

# Appendix B

## Household Natural Hazards Preparedness Survey

ONHW conducted a household preparedness survey in Beaverton with funding provided by the City. The survey asked Beaverton residents to consider natural hazards; whether they were concerned about them, how they have been affected by them; and what if anything, they have done to prepare for them. This survey allowed citizens to become better informed on what the city is doing to reduce risks within the community and what actions it could still undertake. This helped satisfy public participation requirements while also allowing for public values to be incorporated into the planning process. Understanding how the community views natural hazards is an important part of the natural hazard mitigation process. Examining people's attitudes about hazards may help to identify gaps in preparedness, and ways in which public/private coordination could be improved within the City.

### Methods

ONHW adapted this survey from one previously implemented statewide as part of the development of the Partners for Disaster Resistance Strategic Plan. The survey went through multiple review processes and was field-tested for readability and content. Input from the field test and the project steering committee refined the survey further before its distribution. Questions regarding community priorities for general natural hazard planning goals as well as implementation strategies were added to this survey in an effort to evaluate potential public support. The survey addressed the following topics:

- Demographics
- Perception of risk
- Level of preparedness
- Risk reduction activities
- Prioritization of community-wide planning goals and implementation strategies

A total of three mailings were made to survey recipients during the months of January and February 2003. The first mailing included a cover letter, a one-page educational flier on hazard preparedness, a survey and a business reply envelope. Ten days later, a reminder postcard was sent to all households asking them to return the survey if they had not yet done so and thanking them if they already had. Three weeks after the initial survey mailing, a second mailing was sent to those who had not yet responded to the survey. This particular

methodology was chosen to help maximize responses. ONHW distributed 1,500 surveys to households located in Beaverton. The sample list was provided by Qwest.<sup>1</sup> ONHW received 320 valid responses, which yielded a 24% response rate.

## Limitations of Sampling Methodology

This survey identifies key issues about how residents perceive their risk from natural hazards in Beaverton. Moreover, it is a snapshot of perceptions at a single point in time. As such, survey responses may reflect external issues, such as terrorism threats or recent occurrences of natural hazards. The survey was not intended to be representative of the perceptions of all Beaverton residents.

Another limitation of the study's methodology is potential non-response bias from the mailed survey. If one were to assume that the sample was perfectly random and that there was no response bias, then the survey would have a margin of error of  $\pm 5\%$  at the 95% confidence level. This means that if the survey were conducted 100 times, the results would end up within  $\pm 5\%$  of those presented in this report.

Non-response bias is an issue in all surveys, but is particularly important in mailed surveys due to response rates. The Household Natural Hazards Preparedness Questionnaire had a 24% response rate. The question that we cannot answer with 100% confidence is whether those 24% are representative of the entire population, or of some portion of the population that holds a different set of opinions.

## Organization of Survey Findings

This appendix is organized into the following sections:

***Demographics:*** This section describes the characteristics of survey respondents and compares the survey results with selected demographic variables from the 2000 U.S. Census.

***Risk Perception:*** This section creates a profile of survey respondents and identifies:

- The hazards that respondents have experienced;
- Their general level of concern over natural hazard risks;
- The types of natural hazards present in Beaverton;
- Respondents' perceptions of threats posed by natural hazards;
- Perceptions of various education and outreach material in raising natural hazard awareness; and
- Preferred avenues for information dissemination.

***Level of Preparedness:*** This section provides an overview of natural hazard preparedness activities at the household level in Beaverton.

***Risk Reduction Activities:*** To better understand the actions that Beaverton residents are undertaking to protect their homes from disaster, the survey asked respondents to provide information

about their risk reduction activities. This section describes the types of structural and nonstructural measures that are being implemented by survey respondents, and the types of resources or programs that might increase risk reduction activities.

***Community-wide planning goals and implementation***

***strategies:*** This section helped to determine citizen priorities for planning for natural hazards as well priorities for implementation strategies aimed at reducing risk.

***Survey Results:*** Included at the end of this appendix are the results from the Household Natural Hazard Preparedness Survey. A listing of written comments on community issues and general comments are also included.

## **Demographics**

Demographic questions provide a statistical overview of the characteristics of respondents. This section of the survey asked respondents about their age and gender, their level of education, and how long they have lived in Oregon. The survey also included questions regarding respondents' present housing. Where appropriate, the results are compared with 2000 Census data to illustrate differences in the sample population and the overall City population.

### **Age and Gender**

Men accounted for 49.2% of survey respondents – a result that mirrors Beaverton's population (the 2000 Census indicates Beaverton's population was approximately 49.4% male). Table B-1 compares the percentage of survey respondents by age to the percent reported in the 2000 Census. Note that the survey sample included only persons age 18 and over. Note that the survey under represents persons under age of 34 and over represents persons age 35 and over compared to the population of Beaverton.

