

2016 Clackamas County Sandy River Flood Risk Survey



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Draft Report

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Community Service Center

Oregon Partnership for Disaster Resilience



UNIVERSITY OF OREGON

CSC
Community Service Center

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About the Community Service Center

The Community Service Center (CSC) is a research center affiliated with the Department of Planning, Public Policy, and Management at the University of Oregon. It is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance to help solve local issues and improve the quality of life for Oregon residents. The role of the CSC is to link the skills, expertise, and innovation of higher education with the transportation, economic development, and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

About the Oregon Partnership for Disaster Resilience

The Oregon Partnership for Disaster Resilience (OPDR) is a coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster-resilient and sustainable state. Developed and coordinated by the Community Service Center at the University of Oregon, the OPDR employs a service-learning model to increase community capacity and enhance disaster safety and resilience statewide.

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EXECUTIVE SUMMARY

The Sandy River is dynamic. A combination of weather, geology, hydrology, and development (e.g., buildings and roads) create chronic seasonal flooding conditions along the Sandy River. Along with flooding, the Sandy River has a long history with a process called *channel migration*: *the natural shifting of the river's path over time*. While the Sandy River was engineered in the 1960s to minimize channel migration, flood events continue to result in erosion and the river channel's periodic relocation. Year to date, historic flood maps of the Upper Sandy River have not taken this process into account, but Clackamas County has recently generated new Channel Migration and Historic Migration Zone maps that clarify the potential "flood risk zone."

Using these new maps of the Upper Sandy River's "flood risk zone," Clackamas County is focusing on issues of flood plain management. These include sustainable flood recovery, flood induced erosion, river channel migration, flood warning, watershed restoration projects, and significant flood-related community outreach initiatives. The Upper Sandy River Flood Risk Survey seeks to further the County's understanding of residents' attitudes and opinions about managing flood risk in the Upper Sandy River Basin. Clackamas County will use the survey results, summarized in this report, to inform future decisions about flood risk management.

The survey included three categories of questions: (1) demographic and property characteristics, (2) past experiences with floods and erosion, and (3) attitudes towards policies designed to manage flood risk along the Upper Sandy River.

Clackamas County encouraged property owners and residents of the Upper Sandy River Basin to fill out the survey between late June and early August 2016. The survey link was mailed to 3,951 addresses and publicized at various community events. The survey received 320 total responses.

HOUSEHOLD INFORMATION

11%

Of respondents own more than one property in the Upper Sandy River Basin.

49%

Of respondents have owned/occupied property in the Upper Sandy River Basin for more than 15 years.

54%

Of respondents approximated the value of their property to be between \$200,000 and \$399,999.

10%

Of respondents are planning to sell their property along the Upper Sandy River in the next 5 years.

FLOOD RISK ZONE

33% of respondents indicated that they own/occupy property in the flood risk zone, but only half of them indicated having flood insurance.

Of those with flood insurance, 72% of respondents have purchased it voluntarily.

30%

Of respondents are not sure if they are in the flood risk zone.

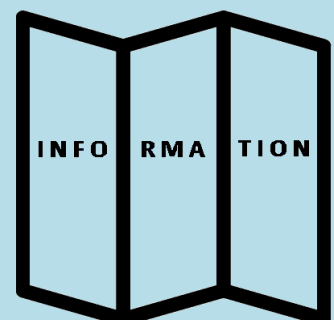
Based on survey responses, residents in the Upper Sandy River Basin communities are fairly risk tolerant.



Only 50% of respondents were somewhat or very concerned with flood and erosion compared with the **79% of respondents** who were somewhat or very concerned with other hazards.

To become more risk adverse, the community needs more information and education about the risk of flood and erosion in the Upper Sandy River Basin.

A majority of respondents thought the most effective outlet to receive information was through **mailed or emailed fact sheets and brochures** as well as **public meetings and workshops**.



Over 75% of respondents were very or somewhat supportive of these 3 County-led mitigation strategies:

- Requiring the **disclosure of flood risks** during real estate transactions,
- Hosting events to educate and **raise awareness** about flood and erosion risks, AND
- Adopting zoning, building or other development regulations that **LIMIT new development** in the flood risk zone.

Survey respondents shared mixed views about property rights.

Some respondents believe property owners should be able to **do what they wish** to their land and structures. Others agree but think it should be done **at their own risk**. And still others believe that the **government** should be involved in managing risk.



Without intervention, there was no clear indication that property owners would leave on their own accord.



A majority of respondents were of a higher age bracket and may likely want to live out their retirement in their **community of choice**. Offering residents an incentive or educating them about potential risks may make respondents more likely to move.

CHAPTER I: INTRODUCTION

During the summer of 2016, Clackamas County worked with the University of Oregon’s Community Service Center to investigate public opinion about flood risk in the Upper Sandy River Basin. As part of this investigation, the County sent a survey to households in the Upper Sandy River Basin Community to learn respondents’ perspectives on the topics of flood and erosion. This report presents key findings and details compiled from survey. The County will use the results to inform actions aimed at reducing the risk of flood and erosion.

Background

The dynamic Sandy River “originates from the high glaciers of Mt. Hood” and has been shaped by glaciation and volcanic activity.¹ In its natural state, the Sandy River moves over time, a process called **channel migration**. The Sandy River not only has a long history of channel migration, but also of periodic flooding.

While the Sandy River was engineered in the 1960s to minimize channel migration, flood events continue to result in erosion and periodic relocation of the river channel. A combination of weather, geology, hydrology, and development (e.g., buildings and roads) create chronic seasonal flooding conditions along the Sandy River. Since the 1964 record-breaking flood (eroding 400 acres of shoreline), several severe flooding events has caused the, “flooding of residences, roads and other infrastructure [producing] millions of dollars of damage.”²

Today, communities in Oregon and across the Pacific Northwest are increasingly challenged to anticipate, prepare for, and recover from natural hazard events. Of particular concern are climate driven increases in hazards such as floods, landslides and winter storms, as well as geologic hazards including earthquake and volcano risks. Planning for natural hazards in Clackamas County has recently focused on issues of flood plain management. These include sustainable flood recovery, flood induced erosion, river channel migration, flood warning, watershed restoration projects and significant flood-related community outreach initiatives. Several partner organizations are currently working in Clackamas County’s Lower Columbia – Sandy River Watershed to generate a new Flood Insurance Study, Flood Insurance Rate Maps (FIRMs), and Risk Report as part of the Oregon Risk MAP project.

Information conveyed by the new Channel Migration and Historic Migration Zone maps have also provided a, “comprehensive and integrated approach to reduce exposure and losses from natural hazards.”³ Planning and permitting staff at Clackamas County are currently using these maps as a new, advisory resource. The County will use these survey results as a complimentary

¹ National Wild and Scenic Rivers System, *Sandy River, Oregon*. <https://www.rivers.gov/index.php>

² Natural Systems Design, *Flood Erosion Hazard Mitigation Evaluation, Upper Sandy River* (2015). <http://www.clackamas.us/dm/documents/sandyerosionhazardreport.pdf>

³ Risk MAP Vision, 2012

resource to assist in understanding how policies can effectively and equitably manage risks associated with living in the floodplain and other natural hazard affected areas.

Purpose of the Survey

This project provides an opportunity to coordinate and align FEMA Risk Map generated products with other county obtained products in or near the Lower Columbia – Sandy River Watershed. The intent of this effort is to build upon Clackamas County’s ongoing efforts to integrate up to date hazard information into the county’s current hazard planning activities. This project builds on a Risk MAP integration pilot project currently underway in Tillamook County. In addition, the project satisfies a local need for community engagement and feedback on proposed development and flood management policies currently under development. This project ultimately provides Clackamas County with actionable information it can use when presenting land-use policy options to the County Planning Commission and Board of County Commissioners.

About the Survey

This survey was both an engagement tool and a source of new information for Clackamas County. Results will inform the County of potential resident supported activities to reduce risks of flood and erosion. Because policy changes are being developed and considered right now, the survey builds upon Clackamas County’s ongoing efforts. The survey sought answers to the following questions:

- How risk averse/tolerant is the community?
- When mitigating risk, what does the community feel should be their responsibility and what do they feel should be the government’s responsibility?
- What are residents’ attitudes toward individual policies being considered by the County?
- What are residents’ attitudes about property rights?
- What would make residents move away on their own?

Data from the survey will directly inform the flood risk management process. Clackamas County will use survey data to improve and support ideas for implementation. Other community organizations and agencies can also use the survey results to inform their own outreach efforts. Finally, data from the survey provides the County with a better understanding of preferred outreach strategies and a baseline understanding of how residents may react to these strategies.

Survey Methodology

Beginning in April 2016, the University of Oregon’s Community Service Center (CSC) team met with Clackamas County staff to discuss survey purpose, approach, and questions. The CSC team then drafted the survey, received and incorporated feedback from the County, and transferred the questions into Qualtrics (www.qualtrics.com)—an online survey vendor.

The survey consisted of 32 questions divided into four sections:

- General information about respondent’s properties
- Past experience with flooding

- Strategies for managing flood risks
- Household information

To publicize and encourage residents to participate in the survey, the CSC team sent a postcard with a link to the survey to 3,951 households within the Upper Sandy River Basin in the summer of 2016. Clackamas County also emailed the announcement to multiple community networks, advertised the survey in the local monthly newspaper, distributed hard copies at various community venues, and personally surveyed people outside of a storefront.

When the survey closed in August 2016, it had received 320 responses. Since the survey was not administered as a random sample, responses cannot be considered statistically representative of the broader Upper Sandy River Basin population. While responses should not be generalized to the broader population, they do provide some insight into the experience and preferences of a subset of residents. More information regarding survey methodology can be found in Appendix B.

Organization of this Report

This report is organized into five chapters and four appendices. The remainder of this report is organized as follows:

Chapter 2 – Household and Property Characteristics: This chapter summarizes the demographics of survey respondents and the characteristics of their properties along the Upper Sandy River Basin.

Chapter 3 – Past Experiences with Flooding: This chapter summarizes the experiences survey respondents have had with flood and erosion along the Sandy River in the past decade.

Chapter 4 – Managing Flood Risks: This chapter conveys survey respondents' thoughts, perceptions, and attitudes about how risk of flood and erosion should be reduced.

Chapter 5 – Conclusion: The final chapter of the report calls out some key findings from the survey post analysis.

Appendix A – Survey Instrument: This section of the report provides a copy of the survey questions and showcases the survey design.

Appendix B – Survey Methodology: This section of the report elaborates on survey methodology including a brief description of the survey's approach and design.

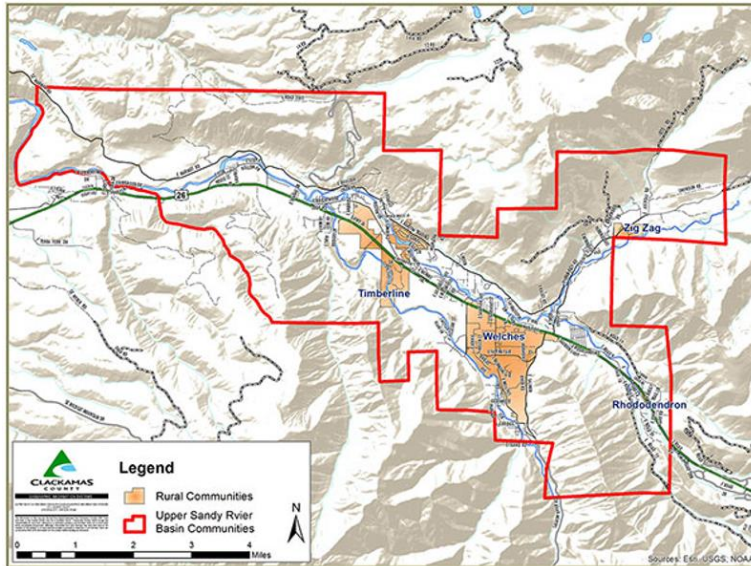
Appendix C – Survey Text Responses: This piece provides a complete list of all survey text responses, categorized by question.

Appendix D – Primary Residence of Respondents: Lastly, this appendix shows a map of where respondent's live (by zip code).

CHAPTER 2: HOUSEHOLD AND PROPERTY CHARACTERISTICS

This section presents information about survey respondent characteristics and characteristics of the properties they own or occupy in the Upper Sandy River Basin communities (Map 2-1).

Map 2-1: Upper Sandy River Basin Communities Geography

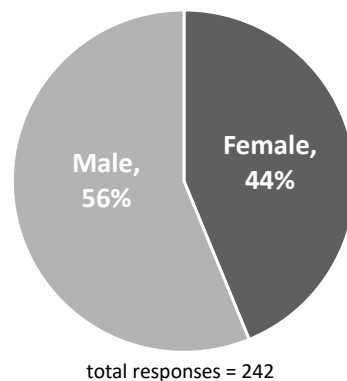


Source: Clackamas County (2016)

Household Demographics

Survey respondents shared several common demographic characteristics. While respondents were generally split between male (56%) and female (44%), a majority of individuals were either between the ages of 30-39 (30%) or 70-79 (32%) (Figure 2-3 and 2-4).

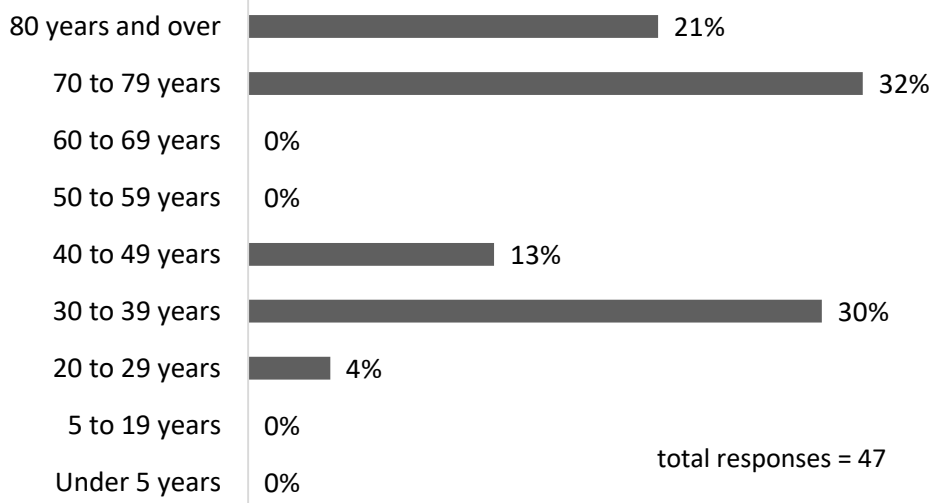
Figure 2-3: What is your gender?



Source: Sandy River Floodplain Risk Survey, Question 26 (2016) and U.S. Census.

Over half of all respondents (53%) were 70 years of age or older indicating that there may be a response bias related to age.

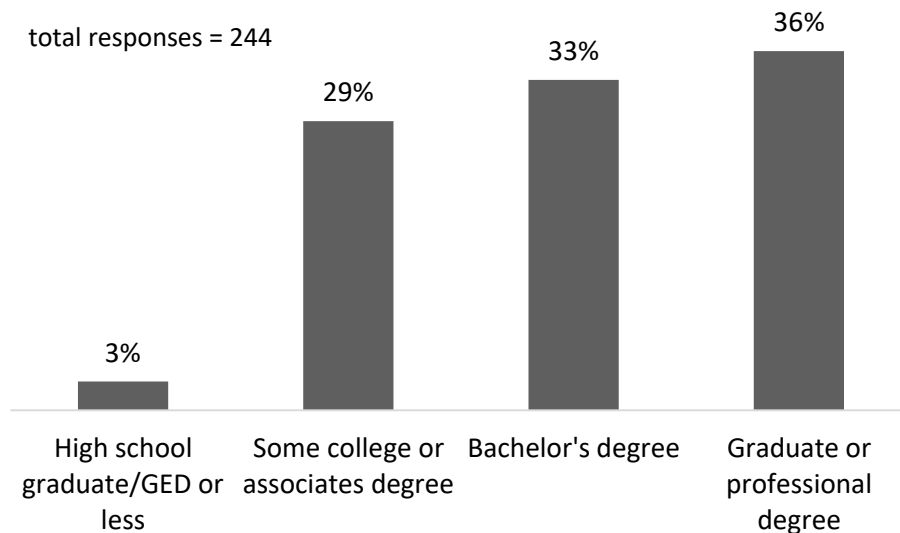
Figure 2-4: What is your age?



