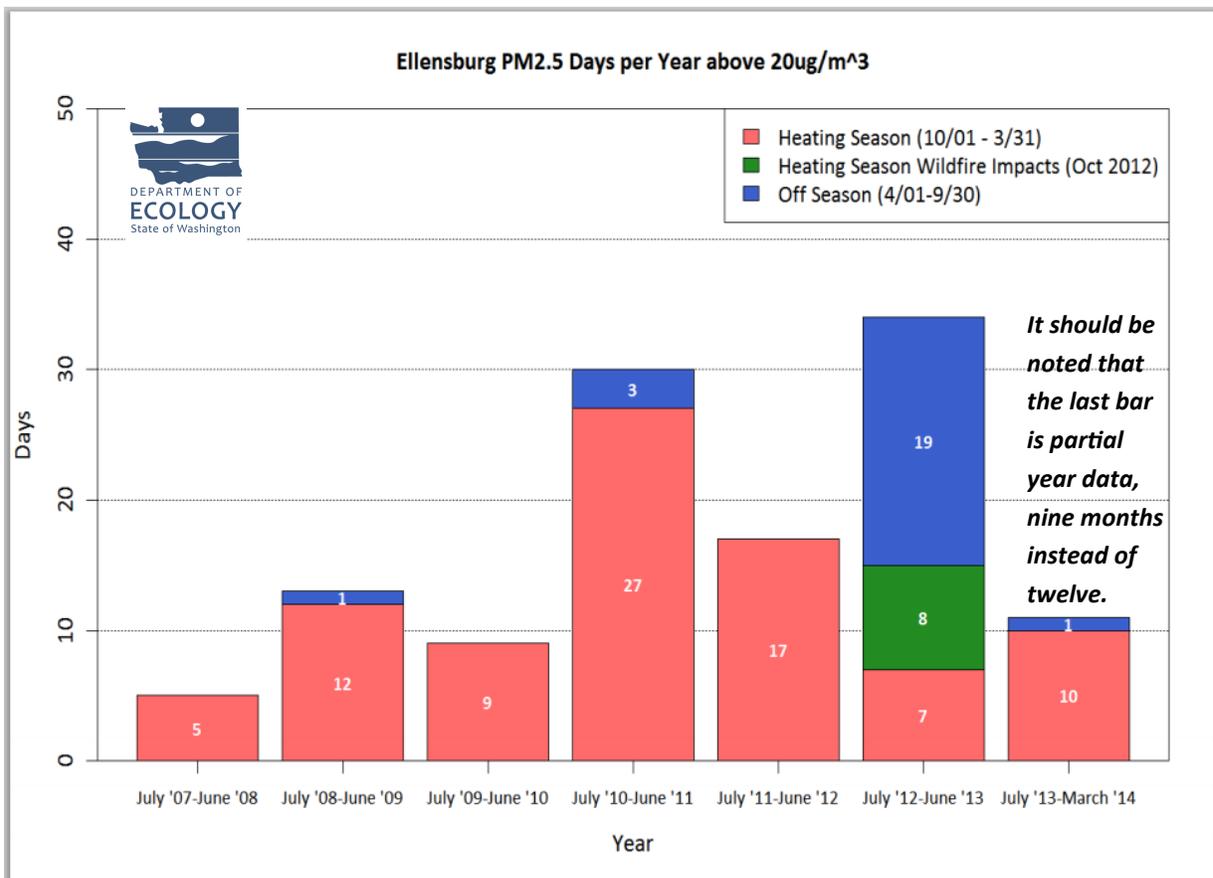
## Background & Objectives

Located in the center of Washington State, Kittitas County is a rural area that lies along the eastern slopes of the Cascade Mountain Range. The county's 2,297 square miles stretches from the top of Snoqualmie Pass down to its eastern border along the Columbia River. The Yakima River and Interstate 90 also run through the middle of the county. The unique geography of the Kittitas valley creates optimal conditions for long periods of high pressure during the winter months that result in lengthy air inversions. This is especially concerning during high heating season, when any smoke emitted into the lower atmosphere becomes trapped until changing conditions allow for the cleaner air to pass through, exposing residents to unhealthy air often for weeks at a time.

During the winter high heating season, air quality readings from the Washington State Department of Ecology (DOE) monitoring station in Ellensburg reports one of the highest levels of PM<sub>2.5</sub> air pollution in the state.<sup>1</sup> According to Washington State Department of Health, Kittitas County also reports a significantly higher mortality rate for influenza and pneumonia as compared to the rest of the state<sup>2</sup>. While we have yet to determine the cause of this, the statistic draws concern regarding respiratory impacts related to poor air quality. In addition, particulate matter pollution created by large area wildfires has increased over the past four years, adding to community health risks associated with ongoing PM<sub>2.5</sub> pollution.

For the past several years, Ellensburg’s number of days with unhealthy fine particle pollution levels has risen, indicating a dangerous trend. Even without the contributions from wildfires, the numbers continue to rise, inviting a closer look at what is contributing to this steady increase in PM<sub>2.5</sub> (see Figure 2). According to the Environmental Protection Agency’s National Ambient Air Quality Standards Review, Kittitas County is a high-risk community that is in danger of violating the federal air quality standards<sup>4</sup>. If this trend continues, it is likely that Kittitas County could become an area of “non-attainment”, inviting costly and demanding federal interventions. As it currently stands, the combined impact on health and the environment is already costing the community money. In a 2009 report, Ecology created a model for estimating health and economic impacts of fine particle pollution in Washington<sup>5</sup>. Ecology’s model estimates that the costs (direct and indirect) associated with fine particle pollution in Kittitas County exceed \$1 million each year (2009 dollars).

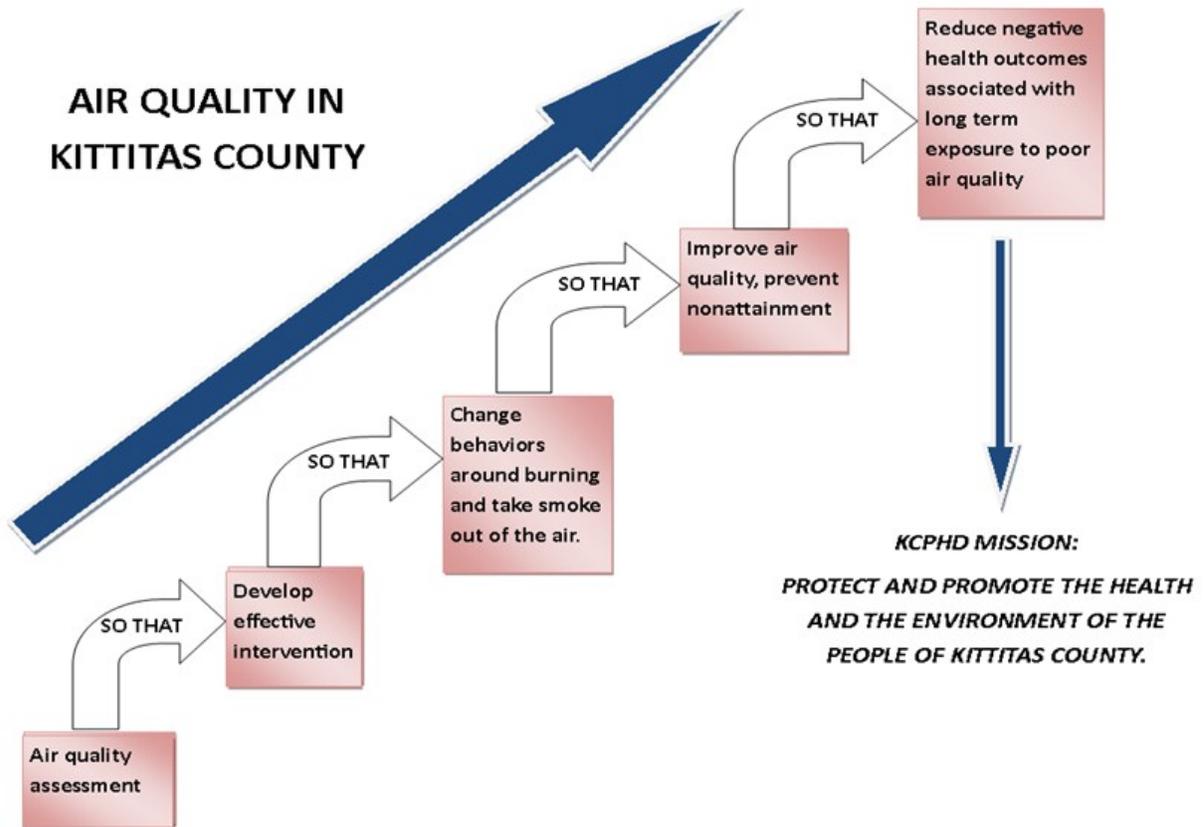
**FIGURE 2: Unhealthy Air Days for Kittitas County<sup>3</sup>**



In 2012, a steering committee of key community partners was gathered to identify and prioritize issues affecting the health of the local community. Issues were identified based on data from the 2012 Kittitas County Community Health Assessment. Poor air quality was identified as an area of concern, however, a lack of financial resources prevented the issue from becoming an immediate priority. Ecology recognized the need for support and partnered with KCPHD to implement an air quality project. The project would begin with a county wide assessment and conclude with an education and outreach campaign to minimize the impact of improper burning behaviors. The primary objectives of this assessment were to collect community information and determine the following:

- Beliefs and attitudes regarding air quality
- General knowledge level regarding air quality in Kittitas County
- General knowledge around clean burning practices
- Inventory of residential wood burning appliances and indoor burning practices
- Prevalence of outdoor burning behaviors that contribute to PM2.5
- Effective avenues for education and outreach

**FIGURE 3: KCPHD Logic Model for Assessment**



## Methods

The KCPHD Assessment Coordinator designed the community survey questions with assistance and feedback from Ecology and the Kittitas County Air Quality Committee (see Appendix A). The Assessment Coordinator also referenced similar studies done in the Pacific Northwest to inform the type and placement of questions:

- British Columbia Woodstove inventory and Behavior Analysis  
(*Envirochem Services, 2012*)
- Inventory of Wood-burning Appliance Use in British Columbia: Report of Findings  
(*Mustel Group, Market Research, 2012*)
- Department of Environmental Quality Residential Wood Combustion Survey: Results Report  
(*PSU Survey Research Lab, 2009*)
- Wood Smoke Awareness & Behavior: Survey of Wood Burning Households in Washington State  
(*Elway Research, Inc., 2010*)

The final survey consisted of 25 questions. The questions were primarily multiple choice with the exception of one Likert scale with six items. Survey takers were also given the option to write in answers that were not provided in the multiple choice questions. Recent census data estimates the current population of Kittitas County at 42,100 residents<sup>6</sup>. In order to achieve results with a 95% confidence level, a sample size of 381 individuals was needed. A mixed approach was used for survey distribution and collection in order to maximize responses and achieve this number. The survey was put into two formats: electronic and paper (see Appendix B). The primary mode of collection was sent out through an electronic survey via Survey Monkey™. Emails were sent out to eight different community listservs. Fliers and handouts with the survey link were distributed to 22 local businesses and agencies. In order to reach those individuals without computers, paper surveys were placed along with survey collection boxes at strategic locations around the county. A total of fifteen boxes were placed in fourteen different community outreach locations (see Appendix C). Collection boxes were emptied each week until the survey was closed. Paper surveys were also sent by mail to residents identified as having received woodstoves through a free woodstove exchange program. These surveys included self-addressed envelopes with paid postage to allow respondents to send in the completed survey free of charge. Paper surveys, once collected, were entered into Survey Monkey™ in order to better analyze the data. It is also important to note that both the electronic survey and paper survey participants were given the opportunity to enter into a drawing for \$25.00 gift certificates to local businesses as an incentive. The survey was conducted for a time period of six weeks from the dates of June 1st to July 18th, 2014.

## Results

At the close of the survey, a total of 613 surveys were collected. Of the 613 returned surveys, 89 (16%) were paper surveys. A filter was then applied to the Survey Monkey™ data in order to eliminate incomplete surveys as well as those completed by residents outside Kittitas County. In the end, the final survey sample size was 561 residents. The results of this sampling has a confidence level of 99% with a confidence interval of  $\pm 5.41\%$ . In laymen's terms, if all of Kittitas County's 42,100 residents had completed the survey, there is a 99% chance that those results would be within  $\pm 5.41\%$  of the results of this survey. We can have confidence that the information contained in this survey results report is a fair representation of our county population.

