

Outdoor Air Quality Survey 2001 Report: City of Fort Collins



The purpose of this survey and report was to provide the City of Fort Collins with an assessment of the knowledge, attitudes, perceptions and behavior of a representative sample of residents concerning outdoor air quality.



Environmental Behavior Consulting

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BACKGROUND

The City of Fort Collins' Air Quality Policy Plan AQPP identifies air quality in Fort Collins to be an issue of significant importance to the City. Every other year, the City of Fort Collins performs a survey of the general population to assess (1) the appropriateness of the priorities listed in the City's current Air Quality Action Plan (AQAP) and the AQPP; (2) to help define the questions that will give direction to policy, planning, outreach and marketing; (3) to help staff assess current programs and to plan future actions; and (4) to address any other temporary and current air quality issues.

In previous years, the air quality surveys were comprised of four separate surveys. In the summer of 2000, Environmental Behavior Consultants was hired to assess the ability of these surveys to assess the AQAP and AQPP objectives. After a statistical analysis of reliability was performed on the four most recently conducted surveys, items on these surveys were put together to form scales that would address the AQAP objectives. Next, the reliability of these combined scales was analyzed to determine which, if any, items from the surveys could be eliminated, revised, or kept. Next, a focus group with the Air Quality Board of the City of Fort Collins was held to get expert direction and input on current and planned policy, planning and marketing. A pilot survey was then sent to 108 Fort Collins citizens in order to determine if the questions and responses were understandable and valid. The result was an instrument, that by reorganizing, deleting, and adding key questions, would provide the City with the residents' perceptions, knowledge and attitudes of indoor and outdoor air quality and programs that have recently been implemented or could effectively be implemented in the near future. The instrument was divided into an *Indoor Air Quality Survey* and an *Outdoor Air Quality Survey*. Each survey is planned to be done every other year starting with the Indoor Air Quality Survey in the winter of 2000 and the Outdoor Air Quality Survey in the Spring of 2001.

The previous air quality surveys have each been conducted at least once in the City of Fort Collins. In order to maintain a measure of change, and still continually revise and update future surveys, certain information was retained for consistency across time. Some items were deleted for the sake of brevity and to reduce redundancy. Items were also deleted that did not provide any useful information in the past to measure over time. Many items were simply moved to develop scales that can be used to predict the important issues or beliefs to help staff focus outreach and programs.

EXECUTIVE SUMMARY

The 2001 Outdoor Air Quality Survey Objectives and Results:

Objective 1: Knowledge of which programs or events have reached the public and how many have participated in them;

?	Emissions Stickers:	74%	Participated
?	Earth-day:	65.8%	Participated
?	“Stop at the Click”	33.9%	either Participated/Heard of it
?	Clean Air Logo:	29.2%	Heard of it
?	Lawn-Mower Rebate:	20.3%	Heard of it
?	Wood-Smoke Response Line:	16.3%	Heard of it

Objective 2: A measure of which marketing techniques were most effective;

<u>Best</u>	
•Local Newspaper	67%
•Utility Bill Insert	61%
•Radio	26.6%
•TV	22.2%
•Fliers/Brochures	14.1%
<u>Worst</u>	
•City Line	1.5%
•Children	2.9%
•Presentations	3.4%
•Internet	4%
•Bathroom Stall	4%

Objective 3: A direct measure of the residents’ perceptions of the major source of air pollution in Fort Collins;

Major

•Gasoline Vehicles:	70%
•Diesel Vehicles:	56%

Minor

•Wood-Burning:	39.2%
•Industry:	35.5%
•Transfort Buses	34.7%

Objective 4: The residents’ belief in “who” is most responsible for maintaining and improving air quality in Fort Collins;

•City Government:	19.3%
•Industry/Business:	18.6%
•Residents of Fort Collins:	18.3%

Objective 5: Where to focus efforts that will be most readily accepted;

1. Improve Traffic Light Timing to Reduce Vehicle Idling at Lights.

2. Increase Enforcement of Exhaust Regulations for Gas/Diesel Vehicles
3. Improve safety and access for bikes, skates, pedestrians
4. Increase Enforcement of Emissions Law
5. Do more to reduce the "Brown Cloud" and improve visibility. Prohibit wood-burning on high pollution days

Objective 6: An attitude scale that will predict the residents' intent to "reduce the daily miles traveled with his/her vehicle" and some factors that are more likely than other to predict this;

1. Riding a bike for errands and/or work $R^2 = .19$
2. Keep my vehicle tuned up $R^2 = .13$

Objective 7: Measure the apathy of residents due to loss of perceived control over the quality of the air in Fort Collins:

The residents do not experience apathy regarding the air quality in Fort Collins due to loss of perceived control. $R^2 = .07$

Objective 8: Current pleasantness rating of the air in Fort Collins for comparison over time.

Very Good	16.3
Good	53.2
Fair	27.8
Poor	2

Objective 9: Major sources of heat used in Fort Collins homes.

1. Natural Gas	80%
2. Hot Water Heater/Furnace	29.8%
3. Electric	15.2%
4. Solar Passive	4.1%
5. Propane	2.3%
6. Solar Active	2.2%
7. Wood	1.9%
8. Coal	1.2%
9. Other	0.7%

Objective 10: Number and other types of heat sources, especially wood stoves or wood-burning fireplaces.

Electric	115
Natural Gas	28
Hot Water Heater/Furnace	44
Solar Passive	88
Solar Active	29
Propane	21
Wood	90
Coal	14
Other	9

☞ Summary

The Outdoor Air Quality Survey was conducted in June and July of 2001. Of the 1500 surveys sent out to a random sample of residents of Fort Collins by mail, a total of 725

completed surveys were returned, or 48%. The purposes and objectives of the survey are listed in the previous section of the Executive Summary.

As a way to determine the effectiveness of the City's Air Quality information programs and events, respondents were asked if they recalled hearing about or participating in some of the current and recent programs. In response, residents said they were most familiar with the *Emissions Sticker Program* (74.1%), followed by *Earthday* (25.5%) and *Stop at the Click* (23.3%). The least familiar programs were the *Idling Campaign* (8.3%) and the *Wood-Smoke Response Line* (7.6%).

Next we asked where the resident recalls seeing or hearing information about air quality issues in Fort Collins. Residents responded the most to the *Local Newspaper* (67%), followed closely by the *City Utility Bill Insert* (61%). The least effective measures of getting information was by *City Line* (2%), *Presentations* and *Children* (3%) and the *Internet* (4%).

Residents perceive *Gasoline Vehicles* (70.1%) and *Diesel Vehicles* (56%) as the major source of air pollution in Fort Collins. *Wood-burning, Industry, Street Dust, and Off-Road Construction* all increased slightly as a source of air pollution from the last survey in 1999.

Twenty percent (20%) of the residents say that air pollution does not affect them in aesthetic or physical ways; however, almost 72% say it does. The biggest concern is that it *Causes a "Brown Cloud"* (86.9%) and 80% stated that it *Obscured Mountain Views*.

One question focused on *where* the resident believed the City should focus their efforts to best address air quality issues in Fort Collins. The overwhelming response was to *Improve Traffic Light Timing to Reduce Vehicle Idling at Lights* (76% "Strongly Agree). Another response that was chosen often as a "Strongly Agree" was to *Increase Enforcement of Exhaust Regulations for Both Gas and Diesel Vehicles* (60.4%). Overall, residents agreed more (97%-60%) with the current or planned programs or plans.

When asked the question of what the resident would be willing to do to help reduce air pollution in Fort Collins, overall, most residents agreed they would be willing to do something (average of 62.8%) compared to those residents who disagreed that they would be willing to do something (average of 16.6%). The top action residents would be willing to take is to keep their *vehicles tuned up*. An action the residents would very much oppose (69%) is to *contribute \$10 when registering vehicle to subsidize repair of high-polluting vehicles*. Residents also appear to only somewhat agree/somewhat disagree that taking the bus is a possible action they might take to reduce air pollution (58.7%). Compared to previous surveys, more residents would be willing to *ride their bikes* or *take the bus*. Compared to 1999 and 1997, residents again picked *keep my vehicle tuned up* as a top action they would take to help reduce air pollution, more residents would be willing to *ride their bike*, and slightly more would be willing to *take the bus*.

The next scale, or set of questions, can tell planners an overall "intent to act/behavior" on the resident's part to help reduce air pollution in Fort Collins. Overall, most residents agreed, (70%) that they would be more likely to act (or at least be open to accepting pro-environmental programs or plans), pro-environmentally.

The 2001 survey found the City (19.3%) to be ranked as *most responsible* for maintaining air quality, followed by Business/Industry (18.6%) and then the Resident (18.4%). As in 1997 and 1999, the Federal Government (12.1%) was considered the least responsible.

Even though residents believe that something can be done to improve or maintain the air quality in Fort Collins (81%), only 36% believe something *will* be done. The main source of heat used in the homes of the respondents was natural gas (80%). Hot water (30%), and electric (15%) were the next most checked sources. In 1995 and 1997, natural gas was the most

common source of heat for both years, 81% and 79% respectively. Hot water heat was not listed in 1995 as a choice and was only 4% in 1997.

The most common additional source of heat used in homes was electric (16%), followed by wood (12%) and passive solar (12%). The 1995 survey found the most common additional sources of heat to be wood (14%), electric (12%) and passive solar (7%), and the 1997 survey results showed the most common additional source of heat to be still be wood (17%), followed by electric (11%) and passive solar (6%).

Gas fireplaces are the top *other source* of heat for residents (33%) followed by wood burning fireplaces (28%) and electric fireplaces (15%). Except for the wood-burning fireplaces, generally, at least half of those with “Other Heat Sources” know that their unit is certified.

Almost half of the respondents have at some time or another experienced unacceptable air quality in Fort Collins. Most respondents rated the air quality as “good”, 46% in 1997 and 43% in 1999, with very few rating it as “excellent” or “poor.” Compared to the 2001 survey, more people in the 2001 survey rated the air quality as “good” than did in either 1997 or 1999. Additionally, less people rated it as “very good”, and more rated it as “fair.” These changes indicate that the residents rated the overall air quality in Fort Collins as worse than in previous survey years.

Most respondents believe that Fort Collins’ air quality will be worse (72%) in five years, while 21% believe it will not change, and only 7% believe it will be better than it is now. Considering that 53% consider the air quality “good” and almost half have at some time or another experienced unacceptable air quality, these results indicate that the respondents believe the air quality is going to not remain at “good”, especially in light of the fact that they have already experienced unacceptable air quality.

Survey Sample

The Outdoor Air Quality Survey was conducted in early June 2001. The survey used a non-experimental design (survey) with a stratified (by zip code) random sampling of 1,500 residents of the City of Fort Collins. The survey was a mail survey using the Total Design Method (Dillman, 1978) of surveying in order to achieve a higher response rate. Data was scanned into a Scantron scanner for accuracy, and results were analyzed using SPSS for Windows. A total of 725 completed surveys were returned, a response rate of 48%.

Selecting the Sample

The method used to select a sample for the surveys was stratified random sampling. In random stratified sampling there is some sub-group in a population that is of interest and can be identified. The sub-groups in a community survey are frequently identified by zip codes. The zip codes in Fort Collins represent the various regions of the City. If we had selected a simple random sample of 1,500 residents, we might not have obtained a representative sample from one or more of the zip codes, or regions of the City. The City of Fort Collins has five zip codes and two post office box zip codes. Four of the zip codes (80521, 80524, 80525, 80526) are approximately equally represented in number. Another is a relatively new zip code (80528) and has significantly fewer addresses than the first four. The two post office box zip codes are 80522 in the old post office building downtown, and 80527 in the newer post office building in the south end of town. There is another zip code in Fort Collins (80523) that is exclusive to the University, Colorado State University. No surveys were mailed to 80523. This does not mean the survey excluded students. The only students excluded were ones living on campus in

resident halls, dormitories or campus housing. Any students living off campus had an equal chance to be included in the survey. As such, the surveys were mailed proportionately to each zip code (excluding 80523) and the numbers mailed to each can be seen in Table 1.

Table 1. Stratified Random Sampling of 1,500 Surveys by City of Fort Collins' Zip Codes

Zip Codes	Number of Surveys Mailed
80521	350
80522	25
80524	350
80525	350
80526	350
80527	25
80528	50

An up-to-date, accurate “resident” mailing list was obtained through a reputable local mailing list company. The mailing list company was directed to randomly sample from the above zip codes. A computer-based record system was used to generate the random list.

✍ Determining Sample Size

The formula used to determine the size of sample necessary to meet the above criteria is:

$$n = (t)^2 (p)(q)/d^2$$

$$(1.96)^2 (.5)(1-.5)/.04^2 = 600$$

Where:

- n = sample size needed
- t = 1.960 for a 95% confidence limit
- p = the proportion estimate (e.g., .50)
- q = (1 - p)
- d = margin of error (degree of precision or 4%)

In other words, a sample of 600 returned surveys would be an adequate sample at a confidence level of 95%, a margin of error of 4%, and a probability of 0.5. This survey’s response rate was 48%. A total of 725 completed surveys were returned.

