# Private Landowner Restoration of Salmon Habitat: A Survey and Discrete Choice Experiment in the Stillaguamish Watershed

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The methods described in this report were organized and implemented by the Washington Department of Fish and Wildlife and were not conducted on behalf of the U.S. Geological Survey.

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## 1. Executive summary

The Stillaguamish Watershed is at the leading edge of salmon declines and habitat conservation concerns in Washington state and across the U.S. West Coast. Endangered Species Act-listed wild Chinook and steelhead runs, a century of habitat loss and degradation, developing communities and changing landscapes all occur together in this watershed. As such, salmon recovery is a critical conservation issue, and habitat restoration is a priority for many entities within the watershed including the Washington Department of Fish and Wildlife (WDFW), other state and federal agencies, the Stillaguamish Tribe of Indians, Snohomish County, anglers, local government, conservationists, and other individuals and organizations. Large portions of the Stillaguamish Watershed are privately owned, and landowner willingness to engage in behaviors that protect and restore habitat must therefore play a significant role in recovering ESA-listed salmonids.

This study sought to identify landowners' concerns, perceptions, knowledge, and motivations regarding salmon habitat restoration. A discrete choice experiment was conducted to evaluate economic barriers and incentives for adopting restoration actions. A survey was mailed to 9,984 randomly selected landowners in the Stillaguamish Watershed. The results presented below are based on the complete survey responses from 1,373 respondents (13.75% response rate).

*Key findings:*

1. There was a strong interest in salmon and salmon habitat recovery in the Stillaguamish watershed as a whole; however, there was less interest from respondents in conducting habitat restoration on their own land.
2. While most respondents had not conducted any restoration on their land, there was interest in future restoration efforts. However, the largest deterrent was that many respondents did not believe their land was eligible for restoration in general, especially salmon habitat restoration. Many believed that this ineligibility was due to small lot size or a location that was not near water or salmon habitat.
3. Many respondents did not believe that any restoration activity taken on their land would have any effect on salmon. However, there was also overall high uncertainty about restoration effectiveness.
4. Respondents reported higher levels of knowledge and familiarity around topics like the salmon life cycle, but were less familiar with legal and regulatory context and treaties (e.g., Pacific Salmon Treaty, Boldt Decision). Knowledge around the Boldt Decision in particular was stratified by age with older participants reporting more familiarity.
5. While respondents reported getting information from sources like family and friends and news media, many desired to receive information from governmental sources such as the WDFW or the Department of Natural Resources. A popular preferred source of information was the Stillaguamish Watershed Council.

6. Landowners were more likely to pay for a hypothetical tax if it supported salmon restoration and water quality. They were not as willing to pay if it was for recreation or sport fishing. Overall, a majority of landowners would pay on average $18.62 per acre for salmon habitat enhancement.
7. Between vegetative enhancements (described as native plantings on landowner's land) and conservation easements (described as signing of land rights to the state), vegetative enhancements were preferred, though the factors that most influenced respondent hypothetical participation were monetary payment to participate (with respondents preferring more compensation per acre), length of contract (with respondents preferring shorter contracts), and monitoring visits (with respondents preferring less governmental monitoring).
8. These findings suggest that education and outreach efforts have an important role to play in future private landowner restoration efforts, but these efforts will be most effective when tailored appropriately based on location, demographics, and environmental identity and delivered by the best positioned messengers.

## 2. Introduction

Salmon species (*Oncorhynchus* sp.) on the west coast of North America are critical to local ecosystems, economies, and cultures (Cederholm et al., 2000; National Research Council, 1996). Salmon populations have been in steady decline, necessitating careful planning and management to meet multiple recovery goals. Washington's salmon runs play a particularly important role in salmon recovery, as allocation for salmon catch across North America is based on salmon populations across rivers. As a result, rivers that face higher salmon recovery can act as a bottleneck for the salmon catch allocation. The Stillaguamish River is one such bottleneck, making it a critically important watershed for salmon management and conservation. Salmon rely on cool, complex, connected habitat in the lowland reaches of rivers, where side channels, floodplain connectivity, and riparian shade determine whether juvenile fish find rearing space and whether adults find passage. Rivers like the Stillaguamish and the surrounding riparian and upland habitats have been drastically altered by human activities, prompting initiatives for habitat restoration that can support local and regional salmon recovery.

Importantly, salmon recovery in the Stillaguamish watershed largely depends on lands the state does not control. Many of the areas most critical to salmon recovery are also where people live and farm. In the Stillaguamish watershed, the upper watershed is largely public and industrial forest, but the lower watershed is a mosaic of small parcels, agricultural holdings, and rural residential properties in private hands. This arrangement of land ownership and land use means that an effective salmon recovery program or strategy must engage with and include residents who own riverfront and near-river land. The private lands conservation literature has long recognized the critical importance of engaging local residents to understand their knowledge and perspectives and develop strategies for engaging and motivating private land restoration (Kamal et al. 2015; Kabii and Horwitz 2006).

While many priority restoration lands may be private, the obligation to recover salmon, by contrast, is public. This obligation has been shaped through more than a century of conflict, which we describe only briefly here. The Treaty of Point Elliott, signed in 1855, ceded land across what is now Snohomish County while reserving to the signatory tribes the right of taking fish at usual and accustomed grounds and stations, in common with the citizens of the Territory. For a century Washington read that clause narrowly and enforced state fishing regulations against treaty fishers. The resulting conflict became open in the 1960s and early 1970s, when tribal fishers and allies staged fish-ins at Frank's Landing and elsewhere, resulting in arrests and seizures. In 1974, in United States v. Washington, Judge George Boldt held that the treaty language entitled the signatory tribes to an opportunity to take up to half the harvestable fish returning to their usual and accustomed grounds, and established the tribes as co-managers of the resource rather than as parties subject to state regulation. This decision has since been upheld, and tensions around salmon management and allocation remain.

Puget Sound Chinook (*Oncorhynchus tshawytscha*) were listed as threatened under the Endangered Species Act in 1999 and steelhead (*Oncorhynchus mykiss*) in 2007. Conservation

attention of these species has shifted to habitat, and courts have held that the state could not guarantee tribes a share of the harvest while permitting the degradation of habitat. As a result, treaty obligations are now understood to encompass the habitat on which the fishery depends. Salmon management also operates at regional scales, apportioned between the United States and Canada under the Pacific Salmon Treaty since 1985. This creates a challenging context in which regional management decisions rely on individual landowner decisions, with little connection across these scales.

The management of private lands for salmon is further complicated by the fact that the state can rarely compel recovery actions on private lands. This includes core actions like riparian planting, fencing, easements, setback of structures, and the surrender of land to a moving channel. Instead, such actions must be agreed to individually at the parcel level. The state is therefore in the difficult position of owing a legally enforceable duty that it can discharge only by persuading people who owe no corresponding duty themselves.

As a result, in watersheds such as the Stillaguamish, the Washington Department of Fish and Wildlife is interested in understanding the perspectives of local landowners on salmon restoration, the potential incentives and motivations for uptake of restoration behavior, and the barriers to widespread adoption of such programs. Previous reviews of practice adoption suggest that general environmental attitudes are inconsistent predictors of whether landowners adopt conservation practices, and that awareness of programs, perceived applicability to one's own property, access to information, incentive structure, and contact with agency staff account for more of the variation (Prokopy et al. 2008, 2019; Baumgart-Getz et al. 2012; Kinney & Fishman, 2026).

Landowner decisions also hinge on judgments about managing institutions. Trust in environmental institutions and their staff is not a single disposition but a set of distinguishable judgments about shared values, competence, procedural fairness, and personal relationship, and these components respond to different interventions and predict different behaviors (Stern and Coleman 2015; Earle and Cvetkovich 1995). In natural resource settings, trust often mediates the relationship between what people know and what they are willing to do rather than following from knowledge as a downstream product (Callahan et al., in review). In a watershed like the Stillaguamish where multiple institutions hold overlapping authority - including a state agency, a county, a federal listing, a tribal co-manager, and a set of nonprofit and conservation district intermediaries - landowners are making judgments about an assemblage of actors rather than about a single agency.

Critically, the Stillaguamish watershed is in the middle of a transition in ownership and land use. Rural land in the Puget Sound region has been changing hands, subdividing, and shifting from production to residence for several decades, and such transitions alter both the practical capacity of owners to undertake land management and the meanings they attach to their property (Gosnell and Abrams 2011; Ulrich-Schad et al. 2016, Trimbach et al. 2022). Attachment to place is

associated with stewardship behavior, though the direction and strength of that association depend on what the place is understood to be and to whom it is understood to belong (Stedman 2002; Masterson et al. 2017; Trimbach et al. 2021; Trimbach et al. 2022).

Despite the volume of research on private lands conservation generally and on Puget Sound recovery specifically, there is currently no population-level account of what Stillaguamish landowners know, believe, and think applies to them with regard to salmon recovery. The recovery effort in this watershed has proceeded on assumptions about its landowner population that have not been measured. This report addresses that gap.

Here we report findings from a survey of landowners in the Stillaguamish Watershed in 2026. The survey was designed to answer the following research questions:

1. What do landowners understand about salmon as well as the status of those salmon in their watershed?
2. Do landowners believe that management of their own property affects salmon outcomes?
3. Do landowners know what types of restoration programs, incentives, and regulatory requirements apply to their property?
4. What programs are landowners most and least interested in?
5. What are the barriers and challenges of restoration that are faced by Stillaguamish landowners and what would increase support and investment in restoration activities?
6. How do landowners feel a sense of place about their land and how do they view stewardship of their land and the Stillaguamish as a whole?
7. How do landowners view the institutions and actors involved in recovery?

We also include results from a discrete choice experiment to understand the role economic incentives could play in motivating recovery behaviors.

Because this report is intended to inform a subsequent social marketing planning effort, it is written to identify barriers and audiences rather than to recommend messages. The community-based social marketing tradition asserts that effective behavior change programs begin by identifying the specific barriers a specific audience faces for a specific behavior, and that message development follows barrier identification (McKenzie-Mohr 2011).

## 3. Methods

This survey was developed and conducted between September 2025 and September 2026. The goal of the survey was to assess landowners' concerns, perceptions, knowledge, and motivations regarding habitat restoration as well as barriers and incentives for adopting restoration actions.

### *a. Study population*

The study population includes all landowners in the Stillaguamish Watershed other than utility landowners, according to land use code series 40 under the Washington State Administrative Code. The population is stratified by riparian status. Riparian status means that the landowner is within the regulatory 150-foot riparian buffer zone along any watercourse or waterbody that has an above-ground delineated flow to the Stillaguamish River, excluding portions of the river classified as part of the bay or Puget Sound. Of all survey eligible properties, in the Stillaguamish (n=27,390), 30% have parcels in the riparian zone and 70% have parcels in the uplands.

### *b. Survey development*

The survey was developed using input from different sources: 1) Other watershed-based surveys (e.g., Scholl & Humphery, 2017; Stets & Biga, 2003), 2) Other environmental-based surveys, specifically those in Washington State that focused on stewardship (e.g., Bordas et al., 2025), 3) Previous discrete choice models and studies (e.g., Greiner, 2023; Hensher et al., 2015; Trenholm et al., 2017), 4) Discussions with agency partners, and 5) Interviews with landowners and key informants in the Stillaguamish watershed.

The survey went through multiple reviews within the project team. A final draft was reviewed by landowners along with tribal and agency officials and final edits were made based on provided feedback. The survey was designed and implemented through Qualtrics software. The survey was written in English, but was translated to Spanish and both were offered to participants. (For a copy of the full survey please see Appendix C).

### *c. Survey deployment and data collection*

Addresses were obtained through the Snohomish County and Skagit County Assessor offices' public parcel databases. Owner addresses were used instead of in situ addresses, so some addresses were out of state. 10,000 addresses were randomly selected, though the landowners were sampled by the inverse proportion to ensure adequate representation of the riparian landowners (Cochran, 1977), so all parcels with riparian status were selected. Riparian landowners are paramount for understanding restoration, especially in a watershed context. This oversampling design ensures that there is adequate representation of riparian landowners for the survey analysis.

Addresses were removed if they were incomplete or they were city or state organizations (e.g., Seattle Public Utilities, Washington Department of Natural Resources). The addresses were

screened for duplicates and were replaced with a randomly generated list of additional addresses. In total 9,984 letters were mailed out by the University of Washington via the United States Postal Service (16 addresses were found to be undeliverable).

A modified version of the Dillman method (Dillman et al., 2015) was used to solicit responses as an initial postcard with information about the survey was sent out, followed by a letter with a QR code, TinyURL link, and a $2 incentive two weeks later. A follow-up postcard was sent another two weeks later with a survey link, QR code and a reminder to landowners to fill out the survey. In the mailed materials, we also included a contact email in case the respondent required a hard copy or additional assistance. An additional $200 gift card incentive was provided via a lottery system. These two steps were done to maximize the response rate and to minimize nonresponse bias. The researchers recognize the possible response bias from this survey as respondents may be more likely to complete this survey if they have an interest or stake in the survey topic. While steps were taken to attempt to minimize nonresponse bias, results should be interpreted with these considerations in mind.

Given that the watershed is relatively rural and agency officials had cautioned that landowners may be hesitant to engage in surveys or research, the study assumed a conservative effective response rate of 5%. With 10,000 surveys planned, the expected number of operable returned surveys was 500.

*d. Data analysis*

Survey responses were cleaned and were screened for insufficient responding by evaluating individual responses and checking for instances of straightlining, where respondents pick the same choice repeatedly. Additionally, each response was checked for duration spent taking the survey with the minimum time necessary for comprehension and completion estimated to be five minutes. One survey was under five minutes, but the question responses varied and qualitative responses were recorded correctly, so we included all received responses.

Basic analyses and data visualizations were performed in Excel and in the statistical program RStudio (Posit team, 2026). We tested for significant differences in responses between groups (e.g., age, environmental identity, riparian status) using ANOVA and chi-squared tests in RStudio. Likert scale questions were analyzed with regressions and visualized using the R package *likert* (Bryer & Speerschneider, 2013). A discrete choice analysis was conducted to determine incentives and barriers engagement (Train, 2003; Hensher et al., 2015). (For more information on the discrete choice analysis, please see Appendix B).

Qualitative data were analyzed separately using an inductive coding approach. For survey items that included an “other” response option or invited participants to provide optional specifics (e.g., “Please indicate where you get and where you would like to get information about doing restoration work on your land: Podcasts (Optional: Specify which ones)”), we reviewed the written responses and identified common themes or concepts. Responses with similar meanings

were grouped into standardized categories, and the resulting categories were tallied to summarize the frequency of each type of response. For example, when asked who was responsible for a healthy environment in the Stillaguamish Watershed as a whole, “all” “anyone who interacts with it” “It’s everyone’s responsibility” “everyone” “we all have a role to play” would be categorized as “everyone” because they conveyed the same underlying concepts. Categories were developed based on the content of the participants’ responses rather than imposed from a predetermined coding framework. When respondents listed multiple responses, they would be counted separately. Percentages were calculated based on the total number of respondents who selected “other.” General percentages and additional ideas and sentiments are included in the results, but no specific quantitative calculations were performed given the lower number of respondents, and the broad nature of the responses.

The results are non-weighted as there is a lack of clear population data within the geographic area that could be compared to the respondent sample. Using estimated acreage bins based on parcel data and collapsing the “less than 0.5 acres” and “0.5 to 1 acre”, weights would be between 0.7 and 1.2. However, estimated acreage bins from parcel data may not reflect complete ownership of respondents in the Stillaguamish Watershed or how respondents view the size of their property. Without a secondary variable to adjust these weights, the data remained unweighted.

## 4. Results

### *a. Study population and area*

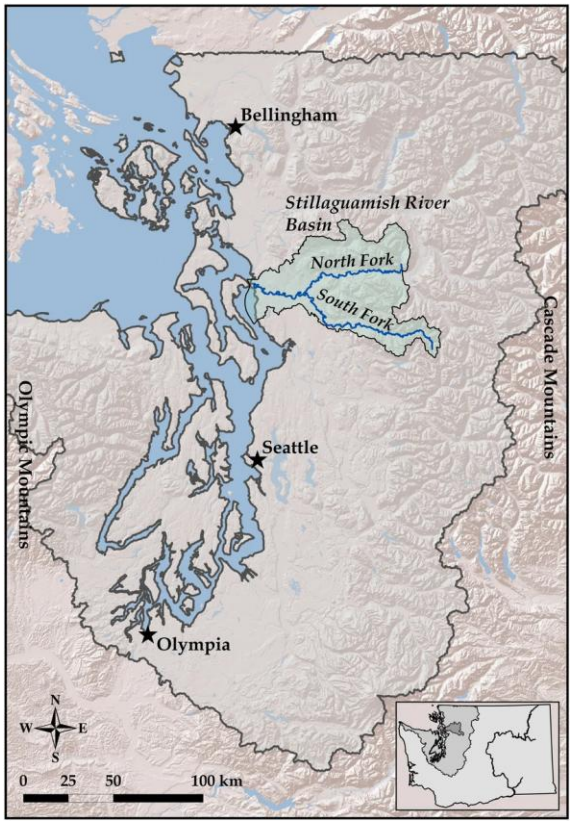
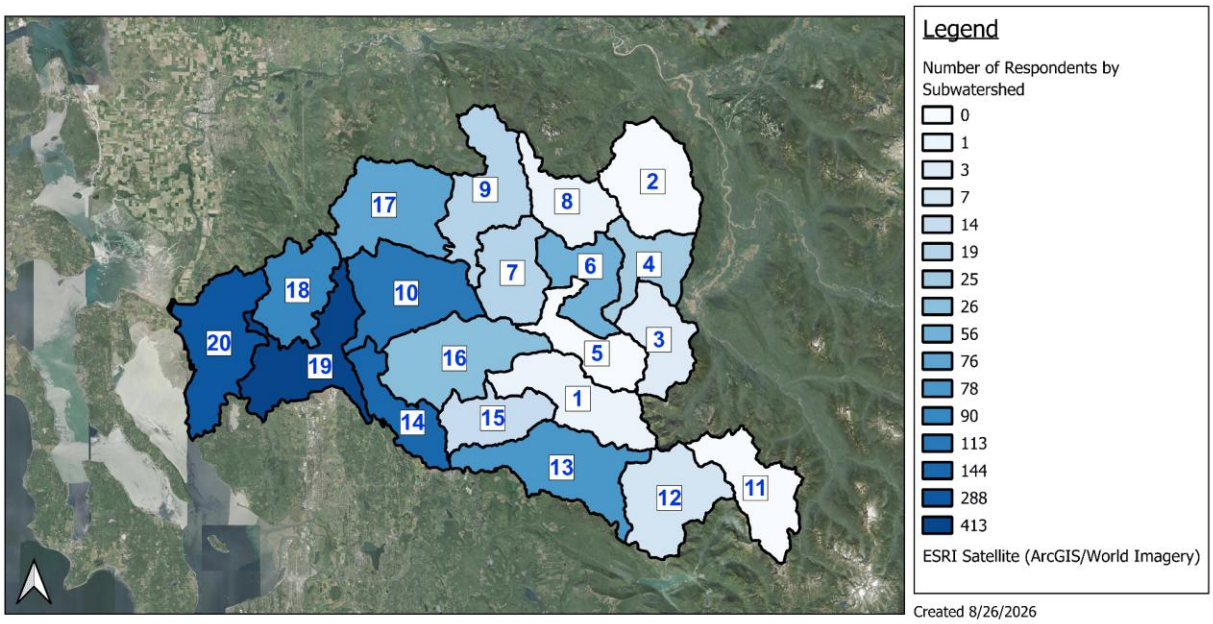


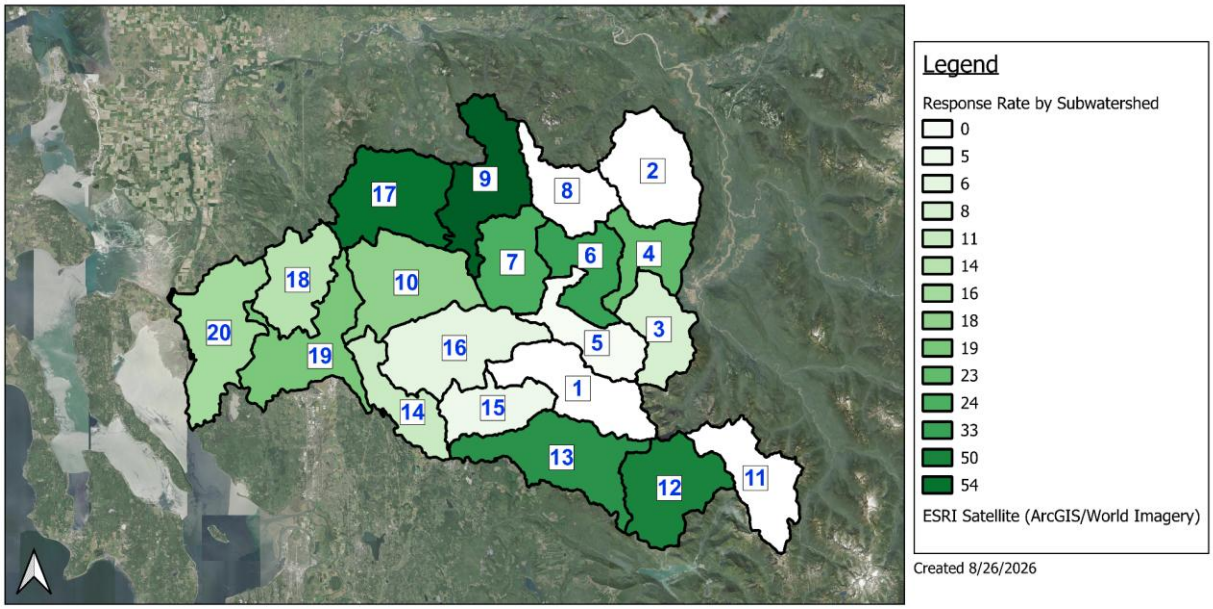

**Figure 1. Map of the Stillaguamish watershed in Washington State.** The full map shows the western part of Washington State (see inset for full view of state), with the Stillaguamish watershed highlighted and the North and South Forks labeled. Map is from Gayeski et al. (2016).