## Demographic Characteristics

For the most part, the demographic characteristics of survey respondents corresponded with the overall county demographic makeup as reported by the 2013 census estimates. Percentage of responses from the major population centers (Upper and Lower County) corresponded closely with the population profile despite an underrepresentation of the Kittitas County males. The various age groups were broadly represented; however, there were not many responses from the 15 to 24 year old subset of the population. The percentage of residents in the 15 to 24 year age range tends to be higher because of the large college student population. The Hispanic population was also slightly underrepresented in the survey results. This is something to take into consideration for future survey efforts. It is also significant to note that homeowners represented much a much bigger percentage of responses than renters.

**TABLE 1: Community Survey Demographic Results**

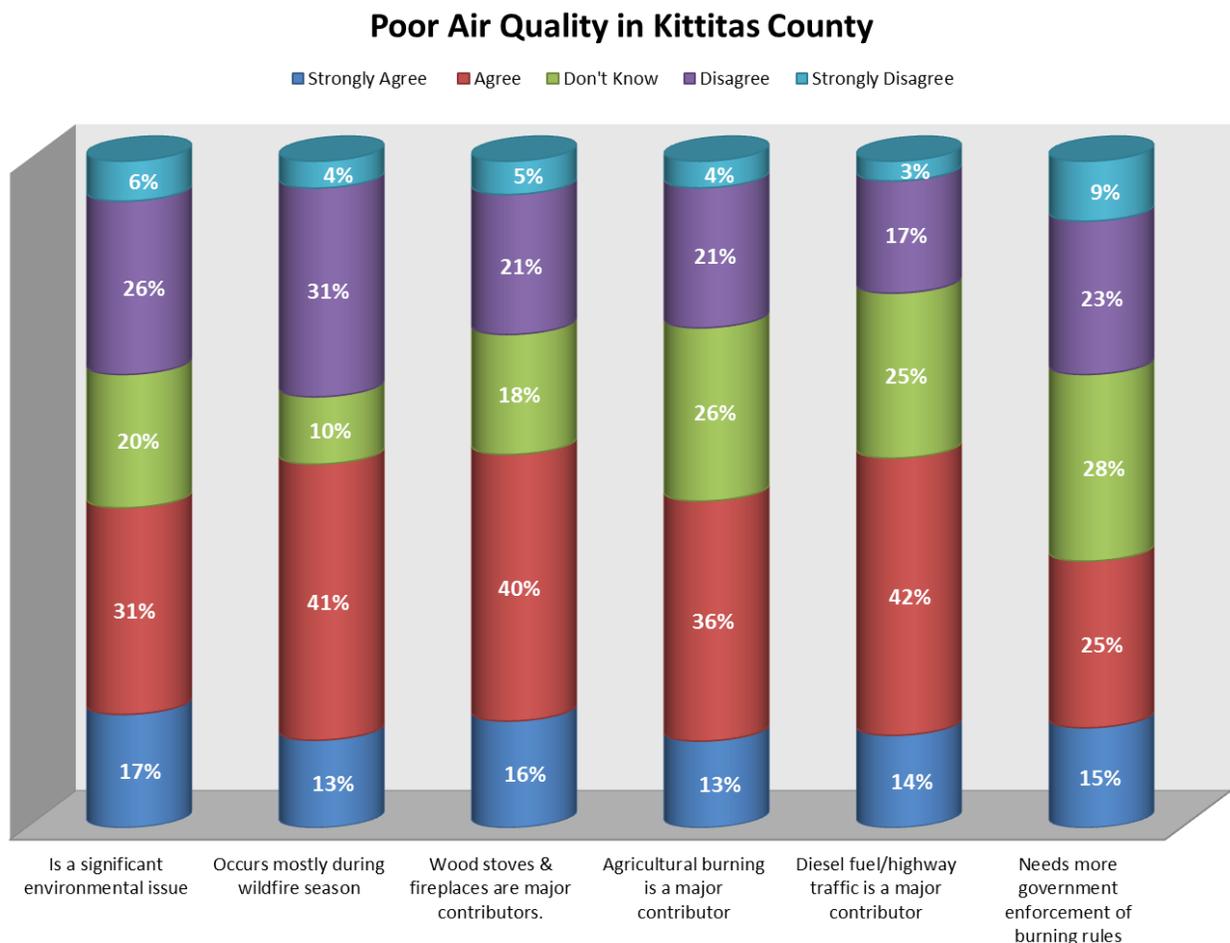
Kittitas County Demographics	Population*	Survey**
County Population Seats		
Upper County: Cle Elum, South Cle Elum, Roslyn, Ronald and Easton	20%	21%
Lower County: Vantage, Kittitas, Ellensburg and Thorp	80%	79%
Gender		
Male	50%	26%
Female	50%	74%
Age		
15-24 years	26%	4%
25-34	12%	16%
35-54	23%	42%
55-64	12%	26%
65 and over	13%	12%
Race/Ethnicity		
African American/Black	1%	0%
Asian/Pacific Islander	3%	1%
Caucasian/White	90%	89%
Hispanic/Latino	8%	2%
Native American/Alaskan Native	1%	1%
Multiple	2%	3%
Housing		
Homeowners	58%	76%
Renters	42%	23%
Resides within city limits/urban areas	54%	52%
Resides outside of city limits/rural areas	46%	48%

*\*Based on 2013 Census estimate. \*\*Percentages are rounded.*

## Beliefs & Attitudes Regarding Air Quality

The first objective for this survey was to examine community perceptions around the issue of air quality and causes of air pollution in Kittitas County. A Likert scale was used to organize participant responses (see Figure 1). Overall, approximately half (47%) of respondents feel that poor air quality is a significant environmental issue in Kittitas County. One fifth (20%) of the community does not know if it is a significant environmental issue while the remaining 32% don't think that it is a problem. Over half of Kittitas County residents (54%) believe that poor air quality occurs mostly during wildfire season. One third (31%) of residents do not agree with this, with the remainder (10%) reporting they aren't sure. Roughly half of the county feels that wood stoves and fireplaces (56%), agricultural burning (50%) and diesel fuel/highway traffic (56%) are major contributors to poor air quality. The remainder of resident responses are split fairly evenly between those that aren't sure if they contribute and those that feel that they don't contribute at all. County responses were also fairly divided on whether or not government should increase enforcement efforts. Forty percent feel that they should, 28% don't know and 32% feel that they should not.

**FIGURE 4: Community Survey Likert Scale Results**



## General Knowledge of Air Quality Related Items

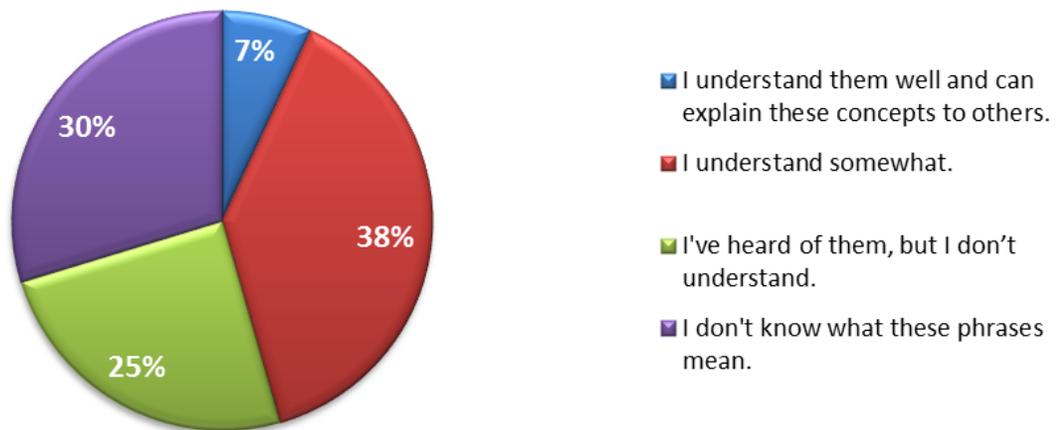
The secondary objective of this survey was to determine some baselines for the general knowledge level of Kittitas County residents regarding PM<sub>2.5</sub> pollution, current levels of air quality and clean burning practices. This information will assist in education program design because it allows for the identification of gaps in the community's understanding of the air quality issue. It will help to narrow down which topics the educational materials will focus on and what messages need to be clearer or better communicated to the public. This data also assists with outreach by identifying the most frequently utilized sources of public information regarding air quality.

### Understanding of PM 2.5

Over half of Kittitas County survey respondents (55%) do not understand the meaning of the air quality related phrase "PM 2.5" with an additional 39% reporting that they understand somewhat. The remaining 7% percent of respondents claim to understand the concept well enough to explain it to others.

*FIGURE 5: Residents' Understanding of PM2.5*

### How well do you understand the air quality related phrases "PM2.5" and "fine particulate matter"?

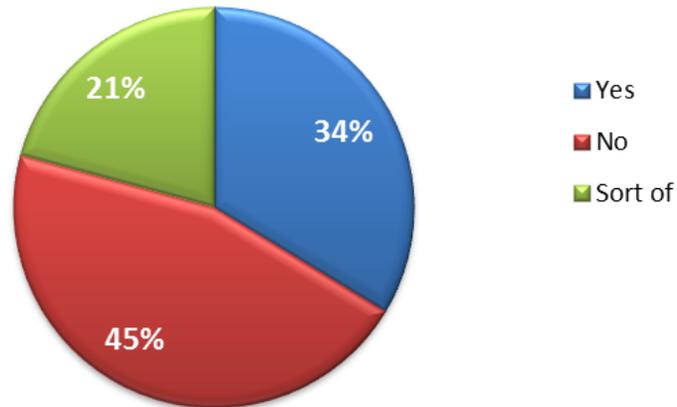


### Sources of Air Quality Information

Almost half of Kittitas County respondents reported that they don't know how to check current air quality conditions. The most popular ways to get information on burn bans is the local newspaper and word of mouth. Radio and internet are closely tied for the second most popular sources of information. Respondents were given the option to write in an "other" category. Write-in answers were evaluated for significant trends and included in the chart.

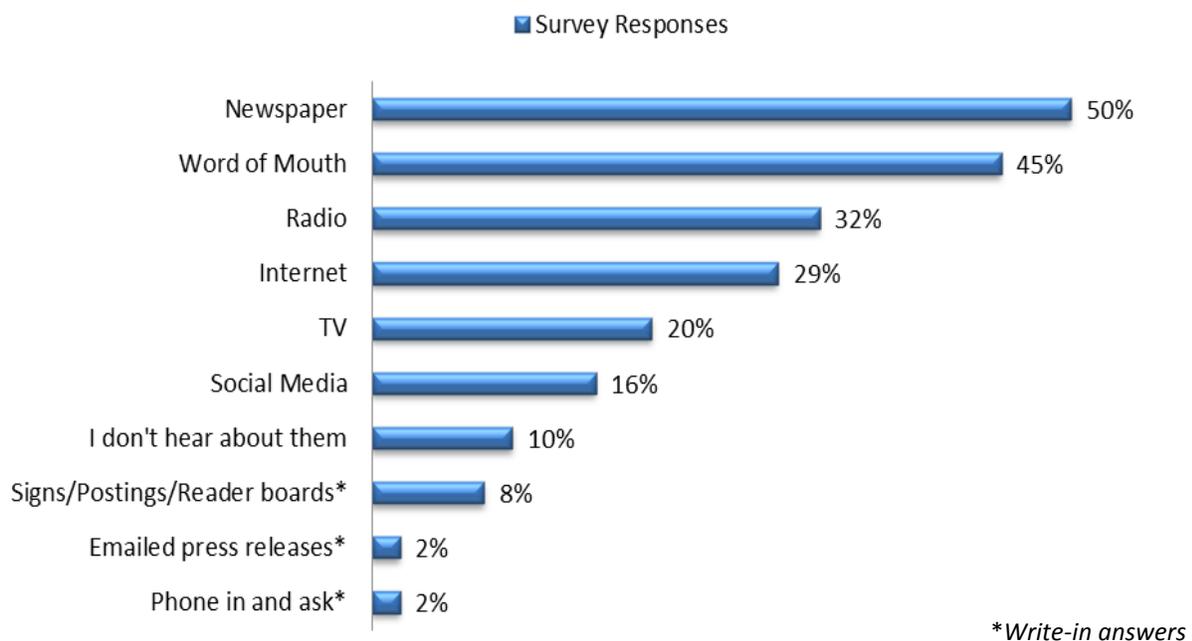
**FIGURE 6: Residents' Ability to Check Air Quality Conditions**