METHOD

✍ Survey Procedure

The framework for implementing the 2001 Outdoor Air Quality survey followed the Total Design Method (TDM) developed by Don Dillman (1978). Among other techniques, this method makes use of mailings which both inform potential respondents of forth-coming surveys and remind them to answer and return the survey materials. Typical response rates using this method range from 60% to 99% depending on the perceived importance to the respondent, and the length of the questionnaire. These rates meet established standards of “very good” (Babbie, 1973; as cited in Edwards, Thomas, Rosenfeld & Booth-Kewley, 1997).

Outline of Survey Procedure Below is an outline of the survey procedure used.

- A. Tasks completed before sending out the survey:
 1. Obtained approval from Natural Resources Board
 2. Chose random sample and determined sample size
 3. Developed surveys, scanning software and database to score surveys
 4. Ordered surveys and address labels
 5. Ordered envelopes, postcards, letters (cover, introductory, second and third letters)
 6. Generated address label database to keep track of respondents
 7. Developed database for survey responses
 8. Sent introductory letter May 18, 2001 (See Appendix A)
- B. Sending out the survey (See Appendix B & C):
 1. Prepared return envelopes
 2. Prepared survey packet
 3. Sent survey packet May 25, 2001
- C. Sending out reminder letters:
 1. Sent first reminder postcard June 1, 2001 (See Appendix D)
 2. Sent second copy of the survey with a follow-up cover letter June 8, 2001 to non-respondents (See Appendix E)
 3. Sent a third final reminder letter June 15, 2001 to non-respondents (See Appendix F)
- D. Established a final date to accept completed surveys: July 13, 2001.

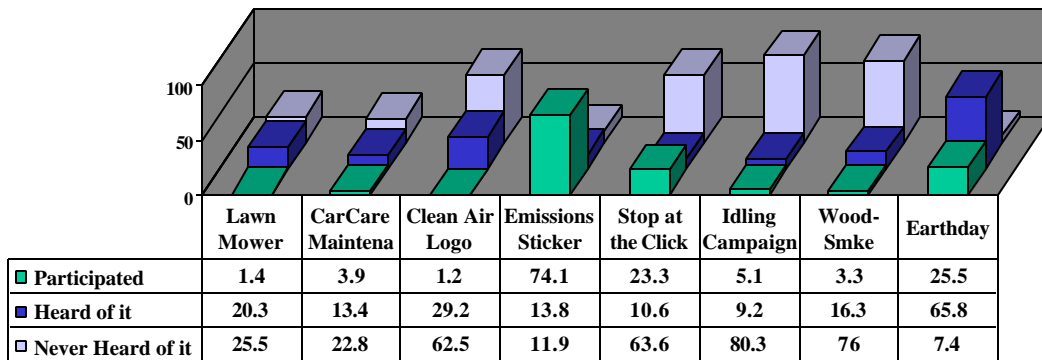
Detailed Results

Outdoor Air Quality Survey Results

Q1. In Order to Address Air Quality Issues, the City Focuses on a Variety of Specific Programs and Events. Do you Recall Hearing About, or Participating in, Any of the Following?

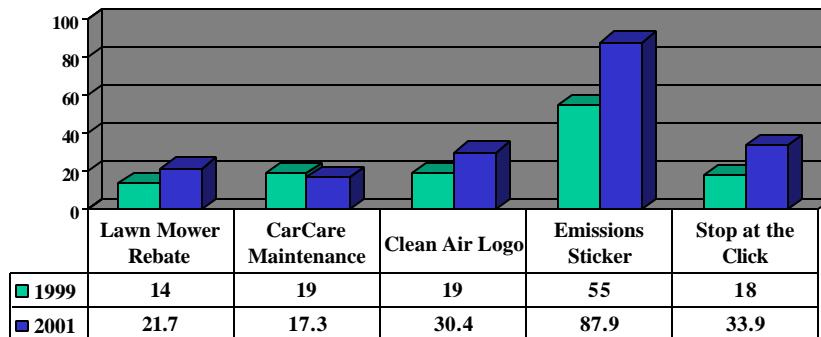
The first set of questions focused on specific air quality programs or campaigns currently in place at the City. As a check on marketing success, the responses can tell *where* money and time was well spent and where it was not well spent. This list is updated as needed for each survey year. The Emission Sticker Law, Earthday, and the Stop at the Click Campaign were the events most people had participated in. *The Clean Air Logo* and the *Lawn Mower Rebate Program* were the most popular in the “heard of it” category.

Figure 1: Recognized or Participated In Programs



The survey in 1999 was the first year this question was asked (see Figure 2). In 1999, the *emissions sticker program* was, again, the number one most recognized program. The *Stop at the Click Program* almost doubled in recognition and both the *Lawn Mower Rebate* and *Clean Air Logo* also increasing in recognition. Only the *CarCare Maintenance Program* decreased in recognition.

Figure 2: Recognition of Programs Comparison 1999, 2001



Q2. Where do you Recall Seeing or Hearing Information About Air Quality Issues in Fort Collins?

Education of citizens of Fort Collins is a significant part of the City's air quality program. Question two gives planners and staff an indication of the success of some recent programs and events the City uses to address air quality issues. This question is also updated each survey year as appropriate. Question Two asked the residents how they recalled receiving information about air quality issues in Fort Collins. The *local newspaper* (67%) and the *utility bill inserts* (61%) were the main sources of information about air quality information (see Figure 4). The least effective sources were found to be: *Children, City Line, Presentations, and Bathroom Stalls*.

Comparing years 1997, 1999, and 2001 (Table 1) we find that the local newspaper and radio have increased as a source of information about air quality issues. Again, the utility bill inserts remain a top source. The Denver newspaper is on a steady decline over the last four years with both the internet and City Line remaining the least effective sources of information dissemination.

Table 1. Sources of Air Quality Information Comparisons: 1997, 1999, 2001

Source of Information	Yes		
	1997 (%)	1999 (%)	2001 (%)
TV	22	20	22
Radio	27	15	27
Local Newspaper	64	49	67
Denver Newspaper	16	11	8
Internet	5	2	4
Utility Bill Insert	58	57	61
Environmental Group	19	10	8
Environmental News	16	10	10
City Line	6	3	2
Displays	*	7	13
Presentations	*	2	3
Flyers/Brochures	*	12	14
Friends	30	8	10
Children	13	4	3
Jobs/School	15	7	11
Other	7	3	6

Q3. For Each of the Following, Please Indicate if you believe it is a Major, Moderate, or Minor Source of Air Pollution in Fort Collins.

Question Three will directly tell planners and staff where the respondent believes the source of air pollution coming from. Figures 4a, 4b, and 4c show that gasoline vehicles, followed closely by diesel vehicles are the major source of air pollution in the opinion of the resident.

Figure 4a: Sources of Air Pollution in Fort Collins

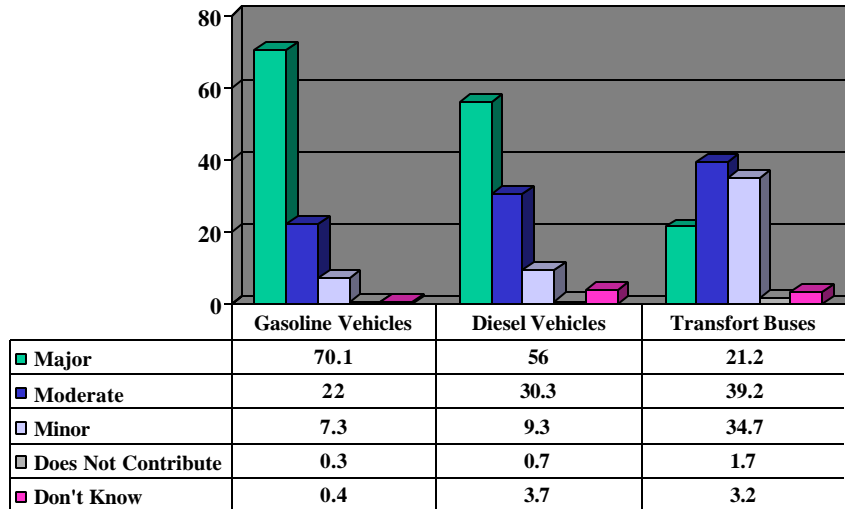


Figure 4b: Sources of Air Pollution in Fort Collins

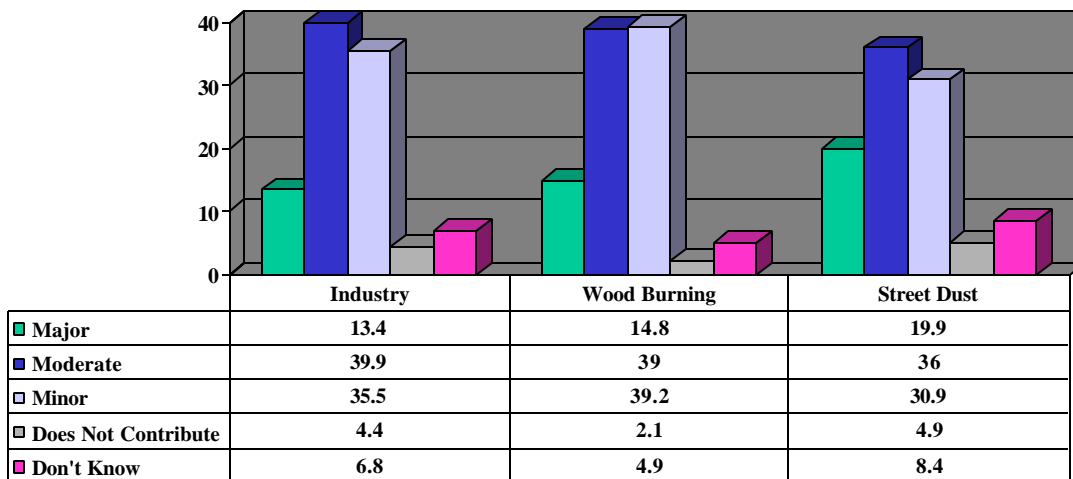
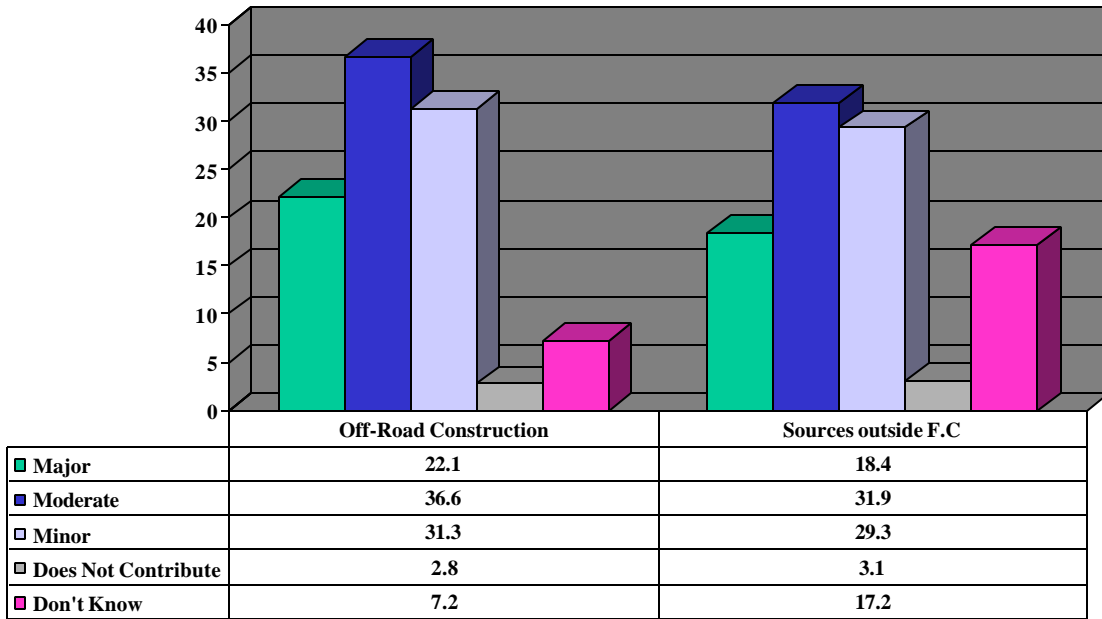


Figure 4c: Sources of Air Pollution in Fort Collins



Comparing the 2001 survey to previous surveys, Table 2 shows that, again, diesel and gasoline vehicles are considered to be the biggest contributors to air pollution in Fort Collins. Woodburning, industry, street dust, and off-road construction all increased slightly as a source of air pollution.

Table 2. Sources of Air Pollution in Fort Collins Comparison: 1997, 1999, 2001

Sources of Air Pollution in FC	Major			Moderate			Minor			Doesn't Contrib.		
	1997	1999	2001	1997	1999	2001	1997	1999	2001	1997	1999	2001
Gasoline Vehicles	57	65	70	32	26	22	9	9	7	<1	<1	.3
Diesel Vehicles	56	50	56	33	35	30	9	12	9	<1	<1	.7
Transfort Buses	20	25	21	37	36	39	37	36	35	2	1	1.7
Industry in Fort Collins	8	11	13	39	37	40	43	39	35	4	5	4
Woodburning Stoves	17	12	15	32	32	39	40	45	39	6	6	2
Street Dust	16	17	20	32	38	36	44	37	31	5	5	5
Off-Road Construction		15	22		45	37		32	31		3	3
Sources Outside FC	11	14	18	33	30	32	27	30	29	6	4	3

Q4, Q5, Q6, Q7. Reliability of Scales

Four of the questions in this survey, Questions Four, Five, Six and Seven, though made up of several questions each, described a “general” comment or statement of the resident. To verify that each question does actually make up a “scale” that reliably measures one factor, an analysis of reliability was performed on each, or a Cronbach’s Alpha (?). The closer Cronbach’s Alpha comes to 1.0, the more reliable the scale. Table Three shows the reliability scores for Questions Four, Five, Six and Seven. All four questions have excellent reliability scores.