Source: Sandy River Floodplain Risk Survey, Question 25 (2016) and U.S. Census.

Respondents were generally very well educated (36% receiving graduate or professional degrees). Close to all respondents (97%) have had at least some level of college education (Figure 2-5).

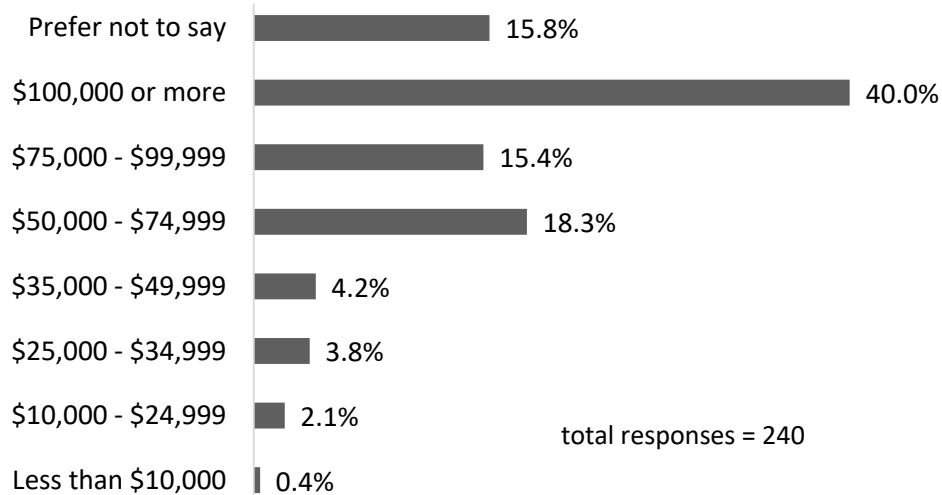
Figure 2-5: Please indicate your highest level of education.



Source: Sandy River Floodplain Risk Survey, Question 27 (2016) and U.S. Census.

A majority (40%) of respondents had a combined household income of \$100,000 or more (Figure 2-6). These findings suggest that those responding to the survey were of a medium to high socio-economic status.

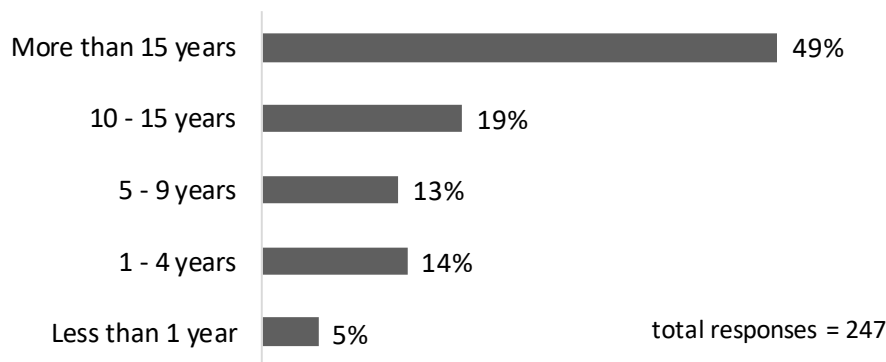
Figure 2-6: What was the combined income for your entire household last year?



Source: Sandy River Floodplain Risk Survey, Question 28 (2016) and U.S. Census.

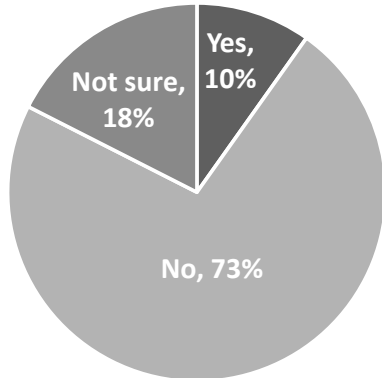
Respondents were asked how long they have owned or occupied property along the Upper Sandy River Basin. Forty-nine percent of the respondents indicated they have owned or occupied property for longer than 15 years (Figure 2-7). As almost half of all respondents have maintained long-term occupancy or ownership within the Upper Sandy River Basin, respondents likely have had ample opportunity to create memories and develop ties in their community. This relates to the fact that very few respondents reported that they are planning to leave this community. When asked, only 10% of all survey respondents stated they were planning to sell their property within the next five years (Figure 2-8). Another 17% indicated they were not sure if they were planning to sell, perhaps signifying that selling their homes may be contingent upon market or family circumstances.

Figure 2-7: How long have you owned or occupied property in the Upper Sandy River Basin Communities?



Source: Sandy River Floodplain Risk Survey, Question 30 (2016).

Figure 2-8: Are you planning to sell your property along the Sandy River in the next 5 years?



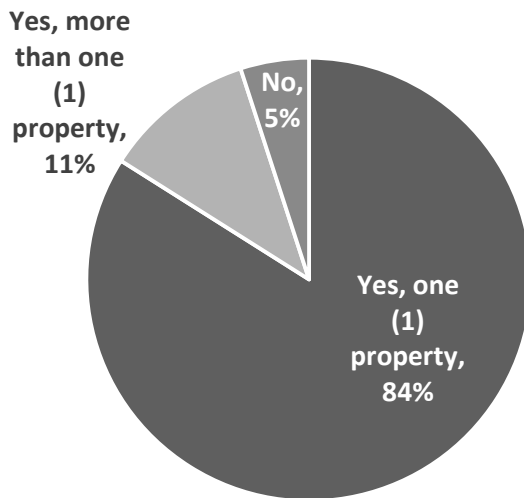
total responses = 234

Source: Sandy River Floodplain Risk Survey, Question 32 (2016).

Property Characteristics along the Upper Sandy River

Respondents also provided a description of the property(s) they owned or occupied in the Upper Sandy River Basin by answering several questions. Of those that responded, 11% owned more than one property in the Upper Sandy River Basin (Figure 2-9). Most of these homes, as indicated by a majority of respondents (87%), are single family homes (Figure 2-10).

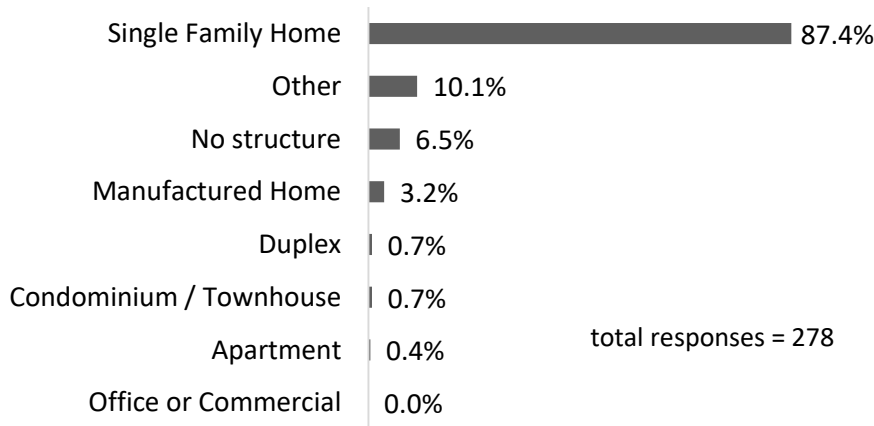
Figure 2-9: Do you own property in the Upper Sandy River Basin?



total responses = 281

Source: Sandy River Floodplain Risk Survey, Question 1 (2016).

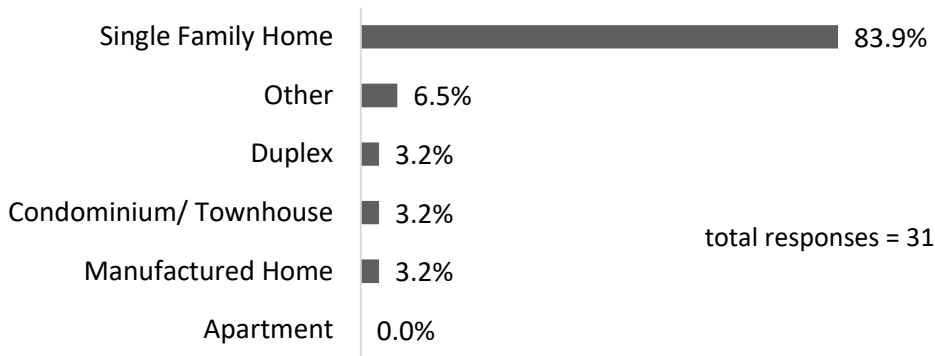
Figure 2-10: Which of the following types of structures are on the properties you own or occupy in the Upper Sandy River Basin?



Source: Sandy River Floodplain Risk Survey, Question 2 (2016).

The 11% who reported owning more than one property in these communities spent a majority of their time at a property which is a single family residence (Figure 2-11). Respondents indicating “other” (Figure 2-10 and 2-11) commonly indicated cabin (See Appendix C—Questions 2 and 2a). This coincides with the fact that many respondents use their property in the Upper Sandy River Basin as a vacation house.

Figure 2-11: Please select the type of residence in the Upper Sandy River Basin Communities where you spend the majority of your time. (For those with more than one property).

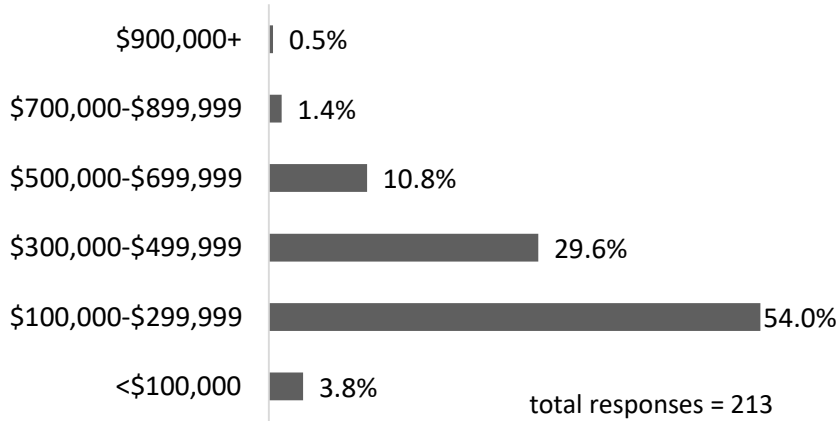


Source: Sandy River Floodplain Risk Survey, Question 2a (2016).

While housing types remain relatively homogenous, property values did encompass a slight range (Figure 2-12). Over half of respondents indicated that the value of their property was between \$100,000 and \$299,999 and almost one third of respondents indicated property values

to be between \$300,000 and \$499,999. Properties with values of \$500,000 or more taper down significantly as the value increases.

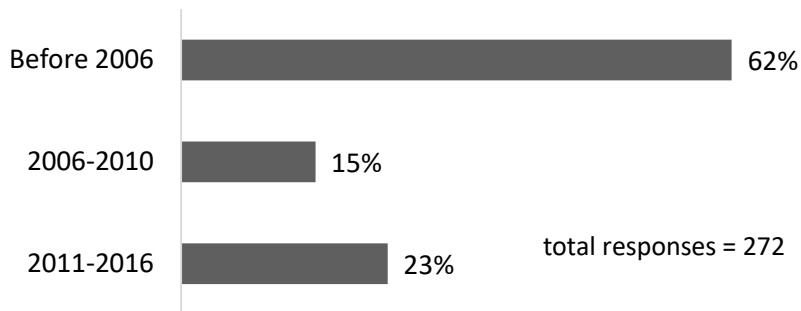
Figure 2-12: Please enter the approximate value of your property (land value plus value of any structures).



Source: Sandy River Floodplain Risk Survey, Question 31 (2016).

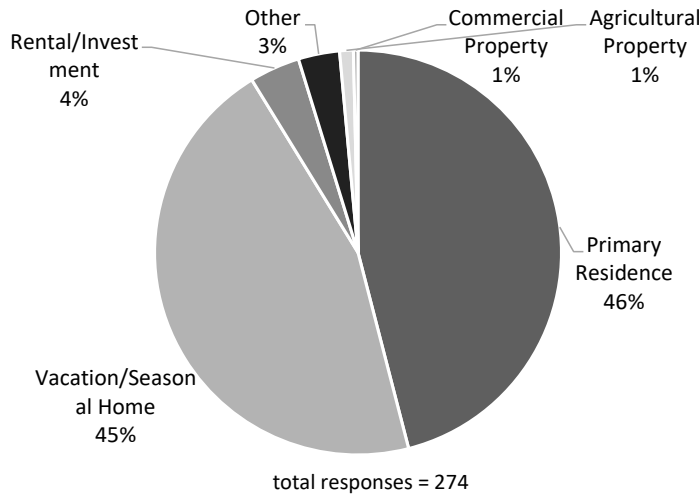
As mentioned before, most respondents have owned property in the Upper Sandy River community for more than 15 years which parallels the fact that a majority of respondents purchased or moved their property before 2006 (Figure 2-13). The specified primary use of these properties was either a primary residence (45%) or vacation/seasonal home (46%) (Figure 2-14).

Figure 2-13: What year did you purchase or move to the property?



Source: Sandy River Floodplain Risk Survey, Question 3, 3a, and 3b (2016).

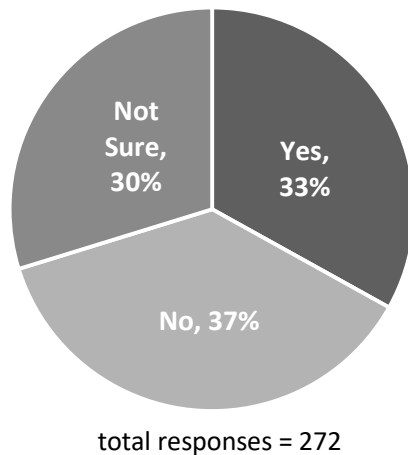
Figure 2-14: Please indicate the primary purpose of the property you own or occupy in the Upper Sandy River Basin Communities.



Source: Sandy River Floodplain Risk Survey, Question 4 (2016).

When asked whether their property(ies) were located within the flood risk zone, respondents indicated a general lack of knowledge about flood risk. Splitting roughly in thirds, 33% of survey respondents thought their properties were in the flood risk zone, 37% thought they were not, and, strikingly, 30% were not sure whether they were in a risk zone or not (Figure 2-15).

Figure 2-15: Is the property you own or occupy in the flood risk zone of the Upper Sandy River?



Source: Sandy River Floodplain Risk Survey, Question 5 (2016).

The 30% who did not know whether their properties were in the flood risk zone may potentially be at risk. Regardless, this result suggests that additional information, education, and flood risk awareness resources may be needed. As only 25% of respondents have flood insurance, survey

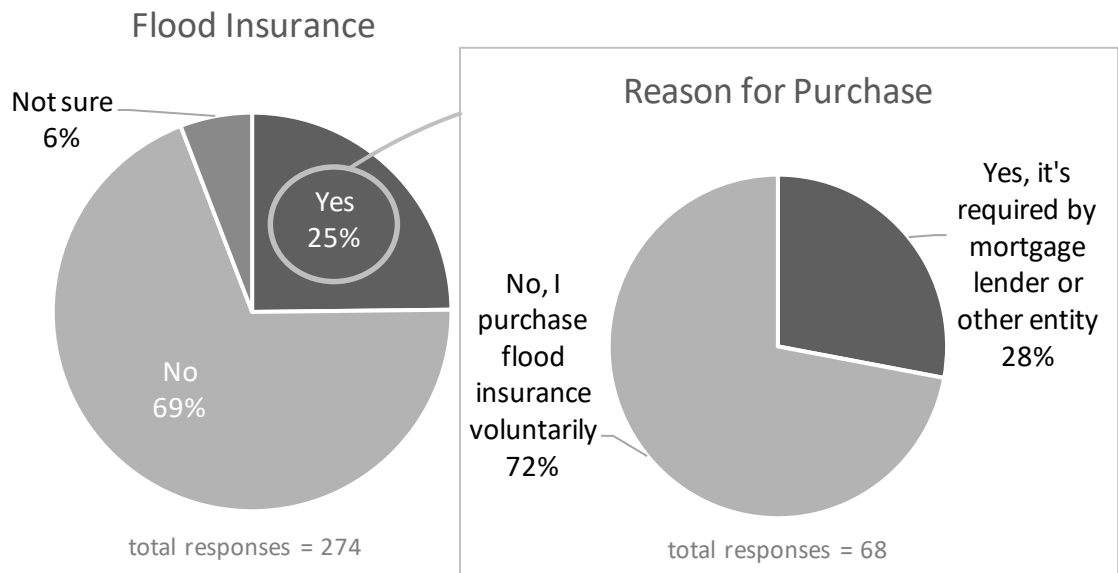
results suggest that many residents could be in danger of hardship if flooding or erosion does occur (Figure 2-16).