**Table B-1. Percentage of Beaverton Population and Survey Respondents in Each Age Classification (persons 15 and over)**

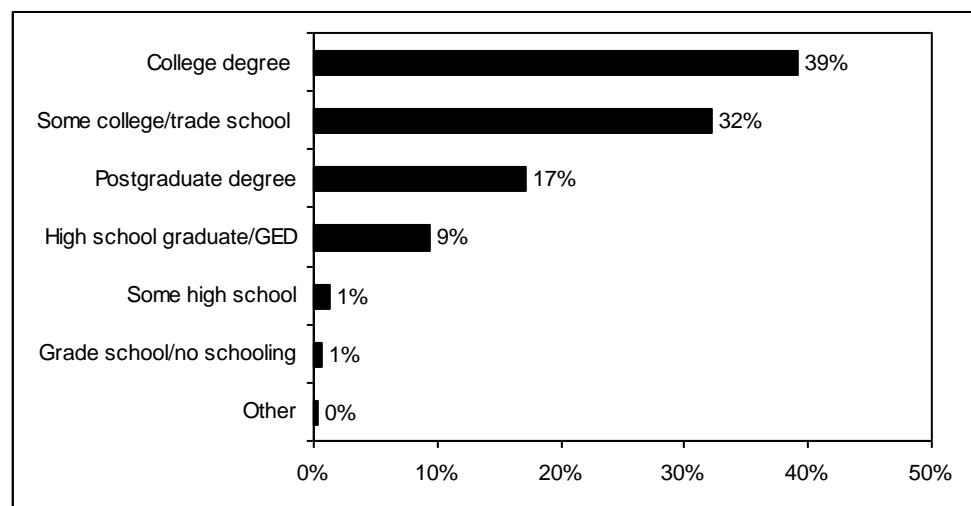
Age Category	Beaverton	Percent of Respondents
15 to 19 years	6.3%	0.0%
20 to 24 years	8.1%	0.3%
25 to 34 years	18.4%	15.2%
35 to 44 years	16.7%	21.7%
45 to 54 years	13.6%	24.5%
55 to 59 years	4.1%	9.9%
60 to 64 years	2.7%	7.5%
65 to 74 years	4.0%	9.9%
75 to 84 years	3.4%	6.8%
85 years and over	1.5%	1.9%

Source: U.S. Census Bureau: www.census.gov (2000) and ONHW/CPW, Beaverton Household Risk Perception Survey, (January 2003)

## Level of Education

Survey respondents were relatively well educated compared to the overall population of Beaverton. Eighty-eight percent of survey respondents have had some college or trade school, or have a college degree or postgraduate degree (see Figure B-1). The US Census Bureau estimates that in 2000 in Beaverton, 72% of people had some college, an associate degree, a bachelor’s degree or a postgraduate degree. Therefore, survey respondents were more likely to have completed a higher educational level than the overall Beaverton population. The survey also under represented those with less than a high school education or a high school diploma.

**Figure B-1. Level of Education**

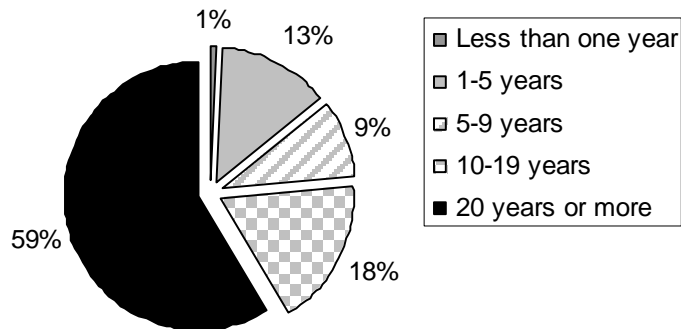


Source: U.S. Census Bureau: www.census.gov (2000) and ONHW/CPW, Beaverton Household Risk Perception Survey, (January 2003)

## Oregon Residency

The majority of survey respondents, 59% have lived in Oregon for 20 years or more (see Figure B-2). Respondents who have lived in Oregon for fewer than 20 years have most commonly moved from California (27%), Washington (12%), and Idaho (3%).

**Figure B-2. Length of Time Respondents Have Lived in Oregon**



Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

## Housing Characteristics

Eighty-four percent of survey respondents are homeowners. This percentage over represents the number of homeowners and under represents the number of renters, as illustrated in Table B-2 below.

**Table B-2. Percentage of Beaverton Population and Survey Respondents who own or rent their home**

Occupied housing units	Beaverton	Percentage of Respondents
Owner-occupied housing units	48%	84%
Renter-occupied housing units	52%	16%

Source: U.S. Census Bureau: [www.census.gov](http://www.census.gov) (2000) and ONHW/CPW, Beaverton Household Risk Perception Survey, (January 2003)

As illustrated in Table B-3, 72% of respondents own a single-family home while only 3% of renters occupy a single-family home. Twenty percent of respondents reported living in apartments with either three to four or 5 or more units or condominiums/townhouses.

**Table B-3. Dwelling Occupied by Respondents Who Own/Rent**

<b>Type of Dwelling</b>	<b>Own</b>	<b>Rent</b>	<b>Total</b>
Single-family	72%	3%	75%
Duplex	1%	1%	3%
Apartment 3-4 Units	0%	3%	3%
Apartment 5 or More Units	0%	8%	8%
Condominium/Townhouse	8%	1%	9%
Manufactured Home	2%	0%	2%
Other	0%	0%	0%
<b>Total</b>	<b>84%</b>	<b>16%</b>	<b>100%</b>

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, (January 2003)