Table 3. Reliability Scores of Questions Four, Five, Six and Seven.

Questions	?
Q4. Adverse Affects of Air Pollution	.86
Q5. Where City Should Focus Programs and Plans	.88
Q6. Actions Resident Would Take to Help Reduce Air Pollution	.80
Q7. Fort Collins has a Problem with Air Pollution	.86

Q4. Air Pollution in Fort Collins Affects Me Because it...

Question Four measured the resident’s opinion or belief of how the outdoor air quality of Fort Collins affects their lives. Table Four shows the overall responses (the sum of all the statements or questions for each “agree” category) to Question Four. A full 81.8 per cent of the residents state that the air pollution in Fort Collins affects them in some negative way (allergies, respiratory, visually, indoor air).

Table 4. Overall Responses of Adverse Affects of Air Pollution.

Strongly Agree	Agree	Somewhat Disagree	Disagree	Don't Know
35.2	36.6	11.9	8.4	7.9

The results of how residents perceive air pollution adversely affects them are broken down in Figures 5a and 5b. Visual affects, such as *creating a brown cloud* and *obscuring mountain views*, are rated the highest by the respondents as adversely affecting them.

Figure 5a. Adverse Affects of Air Pollution

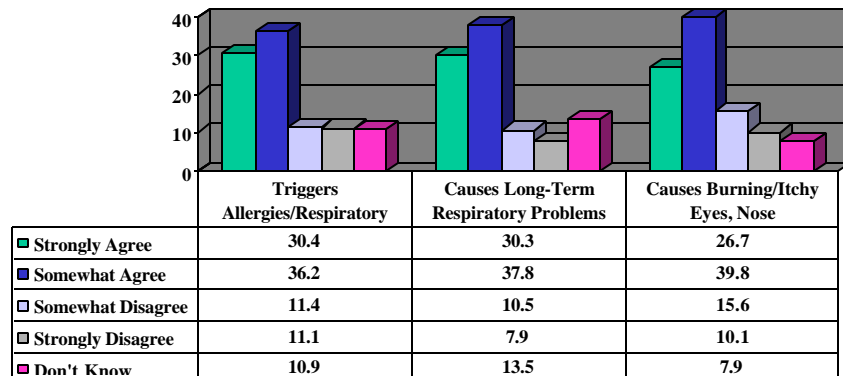
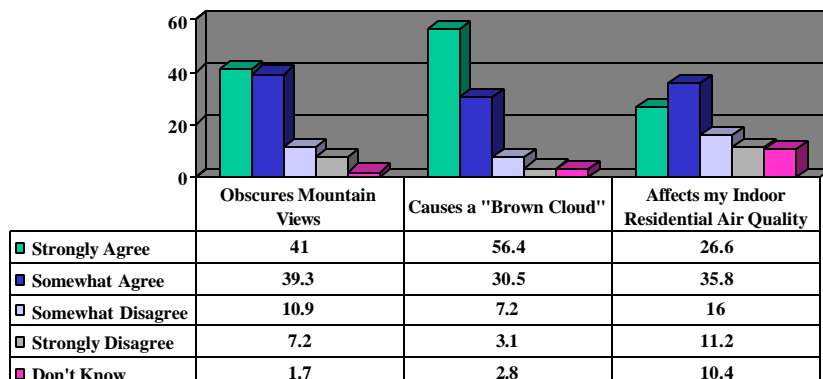
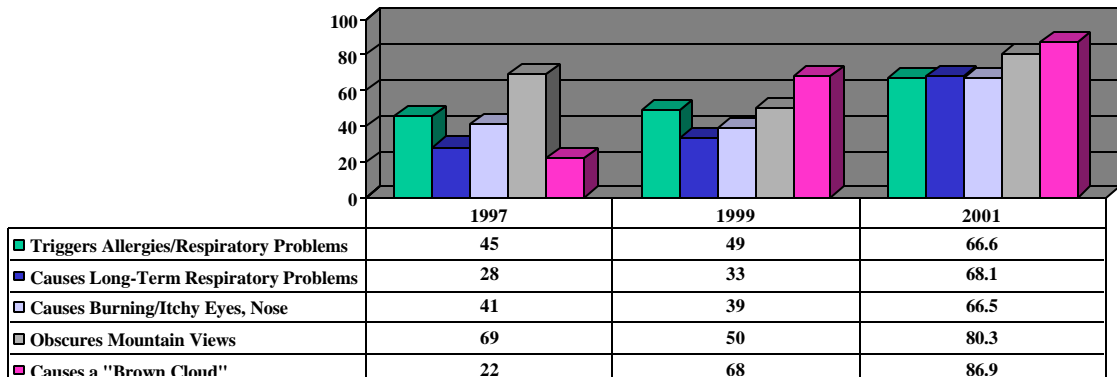


Figure 5b. Adverse Affects of Air Pollution



The 2001 survey asks the respondent on a scale of “agreement” instead of the 1997 and 1999 “Yes/No” responses. The result is a more accurate and complete measure of the respondent’s perceptions of the adverse affects of air pollution in Fort Collins. Even though the comparisons to previous years can not be as clear cut, comparisons between which category is perceived to be the most adverse can still be made. “Strongly Agree” and “Somewhat Agree” from the 2001 survey were added together to compare to “Yes” from the previous surveys. In looking closely at the comparisons from 1999 to 2001, “obscuring mountain views” and “creating a brown cloud” were still considered by the respondents to have the worst adverse affects (see Figure 6). With the increased choices on the questions from “Yes” to “Strongly Agree” and “Somewhat Agree” more respondents rank “allergies”, “respiratory problems” and “burning, itchy eyes/nose” as important negative affects than did so in both 1997 and 1999.

Figure 6. Adverse Affects of Air Pollution: Changes From 1997, 1999



Q5. To Help Improve Air Quality, City Air Quality Programs and Plans Should...

The main focus of Question Five is to determine where the City should focus air quality programs and plans. Responses should help planners and staff focus efforts where they will be easily and readily accepted. In response to the statements and questions regarding where the City should focus programs and plans, overall, the resident responses ranged from 90.4 percent *agreeing* to 14.8 percent *disagreeing* more should be done by the City to better the air quality (see Table 5). Only 3.3 percent felt that City programs or plans “would not help.”

Table 5. Overall: Should the City “Do More” Regarding Air Quality Programs and Plans.

Strongly Agree	Agree	Somewhat Disagree	Disagree	Would Not Help
54.5	35.9	10.2	4.6	3.3

Clearly, *improving traffic light timing* was selected as the top action the City should take (see Table Six and Figures 7a-d)). Traffic signal timing was followed by doing more to *reduce the brown cloud* and *increasing the enforcement of exhaust regulations and emissions law*.

Table 6: Question Five: Responses ranked from “Strongly Agree” to “Strongly Disagree”

1. Improve Traffic Light Timing to Reduce Vehicle Idling at Lights.
2. Do more to reduce the "Brown Cloud" and improve visibility.
3. Increase Enforcement of Exhaust Regulations for Both Gas and Diesel Vehicles.
4. Increase Enforcement of Emissions Law.
5. Improve safety and access for bikes, skates, pedestrians.
6. Promote the Use of Alternative Fuel Vehicles.
7. Do More to control Air Pollution in Fort Collins.
8. Prohibit wood-burning on high pollution days.
9. Improve Convenience of Bus Service.
10. Develop Economic Incentives for Repair of High Polluting Vehicles.
11. Encourage Drivers to Turn off Vehicles at any Wait Longer than 3 Minutes.
12. Do more to reduce local greenhouse gas emissions.
13. Require non-certified wood stoves to be removed at time of home sales.

Figure 7a. City Air Quality Programs and Plans Should...

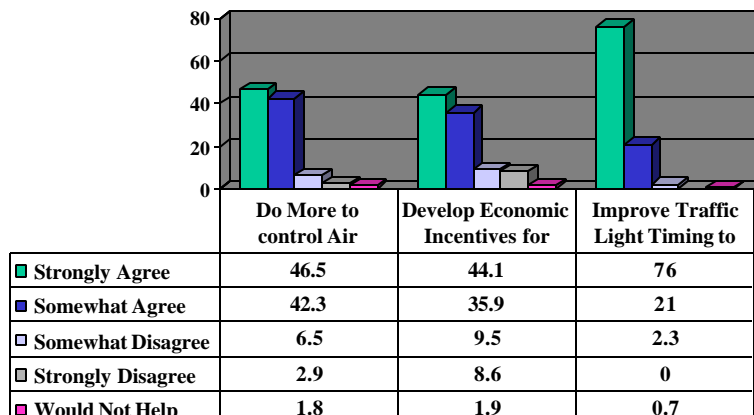


Figure 7b. City Air Quality Programs and Plans Should...

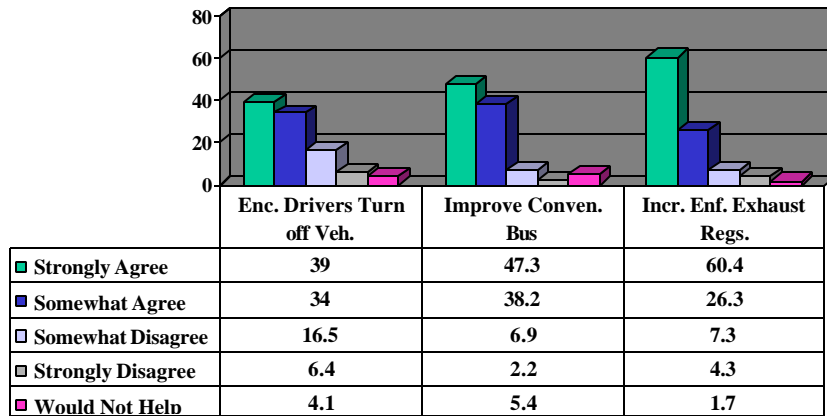


Figure 7c. City Air Quality Programs and Plans Should...

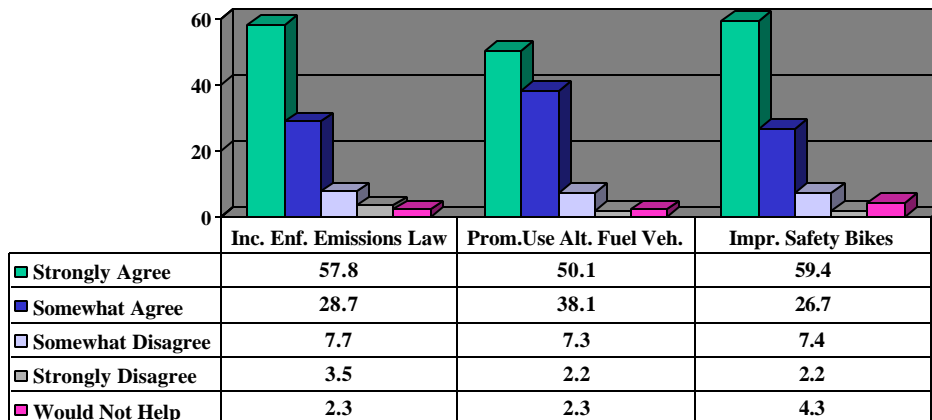
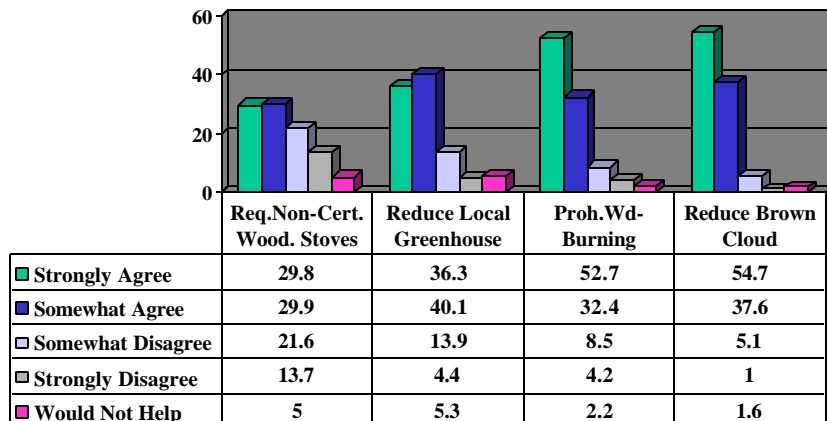


Figure 7d. City Air Quality Programs and Plans Should...



As in 1997 and 1999, in general, the residents support the City’s efforts to improve air quality, with those agreeing with the current programs or plans ranging from 97% to 60%, and those disagreeing ranging from 2% to 36%. As in both 1997 and in 1999, residents agreed that *improved traffic light timing* should remain at the top of the list for what actions the City should take to improve air quality. Traffic signal timing was followed closely by *Increase enforcement of exhaust regulations for both gas and diesel vehicles, Improve safety and access for bikes, skates, and pedestrians, and Increase enforcement of emissions laws*. No major changes were observed from previous years with the exceptions of residents appear to be slightly less concerned about *bike safety and access* and more concerned about *drivers leaving vehicles running while waiting in lines* (Table 7).