Notably, of the 25% with flood insurance, 72% purchased their insurance voluntarily. This indicates that there are households who see the importance or have the financial means of getting coverage on their properties despite not being required to do so (Figure 2-16).

“We looked into flood insurance for our property... [but] the cost prevented us from being able to purchase insurance. The premium was more than the current cost of our homeowner’s policy, which I thought was out of line with our potential risk.”

- Survey Respondent

Figure 2-16: Do you have flood insurance? Are you required to carry flood insurance?



Source: Sandy River Floodplain Risk Survey, Question 6 and 6a (2016).

Chapter Summary

In summary, survey respondents were well educated, older, and had relatively high incomes.

- A majority of respondents (53%) were 70 years of age and older.
- Respondents were highly educated with 33% holding bachelor’s degrees and another 36% holding a graduate or professional degree.

- A large portion of respondents (40%) were making substantial incomes at the household level (\$100,000 or more).

Most respondents also tended to be long-term home owners.

- A majority of respondents (84%) indicated owning a single-family family in the Upper Sandy River community. Most used this property as a primary residence (46%) or a vacation home (45%).
- Forty-nine percent of respondents owned or occupied their home for more than 15 years.
- Few (10%) were planning to sell their property and leave their community in the next five years.

Since most respondents are older and have had a long history in the Upper Sandy River Basin, it is likely that any regulatory or policy changes **will have to coincide with active community engagement**. Community engagement should inform residents of the rationales of these changes and serve to raise general awareness of flood risks. Community engagement should begin with the basics as many respondents (30%) are not sure if their property lies in the flood risk zone.

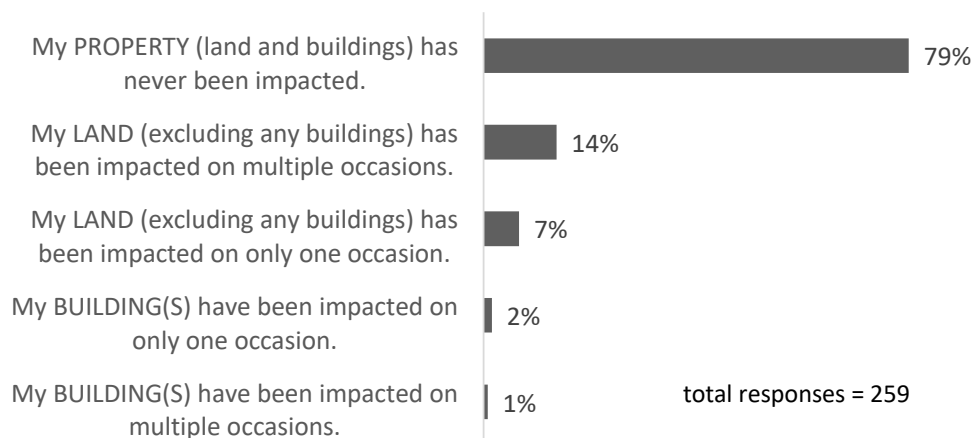
CHAPTER 3: PAST EXPERIENCES WITH FLOODING

Survey respondents' past experiences with flooding gives the County some insight into residents' perceptions and attitudes about flood risk. Those with extreme experiences are likely to be more risk adverse while those that have yet to be impacted are likely to be more risk tolerant⁴. This section describes respondents' past flood experience and discusses the implications for how the County might choose to manage risk.

Direct Experiences with Flooding

Respondents were asked to indicate whether their property has ever been impacted by flooding or erosion since 2006. Twenty-one percent of respondents indicated that their land had been directly impacted by flooding or erosion during that time period, with 14% indicating that their land has been impacted on multiple occasions (Figure 3-1). Notably, only 2% of respondents indicated that buildings they own or occupy have been impacted.

Figure 3-1: How has the property you own or occupy been impacted by flooding or erosion along the Upper Sandy River?



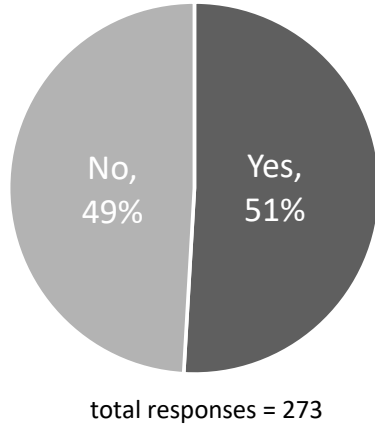
Source: Sandy River Floodplain Risk Survey, Question 7 (2016).

A majority of the respondents' properties (79%) have not been impacted by flood (Figure 3-1), yet half of all respondents (51%) stated that *they know someone else whose property has been directly impacted* by flood or erosion in the Upper Sandy River Community (Figure 3-2). Considering that only 25% of respondents reported property impacts of any kind, this result likely suggests close community relationships where many long-term residents know each other.

⁴ Cameron, Lisa and Shah, Manisha. *Risk-Taking Behavior in the Wake of Natural Disasters*, The Journal of Human Resources (2014) copyrighted by the Board of Regents of the University of Wisconsin System (2015).

Therefore, if a small number of properties are impacted by flooding, many members of the community know those impacted directly.

Figure 3-2: Do you personally know anyone, whose property has been impacted by flood or erosion along the Sandy River?



Source: Sandy River Floodplain Risk Survey, Question 8 (2016).

The financial impact of flooding and erosion will often change attitudes and perspectives about flood risk and mitigation. As such, the survey asked about out of pocket money spent toward property repairs from flooding and erosion. The overwhelming majority (90%+) of respondents indicated that they have not spent money out of pocket for repairs on their property due to flood and erosion damage since 2006 (Table 3-3).

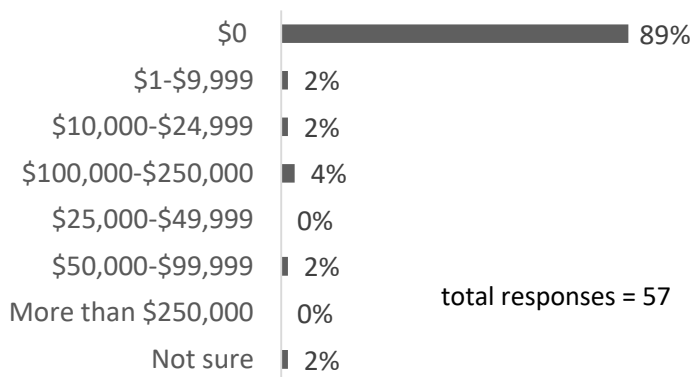
Table 3-3: How much would you estimate you have spent out of your own pocket on repairing your property from all flood and erosion damage since 2006?

	\$0	\$1-\$999	\$1,000-\$4,999	\$5,000-\$24,999	\$25,000-\$49,999	More than \$50,000	Not Sure	TOTAL
Bank Stabilization	90%	4%	1%	3%	1%	1%	0%	213
Debris Removal	90%	5%	2%	2%	0%	0%	0%	207
Repairs to Structures	95%	2%	1%	1%	1%	1%	0%	202

Source: Sandy River Floodplain Risk Survey, Question 9 (2016).

Correspondingly, since 2006, only 11% of respondents with flood insurance estimated that their insurance has covered the cost of repairs from flood and erosion damage (Figure 3-4). These responses indicate that economic impacts from flood events over the past 20-years have been concentrated on a relatively small number of properties, at least among those who responded to the survey.

Figure 3-4: How much would you estimate your flood insurance has covered for repairing all flood and erosion damage on your property since 2006?



Source: Sandy River Floodplain Risk Survey, Question 10 (2016).

For more context, of the respondents who indicated that they had flood insurance, 41% reported that their land or buildings have been directly impacted by floods or erosion. For these residents, about half have not spent any out of pocket money on repairing their property from floods or erosion (Table 3-5). Nevertheless, 35% of respondents with flood insurance have spent over \$5,000 to stabilize their river bank, 44% have spent at least \$1,000 to remove debris, and almost a third have spent more than \$5,000 repairing structures caused by flooding or erosion (Table 3-5).

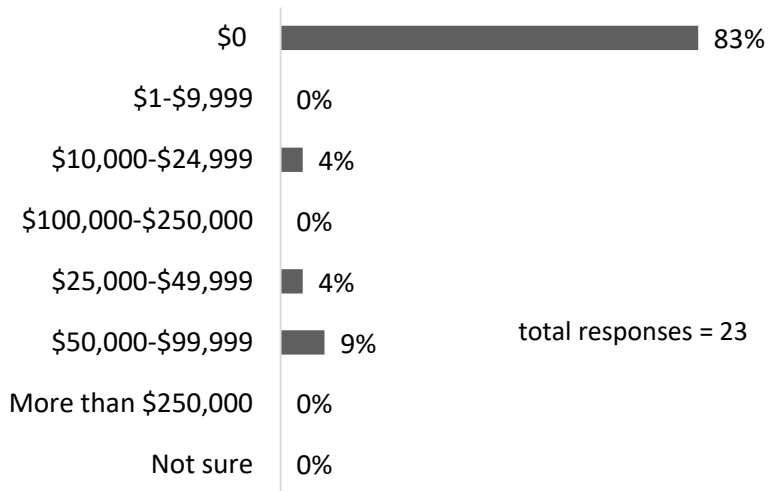
Table 3-5: How much would you estimate you have spent out of your own pocket on repairing your property from all flood and erosion damage since 2006?

	\$0	\$1-\$999	\$1,000-\$4,999	\$5,000-\$24,999	\$25,000-\$49,999	More than \$50,000	Not Sure	TOTAL
Bank Stabilization	45%	10%	0%	25%	10%	10%	0%	20
Debris Removal	50%	6%	19%	25%	0%	0%	0%	16
Repairs to Structures	53%	7%	7%	20%	7%	7%	0%	15

Source: Sandy River Floodplain Risk Survey, Question 9 with filter: only those with flood insurance who have also experienced damage to their property (land, structures, or both) from flood and erosion (2016).

Further, a majority (83%) of respondents with flood insurance whose properties have been impacted by flood and erosion, have not had to use their flood insurance to cover the cost of repairs (Figure 3-6). Nevertheless, 13% of respondents with flood insurance whose properties have been impacted have had to use their flood insurance to cover \$25,000 to \$99,999 worth of damage (Figure 3-6).

Figure 3-6: How much would you estimate your flood insurance has covered from repairing all flood and erosion damage on your property since 2006?

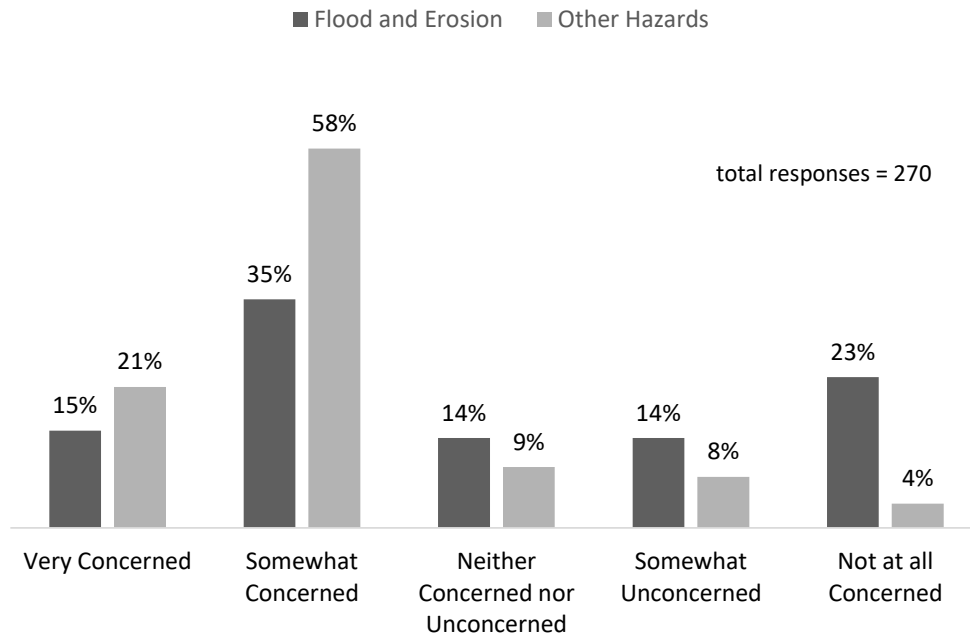


Source: Sandy River Floodplain Risk Survey, Question 10 with filter: only those with flood insurance who have also experienced damage to their property (land, structures, or both) from flood and erosion (2016).

While some respondents have suffered from flooding and erosion causing a high monetary impact, a majority of respondents have not. Yet, flooding is one of the most common natural hazards in Oregon and the United States. Properties in floodplains are seriously at risk of excess water levels destroying or damaging household structures—not to mention the livelihoods of those that live in these areas.

While the threat is very real, only 45% of respondents indicated that they were somewhat or very concerned with floods or erosion effecting their property compared with 79% of respondents who were somewhat or very concerned with other types of hazards effecting their property (Figure 3-7). Further, almost 40% of respondents were somewhat unconcerned or not at all concerned with flooding and erosion compared with the 12% of respondents who were somewhat unconcerned or not at all concerned about other hazards. One possible explanation for this weak/lower level concern for flooding and erosion is that a majority of respondents have not suffered a large financial consequence due to being directly impacted by flood and erosion. Another possible explanation is that residents perceive that the flood risk is limited to areas within or directly adjacent to the current river channel, while other hazards are perceived as having less defined boundaries.

Figure 3-7: How concerned are you about floods or erosion affecting your property versus other hazards (wildfire, landslide, volcano, etc.)?



Source: Sandy River Floodplain Risk Survey, Question 11 and 12 (2016).

Chapter Summary

In summary, a majority of respondents have not had direct or severe experiences with flooding, leaving the community **slightly risk tolerant**.

- Almost 80% of respondents have *never* had their property (land or structures) impacted by flood or erosion.
- About a quarter of respondents were not at all concerned with floods or erosion affecting their property.
- A majority of respondents have not used out of pocket money to cover the cost of flood and erosion damage.
- Eighty-three percent of respondents with flood insurance have not had to use it to cover the cost of flood and erosion damage.

Nevertheless, it is important for community members to understand the inherent risks in living in the Upper Sandy River Basin. Increasing community awareness will help to reduce the exposure to flood and erosion hazards that could dangerously impact this community.

CHAPTER 4: MANAGING FLOOD RISKS

Clackamas County, State and Federal governmental agencies, and local groups such as the Watershed Council and homeowners' association are currently considering several different strategies to reduce the risk of property damage resulting from flooding and erosion risk along the Upper Sandy River. A key purpose of the survey was to engage the community and solicit feedback on proposed development and flood management policies currently under consideration. As such, the findings presented in this chapter can directly inform land-use policy options being considered by the County Planning Commission and Board of County Commissioners.

Figure 4-1: Residencies Damaged by Flooding and Erosion



Source: Clackamas County (2012).