**Do you know how to check current air quality conditions in Kittitas County?**



**FIGURE 7: How Residents Hear About Burn Bans**

**How do you hear about burn bans in Kittitas County?**

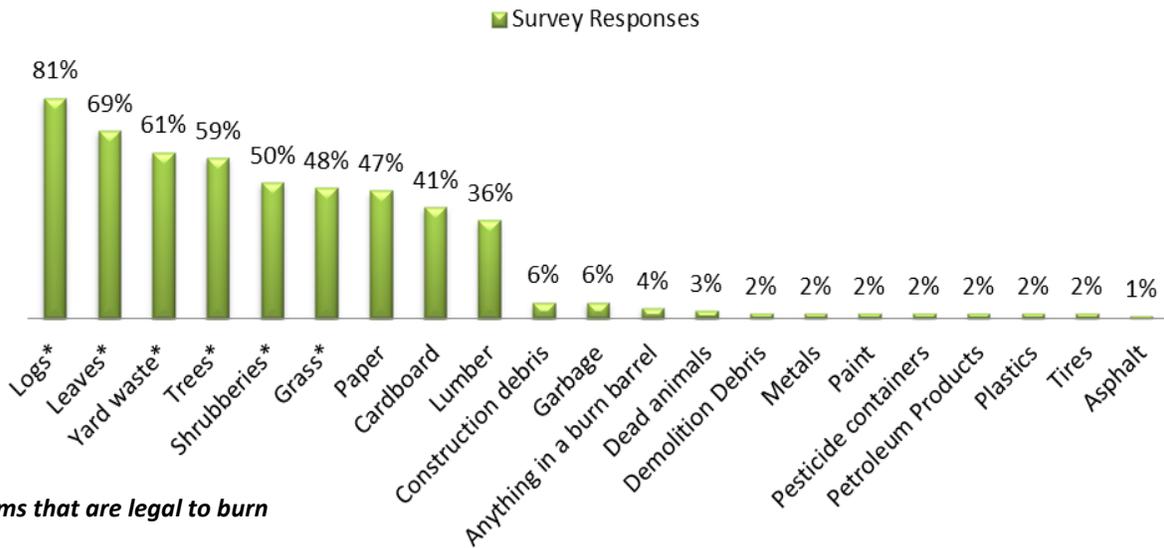


### Knowledge of Clean Burning Practices

Kittitas County residents are able to identify a majority of the items that are legal to burn outdoors, however, there seems to be some knowledge gap around the legality of cardboard and lumber. A large majority of the community has some understanding of what it means to “season” wood (88%). Half of those individuals understand the concept well enough to explain it to others.

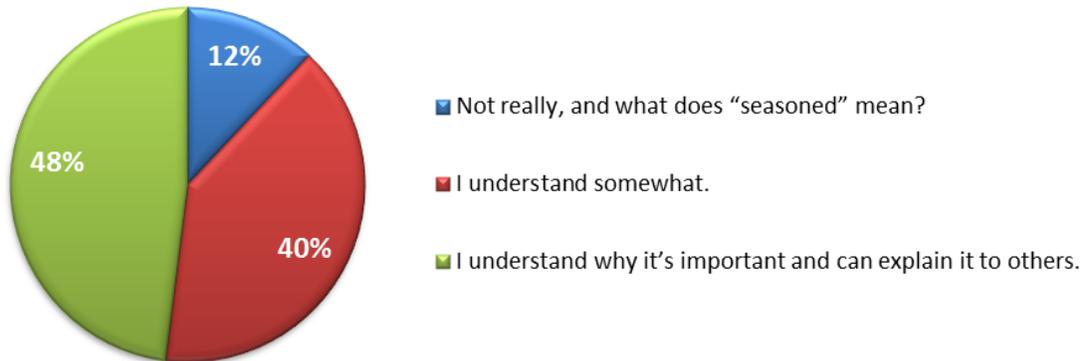
**FIGURE 8: Community Understanding of what’s Legal to Burn in an Outdoor Fire**

#### Can you identify which of the following items are legal to burn in an outdoor fire?



**FIGURE 9: Community Understanding of the Importance of “Seasoned” Wood**

#### Do you understand why it is important to burn dry, "seasoned" wood?



## Profile of Air Quality Related Behaviors

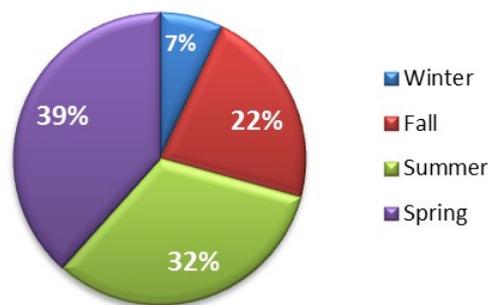
This section of the report gives an overview of indoor and outdoor residential burning practices that contribute to PM2.5 in Kittitas County.

### Outdoor Burning Practices

The highest rates for all outdoor burning behaviors are in Spring (38%) and Summer (32%), however, there are significant amounts done in the Fall as well (22%). The winter has the lowest rates for all residential outdoor burning behaviors. The most common type of outdoor burning practice is recreational in nature (BBQ, fire pits, etc.) and appears to be the most consistent outdoor burning behavior in all four seasons. The rates of recreational burning remain relatively constant throughout Spring, Summer and Fall with 46-52% of residents engaging in this behavior. This practice reduces down to 28% of residents in the Winter. Yard debris is second most common outdoor burning practice, with the highest rates of burning being in the Spring and Fall.

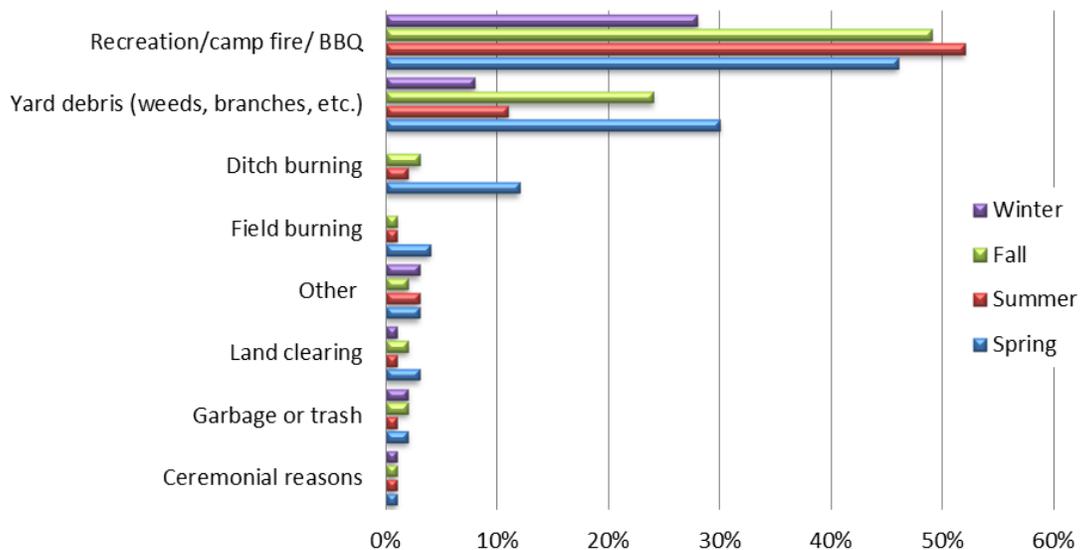
**FIGURE 10: Frequency of Outdoor Burning by Season**

**When do you do the most outdoor burning?**



**FIGURE 11: Frequency & Type of Outdoor Burning Practices by Season**

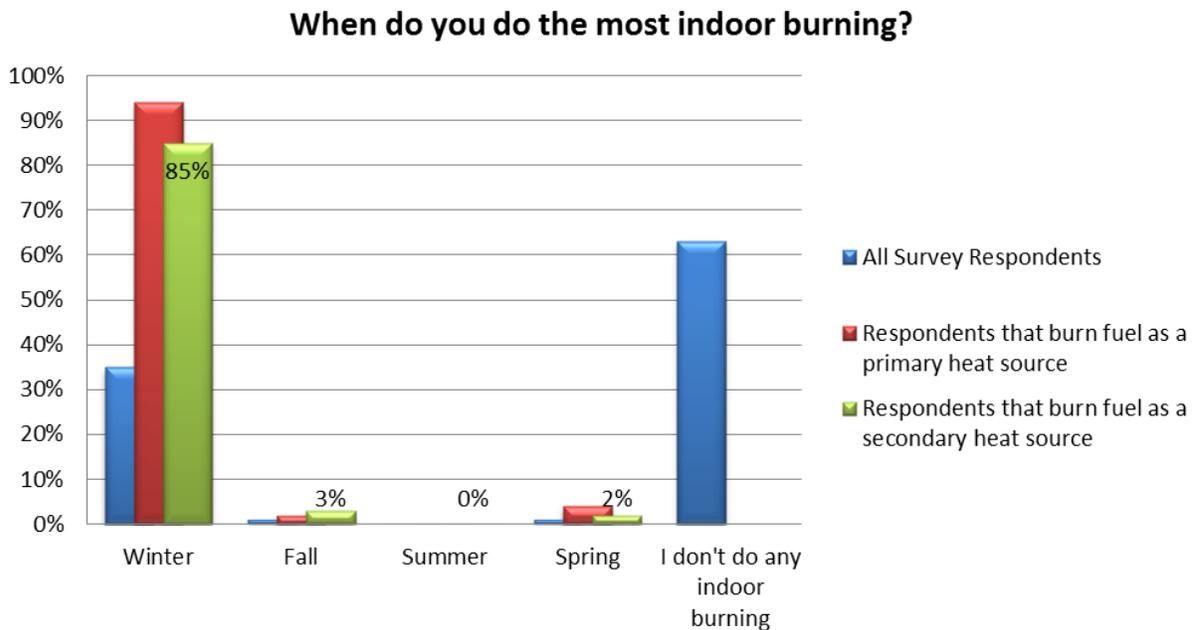
**What type of burning do you do outdoors at your residence?**



### Indoor Burning Practices

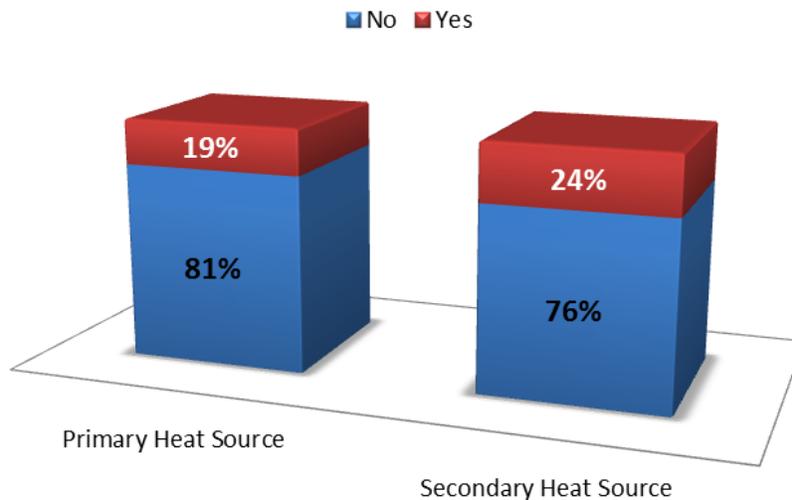
The majority of indoor burning takes place in the winter months (December –February) and is almost exclusively for the purpose of home heating. Approximately 40% of residents engage in burning some type of solid fuel indoors, primarily wood. Nineteen percent of residents report burning solid fuel as a primary source of heat in addition to 24% who report burning solid fuel as a secondary source of heat.