Table 7. City “Should Focus Programs and Plans on” Comparison: 1997, 1999, 2001

Programs and Plans	Strongly Agree			Somewhat Agree			Somewhat Disagr.			Strongly Disag.		
	1997	1999	2001	1997	1999	2001	1997	1999	2001	1997	1999	2001
Develop economic incentives for repair of high polluting vehicles.	32	36	44	37	40	36	16	10	10	9	11	9
Improve traffic light timing to reduce vehicle idling at lights.	76	73	76	20	21	21	2	2	2	<1	2	0
Encourage drivers to turn off vehicles at any wait longer than 3 min.	36	30	39	28	32	34	23	19	17	8	13	6
Improve convenience of bus service.	*	48	47	*	7	7	*	8	2	*	6	5
Increase enforcement of exhaust regulations for both gas and diesel veh.	59	65	60	30	25	26	6	5	7	4	4	4
Increase enforcement of emissions laws.	58	58	58	28	27	29	7	6	8	5	6	4
Promote the use of alternative fuel vehicles.	39	40	50	39	36	38	10	11	7	4	5	2
Improve safety and access for bikes, skates, and pedestrians.	*	67	59	*	24	27	*	4	7	*	2	2
Require non-certified wood-stoves to be removed/replaced at time of home sale.	33	35	30	26	27	30	19	16	22	15	18	14

Q6. To Help Reduce Air Pollution in the City of Fort Collins, “I” Would be Willing To...

When asked the question of what the resident would be willing to do to help reduce air pollution in Fort Collins, overall, most residents agreed they would be willing to do something (average of 62.8%) compared to those residents who disagreed that they would be willing to do something (average of 16.6%). The top action residents would be willing to take is to keep their *vehicles tuned up*. The next set of actions many residents state they would be willing to do is *reduce the number of miles they drive their vehicle, ride a bike for work or errands, reduce number of miles driven in car if there was a tax break incentive, and use public transportation if it were more convenient* (Figure 8a and 8b). An action the residents would very much oppose (69%) is to *contribute \$10 when registering vehicle to subsidize repair of high-polluting vehicles*. Residents also appear to only somewhat agree/somewhat disagree that taking the bus is a possible action they might take to reduce air pollution (58.7%).

Figure 8a: Individual Actions to Reduce Air Pollution

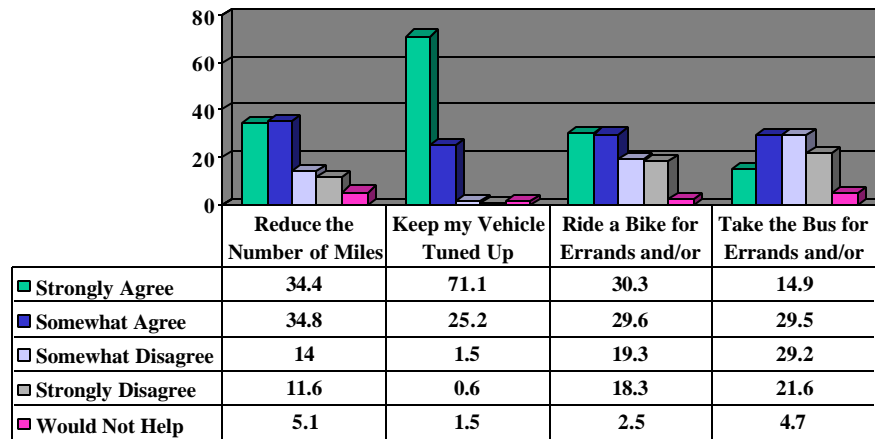
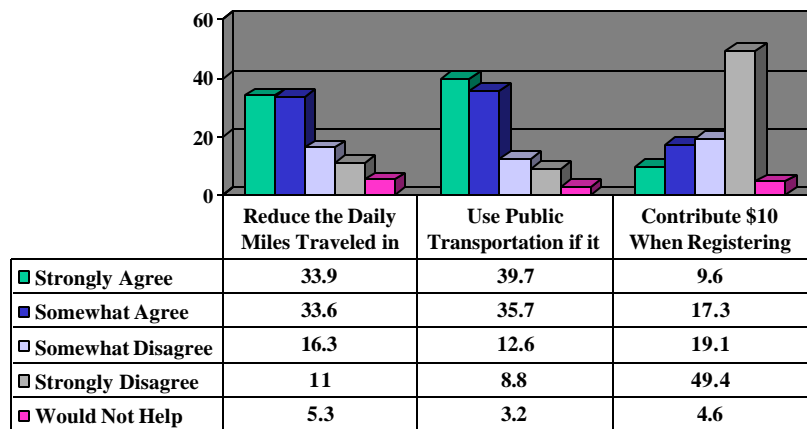


Figure 8b: Individual Actions to Reduce Air Pollution



Compared to 1999 and 1997, residents again picked *keep my vehicle tuned up* as a top action they would take to help reduce air pollution, more residents would be willing to *ride their*

bike, and slightly more would be willing to *take the bus* (see Table 8). Even though the 2001 survey changed the dollar amount of the *contribution when registering their vehicle*, the number of residents that disagreed that this is an action they would be willing to take remained larger than those who agreed they would take.

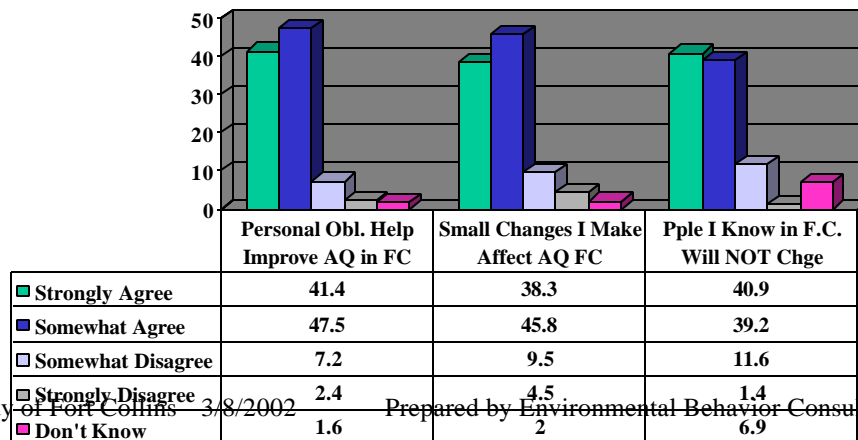
Table 8: Comparison of Individual Actions to Reduce Air Pollution: 1997, 1999, 2001

Statements	Strongly Agree			Somewhat Agree			Somewhat Disagr.			Strongly Disag.		
	1997	1999	2001	1997	1999	2001	1997	1999	2001	1997	1999	2001
Reduce the number of miles I drive my vehicle each day.	27	30	34	41	43	35	15	12	14	13	14	12
Keep my vehicle tuned up.	76	77	71	22	20	25	1	1	2	<1	1	<1
Ride a bike for errands and/or work.	21	26	30	22	27	30	16	16	19	34	27	18
Take the bus for errands and/or work.	10	12	15	19	23	30	34	28	29	28	31	22
Contribute (\$1* \$10 when registering my vehicle to subsidize repair of high-polluting vehicles.	*24	*25	10	*22	*20	17	*14	*13	19	*38	*38	49

Q7. How strongly do you agree/disagree with the following?

The next scale, or set of questions, gets at the resident’s belief of how big the issue of air quality in Fort Collins is to him or her. The questions are based on three factors: (1) statements of how bad or broad they believe the air quality problem in Fort Collins is (attitudes, beliefs), (2) their perception of what type of actions other residents may make (social norms), and (3) how much difference actions they may take would make (perceived control). According to the Theory of Planned Behavior, the sum of responses to these questions should give a general idea of whether or not the resident may actually act in a pro-environmental fashion. In other words, if

Figure 9a: Attitudes, Norms, and Perceived Control of Air Quality in Fort Collins



the residents generally agreed that there was a problem, their neighbors and friends believed there was a problem, and they could actually do some things to alleviate the problem—they would be more likely to do so. The 1997 and 1999 surveys had a few of the current questions, but also included other questions that did not really give important or useful information. The new “scale” can tell planners an overall “intent to act/behavior” instead of a series of single statements that really do not measure any factor that can help planners. In looking at all the responses, most residents agreed, (70%) indicating that they would be more likely to act (or at least be open to accepting pro-environmental programs or plans), pro-environmentally. See Figures 9a-9d.

Figure 9b: Attitudes, Norms, and Perceived Control of Air Quality in Fort Collins

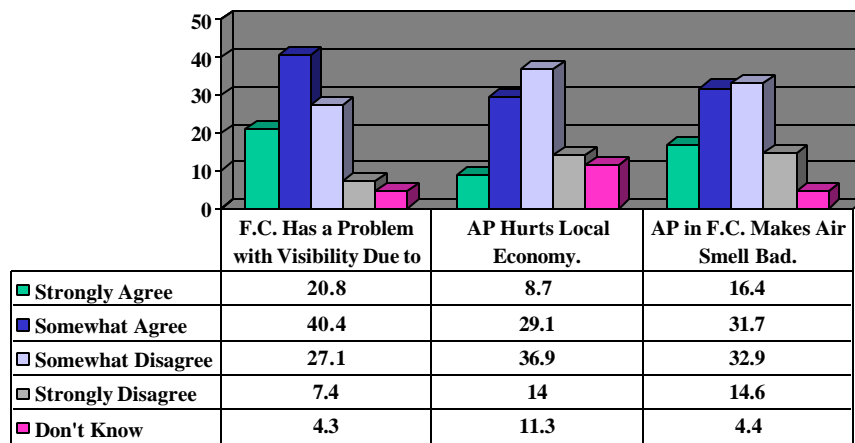


Figure 9c: Attitudes, Norms, and Perceived Control of Air Quality in Fort Collins

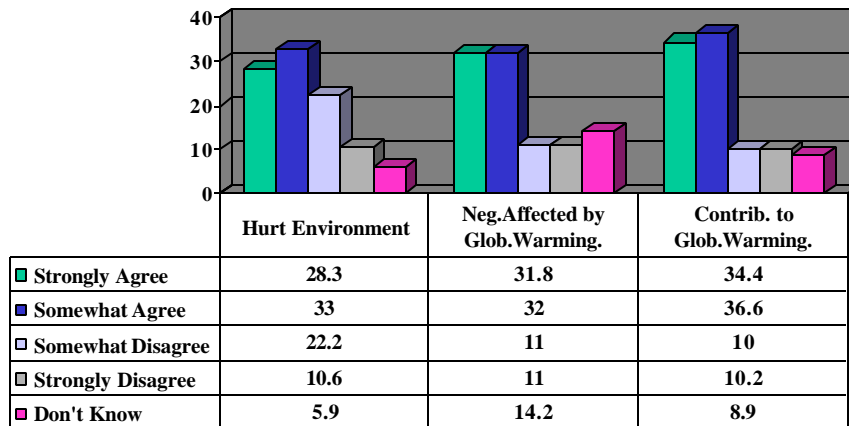
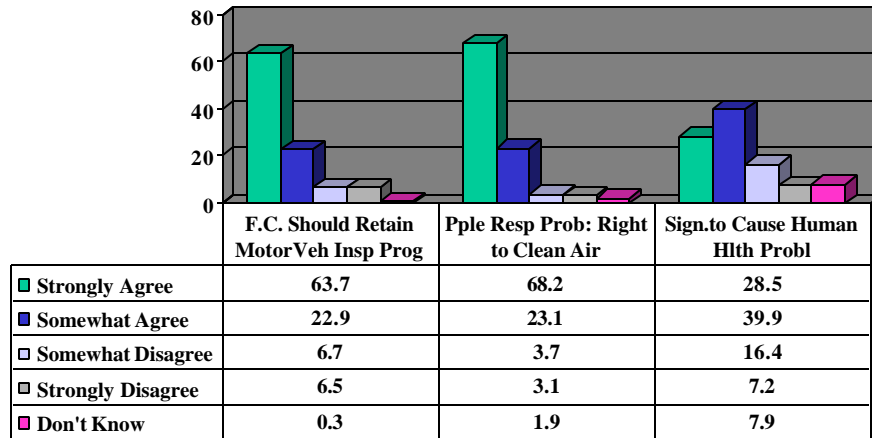


Figure 9d: Attitudes, Norms, and Perceived Control of Air Quality in Fort Collins