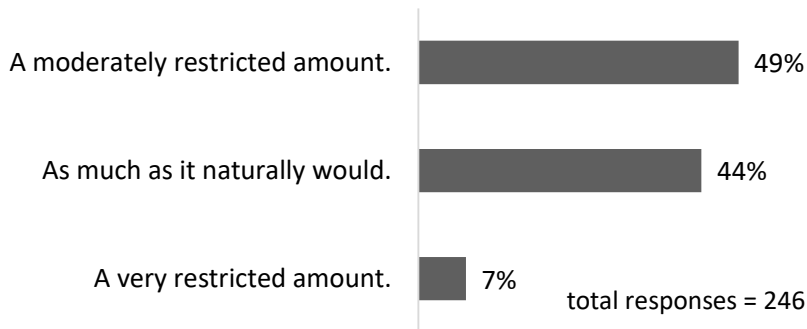
General Perceptions of Mitigation Approaches

The Sandy River's channel will naturally continue to change due to storms and snow melt. This migration can cause problems for the human-made structures located near the river. When respondents were asked to what extent channel migration should be allowed, respondents were somewhat split between allowing the river to migrate as much as it naturally would (44%) and moderately restricting its migration (49%) (Figure 4-2).

"The river should be allowed to migrate naturally in areas where structures are not present but should be restricted as necessary where structures are threatened."

- Survey Respondent

Figure 4-2: How much should the Sandy River channels be allowed to migrate?



Source: Sandy River Floodplain Risk Survey, Question 19 (2016).

The survey also asked respondents about existing properties along rivers in the Upper Sandy River Basin. Eighty-six percent of respondents indicated that those who owned property, lived, or had a business in the flood risk zone of the Upper Sandy River should be allowed to continue to occupy that space. Additionally, 71% of respondents indicated that they should also be able to renovate or repair existing structures that were damaged by flooding or erosion. On the other hand, 54% of respondents indicated that these residents should not be able to build *new* structures and 65% indicated these residents should not be able to expand existing structures in the flood risk zone (Table 4-3). These findings suggest that many respondents want to respect property owner’s and occupant’s rights, but they do not want to heighten threats of damage by adding new development(s).

Table 4-3: If someone lives, owns property, and/or has a business in the flood risk zone of the Upper Sandy River, should they be allowed to engage in the following activities?

	Yes	No	No Opinion	TOTAL
Continue to live, own, and/or operate a business in the flood risk zone.	86%	5%	9%	249
Renovate or repair existing structures in the flood risk zone that have suffered flood damage in the past.	71%	17%	11%	249
Expand existing structures in the flood risk zone.	30%	54%	16%	248
Build new structures in the flood risk zone.	21%	68%	11%	248

Source: Sandy River Floodplain Risk Survey, Question 20 (2016).

A relatable way to gauge people’s opinions is by posing a monetary dilemma. The survey asked respondents to split \$100 into categories of flood management options: mitigation, recovery, response or preparation (refer to Table 4-4). While the average amount survey respondents allocated to each category was relatively close, respondents allocated slightly more towards mitigation activities *to reduce or eliminate the likelihood of damage/property loss* and toward recovery activities that *help a community bounce back after a flood event*. This was closely followed by response and preparation activities.

“I believe that ‘mitigation’ means more than property buy out or relocation out of the flood risk zone. It also means doing things to help prevent more damage if flooding were to occur.”

- Survey Respondent

Table 4-4: If you were given \$100 to spend on dealing with floods along the Upper Sandy River, how would you divide it among the following categories?

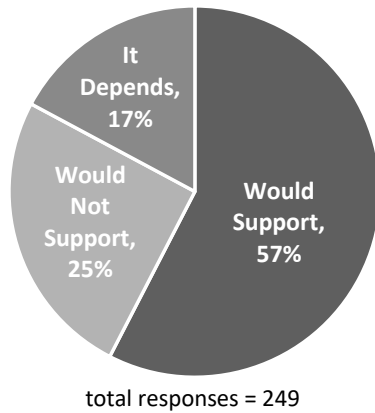
	Mean	Total Respondents
Mitigation Activities Reduce or eliminate the likelihood of a flood causing damage and loss of property/life. For example, property buy-outs and relocation outside of the flood risk zone.	\$30.34	250
Recovery Activities Help a community bounce back after a flood event. For example, repairing or relocating damaged roads and bridges.	\$29.07	249
Response Actions Occur in direct response to a flood. For example, rescue efforts or providing temporary housing for flood victims.	\$21.84	250
Preparation Activities Increase a community's ability to respond when floods strike. For example, developing an evacuation plan.	\$19.28	250

Source: Sandy River Floodplain Risk Survey, Question 22 (2016).

One possible and common mitigation activity is for government agencies or non-government organizations (such as land trusts) to purchase properties in the flood risk zone (buy-outs). Buy-outs would allow current residents to move to a different location—one with a lower risk of

danger—while compensating owners for their land, structures, and moving expenses. The underlying property is then deed restricted to remain as permanent open space. Due to the significant reliance on public dollars and requirement for residents to relocate, respondents were asked whether they would support such a strategy. A majority (57%) stated that they would support buy-outs. However, a moderate proportion would not (25%) (Figure 4-5).

Figure 4-5: Would you support buy-outs of private property in the flood risk zone if the land were then used to create public access to the Sandy River?

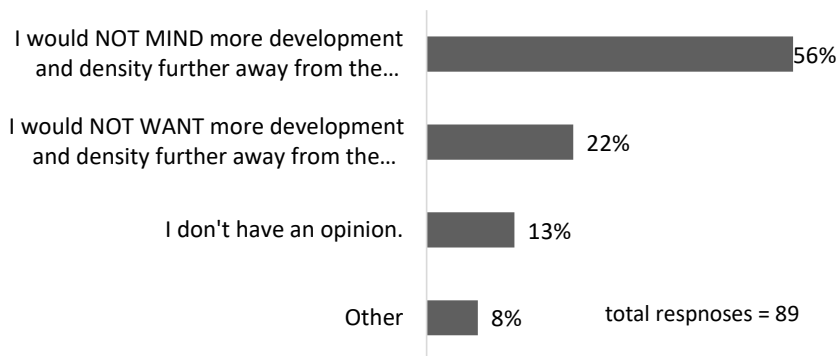


Source: Sandy River Floodplain Risk Survey, Question 23a (2016).

Nonetheless, supporting buy-outs is not the same as partaking in them; 31% of respondents indicated that they were somewhat or very *unlikely* to participate in a government driven buy-out program while 29% of respondents indicated that they were somewhat or very likely to participate (close to even split) (Table 4-8).

Over half of respondents also stated they would not mind if more development and density was located further away from the river (Figure 4-6). This option, to relocate residents in the flood risk zone further away from the river, may be one potential consideration for the buy-out program.

Figure 4-6: How would you feel about property owners that currently have property in the flood risk zone relocating to properties outside the flood risk zone, but still within the Upper Sandy River Basin?



Source: Sandy River Floodplain Risk Survey, Question 23b (2016).

Government-Driven Strategies

Question 15 asked respondents how supportive or unsupportive they were of particular government-driven strategies that would reduce the risk of flood and erosion in the Upper Sandy River Basin. Overall, respondents were generally supportive of the government-driven strategies listed in the survey. The following are government-driven strategies that have been categorized to show respondents' levels of support (also see Table 4-7).

Strategies that 70-100% of respondents were somewhat or very supportive of:

- Requiring the disclosure of flood risks during real estate transactions.
- Hosting events to educate and raise awareness about flood and erosion risks.
- Adopting zoning, building or other development regulations that LIMIT new development in the flood risk zone.
- Restoring riverbanks on public lands to their natural state.

Strategies that 50-69% of respondents were somewhat or very supportive of:

- Adopting zoning, building or other development regulations that PROHIBIT new development in the flood risk zone.
- Compensating property owners who use approved methods of flood and erosion reduction.
- Facilitating land swaps that help property owners move out of the flood risk zone.
- Actively encouraging property owners to sign up for federal flood insurance.

Strategies that 40-49% of respondents were somewhat or very supportive of:

- Compensating property owners for not developing on areas of their property that fall within the flood risk zone.
- Buying out private properties that are within the flood risk zone.
- Fining or penalizing property owners who illegally use riprap or boulders to prevent erosion.

Respondents were generally least supportive of creating a special district to collect taxes to fund risk management projects. Many respondents were not partial to having public dollars fund mitigation efforts:

- “Property owner are responsible for their choice to purchase and develop on flood plains. Public funds should not be spent to reimburse them for their errors or to pay them for performing work on their own land”. –Survey Respondent
- “I appreciate taxpayer dollars being spent to purchase vulnerable lands from private owners, but believe the state should operate in the open market without any monetary/coercive advantage”. – Survey Respondent

The complete list of text responses that accompanied the discussion about government-managed mitigation strategies can be found in Appendix C (Question 16).

Table 4-7: Please indicate how supportive or unsupportive you are of the following government-driven strategies for reducing the risk of floods and erosion along the Upper Sandy River.

	Very Supportive	Somewhat Supportive	Neither Supportive Nor Unsupportive	Somewhat Unsupportive	Very Unsupportive	I Don't Know	TOTAL
Requiring the disclosure of flood risks during real estate transactions.	72%	17%	6%	1%	2%	2%	251
Hosting events to educate and raise awareness about flood and erosion risks.	47%	33%	14%	2%	2%	1%	254
Restoring riverbanks on public lands to their natural state.	47%	25%	16%	4%	5%	4%	253
Adopting zoning, building or other development regulations that LIMIT new development in the flood risk zone.	45%	33%	10%	6%	4%	2%	253
Adopting zoning, building or other development regulations that PROHIBIT new development in the flood risk zone.	42%	25%	11%	10%	8%	4%	252
Compensating property owners who use approved methods of flood and erosion reduction.	29%	35%	15%	7%	11%	3%	253
Actively encouraging property owners to sign up for federal flood insurance.	29%	30%	26%	5%	7%	3%	253
Fining or penalizing property owners who illegally use riprap or boulders to prevent erosion.	28%	20%	20%	12%	15%	6%	253
Facilitating land swaps that help property owners move out of the flood risk zone.	23%	38%	20%	7%	9%	3%	254
Compensating property owners for not developing on areas of their property that fall within the flood risk zone.	16%	25%	22%	14%	18%	6%	251
Buying out private properties that are within the flood risk zone.	15%	26%	24%	13%	19%	4%	252
Creating a special district that collects taxes or fees to fund local risk management projects.	6%	19%	22%	17%	24%	11%	252

Source: Sandy River Floodplain Risk Survey, Question 15 (2016).

Voluntary Mitigation Strategies

Question 17 asked respondents to indicate how likely or unlikely they would be to engage in various voluntary personal actions to reduce the risk of flood and erosion in the Upper Sandy River Basin. Strategies listed have been categorized below to showcase what respondents were either very or somewhat likely to participate in (also see Table 4-8).

Strategies that 70-100% of respondents were somewhat or very likely to engage in:

- Disclosing flood and other hazard risks during real estate transactions.
- Using approved methods of riverbank restoration to reduce erosion.
- Choosing not to build in the flood risk zone.

Strategies that 50-69% of respondents were somewhat or very likely to engage in:

- Using low impact development practices to reduce the likelihood of flooding.

Strategies that 40-49% of respondents were somewhat or very likely to engage in:

- Signing up for federal flood insurance.
- Renovating structures to be more flood resistant.

Interestingly, respondents were just about split when indicating their willingness to engage in a government property buy-out program. As mentioned above, 29% of respondents indicated they were very or somewhat *likely* to engage in a government buy-out while 31% of respondents indicated they would be very or somewhat *unlikely* to participate.

Another split response result conveyed that 28% of respondents were somewhat or very *likely* to voluntarily sell their property through the private real estate market to move to a lower-risk location while 30% were somewhat or very *unlikely* to engage.

Table 4-8: Please indicate how likely or unlikely you would be to engage in the following voluntary personal actions to reduce the risks of flood and erosion along the Sandy River.

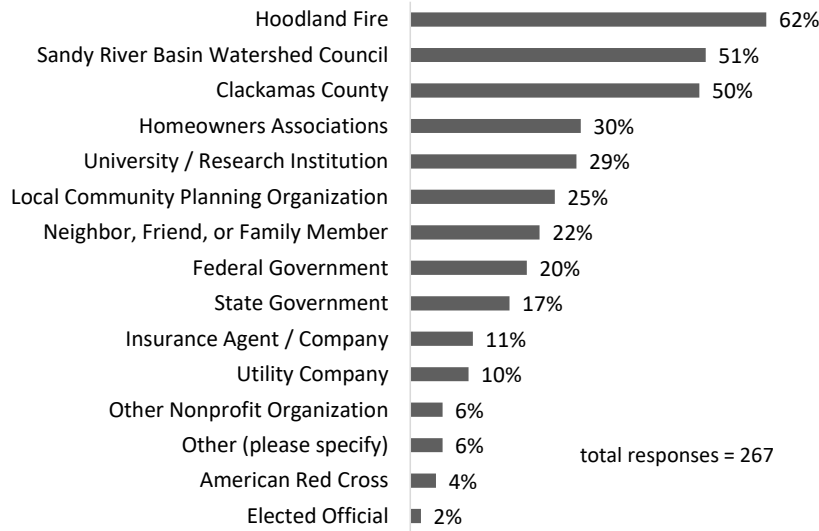
	Very Likely	Somewhat Likely	Neither Likely nor Unlikely	Somewhat Likely	Very Unlikely	N/A to Situation	TOTAL
Disclosing flood and other hazard risks during real estate transactions.	61%	18%	9%	2%	2%	7%	244
Choosing not to build in the flood risk zone.	53%	17%	9%	3%	4%	14%	244
Using approved methods of riverbank restoration to reduce erosion.	45%	28%	7%	2%	4%	14%	246
Using low impact development practices to reduce the likelihood of flooding.	40%	29%	12%	1%	3%	15%	246
Signing up for federal flood insurance.	28%	17%	20%	11%	10%	14%	245
Renovating structures to be more flood resistant.	15%	25%	22%	9%	9%	19%	245
Participating in a government property buy-out program.	13%	16%	22%	11%	20%	18%	247
Voluntarily selling property through the private real estate market and moving to a lower-risk location.	12%	16%	23%	9%	21%	19%	247

Source: Sandy River Floodplain Risk Survey, Question 17 (2016).

Information Access

Educating property owners in the Upper Sandy River Basin is critical to ensure that citizens understand the flood and erosion risks, mitigation opportunities, and preparation techniques. When asked about who they trust to receive information about flooding and erosion, over 50% of respondents indicated that they would be most trusting of Clackamas County, the Sandy River Basin Watershed Council, and Hoodland Fire to deliver them information about how to make their property less vulnerable to floods and erosion (Figure 4-9). Respondents were least trustworthy of elected officials, the American Red Cross, other nonprofit organizations, and the utility company (Figure 4-9). Ensuring that citizens are receiving valuable information from organizations they deem credible and trustworthy can mean the difference between heeding certain warnings and ignoring warranted advice.

Figure 4-9: Which of the following would you most trust to provide you with information about how to make your property less vulnerable to floods and erosion?



Source: Sandy River Floodplain Risk Survey, Question 13 (2016).

Another survey question asked respondents to consider informational outlets. When asked, respondents generally indicated a preference for emailed or mailed fact sheets or brochures and public workshops or meetings (Table 4-10). The least effective methods identified were local radio programs, books, and magazines (Table 4-10).

Table 4-10: How effective are the following outlets for providing you with information about how to make your property less vulnerable to floods and erosion?

	Very Effective	Somewhat Effective	Slightly Effective	Not at all Effective	TOTAL
Other	37%	10%	10%	43%	30
Mailed fact sheet/brochure	30%	42%	17%	11%	240
Emailed fact sheet/brochure	25%	43%	17%	15%	240
Public workshops/meetings	20%	45%	22%	13%	240
Local newspaper	13%	32%	27%	28%	240
Social media	13%	16%	24%	48%	224
Citizen News from Clackamas County	9%	30%	31%	31%	235
Publically posted fact sheet/brochure	7%	25%	28%	40%	232
Books	5%	20%	25%	50%	227
Regional newspaper	4%	20%	30%	46%	238
Local television program	3%	20%	28%	49%	232
Local radio program	2%	13%	28%	57%	228
Magazines	1%	16%	23%	60%	223

Source: Sandy River Floodplain Risk Survey, Question 14 (2016).