In total, we collected 1,373 usable responses (response rate: 13.75%). The majority of the respondents (96%) confirmed they had primary decision-making authority for their land. Most respondents were from the sub-watersheds located in the Main Stem and around Arlington, specifically the Armstrong Creek-Stillaguamish River sub-watershed (30%) and the Stillaguamish River-Frontal Port Susan sub-watershed (21%). The sub-watersheds were combined into three groupings (South Fork, North Fork, and Main Stem) based on geographical location Hydrologic Unit Code (HUC) 10. Most respondents were from the Main Stem (63%) followed by the South Fork (20%) and the North Fork (17%) (Figures 2 and 3).




| Num | Name | # of Resp | Num | Name | # of Resp | Num | Name | # of Resp | Num | Name | # of Resp |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N. Fork Canyon Creek | 1 | 6 | French Creek - N. Fork | 56 | 11 | Headwaters S. Fork | 0 | 16 | Jim Creek | 26 |
| 2 | Headwaters N. Fork | 0 | 7 | Brooks Creek - N. Fork | 19 | 12 | Upper S. Fork | 7 | 17 | Upper Pilchuck | 76 |
| 3 | Squire Creek | 3 | 8 | Upper Deer Creek | 1 | 13 | Middle S. Fork | 78 | 18 | Lower Pilchuck | 90 |
| 4 | Segelsen Creek - N. Fork | 25 | 9 | Lower Deer Creek | 19 | 14 | Lower S. Fork | 144 | 19 | Armstrong Creek | 413 |
| 5 | Boulder Creek | 0 | 10 | Rock Creek - N. Fork | 113 | 15 | Canyon Creek | 14 | 20 | Frontal Stilly | 288 |

**Figure 2. Map of the Stillaguamish watershed divided by sub-watersheds.** Colors indicate the number of respondents from each watershed, while the full name of the watershed and the total number of respondents is in the table below.




| Num | Name | Resps/Mail | Num | Name | Resps/Mail | Num | Name | Resps/Mail | Num | Name | Resps/Mail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N. Fork Canyon Creek | 1/0 | 6 | French Creek - N. Fork | 56/171 | 11 | Headwaters S. Fork | 0/0 | 16 | Jim Creek | 26/411 |
| 2 | Headwaters N. Fork | 0/0 | 7 | Brooks Creek - N. Fork | 19/80 | 12 | Upper S. Fork | 7/14 | 17 | Upper Pilchuck | 76/141 |
| 3 | Squire Creek | 3/37 | 8 | Upper Deer Creek | 1/0 | 13 | Middle S. Fork | 78/235 | 18 | Lower Pilchuck | 90/666 |
| 4 | Segelsen Creek - N. Fork | 25/105 | 9 | Lower Deer Creek | 19/35 | 14 | Lower S. Fork | 144/1363 | 19 | Armstrong Creek | 413/2179 |
| 5 | Boulder Creek | 0/13 | 10 | Rock Creek - N. Fork | 113/642 | 15 | Canyon Creek | 14/300 | 20 | Frontal Stilly | 288/1799 |

**Figure 3. Map of the survey response rate for the Stillaguamish watershed divided by sub-watersheds.** Colors indicate the percentage of responses based on the number of mailed survey codes to each sub-watershed, while the full name of the watershed and the total number of respondents/total number of mailed survey codes is in the table below.

Of the respondents, 64% reported that their property had a stream, river, or riparian zone, or was 150 feet or less from a stream, river, or natural water body. A majority of respondents (82%) categorized their property as rural, while 15% said their property was suburban, and 3% said urban. Most respondents categorized their property as residential, either their primary residence (75%), vacation property (12%), or residential farming and ranching (5%). Of those who answered "other," the most common response was that their property was either forest land (17%) or a vacant lot/undeveloped raw land (30%) (Figure A1).

Overall, respondents generally had smaller land plots, but had lived in the Stillaguamaish watershed for many years. Only 7% of all respondents had property over 20 acres (compared to 5% of all survey eligible properties). The majority of respondents had smaller properties, either 2-5 acres (34%), half an acre-1 acres (20%), or less than half an acre (21%) (Figure A2). Respondents had generally lived in the Stillaguamish for many years with 45% reporting they had lived in the Stillaguamish for 21 or more years (Figure A3).

Overall, the study respondents tended to be male, white, older, with some higher education. The majority of respondents were male (55%), followed by female (39%) and "prefer not to answer" (6%). Generally, respondents were older with almost a quarter (24%) of respondents listing their age as 60-69 years and 70-79 years (Figure A4). The majority of respondents (80%) were white

(Figure A5). Additionally, a majority of respondents reported education at either the college level or beyond (Figure A6).

*b. Restoration actions*

While a majority of respondents had not conducted restoration on their land in the past (52%) or were not currently conducting restoration (74%), there was more potential for interest in future restoration with 32% of respondents wanting to conduct restoration on their land in the future and 35% of respondents unsure. Additionally, 42% of respondents wanted more information about restoration (Figure 4).

The most common types of restoration that respondents had undertaken in the past were planting native plants (39%), removing invasive wildlife and plant species that could impact salmon (22%), and maintaining mandatory buffers around waterways or wetlands (21%). Respondents were interested in certain kinds of restoration assistance, generally ones in which additional funding or technical support was provided (e.g., 64% of respondents were interested in tax reduction programs for land under restoration or protection). Additionally, respondents were also more likely to be interested in activities they could do on their land that would have an impact on salmon such as removing fish barriers or naturalizing waterways (54% would be interested) or removing invasive wildlife and plant species that could impact salmon (56%) (Figure 5). Respondents were least supportive of actions that would involve land easement purchases (68% would not be interested), selling all or a part of their land (80%), or engaging in a home setback or relocation from the floodplain (74%) (Figure 5).

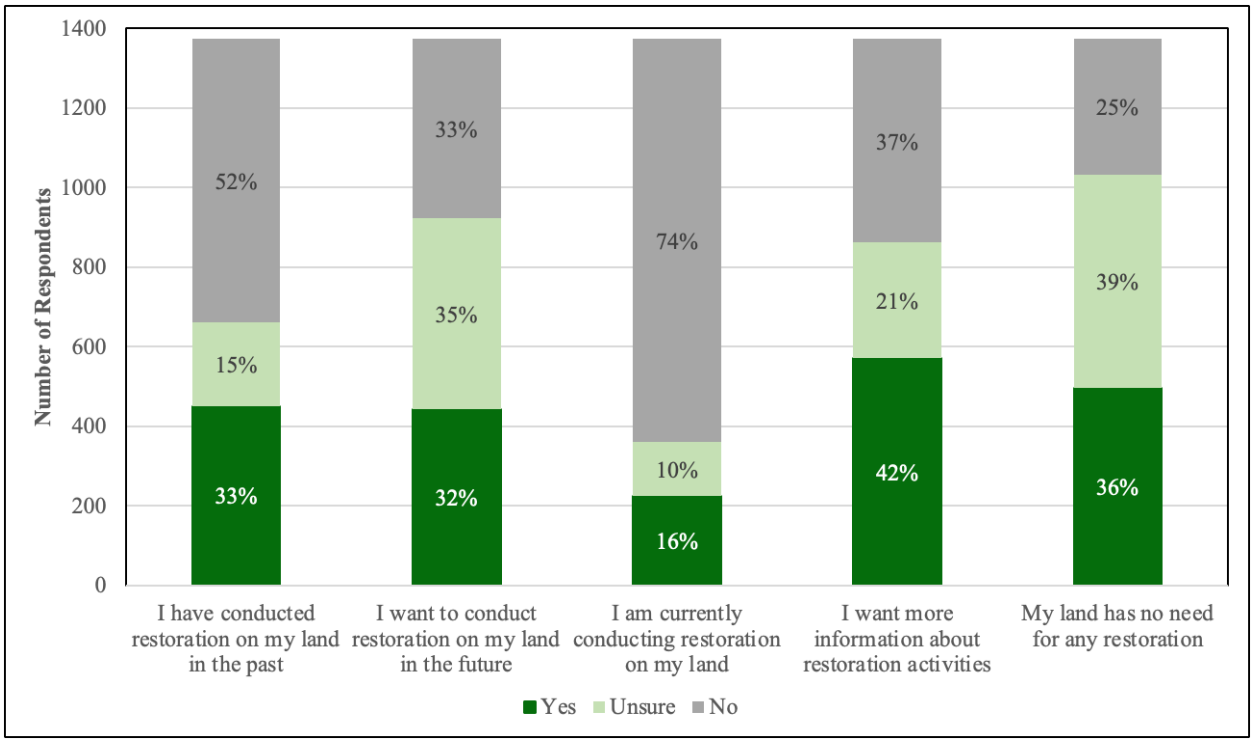



**Figure 4. Stillaguamish landowner responses regarding past, current, and future restoration activities.** For each question respondents indicated yes, no, or unsure. Bars show the number of respondents selecting each response category.

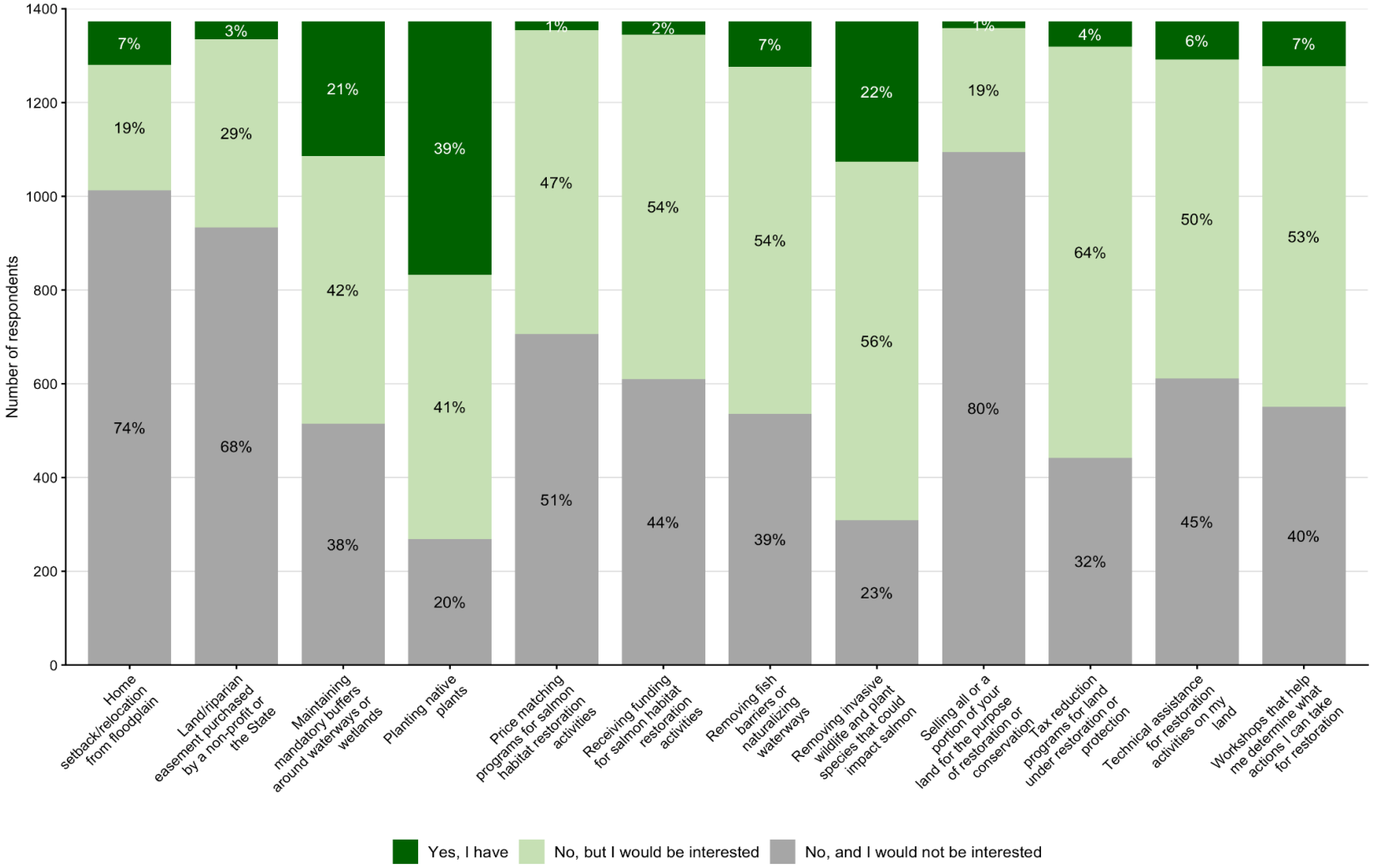



**Figure 5. Stillaguamish landowner participation and interest in participation in restoration activities**. For each question respondents answered either yes they had participated in the restoration activity, no they had not participated in the restoration activity, but they would be interested, or no they had not participated and would not be interested. Bars show the number of respondents selecting each response category.

### c. *Eligibility and effect of restoration*

A common deterrent to conducting or supporting restoration was that respondents did not think their land was eligible. 36% of respondents agreed their land had no need of restoration, while another 39% were unsure (Figure 4). Additionally, when asked what would deter them from conducting restoration on their land, 19% of respondents answered "other" (n=258). The most common reason entered under the "other" category was respondents did not believe their land was eligible for restoration, it was not near water, or it was not near salmon habitat (n=176).

Additionally, many respondents believed that restoration on their land would not help salmon populations if they were not near rivers, or if they were not near a waterway containing salmon. When asked if they believed that any type of restoration on their land would have a direct benefit to salmon recovery, 38% of respondents somewhat or strongly disagreed, while only 27% of respondents somewhat or strongly agreed (Figure 6). However, 34% neither agreed nor disagreed, indicating a high level of uncertainty about the issue.

Certain populations were more likely to agree that restoration on their land would have a direct benefit to salmon recovery. For example, riparian landowners were significantly more likely to agree compared with non-riparian landowners ($\chi^2(4)= 78.73$, $p<0.001$) (Table A1). Additionally, respondents with more land (11-20 acres and 20+ acres) were more likely to agree that any restoration on their land would have a direct benefit on salmon recovery compared with landowners with less acres ($\chi^2(20)= 49.38$, $p<0.001$) (Table A2). Main Stem residents were the most likely to disagree that any restoration activity on their land would have a benefit compared with North and South Fork residents ($\chi^2(8)= 23.93$, $p<0.01$) (Table A3). Interestingly, while there were no clear trends regarding length of residence in the Stillaguamish, respondents who said they did not live in the Stillaguamish (e.g., trustees, rental-property owners) were slightly more likely to strongly agree and less likely to strongly disagree that any restoration activity would have a benefit ($\chi^2(16)= 35.31$, $p<0.01$) (Table A4).

### d. *Salmon restoration*

There was a strong population-level interest in and support for salmon in the Stillaguamish. A majority of respondents (72%) somewhat or strongly agreed that they wanted to see more salmon habitat restoration in the Stillaguamish Watershed (Figure 6). When asked how they interact with the Stillaguamish watershed, 31% of respondents participated in recreational fishing, and a quarter of respondents (25%) reported interacting through viewing salmon (Figure A7), indicating salmon are an element of interest to respondents.

However, while there was a desire for more salmon habitat restoration given the strong emphasis placed on salmon, there was less stated interest in conducting and/or allowing habitat restoration on respondents' land. Only 36% of respondents agreed that if given the opportunity they would participate in a salmon habitat restoration project on their land. This could be in part due to the

"not in my backyard" (NIMBY) phenomenon, in which residents have a fear of losing their own well-being and/or economic value of their property (Pol et al., 2006). Indeed, 53% of respondents cited they were worried about restrictions on what they could do on their land as the main reason for that would discourage them from participating in habitat restoration on their property (Figure A8). Additionally, 50% of respondents would be discouraged from selling some or all of their property because they were concerned about losing economic benefits (Figure A9). This dissonance between wanting to protect salmon and salmon habitat and not stating an intention to do so individually may relate to the previous finding that many respondents did not believe that any restoration on their land would have a direct benefit to salmon.

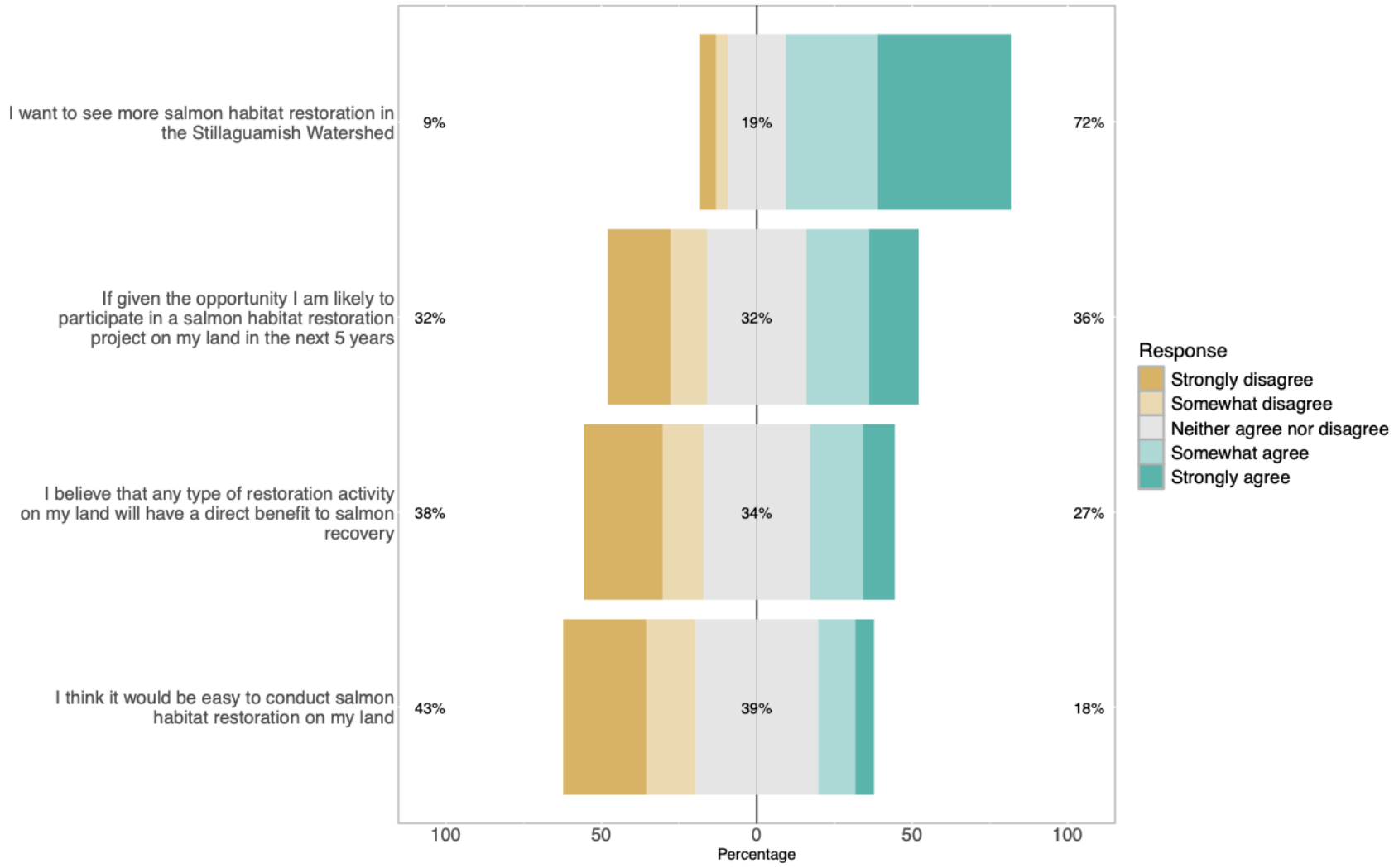



**Figure 6. Likert scale responses of Stillaguamish landowners to salmon habitat restoration statement.** Response distributions are arranged along a diverging Likert scale with agreement ("Somewhat agree" and "Strongly agree") in blue on the right, and Disagreement ("Somewhat disagree" and "Strongly disagree") in yellow on the left. Neutral responses ("neither agree nor disagree") are shown in grey in the middle. The length of each segment represents the percentage of respondents selecting that response.

*e. Referral of responsibility*

Results showed that respondents sometimes attributed or referred the responsibility for a healthy environment on their land to others, but respondents most commonly attributed responsibility for healthy environment in the Stillaguamish in general to others. While respondents overwhelmingly indicated they were responsible for a healthy environment on their land (96%), a slightly smaller amount (70%) believed they were responsible for a healthy environment in the Stillaguamish watershed as a whole. Instead, respondents identified others as having a larger responsibility to protecting the health of the Stillaguamish watershed, including residents of the Stillaguamish watershed (81%), local government (e.g., county government, cities) (76%), state government (e.g. Washington Department of Fish and Wildlife) (76%), and landowners (73%). Fishing, forestry, mining industries (64%) and business corporations in the Stillaguamish (51%) were not as commonly selected as the other options, but over half of all respondents still selected one or both as responsible for a healthy environment in the Stillaguamish watershed.

In addition, while respondents often had concerns about environmental issues in the Stillaguamish as a whole, those concerns were rarely reported on their own land (Figure 8). The most common environmental concerns related to salmon populations. While a majority of the respondents were concerned about declining salmon populations (70%), salmon habitat loss (69%), and salmon passage barriers (66%) in the Stillaguamish Watershed as a whole, only 2% were concerned about those issues on their land.