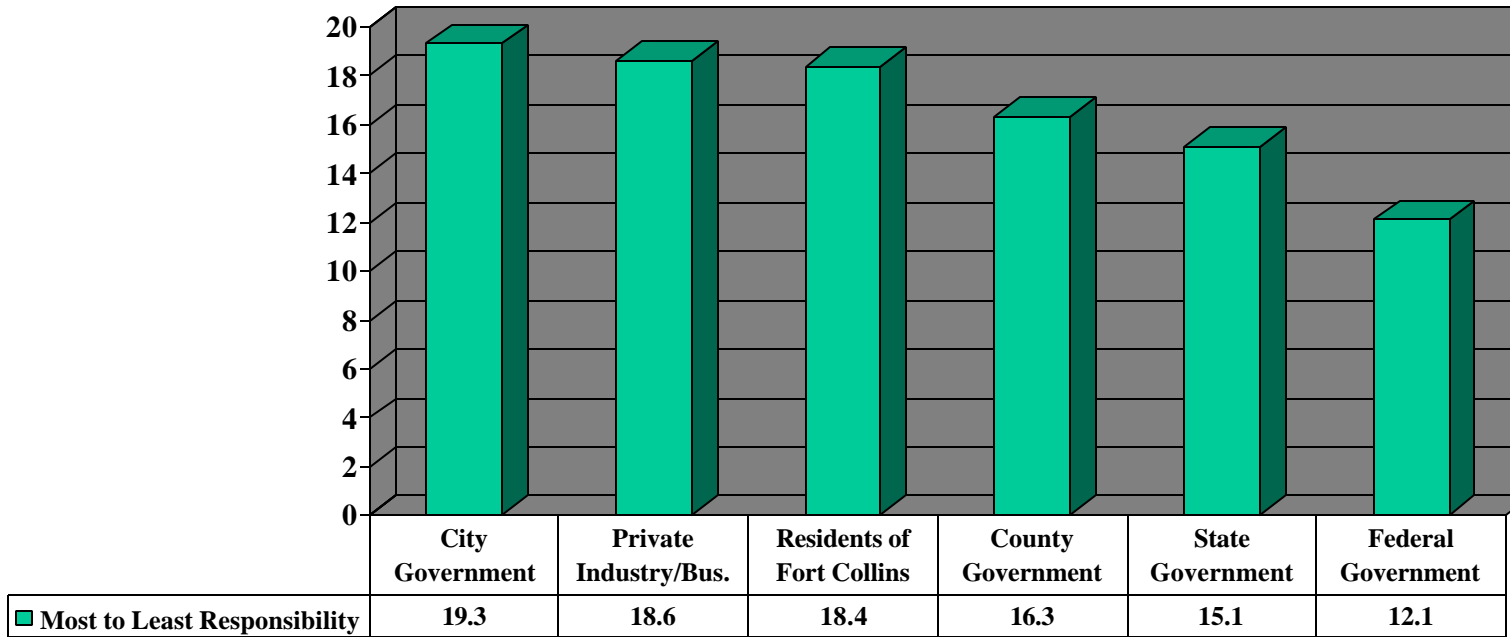
Comparisons between 1997, 1999 and the 2001 survey can only be made through three of the statements. Many of the statements from 1997 and 1999 were eliminated, re-worded, or merged into other surveys where they would be more appropriate. Table 9 shows that very little change in opinion on these three statements have occurred.

Table 9: Comparison Between Three Belief Statements: 1997, 1999, 2001

Statements	Strongly Agree			Somewhat Agree			Somewhat Disagr.			Strongly Disag.		
	1997	1999	2001	1997	1999	2001	1997	1999	2001	1997	1999	2001
I feel a strong personal obligation to help improve the air quality in FC.	34	30	41	49	50	48	12	11	7	2	5	2
Air pollution in FC is bad enough to cause human health problems.	15	19	29	45	39	40	21	21	16	11	12	7
Air pollution in FC makes the air smell bad.	11	14	16	31	34	32	35	30	33	17	16	15

Q8. Who Should Have the Most Responsibility/Least Responsibility in Maintaining or Improving the Outdoor Air Quality in Fort Collins?

Figure 10: Who is Responsible for Air Quality in Fort Collins?



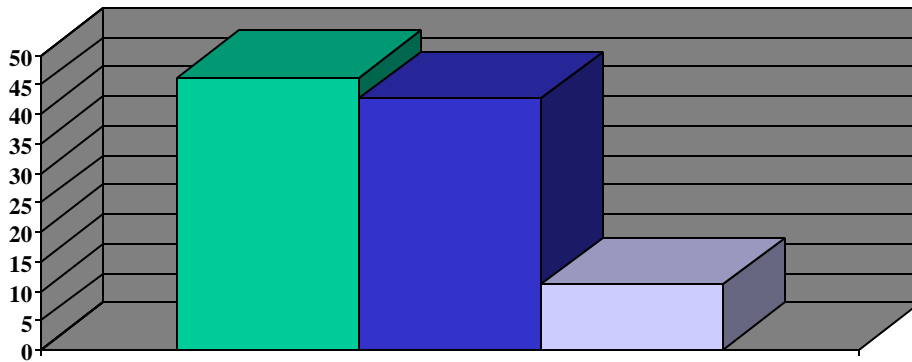
The question format for whose responsibility it is to maintain air quality changed from 1999 to 2001, from “Major” “Minor” “None” ratings of each to a ranking of the entities. Still, in 1997, respondents felt the major responsibility of air quality fell to first business/industry (80%), followed closely by the resident themselves (78%), and City government (74%). In 1999, major responsibility stayed in the exact same order with to first business/industry (85%), followed closely by the resident themselves (84%), and City government (79%). Both years showed that the federal government (26% and 35% respectively) were the least responsible.

In the 2001 survey, where ranking (a comparison between each) was made, less intransitivity was possible allowing the resident to actually look at the list and decide who was more responsible compared to the others. In the previous survey, allowing a rating of each probably ended up in a false representation of the residents’ opinions since each was possible response was weighted and then summed with averages across responses as the reported result. The 2001 survey found the City to be ranked as *most responsible* followed by Business/Industry and then the Resident. Again, the Federal Government was considered the least responsible.

Q9. Have You Ever Experienced Unacceptable Outdoor Air Quality in Fort Collins?

This question is new to the 2001 survey. Figure 11 shows that almost the same number of residents have experienced unacceptable outdoor air quality, with slightly more responding “yes.” Between this question and the next question, the degree of awareness and concern in regard to air quality in Fort Collins can be found. Almost half of the respondents have at some time or another experienced unacceptable air quality in Fort Collins.

Figure 11: Resident ever Experience Unacceptable Air Quality in Fort Collins

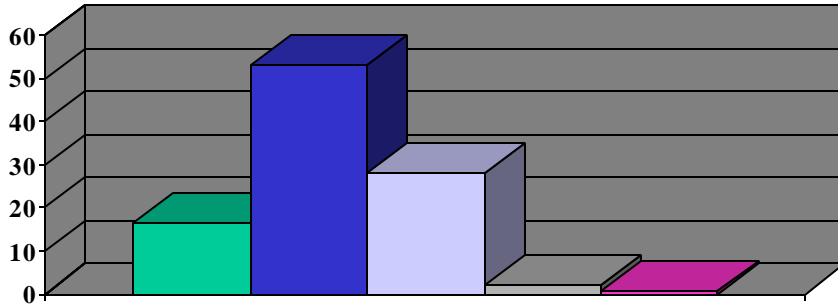


■ Yes	46.2
■ No	42.7
■ Don't Know	11.1

Q10. Overall, How Would You Rate the Quality of Outdoor Air in Fort Collins?

Figure 12 shows that most respondents rate the overall air quality in Fort Collins as “good” (53%).

Figure 12: Rating of Overall Air Quality in Fort Collins



Very Good	16.3
Good	53.2
Fair	27.8
Poor	2
Not Sure	0.8

Table 10 shows the results of the previous surveys. Most respondents rated the air quality as “good”, 46% in 1997 and 43% in 1999, with very few rating it as “excellent” or “poor.” Compared to the 2001 survey, more people in the 2001 survey rated the air quality as “good” than did in either 1997 or 1999. Additionally, less people rated it as “very good”, and more rated it as “fair.” These changes indicate that the residents rated the overall air quality in Fort Collins as worse than in previous survey years.

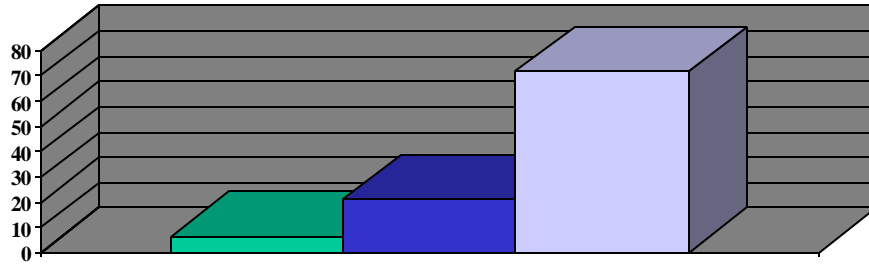
Table 10: Rating of Overall Air Quality in Fort Collins Comparison: 1997, 1999, 2001

Rating	1997	1999	2001
Excellent	4	6	*
Very Good	23	24	16
Good	46	43	53
Fair	23	23	28
Poor	2	2	2
Not Sure	*	*	

Q11. What Do You Think Fort Collins’ Air Quality Will be Like in Five Years?

Figure 13 shows that most respondents believe that Fort Collins' air quality will be worse (72%) in five years, while 21% believe it will not change, and only 7% believe it will be better than it is now. Considering that 53% consider the air quality "good" and almost half have at some time or another experienced unacceptable air quality, these results indicate that the respondents believe the air quality is going to not remain at "good", especially in light of the fact that they have already experienced unacceptable air quality. Respondents in the previous survey

Figure 13: What Will Fort Collins' Air Quality Be Like In Five Years From Now?



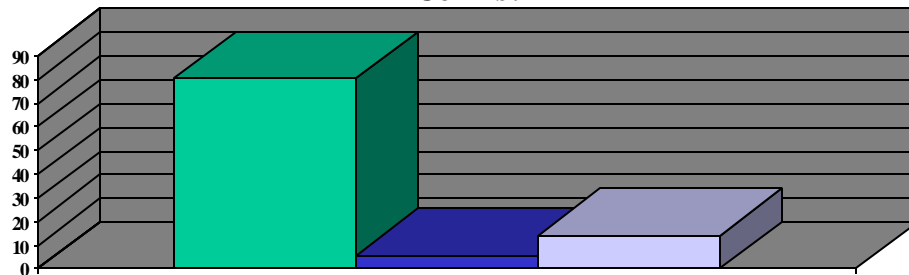
■ Better Than Now	6.6
■ No Change From Now	21.4
■ Worse Than Now	71.9

(this question was not asked in the 1997 survey) responded very similarly, with 78% stating that Fort Collins' air quality would be worse in five years, 18% saying it will remain the same, and only 4% saying it would be better than it is now.

Q12. Do You Think Anything *Can* Be Done to Improve the Air Quality in Fort Collins?

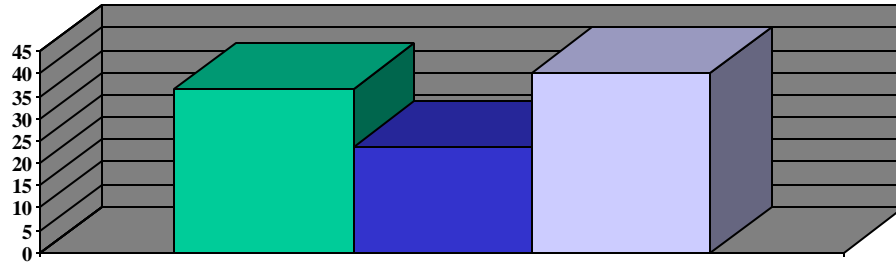
Q13. Do You Think Anything *Will* Be Done to Improve the Air Quality in Fort Collins?

Figure 14: Can Something Be Done To Maintain or Improve the Air Quality in Fort Collins?



■ Yes	80.5
■ No	5.6
■ Don't Know	13.8

Figure 15: Will Something Be Done To Improve or Maintain the Quality of Air in Fort Collins?

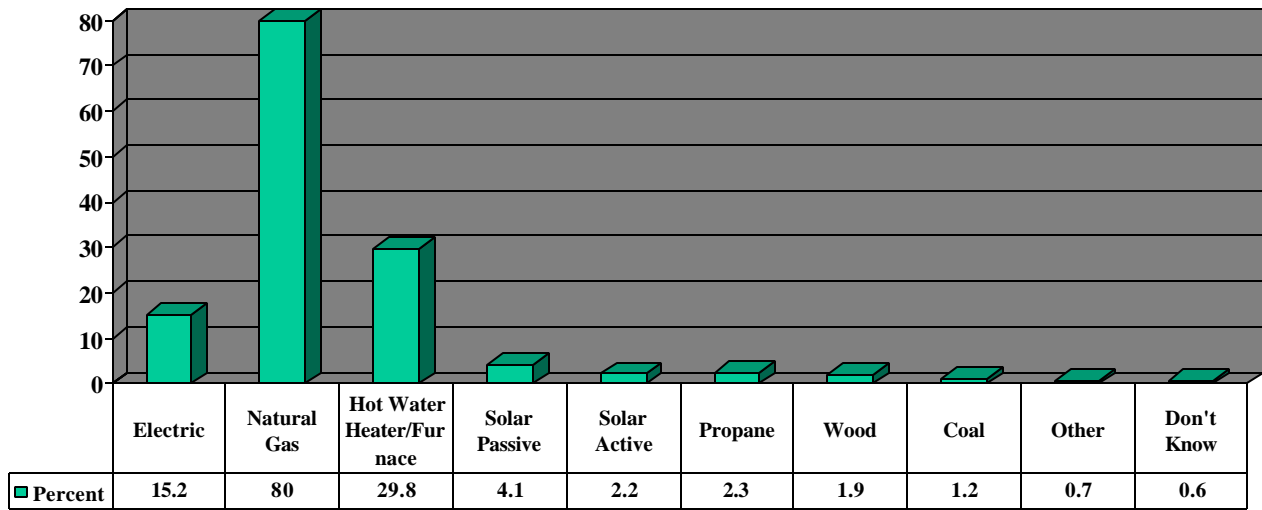


■ Yes	36.4
■ No	23.5
■ Don't Know	40.1

What about the public's feelings about the actualities? The issue the previous question and the next two questions get at concerns the respondent's view of the chances that anything effective will or can be done to maintain and/or better the air quality in Fort Collins. The next two questions directly assess whether something can be done. Results show in Figure 14 that residents do, in general, believe that something can be done to improve or maintain the air quality in Fort Collins (81%).