**FIGURE 12: Frequency of Indoor Burning by Season**



**FIGURE 13: Solid Fuel as Primary or Secondary Heat Source**

**Do you burn fuel as a primary or secondary source of heat?**

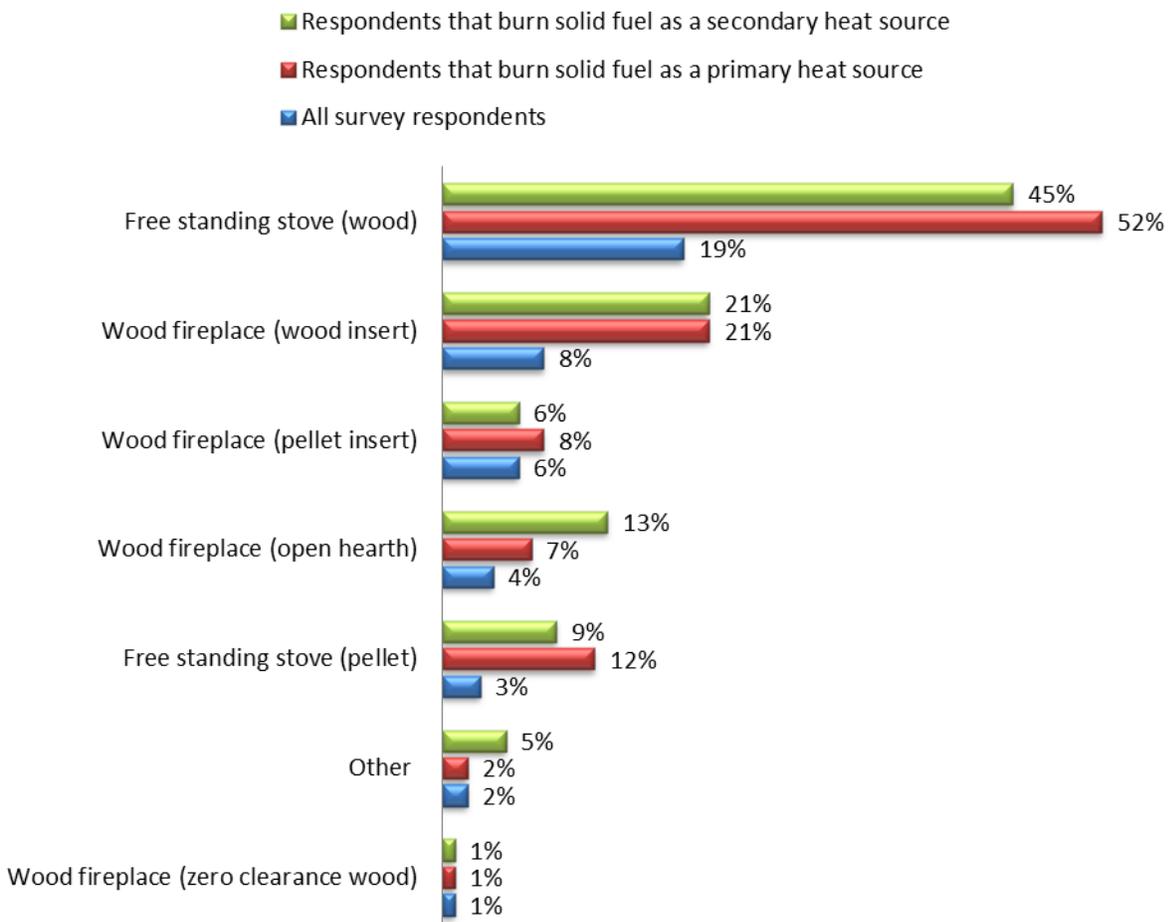


## Solid Fuel Burning Appliances

Forty percent of the Kittitas County households surveyed reported having have some type of solid fuel burning appliance in use during various times of the year. One third of those respondents reported having a secondary fuel burning appliance as a supplemental heat source to their primary, which means these individuals have more than one appliance on site. Almost 90% of indoor solid fuel burners report using firewood and 18% report using pellets. Less than 5% percent use alternative materials such as presto logs. These percentages do not represent exclusive fuel use. The total percentages of fuel type usage is greater than 100% because the survey allowed for single respondents to report using multiple types of solid fuel.

**FIGURE 14: Types of Indoor Burning Practices**

### What type of indoor burning do you do at your residence?

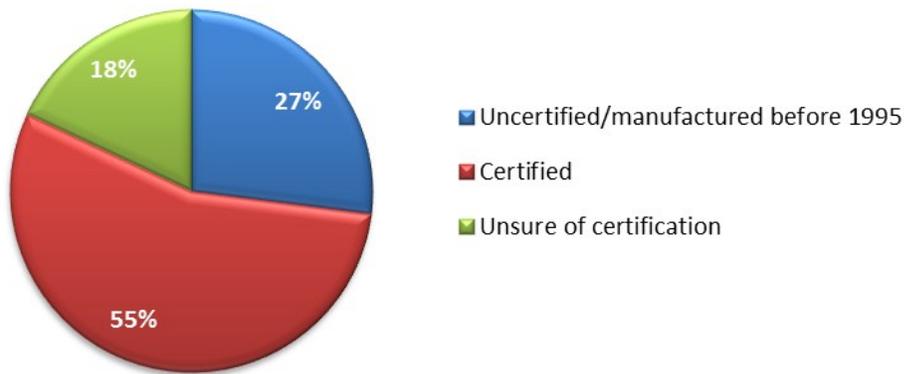


### Uncertified Wood Stoves

At the time of the survey, 8% of all survey respondents report that their wood stoves are uncertified or manufactured before 1995. Looking solely at the 18% of survey takers who reported having free standing wood stoves, the percentage of potentially uncertified stoves is 27% with an additional 18% who are unsure of their stove’s certification status. This does not include those who reported having a wood stove with a pellet insert.

**FIGURE 15: Uncertified Wood Stoves**

**Is your wood stove uncertified and/or manufactured before 1995?**

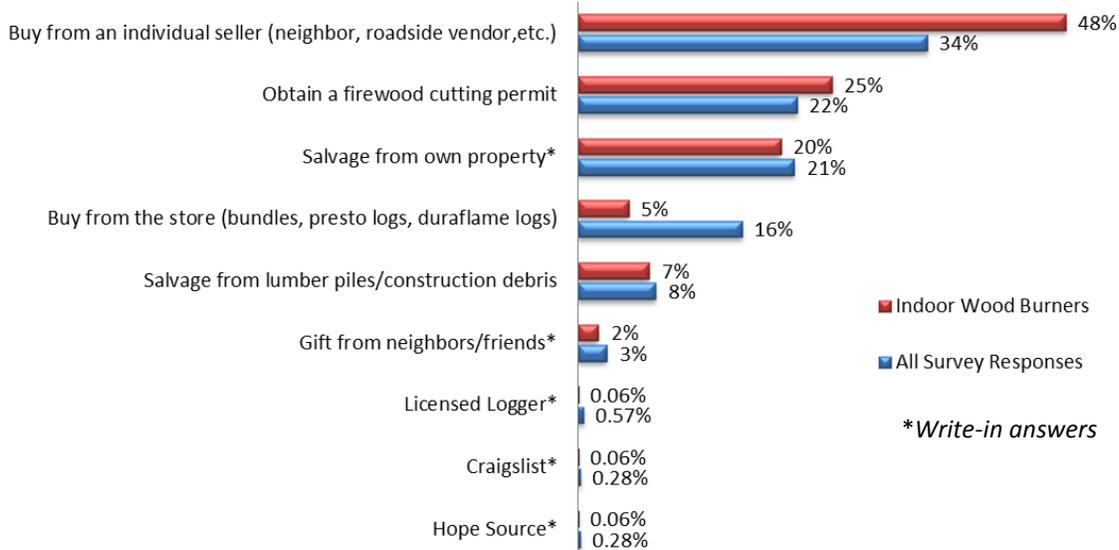


### Sources of Wood

Residents’ primary sources for firewood are individual sellers, obtaining a permit to cut firewood, and clearing trees from their own property. Respondents that report burning in a fireplace or wood stove differ in their sources only in that they buy less from stores and more from individual sellers.

**FIGURE 16: Sources of Firewood for Kittitas County Residents**

**Where do you get the majority of the wood you burn (indoors and outdoors)?**



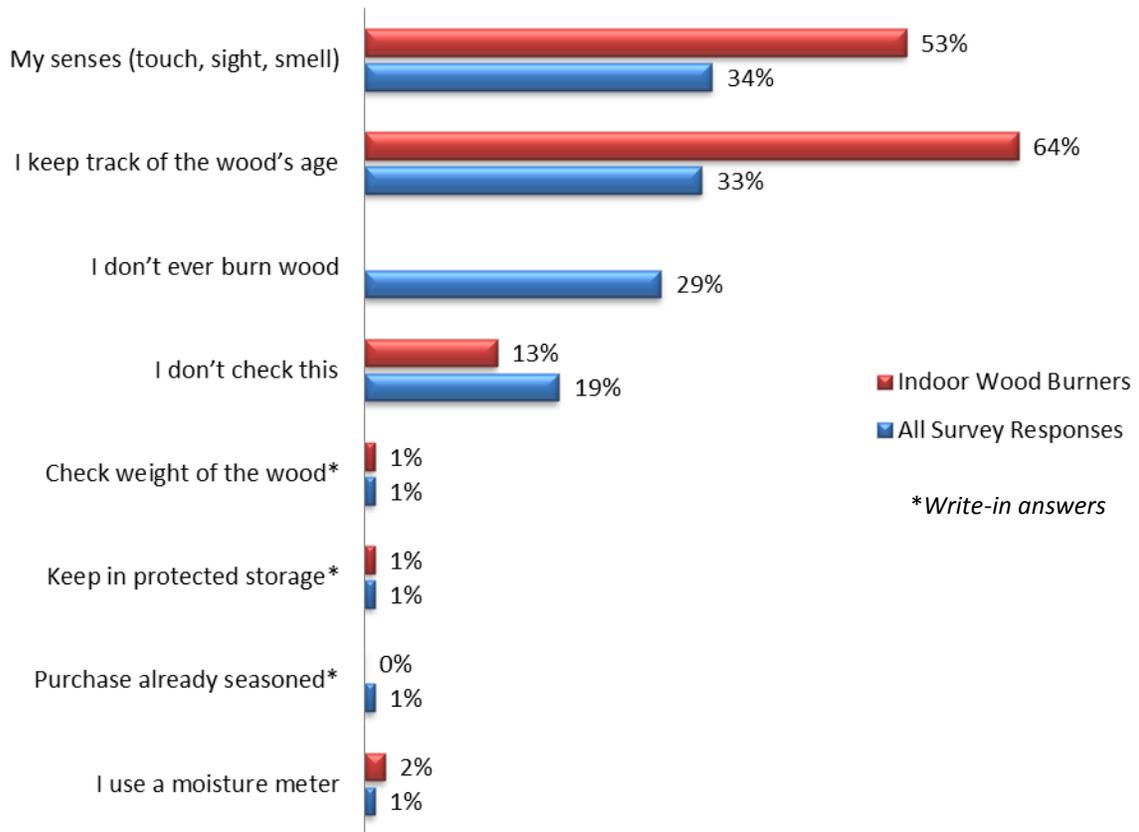
\*Write-in answers

## Seasoning Practices

Residents' primary way to ensure they are burning dry wood is to keep track of the wood's age and use their senses to determine moisture content. Residents who heat with wood indoors primarily use the clean burning practice of aging the wood ("seasoning" it) to ensure a dry wood supply.