Some respondents reported a belief that Tribal groups should hold more responsibility in the Stillaguamish. This belief manifested in the write-in answers to the "other" category of who has responsibility for a healthy environment. 17% of the respondents who selected "other" (n=11) listed Tribes as responsible for a healthy environment on their land, and 34% (n=27) listed Tribes as responsible for a healthy environment in the Stillaguamish as a whole. This perception may be due to the fact that the Stillaguamish Tribe is purchasing land in the Stillaguamish Watershed to conduct restoration. These purchases may activate anxiety from residents that their land will be taken or sold, or that their access to benefits on the watershed will be removed, all of which are concerns expressed by interviewees and in write-in comments in the survey. Alternatively, the fact that Tribes were written in as being responsible for a healthy environment may simply indicate respondents are aware of the Tribe's restoration activities.

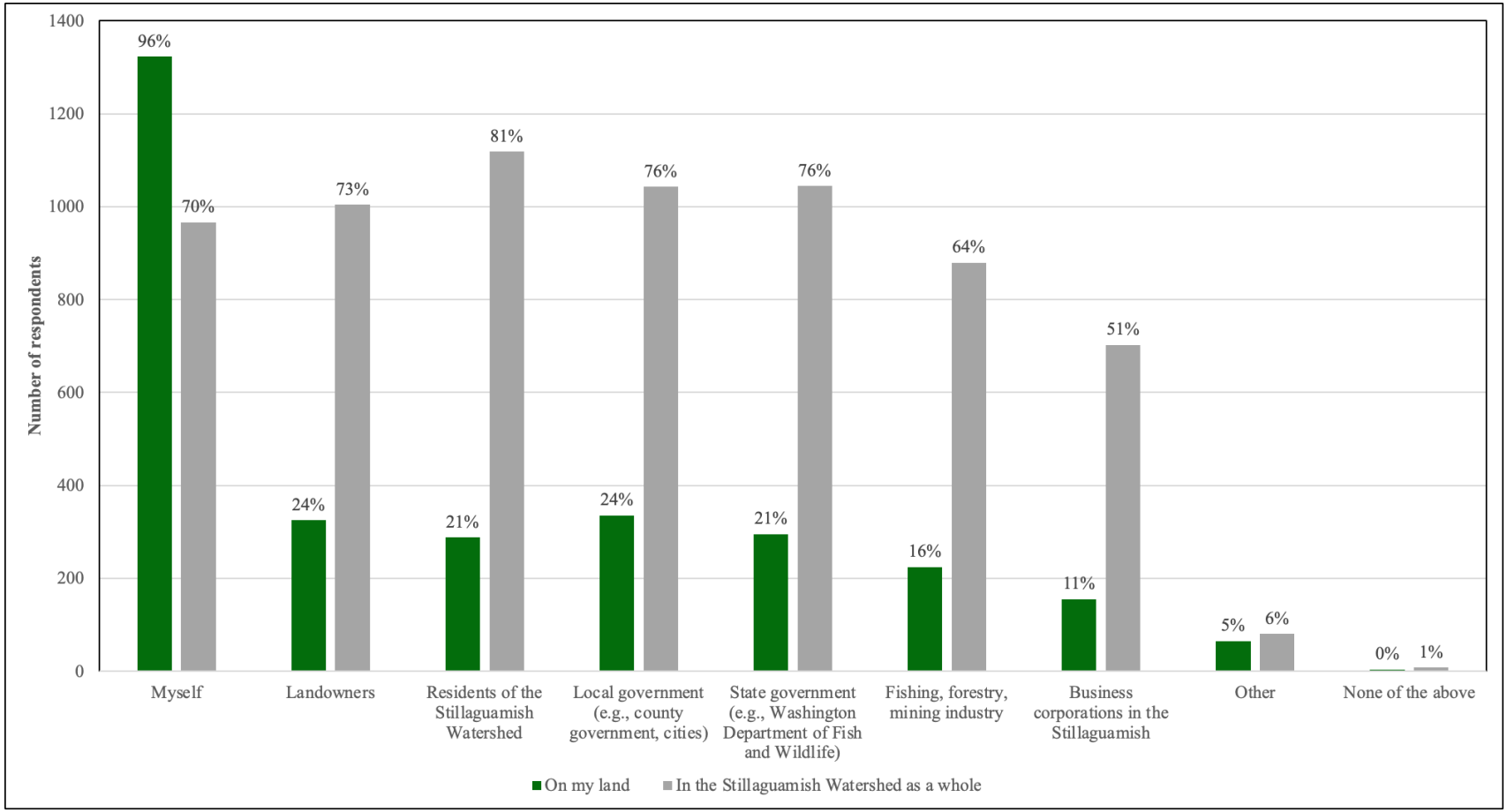



**Figure 7. Respondents' perceptions of responsibility for a healthy environment on landowners' land (green) and the Stillaguamish Watershed as a whole (grey).** Respondents could select all that applied.

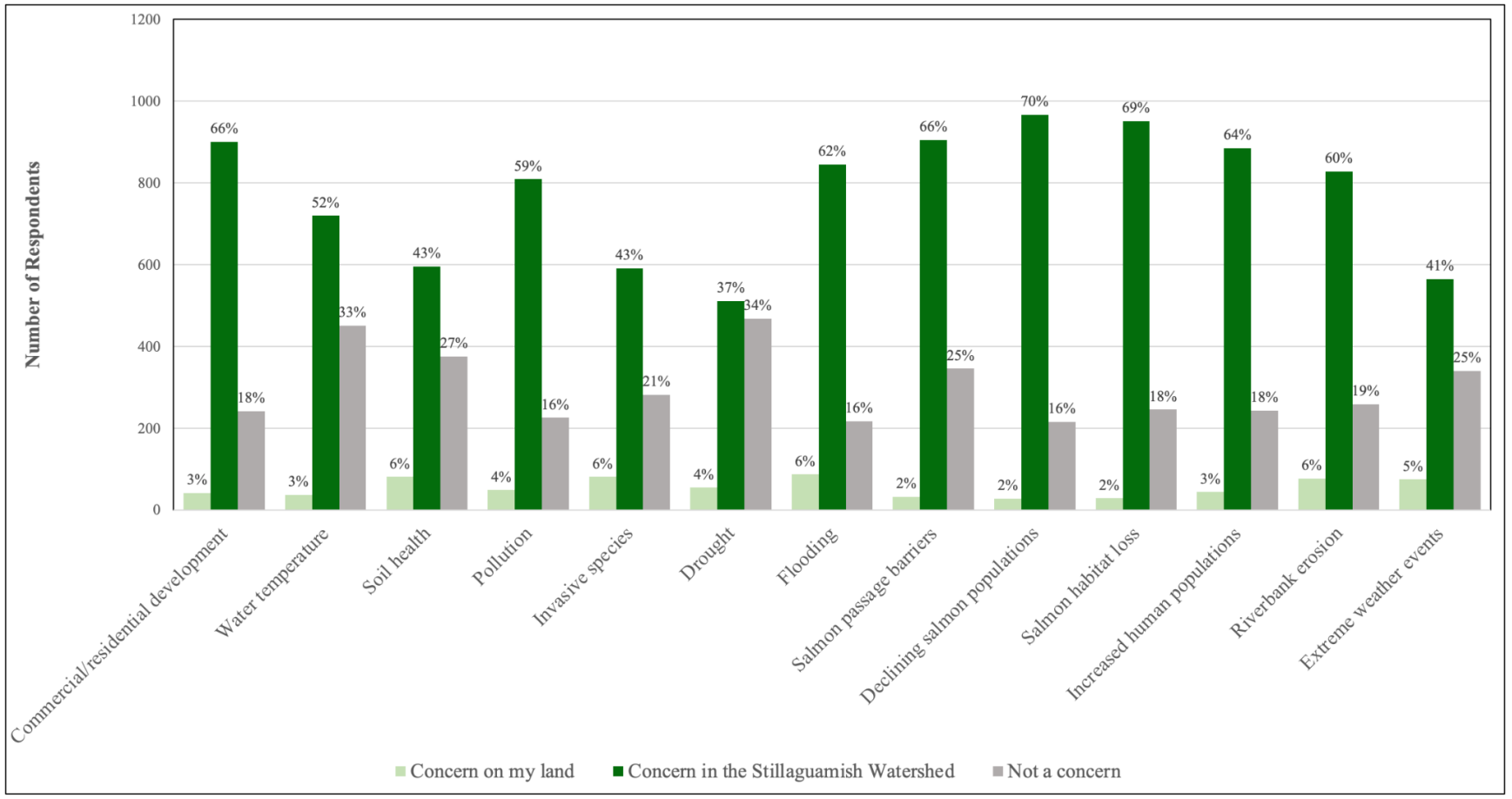



**Figure 8. Environmental concerns on landowners' land (light green) and in the Stillaguamish Watershed (dark green).** Respondents could select all that applied.

*f. High levels of uncertainty*

While there was broad agreement about certain topics, such as salmon recovery, many people answered "neither agree nor disagree" to other topics, indicating high levels of uncertainty. This was particularly true for landowners asked if it would be easy to conduct salmon habitat restoration on their land (39% neither agreed nor disagreed), if they believed that any restoration activity on their land would have a direct benefit to salmon recovery (34%) and if given the opportunity they would be likely to participate in salmon habitat restoration projects on their land in the next 5 years (32%) (Figure 6). These results suggest there may be room for additional education and outreach, especially around salmon habitat restoration.

*g. Knowledge*

The survey assessed self-reported knowledge and familiarity. Specifically, it considered knowledge of salmon and salmon recovery, awareness of where to find information, as well as familiarity with current decisions and treaties. Overwhelmingly, respondents strongly or somewhat agreed that they know about the salmon life cycle (81%). A majority also reported they knew where to find official information about fishing opportunities and regulations (74%) and that they know what the environmental regulations are on their land (58%). Respondents reported much less knowledge about treaties and decisions. Half of all respondents (50%) reported they somewhat or strongly disagreed that they were familiar with the Boldt Decision (and only 38% reported they were familiar with the Boldt Decision). Similarly, 46% were not familiar with the Pacific Salmon Treaty (and only 33% were familiar with it). While respondents were more familiar with salmon and salmon ecology in general, 43% did not know which species of fish were listed as endangered or protected in the Stillaguamish watershed (37% reported they did) (Figure 9).

A particular finding involved knowledge of the Boldt Decision. While only 38% of respondents somewhat or strongly agreed they were familiar with the Boldt Decision (and 50% disagreed), knowledge was correlated with the age of the respondents. Older respondents were much more likely to report being familiar with the Boldt Decision compared to the younger respondents (Table A5).

Some of the factors that most significantly predicted reported knowledge were the environmental identity scale ($p<0.001$, $b = 0.303$) (those with higher environmental identity scores reported a higher knowledge) and if the respondents had lived in the Stillaguamish for 11-20 ($p<0.05$, $b = 1.61$) or 21+ ($p<0.001$, $b = 2.22$) years (those who had lived in the Stillaguamish for longer reported a higher knowledge). (See Figure 12 for more information on the environmental scale).

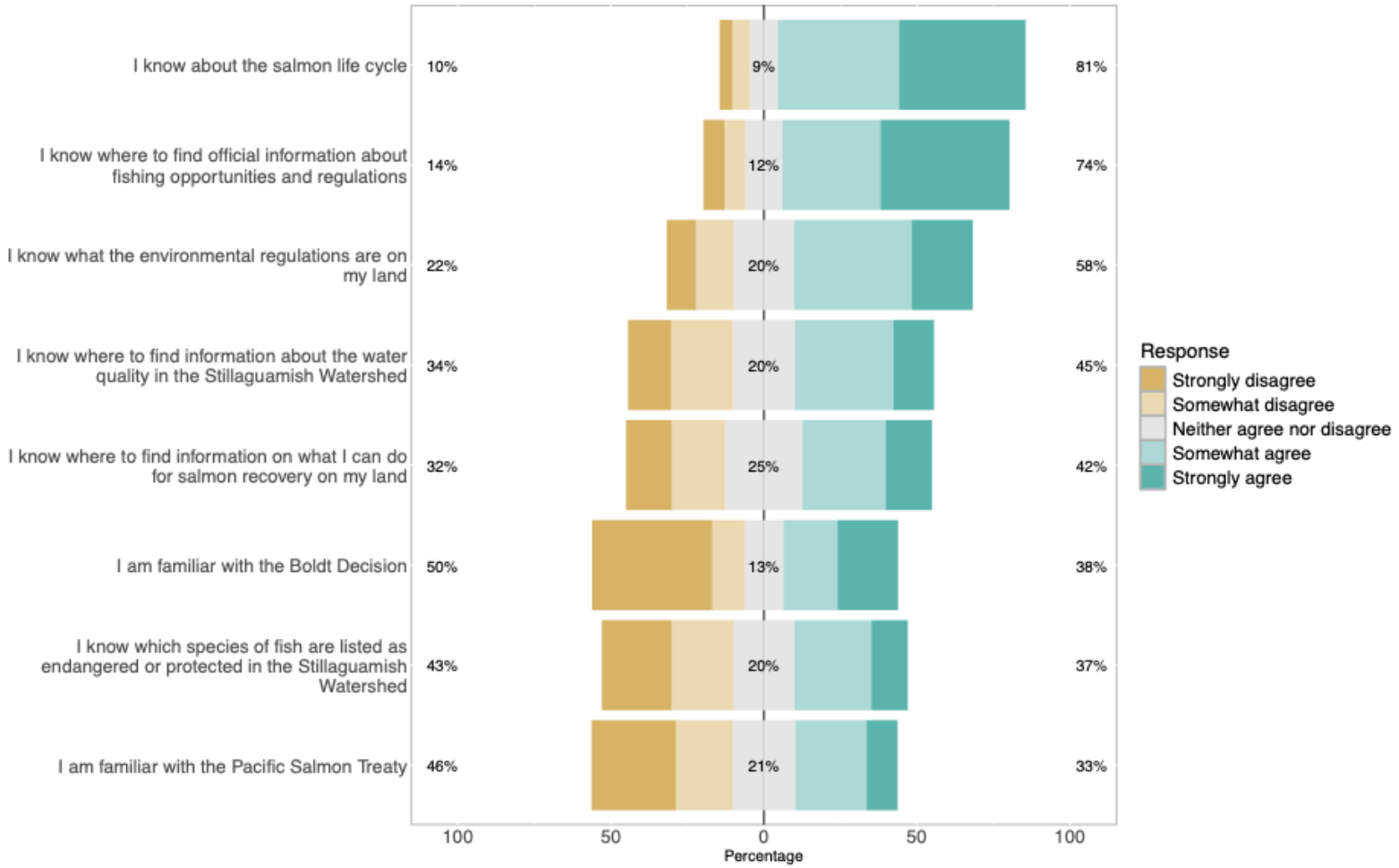



**Figure 9. Respondents' self-reported knowledge and familiarity with knowledge topics in the Stillaguamish Watershed.** Response distributions are arranged along a diverging Likert scale with agreement ("Somewhat agree" and "Strongly agree") in blue on the right, and Disagreement ("Somewhat disagree" and "Strongly disagree") in yellow on the left. Neutral responses ("neither agree nor disagree") are shown in grey in the middle. The length of each segment represents the percentage of respondents selecting that response.

*h. Information*

There was a surprising difference between where respondents currently get information about doing restoration work on their land from and where they would like to get it from. While respondents reported currently getting information most from friends, family and neighbors (34%), as well as news media (e.g., newspapers, local TV, news, radio) (33%), they did not as strongly prefer to get information from those sources (20% and 14% preferred to receive information from those sources respectively) (Figure 10).

Instead, the sources that respondents most wanted to receive information from were more official in capacity. For example, 39% of respondents wanted information from the Stillaguamish Watershed Council (only 10% reported currently getting information from them). Indeed the Stillaguamish Watershed Council was cited a number of times in write-in responses as a source of information. Additionally, 38% of respondents wanted information from the Washington Department of Natural Resources (23% currently get information from there), and 36% of respondents wanted information from WDFW (28% currently get information from there). That said, no source received a majority of the responses, so it may be additional avenues, or a multitude of avenues should be explored to maximize information distribution.

In terms of the method of receiving information, most respondents indicated that they would be open to receiving some type of information about habitat restoration on their land as only 12% responded that they did not want information on habitat restoration. Generally, respondents seemed to prefer written information and information that was sent directly to them over in-person workshops and presentations. The most popular form of communication was a mailed flyer (43%), followed by informational webpage (38%) and email newsletter (32%). Additionally, there was interest in a landowner's guidebook (30%). It should be noted that this survey was shared via mailings, thus there may be a bias in the population that responded. The communication forms of least interest to respondents were presentation at a community festival or event (18%), demonstration field tour (18%), and social media pages (e.g., Instagram, Facebook) (12%) (Figure 11).

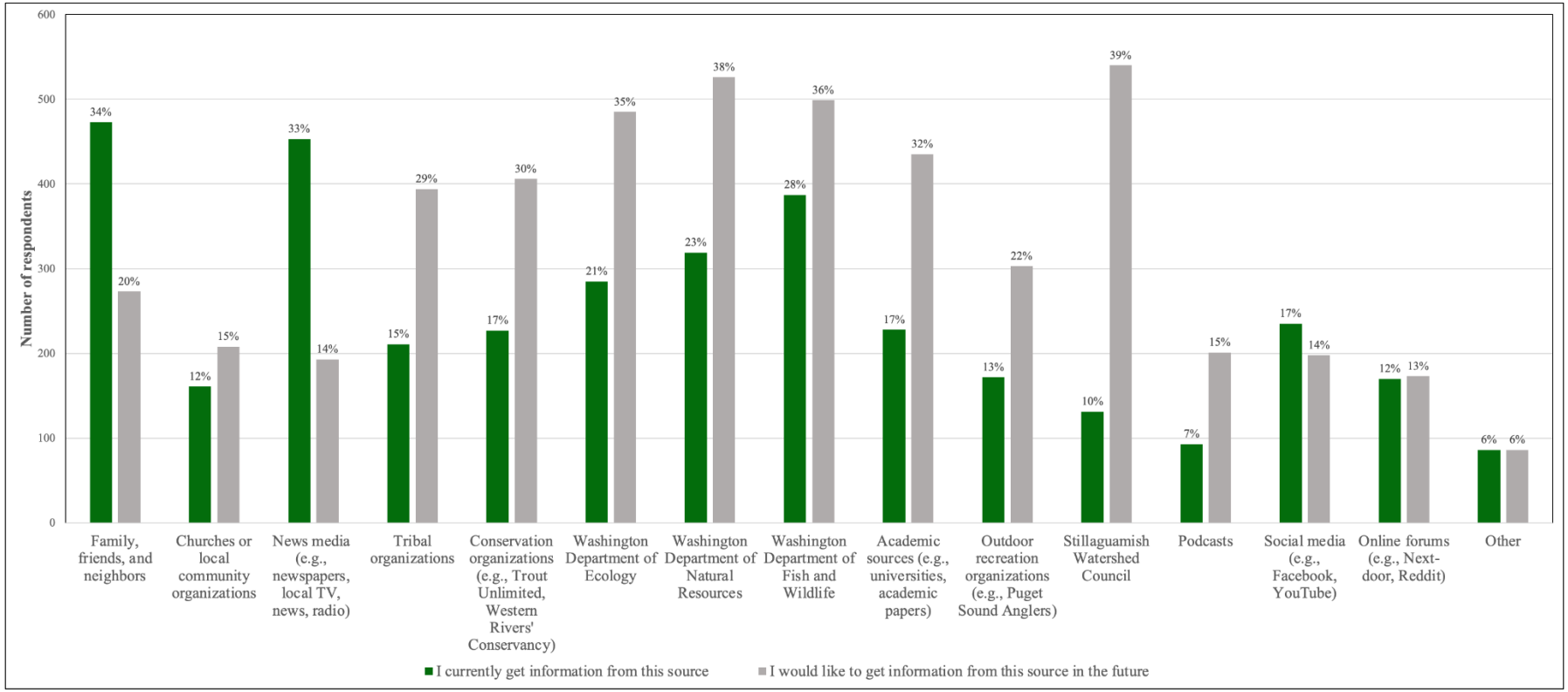



**Figure 10. Where respondents' currently get information about doing restoration on their land (green), and from where they would like to receive information in the future (grey).** Respondents could select all that applied.