Q14. Main Sources of Heat Currently Used in Home. The main source of heat used in the homes of the respondents of the 2001 survey was natural gas (80%). Hot water (30%), and electric(15%) were the next most checked sources. (see Figure 16). Numbers do not add to 100% because each source was checked “yes” “no.”

Figure 16: Main Sources of Heat



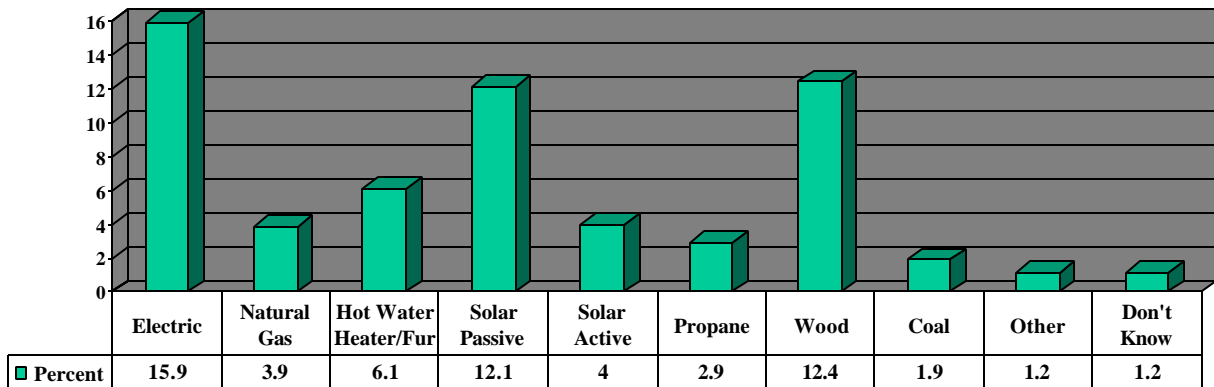
Comparing 1995 and 1997, natural gas was the most common source of heat for both years, 81% and 79% respectively. Hot water heat was not listed in 1995 as a choice and was only 4% in 1997. Electric heat was 15% in 1995 and 12% in 1997.

Q14. Additional Sources of Heat in Home

Figure 17 shows that the most common additional source of heat used in homes in the 2001 survey was electric (16%), followed by wood (12%) and passive solar (12%). The 1995 survey found the most common additional sources of heat to be wood (14%), electric (12%) and passive solar (7%).

The 1997 survey results showed the most common additional source of heat to be still be wood (17%), followed by electric (11%) and passive solar (6%).

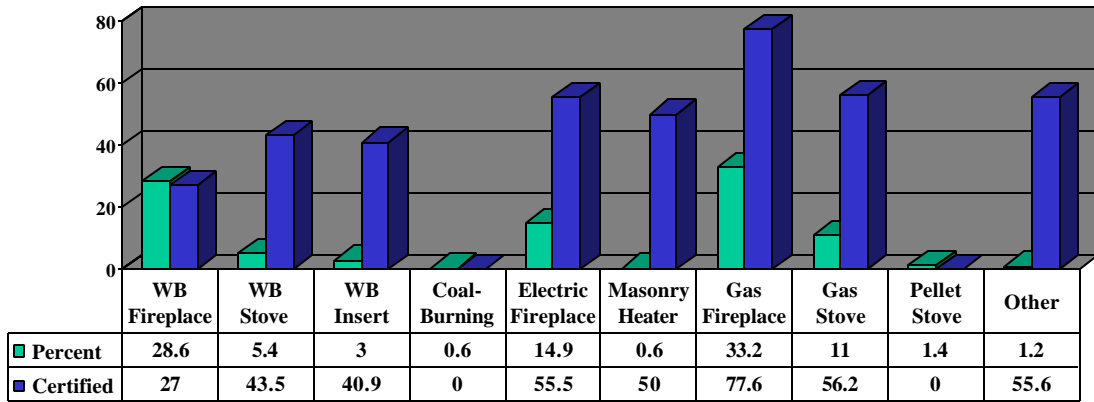
Figure 17: Additional Sources of Heat Used in the Home



Q15. Other Heat Sources, and is it Certified?

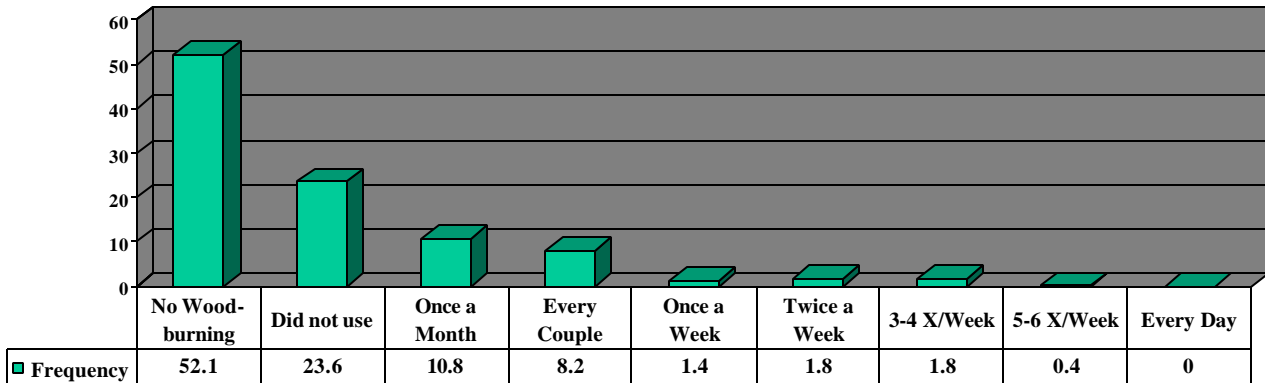
New in 2001, this question brings together many of the questions from the original wood-smoke survey. Gas fireplaces are the top other source of heat for residents (33%) followed by wood burning fireplaces (28%) and electric fireplaces (15%). The percent of those who checked they are certified are the percent of those who responded “Yes” to each. Except for the wood-burning fireplaces, generally, at least half of those with “Other Heat Sources” know that their unit is certified (see Figure 18).

Figure 18: Other Heat Sources and Certification Status



Q16. If Resident Has a Wood-Burning Fireplace or Stove, How Often Was it Used Last Winter? (Figure 19)

Figure 19: Days Per Month Wood Stove/Fireplace Used



- **Objective 11:** Evaluation of the survey by the residents.
- **How long did the survey take you?**—Minimum time: 20 minutes
 - Maximum time: 45 minutes
 - Mode: 30 minutes
 - Mean: 32.18 minutes

It is important to survey citizens' opinions of the air quality to help the city make planning decisions. Percent—Strongly Agree 25.2

- Agree 31.8
- Neutral 13.1
- Disagree 19.6
- Strongly Disagree 10.3

It is important to survey citizens' opinions to let the City know whether their education efforts to improve air quality are effective.—Strongly Agree 24.1

- Agree 38.2
- Neutral 11.0
- Disagree 16.2
- Strongly Disagree 10.5

Demographics

The following questions will deal with the demographics of the survey, or *who* responded to the survey.

Gender

The sex of the respondents (Figure 20, 21; Table 11) remains essentially equal, with slightly more females responding to the surveys as males.

Figure 20: Gender of Respondent

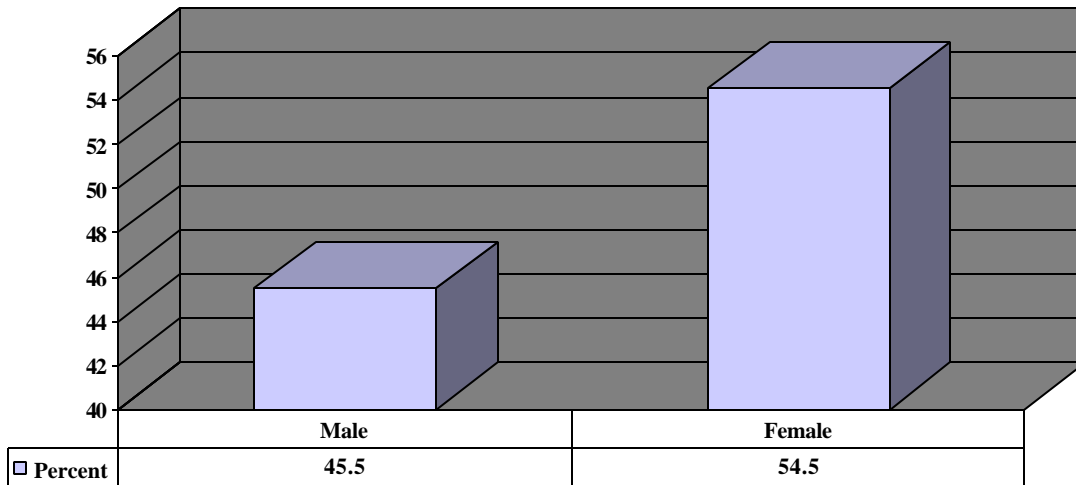
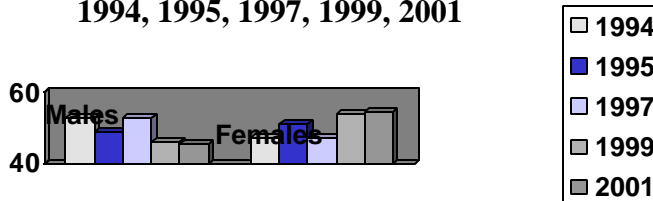


Table 11: Gender Comparison Surveys 1994, 1995, 1997, 1999, 2001

Gender	1994	1995	1997	1999	2001	Other Surveys
Male	52.9	49	53	46	45.5	50.2
Female	47.1	51	47	54	54.5	49.8

Figure 21: Gender Comparison Surveys 1994, 1995, 1997, 1999, 2001



Age of Respondent

As in previous years (Figure 22, Figure 23; Table 12), the majority of the respondents fell between 35 and 55 years of age. The 65 and older group decreased somewhat, and the 18-25 doubled in size.

Figure 22: Age of Respondent

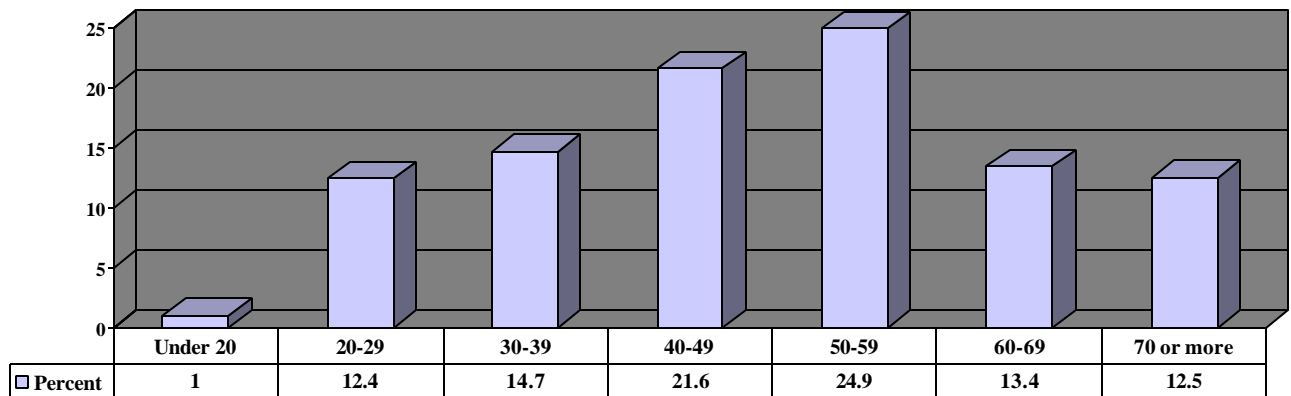
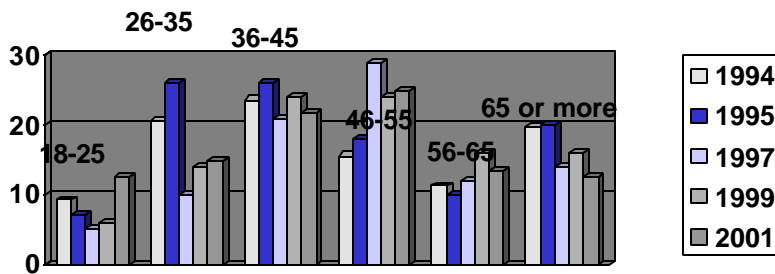


Table 12: Age of Respondent Comparison, 1994, 1995, 1997, 1999, 2001

Age of respondent.						
Age	1994	1995	1997	1999	2001	Other Surveys
Under 20	0	0	0	0	1	28%
18-25	9.22	7	5	6	12.4	Ages 20-59 = 59%
26-35	20.6	19	10	14	14.7	
36-45	23.6	26	21	24	21.6	
46-55	15.5	18	29	24	24.9	
56-65	11.2	10	12	16	13.4	
65 or more	19.8	20	14	16	12.5	12%