**FIGURE 17: Residential Wood "Seasoning" Practices**

### How do you determine how much moisture is in your wood supply?

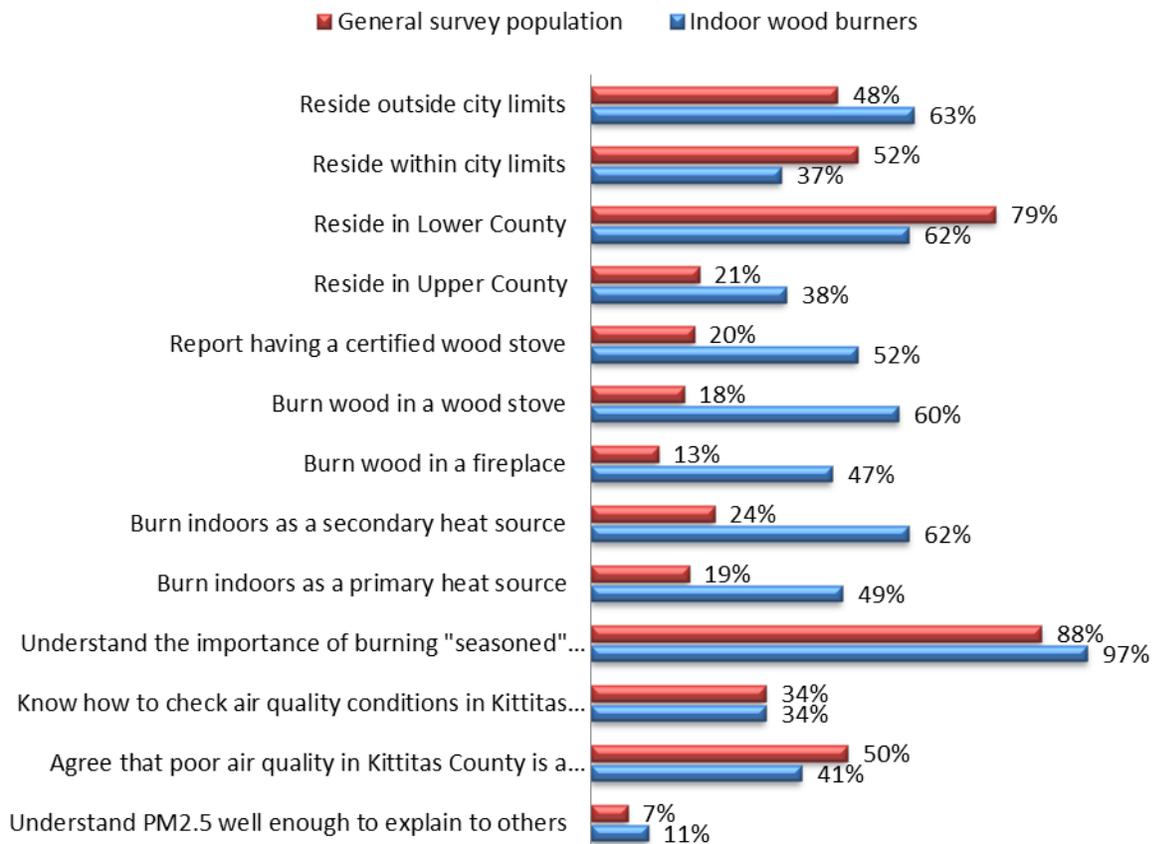


## Education & Outreach

The primary audience of an education and outreach program would be individuals that engage in burning large amounts of solid fuel that may not be aware of current air quality issues or how their behaviors may contribute to pollution. Sixty percent of indoor wood burners surveyed report using a wood stove and 47% report having a fireplace. Almost all of the individuals who burn in a woodstove or a fireplace as a primary or secondary heat source report understanding the importance of “seasoning” wood. However, very few report understanding particulate matter pollution. Less than half (41%) of these individuals feel that poor air quality is a significant environmental issue. Looking solely at the respondents who burn wood as a heat source, 52% report having a certified stove which leaves 48% who are unsure if their equipment is manufactured before 1995 or uncertified. These individuals may benefit from education regarding how to get the most effective burn from heating equipment or how to access programs that allow for free or discounted equipment upgrades. According to survey results, 63% of the individual who report heating with wood live outside the city limits. More of these individuals report living in lower county (62%), however, a significant amount reside in upper county as well (38%). When designing outreach programs, it will be important to factor in equal distribution in both upper and lower Kittitas County.

**FIGURE 18: Profile of Indoor Wood Burners**

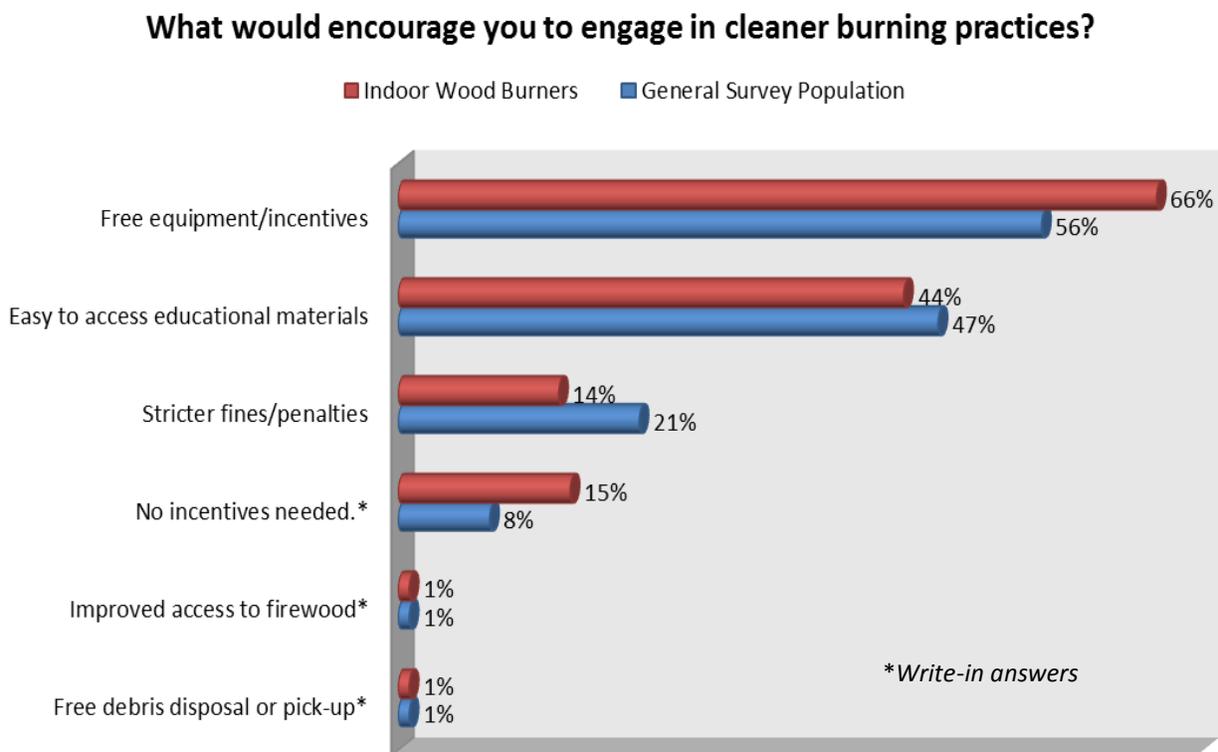
### Comparison of Survey Responses: General vs. Wood Burners



## Motivation for Cleaner Burning Practices

Both the general population and indoor wood burners responded that financial incentives or free equipment would assist them in engaging in cleaner burning practices. Almost as many respondents felt that easy access to educational materials would encourage cleaner burning practices as well. A much smaller percentage of the general population felt that stricter fines or penalties would be effective motivation for enhancing cleaner burning practices. The responses of the indoor wood burners aligned with the overall general survey population.

**FIGURE 19: Motivation for Engaging in Cleaner Burning Practices**



## Discussion

This survey set out to determine the community attitudes surrounding poor air quality in Kittitas County and to inventory the burning practices that contribute to PM<sub>2.5</sub> air pollution. The results show that the community is divided on whether or not poor air quality is a significant environmental issue here in Kittitas County. However, survey results indicate that most residents are not clear on what PM<sub>2.5</sub> pollution is, how they can monitor it for themselves, or which of their behaviors contribute to it. A large portion of the community appears to feel strongly that there should be incentives and educational materials available to encourage cleaner burning practices. These findings indicate that there is an emergent need for outreach and education regarding the current status of air quality in Kittitas County as well as the impact burning practices can have on PM<sub>2.5</sub> air pollution.

Our findings regarding wood burning emissions are similar to other studies conducted in the region with some notable exceptions. In 2007, The Puget Sound Clean Air Agency (PSCAA) conducted a wood burning emissions inventory survey of King, Kitsap, Pierce and Snohomish counties.<sup>7</sup> Ecology compared the Kitsap, Pierce, and Snohomish county survey data from this report with the Kittitas County survey results. The data shows Kittitas County households burning solid fuel as a primary heat source 22% more than Kitsap, Pierce, and Snohomish county residents. A statewide wood burning survey conducted in 2010 by the Northwest Air Quality Communicators (NAQC) reported that 25% of Washington state households have a wood burning appliance (fireplace, insert, wood or pellet stove).<sup>8</sup> Our survey results show approximately 40% of Kittitas County households are burning solid fuel in a wood burning appliance, which is higher than the statewide average. In terms of attitudes of frequent wood burners, the NAQC study found that “frequent wood burners see the situation differently from air quality professionals. The large majority did not perceive an air quality problem at all and they did not connect their wood burning to air quality or health threats”. It would appear that the attitudes of Kittitas County residents follow this statewide trend as well. While our findings provide an overview of wood burning appliance use, it would be helpful to do a more specific inventory to verify our high numbers of indoor solid fuel burning. We would also need to look more closely at fuel usage and get specific amounts for a more comprehensive emissions inventory that can be compared with additional regional studies. It would also be helpful to gather more information about motivation for compliance behaviors specifically related to clean burning practices in addition to seasoning wood and legal outdoor burning. Further exploration should be done to determine if those reporting certified equipment really understand what being “certified” means and if those who reported not knowing can clarify their answers.

The survey process encountered some limitations that should be addressed to improve future data gathering. Our survey was translated into Spanish but due to a limited distribution timeline, we were not able to get the desired percentage of responses from the Hispanic community. Responses from the male sector of our community were also incongruent with population demographics. Female responses outnumbered male three to one. This higher rate of response from females is consistent

with recent research on gender differences in response to paper and web surveys.<sup>9</sup> When distributing surveys, we asked for one respondent per household, however, we did not provide a way to verify this. In addition, there was an error made while transposing question number thirteen into the electronic survey. The error was not caught until after survey distribution. The question asks respondents to identify their sources for the majority of the wood they burn. The paper survey gave them to the option to “check all that apply” while the electronic version only allowed them to choose one source. Many of the individuals who took the electronic survey corrected for this by writing in multiple sources into the “other” answer field. These answers were later evaluated and added into the original survey data to correct for the glitch. This question should be revisited in future surveys in order to verify findings. The questions regarding motivation and cleaner burning practices did not specify what “cleaner burning practices” are. We also did not clearly define what was meant by “equipment” or “financial” incentives. It would be helpful to specify the exact clean burning practices that people are engaging in to identify strengths and deficits in community practices other than the few mentioned in this survey (certified equipment, legal outdoor burns, “seasoning” wood). The individuals who are frequent solid fuel burners appear to be engaging in cleaner burning practices than the average individual and therefore may be able to provide helpful feedback designing education and outreach campaigns for the general public who may not be aware of the clean burning practices they could utilize. We need to verify that this is actually the case, and if it is, determine how we can use that already present knowledge to inform public education and outreach. Key informant interviews and focus groups would be an effective way to access this information.

## Conclusion

The findings of this study show that Kittitas County residents are engaging in many types of burning behaviors that contribute to PM<sub>2.5</sub> air pollution. The amount of solid fuels being burned appear to be larger than other areas of the state, and if this is verified, it may mean the county’s emission levels are contributing more to PM<sub>2.5</sub> pollution than previously thought. The lack of general knowledge regarding particulate matter pollution in Kittitas County points to a strong need for outreach and education in this area. An outreach and education campaign focused on clean burning practices should be designed with feedback from individuals who burn solid fuel as a primary or secondary heat source. The focus of community education programs should be on helping people to connect their behaviors with clean air outcomes. Pairing education with financial incentives would be the most effective way to disperse information. There is still not enough information to determine the largest contributors to poor air quality in Kittitas Valley. While the survey was comprehensive, further research needs to be done to verify findings and to inform future clean air projects.