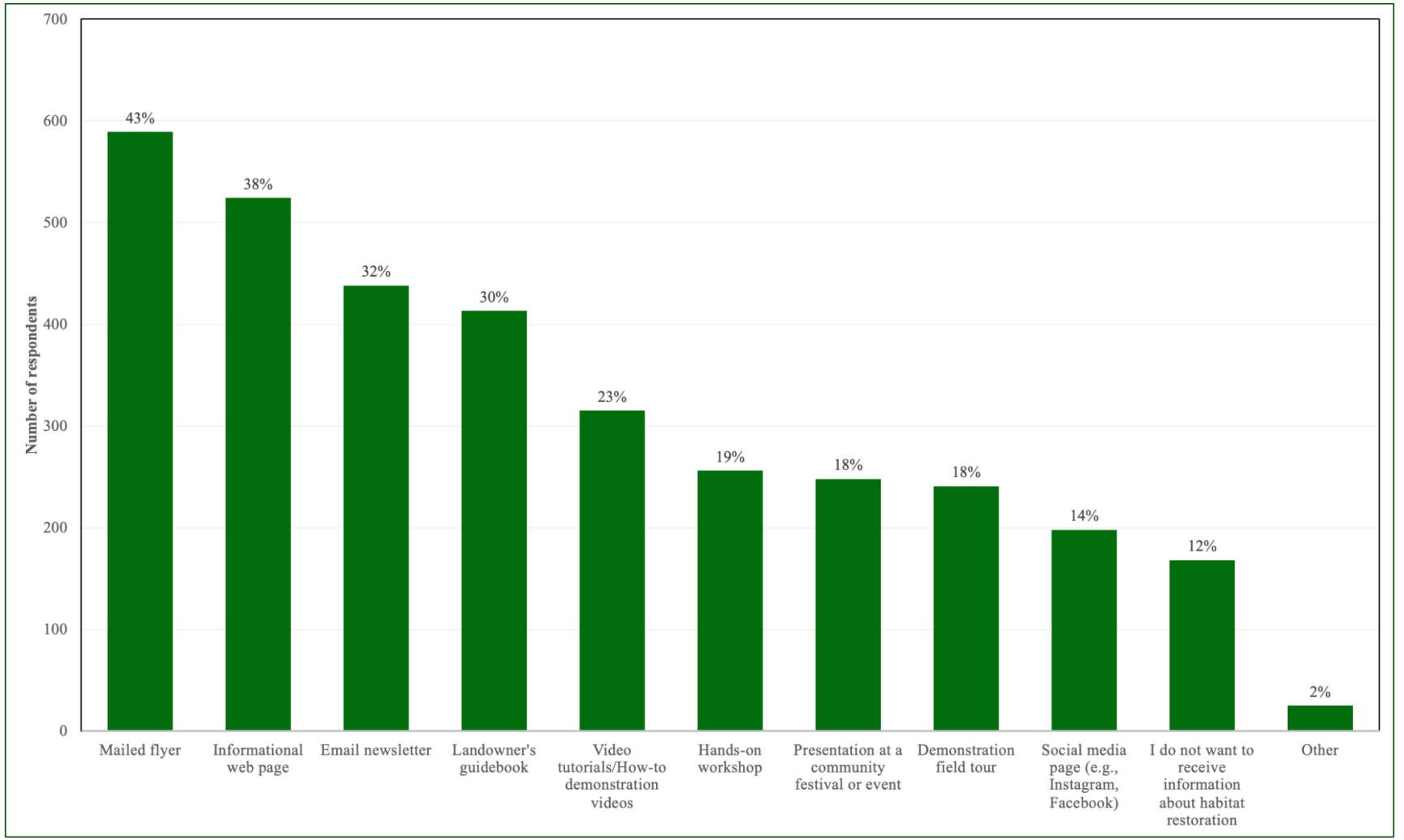



**Figure 11. Respondents' preferred way of receiving information about habitat restoration.** Respondents could select all that applied.

*i. Environmental identity*

Environmental identity was determined through an adapted scale (Scholl & Humphery, 2017; Stets & Biga, 2003) that aimed to examine how each individual respondent viewed themselves in relation to the watershed environment. The seven, 5-point bipolar scale environmental questions were summed giving a possible score between 5 and 35. The scores indicated how much each respondent felt in relationship to the watershed, with lower scores representing less connection, or more anthropocentric behavior and higher scores representing more connection, or more ecocentric behavior. The summed environmental scores skewed more towards the "stronger" side (M=26.38, SD=4.42), indicating more respondents felt a connection with the watershed (Figure 12).

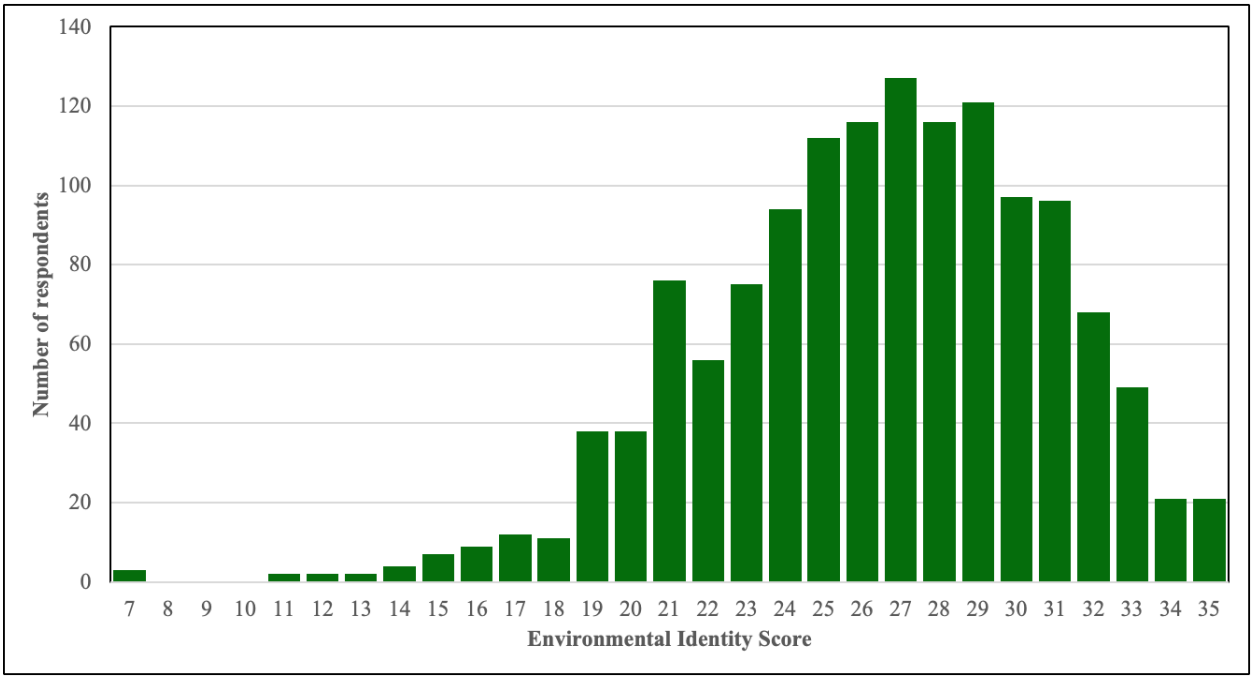



**Figure 12: Summed environmental identity scores.** Scores can range from 7 to 35. Higher scores indicate more connection with the watershed or ecocentric behavior. Lower scores indicate less connection with the watershed or anthropocentric behavior. Bars indicate the number of total respondents for each score.

Environmental identity was ultimately linked to many of the other findings. Those with higher environmental identity scores were more likely to have conducted restoration in the past, want to conduct restoration in the future, and want information on restoration. They were also a predictor of self-reported knowledge. Riparian owners and those with higher levels of education, were more likely to have higher environmental identity scores.

While environmental identity is more difficult to change in the short-term, given it is rooted in beliefs, education and outreach remain important tools for promoting environmental restoration. Outreach and education efforts can focus on and reinforce existing environmental identities in certain areas, as well as increase awareness of restoration opportunities and information in other areas.

## 5. Economic Analysis

We conducted a split-sample discrete choice experiment to explore the barriers and drivers for landowners' willingness-to-pay (WTP) (for examples and related literature, see Bell et al., 2003; Mueller, 2014; Nielsen-Pincus et al., 2017; Petrolia et al., 2014) for restoration that may not necessarily be on their land and for landowners' willingness-to-accept (WTA) (for examples and related literature, see Knoot et al., 2010; Luther et al., 2022; Ma et al., 2012; Rabotyagov & Lin, 2013; Trenholm et al., 2017) in the form of incentives to participate in restoration work on their land. Through the random selection process conducted in Qualtrics and after cleaning, the WTA sample resulted in 672 respondents and the WTP sample resulted in 701 respondents. From selected variables, the group comparison demographics are relatively similar, with the sex category having the largest difference at 4% Table A6. These demographics suggest that the two sample populations are comparable for this analysis. Detailed experimental design and methodology can be found in Appendix B.

### *a. Willingness to Accept*

Through an iterative process, we arrived at a final WTA mixed logit model (Table 1). Across the hypothesized interactions, the model retained the programmatic components of the WTA design and respondent-level data of environmental identity, length of ownership, and age. Other tested variables, including acreage, residency, and geographic location were excluded for either loss of respondents through missing data or preference not to answer, insignificance, or worsening model diagnostics measure outputs.

As expected for restoration programs, the alternative specific constants (ASCs), or the calculated base value respondents weigh the option, were negative and significant, indicating that individuals hold a negative utility value to enrollment of their land into any conservation program. The payment coefficient was significant and positive, after considering the exponential transformation, as monetary compensation alleviates the loss of utility through enrollment. Contract length was significant and negative, indicating that for every unit increase in contract length, individuals perceive their utility negatively affected. Monitoring visit frequency demonstrates a negative coefficient, suggesting that individuals prefer less visitations from program monitors. The estimated median marginal WTA (mWTA) along with confidence intervals and heterogeneity calculations for contract length and monitoring visits are in Table A7.

## Table 1: WTA Mixed Logit Model Coefficients and Model Performance Metrics

| Measure | Interaction Mixed Logit |
|---|---|
| ASC Vegetative Enhancement | -1.967 (<0.001)*** |
| ASC Conservation Easement | -3.435 (<0.001)*** |
| *ASC Estimated Standard Deviation* | *6.402 (<0.001)**** |
| Payment to Landowner | 2.425[†] (<0.001)*** |
| *Payment Estimated Standard Deviation* | *1.099 (<0.001)**** |
| Contract Length | -0.422 (<0.001)*** |
| *Contract Estimated Standard Deviation* | *0.621 (<0.001)**** |
| Monitoring Visit Frequency | -0.100 (<0.001)*** |
| Environmental Identity Score | 2.074 (<0.001)*** |
| 0 – 20 Years Ownership | 2.010 (<0.001)*** |
| Age | -0.059 (0.025)* |
| Pseudo-$r^2$ | 0.389 |
| Log Likelihood | -2332.69 |
| AIC | 4687.38 |
| BIC | 4756.38 |

. *p<0.1*

* *p<0.05*

** *p<0.01*

*** *p<0.001*

[†] The modeled coefficient for Payment to Landowner is negative. However, since payment is treated with an exponent, the coefficient becomes positive in the utility model. The coefficient is represented here as positive for ease of interpretation.

[‡] Constrained to be the same for both the ASC for Vegetative Enhancement and Conservation Easement

From the final interaction model, choice shares can be predicted from the estimated coefficients. To demonstrate the relationships between incentives and the differences between labeled alternatives, three scenarios were developed. The first scenario describes low financial incentive ($350 per acre) and high programmatic burdens (contract length of 40 years and 4 monitoring visits). The second scenario describes a moderate incentive and burden situation ($700 per acre, contract length of 10 years, and 2 monitoring visits per year). The final scenario is a high incentive, low burden program offering $1,400 per acre, contract length of 5 years, and 1 monitoring visit per year. Under these scenarios, the predicted choice share represents the model's predicted respondent choice percentage from the collected sample (Table 2).

**Table 2: WTA Scenario Comparison of Predicted Choice Shares from Respondent Sample**

| Scenario | Payment ($USD per acre) | Contract Term (Years) | Monitoring (Visits per year) | Vegetative Enhancement Predicted Share[1] | Conservation Easement Predicted Share[1] | Status Quo Predicted Share[1] |
|---|---|---|---|---|---|---|
| Low Incentive | $350 | 40 | 4 | 30.7% | 7.1% | 62.3% |
| Moderate Incentive | $700 | 10 | 2 | 39% | 9% | 52% |
| High Incentive | $1,400 | 5 | 1 | 44.5% | 10.3% | 45.2% |

[1]Predicted share is the percentage of choice sets the model predicts will be selected under the scenario inputs.

The predicted choice shares illustrate that high incentives, low burdens result in higher program choice predicted shares compared to low incentives, high burdens. The status quo predicted share remains relatively high, indicating the overall perceived burden of program enrollment. The "Conservation Easement" labeled alternative results in a lower predicted choice share compared to the "Vegetative Enhancement" labeled alternative. This indicates that respondents hold an unobserved higher utility loss associated with programmatic framing of conservation easements.

If a respondent ever selected "status quo", the respondent would be prompted to state their rationale after all choice sets. Out of the 672 responses, the top reasons were respondents not wanting monitoring activity on their land, not believing that their land would be eligible for the programs, and not believing that their land needed restoration with 181, 188, and 195 responses respectively. The least selected options were concerns about restoration programs decreasing the respondent's income from their land or concerns about restoration activities resulting in an increased risk of erosion or flooding on their land (Figure 13).

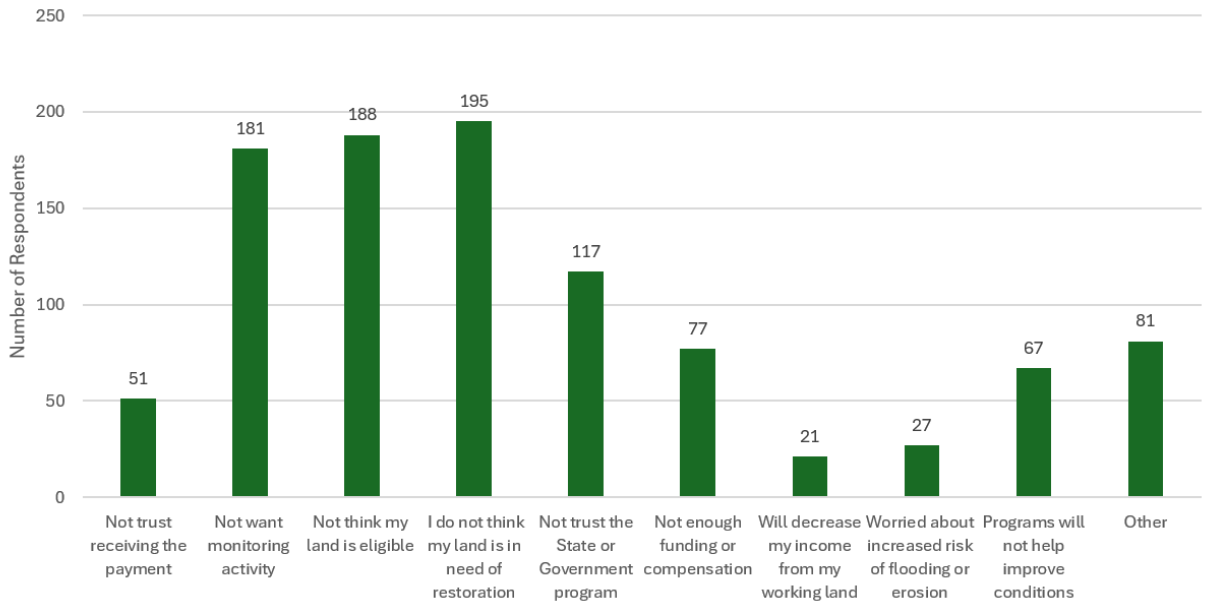



**Figure 13: Willingness-to-Accept Respondent Rationale for Selecting "Status Quo" during Choice Tasks (n=672)**

*b. Willingness-to-pay*

The final mixed logit model of the WTP retained the structural components of the WTP program design and respondent-level data of environmental identity, large-acreage category, and prior-participation. Other tested variables, including age, multi-acreage categories, residency, geographic location, and tenure of residency were excluded for either loss of respondent data through missing data or preference not to answer, insignificance, or worsening model diagnostics measure outputs.

Results of the finalized interaction model suggested that there is significant standard deviation for structural program attributes. Length of program term before another referendum vote had a statistically insignificant coefficient and standard deviation. Overall, these results indicate high preference heterogeneity. This may indicate that additional taxation or restoration activities may be viewed as polarizing in the sample.

As expected, the payment term was negative, suggesting that respondents were less likely to vote "yes" as the amount paid increased. The modeled program purpose variable suggests that individuals typically rank enhancing salmon habitat, improving water quality, and recreation respectively above improving sport fishing with enhancing salmon habitat and improving water quality as positive influences on voting "yes." Sport fishing is the implied effects-coded baseline for this model, as such the coefficients are in relation to the grand mean for interpretation. In a different comparison, the median marginal WTP (mWTP) for the program purpose being "salmon habitat enhancement" is $33.92 (CI 95: $24.10 – $44.93) (Table 3).

**Table 3:** Willingness-to-pay **Mixed Logit Model Coefficients and Model Performance Metrics**

| Measure | Interaction Mixed Logit |
|---|---|
| ASC (Yes) | 0.181 (0.655) |
| *Estimated Standard Deviation* | *3.466 (<0.001)*** |
| Landowner Payment (per acre per year) | -0.975 (<0.001)*** |
| *Estimated Standard Deviation* | *0.875 (<0.001)*** |
| Duration of Funding Program | -0.004 (0.780) |
| Purpose – Salmon Habitat Enhancement | 1.260 (<0.001)*** |
| *Estimated Standard Deviation* | *0.976 (0.001)*** |
| Purpose – Recreation Improvement | -0.778 (<0.001)*** |
| Purpose – Water Quality Improvements | 0.988 (<0.001)*** |
| *Estimated Standard Deviation* | *2.067 (<0.001)*** |
| Prior Restoration Participation | 0.810 (0.024)** |
| Environmental Identity Score | 1.419 (<0.001)*** |
| Own 21+ Acres | -2.306 (0.009)** |
| 1-5 Acres x Payment | 0.695 (<0.001)*** |
| 6-10 Acres x Payment | 1.274 (0.001)*** |
| 11-20 Acres x Payment | 1.231 (<0.001)*** |
| 21+ Acres x Payment | 0.498 (0.277) |
| Pseudo-$r^2$ | 0.352 |
| Log Likelihood | -1654.35 |
| AIC | 3342.71 |
| BIC | 3450.56 |

. *p<0.1*
* *p<0.05*

** *p<0.01*
*** *p<0.001*

Additionally, respondent level data indicate that attitudinal factors and acreage size have a statistically significant impact on respondent WTP. Based on a scaled environmental identity score, those with higher scores, or scores that reflect a more ecocentric attitude, are more likely to consider voting in favor of the referendum when all else is held constant. Prior participation in restoration programs also had a positive influence. Large acreage owners, those owning more than 21 acres, resulted in a negative coefficient.

Total WTP scenarios were developed for each purpose statement and set to ten-year program duration, understanding that program duration has a negligible effect on the model. The median total WTP for a program aimed at funding salmon habitat enhancement lasting 10 years is $21.65 (95% CI: $12.75 to $28.94), whereas the median total WTP for a program aimed at funding sport fishing opportunities lasting 10 years is -$10.58 (95% CI: -$24.52 to -$1.13) (Table 4). Using the salmon enhancement 10-year scenario as an example, if the median total WTP is applied to all properties in the Stillaguamish that fit under the survey instrument criteria (187,997.54 acres), the annual payment would be $4,070,146.74 (95% CI: $2,396,968.64 to $5,440,648.81).

**Table 4: Median Total WTP for 10-Year Policy Purpose Scenarios**

| 10-Year Policy Purpose | Median Total WTP ($USD) | 95% CI ($USD) | $5^{th}$-$95^{th}$ Heterogeneity ($USD)[1] | Share Positive[2] |
|---|---|---|---|---|
| Salmon Habitat Enhancement | 21.65 | 12.87 to 28.94 | -28.89 to 188.04 | 0.82 |
| Water Quality Improvement | 16.55 | 7.63 to 25.53 | -69.51 to 205.15 | 0.71 |
| Recreation Improvement | -2.39 | -12.57 to 4.51 | -98.64 to 60.56 | 0.46 |
| Sport Fishing Enhancement | -10.58 | -24.52 to -1.13 | -193.44 to 89.67 | 0.36 |

[1] The distribution of mWTP within the $5^{th}$ and $95^{th}$ percentile of the distribution.

[2] The proportion of individual medians above zero.

If a respondent ever selected “no” on a choice task, they were presented with a question to state their rationale. Out of the 701 responses, 414 selected the option “I already pay too much in

various taxes," being the most common rationale for ever voting "no" on a task choice. The least common selected option was "I do not think there is a need for funding restoration in the Stillaguamish Watershed" with 61 responses (Figure 14).

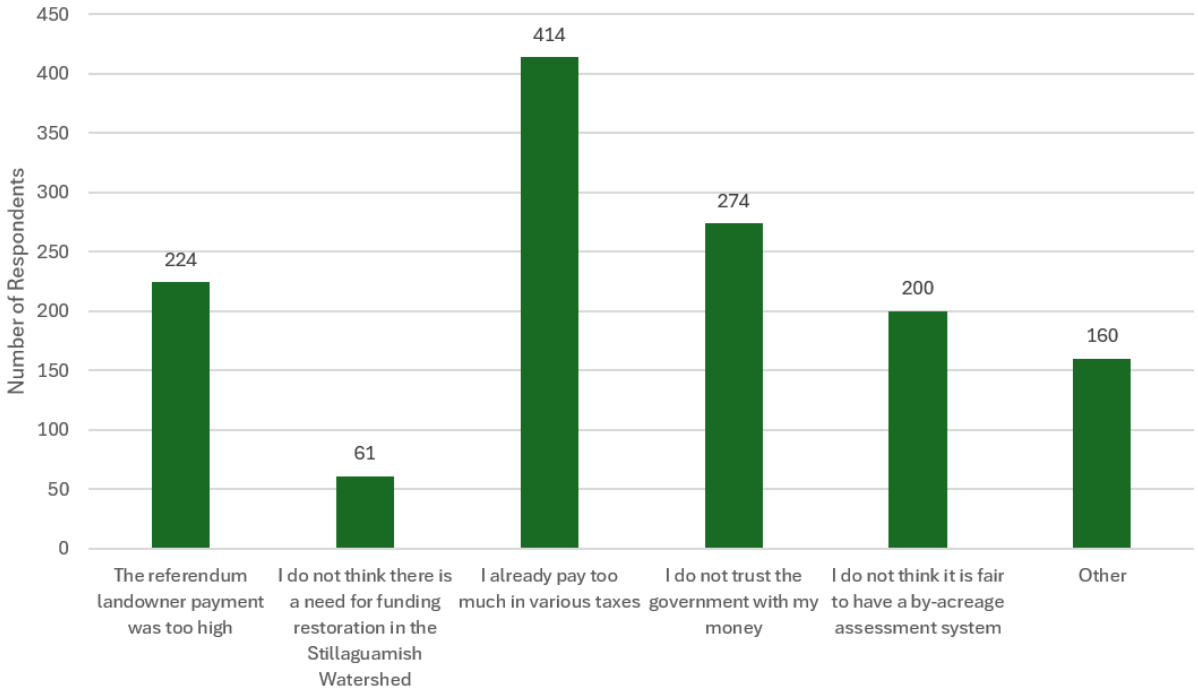



**Figure 14: Willingness-to-Pay Respondents Rationale for Voting "No" on Referendum (n=701)**

Respondents were additionally asked if they would be willing to donate to support restoration in the watershed. Generally, respondents were unsure (39.6%) or would not (31.5%) donate to support restoration in the watershed. Those that would (20.9%) are the smallest group, less than the number of times respondents typically voted "yes" across the referendum choices (30.3%).