“I believe education in regards to causes and ways to try to prevent erosion are very good. The more one understands the reasons, the easier it is to get them to work and support the need.”

- Survey Respondent

Chapter Summary

In summary, respondents’ **mixed perceptions** about mitigating flood risk.

- About 50% of respondents believed that migration of the Sandy River’s channel should be *moderately restricted* and 44% believed that it should be *allowed to migrate as much as it naturally would* (about split).
- A majority of respondents (86%) believed that if some owns property, lives, or has a business in the flood risk zone *they should be able to continue to occupy, renovate, and repair* existing structures that have suffered damage.
 - However, a majority of respondents thought these same individuals should not be able to expand existing structures in the risk zone (54%) or build new structures in the risk zone (68%).
- About 30% of respondents thought money used to deal with flooding should be allocated toward mitigation activities and 29% thought it should be allocated toward recovery activities (about split).
- A majority of respondents (56%) would *not mind more density further away* from the Sandy River and almost a quarter of respondents would not want it.

Overall, respondents were generally **supportive of most government-driven strategies**.

- Over three quarters of respondents were very or somewhat *supportive* of the government requiring the disclosure of flood risks during real estate transactions (89%), hosting events to educate and raise awareness (80%), and adopting regulations that limit development in the flood risk zone (79%).
- Also, over half of all respondents were very or somewhat *supportive* of the government: restoring riverbanks on public lands to their natural state (71%), adopting regulations that prohibit new development in the flood risk zone (67%), compensating property owners who use approved methods of flood and erosion reduction (64%), facilitating land swaps (61%), and actively encouraging property owners to sign up for flood insurance (59%).

Respondents were also **likely to engage in various voluntary mitigation strategies**.

- Over three quarters of respondents (79%) were very or somewhat *likely* to engage in disclosing flood and other hazard risks during real estate transactions.

- Close to three quarters of respondents were also very or somewhat *likely* to use approved methods of riverbank restoration (73%), choose not to build in the flood risk zone (70%), and use low impact development practices.
- A majority of respondents (57%) would *support a government buy-out*, but were *split in whether or not they would participate*.
 - Twenty-nine percent of respondents indicated they would be very or somewhat *likely* to participate in a buy-out and 31% indicated they were very or somewhat *unlikely* to participate in one.
- About a quarter of respondents were very or somewhat *unlikely* to engage in voluntarily selling their property through the private market and moving to a lower-risk location (30%) or signing up for federal flood insurance (21%).

CHAPTER 5: CONCLUSION

These findings can be used as a tool for Clackamas County, the Upper Sandy River Basin Community, and other organizations wishing to further the discussion on appropriate mitigation strategies to implement in the Upper Sandy River Basin. These discussions will allow local governments to make more informed policy decisions.

Key Findings

This survey sought to answer several questions about residents and property owners in the Upper Sandy River Basin, including:

- How risk averse/tolerant is the community?
- When mitigating risk, what does the community feel should be their responsibility and what do they feel should be the government's responsibility?
- What are residents' attitudes toward individual policies being considered by the County?
- What are residents' attitudes about property rights?
- What would make residents move away on their own?

The survey responses provide a snapshot of a subset of community members' attitudes and opinions about flood risk reduction.

How risk averse/tolerant is the community?

Based on survey responses, residents are fairly risk tolerant. Respondents were only mildly concerned over flooding than with other hazards. With 51% of respondents being indifferent, somewhat unconcerned, or very unconcerned with flooding and erosion, passivity toward risk may open up significant problems in the future.

To help the community become more risk averse, the community needs to be familiarized with the risk of flood and erosion. Many survey respondents indicated a lack of education or awareness about the risks of flooding hazards in the Upper Sandy River Basin. Part of this problem stems from a real or perceived lack of readily available information about the danger of area flooding. Many respondents also do not know whether their properties are at risk. Further, some respondents were cognizant of the potential risks, but uncertain if the level of risk merits the expensive purchase of flood insurance or mitigation efforts.

When mitigating risk, what does the community feel should be their responsibility and what do they feel should be the government's responsibility?

Respondents were slightly divided when it came to assigning responsibility. Many text responses indicated that property owners should be left to their own devices when it comes to development of their land and maintenance of structures and, with that, the financial risk should be theirs alone. Others thought that the government should assist those living in flood risk areas.

As far as general strategies for mitigation are concerned, **respondents demonstrated far more support for government-driven strategies than willingness to voluntarily engage in personal actions** to reduce the risk of flood and erosion. When mitigating risk, respondents were most clearly supportive of the government driven strategy to require the disclosure of flood risks in real estate transactions—this also happens to be the strategy respondents were most likely to voluntarily partake in.

What are the community’s attitudes toward individual policies being considered by the County?

Survey respondents were generally receptive of the County’s flood risk management ideas.

Activities that would not require an increase in taxes were especially popular with the community. Policies that at least 60% of respondents were either very or somewhat supportive included:

- Requiring the disclosure of flood risks during real estate transactions.
- Hosting events to educate and raise awareness about flood and erosion risks.
- Adopting zoning, building or other development regulations that LIMIT new development in the flood risk zone.
- Restoring riverbanks on public lands to their natural state.
- Adopting zoning, building or other development regulations that PROHIBIT new development in the flood risk zone.
- Compensating property owners who use approved methods of flood and erosion reduction.
- Facilitating land swaps that help property owners move out of the flood risk zone.

What are the community’s attitudes about property rights?

Survey respondents shared mixed views about property rights. While some respondents indicated that property owners should be able to do what they want with their property, others believed that the government should be more involved. Responses, such as the text responses below, illustrate that some believe property owners should be able to do as they wish.

- “If people own property in a flood zone it's theirs to do with what they please.”
- “If the building already exists, people can continue living there. They should also be able to make changes or repairs to their home if they choose, or if it has been damaged by the elements rather than being forced to leave their home.”
- “I don't feel it's someone else's place to force people to move or restrict their business, certainly not the governments.”

Others qualified their responses by saying that while property owners should have full rights to do as they wish, they should also bear the full responsibility of that risk.

- “After being well informed of the flooding probability, people should be able to develop their property at their own risk as long as it doesn't damage the ecosystem.”
- “It's common knowledge that homes are at risk and people choose to take the risk or leave.”
- “If someone has lived in the flood risk zone, they deserve to decide if they want to stay and take that risk, and pay the price for it. I don't believe there should be a heavy hand

of government involved in affirming or denying someone the right to stay on the property where they have invested time, effort and connections.”

Finally, some respondents felt that some government involvement, regulation, or restrictions was needed. A few text responses below illustrate this point.

- “I believe that properties should be moved out of the 100-year flood zone, and if damaged, should not be allowed to rebuild.”
- “I don't believe a river can be ‘controlled’... it would be better to buy out homeowners to avoid tragedy.”
- “People are there now. Let them stay, but no more building.”

What would make community residents move away on their own?

Without intervention, there was no clear indication that survey respondents would leave on their own accord. A majority of respondents were of a higher age bracket and may likely want to live out their retirement in their community of choice. Offering residents some sort of incentive will then become necessary. Another option, however, is to educate the community about potential risks which may change residents’ perceptions about safety in their communities. Respondents’ preferred mode of receiving information was through emailed or mailed fact sheets and brochures, as well as by attending public meetings and workshops. Information mailers, meetings, and workshops should therefore be offered consistently and regularly. Further, this information should be delivered by Hoodland Fire, Sandy River Basin Watershed Council, or Clackamas County as respondents indicated that they were most trusting of these three organizations.

APPENDIX A: SURVEY INSTRUMENT

The following is a replica of the paper survey instrument used to gather responses from survey respondents. It should be noted however that most respondents completed this survey (with identical questions) via Qualtrics, a web-based survey tool used to conduct survey research.

Upper Sandy River Base Flood Risk Survey

What's your experience living near the Sandy River and its floodplain?

Dear Community Member,

Clackamas County has partnered with the University of Oregon's Oregon Partnership for Disaster Resilience to investigate community attitudes to flood risk reduction. Your responses today will help us understand how to better address the risks associated with flooding and erosion in the Upper Sandy River Basin.

This survey has about 30 questions and should take you 20 minutes or less to complete. Your answers are confidential and will not be connected to any personal information you provide.

To thank you for participating in the survey, you can enter a drawing to win one of three \$50 certificates! Please check the box at the end of this survey to be entered.



Photo courtesy of Oregon's Mt. Hood Territory

The University of Oregon's Oregon Partnership for Disaster Resilience developed this survey and will be analyzing the results. Findings from the survey will be used to inform policies and programs aimed at reducing the risks associated with flooding along the Upper Sandy River. If you have questions, please contact Aniko Drlik-Muehleck, Community Planning Workshop Project Manager, at aniko@uoregon.edu.

Q1. Do you own property in the Upper Sandy River Basin? *Select one.*

- Yes, *one* property Yes, *more than one* property No

Q2. Which of the following types of structures are on the property(s) you own or occupy in the Upper Sandy River Basin? *Please select all that apply.*

- Single Family Home Apartment
 Manufactured Home Office or Commercial
 Condominium / Townhouse No Structure
 Duplex Other: *(Please specify)*
-

Q2a. *IF you own more than one property:* For the purposes of this survey, we would like you to select just **ONE** property to answer questions about. Please select the type of residence in the Upper Sandy River Basin Communities where you spend the majority of your time. *Please answer the remaining questions in the survey about this property.*

- Single Family Home Apartment
 Manufactured Home Office or Commercial
 Condominium / Townhouse No Structure
 Duplex Other: *(Please specify)* _____

Q3. If you own your property, what year did you *purchase* your property? If you do not own your property, what year did you *move to* the property you currently occupy in the Upper Sandy River Basin Communities?

Year purchased or moved to: _____

Q4. Please indicate the primary purpose of the property you own or occupy in the Upper Sandy River Basin Communities.

- This is my primary residence. This is a rental or investment property. This is an agricultural property.
 This is a vacation or seasonal home. This is a commercial or business property. Other: *(Please specify)* _____

Q5. Is the property you own or occupy in the flood risk zone of the Upper Sandy River?

- Yes No Not Sure

Q6. Do you have flood insurance?

- Yes No Not Sure

Q6a. *IF yes:* Are you *required* to carry insurance?

- Yes, it's required by my mortgage lender or other entity No, I purchase flood insurance voluntarily

Part 1. Past Experience with Flooding

We would like to know more about your experience with floods and erosion along the Sandy River in the past decade. If you have multiple properties, please answer these questions about the residence located in the Upper Sandy River Basin Communities where you spend the majority of your time.

Q7. Since 2006, how has the property you own or occupy been impacted by flooding or erosion along the Upper Sandy River? If you bought or moved to your property more recently than 2006, answer for just the years you have owned or occupied your property. *Select all that apply.*

- My **LAND** (excluding any buildings) has been directly impacted by floods or erosion on **only one occasion**.
- My **LAND** (excluding any buildings) has been directly impacted by floods or erosion on **multiple occasions**.
- My **BUILDING(S)** have been directly impacted by floods or erosion on **only one occasion**.
- My **BUILDING(S)** have been directly impacted by floods or erosion on **multiple occasions**.
- My **property** (land and buildings) has **never been** directly impacted by floods or erosion.

Q8. Do you personally know anyone, other than the people who live with you, whose property has been impacted by flood or erosion along the Sandy River?

- Yes No

Q9. How much would you estimate you have spent **out of your own pocket** on repairing your property from all flood and erosion damage since 2006?

<i>Amount</i>	Bank Stabilization	Debris Removal	Repairs to structures
\$0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
\$1 - \$999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
\$1,000 - \$4,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
\$5,000 - \$24,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
\$25,000 - \$49,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More than \$50,000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not sure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q10. *IF you have flood insurance:* How much would you estimate your **flood insurance** has covered for repairing all flood and erosion damage on your property since 2006?

- \$0 \$10,000 - \$24,999 \$50,000 - \$99,999 More than \$250,000
 \$1 - \$9,999 \$25,000 - \$49,999 \$100,000 - \$250,000 Not sure

Q11. How concerned are you about floods or erosion affecting your property?

- Very concerned Somewhat concerned Neither concerned nor unconcerned Somewhat unconcerned Not at all concerned

Q12. How concerned are you about other hazards (wildfire, landslide, volcano, etc.) affecting your property?

- Very concerned Somewhat concerned Neither concerned nor unconcerned Somewhat unconcerned Not at all concerned

Q13. Which of the following would you most trust to provide you with information about how to make your property less vulnerable to floods and erosion? *Please select all that apply.*

- Hoodland Fire State government Neighbor, friend, or family member
 Sandy River Basin Watershed Council Federal government Elected official
 Local Community Planning Organization (COP, Village Board) Utility company American Red Cross
 Homeowners Association Insurance agent or company Other nonprofit organization
 Clackamas County University or research institution Other: *(Please specify)* _____

Q14. How effective are the following outlets for providing you with information about how to make your property less vulnerable to floods and erosion?

<i>Information outlet</i>	Very effective	Somewhat effective	Slightly effective	Not at all effective
Regional newspaper	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local newspaper	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizen News from Clackamas County	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local television program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local radio program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magazines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social media (ex. Facebook)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emailed fact sheet/brochure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mailed fact sheet/brochure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Publically posted fact sheet/brochure (ex. on a bulletin board)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public workshops/meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (<i>please specify</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 2. Managing Flood Risks

Clackamas County, State and Federal governmental agencies, and local groups such as the Watershed Council and homeowners' associations are considering several different strategies to reduce flooding and erosion risk along the Upper Sandy River. To help these agencies and groups determine what strategies to use, we would like to know more about how you think the risk of flood and erosion should be reduced.

Q15. Please indicate how supportive or unsupportive you are of the following *government-driven* strategies for reducing the risk from floods and erosion along the Upper Sandy River.

<i>Government-driven strategy</i>	I am very supportive	I am somewhat supportive	I am neither supportive nor unsupportive	I am somewhat unsupportive	I am very unsupportive	I don't know
Adopting zoning, building or other development regulations that LIMIT new development in the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adopting zoning, building or other development regulations that PROHIBIT new development in the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creating a special district that collects taxes or fees to fund local risk management projects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fining or penalizing property owners who illegally use riprap or boulders to prevent erosion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Requiring the disclosure of flood risks during real estate transactions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compensating property owners for not developing on areas of their property that fall within the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buying out private properties that are within the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitating land swaps that help property owners move out of the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Restoring riverbanks on public lands to their natural state.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compensating property owners who use approved methods of flood and erosion reduction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Actively encouraging property owners to sign up for federal flood insurance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hosting events to educate and raise awareness about flood and erosion risks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16. Do you have any specific comments about any of the strategies listed in Q15 or the selections you made?

Q17. Please indicate how likely or unlikely you would be to engage in the following *voluntary personal actions* to reduce the risks of flood and erosion along the Sandy River.

<i>Voluntary personal action</i>	Very likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Very unlikely	Not applicable to my situation
Choosing not to build in the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Renovating structures to be more flood resistant (ex. elevating home).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in a government property buy-out program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Voluntarily selling property through the private real estate market and moving to a lower-risk location.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disclosing flood and other hazard risks during real estate transactions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using approved methods of riverbank restoration to reduce erosion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signing up for federal flood insurance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using low impact development practices (ex. reducing impervious surfaces) to reduce the likelihood of flooding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q18. Do you have any specific comments about any of the strategies listed in Q17 or the selections you made?

Q19. In their natural state, river channels on the Upper Sandy River frequently change location. This is part of the river’s natural response to storms and snow melt, but can cause problems for the man-made structures located near the river. **In your opinion, how much should channels of the Sandy River be allowed to migrate?**

- As much as they naturally would.
 A moderately restricted amount.
 A very restricted amount.

Q20. If someone lives, owns property, and/or has a business in the flood risk zone of the Upper Sandy River, should they be allowed to engage in the following activities?