## **Risk Perception**

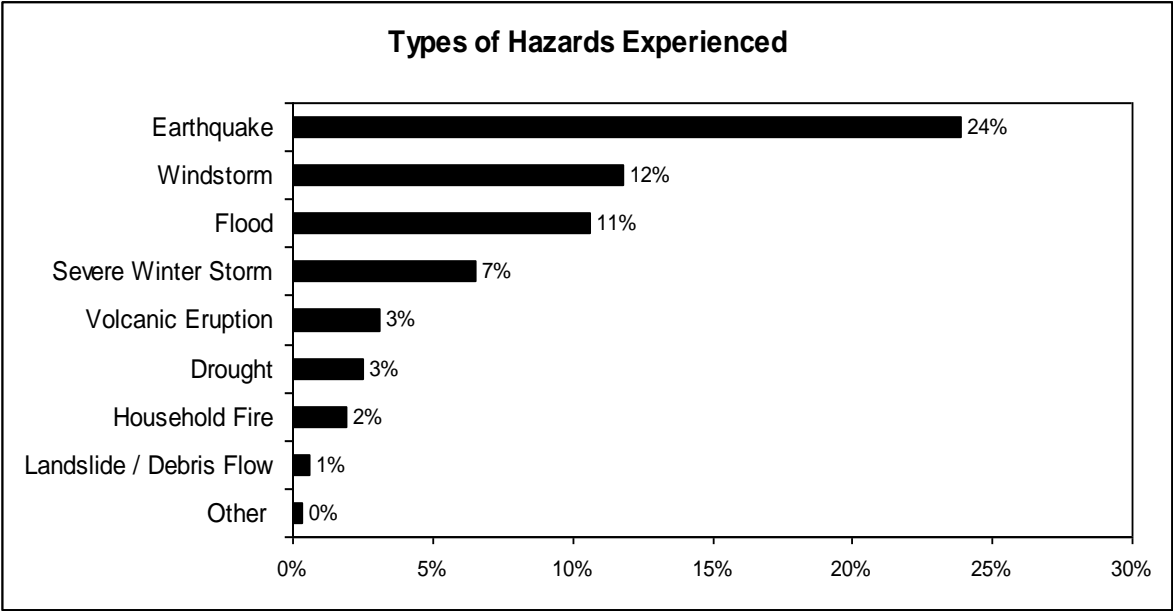
To make informed decisions about natural hazard risk reduction, it is essential to understand the population's experiences and perceptions of natural hazards. The survey asked respondents for information regarding their personal experiences with natural disasters and their level of concern for specific hazards in Beaverton. The primary objective of these questions was to create a natural hazard profile of respondents to better understand how Beaverton residents perceive natural hazards.

To understand the effectiveness of current outreach activities regarding home and family safety, the survey asked respondents about the types of information they receive on how to make their home and family safer. By identifying communication tools that have been effectively used in the past, the City of Beaverton can continue to make use of or augment the use of these effective sources.

## **General Level of Concern**

The survey results indicate that 33% of the respondents have personally experienced natural hazard within the past five years or since living in Beaverton. Of the 33% of respondents that have experienced a natural hazard; earthquake, windstorm, and flood were the most frequently cited hazards. This result reflects the February 2002 Nisqually earthquake near Seattle, the December 1995 windstorm, and flooding events in February 1996. Figure B-3 shows the most frequently experienced disasters in Beaverton.

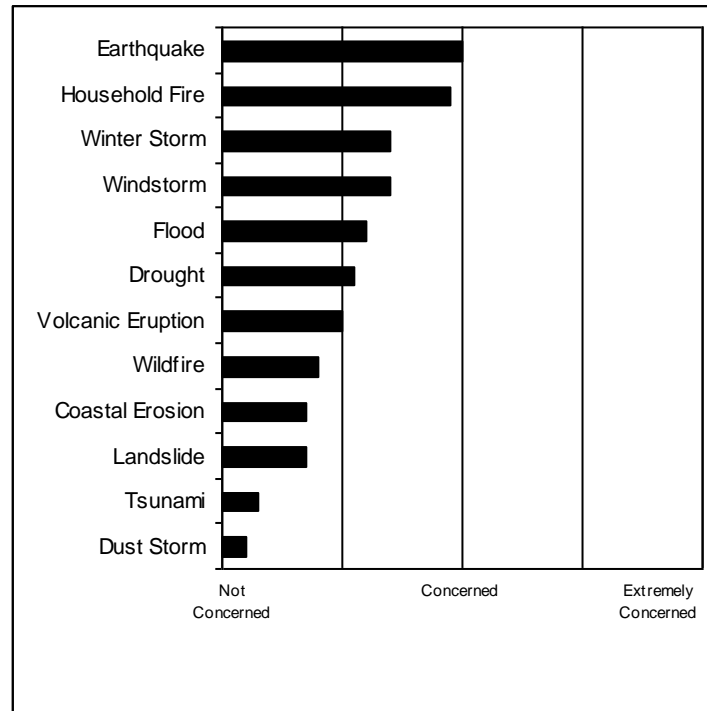
**Figure B-3. Types of disasters experienced by respondents that have experienced a disaster**



Source: ONHW/CPW, Beaverton Household Risk Perception Survey, January 2003

The survey asked respondents to rank their personal level of concern for specific natural hazards. As illustrated in Figure B-4, earthquake ranked first on the 12-item list as the hazard that Beaverton residents are the most concerned about. Despite the fact that nearly one-third of survey respondents have experienced a natural disaster, respondents had a relatively low level of concern for natural disasters.

**Figure B-4. General Level of Concern about Natural Hazards in Beaverton**



Source: ONHW/CPW, Beaverton Household Risk Perception Survey, January 2003

Table B-4 illustrate responses concerning the level of concern for natural hazards. Results for all hazards except for earthquake and household fire show that over 50% of respondents are only somewhat or not at all concerned about those hazards

**Table B-4. Level of Concern for Natural Hazards**

Natural Disaster	Extremely Concerned	Very Concerned	Concerned	Somewhat Concerned	Not Concerned
Drought	4%	9%	20%	29%	38%
Dust Storm	1%	1%	3%	8%	88%
Earthquake	12%	19%	34%	28%	7%
Flood	5%	10%	20%	32%	33%
Landslide / Debris Flow	3%	6%	10%	23%	58%
Wildfire	3%	5%	18%	19%	55%
Household Fire	10%	14%	39%	29%	8%
Tsunami	1%	1%	4%	14%	80%
Volcanic Eruption	5%	5%	16%	29%	45%
Wind Storm	4%	10%	30%	35%	21%
Coastal Erosion	5%	5%	10%	18%	63%
Severe Winter Storm	6%	9%	23%	41%	22%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, January 2003



## Information Distribution

### Recent Information and Sources

Table B-5 shows when respondents most recently received information on natural disasters. Fifty-three percent of respondents indicated that they have received information regarding home and family safety at some time in the past. Of the 53% of respondents who had received information, 27% of respondents indicated that the information was received within the last six months.