*c. Policy implications of economic analysis:*

Using the results of the WTA and WTP models, hypothetical policy scenarios can be developed to illustrate the possible funding scenarios and the supply of land that would be available for enrollment. These scenarios can indicate how supportive the respondent sample would be of the funding program and how many acres the respondent population would likely be willing to put into the conservation programs.

First, from the WTP scenarios, frontier curves are created to illustrate predicted majority support for referendums across the payment continuum. The calculated frontier curve for the respondent population by purpose indicates that there is no calculated majority support for the purposes of sport fishing opportunities and recreational enhancements. Salmon habitat enhancement purpose

frontier intersects with the 50% support line at $18.62 and water quality improvement purpose frontier intersects with the 50% support line at $15.23 (Figure 15). These frontier curves indicate that it is unlikely that a referendum framed to support sport fishing opportunities and recreational enhancements would be supported by the respondent landowner sample at any given monetary value.

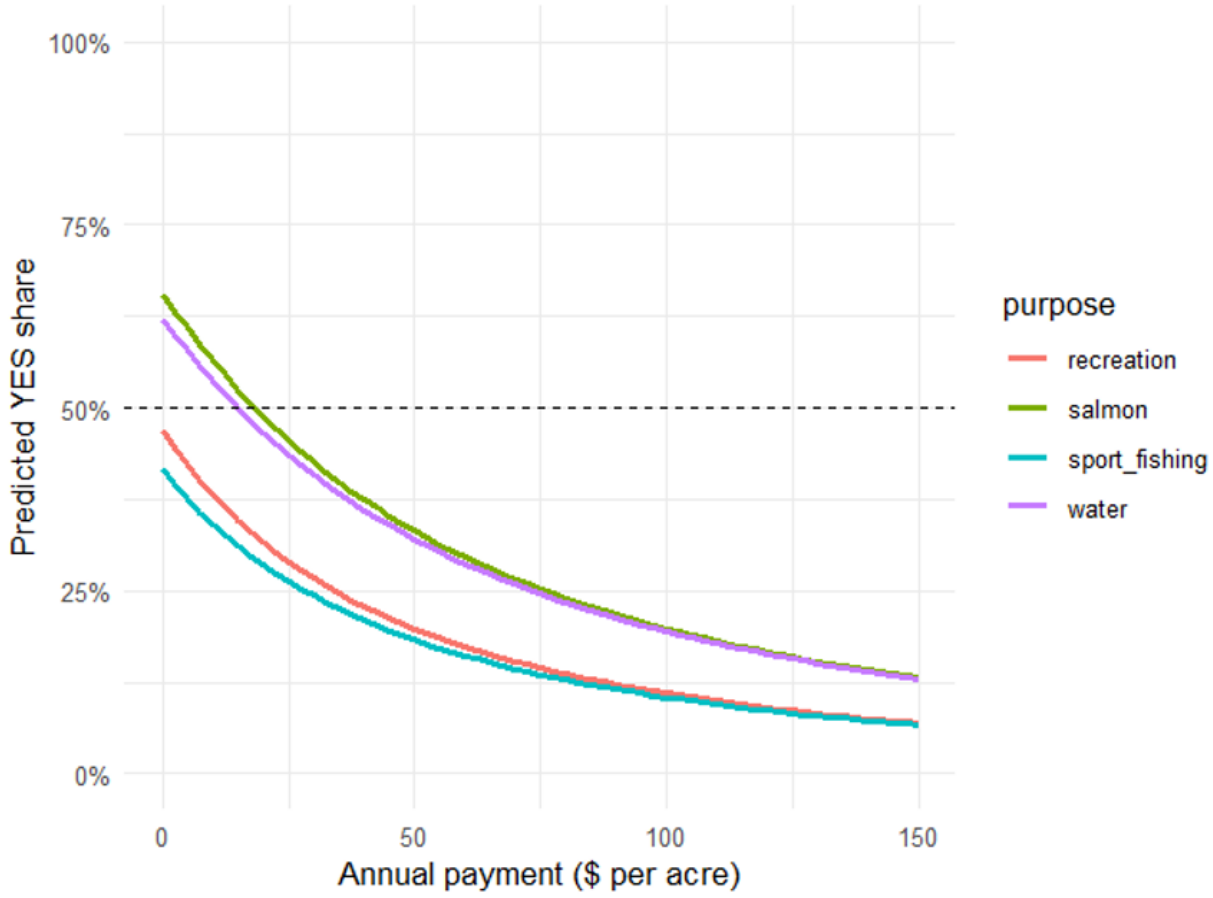



**Figure 15: Willingness-to-Pay Frontier Curves by Program Purpose with Expected Majority Support**

We used the modeled frontier curve and the modeled WTA scenarios to create pseudo-policy scenarios to demonstrate possible revenue and possible program enrollment. Here, we assumed that the referendum passes at 50% majority, allowing for revenue to be collected from every landowner in the watershed. The taxable area, determined by the area of eligible parcels for the survey, was estimated to be 187,997.54 acres. For this exercise, we used the salmon habitat enhancement median frontier curve intersect of $18.62. For the WTA scenarios, four contract bundles were developed (Table 5). The estimated funded acres was calculated as the number of acres that could be funded by the revenue generated from the taxable landbase at each restoration program bundle payment to landowner level. The estimated interested acres were calculated from the WTA model as the proportion of acres landowners would enroll (see detailed methods

in Appendix B). The funding-constrained acres were then the number of acres that could be enrolled out of all of the interested acres.

**Table 5: Pseudo-Policy WTA Program Scenario Attribute Levels**

| Scenario | Payment to Landowner ($USD per acre per year) | Contract Duration (years) | Monitoring Frequency (visits per year) |
|---|---|---|---|
| Low Payment \| 40-year Contract | 350 | 40 | 4 |
| Moderate Payment \| 10-year Contract | 700 | 10 | 2 |
| High Payment \| 20-year Contract | 1,050 | 20 | 2 |
| Maximum Payment \| 5-year Contract | 1,400 | 5 | 1 |

Modeled pseudo-policy scenarios suggest the number of acres landowners would want to enroll is greater than the number of acres that generated revenue could fund. The Low Payment | 40-year Contract, the lowest landowner incentive contract bundle, had 39,294 expected interested acres with 10,002 acres that could be enrolled during the first contract cycle through the generated revenue. In contrast, the Maximum Payment | 5-year Contract, the highest landowner incentive contract bundle, had 57,322 expected interested acres with 2,501 acres that could be enrolled under funding constraints. Full pseudo-policy scenario outputs are found in Table 6 and Figure 16.

**Table 6: Pseudo-Policy Scenarios with Expected Acreage Enrollment, Expected Annual Costs, and Financial Limitation Differences**

| Scenario | Expected Willing Acres | Financially Constrained Enrollment (Acres) | Expected Annual Total Cost | Annual Funding Gap at Frontier WTP |
|---|---|---|---|---|
| Low Payment \| 40-year Contract | 39,294 | 10,002 | $13,752,779 | -$10,251,958 |
| Moderate Payment \| 10-year Contract | 50,070 | 5,001 | $35,048,786 | -$31,547,964 |
| High Payment \| 20-year Contract | 50,563 | 3,334 | $53,091,553 | -$49,590,731 |
| Maximum Payment \| 5-year Contract | 57,322 | 2,501 | $80,250,702 | -$76,749,881 |

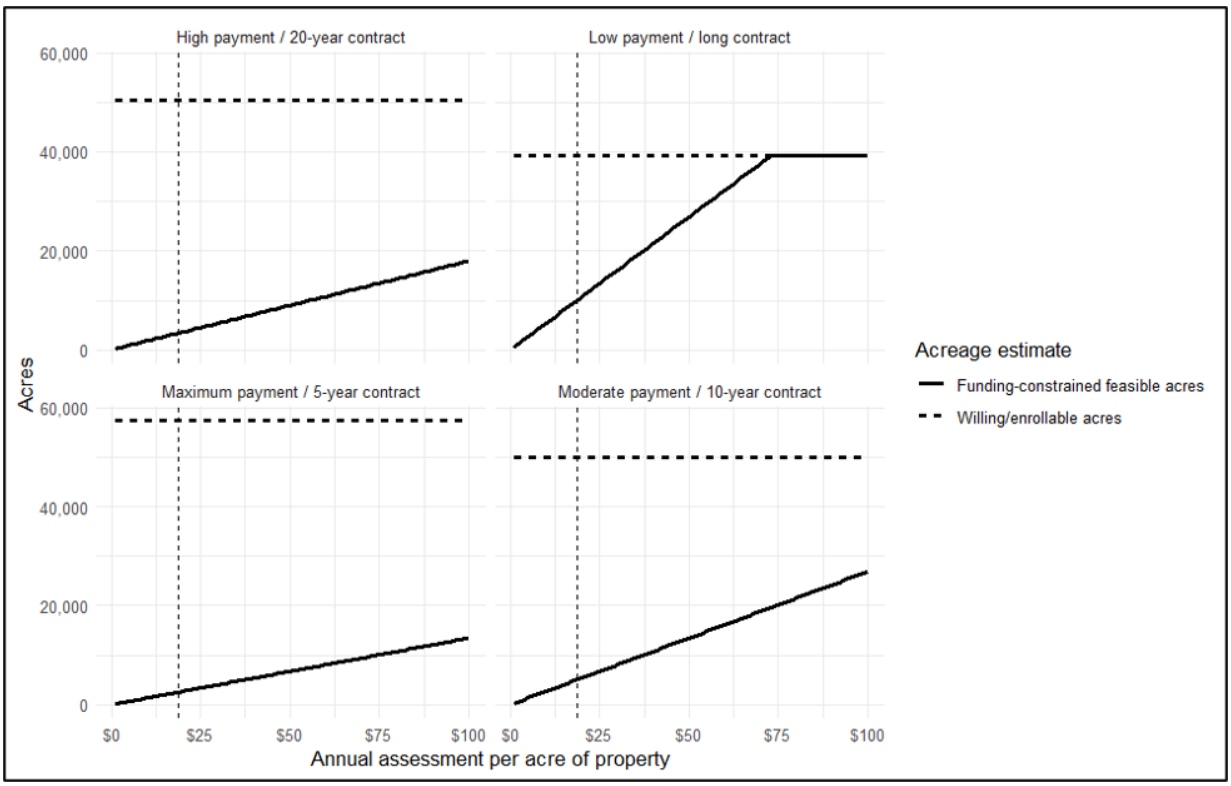



**Figure 16: Financially constrained and enrollment interested acres across WTA program scenarios compared under WTP scenario. Vertical dashed line represents the majority support value from the WTP frontier curve analysis of $18.62 for funding salmon habitat enhancement with a program length of 5 years.**

## 6. Implications and Next Steps

This report details insights that can broadly inform WDFW but also provide specific implications and next steps for future education, outreach, and marketing efforts the agency may undertake to support restoration efforts for salmon.

The finding with the most salient implications for future efforts is that survey respondents broadly supported the presence of salmon in a healthy watershed, and restoration specifically was well supported across respondents (72%). However, this finding stands in contrast to a much lower belief among respondents that their individually owned land was suitable for restoration (36%). While 70% are concerned about declining salmon populations in the Stillaguamish, only 2% are concerned about them on their own property. This contrast appears across multiple questions at multiple registers, underscoring its importance. In other words, there was widespread support for restoration and salmon at the watershed level, but much lower support on a parcel-by-parcel basis. As WDFW considers management options, this finding offers important clarity. Based on the findings of this survey, it does not appear that an education campaign to broadcast the importance of salmon would have a strong effect on landowner willingness to undertake restoration efforts given the high value landowners already place on salmon in the Stillaguamish. Instead, the challenge ahead is how to link individual landowner behavior with broader trends of support for salmon habitat and restoration.

One effective approach for making this link between individual property and the watershed could be to stratify the watershed's population and target education and outreach efforts accordingly. Our survey results point to several important segments of the population to consider. First, riparian and non-riparian landowners have substantially different roles to play in restoration. While non-riparian landowners seem to systematically underestimate their role and the suitability of their lands for salmon restoration, many still accurately self-assessed that their role was smaller compared to riparian landowners. Different misperceptions characterized riparian and non-riparian landowners, and targeted education and outreach should approach these populations accordingly. One of the most important considerations here is that many landowners either did not know or did not believe - often incorrectly - that their property was eligible or suitable for restoration. Informing residents about suitability, both ecologically and legally, could be a high impact effort, as long as it was tuned appropriately to riparian and non-riparian landowners. Targeting landowners having over 11 acres will maximize the benefits of these efforts.

A second important stratification apparent in our survey results is based on environmental identity. More than demographic characteristics, environmental identity had important ramifications for multiple results presented above. Environmental identity therefore offers another important spectrum that a successful education campaign can use to target messaging. This is especially important in considering subjects that have not been central in education around salmon habitat and restoration up to now. While many current efforts have focused on educating the public on the salmon ecology and lifecycle, few have educated the public on the

history, regulations, treaties, and legal decisions that define the current salmon management paradigm. This current lack is made clear by the age stratification in the self-reported knowledge. While a majority of older residents reported familiarity with previous actions and standards such as the Boldt decision, younger respondents reported a distinct lack of familiarity. Additionally, many comments suggested that varying perspectives may form sources of tension, amplify grievances, or lead to misunderstandings or discontent. Targeted education that understands environmental identities and focuses on these “human dimensions” of salmon recovery holds promise.

A third mode of segmenting this population is based on levels of uncertainty. On some of the most important survey items (e.g., ease of restoration, whether their actions benefit salmon, whether they would participate in restoration), roughly a third of respondents answered "neither agree nor disagree". This suggests that for core issues, a large portion of the population has not formed a position. This portion is in fact larger than the group that has formed a negative position. Segmenting the population on certainty can also help prioritize and fine tune education and outreach efforts. Additionally, increasing knowledge and awareness about some of these issues may help ease some of that uncertainty and promote more agreement.

Building on our results, future education, outreach, and marketing efforts can work to identify the most high impact and high acceptability actions and behaviors to maximize returns on agency effort. For example, one of the most supported actions was fish passage removal. As a one-time action, it is not burdened by the monitoring and oversight that some respondents objected to. Invasive removal had even higher support among survey respondents, though less direct positive impacts for salmon. Mapping out options based on impact and acceptability could form an important toolkit for managers, even helping identify specific parcels where actions would be most effective.

It is important to note, however, that the results of the economic analyses did not identify any scenarios that led to majority enrollment of landowners in restoration activities, other than the highest incentive bundle. This finding has important implications for how the agency considers the economics and incentives regarding management. In particular, these results suggest that education and outreach may play a long-term role in shifting perspectives about salmon and restoration, but are unlikely to lead to rapid, broad change in individual restoration behaviors. In the short term, this finding suggests that a continued focus on willing sellers and conservation adopters holds merit for broadening the scope and reach of restoration efforts.

Furthermore, as the agency considers education and outreach, it is also important to identify the structural and regulatory entanglements that appear to limit interest in restoration. For example, 53% of respondents named restrictions on land use as a deterrent to restoration activities, a problem that is not easily fixable through a messaging campaign. Instead - or in addition - the agency could explore approaches that reduce the barriers in terms of time, regulation, and oversight that landowners cited as prohibitive. The behaviors at the far end of the acceptability

distribution, easement purchase (68% not interested), sale (80%), and structure relocation (74%), are likely not campaignable at achievable prices.

Another important finding deals with the role of other governance entities, in particular, the Stillaguamish Watershed Council (SWC), and Tribal governments. Results of the survey indicate that many more landowners want to receive information from the SWC than currently do and written responses underscored the frequency that the SWC arose in conjunction with restoration in the Stillaguamish. While respondents wanted to receive information from governmental sources such as WDFW and the Washington Department of Natural Resources, given parallel results that indicate fears about regulation and agency distrust, the SWC could be an important entity to mobilize as a messenger. Several respondents discussed misgivings, misconceptions, or even grievances about Tribal watershed management. However, results also showed more landowners wanted information on restoration from Tribes than they were currently getting. To overcome these issues and ensure successful Tribal co-management, WDFW may consider long-term, deep partnerships with Tribal governments in addition to clarifying educational materials to avoid activating grievances and deal with the low knowledge of legal and regulatory histories.

Our economic analysis results also indicate that respondents' WTP was associated with referendum framing. Landowners were more likely to support referendums framed around salmon habitat enhancement and water quality improvements over recreation-oriented purposes. While all these purpose statements support restoration, the association with environmentally coded purposes over recreational purposes for WTP suggests that framing restoration may play an important factor in landowner support. These findings suggest framing and communication may be key to gaining landowner willingness to engage with restoration funding and activities. WDFW may consider careful messaging around restoration activities and understanding local community motivations prior to deploying landowner restoration programs.

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## Appendix A: Additional Figures and Tables