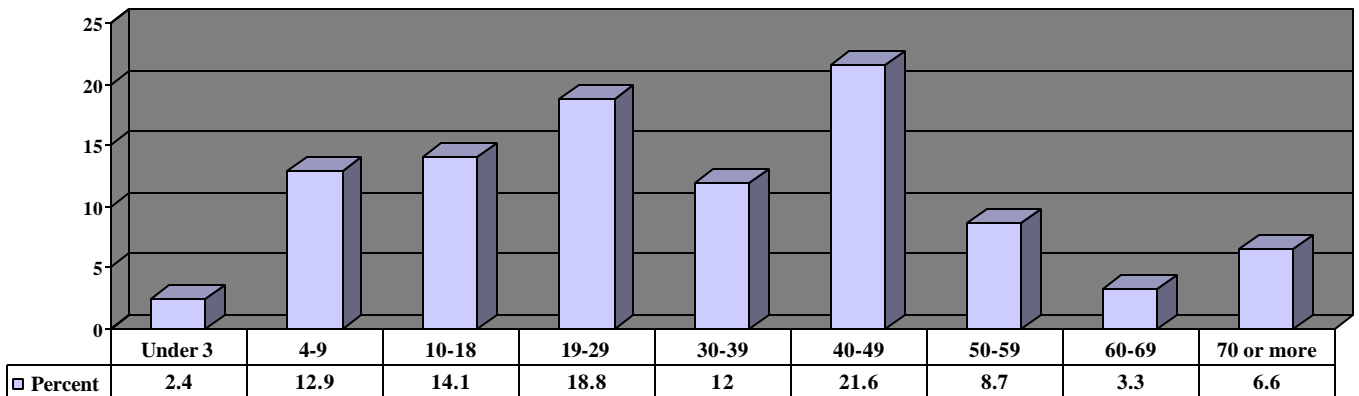
Figure 23: Age of Respondent Comparison 1994, 1995, 1997, 1999, 2001



Ages of People in Household

The ages of people in the household show the largest group to be between 40 and 49 (see Figure 24). A total of 9.9% are over the age of 60, and 29.4% are children aged 18 and under. The comparison of previous surveys only asked the number of households with people under the age of 18, so no comparison can be made.

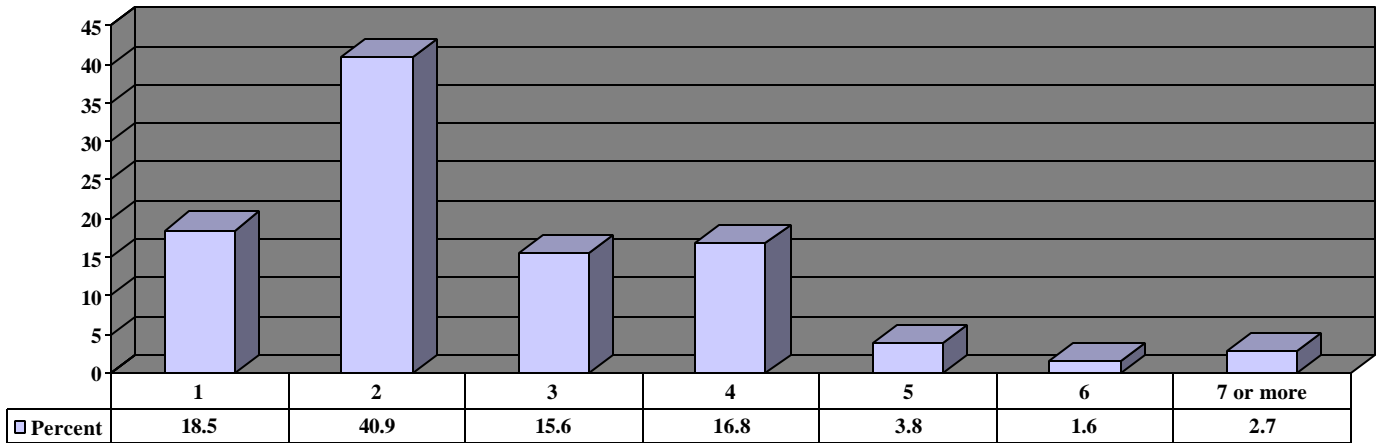
Figure 24: Ages of People in the Household



Number of People in Household

This question is new to the surveys this year. The majority of the households responding to the survey were two-member households. Three and four-member households totaled 32.4%, 8.1% were five or more member households, and a fairly large 18.5% were one-member.

Figure 25: Number of People in the Household



I found that roughly 40% of households in Fort Collins had 2 members.

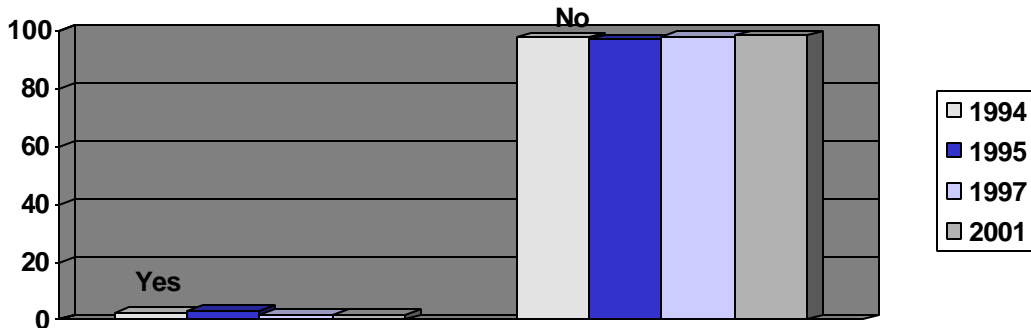
Anyone in Household Pregnant?

Only 1.8% of the households that responded to the survey had a pregnant member of the household at the time of the survey. This number is very similar to the 1997 survey, both of which were less than both the 1994 and the 1995 surveys.

Table 13: Anyone in Household Pregnant? Comparison: 1994, 1995, 1997, 2001

Is anyone in household currently pregnant?				
Response	1994	1995	1997	2001
Yes	2.4	3	2	1.8
No	97.6	97	98	98.2

Figure 27: Anyone in Household Pregnant? Comparison: 1994, 1995, 1997, 2001



Anyone in Household Suffer from Asthma, Emphysema, Heart Disease, or other Respiratory Ailments?

A full 30.9% of the households reported there was a member that suffered from asthma, emphysema, heart disease, or other respiratory ailments (see Figure 28). This number has been rising steadily since the first record in 1994 (see Table 14 and Figure 29).

Figure 28: Percent of Households With Member With Asthma, Respiratory Problems

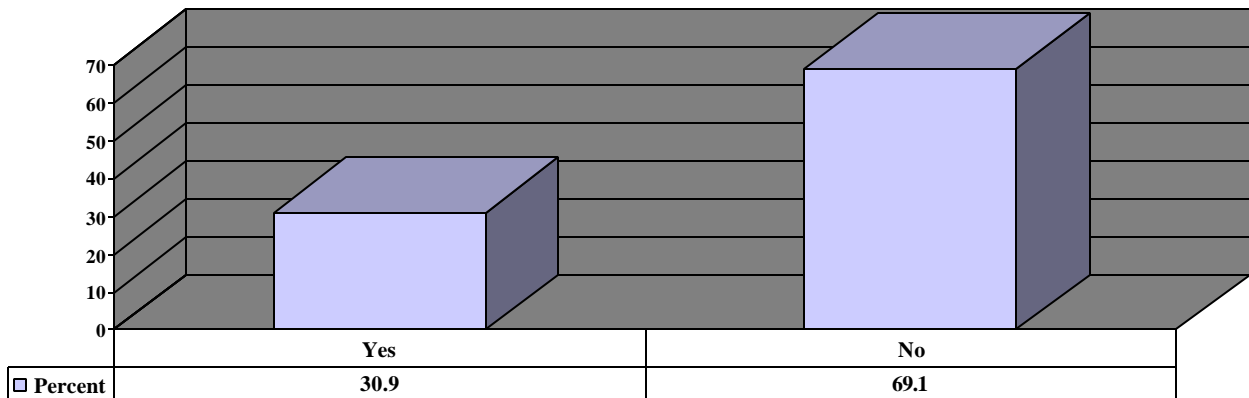
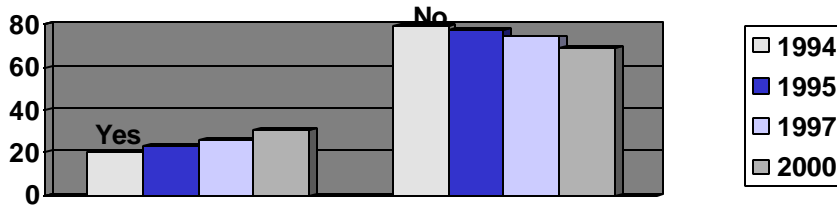


Table 14: Percent of Households With Asthma, Emphysema, Heart Disease, or Other Respiratory Disease, Comparison: 1994, 1995, 1997, 2001

Response	1994	1995	1997	2001
Yes	20.5	23	26	30.9

No 79.5 77 74 69.1

Figure 29: Percent of Households With Asthma, Emphsema, Heart Disease, or Other Respiratory Disease, Comparison: 1994, 1995, 1997, 2001



I did not find any data that could be compared to the pregnancy and respiratory questions adequately.

How Many Years in Fort Collins?

The 2001 survey showed a decrease in the number of people having lived in Fort Collins for less than five years (Figure 30 and Table 15). Those that have lived here more than 20 years is increasing and the other categories are averaging out.

Figure 30: Years Lived in Fort Collins

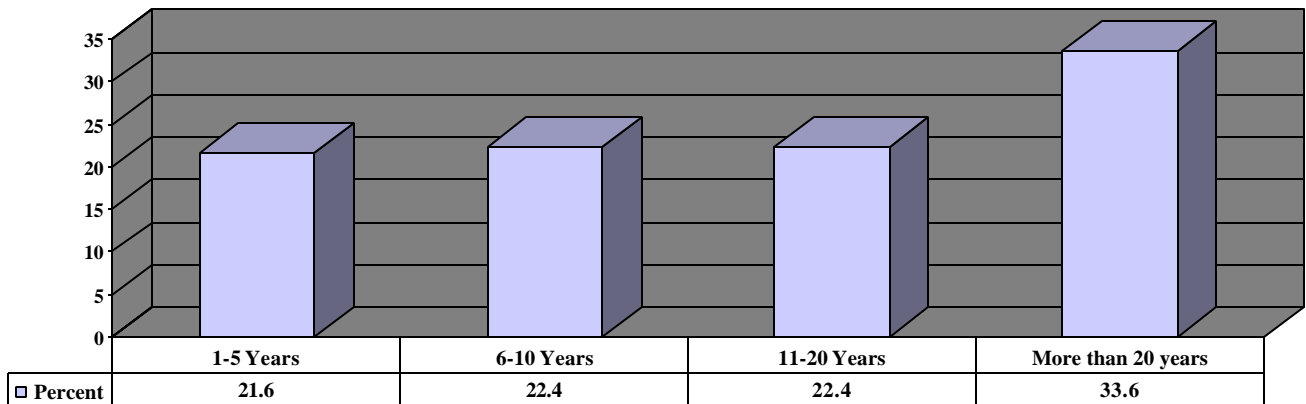


Table 15: Years Lived in Fort Collins, Comparison: 1997, 1999, 2001

Years	1997 (%)	1999 (%)	2001 (%)
0-5	17	33	22
6-10	16	17	22
11-20	27	20	22
More Than 20	39	29	34

Education Level

Figure 31 shows that most of the respondents in the survey have at least some college and a very large percentage have a graduate degree (27.1%). A closer look at Table 16 shows that very few changes from the 1997 survey to the 2001 survey can be seen in the 3education level of the respondents.