**Table B-5. Respondent History of Receiving Information on Family and Home**

<b>How Recently?</b>	<b>Percent of Respondents</b>
Within the last 6 months	27%
Between 1 and 2 years	27%
Between 6 and 12 months	22%
Between 2 and 5 years	18%
5 years or more	6%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, January 2003

Of those respondents that indicated they had received information on natural hazard preparedness, over 40% said they had received it from the news media or utility companies. Eleven percent of respondents indicated that they received information from an insurance agent or company.

### Preferred Sources and Formats of Information

The creation of the Disaster Mitigation Act of 2000 has expanded the importance of educating and informing the public on natural hazard preparedness. Because of this, it is important to understand the mechanisms for information dissemination to develop and implement effective outreach and education activities. Survey findings show that 54% of respondents most trusted utility companies to provide information about home and family safety. The American Red Cross (45%) and government agencies (42%) also ranked high as trusted sources of information. Table B-6 shows the most trusted information sources for survey respondents.

**Table B-6. Most Trusted Information Sources for Household Preparedness Information**

<b>Source of Information</b>	<b>Percent of Respondents</b>
Utility company	54%
American Red Cross	45%
Government agency	42%
Insurance agent or company	33%
University or research institution	32%
News media	29%
Other non-profit organization	15%
Not sure	9%
Other	7%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

Table B-7 shows the preferences respondents have for 12 different methods of communication. Fifty-three percent of respondents indicated that mail as well as television news were effective methods of receiving information. Respondents also indicated that newspaper stories (44%) and fact sheets or brochures (42%) were effective methods of communication as well.

**Table B-7. The Most Effective Way for Families to Receive Information About Household Preparedness**

<b>Media Type</b>	<b>Percent of Respondents</b>
Television News	53%
Mail	53%
Newspaper Stories	44%
Fact Sheet/Brochure	42%
Internet	30%
Radio News	29%
Fire Department	29%
Television Ads	13%
Schools	13%
Public Workshop / Meeting	13%
University or Research Institution	12%
Books	11%
Magazine	10%
Radio Ads	9%
Newspaper Ads	9%
Outdoor Advertisements	7%
Chamber of Commerce	5%
Other	4%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

## Level of Preparedness

There are many things a household can do to prepare for a natural disaster or emergency event. Basic services, such as electricity, gas, water, and telephones, may be cut off, or there may be an immediate evacuation. The Household Natural Hazard Preparedness Survey asked respondents to provide information that could help inform decision-makers of preparedness activities that are taking place at the household level in Beaverton.

### Types of Household Preparedness Activities

When asked about household preparedness activities that respondents have engaged in, the survey provided a range of choices that ranged from “Have Done” to “Unable to Do.” Table B-8 summarizes the questions the respondents were asked and the types of activities that are taking place in Beaverton households.

The results show a lack of preparedness among respondent households for natural disasters. More than half of the respondents have not attended meetings or received information on emergency preparedness (59%) or been trained on CPR (65%). Only 39% had prepared a disaster supply kit and 46% had talked to their family about what to do during an emergency.

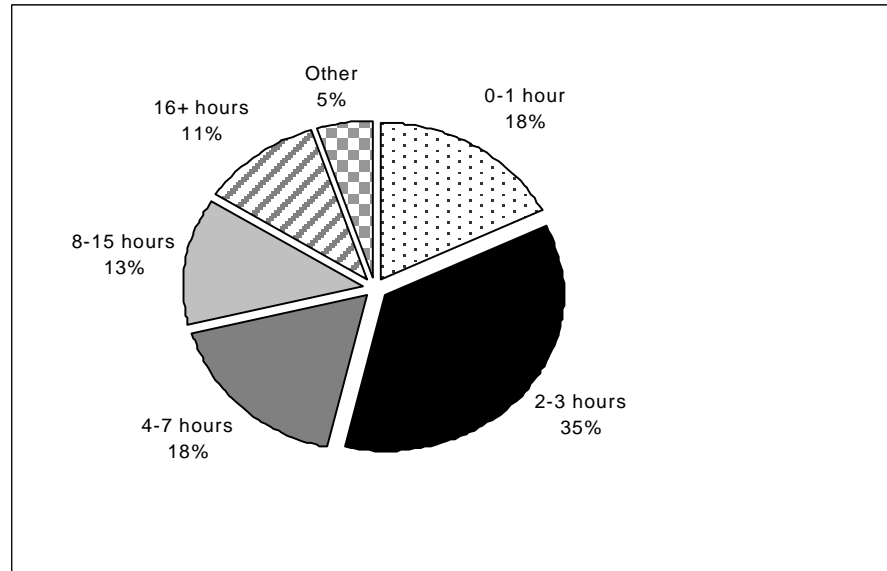
**Table B-8. Level of Household Disaster Preparedness Activities**

In your household, have you or someone in your household:	Have Done	Plan To Do	Not Done	Unable To Do
A. Attended meetings or received written information on natural disasters or emergency preparedness?	37%	5%	57%	2%
B. Talked with members in your household about what to do in case of a natural disaster or emergency?	46%	20%	29%	5%
C. Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the in event of a disaster?	26%	26%	44%	4%
D. Prepared a "Disaster Supply Kit" (Stored extra food, water, batteries, or other emergency supplies)?	39%	23%	37%	1%
E. In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	30%	5%	63%	2%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

To target effective programs that will better prepare residents for emergency events, the amount of time a person is willing to commit to activities is important to understand. Figure B-5 shows the number of hours, per year, that respondents would be willing to spend to make their home safer from natural hazards. The survey results show that residents are not willing to spend a lot of time (more than 8 hours) preparing for natural hazards, nearly half of the respondents would be willing to spend between two and seven hours only.