## Appendix A: Kittitas County Air Quality Advisory Committee

Name	Organization Represented	E-mail Contact Information
Holly Myers	Environmental Health Program Manager, Kittitas County Public Health Department	<a href="mailto:holly.myers@co.kittitas.wa.us">holly.myers@co.kittitas.wa.us</a>
Patti Johnson	Kittitas County Solid Waste	<a href="mailto:Patti.johnson@co.kittitas.wa.us">Patti.johnson@co.kittitas.wa.us</a>
Andrew Lyons	Weatherization & Energy Manager, Hopesource	<a href="mailto:alyons@hopesource.us">alyons@hopesource.us</a>
Brenda Larsen	Kittitas County Fire Marshall	<a href="mailto:brenda.larsen@co.kittitas.wa.us">brenda.larsen@co.kittitas.wa.us</a>
Josh Hink	Deputy Fire Marshall	<a href="mailto:josh.hink@co.kittitas.wa.us">josh.hink@co.kittitas.wa.us</a>
Susan Billings	AQ Section Supervisor-Ecology	<a href="mailto:Sbil461@ecy.wa.gov">Sbil461@ecy.wa.gov</a>
Anne M Johansen, PhD	Professor, Analytical/Environmental Chemistry Director of Environmental Studies Program Director of Chemical Analysis Laboratory Department of Chemistry, Central Washington University	<a href="mailto:johansea@cwu.edu">johansea@cwu.edu</a>
Jim Allen	Director Cardiopulmonary Services, Kittitas Valley Healthcare	<a href="mailto:jallen@kvhealthcare.org">jallen@kvhealthcare.org</a>
Mark Larson, MD	Local Clinician, Kittitas Valley Healthcare  Health Officer, Kittitas County Public Health Department	<a href="mailto:mark.larson@co.kittitas.wa.us">mark.larson@co.kittitas.wa.us</a>
Greg Armstrong	Armstrong Home Heating	<a href="mailto:sales@armstrongsstovespa.com">sales@armstrongsstovespa.com</a>
Art Stoltman	Windermere Real Estate	<a href="mailto:arts@windermere.com">arts@windermere.com</a>
Matt Eberlein	Department of Natural Resources Washington State	<a href="mailto:Matt.eberlein@dnr.wa.gov">Matt.eberlein@dnr.wa.gov</a>
Rich Elliott	Mayor, City of Ellensburg Kittitas Valley Fire & Rescue	<a href="mailto:elliotr@kvfr.org">elliotr@kvfr.org</a>
Joe Seemiller	Kittitas Valley Fire & Rescue	<a href="mailto:seemillerj@kvfr.org">seemillerj@kvfr.org</a>
Debbie DeSoer	City of Ellensburg Public Library (Site of Air Monitoring Station)	<a href="mailto:desoerd@ci.ellensburg.wa.us">desoerd@ci.ellensburg.wa.us</a>

# Appendix B: Questionnaire & Data

## PAPER SURVEY COVER SHEET



**THANK YOU** for taking a few minutes to fill out our anonymous Community Air Quality Survey! Register below for a chance to win!!

The **Kittitas County Public Health Department** (KCPHD), in partnership with the Department of Ecology in Yakima and the Kittitas County Air Quality Committee, is conducting a community assessment to find out what **Kittitas County residents know about air quality monitoring, what people know about the contributors to poor air quality and what's being burned in our community.** Information collected will help us advocate for **positive change** in the air we share. Behind this cover sheet is the paper version of the survey.

- Please only fill out one survey per household.
- PAPER SURVEYS may be returned:
  - ◊ At the same place you picked it up.
  - ◊ BY MAIL: KCPHD, Attn: Amy Fuller  
507 N. Nanum St. Suite #102  
Ellensburg, WA 98926
  - BY FAX: KCPHD, Attn: Amy Fuller  
509-962-7581
- OR, you can TAKE THE SURVEY ONLINE at:  
<https://www.surveymonkey.com/s/KCPHDAirQualitySurvey>
- Please turn in survey no later than June 30th, 2014.
- For more information or to participate in the community air quality assessment, please contact Amy Fuller at the health department:  
**509-962-7515** or e-mail: [communityassessment@co.kittitas.wa.us](mailto:communityassessment@co.kittitas.wa.us)

**ENTER YOUR NAME AND CONTACT INFORMATION FOR  
A CHANCE TO WIN \$25 GIFT CERTIFICATES TO THESE LOCAL BUSINESSES:**

\* FRED MEYERS      \* RANCH & HOME      \* ARMSTRONG  
\* BI-MART      \* OLD MILL COUNTRY STORE      STOVE & SPA

Name: \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

Phone Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

I am interested in finding out how I can be more involved in air quality assessment efforts.

I am interested in getting some information about how to become a member of the Air Quality Committee for Kittitas County.

TEAR OFF and PLACE IN BOX

# Appendix B: Questionnaire & Data

## PAGE ONE



### COMMUNITY SURVEY: AIR QUALITY

**1. How well do you understand the air quality related phrases “PM2.5” or “fine particulate matter” ?**

- I don't know what these phrases mean.
- I've heard of them, but I don't understand.
- I understand somewhat.
- I understand them well and can explain these concepts to others.

**2. How much do you agree or disagree with the following statements:**

Please check one of the following <input checked="" type="checkbox"/> : ----->	Strongly Agree	Agree	I don't know	Disagree	Strongly Disagree
Poor air quality in Kittitas County is a significant environmental issue.	<input type="checkbox"/>				
Poor air quality in Kittitas County occurs mostly during wildfire season.	<input type="checkbox"/>				
Wood stoves and fireplaces are major contributors to poor air quality.	<input type="checkbox"/>				
Agricultural burning is a major contributor to poor air quality.	<input type="checkbox"/>				
Diesel fuel/highway traffic is a major contributor to poor air quality.	<input type="checkbox"/>				
The government should put more effort into enforcing burning rules	<input type="checkbox"/>				

**3. Do you know how to check current air quality conditions in Kittitas County?**

- Yes
- No
- Sort of

**4. How do you hear about burn bans in Kittitas County?**

( Check all that apply)

- Word of mouth (friends, neighbors, etc.)
- Newspaper
- Radio
- Internet
- TV
- Social media (Facebook, Twitter, etc.)
- I don't hear about them
- Other: \_\_\_\_\_

CONTINUE TO NEXT PAGE ----->

# Appendix B: Questionnaire & Data

## PAGE TWO

### QUESTIONS ABOUT GENERAL OUTDOOR BURNING PRACTICES

**5. What type of outdoor burning do you do at your residence in the SPRING (March-May)?**

*(☑ check all that apply)*

- |  |   |
|--|---|
| <input type="checkbox"/> Recreation/camp fire/ BBQ           | <input type="checkbox"/> Garbage or trash   |
| <input type="checkbox"/> Ditch burning                       | <input type="checkbox"/> Field burning      |
| <input type="checkbox"/> Yard debris (weeds, branches, etc.) | <input type="checkbox"/> Ceremonial reasons |
| <input type="checkbox"/> Land clearing                       | <input type="checkbox"/> None               |
| <input type="checkbox"/> Other _____                         |   |

**6. What type of outdoor burning do you do at your residence in the SUMMER (June-August)?**

*(☑ check all that apply)*

- |  |   |
|--|---|
| <input type="checkbox"/> Recreation/camp fire/ BBQ           | <input type="checkbox"/> Garbage or trash   |
| <input type="checkbox"/> Ditch burning                       | <input type="checkbox"/> Field burning      |
| <input type="checkbox"/> Yard debris (weeds, branches, etc.) | <input type="checkbox"/> Ceremonial reasons |
| <input type="checkbox"/> Land clearing                       | <input type="checkbox"/> None               |
| <input type="checkbox"/> Other _____                         |   |

**7. What type of outdoor burning do you do at your residence in the FALL (September-November)?**

*(☑ check all that apply)*

- |  |   |
|--|---|
| <input type="checkbox"/> Recreation/camp fire/ BBQ           | <input type="checkbox"/> Garbage or trash   |
| <input type="checkbox"/> Ditch burning                       | <input type="checkbox"/> Field burning      |
| <input type="checkbox"/> Yard debris (weeds, branches, etc.) | <input type="checkbox"/> Ceremonial reasons |
| <input type="checkbox"/> Land clearing                       | <input type="checkbox"/> None               |
| <input type="checkbox"/> Other _____                         |   |

**8. What type of outdoor burning do you do at your residence in the WINTER (December-February)?**

*(☑ check all that apply)*

- |  |   |
|--|---|
| <input type="checkbox"/> Recreation/camp fire/ BBQ           | <input type="checkbox"/> Garbage or trash   |
| <input type="checkbox"/> Ditch burning                       | <input type="checkbox"/> Field burning      |
| <input type="checkbox"/> Yard debris (weeds, branches, etc.) | <input type="checkbox"/> Ceremonial reasons |
| <input type="checkbox"/> Land clearing                       | <input type="checkbox"/> None               |
| <input type="checkbox"/> Other _____                         |   |

**9. When do you do the most outdoor burning? (☑ check all that apply)**

- Spring  Summer  Fall  Winter  I don't do any outdoor burning

## Appendix B: Questionnaire & Data

### PAGE THREE

**10. Can you identify which of the following items are LEGAL to burn in an outdoor fire? ( check all that apply)**

- |  |                                 |   |
|--|---------------------------------|---|
| <input type="checkbox"/> Anything in a burn barrel | <input type="checkbox"/> Logs   | <input type="checkbox"/> Pesticide containers |
| <input type="checkbox"/> Asphalt                   | <input type="checkbox"/> Metals | <input type="checkbox"/> Petroleum Products   |
| <input type="checkbox"/> Cardboard                 | <input type="checkbox"/> Grass  | <input type="checkbox"/> Plastics             |
| <input type="checkbox"/> Construction debris       | <input type="checkbox"/> Leaves | <input type="checkbox"/> Shrubberies          |
| <input type="checkbox"/> Dead animals              | <input type="checkbox"/> Lumber | <input type="checkbox"/> Tires                |
| <input type="checkbox"/> Demolition Debris         | <input type="checkbox"/> Paint  | <input type="checkbox"/> Trees                |
| <input type="checkbox"/> Garbage                   | <input type="checkbox"/> Paper  | <input type="checkbox"/> Yard waste           |

For more information about what is legal to burn outdoors,  
call the WA State Dept. of Ecology Burn Day Hotline: **1-800-406-5322**

#### QUESTIONS ABOUT INDOOR and OUTDOOR WOOD BURNING PRACTICES

**11. Do you understand why it is important to burn dry, "seasoned" wood?**

- Not really, and what does "seasoned" mean?
- I understand somewhat.
- I understand why it's important and can explain it to others.

**12. How do you determine how much moisture is in your wood supply?**

- I use a moisture meter
- My senses (touch, sight, smell)
- I keep track of the wood's age.
- I don't check this.
- I don't ever burn wood.
- Other \_\_\_\_\_

**13. Where do you get the majority of the wood you burn indoors or outdoors?**

( check all that apply)

- Buy from the store (bundles of wood, presto logs, duraflame logs)
- Buy from a individual seller (neighbor, roadside stand, etc.)
- Salvage it from lumber piles/construction debris
- Get a permit to cut down trees
- I don't burn wood.
- Other \_\_\_\_\_

**14. What would encourage you to engage in cleaner burning practices?**

( check all that apply)

- Free equipment/incentives
- Other: \_\_\_\_\_
- Easy to access educational materials
- Stricter fines/penalties

**CONTINUE TO BACK PAGE** →

# Appendix B: Questionnaire & Data

## PAGE FOUR

### QUESTIONS ABOUT INDOOR BURNING PRACTICES

15. What type of indoor burning do you do at your residence? ( check all that apply)

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Wood Fireplace      | <input type="checkbox"/> Free Standing Stove | <input type="checkbox"/> I don't do any indoor burning. |
| <input type="checkbox"/> Open Hearth         | <input type="checkbox"/> Pellet              |   |
| <input type="checkbox"/> Wood Insert         | <input type="checkbox"/> Wood                |   |
| <input type="checkbox"/> Zero Clearance Wood |  |   |
| <input type="checkbox"/> Pellet Insert       |  |   |

16. Are any of the items above your primary heat source?  Yes  No

17. Are any of the items above your secondary heat source?  Yes  No

18. When do you do the most indoor burning? ( check all that apply)

- Spring  Summer  Fall  Winter  I don't do any indoor burning.