Activites	Yes	No	No opinion
Continue to live, own, and/or operate a business in the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Build new structures in the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expand existing structures in the flood risk zone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Renovate or repair existing structures in the flood risk zone that have suffered flood damage in the past.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21. Do you have any specific comments about the activities listed in Q20 or the selections you made?

Q22. If you were given \$100 to spend on dealing with floods along the Upper Sandy River, how would you divide it among the following categories? You may put it all in one category or in any combination of categories, *but it must add up to \$100.*

Spending Category	
Mitigation Activities that <i>reduce or eliminate the likelihood of a flood causing damage and loss of property/life</i> . For example, property buy-outs and relocation outside of the flood risk zone.	\$ _____
Preparation Activities that <i>increase a community's ability to respond when floods strike</i> . For example, developing an evacuation plan.	\$ _____
Response Actions that <i>occur in direct response to a flood</i> . For example, rescue efforts or providing temporary housing for flood victims.	\$ _____
Recovery Activities that <i>help a community bounce back after a flood event</i> . For example, repairing or relocating damaged roads and bridges.	\$ _____
TOTAL	\$100.00

Q23a. Would you support buy-outs of private property in the flood risk zone if the land were then used to create public access to the Sandy River?

- Yes No It depends/I don't know
(Please explain) _____

Q23b. IF the property you own is NOT in the flood risk zone: How would you feel about property owners that currently have property in the flood risk zone *relocating* to properties *outside* the flood risk zone, but still *within* the Upper Sandy River Basin?

- I would **NOT WANT** more development and density further away from the River. I don't have an opinion.
 I would **NOT MIND** more development and density further away from the River. Other: (Please explain) _____

Q17. Do you have any other comments about flood risk reduction?

3. Household Information.

Finally, we would appreciate any information you are willing to share with us about you and your household. This information will help us understand the characteristics of the people who took our survey and will remain confidential.

Q25. What is your age? _____ Q26. What is your gender? _____

Q27. Please indicate your highest level of education.

- High school graduate/GED or less Bachelor's degree
 Some college or associates degree Graduate or professional degree

Q28. What was the combined income for your entire household last year?

- Less than \$10,000 \$25,000 to \$34,999 \$75,000 to \$99,999
 \$10,000 to \$14,999 \$35,000 to \$49,999 \$100,000 or more
 \$15,000 to \$24,999 \$50,000 to \$74,999 Prefer not to say

Q29. Please enter the zip code of your primary residence. _____

Q30. How long have you owned or occupied property in the Upper Sandy River Basin Communities?

- Less than 1 year 5 - 9 years More than 15 years
 1 - 4 years 10 - 15 years

IF you OWN property in the Upper Sandy River Basin, please answer these last two questions.

Q31. Please enter the approximate value of your property (land value plus value of any structures). If you own multiple properties, please answer for the property you selected in the beginning of the survey. _____

Q32. Are you planning to sell your property along the Upper Sandy River in the next 5 years?

- Yes No Not Sure

Thank you for your participation!

If you would like to be entered in the drawing for one of three \$50 gift certificates, please check the box below and enter your email address. This information will not be connected to your responses to this survey.

- Yes! Enter me into the drawing! *Email:* _____

Thank You!



APPENDIX B: SURVEY METHODOLOGY

In order to reach a large number of residents and business owners in the Upper Sandy River Basin, the Upper Sandy River Basin Flood Risk Survey was disseminated both online and through community outreach events. Since the sample of residents who received the survey was not random, the survey results should not be assumed to represent the opinions of the general public. The results, however, do offer insight into a subset of community members' experiences and preferences.

About the Survey

The Upper Sandy River Basin Flood Risk Survey consisted of 32 questions divided into four sections: a general inquiry section, a past experience with flooding section, a managing flood risks section, and a household information section. The University of Oregon's Community Service Center (CSC) designed the survey to determine public perceptions and opinions regarding flood and erosion in the Upper Sandy River Basin. Questions also focused on the methods and techniques survey respondents prefer to use in reducing the risks and losses associated with these hazards.

Approach

Survey Development

Beginning in April of 2016 the Community Service Center (CSC) team met with Clackamas County staff to discuss survey questions and approach, including options for an interactive map of the study area. Partners discussed strategies to boost survey responses (incentives, targeted outreach, etc.). The group agreed offer a drawing for three \$50 gift certificates as an added incentive for taking the survey. After the initial strategy meeting, the CSC team developed and refined the survey instrument based on iterative discussions with County staff.

After the CSC team made final modifications to the survey instrument, survey questions were transferred into Qualtrics (www.qualtrics.com)-- an online survey vendor used by the University of Oregon. The CSC team provided Clackamas County staff with a link to the survey for review and comment. Several rounds of review occurred, and resulted in small modifications to the survey instrument to improve focus and clarity.

Simultaneously, Clackamas County developed an interactive map that residents could use to locate their properties in relation to the flood risk zone. The County also created a "landing page" on their website to (1) provide background information about the flood risk zone, (2) direct residents to the interactive map, and finally (3) encourage residents to take the survey after viewing their property's location on the map relative to the flood risk zone. The "landing page" provided the portal for all residents who participated in the online survey.

Survey Distribution

Clackamas County provided the CSC team with a list 3,951 addresses in the Upper Sandy River Basin for the purposes of survey administration and tracking. In July 2016, the CSC sent postcards with the link to the County's landing page to every address on the list.

At the same time, the County emailed the landing page link to multiple community networks, advertised the survey in the local monthly newspaper, distributed hard copies at various community venues, and personally surveyed people outside of a storefront. The County also brought paper copies of the survey developed by the CSC team to various public outreach events in July and August of 2016.

Survey Response

When the survey closed in August 2016, 320 residents and business owners in the Upper Sandy River Basin has provided responses (some partial, some complete). Three respondents who entered the drawing for the three \$50 gift certificates were randomly selected and contacted by email to receive their prizes.

Limitations

As previously mentioned, the Upper Sandy River Basin Flood Risk Survey was not administered as a traditional random sample survey. As such, the results should not be characterized as representative of the views of the Upper Sandy River Basin's general population. Rather, the results merely provide insight into the views of those who chose to complete the survey, which may or may not match the views of the wider population.

Data Analysis Process

Upon survey close, the CSC team exported data from Qualtrics to an excel spreadsheet. The team assessed quantitative data and created visual representations (tables, charts, and graphs) to more easily communicate survey responses. The team cross tabulated certain survey questions to provide a more detailed view of the characteristics of respondents and their responses. To process the qualitative data, the team categorized text responses for each question by theme (recorded in Appendix C).

APPENDIX C: SURVEY TEXT RESPONSES

The following questions required or had the option for respondents to choose to complete a text response. Responses have not been altered to correct spelling, grammar, composition, or personality, though any identifying information has been removed to protect the identity of respondents.

Question 2: Which of the following types of structures are on the properties you own or occupy in the Upper Sandy River Basin? Please select all that apply.

Respondents who selected “other” were given the opportunity to specify via text response. The following are their categorized responses:

Cabin (18 of 25 responses):

- cabin
- Cabin
- vacation cabin
- Forest service cabin
- Cabin
- Cabin on USFS land
- Forest Service cabin
- Cabin on MHNH land
- cabin
- cabin
- own only cabin, not land on FS land
- Cabin
- National Forest Summer Cabin
- Summer Home cabin
- Forest Service cabin only
- Cabin on USFS land
- Cabin
- Forest Service Cabin

Deltec Home (1 of 25 responses):

- Deltic [sic] Home 14 sides (1000+SF)

Bunker (1 of 25 responses):

- U.S.F.S. Bunk house

Generator (1 of 25 responses):

- hydroelectric generator

Miscellaneous Structure (4 of 25 responses):

- Garage, outhouse, water shed
- Garage
- Shop
- woodshed

Question 2a: For the purposes of this survey, we would like you to select just one property to answer questions about. Please select the type of residence in the Upper Sandy River Basin Communities where you spend the majority of your time.

Respondents who selected “other” were given the opportunity to specify via text response. The following are their responses:

- cabin
- Deltic (Same as Q2)

Question 4: Please indicate the primary purpose of the property you own or occupy in the Upper Sandy River Basin Communities.

Respondents who selected “other” were given the opportunity to specify via text response. The following are their categorized responses:

Recreational:

- Recreationa [sic]
- Recrearon [sic]

Co-Primary Home:

- Part time home
- co-primary

Other:

- Separated ex lives there
- Re broker
- Plan to build vacation home
- for building vacation cabin

Question 13: Which of the following would you most trust to provide you with information about how to make your property less vulnerable to floods and erosion? Please select all that apply.

Respondents who selected “other” were given the opportunity to specify via text response. The following are their categorized responses:

Organization/group/individuals:

- OPB (local nonprofit news)

- Mt Hood Forest Home Owners Assc. [sic]
- Forest Service
- Mt. Hood Cabin Owners
- Private engineering companies
- Jay Wilson
- U.S. Army Corps of Engineers
- hired fluvial engineer

Other:

- The county is worthless.
- 40 yrs experience on site (me+old timers)
- Natural Sysrems Design [sic]
- Don't know
- I expect no help from any org. That would claim to help the private land owners when they really needed it.
- No info has been offered

Question 14: How effective are the following outlets for providing you with information about how to make your property less vulnerable to floods and erosion?

Respondents who selected “other” were given the opportunity to specify via text response. The following are their categorized responses:

Organizations/Individuals:

- Forest Service
- Flood risk management committee
- USFS
- Paula Holland
- Corps of Engineers

Web-Based Outlets:

- Google search
- The Internet!!
- Online open houses

Word of Mouth:

- word of mouth with neighbors or others
- Local old timers know it all, seen it all

Other:

- The above have not provided
- FEMA resources
- flood erosion hazard mitigation evaluation 2015
- CCGC broadcast of presentations/meetings

Question 16: Do you have any specific comments about any of the strategies listed in Q15 or the selections you made?

The following are categorized text responses for question 16. As categories are broad and some residents offered lengthier responses, some responses could fall into multiple categories; however, they have only been recorded in one.

Property Owners should have heightened property rights with risk their own (9 of 63 responses):

- People know they have acquired property in flood zone and should have insurance or make repairs at their own [sic] expense.
- I do not think that people who knowingly bought or developed in a flood zone should be "rewarded". I'm tired of them being compensated for bad decisions, when I have actively avoided buying property within [sic] the 100-year flood zone.
- Property owners are responsible for their choice to purchase and develop on flood plains. Public funds should not be spent to reimburse them for their errors or to pay them for performing work on their own land. Education through the Library, USFS, or home owners association would be appreciated.
- Let the buyer beware and do their own investigations. The information is already there without more govt studies. Get the nanny state out of Oregon. PS your maps program does not work to get from the address to the lot location on Forest service lease land.
- I am not very supportive of using taxpayer dollars to "pay" property owners for doing the right thing. I appreciate taxpayer dollars being spent to purchase vulnerable lands from private owners, but believe the state should operate in the open market without any monetary/coercive advantage.
- If riprap can be used properly property owners should be allowed to protect their homes.
- I'm in general NOT in favor of more government spending (people should do their due diligence when buying property), nor in government controlling how private property owners protect their property from erosion and flooding.
- I was standing next to the home in timberline rim when it broke in half and washed away in 06 very sad that they canceled flood insurance a few months prior to that but you cannot fix stupid. We should not be taxed for people building in silly places. My home is 200' above the river and I have plenty of drainage.
- People should know the risks when buying/building in flood zones. Tax payers should not be burdened with buying at risk properties. Limiting permits to build on risky properties would be one way to avoid the problem, but Mother Nature always wins and it is natural that rivers change courses. No amount of expensive reparation will change that fact.

Government should be less involved (9 of 63 responses):

- The multiple bureaucratic entities (agencies) have competing agendas + complicated projects of which I have personal experience. (sewer outage construction and repair which has dug up the river and bank upstream from my property 3 TIMES SINCE 1980. See Clack Co. Wes) BAD ACT THROUGHOUT. LEAVE IT ALONE!
- The state and local Governments are COMPLETELY inept at supporting the property owners when the owners are at their greatest time of need. Specifically, County support

was anything but supportive. The person that came to look at our property only threw up road blocks and provided no solutions. She a was complete idiot and had no business having a county job. Her concern was not for saving property - it was solely for habitat preservation. If she had an investment on the river, I know that she would have looked at the issue differently. It's easy to play with others money and livelihoods when it doesn't affect you. She forgets who her paycheck is paid by. Completely unacceptable.

- I'm really not up for more government regulation.
- Government injection is another continued source of interference. They solve nothing and offer no concrete advantages to the home owner. Another opportunity to regulate without representing the needs of the taxpayer. More and more of my way or the highway. Let's make life more difficult and hold everyone accountable except us of course. Why are people rebellious?
- Governments should not force taking over privately owned lands to reduce flooding risks. This includes the use of eminent domain.
- More regulations will not help property owners already within the zone. Re-zoning just put more un-needed stress on owners unless compensation were to be considered. Owners should be allowed to place riprap within guidelines and without fees if this is a suitable way to prevent further erosion. Keeping government out of the business of peoples lives but with full options and support.
- "I highly doubt that any level of government has the financial resources to accomplish their objectives. If additional taxes, levies or fees are required, the government should stay out of it. By the way, why is FEMA insurance approximately 3x more costly [sic] than private insurance?"
- I think state government has it's hands full. Let environment experts and college research take care of it.
- The gov. Doesn't seem to really help the property owners that are affected by flooding and property damage. Most of their help is lip service and paperwork that is designed to frustrate and hinder the people that really need the help and services in their time of need.

Development should be stopped or limited (4 of 63 responses):

- I reiterate that development in flood zones should be prohibited and all real estate transactions should prominently disclose flood zones status, i.e. property is or is not in flood zone
- What do you mean by restoring river banks to their natural state? I believe riverbanks should be protected where vulnerable.
- Letting owners apply for and receive variances in flood risk areas is the reason for the problems. Putting more on the tax rolls when nothing should have been built. Government foolishness!
- I indicated that I was not supportive of limiting or prohibiting development in flood risk areas because I own a lot that I'd like to build a house on. I am in favor of allowing a single family dwelling on a legal lot of record. I'm opposed to the county approving partitions and subdivisions in flood risk areas unless as part of the development approval there is a requirement that each owner of each lot and/or house is required to purchase and continue to have flood insurance. A building permit should not be approved without proof of insurance. If the owner gets the insurance, builds the house and then no longer pays for the insurance then the county must have the authority to

and must impose significant fines on the property with the ability to place a lien on the house until such time as insurance is paid. Or, come up with another way to ensure that everyone who develops in the floodplain gets and continues to pay for insurance. People who develop in the floodplain must be required to get insurance. It's not equitable for others to subsidize those who do not get insurance after an event.

More Information Requested (12 of 63 responses):

- Not knowing the full extent of the upside and downside for the suggested options makes it difficult to decide. So the decisions I submit are subject to change with additional information.
- More information is valuable. There has been almost NO information available about 100 year flood levels, etc. Seems like there is a lot more information available that I haven't been able to access that would help me as a property owner make good decisions.
- "The FEMA maps are not accurate. My house is on a rise. The map resolution doesn't show this. XXXXXXXXXXXX became somewhat of an island in the 1996 flood. Later floods didn't even come close. It was my primary residence most of the time, since 1993. I support efforts of the watershed council to educate private landowners to keep natural vegetation on the riverbank. "
- I live on XXXXXXXXXXXX. I feel vulnerable to flooding and erosion because of this in addition to Upper Sandy River flooding. There doesn't seem to be any discussion about small creek risks.
- While I am generally supportive of helping landowners whose structures are exposed to floods, I am wary of the "moral hazard" consequences--too often, people simply do not exercise common sense in choosing where they build--the cabins and houses you see hanging on the side of the Sandy along the XXXXXXXXXXXX are classic examples of poor judgment, and I am not sure that as a taxpayer I should be responsible for their choices. Anyone who knows the area knows that the Sandy is a wild and unpredictable river, and should remain that way.
- I believe education in regards to causes and ways to try to prevent erosion are very good. The more one understands the reasons, the easier it is to get them to work and support the need.
- We feel our home is well outside a flood risk, but learning anything about the river, how to enhance it and keep it preserved, and limiting our flood risk are things we are very open to learning about.
- I wish I would've had better information when I bought my place about the Sandy river itself. I never would've bought it as it scares the crap out of me when the river gets high.
- Want more info about Federal Flood Insurance.
- the devil is in the details; some of the ideas have potential merit, but really need flushed out with specifics before I can comment on "support" or not.
- All these strategies are dependent on accurate detailed mapping of flood risk zones. Although the mapping technology has significantly improved since the flood of 1964, it still does not reflect the variable flood risk characteristics as accurately as on the ground observation of specific properties and research of historical records regarding flooding in the basin. 2006 is an arbitrary experiential beginning point and excludes the observations and experiences of those who lived here in 1964 and 1996 during bigger flood events.