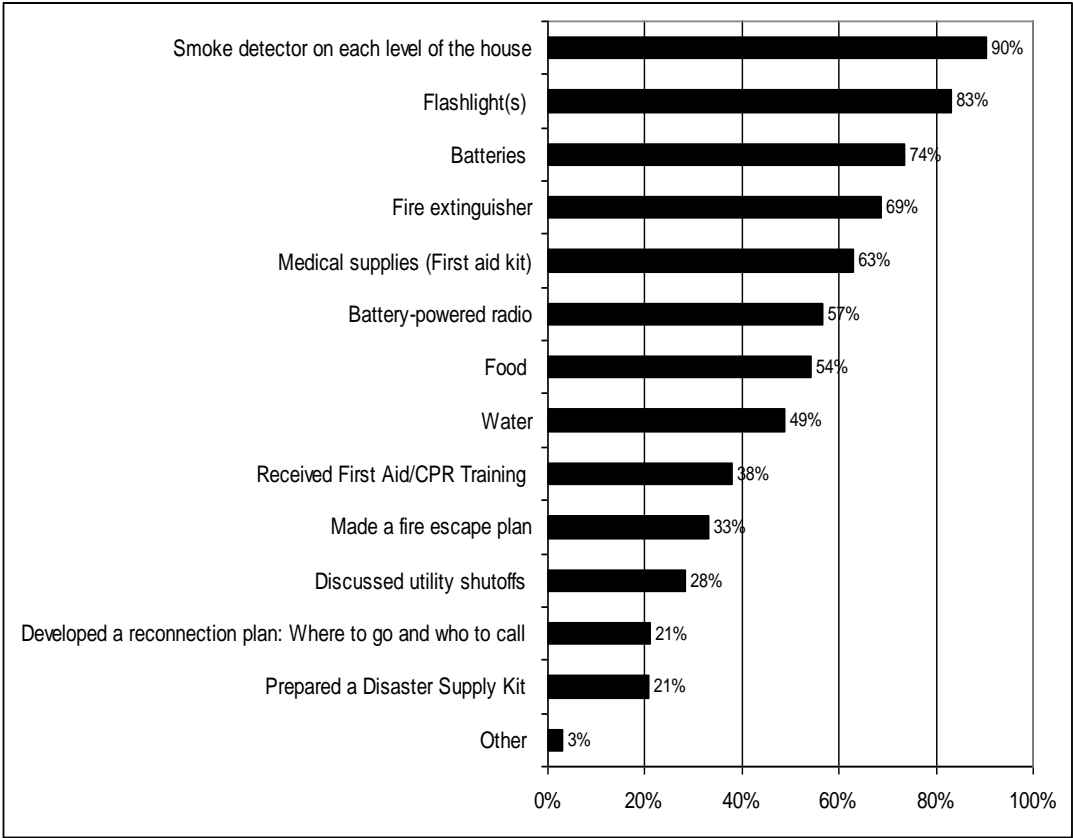
**Figure B-5. Hours Respondents are Willing to Spend Per Year on Personal and Household Natural Disaster Preparedness**



Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

Figure B-6 shows the most common steps that households have taken to prepare for natural disasters. Smoke detectors, flashlights, batteries, fire extinguishers, and medical supplies were common items stored among respondents. Household disaster preparedness steps specific to disaster response and recovery were ranked as some of the lowest items that respondents have done. For example, only 21% of respondents indicated that they had prepared a “Disaster Supply Kit,” or had established a “Reconnection Plan.”

**Figure B-6. Steps Respondents have taken to Prepare for Natural Disaster**



Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

**Property and Financial Recovery**

The need to have adequate provisions for financial and property recovery when natural disasters do occur is a necessary component of natural hazard preparedness. However, only 28% of the respondents indicated they have flood insurance. Approximately 59% of those who don't have flood insurance indicated the reason is because their home is not located in the floodplain. Fourteen percent felt it was not necessary. On the other hand, over 56% of respondents have earthquake insurance. The top two reasons given by those who don't have earthquake insurance were that they had never considered it (31.5%) or that it is too expensive (26.8%) (see Table B-9).

**Table B-9. Respondents' Reasons For Not Having Disaster Insurance**

<b>Flood Insurance</b>	<b>Percent of Respondents</b>	<b>Earthquake Insurance</b>	<b>Percent of Respondents</b>
Not located in floodplain	59%	Never considered it	32%
Not necessary	14%	Too expensive	27%
Never considered it	10%	Don't know about it	14%
Too expensive	7%	Not necessary	9%
Don't know about it	5%	Deductible too high	8%
Other	3%	Not available	6%
Deductible too high	2%	Other	4%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

## Risk Reduction Activities

This section provides information on the long-term risk reduction activities Beaverton residents have already taken or are willing to take. This section also explores how much respondents are willing to spend in order to reduce risks, and the types of incentives that would motivate respondents to take risk reduction steps.