19. Is your wood stove uncertified and/or manufactured before 1995?

- Yes  No  I don't Know  I don't have a wood stove

*If "YES", HopeSource may be able to help you replace your wood stove. Call 509-925-1448 for more information. Restrictions do apply (wood needs to be your primary heat source, depends where you live in the County, cost of replacement, etc.)*

### QUESTIONS ABOUT YOU ( this information is optional but very helpful)

20. What is your age?

- 19 and under  
 20-24  
 25-29  
 30-34  
 35-39  
 40-44  
 45-49  
 50-54  
 55-59  
 60-64  
 65-69  
 70-74  
 75-79  
 80 and up

21. What is your gender?  Male  Female

22. What is your race/ethnicity?

- African American/Black  
 Asian/Pacific Islander  
 Caucasian/White  
 Hispanic/Latino  
 Native American/Alaskan Native  
 Multiple Ethnicities

23. What is your zip code?

- |   |   |
|---|---|
| <input type="checkbox"/> 98950 (Vantage)    | <input type="checkbox"/> 98946 (Thorp)          |
| <input type="checkbox"/> 98934 (Kittitas)   | <input type="checkbox"/> 98943 (South Cle Elum) |
| <input type="checkbox"/> 98922 (Cle Elum)   | <input type="checkbox"/> 98941 (Roslyn)         |
| <input type="checkbox"/> 98926 (Ellensburg) | <input type="checkbox"/> 98940 (Ronald)         |
| <input type="checkbox"/> 98925 (Easton)     | <input type="checkbox"/> Other _____            |

24. Do you live in or out of the city limits?

- In  Out

25. Do you rent or own your residence?

- Rent  Own  Other



To Protect and Promote the Health and the Environment of the People of Kittitas County

**END OF SURVEY**

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #1

How well do you understand the air quality related phrases “PM2.5” or “fine particulate matter” ?		
Answer Options	Response Percent	Response Count
I don't know what these phrases mean.	30.1%	166
I've heard of them, but I don't understand.	24.5%	135
I understand somewhat.	38.8%	214
I understand them well and can explain these concepts to others.	6.5%	36
<i>answered question</i>		<b>551</b>
<i>skipped question</i>		<b>10</b>

### Community Survey: Air Quality. Question #2

How much do you agree or disagree with the following statements:						
Answer Options	Strongly Agree	Agree	I don't know	Disagree	Strongly Disagree	Response Count
Poor air quality in Kittitas County is a significant environmental issue.	92	171	113	144	34	554
Poor air quality in Kittitas County occurs mostly during wildfire season.	73	225	58	174	24	554
Wood stoves and fireplaces are a major contributor to poor air quality.	89	219	102	117	26	553
Agricultural burning is a major contributor to poor air quality.	72	202	146	114	20	554
Diesel fuel/highway traffic is a major contributor to poor air quality.	76	232	135	92	16	551
The government should put more effort into enforcing burning rules.	83	137	153	127	50	550
<i>answered question</i>						<b>560</b>
<i>skipped question</i>						<b>1</b>

### Community Survey: Air Quality. Question #3

Do you know how to check current air quality conditions in Kittitas County?		
Answer Options	Response Percent	Response Count
Yes	33.6%	187
No	45.9%	255
Sort of	20.5%	114
<i>answered question</i>		<b>556</b>
<i>skipped question</i>		<b>5</b>

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #4

How do you hear about burn bans in Kittitas County? (Check all that apply)		
Answer Options	Response Percent	Response Count
Word of mouth (friends, neighbors, etc.)	44.6%	250
Newspaper	49.7%	279
Radio	31.9%	179
Internet	29.4%	165
TV	19.8%	111
Social Media (facebook, twitter, etc.)	15.5%	87
I don't hear about them.	10.3%	58
I don't know	0.4%	2
Other (please specify)	14.4%	81
<i>answered question</i>		<b>561</b>
<i>skipped question</i>		<b>0</b>

### “Other” Responses Organized into Categories

<b>Emailed press releases</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		12.35%	10
<b>Internet</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		4.94%	4
<b>Local News</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		2.47%	2
<b>Phone in and ask.</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		14.81%	12
<b>Signs/Postings</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		58.02%	47
<b>Word of mouth</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		3.70%	3
<b>Uncategorized</b> <a href="#">View all</a>		4.94%	4

**“Uncategorized” items are write-in answers that were not applicable to the question and therefore did not warrant categorization.**

## Appendix B: Questionnaire & Data

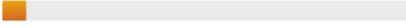
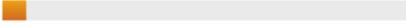
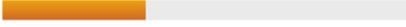
### Community Survey: Air Quality. Question #5

What type of OUTDOOR burning do you do at your residence in the SPRING (March-May)? Check all that apply:

Answer Options	Response Percent	Response Count
Recreation/camp fire/ BBQ	45.5%	254
Ditch burning	12.4%	69
Yard debris (weeds, branches, etc.)	30.3%	169
Land clearing	3.0%	17
Garbage or trash	2.0%	11
Field burning	3.8%	21
Ceremonial reasons	1.1%	6
None	40.7%	227
Other (please specify)	3.0%	17
<i>answered question</i>		<b>558</b>
<i>skipped question</i>		<b>3</b>

### Question #5 "Other" Responses Organized into Categories

Showing 4 custom categories

<b>BBQ/Campfire</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		23.53%	4
<b>Burn yard vegetation</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		29.41%	5
<b>fire breaks</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		5.88%	1
<b>garbage</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		5.88%	1
<b>Uncategorized</b> <a href="#">View all</a>		35.29%	6

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #6

What type of OUTDOOR burning do you do at your residence in the SUMMER (June-August)? Check all that apply:

Answer Options	Response Percent	Response Count
Recreation/camp fire/ BBQ	51.8%	285
Ditch burning	2.0%	11
Yard debris (weeds, branches, etc.)	11.5%	63
Land clearing	1.3%	7
Garbage or trash	1.1%	6
Field burning	0.9%	5
Ceremonial reasons	1.3%	7
None	44.2%	243
Other (please specify)	3.1%	17
<i>answered question</i>		<b>550</b>
<i>skipped question</i>		<b>11</b>

### Question #6 "Other" Responses Organized into Categories

Showing 3 custom categories

<b>BBQ/Campfire</b> View all • Edit • Delete		47.06%	8
<b>Burn Yard vegetation</b> View all • Edit • Delete		11.76%	2
<b>garbage burning</b> View all • Edit • Delete		5.88%	1
<b>Uncategorized</b> View all		35.29%	6

## Appendix B: Questionnaire & Data

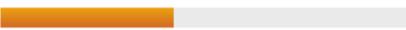
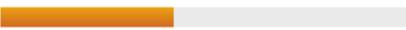
### Community Survey: Air Quality. Question #7

What type of OUTDOOR burning do you do at your residence in the FALL (September-November)?  
Check all that apply:

Answer Options	Response Percent	Response Count
Recreation/camp fire/ BBQ	48.7%	271
Ditch burning	3.1%	17
Yard debris (weeds, branches, etc.)	23.7%	132
Land clearing	1.8%	10
Garbage or trash	1.8%	10
Field burning	1.1%	6
Ceremonial reasons	0.9%	5
None	40.8%	227
Other (please specify)	2.5%	14
<i>answered question</i>		<b>557</b>
<i>skipped question</i>		<b>4</b>

### Question #7 "Other" Responses Organized into Categories

Showing 2 custom categories

<div style="background-color: #e91e63; color: white; padding: 2px; display: inline-block;">bbq/fire pit</div> 	42.86%	6
<a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		
<div style="background-color: #00bcd4; color: white; padding: 2px; display: inline-block;">garbage</div> 	14.29%	2
<a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		
<div style="background-color: #333; color: white; padding: 2px; display: inline-block;">Uncategorized</div> 	42.86%	6
<a href="#">View all</a>		

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #8

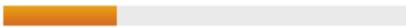
What type of OUTDOOR burning do you do at your residence in the WINTER (December-February)?

Check all that apply:

Answer Options	Response Percent	Response Count
Recreation/camp fire/ BBQ	28.0%	156
Ditch burning	0.0%	0
Yard debris (weeds, branches, etc.)	7.7%	43
Land clearing	0.5%	3
Garbage or trash	1.8%	10
Field burning	0.0%	0
Ceremonial reasons	1.1%	6
None	65.4%	364
Other (please specify)	3.2%	18
<i>answered question</i>		<b>557</b>
<i>skipped question</i>		<b>4</b>

### Question #8 "Other" Responses Organized into Categories

Showing 2 custom categories

<b>bbq/fire pit</b>		27.78%	5
<a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>			
<b>burn yard vegetation</b>		5.56%	1
<a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>			
<b>Uncategorized</b>		66.67%	12
<a href="#">View all</a>			

### Community Survey: Air Quality. Question #9

When do you do the most outdoor burning? (check all that apply)

Answer Options	Response Percent	Response Count
Spring	37.9%	212
Summer	32.4%	181
Fall	22.0%	123
Winter	7.0%	39
I don't do any outdoor burning.	33.5%	187
<i>answered question</i>		<b>559</b>
<i>skipped question</i>		<b>2</b>

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #10

Can you identify which of the following items are LEGAL to burn in an outdoor fire? (check all that apply)		
Answer Options	Response Percent	Response Count
Anything in a burn barrel	4.4%	23
Asphalt	1.3%	7
Cardboard	41.3%	217
Construction debris	5.5%	29
Dead animals	2.9%	15
Demolition Debris	1.7%	9
Garbage	6.3%	33
Logs	80.8%	425
Metals	1.5%	8
Grass	47.7%	251
Leaves	69.0%	363
Lumber	35.9%	189
Paint	1.7%	9
Paper	47.1%	248
Pesticide containers	1.5%	8
Petroleum Products	1.5%	8
Plastics	2.1%	11
Shrubberies	49.8%	262
Tires	2.1%	11
Trees	58.6%	308
Yard waste	60.8%	320
	<i>answered question</i>	<b>526</b>
	<i>skipped question</i>	<b>35</b>

### Community Survey: Air Quality. Question #11

Do you understand why it is important to burn dry, "seasoned" wood?		
Answer Options	Response Percent	Response Count
Not really, and what does "seasoned" mean?	11.8%	66
I understand somewhat.	39.8%	222
I understand why it's important and can explain it to others.	48.4%	270
	<i>answered question</i>	<b>558</b>
	<i>skipped question</i>	<b>3</b>

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #12

How do you determine how much moisture is in your wood supply? (check all that apply)

Answer Options	Response Percent	Response Count
I use a moisture meter.	1.3%	7
My senses (touch, sight, smell).	34.0%	188
I keep track of the wood's age.	32.9%	182
I don't check this.	18.8%	104
I don't ever burn wood.	28.9%	160
Other (please specify)	4.5%	25
<i>answered question</i>		<b>553</b>
<i>skipped question</i>		<b>8</b>

### Question #12 "Other" Responses Organized into Categories

Showing 6 custom categories

<b>Age the wood.</b> View all • Edit • Delete		8%	2
<b>Don't burn wood.</b> View all • Edit • Delete		24%	6
<b>Five senses</b> View all • Edit • Delete		16%	4
<b>Keep in protected storage</b> View all • Edit • Delete		8%	2
<b>Purchase already seasoned</b> View all • Edit • Delete		8%	2
<b>Weight</b> View all • Edit • Delete		12%	3
<b>Uncategorized</b> View all		24%	6

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #13

Where do you get the majority of the wood you burn indoors or outdoors?