- based on a quick google search of riprap for erosion control, it does not appear to be bad. I was not aware it was illegal to use riprap.

Other (17 of 63 responses):

- Stop channel closures and rip-rapping in the floodplain. Stop DSL Emergency permits post-flood events. No work should begin until county, state, and federal are all completed and complimentary contractors who work in the flood plain/way without permits should be fined and/or lose their license.
- Federal flood insurance programs have a history of being mismanaged and because of this should be discouraged unless a method is found to select professional management.
- Apparently FEMA is reducing the number of areas that are available for flood insurance, making it difficult for people to even get it. Buy outs for people living in flood risk areas are not well known, if they are available.
- keep up the good work, thanks
- We find the Zig Zag river changes every year and will flood or take out trees and banks as it wishes. We are not terribly in favor of placing trees in rivers for fish habitat since a downed tree will change the rivers course and will cause some flooding.
- There is the start of a group of county, state, federal, watershed council, and community representatives that started forming a committee to brainstorm solutions to address these serious issues that are before us. The upper Sandy River erosion analysis that was recently completed needs to be adopted by the county so the recommended solutions to the increasing river's energy can be addressed.
- In on XXXXXXXX. The cabin is 90 years old and has survived several 100 year floods.
- Encouraging property owners to purchase federal flood insurance is all well and good, but it's even more important for the Clackamas County Government to support keeping insurance costs down. The county's recent ineptitude will cause homeowners premiums to rise by about 20% in the coming year. That is counterproductive to any reasonable risk management strategy.
- My property was most effected by the 1996 flood. At that time, my father, XXXXXXXXXX, was owner of the property.
- Take care of the fish and their environment. My understanding is that the upper Sandy basin is a wild fish sanctuary. Treat it as such.
- "Dilemma: The greater the risks, the greater the property, building, and flood-related costs (flood-insurance, retrofitting, taxes, etc.), and the harder to sell at needed market rates to move.

Comment/Concern: The County is presently actively granting and allowing residential and industrial land-use development in the mapped flood-risk zone. The County has even legislatively promoted and pushed county approval to allow industrial development as a conditional use in the mapped flood-risk zone, specifically promoting approval for the development of a log home manufacturing company and its operations within 200 feet of the Sandy River, and in the flood zone. The land was formerly used for growing trees and harvesting timber, but now, with county support, and by the county granting the company an elective Conditional Use Permit, the land is under site-wide industrial development. The county continues to actively promote and support this land development in the flood-risk zone, and it sends a highly-conflicting message to the community and public. "

- My property is at XXXXXXXXXXXXXXX well away from the Sandy river. My concerns are possible utility and road damage on Lo Lo Pass Rd due to flooding. The last flood took out Lo Lo Pass Rd up river beyond Barlow Trail rd. Thanks to Clackamas Co. for quick response and road restoration. And Hoodland Fire Dept. for with fuel for backup generators, those trapped were able to get to the local store for food!
- My flood experience was in 1964, before the Salmon River was put in it's present channel. The flood of 1996 (?) didn't affect this property, nor did 2011 (?). For us, the Army Corps of Engineers did a very good job!
- Any property buyouts should be done at full market values. Otherwise I and all other property owners would be strongly opposed and would fight in the courts.
- Too many legislators have greedily developed lands and hidden information from consumers. They should be held accountable.
- Putting in log jams in the salmon River has caused more damage to property when they break lose during flood events they are piled high and are dry and very buoyant hitting the trees on the shore line in shallower water I have lost a lot of trees because of the log jams there was no problem before that.
- "County allowed development of HOA in a flood plain so they should buy out homeowners instead of waiting until there is a loss of homes and lives. When the homes were purchased the homeowners expected an increase in value overtime. Since they need to disclose to possible buyers that the house is in a flood plain they won't sell homes for as much as a home outside the flood plain. If it sells at all. And now there is a good possibility a logger is going to be allowed to clearcut (mine or...?) his recently purchased property above Barlow Trail Road which will increase the risk of slides, well water contamination, wildfire caused by slash burning. XXXXXXXX has a reputation for raping the land so why would anyone choose his greed over 500+ homeowners safety?

No Comment (12 of 63 responses):

- No
- no
- No
- no
- No
- No
- No
- no
- NO
- No
- No
- None

Question 18: Do you have any specific comments about any of the strategies listed in Q17 or the selections you made?

The following are categorized text responses for question 18. As categories are broad and some residents offered lengthier responses, some responses could fall into multiple categorizes; however, they have only been recorded in one.

More Information is needed (4 of 46 responses):

- Inform up front, Ignorant people make ignorant decisions.
- Seems like more information to owners and cooperative preventative measures are the way to go.
- I would hope that additional information and educating of our community will lead to a greater willingness to "do the right thing" in preserving our precious river.
- How can one answer the question of voluntarily selling property through a private real estate market and then moving to another location when one doesn't know the ramifications of doing this? Would it likely involve selling below the current market rate? If so, I'm not inclined to do that.

Prohibit or limit new development (4 of 46 responses):

- Listed voluntary actions can be very expensive. Many, if not most people, do not have the where with all to accomplish some of them. Prohibiting development in flood zone should prevent needing to take these voluntary actions. The usual effort to deal with those problems results in high real estate taxes and we are already at a breaking point with regard to such taxation. Try something new.
- We are cabin owners on Federal land in the and will not be developing or making changes to property.
- maintaine [sic] what we have
- Why why why are developers allowed to build in flood zones? Building codes should have to follow Oregon's land use goals, and if someone buys a home in a flood zone, the builder should be accountable because the builder typically knows and has set up the consumer for failure, laughing all the way to the bank. The accountability should be on the builder, especially developers who knowingly develop in high-risk unstable areas. They are the cause for putting lives and property at risk. Several legislators have assisted in this as well. Wrong!

Support conservation strategies (2 of 46 responses):

- Require floodplains to be maintained in a natural state, with native vegetation and weed control. Support conservation easements in the floodplain, with property tax reduction incentives.
- "My streambank restoration project has reduced my risk.

Less/no government involvement (2 of 46 responses):

- A little heavy handed towards Govt programs to force you to do things
- Don't need more govt insurance scams that just lead to more institutions, taxes and less self-sufficiency [sic] and responsibility

Consider affordability of strategies (6 of 46 responses):

- We looked into flood insurance for our property and even though we are located on a creek and not within a special flood hazard area, the cost prevented us from being able to purchase insurance. The premium was more than the current cost of our homeowners policy, which I thought was out of line with our our [sic] potential risk. Earthquake insurance is far more affordable.
- As indicated, FEMA insurance is significantly more costly [sic] than private insurance. We should be directing those who want coverage to the private market.

- I did receive recommendations for erosion control from a government person. I did what I could afford (planted lots of native plants), but cannot physically nor afford to pay someone, to do the rest.
- our home was flooded and is elevated 6 feet now. a major challenge for a property owner is the lack of coordination between the various governmental agencies; we had to deal with a total of 12 different agencies between Clackamas County, The State of Oregon, and the US Govt. in the end it all worked, but the hassle and permitting expense encourages property owners to attempt to do things outside the regulatory environment
- I can't get insurance on my rustic log cabin because it's not up to any building codes. It has flooded before 2006, but it is doubtful that I would be able to qualify or could afford Federal flood insurance.
- The county and the real estate [sic] co. did not disclose flood or any other risk, current homeowners do not have a choice we are required to disclose. If we are paid a reasonable offer for our property we would be interested in a gov buy out. I have been told flood ins. will not cover your home if it slides in the river because of bank erosion.

Other (14 of 46 responses):

- Most of these options were not made available to us, or we would likely have taken advantage of some these options and having to deal with the county
- This section should already be descriptions [sic] of actions that are taking place to the residents and whole communities that have been scientifically described [sic] as in harms way.
- I don't think my property has much risk of flood which makes me unlikely to take these actions.
- My flood risk on the Zigzag River is long-term and would probably happen only in catastrophic floods or pyroclastic flows from Zigzag glacier. 100 cubic yards of bank was lost in 1962 flood.
- "Wedontknowifwe Wearenotonthewaterbut near it. [sic]
- Do you realize that half the cabins would no longer be allowed along the Cool Creek Track of USFS homes if these "volunteer" programs became reality. Be prepared for a fight.
- We use approved methods, and retain the natural aspects of the river, but we hear from other people who have been allowed to purchase wetlands property near us, that they may build structures on the wetlands. We were told by Capitol Rivers that that is not allowed. It is obvious that the property will flood (it has done so three times over the past 10 years), so why have the rules been changed??
- We had our property surveyed a few years ago and found that it sits 3 feet above the 100 year flood plain. Our property sits along the western side of XXXXXXXXXX at the intersection of XXXXXXXXXX and XXXXXXXXXX. The 2011 flood waters in Clear Creek were five feet below the surface of our property. That fact reflects on my answers to strategies listed in Q17.
- I am well away from the Sandy River, not directly effected by flooding, other than access to the outside world.
- We are not in the flood zone.
- Again, property has not seriously flooded since 1964.

- While, according to maps, I am not located in a flood risk zone, I have still purchased flood insurance because we have lost much of our riverfront property to erosion, and we can tell that, over the years, our house has started to slump.
- Some riverbank restorations were done in 1965 that effect my house now. My house is on Forest Service property.
- Back the required 150 ft from the river and slightly elevated, our place is free and clear and needs no anti-flood improvement.

No comment (14 of 46 responses):

- No
- no
- No
- No
- See previous comments.
- No.
- none
- No
- no
- no
- no
- No
- Nope :)
- No

Question 21: Do you have any specific comments about the activities listed in Q20 or the selections you made?

The following text responses have been categorized into several classifications for ease of assessment. While some responses could have fit into more than one category, they have only been recorded under one.

Prohibit/limit new development (4 of 58 responses)

- Repairs from flood damage should not "reclaim" eroded land. Repairs should be limited to stabilizing existing structures and revegetating the erosion zone.
- I believe that properties should be moved out of the 100-year flood zone, and if damaged, should not be allowed to rebuild.
- Do not build or live below flood plane [sic].
- Get structures out of flood zones, the only exception would be creative architecture that can withstand changes such as they have in Holland which will float; the only issue with the types of structures in Holland is they are for delta flooding, not torrential flooding. Not sure there are any fixes for buildings coexisting in torrential floods carrying massive g-forces against anything in their path.

Property rights and responsibilities (19 of 58 responses):

- House design and consideration of personal responsibility for potential risks

- People who already live in a flood zone need to assess whether they want to continue with the risk of living there. Some assistance should be considered to help them relocate. Folks must be made aware that property is in a flood zone before they buy it and agree to a provision in the contract that they will not or cannot be compensated for flood damage. This should be a feature of future transactions.
- After being well informed of the flooding probability, people should be able to develop their property at their own risk as long as it doesn't damage the eco system.
- My thoughts on this are that if people own property in a flood zone it's theirs to do with what they please. Personally I might not do these things, but I think they should be able to since it's their property.
- I don't feel it's someone else's place to force people to move or restrict their business, certainly not the governments [sic].
- At their own risk, if done in a way that will not affect adjacent lands and structures should a flood occur and damage the structures.
- As long as people are aware of the risk and take appropriate measures current structures should not necessarily be removed due to risk of flooding
- Allowing erosion resistant safeguards should be allowed to existing property owners.
- Life is full of risks. If someone has lived in the flood risk zone, they deserve to decide if they want to stay and take that risk, and pay the price for it. I don't believe there should be a heavy hand of government involved in affirming or denying someone the right to stay on the property where they have invested time, effort and connections. I firmly believe in grandfathering the homes that have long been here -- but would encourage a more demanding criteria for new homes and buildings on currently undeveloped properties.
- If they build it, they are responsible for it. Not anyone else.
- allow to rebuild, but do not supply compensation or insurance to do so
- I believe such property owners should be allowed to use riparian repairs to their property to protect it as much as possible.
- You should be able to do anything you want on private property. However, if it floods and damages your buildings, that's just too bad for you. It used to be a free country. Sigh. The government can't hover over everyone's decisions and make the bad ones up to them.
- It may be foolish to buy property in a flood zone, but once it's been done they should have the same rights to do as they please with their property as anyone else.
- It's their property they new the risk going into it.
- If they are already residing on the developed property then why restrict further repair or development
- All of this is NEW science. Even the government's plan to reduce flooding in the past has been in error. People are there now. Let them stay, but no more building.
- People should be allowed to do what they want with the property that they own
- If the building already exists, people can continue living there. They should also be able to make changes or repairs to their home if they choose, or if it has been damaged by the elements rather than being forced to leave their home. It's common knowledge that homes are at risk and people choose to take the risk or leave.

Some government involvement in determining what property owners can and can't do (3 of 58 responses):

- Help the property owners, instead of putting up roadblocks
- These properties should be offered buyouts or land swaps. If they choose to stay and are no threat to anyone else or any other property let them stay.
- I think one repair a renovation should be allowed. Then the owner would have an option to participate in a buyout program during their lifetime. Phasing out should be gradual and not affect an individual's lifetime earnings and investments. Program planning should take into account at least two generations.

Other (15 of 58 responses):

- More awareness should be required as part of buying into property in or (as ours is) on the boundary of flood zone--or even possible catastrophic flood zone.
- This is tricky. Some of the problems have been created by government intervention - i.e. corp of engineers, etc. - there doesn't seem to be a long term plan with involvement of all affected. That would be a good start; especially if there is discussion and collaboration at a reasonable level.
- Q20 and 21 are rather restrictive. The river should be allowed to migrate naturally in areas where structures are not present but should be restricted as necessary where structures are threatened. If property owners were not permitted to continue to reside or operate business in the flood risk zone, it would have to be incumbent upon the jurisdiction creating the restriction to purchase properties at fair market values. It would otherwise amount to illegal confiscation of personal property. If the county would like to buy me, please make an offer.
- This Q20 should have more options for answers. yes or no is too harsh for many of these topics that the answer really include "it depends" on the detail of the situation.
- I think they should have flood insurance and the deductible in their savings.
- just let the know
- See my responses to Q16. By the way, I am unaware of there having been any taxpayer involved reimbursement for the loss of cabins which had been built, at an obvious high risk, on the island in Boulder Creek just above the confluence with the Salmon, when they were wiped out by that little creek flooding in the 50s.
- I'm not clear about what the "flood risk zone" is. Does t hat include the Channel Migration Zone?
- As long as they are fully insured.
- Fairness and equity are tough pieces here. Property was purchased with a purpose and value based on buildability (or not), so severely restricting a property owners opportunity to use their land to its full potential by changing the rules represents a loss of value that should be compensated. Our property, which has flooded, was not in the flood zone, and we were not required to have flood insurance. We decided what the heck and got it...and are ever so thankful that we did.
- Without seeing what "flood risk zone" you are referring to, it is hard to answer these ??s
- Again, when Clackamas County uses FEMA flood maps to make development application decisions, they are using an only partially accurate tool.
- I don't think these questions are comprehensive enough and get to more specific solutions. Again, if one has a legal lot of record one should be allowed to build a single family dwelling only if the owner gets insurance. Regarding continuing to live, operate, etc. in the flood risk area - this should only be allowed if the property owner has flood

insurance. New structures/renovating or repair of existing structures should only be allowed if the owner gets insurance.