### Home and Life Safety

Almost 63% of the respondents did not consider the possible occurrence of a natural hazard when they bought or moved into their current homes. Forty-two percent of the respondents indicated they would be willing to spend more money on a home that had disaster-resistant features, while almost 43% said they did not know whether or not they would be willing to.

Seventy-two percent of respondents indicated they are willing to make their home more resistant to natural disasters. Table B-10 illustrates how much respondents are willing to spend to better protect their homes from natural disasters.

**Table B-10. Amount Respondents Are Willing to Spend**

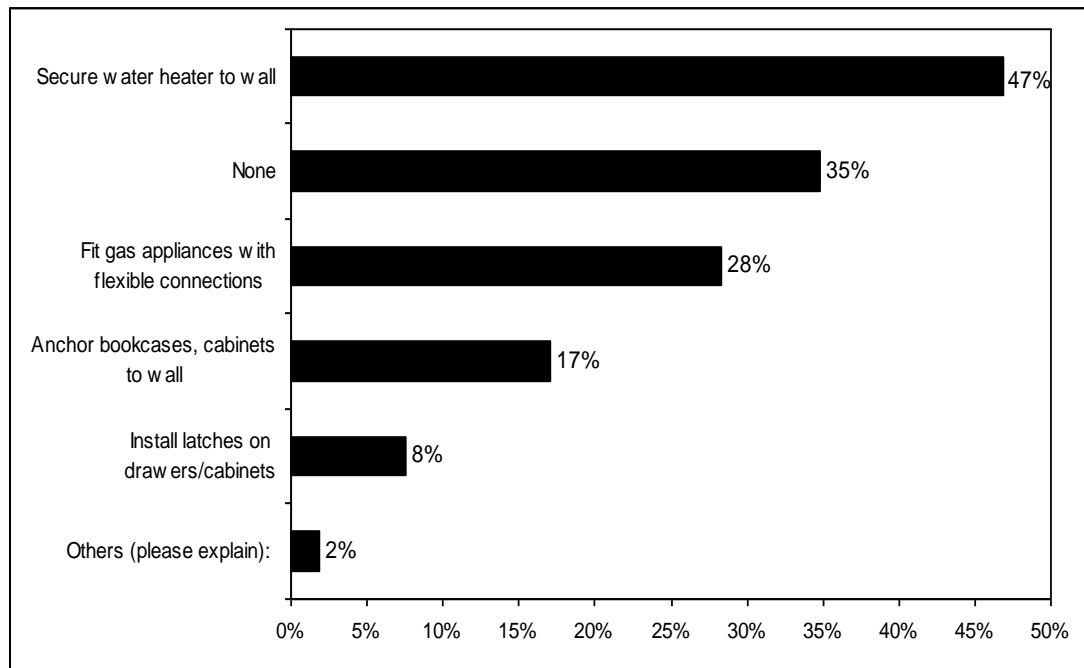
<b>Amount</b>	<b>Percent of Respondents</b>
Less than \$100	5%
\$100 - \$499	16%
\$500 - \$999	11%
\$1000 - \$2499	12%
\$2500 - \$4999	3%
\$5000 and above	4%
Nothing	2%
Don't know	34%
Other, please explain	3%
What ever it takes	10%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

## Nonstructural and Structural Home Modifications

While 34.8% of respondents said they have not completed any nonstructural modifications in their homes to prepare for earthquakes, Figure B-7 shows that some respondents have taken such steps as securing water heaters to the wall and fitting gas appliances with flexible connectors.

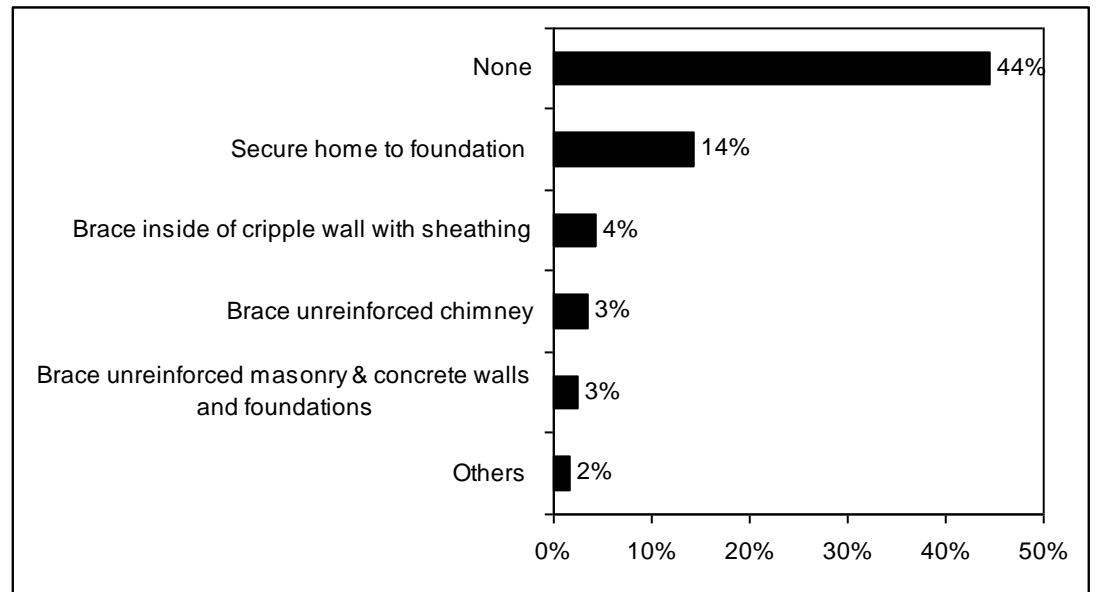
**Figure B-7. Nonstructural Modifications**



Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

Respondents reported making some structural modifications to make their homes more resistant to earthquakes. However, approximately 45% of the respondents have not completed any structural modifications. Figure B-8 indicates that the most common step taken is securing the home to the foundation.