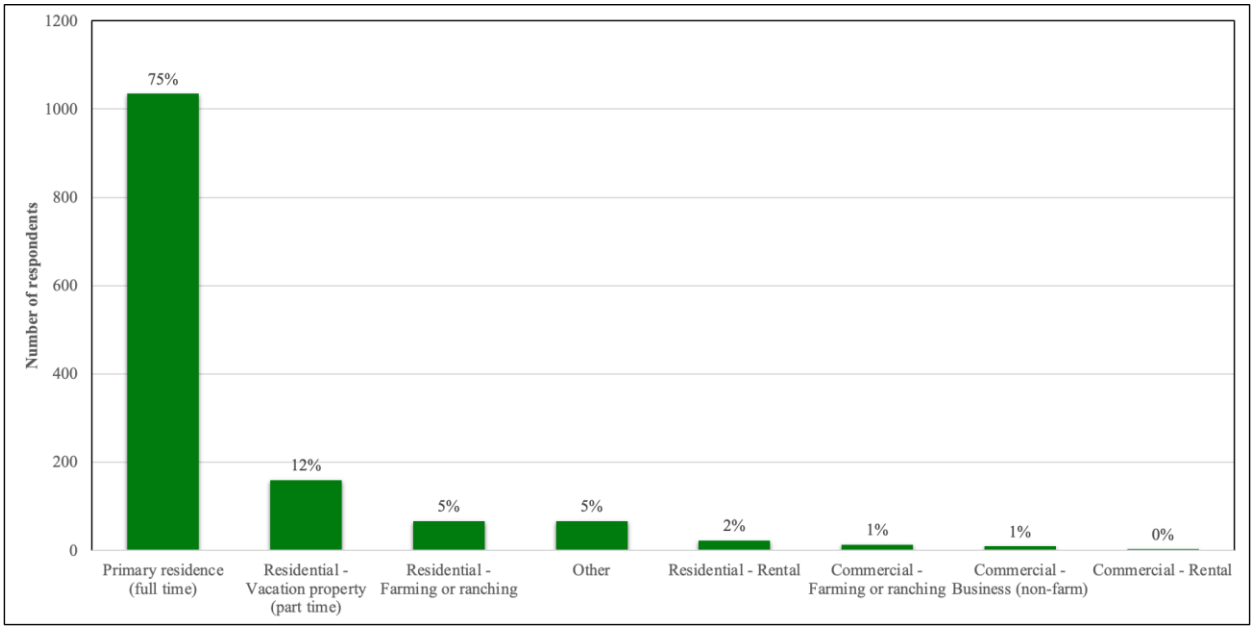



**Figure A1. Categorization of property in the Stillaguamish Watershed by residents.**

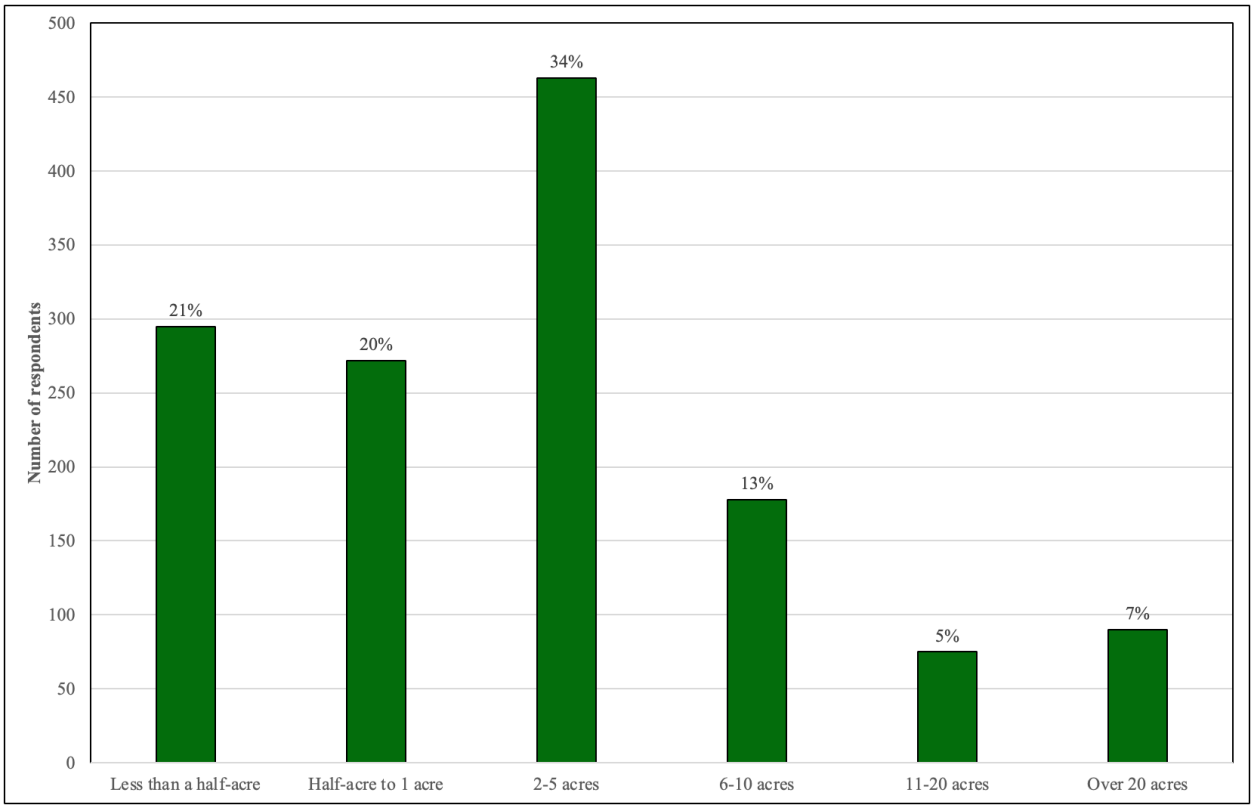



**Figure A2. Acreage of property in the Stillaguamish Watershed**

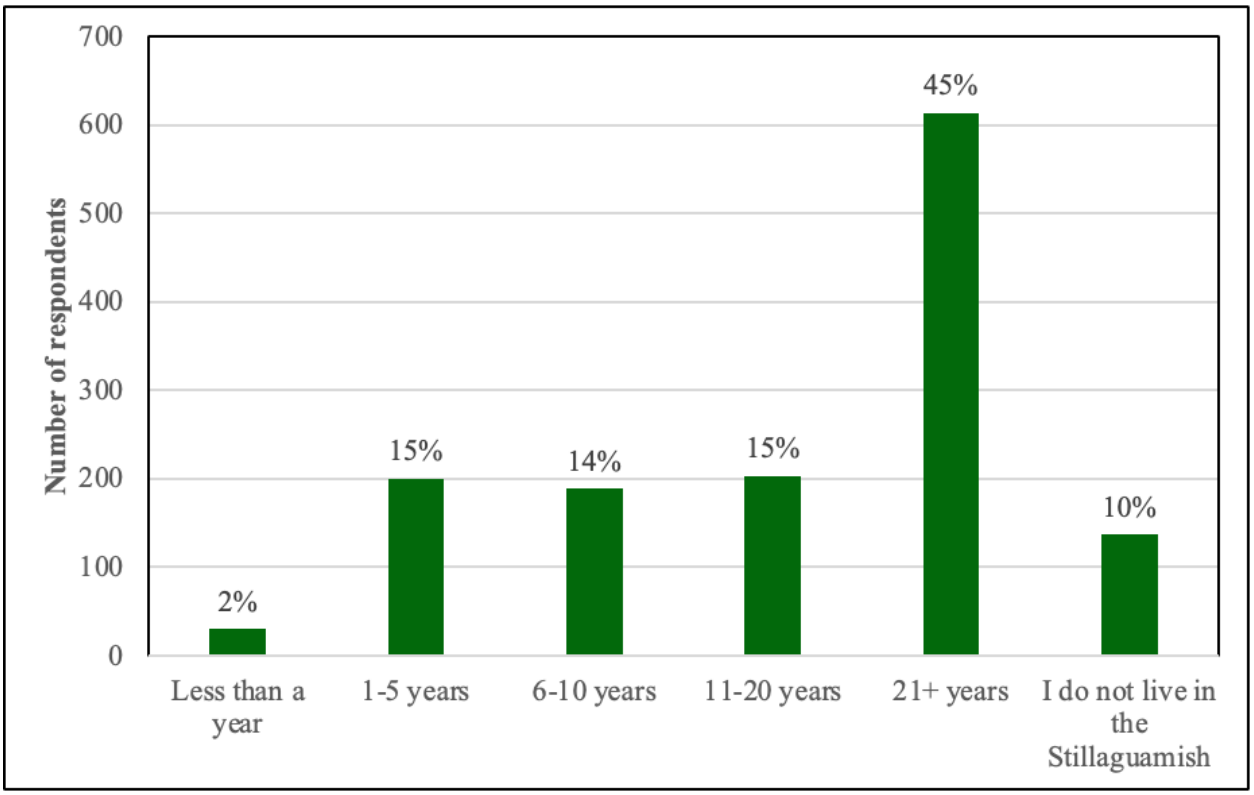



**Figure A3. Years lived in the Stillaguamish Watershed**

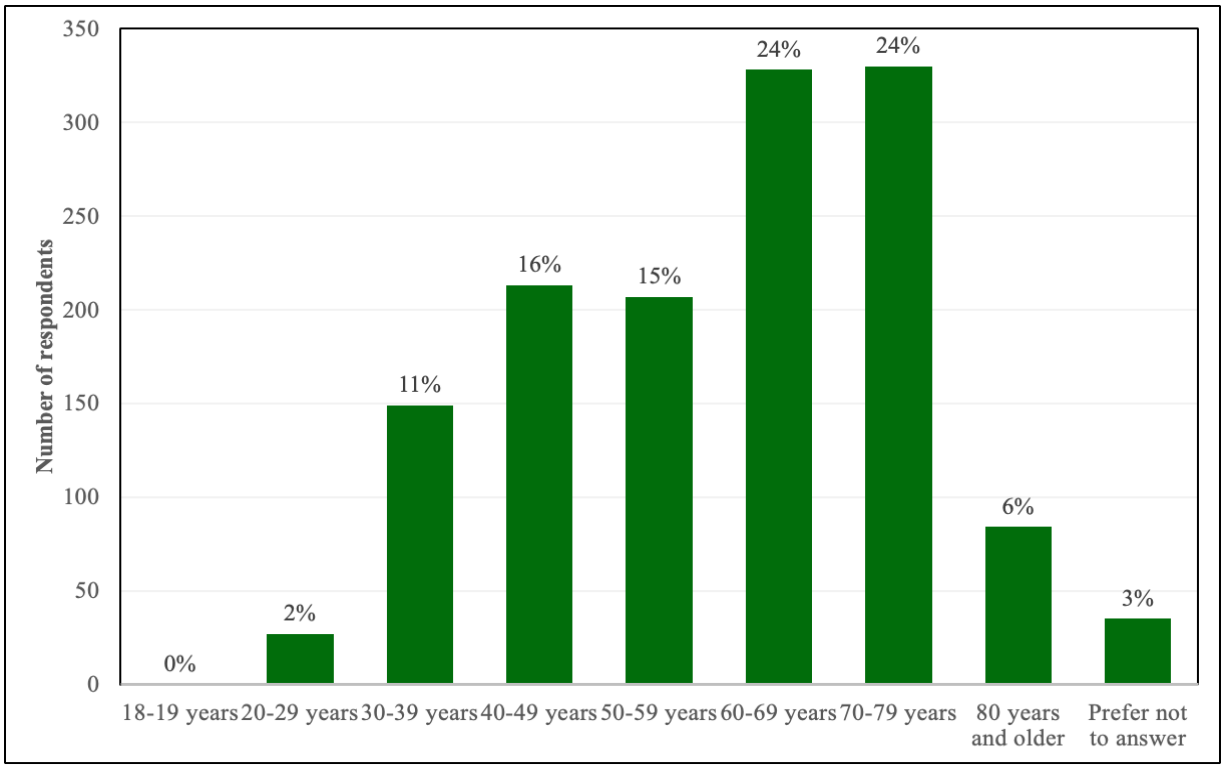



**Figure A4. Age of survey respondents.**

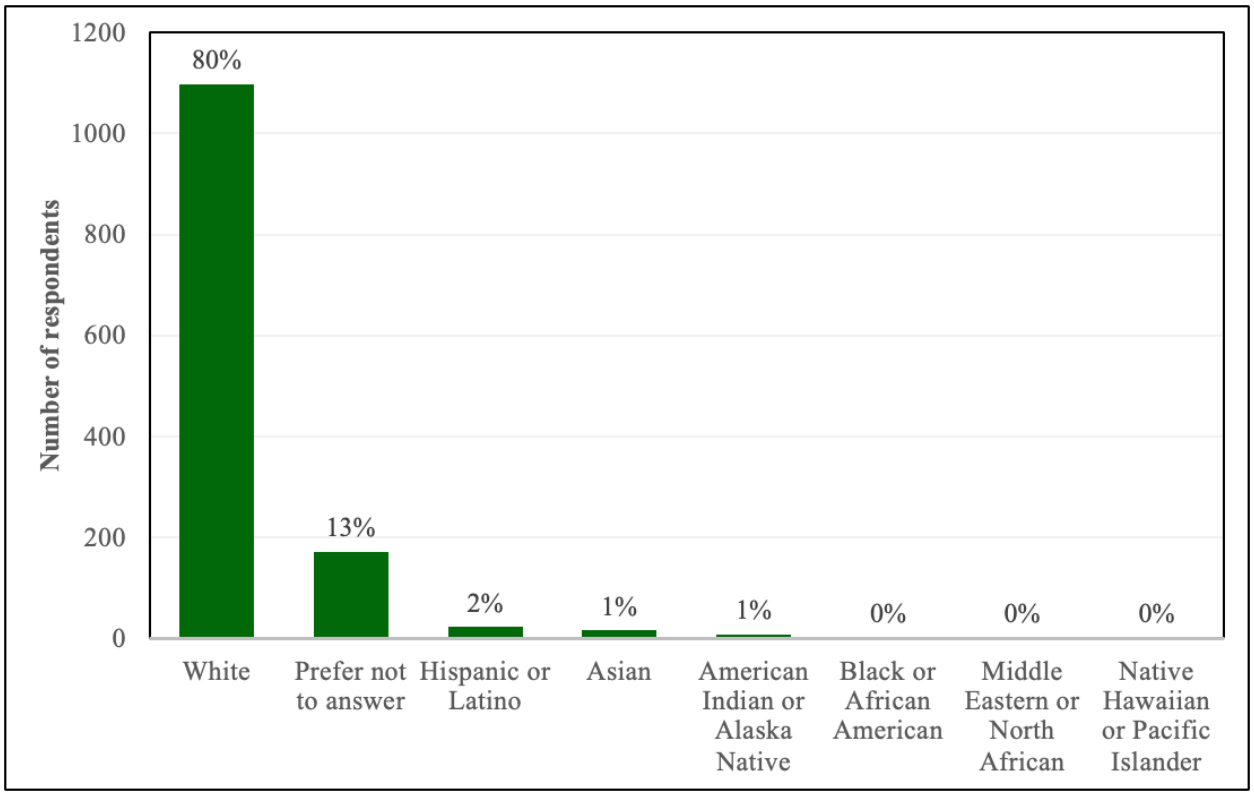



**Figure A5. Self-reported identity of respondents**

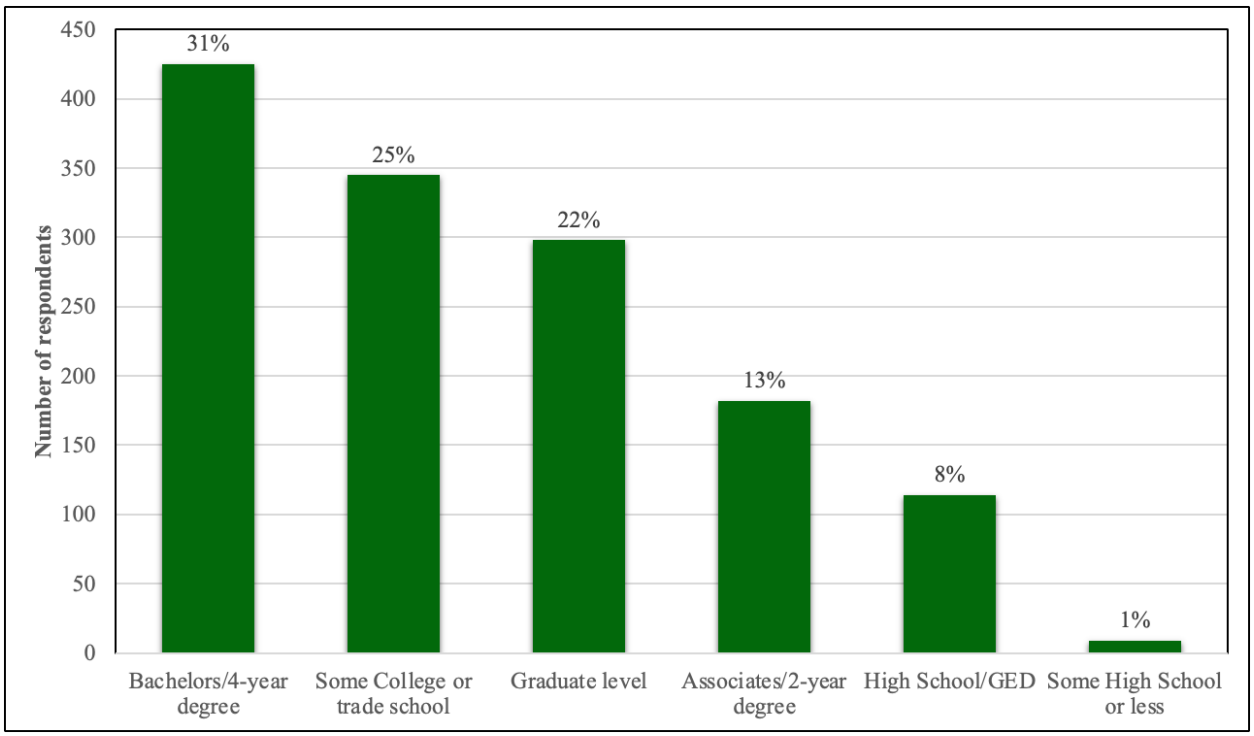



**Figure A6. Highest level of education completed**

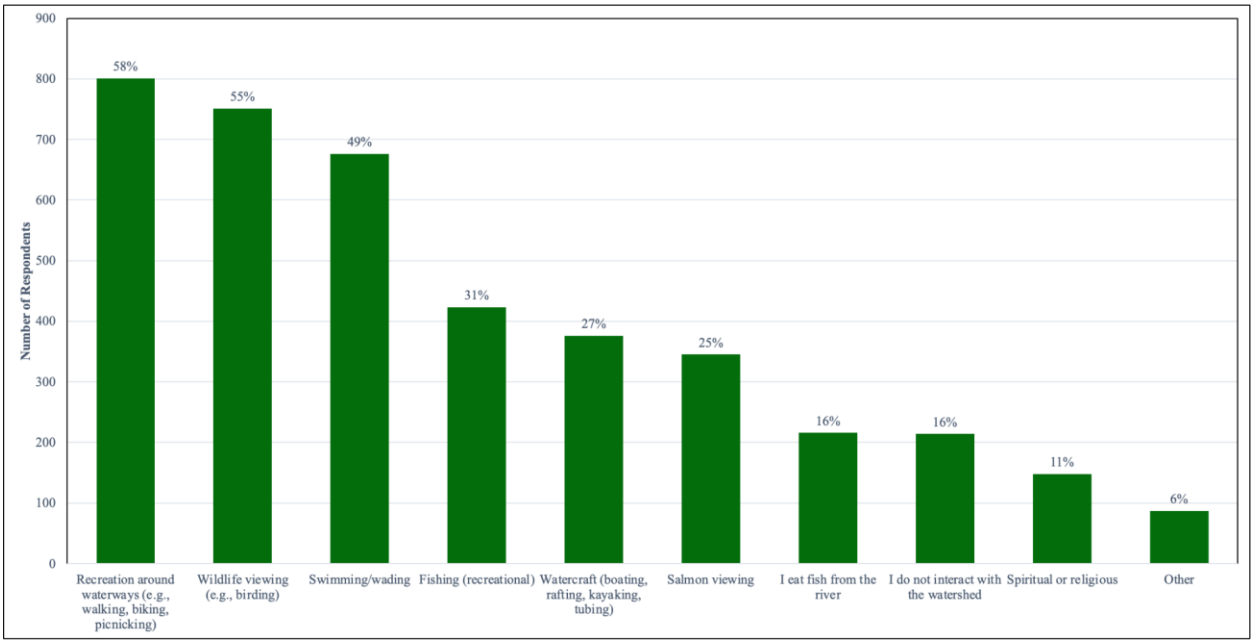



**Figure A7. Respondents' reported interactions with the Stillaguamish Watershed. Respondents could select all that apply.**

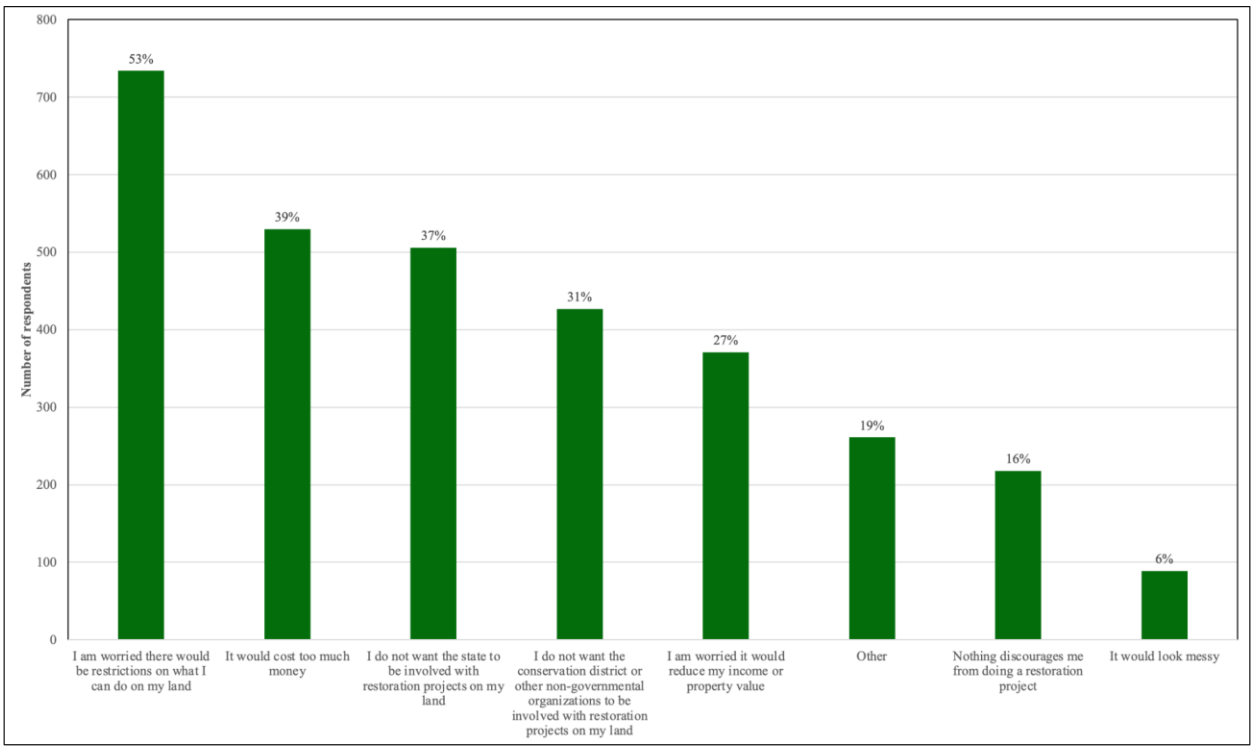



**Figure A8: Factors that discouraged respondents from doing a restoration project**

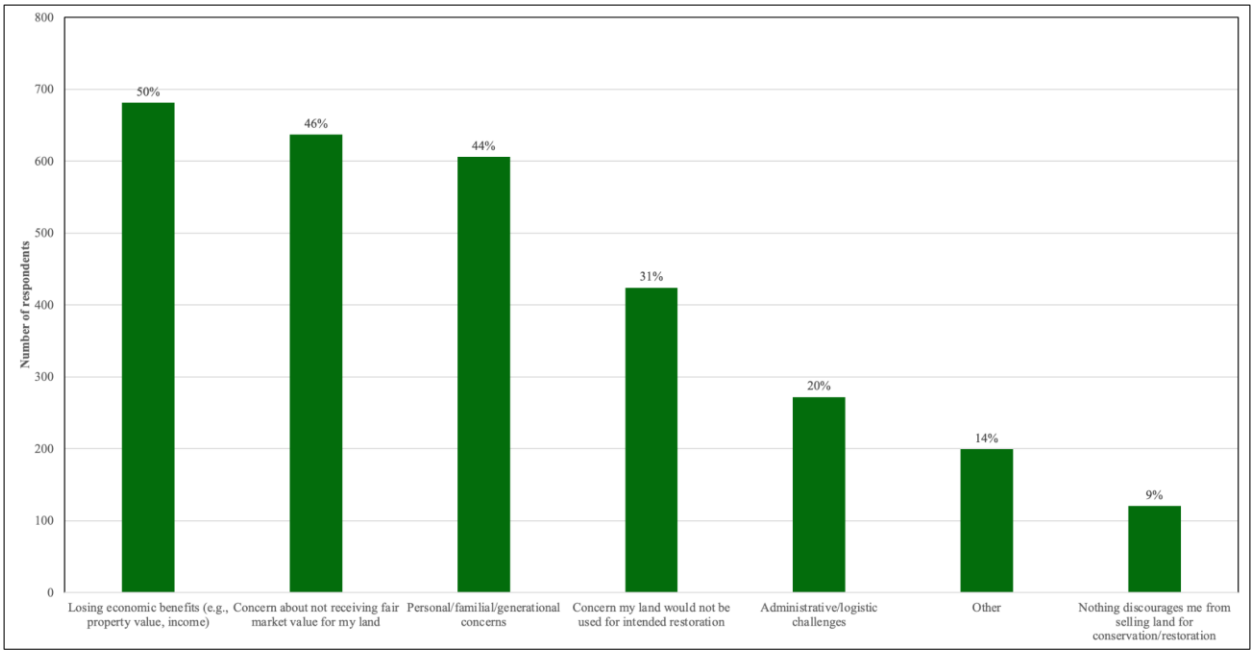



**Figure A9: Factors that discouraged respondents from selling their land (or a portion of their land) for restoration**

**Table A1: Proportion of respondents level of agreement with the statement: Any restoration activity on land will have direct benefit to salmon recovery, by riparian status**

| | Strongly disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Strongly agree |
|---|---|---|---|---|---|
| Riparian | 19.2 | 12.2 | 35.0 | 19.6 | 14.0 |
| Not Riparian | 36.1 | 14.6 | 33.1 | 12.4 | 3.8 |

Note: Proportions are calculated within groups.