- Put the river in its oldest location and keep it there, it's a river not a living pet
- Any action taken to try to control the river will cause a reaction either across the river or down river. I don't believe a river can be "controlled" instead of throwing millions of dollars into the river in hopes it will lessen the raging river during a flood it would be better to buy out homeowners to avoid tragedy. As the cost of trying to save lives and homes can be costly and will continue to happen over & over.

No Comment (17 of 58 responses):

- See previous comments
- See previous comments
- No
- No.
- No
- no
- no
- no
- No
- No
- No
- No
- No
- No
- no
- no
- No

Question 23a: Would you support buy-outs of private property in the flood risk zone if the land were then used to create public access to the Sandy River?

The following text responses have been categorized into several classifications for ease of assessment. While some responses could have fit into more than one category, they have only been recorded under one.

Depends on: Funding Mechanism (4 of 39 responses):

- Or if a funding mechanism other than property tax increase
- on the cost to the public.
- What is the funding source?
- where does money come from?

Depends on: Effect on Properties (2 of 39 responses):

- On the effect on values of remaining properties
- on how public access would impact my home and its privacy/location

Depends on: Effect on Environment (2 of 39 responses):

- It would depend on if ODFW engaged in an appropriate hatchery supplementation program for steelhead and salmon. The Sandy and Salmon should both have this - the fishing on both in the early 80's (when there was excellent hatchery supplementation) was terrific. It's terrible today. It breaks my heart.
- while restoring wild areas

Depends on: System Used to Determine Fair Market Value (7 of 39 responses):

- if the property owners are given fair market value, or are they stuck with the County's valuation.
- System used to determine property value, where will money come from to buy land?, how will it be a transparent and fair process for all?, where will the people move to (especially if low income)
- The buyouts would, of course, have to be at fair market prices.
- if done fairly and honestly I would support buy-outs at fair market values
- Only if they were given market value and could make the decision on their own.
- Only if the property owners were compensated fairly
- If it was fair market value

Depends on: Whether Buy-Outs are Voluntary (11 of 39 responses):

- Is it mandatory
- depends if it's a voluntary buy out - if we're talking eminent domain then no.
- Buyouts are only good if the property owner wants it. Forced buyouts is STEALING!
- If the buyout was willing seller only, and the public access was a public participation planning process.
- Only if the seller WANTED to sell, and was not coerced to sell.
- if it were voluntary
- If voluntary
- On voluntary basis.
- It depends on if the buy-outs were voluntary or not. If not voluntary, then the answer is no
- Yes, if it's not a forced buy-out.
- Only if voluntary by owner

Depends on: Other (9 of 39 responses):

- I'm not sure how I feel about property buy-outs, but public access would be the best use.
- Maybe
- Buyout by the federal government? You must be
- who manages it and where is the money to "manage" it. Need more info.
- spend the money on buyouts and not public structures that will likely be damaged by future flooding
- Access would need to be designed to mitigate flooding.
- There is already a \$250 federal surcharge on second homes and I think a ridiculously low \$25 surcharge for primary residences with flood insurance and the surcharge is not based

on the value of the property and/or home. So people with a fairly low home value, e.g. \$75,000 are subsidizing property owners with much larger values! While I would normally support buy-outs I don't want to help pay for them as owners with expensive properties don't pay their fair share of the cost of insurance based on property value at least in terms of the federal FEMA surcharge.

- Much of the upper river has riverside cliffs which are dangerous.
- If the land is used only during summer months so as not to cause risk of life.

Question 23b: How would you feel about property owners that currently have property in the flood risk zone relocating to properties outside the flood risk zone, but still within the Upper Sandy River Basin?

Respondents who selected “other” were given the opportunity to specify via text response. The following are their responses:

- Wild land fire is the other element in development here. Should be constrained and limited
- It would depend on how much development and where exactly.
- if own property and trade land
- That would be fine with me
- depends on the number and again the boundaries of the flood zone.
- As long as it isn't used to create more or extra structures.
- It is there risk to buy in flood plan there choice on flood insurance there loss, no new structures on flood plains

Question 24: Do you have any other comments about flood risk reduction?

The following text responses have been categorized into several classifications for ease of assessment. While some responses could have fit into more than one category, they have only been recorded under one.

Education and Awareness (4 of 53 responses):

- I want to affirm that many folks who live in a flood zone do so because they were unaware that the area is in a flood zone when they purchased it or have been there prior to a county or local recognition that it was a flood zone. They should of course, be provided with assistance to repair, renovate or relocate. But the ultimate goal should be to prohibit development with a flood zone.
- Owners need information on approved erosion controls and access to cost-effective implementation.
- Much of the upper basin has been channelized to mitigate flood damage. Why is this not mentioned? Would the channelization efforts be reversed?
- Stop the big piles of log jams. educate property owners on vegetation [sic] and tree growth on the banks by news letters

Buy-Out Process (2 of 53 responses):

- I'm against forced buyouts. If the property owner wants a buyout and its a fare [sic] price then fine.

- "I would fully support and participate in a buy-out if the buy-out were at market value. However, I support the idea with great trepidation, fearing what such public access would do to the Upper Sandy River and its environment, and its fish and wildlife. Not everyone is an environmental steward, and much would depend on the type and extent of public access to the Upper Sandy River. If it were to be overrun by the public, I would not support or participate.

Inevitable Risks (4 of 53 responses):

- Nature happens, risk is inevitable.
- We live where we live as our choice. Moving because we are concerned makes no sense. Preparing can't hurt and helping each other out is a must. When my neighbors lost 10 feet of their bank because the river was roaring on the corner, we did what we could to reinforce that location.
- None of us want flooding, but it is inevitable. Preventing damage is the goal. Decrease new building in those areas. Do the best we can to provide for the people in these areas. My home may not be in the flood zone, but I get to and from my home on roads through that flood zone. One of those roads will be closed east of me for 4 months for repairing the damage done by the most recent flood to the repairs put in by the 1964 flood. Not sure how to get around that. But, I make sure I keep as much moisture up on my hill by not cutting everything down, so as not to increase the water in the river. Maybe we should do that federally and statewide as well and do better tree harvesting rather than clear cuts. Water flows downhill, so we need to start this process at the top of the hills.
- "Flooding and other natural disasters such as mudslides are a part of the risk of living in a rural environment. In addition, there are frequent power outages, water disruptions, and other inconveniences that are not common in urban areas. People know that rivers change courses. It is unrealistic to think we can prevent this and can put it back the way it once was. Insurance is one way of mitigating the cost to repair the home. A government purchase of private properties for a river seems that it would be a patchwork quilt of private/public properties that could lead to conflict. P.s. The font on the postcard inviting me to participate in this survey was difficult to read the we address. Had to make numerous attempts. This may limit participation."

Development Rights and Responsibilities (3 of 53 responses):

- Keeping in mind that the Sandy river was a Corp of Engineers re-development back in the 1950/1960's. The Corp created some of the problems. Correcting them should not be borne by property owners. Full support of property owner rights and solutions should be a priority in any decisions.
- Responsibility lies primarily with property owners, as it does with the risk of wildfire (which is a risk to virtually everyone in the upper Sandy River basin, in or out of the flood risk zone).
- In future, do not allow developers and property owners in the flood risk areas to build or develop... at any time.

Consider the Environment (7 of 53 responses):

- I totally agree that the river should be allowed to find it's own course, and that it should be 'natural' so that the fish can return and the river can be healthy. I also think it is important that the wetlands NOT be developed by people or that the properties in areas that are potential flood zones. For the people that have already established homes along the river, I think that there should be certain special allowances by way of rip-rap protection if the river erodes their banks enough to threaten their homes.
- Resources should be used to repair damage from floods such as the channel of the Sandy River near Lolo Pass Road and the bridge over the Sandy River.
- Due to the number of developed properties along the Sandy River I want agencies to focus on stabilizing the Sandy's channel.
- The River will always rule!
- I like the idea of tax money going to prevention of high water events by expanding areas allocated to wetlands near the river where the overflow can spread out here and there and hopefully keep the river from becoming so torrential.
- Utilize vegetated methods and not rock or concrete
- There is some conflict between leaving riparian zones undisturbed for fish and wildlife, and removing some logs and rocks which might deflect flood currents toward roads or structures which would otherwise be undamaged.

Other (14 of 53 responses):

- why would we use public funds to buy private property? Makes no sense
- I'm really surprised that more action to reduce the risk of danger to life and destruction of property has not happening at a faster pace. Most of this upper Sandy River valley has been identified as a high risk area for flooding, wildfire, and landslides.
- "Periodic monitoring of the flood zone river banks and debris fields with some \$ into cleanup of snag and debris dam fodder, would eliminate much of the problem of the less than 100 year flood events. Having the Forest Service review it's policy of none harvesting of old trees (since trees DO get old and die) and policy of allowing fisheries folks to place debris in the rivers as shelter and habitat which often break loose in floods and add to the destruction.
- I received a postcard for a public meeting to discuss the flood risks less than a week before the mid-July meeting on Mt. Hood.. I want to be involved in this process but have a life and can't drop what I'm doing to attend a meeting that's convenient for the county.. This is 2016, provide an online option for people to participate in the process besides a survey. Many state agencies are utilizing online open houses. Please consider ithe for future outreach efforts.
- I am very happy to have this opportunity to comment and I'm pleased you are actively addressing this problem. I hope you are considering all perils that may cause flooding including eruptions of Mt Hood so we do not experience the devastation seen on the Toutle River basin when Mt St Helens erupted.
- "In my experience the media cannot be genuinely helpful during a flood. This is because the media focuses on the most sensational thing happening at the moment. In 1996 several houses on our road experienced minor losses such as the loss of a staircase going to the river. But all of us were in a state of high anxiety, because the river was higher than we had ever seen it except for those people who had witnessed the 1964 flood. There was Zero media coverage about the Sandy River. Even though two people died that night on the Sandy River. This was because the seawall in downtown Portland

was at risk and that was the most sensational story affecting the most people. In contrast, in 2011 there was tremendous media coverage on the Sandy River. And a small section of the river was heavily affected. But my road wasn't affected at all. I went to work and found everybody thought I had been in grave danger. The media was extremely misleading."

- My father, XXXXXXXXXXXX, bought the lot where our house now stands in the 1960s, when Timberline Rim was first created. At that time, he had no knowledge that the property involved was in a historic flood plain. This was partly his own ignorance and partly his trust in Clackamas County allowing the Timberline Rim area to be zoned for housing. My father built our house in 1973-1974. He lived in it full time between 1975 and 2005, when he died. I inherited the house from him, and we use it as a vacation cabin. My husband and I were married on the porch there in 1976. We were horrified in 1996 when the floods then ate away at the bank and the structure of the house.
- "Clear cut logging should be considered! Also regarding Q23b, I support increased development and density away from the river if it is done sustainably and tastefully with adequate infrastructure in place. this river could be made into class river with side water for marsh ponds for ducks deep pools for fish hiking trails and camp grounds less than a hour from international airport and large city.pluse white water for kiacks to much talk no action"
- Yes, since we purchased our property in 1979 we have experienced two major high water situations on the Sandy river, our property is circa 1938 and we have watched the Sandy river change it's channel flow which now is approximately 80 to 100 feet from the bank of our property and was directly abutting our high water mark on the south edge of the river. We've heard the river move enormous boulders and watched it carry 100 foot fir trees with 30 foot diameters root balls down the river like match sticks and even an Elk drift by hoping that it made it out safe down river. I personally feel that FEMA flood insurance is just a government shake down of the private property owner. At an annual expense of over \$1000 it just isn't and shouldn't be a requirement. Any outcome to reduce the chance of flooding on the Sandy river will have a direct impact on those that own riverfront property. Please feel free to look at our property on craigslist, Clackamas county real estate Mt. Hood cabin.
- I believe that "mitigation" means more than property buy out or relocation out of the flood risk zone. It also means doing things to help prevent more damage if flooding were to occur.
- "Not on flood risk reductions, but please pass on to the county that I was not impressed with their lack of communication after the 2011 event. No information on the county web site. When I asked the county public affairs person at a public meeting a week later, they said that it was too hard to get accurate information. What a joke. Luckily, it appears that emergency services information has improved as shown in the 36 pit fire.
- Natural log jams have been developing from the last two floods and are located between the bridge over the Sandy River at Lolo Pass Rd. and the one at the Muddy Fork of the Sandy River. They could hold more water during a flood and then burst, causing a flash flood event.
- remove the little sandy drainage from bull run restricted area. Open/build new roads, so people can get to high ground to escape the lahar from Mt. Hood. Relocate people in flood zone there also.

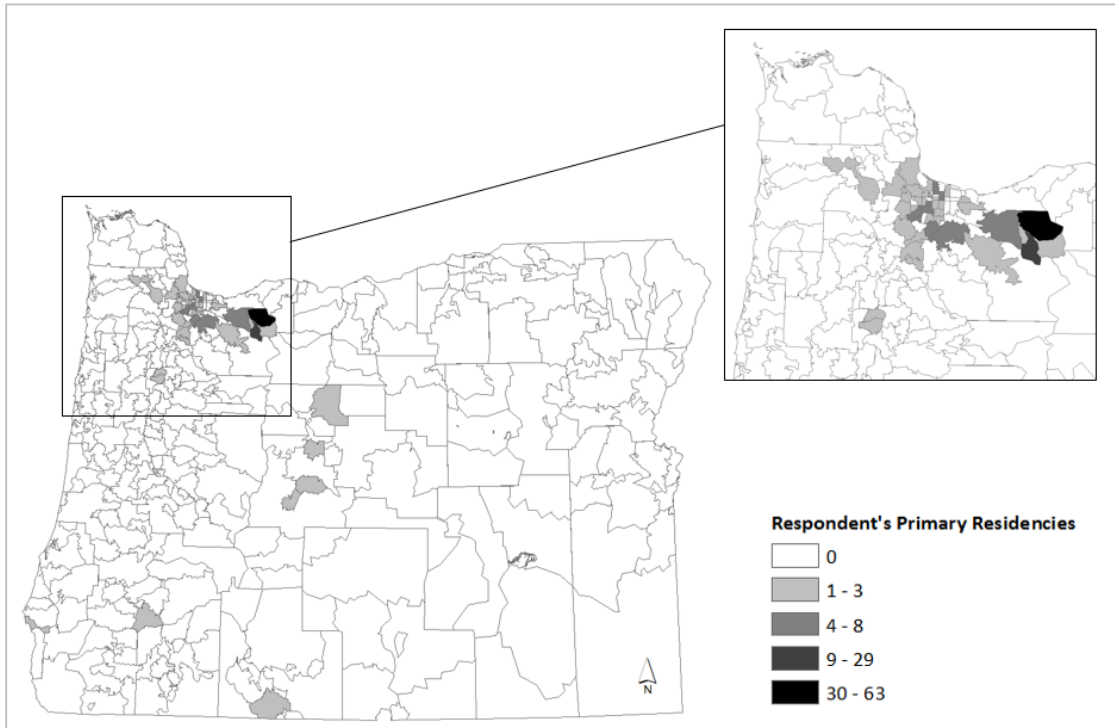
No Comment (19 of 53 responses):

- No
- No
- no
- NO
- no
- Thanks for getting our opinions. It's a good start.
- No
- No
- See previous comments
- No
- No
- no
- No
- No.
- no
- no.
- no
- nope
- No

APPENDIX D: PRIMARY RESIDENCE OF RESPONDENTS

This map represents the location of respondents' primary residence.

Map D-1: Please enter your zip code of your primary residence.



Source: U.S. Census geography shapefiles (2016) and Sandy River Floodplain Risk Survey, Question 29 (2016).

In addition, some respondents indicated that their primary residence was outside the state of Oregon. These include:

- Eight respondents from Washington (two indicating zip code 98607 and one respondent per zip code indicating 99354, 99203, 98685, 98642, 98027, and 98004).
- Three respondents from California (zip code 94515, 93940, and 92782).
- One respondent from Indiana (zip code 47906).
- One respondent from Florida (zip code 32605).
- One respondent from West Virginia (zip code 26508).
- One respondent from Hawaii (zip code 96710).