**Figure B-8. Structural Modifications**



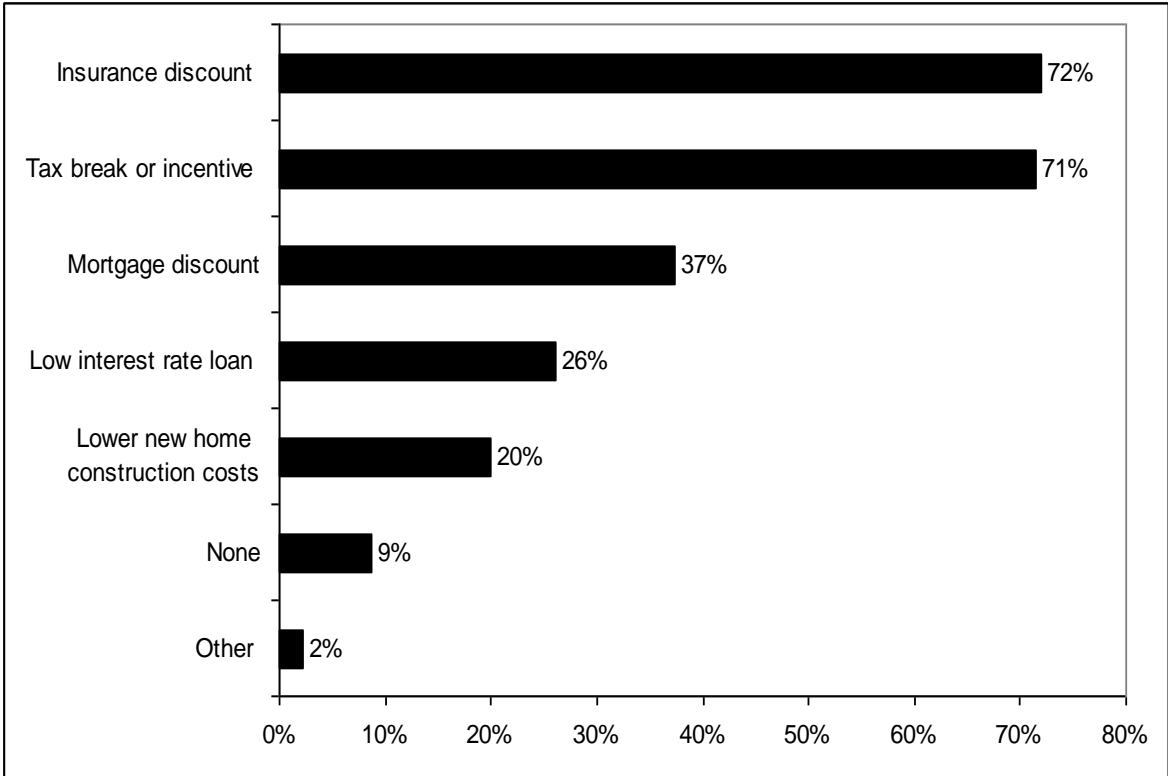
Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

### **Incentives**

Approximately 72% of the respondents indicated that insurance discounts would motivate them to take additional steps to better protect their homes from natural disasters. Seventy-one percent also indicated that tax breaks or incentives would be a motivator (See Figure B-9).