**Table A2: Proportion of respondents level of agreement with the statement: Any restoration activity on land will have direct benefit to salmon recovery, by acreage**

| | Strongly disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Strongly agree |
|---|---|---|---|---|---|
| Less than a half-acre | 24.1 | 10.8 | 37.6 | 19.3 | 8.1 |
| Half-acre to 1 acre | 26.8 | 12.1 | 41.2 | 12.9 | 7.0 |
| 2-5 acres | 28.5 | 14.0 | 32.8 | 15.3 | 9.3 |
| 6-10 acres | 25.3 | 15.2 | 25.8 | 21.3 | 12.4 |
| 11-20 acres | 21.3 | 14.7 | 28.0 | 16.0 | 20.0 |
| Over 20 acres | 12.2 | 13.3 | 32.2 | 22.2 | 20.0 |

**Table A3: Proportion of respondents level of agreement with the statement: Any restoration activity on land will have direct benefit to salmon recovery, by subwatershed**

| | Strongly disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Strongly agree |
|---|---|---|---|---|---|
| North Fork | 21.2 | 11.9 | 35.2 | 16.9 | 14.8 |
| South Fork | 18.9 | 11.1 | 39.6 | 17.8 | 12.6 |
| Main Stem | 28.5 | 14.1 | 32.4 | 16.7 | 8.3 |

**Table A4: Proportion of respondents level of agreement with the statement: It would be easy to conduct salmon habitat restoration on my land, by how long respondents have lived in the Stillaguamish**

| | Strongly disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Strongly agree |
|---|---|---|---|---|---|
| I do not live in the Stillaguamish | 19.0 | 12.4 | 50.4 | 12.4 | 5.8 |
| 0-5 years | 22.6 | 13.9 | 46.5 | 10.9 | 6.1 |
| 6-10 years | 29.6 | 18.0 | 37.6 | 10.6 | 4.2 |
| 11-20 years | 24.6 | 17.2 | 40.9 | 8.9 | 8.4 |
| 21+ years | 29.8 | 16.1 | 34.5 | 13.7 | 5.9 |

**Table A5: Proportion of respondents who are familiar with the Boldt decision by age group**

| | Strongly disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Strongly agree |
|---|---|---|---|---|---|
| 20-29 years | 63.0 | 11.1 | 18.5 | 7.4 | 0.0 |
| 30-39 years | 58.4 | 14.1 | 8.7 | 7.4 | 11.4 |
| 40-49 years | 59.2 | 15.0 | 9.9 | 7.5 | 8.5 |
| 50-59 years | 51.7 | 15.0 | 12.1 | 9.2 | 12.1 |
| 60-69 years | 32.6 | 8.2 | 14.0 | 23.8 | 21.3 |
| 70-79 years | 20.6 | 7.3 | 14.2 | 26.7 | 31.2 |

**Table A6: Comparison of Selected Demographics for WTA and WTP Respondent Samples**

| Variable | WTA Respondent Sample (n = 672) | WTP Respondent Sample (n =701) |
|---|---|---|
| Age \| 20-29 years | 14 (2%) | 13 (2%) |
| Age \| 30-39 years | 65 (10%) | 84 (12%) |
| Age \| 40-49 years | 112 (17%) | 101 (14%) |
| Age \| 50-59 years | 103 (15%) | 104 (15%) |
| Age \| 60-69 years | 169 (25%) | 159 (23%) |
| Age \| 70 -79 years | 154 (23%) | 176 (25%) |
| Age \| 80+ years | 36 (5%) | 48 (7%) |
| Age \| No Answer | 19 (3%) | 16 (2%) |
| Subwatershed \| Stanwood | 138 (21%) | 150 (21%) |
| Subwatershed \| Arlington | 209 (31%) | 204 (29%) |
| Subwatershed \| Pilchuck | 76 (11%) | 90 (13%) |
| Subwatershed \| North Fork | 114 (17%) | 122 (17%) |
| Subwatershed \| South Fork | 135 (20%) | 135 (19%) |
| Riparian Status | 435 (64%) | 439 (63%) |
| Sex \| Female | 274 (41%) | 260 (37%) |

**Table A7: Median Marginal WTA for Programmatic Attributes**

| Variable | mWTA Median ($USD) | 95% CI ($USD) | $5^{th}$-$95^{th}$ Heterogeneity ($USD)[1] |
|---|---|---|---|
| Contract Length (1-year increase) | 33.34 | 21.28 to 49.39 | -98.20 to 441.51 |
| Monitoring Visits (1 additional visit) | 113.15 | 57.62 to 191.41 | 18.61 to 692.02 |

[1] The distribution of mWTA within the $5^{th}$ and $95^{th}$ percentile of the distribution.

**Table A8: Median Marginal WTP Across Programmatic Purposes**

| Programmatic Comparison | Median mWTP ($USD) | 95% CI ($USD) | 5th-95th Heterogeneity ($USD)[1] | Share Positive[2] |
|---|---|---|---|---|
| Salmon Habitat Enhancement vs. Sport Fishing Opportunities | 33.93 | 24.10 to 44.93 | -36.08 to 297.02 | 0.83 |
| Water Quality Improvements vs. Sport Fishing Opportunities | 27.96 | 17.72 to 41.10 | -105.02 to 343.71 | 0.71 |
| Recreation Improvements vs. Sport Fishing Opportunities | 7.27 | 1.96 to 14.53 | -81.48 to 149.03 | 0.62 |
| Salmon Habitat Enhancement vs. Recreation Improvement | 29.43 | 21.07 to 39.46 | 3.00 to 178.95 | 0.98 |
| Water Quality Improvements vs. Recreation Improvement | 21.47 | 13.36 to 31.95 | -32.41 to 202.26 | 0.80 |
| Salmon Habitat Enhancement vs. Water Quality Improvements | 2.72 | -3.26 to 9.12 | -100.33 to 127.20 | 0.55 |

[1] The distribution of mWTP within the 5th and 95th percentile of the distribution.
[2] The proportion of individual medians above zero.

## Appendix B: Economic Analysis Methods

### Conceptual and Theoretical Framework

Choice experiments, like this one, are derived from the standard random utility model (Train, 2003; Hensher et al., 2015). We assume that landowners have an expected utility from their land by how they manage it. Utility is then modified by the adoption of a restoration program or through electing to pay for restoration activities within the watershed. Opting for neither restoration nor paying for restoration represents the baseline utility that the landowner currently receives from the land management.

### Willingness-to-Accept Model Framework

For the WTA, we test payment per acre, contract length, monitoring frequency, label alternatives, and respondent-level data. The utility function:

$$\begin{Bmatrix} V_{i,VE,t} = \alpha_{VE} + X_{it,VE}\beta_i + Z_i\gamma + \eta_{program,i} \\ V_{i,CE,t} = \alpha_{CE} + X_{it,CE}\beta_i + Z_i\gamma + \eta_{program,i} \\ V_{i,SQ,t} = 0 \end{Bmatrix}$$

was used to describe willingness-to-accept, where:

- $i$ is the respondent;
- $t$ is the task choice;
- $X$ are the program attributes of payment, contract length, and monitoring, with an exponential coefficient on payment;
- $Z$ are respondent-level variables (i.e., environmental identity, prior conservation participation, subwatershed location, acreage, age, longevity in watershed);
- $VE$ defines the choice selection of the labeled alternative: “Vegetative Enhancement”;
- $CE$ defines the choice selection of the labeled alternative: “Conservation Easement”;
- $SQ$ defines the choice selection of “Status Quo”.

Model development used an iterative process to assess the respondent-level interaction effect model using these utility functions. First, a multinominal logistic model was used to understand baseline effects under the independence of irrelevant alternatives (IIA) assumption (i.e., the respondent choice is independent of the conditions of the other alternatives presented). Then, a program-attribute mixed logit model was developed to understand main effects and heterogeneity within respondent choices. Respondent-level heterogeneity was tested across the main effect variables one or two at a time. Insignificant heterogeneity effects were removed from the final structural mixed logit for ease of interpretation and model performance. For the respondent-level interaction mixed logit model, respondent-level variables were added to the model one at a time to test for significance and model improvement. Variables were dropped if they are insignificant or decrease model performance without meaningful interpretation through

AIC, BIC, and log-likelihood metrics. When another variable became insignificant after adding another interaction, that variable was dropped from the model unless the relationship has clear interpretation.

The utility function described how program attributes and respondent-level variables affected a respondent's choice in selecting one of the restoration programs or the status quo. The status quo, or business as usual, was then assumed to be baseline, representing that the respondents do not gain nor lose from their current utility by choosing to manage their land as they do so currently. The utility expressed for the respondent was then normalized to the status quo baseline. This was the primary stage of this analysis.

This primary utility model was a labeled experiment approach (i.e., vegetative enhancement and conservation easement). This model specified that the coefficients on attributes are considered generic across labels. The alternative-specific constants (ASCs) represented the preference difference between the label alternatives. This assumed that respondents perceived the attributes similarly across labels (Hensher et al., 2015).

The second stage of the utility analysis was understanding how many acres an individual would be willing to enroll under the restoration program that they have selected, removing responses that have selected the status quo. This modeled a conditional supply decision compared the attribute effects as described in the primary model. The second stage supply model came from Greiner (2023), where a discrete-continuous concept was applied to demonstrate that the decision to participate in a program and the decision to enroll a specific amount of land are related but separate decisions. Acreage was considered as a continuous outcome conditional on restoration enrollment, as the survey did not collect WTA respondents' total acreage other than in broad categories.

**Willingness-To-Accept Instrument Design**

The WTA instrument was designed to understand what barriers and incentives are needed to encourage a landowner to participate in a restoration program. The three attributes were developed with two different program types, as described in Table B1. The attributes included annual payment to the landowner per acre in U.S. dollars (USD), longevity of the contract in years, and monitoring frequency by program sponsor in months. Annual payments were developed from average Natural Resources Conservation Service (NRCS) payment schedules for riparian habitat establishment and restoration for Washington State, approximately $700 per year per acre then set at approximately 50%, 100%, 150%, and 200% of that benchmark. Longevity of contract mirrors other real-world programs and monitoring frequency came from input provided by agency officials.

The program types included a conservation easement program or a vegetation enhancement program in Table B2. The conservation easement program was developed to mirror the Washington State's Forestry Riparian Easement Program (FREP). The vegetation enhancement program was inspired by the NRCS's Conservation Reserve Enhancement Program (CREP).

**Table B1:** *Attributes and Attribute Levels of the Willingness-to-Accept Instrument*

| Attributes | Description | Levels |
|---|---|---|
| Annual Payment to Landowner | The amount of money that the individual receives per acre per year for the restoration program. | $350<br>$700<br>$1,050<br>$1,400 |
| Length of the Contract | The number of years that the restoration program is active. | 5<br>10<br>20<br>40 |
| Monitoring Frequency | The number of visits per year from the program sponsor for monitoring. | 1<br>2<br>4 |
| Program Type | The types of program (alternatives) the individual may choose. | Vegetation Enhancement<br>Conservation Easement |

**Table B2:** *Description of Choice Labels in the Willingness-to-Accept Instrument*

| Program Type | Definition to Respondents |
|---|---|
| Vegetation Enhancement | *The State would give you money each year to add and maintain native vegetation on your land. The State would assist with the initial purchasing of materials and labor. You would be responsible for long-term monitoring and maintenance of the site.* |
| Conservation Easement | *The State would pay you for the right to access and manage the portion of your land placed into the conservation easement. You would give up the development and management rights to that portion of your land to the State.* |

Alternatives were not considered as parameters in this model through the explained generic coefficient assumption. Similar structuring of utility and labeled alternatives have been applied elsewhere in environmental economics (Lizin et al., 2016).

**Willingness-to-Accept Experimental Design**

The WTA and the WTP components were part of the larger survey instrument. Through the split-sample design, all landowners had a 50% chance of being in the WTA or the WTP

sample. The split-sample was designed to reduce the cognitive burden on the landowners filling out the survey and to prevent landowners from anchoring responses between the instruments. Respondents received six task choice sets in the survey across four blocks for a total of 24 different choice sets. Each of the choice sets included one follow-up question that asks for how many acres the respondent would be willing to put into the program. Only one task choice was presented at a time. Once the respondent finished all choice sets, they were asked how certain they were of their choices and rationale for selecting the status quo. "Cheap talk," a method used to tell the respondents about hypothetical bias and asking respondents to consider the presented options as if their selection had real-world consequences, was used to encourage engagement and accurate responses (Cummings & Taylor, 1999).

Due to time constraints for this study, no significant pretesting was conducted other than cognitive interviews with agency officials and some landowner reviews of the survey. Changes were made to survey to reflect the feedback from agency officials and landowners by clarifying questions, defining key terms, and adjusting answer options to be more reflective of the landowner experience. The reviewed literature provides reasonable justification for signs and possible magnitudes for the parameters suggested, but these studies were not specific enough to the target population to use such magnitudes with certainty. Published best practices for efficient design generation have demonstrated that *a priori* magnitudes and signs perform better than naïve designs even under uncertain *a priori* information, as long as the *a priori* information is reasonable (Table B3) (Ferrini & Scarpa, 2007). Following Ferrini and Scarpa (2007), near-Bayesian designs were created as there was reasonable evidence for signs and magnitude but with uncertainty.

Landowner payment was assumed to be the main driver with a positive effect on the utility as found in several studies (Rabotyagov & Lin, 2013; Schneider et al., 2025; Trenholm et al., 2017). The effect of contract length was assumed to be negative and less than that of landowner payment from findings previously reviewed (Rabotyagov & Lin, 2013; Schneider et al., 2025). Monitoring effects were assumed to be negative by the opinions of the researchers and program managers familiar with the study; however, there appeared to be little literature addressing monitoring in WTA analyses involving landowners and restoration programs. A Danish study found that monitoring resulted in a higher WTA for landowners than no monitoring, indicating that monitoring has a negative effect on landowners (S. Vedel et al., 2015). This study indicated the negative effect monitoring has on utility, but given the distinctly different population of the study, what will be found in the United States is uncertain. The distribution of the monitoring effects was set wide to reflect the uncertainty of impact. Given there were no direct relationships in the literature, priors were selected as small at the discretion of the researcher, as supported by Ferrini and Scarpa (2007). Standard deviations then exceeded the threshold of a positive and negative prior mean to represent the expectation but uncertainty around the magnitude and expected sign of the mean. The multinomial logit (MNL) model was described as:

$$U_{nij} = ASC_j + \beta_{Payment} Payment_{nij} + \beta_{Contract} Contract_{nij} + \beta_{Monitoring} Monitoring_{nij} + \varepsilon_{nij,} \quad j \epsilon \{VE, CE\}$$

Where:

- $U_{nij}$ is the utility $(U)$ of the respondent $(i)$ for every task $(n)$ for each labeled alternative $(j)$;
- $ASC_j$ is the alternative specific constant $(ASC)$ for each labeled alternative $(j)$;
- $\beta$ is the coefficient for each variable;
- $Payment_{nij}$ is the payment level for the respondent $(i)$ for every task $(n)$ for each labeled alternative $(j)$;
- $Contract_{nij}$ is the contract length level for the respondent $(i)$ for every task $(n)$ for each labeled alternative $(j)$;
- $Monitoring_{nij}$ is the monitoring level for the respondent $(i)$ for every task $(n)$ for each labeled alternative $(j)$;
- $\varepsilon_{nij}$ is the random error for the respondent $(i)$ for every task $(n)$ for each labeled alternative $(j)$.

The efficient design was calculated in the proprietary software Ngene by ChoiceMetrics (ChoiceMetrics, 2025). The design was optimized using a multinomial logit (MNL) parameter and the specified prior distributions. The design used 500 draws using the Halton method (Halton, 1960). To minimize dominant choice tasks between the different program types (Vegetation Enhancement and Conservation Easement), the efficient design was constrained to only allow for combinations where the payment to the landowner for each program was between one step below or above the other, or equal. The Bayesian MNL D-error for the near-Bayesian design is 0.026373.

**Table B3:** *Assumed Mean and Standard Deviation of Priors for the Near Bayesian Design of the Willingness-to-Accept Instrument*

| Attribute | Mean for Prior | Std. Dev. for Prior |
|---|---|---|
| $\beta(Program\ Type)$ | 0 | 0.8 |
| $\beta(Landowner\ Payment)$ | 0.2 | 0.6 |
| $\beta(Length\ of\ Contract)$ | -0.2 | 0.6 |
| $\beta(Monitoring\ Frequency)$ | -0.1 | 0.6 |

A naïve approach, where the priors were set to zero, was also calculated to understand the difference in efficiency between the two designs. This is not evidence of ex post performance of the design as the design calculations are not directly comparable and may not actually reflect ex post performance (Ferrini & Scarpa, 2007). The naïve approach assumed that all priors are set to

zero and there are no constraints on the design. The MNL D-error for the naïve design is 0.025121.

**Willingness-to-Pay Model Framework**

For the WTP, the model tested a per acreage fee collected from the landowner with longevity of the fee program and the stated purpose of the funding program. The WTP experiment was presented as a series of referendum questions where the respondents "votes" for or against the given referendum scenario. The utility function:

$$\begin{Bmatrix} V_{i,Yes,t} = \alpha_{Yes} + \beta_{pay,i} Pay_{it} + \beta_{length} Length_{it} + \beta_{purpose,i} Purpose_{it} + Z_i \gamma + \eta_{Yes,i} \\ V_{i,No,t} = 0 \end{Bmatrix}$$

described the willingness to pay where:

- $i$ was the respondent;
- $t$ was the task choice;
- $\alpha$ was the alternative specific constant;
- $Pay$ was the per acre per year cost to the landowner, with a negative lognormal payment coefficient;
- $Length$ was the longevity of the fee program;
- $Purpose$ was the stated purpose of the fee program, effects coded;
- $Z$ represented the respondent-level variables (i.e., environmental identity, prior conservation participation, subwatershed location, acreage, age, longevity in watershed).

Model development underwent an iterative process to reach a respondent-level interaction effect model using these utility functions. First, a multinominal logistic model was used to understand baseline effects under the IIA assumption. Then, a program-attribute mixed logit was developed to understand main effects and heterogeneity within respondent choices. Heterogeneity was tested across the main effect variables, beginning with payment and payment program length then each purpose statement individually. Insignificant heterogeneity effects were removed from the final program-attribute mixed logit for ease of interpretation and model performance. For the respondent-level interaction mixed logit model, respondent-level variables were added to the model one at a time to test for significance and model improvement. Variables were dropped if they were insignificant or decrease model performance without meaningful interpretation. Model performance was assessed for each variable added through the overall changes of AIC, BIC, and log-likelihood. If another variable became insignificant after adding another interaction, that variable was dropped for model performance unless the relationship had clear interpretation. The final model presented the clearest interpretation and associated model performance variables.

**Willingness-to-Pay Instrument and Experimental Design**

The WTP instrument was a modified referendum task. Respondents were prompted to "vote" for each of the choice sets that they were given. Three attributes were developed as described in Table B4. The attributes included annual payment from landowner per acre in USD, number of years that the payment program is established, and the framed purpose of the payment program. The referendum was modeled after special district assessments that are conducted in the Stillaguamish Watershed and nearby watersheds and counties. Modeling the referendum after nearby special districts formed the basis that the referendum is only for landowners rather than all residents.

The per-acre payment mechanism was developed to provide an equitable funding mechanism that weighs the acreage of the landowner as a function of their impact on the landscape. This model assumed structures similar to those of flood control districts in the region where assessments are often per-acre or by the value of improvements on the landowner's parcel. By constructing the design similar to that of other special assessments in the area, the instrument construction framed the choice to structure that is similar to that in which respondents are familiar (Carson & Groves, 2007). Additionally, the assumption lies that larger landowners may be eligible for enrolling more acres into a restoration program compared to smaller landowners, suggesting that incentives may benefit larger landowners compared to smaller landowners.

**Table B4:** *Attributes and Attribute Levels for the Willingness-to-Pay Instrument*

| Attributes | Description | Levels |
|---|---|---|
| Yearly Payment from Landowner | The amount of money that the individual pays out per acre per year for the fee program. | $10<br>$25<br>$50<br>$100 |
| Length of Fee Program | The number of years that the fee program lasts | 5<br>10<br>20 |
| Purpose of Fee Program | The stated purpose that the fee program would support in terms of restoration. | · Improve sport fishing opportunities<br>· Enhance salmon habitat<br>· Enhance recreation in watershed<br>· Improve water quality |

With this, respondents received six task choice sets across four blocks for a total of 24 possible choices. Once the respondent finished all choice sets, there were several follow-up questions, including how certain they were of their responses, how many total acres they own in

the Stillaguamish Watershed, rationale for if they selected status quo, if they would be more willing to adopt a flat fee compared to an acreage assessment, and if they would be willing to donate instead of having an annual assessment. These follow-up questions tested whether the respondent is protesting the per-acre mechanism or if they are truly against funding restoration activities.