Figure 31: Education Level of Respondent

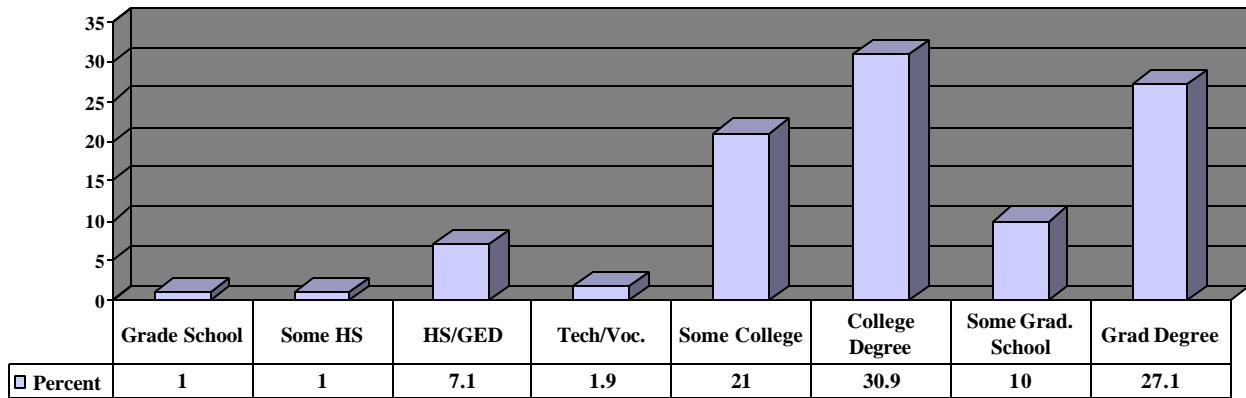


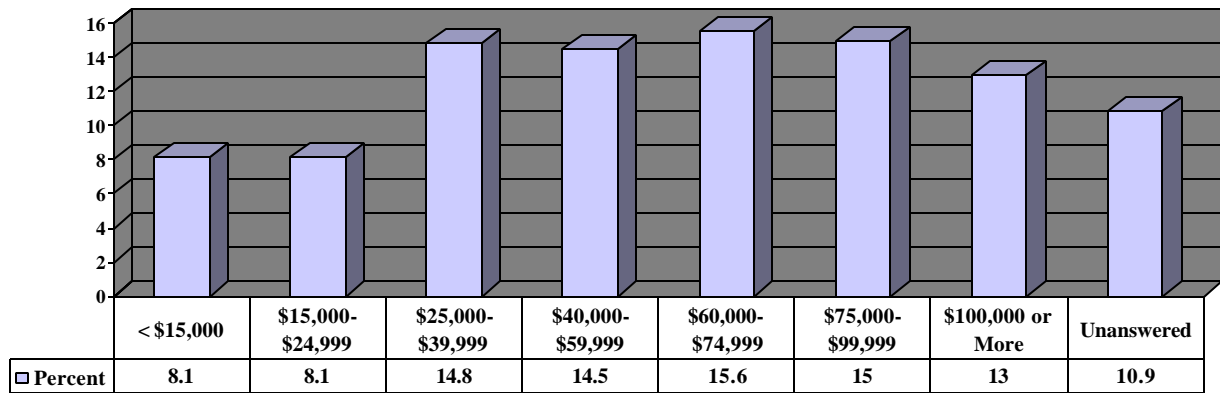
Table 16. Respondent’s Education Level, Comparison: 1994, 1995, 1997, 2001

Education Level	1994	1995	1997	2001	Other Surveys
Grade school		*	0	1	
Some high school	1.9	5	1	1	5
High school diploma/GED	34.34	5	10	7.1	19
Technical/vocational school	*	*	3	1.9	
Some college	*	23	23	21	23
College degree	37.58	27	30	30.9	27
Some graduate degree	*	*	9	10	
Graduate degree	26.16	32	23	27.1	16

Yearly Family Income

This is the first year this question has been recorded. Figure 32 shows that a very even number of respondents reported earnings at several of the categories: \$25,000-\$39,999 (14.8%), \$40,000-\$59,999 (14.5%), \$60,000-\$74,999 (15.6%), \$75,000-\$99,999 (15%), \$100,000 or More (13%),

Figure 32: Yearly Family Income



and \$75,000-\$99,999 (15%). The largest group made under \$25,000 last year (16.2%).

Median income from other surveys = \$46,562.

Employment Situation

As in 1997 and 1999, most respondents were employed outside the home (52%), with an increasing number of student respondents (6%) and a large group of retired people (23%). See Figure 33 and Table 17.

Figure 33: Employment Status

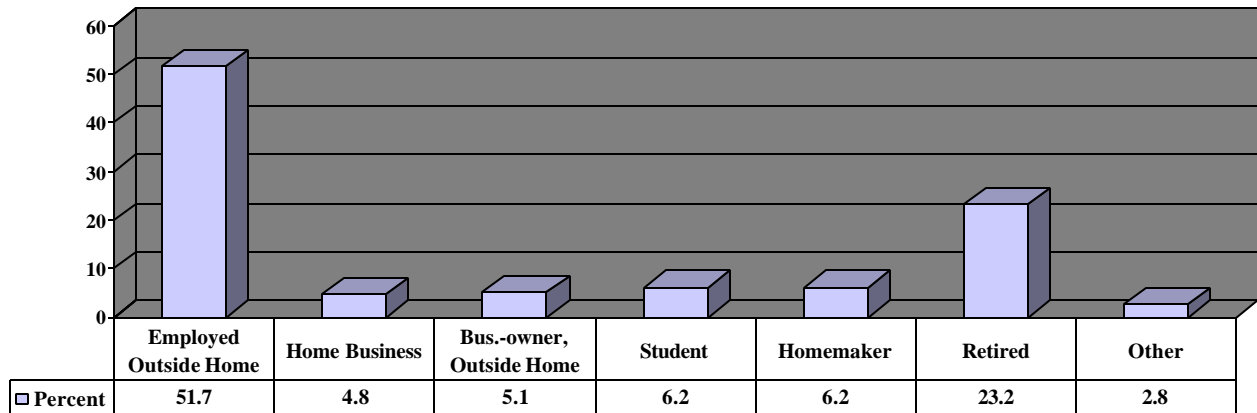


Table 17: Employment Situation Comparison: 1997, 1999, 2001

Employment Situation	1997 (%)	1999 (%)	2001 (%)
Employed Outside Home	57	53	52
Home Business	10	10	5
Business Owner-Outside Home	*	*	5
Student	4	9	6
Homemaker	5	4	6
Retired	24	21	23
Other	1	3	3

No information regarding this question.

Home Ownership

Figure 34 shows that home owners are the majority of the respondents of the 2001 survey (81.2%). Home ownership appears to be slowly on the rise for respondents from 1994 through 2001 (see Table 18 and Figure 35)..

Figure 34: Home Ownership

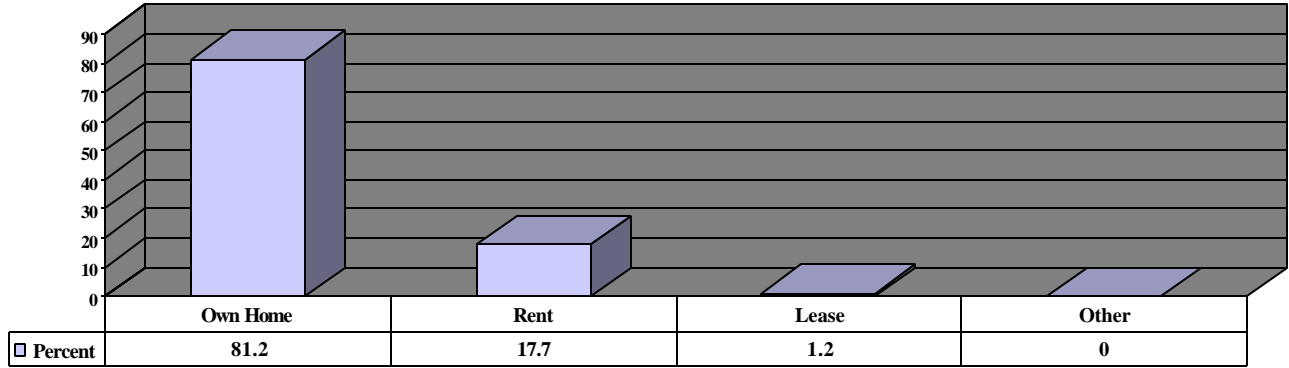
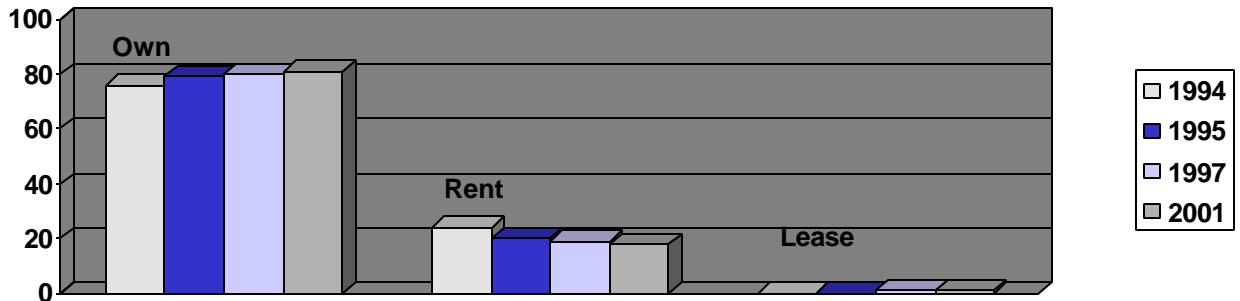


Table 18. Home Ownership Comparison: 1994, 1995, 1997, 2001

Response	1994	1995	1997	2001	Other Survey (1990)
Own	75.9	79	80	81.2	57
Rent	24.1	20	19	17.7	43
Lease	0	0	1	1.2	

Figure 35: Home Ownership Comparison: 1994, 1995, 1997, 2001



Home Type

Most of the respondents (47.4%) live in a home that is more than one-story, followed closely by single story (37.6%) homes (See Figure 36). The biggest change from the last survey can be seen in respondents living in a mobile home or trailer. In 1997, 4% of the respondents lived in a mobile home compared to 0.6% in 2001. Respondents living in apartments or condominiums is decreasing steadily for the past several years (See Table 19).

Figure 36: Home Type

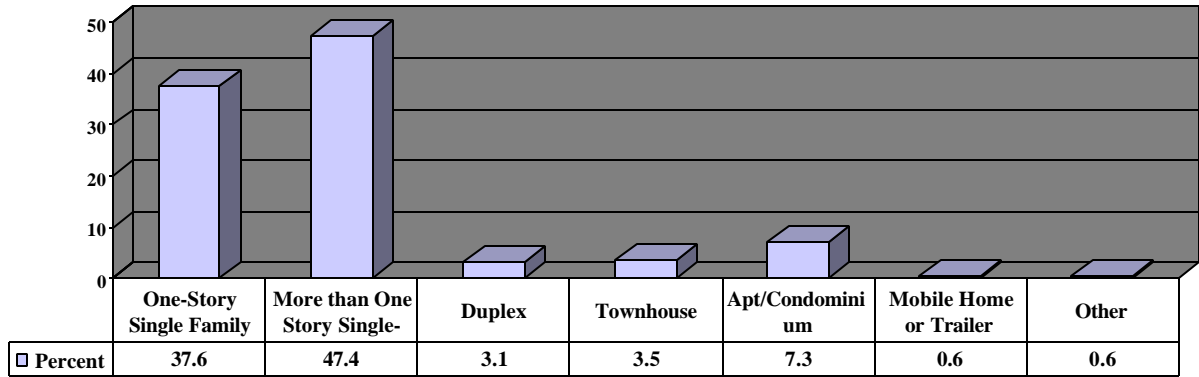
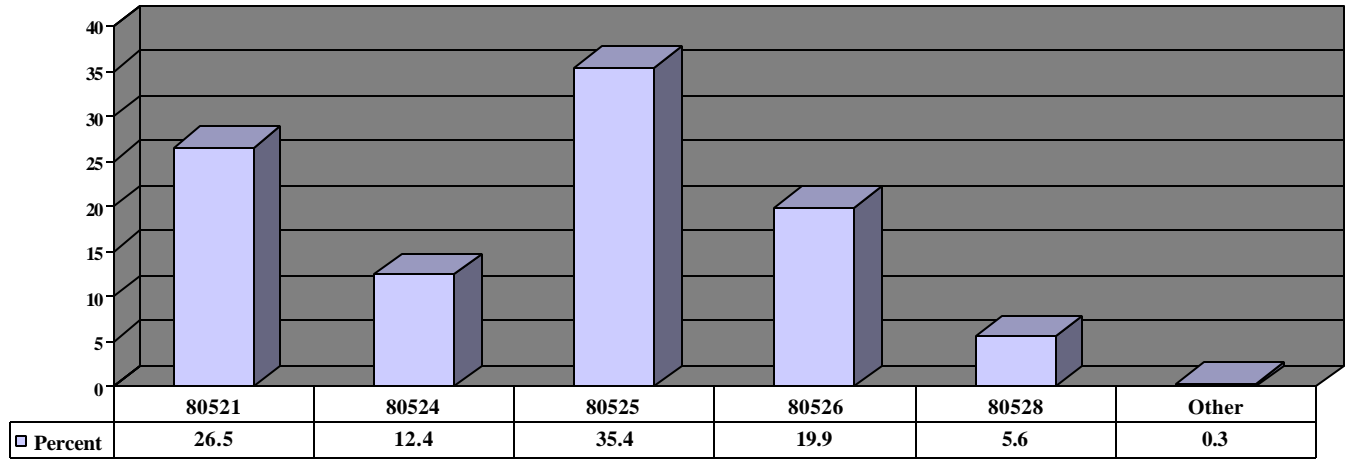


Table 19. Home Type Comparison: 1994, 1995, 1997, 2001

Which of the following best describes your home?

Home Type	1994	1995	1997	2001
One-story single-family	34	34	33	37.6
More than one story single-family	36.9	39	44	47.4
Duplex	3.9	4	4	3.1.
Townhouse	4.0	3	3	3.5
Apartment or condominium	16.6	12	10	7.3
Mobile home or trailer	4.5	6	4	.6

Zip Code



What is the zip code of your current residence?

Zip Code	1994	1995	1997	2001
80521	21	25	20	26.5
80524	13	25	18	12.4
80525	38	25	31	35.4
80526	28	25	28	19.9
80528	0	0	0	5.6
Other	0	0	3	0.3