**Figure B-9. Incentives for Protecting Homes**

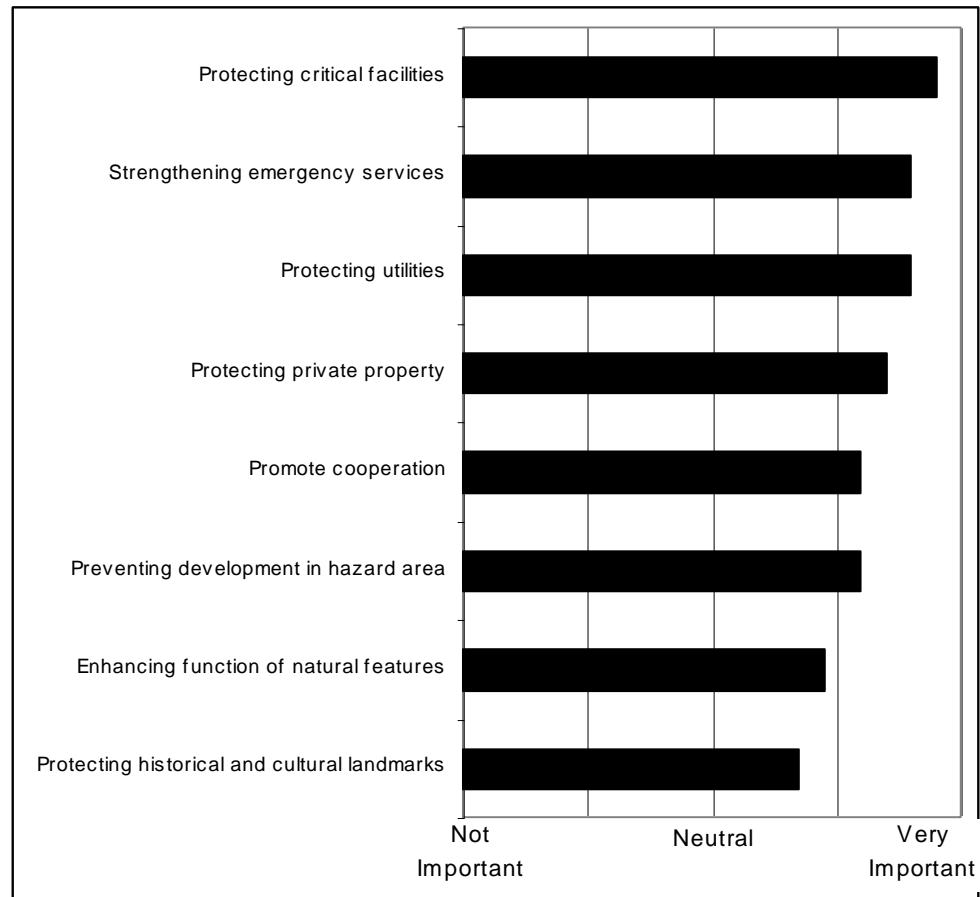


Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

## **Community-wide planning goals and implementation strategies**

In order to assist those preparing the City of Beaverton in developing its natural hazard mitigation plan, three questions were added to those asked in the statewide survey in 2002. These questions could help Beaverton determine citizens’ priorities for planning for natural hazards and what types of strategies to reduce the communities’ risk the citizens will support. Figure B-10 illustrates generally how important respondents feel each goal statement is.

**Figure B-10. General level of importance for goal statements**



Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

As shown in Table B-11, approximately 98% of respondents indicated that it is very important or somewhat important for the community to protect critical facilities (B.). About 92% indicated that it is very important or somewhat important to protect and reduce damage to utilities (G.) and 91% indicated that it is very important or somewhat important to strengthen emergency services (H.).

**Table B-11. Goal Prioritization**

<b>Statements</b>	<b>Very Important</b>	<b>Somewhat Important</b>	<b>Neutral</b>	<b>Not Very Important</b>	<b>Not Important</b>
<b>A.</b> Protecting private property	58%	30%	8%	3%	1%
<b>B.</b> Protecting critical facilities (e.g. transportation networks, hospitals, fire stations)	86%	12%	2%	1%	0%
<b>C.</b> Preventing development in hazard areas	45%	35%	17%	2%	1%
<b>D.</b> Enhancing the function of natural features (e.g. streams, wetlands)	35%	33%	25%	6%	2%
<b>E.</b> Protecting historical and cultural landmarks	23%	38%	28%	9%	3%
<b>F.</b> Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	42%	38%	16%	2%	2%
<b>G.</b> Protecting and reducing damage to utilities	65%	27%	7%	1%	0%
<b>H.</b> Strengthening emergency services (e.g.- police, fire, ambulance)	68%	23%	8%	1%	1%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

There are a number of activities a community can undertake to reduce the risk from natural hazards. These activities can be both regulatory and non-regulatory. Table B-12 shows respondents' general level of agreement regarding the community-wide strategies included in the survey.

Table B-12 illustrates that 85% of the respondents strongly agree or agree that they support improving the disaster preparedness of local schools (J). Approximately 78% strongly agree or agree that support steps to safeguard the local economy (I.), while 75% said they strongly agree or agree that they support policies to prohibit development in areas subject to natural hazards (D.).

**Table B-12. General level of agreement regarding community-wide strategies**

Community-wide Strategies	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Sure
A. I support a regulatory approach to reducing risk	15%	38%	24%	13%	5%	6%
B. I support a non-regulatory approach to reducing risk	19%	38%	26%	10%	1%	6%
C. I support a mix of both regulatory and non-regulatory approaches to reducing risk	22%	42%	21%	7%	3%	5%
D. I support policies to prohibit development in areas subject to natural hazards	32%	43%	18%	4%	2%	2%
E. I support the use of tax dollars (federal and/or local) to compensate land owners for not developing in areas subject to natural hazards	6%	18%	25%	30%	17%	3%
F. I support the use of local tax dollars to reduce risks and losses from natural disasters	7%	51%	27%	9%	4%	2%
G. I support protecting historical and cultural structures	10%	39%	39%	8%	4%	0%
H. I would be willing to make my home more disaster-resistant	13%	59%	23%	1%	1%	3%
I. I support steps to safeguard the local economy following a disaster event	16%	62%	19%	2%	1%	1%
J. I support improving the disaster preparedness of local schools	33%	52%	12%	3%	0%	--
K. I support a local inventory of at-risk buildings and infrastructure.	17%	53%	23%	4%	2%	2%

Source: ONHW/CPW, Beaverton Household Risk Perception Survey, 2003

The household survey examined attitudes about hazards in the City of Beaverton and identified a number of issues that the city could use to improve community preparedness. Some issues that the majority of survey respondents, who are a majority of homeowners, included the fact that only a third of them have experienced the impacts of natural hazards. Of those that have experienced hazards the majority have experienced earthquakes – this is also the only hazard that a majority of residents are concerned about. Education regarding the impacts and preparedness of the community’s hazards may be appropriate – as this survey indicates that they may be overlooked. Additional information includes that the most trusted source of information is the utility providers – this may be a good conduit for continuing outreach efforts. The most effective way that the survey respondents indicated to receive information is both television and mail – the city may want to consider coordinating outreach through these aspects. Other information that may be of benefit to the city is that the most important goals the survey respondents noted were to protect critical facilities, emergency services and utilities – efforts to protect these aspects of the community through mitigation activities may be more broadly supported by the community. Lastly, the survey respondents generally supported using local tax dollars to reduce risks and losses from natural disasters and use a mix of regulatory and non-regulatory approaches to reducing risk.

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## **Appendix B Endnotes**

<sup>1</sup> Qwest develops samples by using the nth selection technique to ensure randomness.