Answer Options	Response Percent	Response Count
Buy from the store (bundles of wood, presto logs, duraflame logs)	9.1%	51
Buy from a individual seller (neighbor, roadside stand, etc.)	19.2%	107
Salvage it from lumber piles/construction debris	3.0%	17
Obtain a firewood cutting permit	12.2%	68
I don't burn wood	36.9%	206
Other (please specify)	19.5%	109
<i>answered question</i>		<b>558</b>
<i>skipped question</i>		<b>3</b>

### Question #13 "Other" Responses Organized into Categories

Showing 10 custom categories

<b>Buy from private seller</b> View all • Edit • Delete		12.84%	14
<b>Buy from Store</b> View all • Edit • Delete		5.50%	6
<b>Craigslist</b> View all • Edit • Delete		0.92%	1
<b>Do not burn wood</b> View all • Edit • Delete		6.42%	7
<b>Hopesource</b> View all • Edit • Delete		0.92%	1
<b>Licensed Logger</b> View all • Edit • Delete		1.83%	2
<b>Neighbors/friends</b> View all • Edit • Delete		9.17%	10
<b>Permit</b> View all • Edit • Delete		7.34%	8
<b>Salvage from lumber pile</b> View all • Edit • Delete		9.17%	10
<b>Salvage from own property</b> View all • Edit • Delete		68.81%	75
<b>Uncategorized</b> View all		0.92%	1

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #14

What would encourage you to engage in cleaner burning practices? (check all that apply)

Answer Options	Response Percent	Response Count
Free equipment/incentives	53.0%	271
Easy to access educational materials	44.8%	229
Stricter fines/penalties	20.9%	107
Other (please specify)	20.9%	107
<i>answered question</i>		<b>511</b>
<i>skipped question</i>		<b>50</b>

### Question #14 "Other" Responses Organized into Categories

Showing 6 custom categories

<b>Availability of firewood</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		1.87%	2
<b>Debris disposal/pickup</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		6.54%	7
<b>Educational materials</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		9.35%	10
<b>Equipment/\$incentives</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		12.15%	13
<b>No incentives needed.</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		40.19%	43
<b>I don't burn anything.</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		24.30%	26
<b>Uncategorized</b> <a href="#">View all</a>		6.54%	7

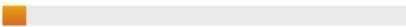
## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #15

What type of indoor burning do you do at your residence? (check all that apply)		
Answer Options	Response Percent	Response Count
Wood Fireplace (open hearth)	4.3%	24
Wood Fireplace (wood insert)	8.5%	47
Wood Fireplace (zero clearance wood)	0.4%	2
Wood Fireplace (pellet insert)	2.9%	16
Free standing stove (wood)	17.8%	99
Free standing stove (pellet)	3.4%	19
I don't do any indoor burning	61.1%	339
Other (please specify)	6.1%	34
<i>answered question</i>		<b>555</b>
<i>skipped question</i>		<b>6</b>

### Question #15 "Other" Responses Organized into Categories

Showing 3 custom categories

<b>fireplace</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		5.88%	2
<b>Gas/Propane</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		47.06%	16
<b>wood stove</b> <a href="#">View all</a> • <a href="#">Edit</a> • <a href="#">Delete</a>		11.76%	4
<b>Uncategorized</b> <a href="#">View all</a>		35.29%	12

### Community Survey: Air Quality. Question #16

Are any of the items above your primary heat source?		
Answer Options	Response Percent	Response Count
Yes	18.6%	101
No	81.4%	442
<i>answered question</i>		<b>543</b>
<i>skipped question</i>		<b>18</b>

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #17

Are any of the items above your secondary heat source?		
Answer Options	Response Percent	Response Count
Yes	23.6%	125
No	76.4%	404
<i>answered question</i>		<b>529</b>
<i>skipped question</i>		<b>32</b>

### Community Survey: Air Quality. Question #18

When do you do the most indoor burning? (check all that apply)		
Answer Options	Response Percent	Response Count
Spring	1.1%	6
Summer	0.2%	1
Fall	1.3%	7
Winter	34.9%	192
I don't do any indoor burning.	62.5%	344
<i>answered question</i>		<b>550</b>
<i>skipped question</i>		<b>11</b>

### Community Survey: Air Quality. Question #19

Is your wood stove uncertified and/or manufactured before 1995?		
Answer Options	Response Percent	Response Count
Yes (If "YES", HopeSource may be able to help you replace your wood stove. Call 509-925-1448 for more information. Restrictions do apply (wood needs to be your primary heat source, depends where you live in the County, cost of replacement, etc.)	8.0%	44
No	19.9%	110
I don't know	8.3%	46
I don't have a wood stove	63.8%	352
<i>answered question</i>		<b>552</b>
<i>skipped question</i>		<b>9</b>

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #20

Which category below includes your age?		
Answer Options	Response Percent	Response Count
19 and under	0.4%	2
20-24	3.2%	18
25-29	6.8%	38
30-34	9.1%	51
35-39	9.1%	51
40-44	9.5%	53
45-49	11.1%	62
50-54	12.3%	69
55-59	14.3%	80
60-64	11.8%	66
65-69	6.8%	38
70-74	3.2%	18
75-79	1.4%	8
80 and up	0.9%	5
<i>answered question</i>		<b>559</b>
<i>skipped question</i>		<b>2</b>

### Community Survey: Air Quality. Question #21

What is your gender?		
Answer Options	Response Percent	Response Count
Male	26.5%	143
Female	73.5%	397
<i>answered question</i>		<b>540</b>
<i>skipped question</i>		<b>21</b>

### Community Survey: Air Quality. Question #22

What is your race/ethnicity?		
Answer Options	Response Percent	Response Count
African American/Black	0.0%	0
Asian/Pacific Islander	1.1%	6
Caucasian/White	88.5%	478
Hispanic/Latino	1.5%	8
Native American/Alaskan Native	0.9%	5
Multiple Ethnicity	3.1%	17
Other (please specify)	4.8%	26
<i>answered question</i>		<b>540</b>
<i>skipped question</i>		<b>21</b>

## Appendix B: Questionnaire & Data

### Community Survey: Air Quality. Question #23

What is your zip code?		
Answer Options	Response Percent	Response Count
98950 (Vantage)	0.4%	2
98934( Kittitas)	3.8%	21
98926 (Ellensburg)	73.7%	412
98946 (Thorp)	1.4%	8
98943 (South Cle Elum)	1.8%	10
98922 (Cle Elum)	11.4%	64
98941 (Roslyn)	3.8%	21
98940 (Ronald)	2.5%	14
98925 (Easton)	1.3%	7
Other (please specify)	0.0%	0
<i>answered question</i>		<b>559</b>
<i>skipped question</i>		<b>2</b>

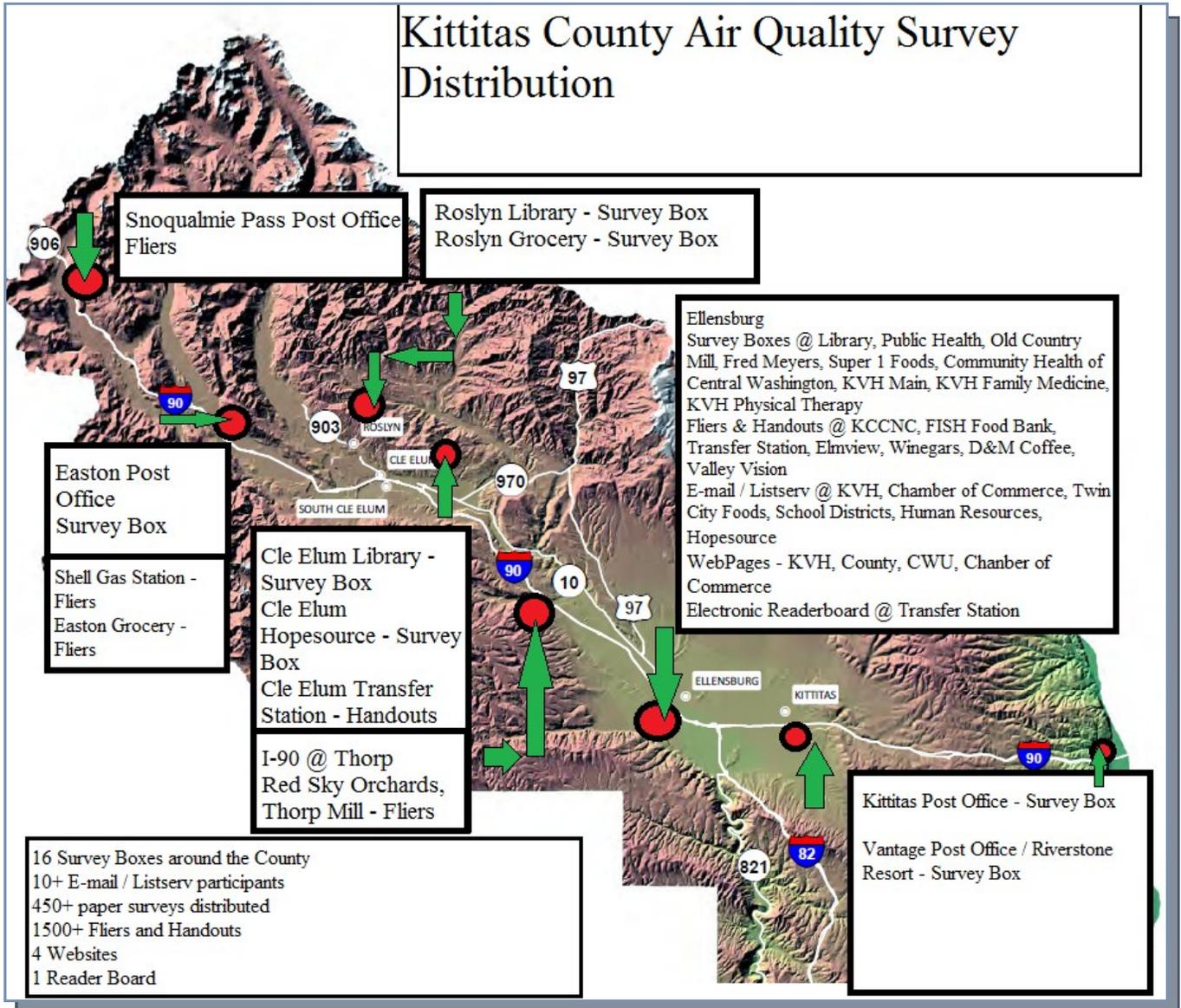
### Community Survey: Air Quality. Question #24

Do you live in or out of the city limits?		
Answer Options	Response Percent	Response Count
In	51.4%	287
Out	47.7%	266
Other (please specify)	0.9%	5
<i>answered question</i>		<b>558</b>
<i>skipped question</i>		<b>3</b>

### Community Survey: Air Quality. Question #25

Do you rent or own your residence?		
Answer Options	Response Percent	Response Count
Rent	23.2%	129
Own	75.8%	422
Other (please specify)	1.1%	6
<i>answered question</i>		<b>557</b>
<i>skipped question</i>		<b>4</b>

# Appendix C: Map of Survey Distribution & Collection



## Appendix D: Additional Data Sources

<b>Source</b>	
1	Washington State Department of Ecology: Air Quality. Real Time Air Monitoring Data. Available at: <a href="https://fortress.wa.gov/ecy/enviwa/">https://fortress.wa.gov/ecy/enviwa/</a> . Accessed August 12th, 2014.
2	Washington State Department of Health: Center for Health Statistics. <i>Death Certificate Data, 1990–2010</i> , August 2011.
3	Graph courtesy of Sue Billings, Washington State Department of Ecology, Air Quality Division.
4	Washington State Department of Health. <i>Health of Washington State: Outdoor (Ambient) Air Quality</i> . Updated January 2014. Available at: <a href="http://www.doh.wa.gov/Portals/1/Documents/5500/EH-AQ2014.pdf">http://www.doh.wa.gov/Portals/1/Documents/5500/EH-AQ2014.pdf</a> Accessed August 13,2014.
5	Washington State Department of Ecology: Air Quality Program. <i>Health Effects and Economic Impacts of Fine Particle Pollution in Washington</i> . Publication number:09-02-021. December 15,2009.
6	U.S Census Bureau: American Fact Finder. American Community Survey Five year estimate. Available at <a href="http://factfinder2.census.gov">factfinder2.census.gov</a> Accessed August 19,2014.
7	Puget Sound Clean Air Agency. <i>Indoor Wood-burning Emission Inventory Survey of King, Kitsap, Pierce and Snohomish Counties: Report of Results</i> . National Research Center, Inc. November 2007.
8	Northwest Air Quality Communicators: Washington Sub Group. <i>Wood Smoke Awareness &amp; Behavior Survey Of Wood Burning Households in Washington State</i> . Elway Research, Inc. July 2010.
9	Sax, Gilmartin, and Bryant. "Assessing Response Rates and Non-response Bias in Web and Paper Surveys." <i>Research in Higher Education</i> Vol. 44, no. 4 (2003): 409-31.



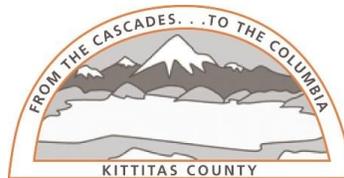
507 N. Nanum St. Ste. 102

Ellensburg, WA 98926

509-962-7515

[communityassessment@co.kittitas.wa.us](mailto:communityassessment@co.kittitas.wa.us)

[www.co.kittitas.wa.us/health/](http://www.co.kittitas.wa.us/health/)



*For more information or extra copies of this report, please contact the Kittitas County Public Health Department at [communityassessment@co.kittitas.wa.us](mailto:communityassessment@co.kittitas.wa.us), (509) 962-7515, or by mail at 507 N. Nanum St. Suite 102, Ellensburg, WA 98926.*

*To view this report online visit <http://www.co.kittitas.wa.us/health/assessment.asp>.*