Cheap talk was also used to encourage engagement and accurate responses (Cummings & Taylor, 1999). A full example of what respondents received can be found in Supplemental III-III. With the same constraints as the WTA instrument, a near-Bayesian D-efficient design was developed for the WTP following Ferini and Scarpa (2007) guidance. Table B5 describes the assumed prior signs and distributions. Payment from the landowner is expected to have a negative effect, with the greatest impact (Mueller et al., 2013; A. B. Rosenberg et al., 2023). Length of the payment program is expected to have a negative effect, taking from WTA literature on contract length (Rabotyagov & Lin, 2013; Schneider et al., 2025), with a wide distribution due to uncertainty. The purpose of funding is a categoric variable and is designed to be effects coded (i.e., the reference category is the negative sum of all the variable level coefficients). As the program does not support near-Bayesian methods with effects variables, the priors were set to zero. The MNL utility for the WTP:

$$U_{nit} = ASC_i + \beta_{Payment} Payment_{nt} + \beta_{Duration} Duration_{nt} + \sum_{k}^{K-1} \beta_k Z_{knt} + \varepsilon_{nit}$$

Described so that:

- $i$ is the vote alternative (“yes” or “no”0);
- $Z_k$ denotes the levels of the purpose statement, effects coded so that the model includes salmon habitat enhancement, water quality improvement, and recreation improvements and sports fishing improvements is the inverse of the grand purpose mean.

**Table B5:** *Assumed Means and Standard Deviations of Priors for the Near-Bayesian Design of the Willingness-to-Pay Instrument*

| Attribute | Mean for Prior | Std. Dev. for Prior |
|---|---|---|
| $\beta(Landowner\ Payment)$ | -0.2 | 0.6 |
| $\beta(Length\ of\ Fee\ Program)$ | -0.1 | 0.8 |
| $\beta(Purpose)$ | 0 | NA |

The designs were made in Ngene (ChoiceMetrics, 2025). The near Bayesian efficient design resulted in a d-error of 0.352532. Similarly to the WTA, a naïve design was made with priors set to zero. The naïve design resulted in a d-error of 0.349473. The d-error for the WTP instrument is expected to be higher than the WTA with a categoric variable. The naïve design is lower than the Bayesian design. The resulting choice blocks can be found in Supplemental III-II

**Willingness-to-Accept and Willingness-to-Pay Analysis**

The experiments were designed to be compatible with mixed logit models, allowing for more flexibility and avoiding the IIA of multinominal logit models (Hensher et al., 2015; Train, 2003). Through an estimated error component random parameters logit, individuals' choices were modeled at each task choice while accounting for the respondent's unobserved preference that breaks the IIA assumption. The mixed logit design also supported the repeated choice decisions made by the respondent. The results of the model better reflect the heterogeneity in individual decisions by the assumption that each individual had a different coefficient associated with a variable.

For the analysis coefficient development, the payment variable was divided by $100 for the WTA and $10 for the WTP for scaling. Contract duration and length of the fee program were divided by 10 for scaling. Scaling of the continuous and temporal terms helped in the estimation and interpretation of results while having no impact on the utility specification and predicted probabilities (Train, 2003).

All estimation was conducted in Apollo (Hess & Palma, 2019). For model draws, models used Sobol draws of 1,000. Respondent-level variables are defined in Table B6.

**Table B6:** Definitions and Adjustments of Variables used in the Willingness-to-Accept and Willingness-to-Pay Models

| Variable | Definition | Data Adjustment |
|---|---|---|
| Age | Self-reported age via bins: 18-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80 and older. | Respondents are given the median age of their respondent bin, then the data is centered. Group 18-19 dropped due to lack of respondents. Group 80 and older given 85. |
| Acreage | Self-reported acreage via bins: less than one-half, 0.5-1, 2-5, 6-10, 11-20, 21 and more. | Acreage treated as categorical given the wide range that is feasible above 20 acres. Bins may be merged for analysis. |
| Tenure | Self-reported ownership and tenure bins: less than a year, 1-5 years, 6-10 years, 11-20 years, 21+ years, I do not live in the Stillaguamish Watershed. | Bins were treated as categories. Bins may be merged for analysis. |
| Subwatershed | Self-reported property location via HUC 10 subwatersheds for the Stillaguamish Watershed. | Subwatersheds are aggregated into larger regions for analysis. |

| | | |
|---|---|---|
| Riparian Status | Self-reported property location of whether or not the property is 150 feet from a stream, river, or natural water body. | Treated as a binary category. |
| Prior Restoration Participation | Self-report previous activity, interest, or disinterest in 12 different specified restoration activities. | If the respondent ever selected "Yes, I have" for any item, coded as 1 otherwise 0. Treated as a binary category |
| Environmental Identity Score | A Likert scaling belief question of 7 paired statements. | Respondents were given a summative score based on the 7 questions for totals between 7 and 35. Summed responses scaled to Z-scores. |

The environmental identity score came from a series of bipolar questions in our survey inspired by Sets and Biga's (2003) work on environmental identity as reported by the respondent (Stets & Biga, 2003). The measure was an additive scale of bipolar statements about how the respondent views their relationship with the watershed and asks the respondent to score along a scale where they fall along the statements. The scale was then scored 1 through 5 with a score of 1 on the item being more anthropocentric and a 5 on the item being more ecocentric. The scores were totaled for each respondent, resulting in a "environmental identity" score, with a lower score associated with anthropocentrism and a high score associated with ecocentrism. This tool has been implemented elsewhere, showing promising results of high scores associated with conservation willingness compared to lower scores (Scholl & Humphery, 2017).

When testing respondent-level variables, variables were scaled and centered as appropriate. For this analysis, environmental identity score was centered and scaled. Age was converted to a continuous variable, using the midpoint of the age bins, and centered. Conversion of age to a continuous variable was to lessen the parameter burden of the model.

**Supply of Restoration Land and Funding Scenarios**

Inspired by Greiner (2023), asking how many acres respondents were willing to enroll into a restoration program and the total number of acres a respondent has in the watershed allowed for the calculation of a projected number of acres that are in "willing" to be restored and a hypothetical budget amount set by a watershed fee (Greiner, 2023). Under certain payment to landowner and payment from landowner schemes, policy scenarios were developed to understand the supply of restoration funds, the demand for restoration, and the amount of money the local population would be willing to put forward for that restoration.

For the pseudo-policy scenarios, WTA results considered the choice probability and self-elected acreage responses across the watershed to develop expected enrollment projections under

the WTA alternatives. The WTP scenarios calculated the predicted support for fee systems that will be used to compute the projected funding collected under the fee scenario. These policy scenarios were compared to demonstrate functionality.

As self-elected enrollment and reported total acres were voluntary, missing data became a persistent issue. To address missing data, total estimated acres were derived by assigning the median reported total acreage by selected acreage bin from respondents who reported to those who did not. The conditional acres that a respondent would enroll was calculated for missing data points as the midpoint of reported shares by acreage bin, which would then be used against the estimated or reported total acres to get conditional enrolled acres. Enrolled acres were constrained to be no more than the estimated or reported acres.

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## Appendix C: Survey Instrument

**Study Purpose and Description:**
In this survey, we will ask for your thoughts about land restoration and management activities that improve salmon habitat and support a healthy Stillaguamish Watershed. The goal of this survey is to help ensure restoration and management efforts are informed by the needs and perspectives of the local residents. The results will be used in a report submitted to the Washington Department of Fish and Wildlife (WDFW) to aid in management and outreach activities and may subsequently appear in other publications.

**Risks and Benefits:**
There are no known risks should you choose to participate in this study. You may withdraw from the study at any point. You should have received a token of appreciation for considering our request to participate in this important study inside the survey envelope. **At the end of the survey, you may choose to be entered in a drawing for one of the $500 Visa gift cards.**

**Confidentiality:**
You will remain anonymous. All survey responses will remain strictly confidential. If you choose to enter the drawing, your email will only be used to contact you if you win the drawing, it will not be linked with your responses or used in any other way and will not be stored after the drawing. The security and privacy policy for the web survey company can be found at the following link: https://www.qualtrics.com/privacy-statement/

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**Contact Information:**
If you have any questions or desire further information with respect to this study you may contact our project team at stillysurvey@gmail.com. If you want to talk with someone who is not part of the study team about the study, your rights as a research subject, or to report problems or complaints about the study, contact the UW Human Subjects Division at hsdinfo@uw.edu or 206-543-0098.

**Participant Consent:**
Participation in this study is optional. The survey should take you around 15-20 minutes to complete. If you choose to be involved in this study you may withdraw at any time without any consequences of any kind. By completing this questionnaire, you are consenting to participate in this research.

***A watershed is a land area where water drains into a common body of water like a lake, river, or wetland. Looking at the picture of the Stillaguamish Watershed below, please indicate which area/region you primarily live in by selecting the number of the area in the dropdown menu.***

1. When answering the questions below, please think about your primary property in the Stillaguamish Watershed and your relationship to the Stillaguamish Watershed. Do you have primary decision-making authority for your land (e.g., sole owner, partner, board member)?
    - Yes
    - No

2. How would you best categorize your property?
    - Primary residence (full time)
    - Residential - Vacation property (part time)
    - Residential - Rental
    - Commercial - Business (non-farm)
    - Commercial - Farming or ranching
    - Commercial - Rental
    - Residential - Farming or ranching
    - Other

3. How many years have you or your family owned or rented the property? _____

4. How long have you lived in the Stillaguamish Watershed?
    - Less than a year
    - 1-5 years
    - 6-10 years
    - 11-20 years
    - 21+ years
    - I do not live in the Stillaguamish watershed

5. How would you best define your property location?
    - Urban
    - Suburban
    - Rural

***Riparian zones are the land areas within 150 feet of a stream or river***

6. Does your property have a stream, river, or riparian zone, or is it 150 feet or less from a stream, river, or natural water body?
    - Yes
    - No

7. Around how many acres is your primary residence?

- Less than a half-acre
- Half-acre to 1 acre
- 2-5 acres
- 6-10 acres
- 11-20 acres
- Over 20 acres

8. How do you interact with the river/streams in the Stillaguamish Watershed? (Please select all that apply)

- ☐ Fishing (recreational)
- ☐ I eat fish from the river
- ☐ Swimming/wading
- ☐ Watercraft (boating, rafting, kayaking, tubing)
- ☐ Wildlife viewing (e.g., birding)
- ☐ Salmon viewing
- ☐ Spiritual or religious
- ☐ Recreation around waterways (e.g., walking, biking, picnicking)
- ☐ Other
- ☐ I do not interact with the river/streams

9. Who is responsible for a healthy environment on my land: (Select all that apply)

- ☐ Myself
- ☐ Landowners
- ☐ Residents of the Stillaguamish Watershed
- ☐ Local government (e.g., county government, cities)
- ☐ State government (e.g., Washington Department of Fish and Wildlife)
- ☐ Fishing, forestry, mining industry
- ☐ Business corporations in the Stillaguamish
- ☐ Other
- ☐ None of the above

10. Who is responsible for a healthy environment in the Stillaguamish Watershed as a whole: (Select all that apply)

- ☐ Myself
- ☐ Landowners
- ☐ Residents of the Stillaguamish Watershed
- ☐ Local government (e.g., county government, cities)
- ☐ State government (e.g., Washington Department of Fish and Wildlife)
- ☐ Fishing, forestry, mining industry
- ☐ Business corporations in the Stillaguamish
- ☐ Other
- ☐ None of the above

11. What are your biggest environmental concerns (Please select all that apply)

| | This is a concern on my land | This is a concern in the Stillaguamish Watershed | This is not a concern on my land or in the Stillaguamish Watershed |
|---|---|---|---|
| Declining salmon populations | □ | □ | □ |
| Flooding | □ | □ | □ |
| Drought | □ | □ | □ |
| Soil health | □ | □ | □ |
| Increased human populations | □ | □ | □ |
| Commercial/residential development | □ | □ | □ |
| Extreme weather events | □ | □ | □ |
| Salmon habitat loss | □ | □ | □ |
| Salmon passage barriers | □ | □ | □ |
| Water temperature | □ | □ | □ |
| Pollution | □ | □ | □ |
| Invasive species | □ | □ | □ |
| Riverbank erosion | □ | □ | □ |

12. Please identify where your beliefs fall between each statement. Place one check along the scale for each of the following phrases. The closer you click to one side the more you agree with it: If you are using a mobile device, rotate your phone horizontally (landscape) for easier reading. If the screen doesn't rotate, please disable portrait lock.

| | | |
|---|---|---|
| The watershed's problems are bigger than humans can solve and manage | □ □ □ □ □ | Humans can solve and manage any watershed problems |
| Landowners should individually bear the cost of improving the watershed | □ □ □ □ □ | The cost of improving the watershed should come from the government |
| I feel detached from the watershed | □ □ □ □ □ | I feel connected to the watershed |
| I live in competition with the watershed | □ □ □ □ □ | I live in cooperation with the watershed |

| | | |
|---|---|---|
| I'm independent from the watershed | □ □ □ □ □ | I'm dependent on the Watershed |
| Utilize the watershed for human needs | □ □ □ □ □ | Preserve the watershed for its own sake |
| I'm disinterested in the watershed | □ □ □ □ □ | I'm an advocate of the watershed |

13. In the past year, about how often did you engage in the following types of behaviors/activities in the Stillaguamish?

| | Never | Rarely (1-4 times a year) | Occasionally (Once a month) | Regularly (Once a week) | Frequently (Almost daily) | Don't know |
|---|---|---|---|---|---|---|
| Behaviors that you believe effectively benefitted the environment | □ | □ | □ | □ | □ | □ |
| Environmental behaviors that were personally meaningful to you | □ | □ | □ | □ | □ | □ |
| Environmental behaviors that you believe were needed by the community | □ | □ | □ | □ | □ | □ |

14. Please select how much you agree or disagree with the following statements:

| | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|---|---|---|---|---|
| I know what the environmental regulations are on my land | □ | □ | □ | □ | □ |
| I am familiar with the Pacific Salmon Treaty | □ | □ | □ | □ | □ |

| | | | | | |
|---|---|---|---|---|---|
| I know which species of fish are listed as endangered or protected in the Stillaguamish Watershed | □ | □ | □ | □ | □ |
| I am familiar with the Boldt Decision | □ | □ | □ | □ | □ |
| I know about the salmon life cycle | □ | □ | □ | □ | □ |
| I know where to find official information about fishing opportunities and regulations | □ | □ | □ | □ | □ |
| I know where to find information about the water quality in the Stillaguamish | □ | □ | □ | □ | □ |

***Habitat restoration is the process of assisting in the recovery of upland and riparian ecosystems. In the Stillaguamish Watershed, habitat restoration focuses on salmon recovery and includes activities like invasive species removal, replanting along waterways, removal of barriers for salmon passage, etc.***

15. What best describes your thoughts on restoration on your land?

| | Yes | No | Unsure |
|---|---|---|---|
| I have conducted restoration on my land in the past | □ | □ | □ |
| I want to conduct restoration on my land in the future | □ | □ | □ |
| I am currently conducting restoration on my land | □ | □ | □ |
| I want more information about restoration activities | □ | □ | □ |
| My land has no need for any restoration | □ | □ | □ |

16. Please select how much you agree or disagree with the following statements:

| | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| If given the opportunity, I am likely to participate in a salmon habitat restoration project on my land in the next 5 years | □ | □ | □ | □ | □ |
| I want to see more salmon habitat restoration in the Stillaguamish Watershed | □ | □ | □ | □ | □ |
| I think it would be easy to conduct salmon habitat restoration on my land | □ | □ | □ | □ | □ |
| I believe that any type of restoration on my land will have a direct benefit to salmon recovery | □ | □ | □ | □ | □ |

17. Have you ever participated in the following restoration activities? In both upland and riparian areas, these restoration activities may have direct impacts on salmon habitat.

| | Yes, I have | No, but I would be interested | No, and I would not be interested |
|---|---|---|---|
| Workshops that help me determine what actions I can take for restoration on my land | □ | □ | □ |
| Technical assistance for restoration activities on my land | □ | □ | □ |
| Removing invasive wildlife and plant species that could impact salmon | □ | □ | □ |
| Land/riparian easement purchased by a non-profit or the State | □ | □ | □ |
| Selling all or a portion of your land for the purpose of restoration/conservation | □ | □ | □ |
| Price matching programs for salmon habitat restoration activities | □ | □ | □ |
| Planting native plants | □ | □ | □ |

| | | | |
|---|---|---|---|
| Receiving funding for salmon habitat restoration activities | ☐ | ☐ | ☐ |
| Removing fish barriers or naturalizing waterways | ☐ | ☐ | ☐ |
| Home setback/relocation from floodplain | ☐ | ☐ | ☐ |
| Maintaining mandatory buffers around waterways or wetlands | ☐ | ☐ | ☐ |
| Tax reduction programs for land under restoration or protection | ☐ | ☐ | ☐ |

18. What would discourage you from doing a restoration project? (Please select all that apply)

- ☐ I do not want the state to be involved with restoration projects on my land
- ☐ I do not want the conservation district or other non-governmental organizations to be involved with restoration projects on my land
- ☐ I am worried there would be restrictions on what I can do on my land
- ☐ I am worried it would reduce my income or property value
- ☐ It would cost too much money
- ☐ It would look messy
- ☐ Nothing discourages me from doing a restoration project
- ☐ Other (Please specify)

19. Would any of the following concerns discourage you from selling your land (or a portion of your land) for restoration? (Please select all that apply)

- ☐ Concern my land would not be used for intended restoration
- ☐ Losing economic benefits (e.g., property value, income)
- ☐ Personal/familial/generational concerns
- ☐ Administrative/logistic challenges
- ☐ Concern about not receiving fair market value for my land
- ☐ Nothing discourages me from selling land for conservation/restoration
- ☐ Other (Please specify)

20. Please indicate where you get and where you would like to get information about doing restoration work on your land: (Please select all that apply)

| | I currently get information from this source | I would like to get information from this source in the future |
|---|---|---|
| Family, friends, and neighbors | ☐ | ☐ |
| Churches or local community organizations (Optional: Specify which ones) | ☐ | ☐ |

| | | |
|---|---|---|
| News media (e.g., newspapers, local TV, news, radio) (Optional: Specify which ones) | ☐ | ☐ |
| Tribal organizations | ☐ | ☐ |
| Conservation organizations (e.g., Trout Unlimited, Western Rivers' Conservancy) (Optional: Specify which ones) | ☐ | ☐ |
| Washington Department of Ecology | ☐ | ☐ |
| Washington Department of Natural Resources | ☐ | ☐ |
| Washington Department of Fish and Wildlife | ☐ | ☐ |
| Academic sources (e.g., universities, academic papers) | ☐ | ☐ |
| Outdoor recreation organizations (e.g., Puget Sound Anglers) (Optional: Specify which ones) | ☐ | ☐ |
| Stillaguamish Watershed Council | ☐ | ☐ |
| Podcasts (Optional: Specify which ones) | ☐ | ☐ |
| Social media (e.g., Facebook, YouTube) (Optional: Specify which ones) | ☐ | ☐ |
| Online forums (e.g., Next-door, Reddit) (Optional: Specify which ones) | ☐ | ☐ |
| Other (Please specify) | ☐ | ☐ |

21. What is your preferred way of receiving information about habitat restoration? (Please select all that apply)

- ☐ Hands-on workshop

- ☐ Mailed flyer
- ☐ Demonstration field tour
- ☐ Informational web page
- ☐ Video tutorials/How-to demonstration videos
- ☐ Email newsletter
- ☐ Social media page (e.g., Instagram, Facebook)
- ☐ Presentation at a community festival or event
- ☐ Landowner's guidebook
- ☐ Other
- ☐ I do not want to receive information about habitat restoration

The Stillaguamish Watershed has the most at-risk Chinook salmon run along the Pacific Coast, so it is a critical area for this culturally and economically important species

Washington State is reviewing incentive programs for the Stillaguamish Watershed to improve the environmental quality of the Stillaguamish River. The State believes that this will increase recreational opportunities, increase salmon runs, improve habitat and increase water quality.

> For the next section, you will be asked to choose between three options for the given scenario. These scenarios ask you to choose different restoration programs that will pay you to enroll a portion of your land in the program. These scenarios are hypothetical and involve money. No one will actually be paid money based on the decisions you make. However, please consider these scenarios as though you would receive the money presented for the program you choose and the restoration program would actually be implemented on your land.

For the following sets of options:

- All lands (no matter the size or if the land is near water), are eligible for these programs.
- You may also participate in other conservation programs.

For each scenario, you will see three options:

- **Vegetation Enhancement Project**: The State would give you money each year to add and maintain native vegetation on your land. The State would assist with the initial purchasing of materials and labor. You would be responsible for long-term monitoring and maintenance of the site.
- **Conservation Easement**: The State would pay you for the right to access and manage the portion of your land placed into the conservation easement. You would give up the development and management rights to that portion of your land to the State.
- **Status Quo**: This is how you currently manage or use your land.

Scenario 1 of 6

| | Vegetation Enhancement | Conservation Easement | Status Quo |
|---|---|---|---|
| Annual payment to landowner | $700 per acre | $1050 per acre | $0 |

| | | | |
|---|---|---|---|
| Contract length | 20 years | 10 years | 0 |
| Monitoring visits | 4 per year | 1 per year | None |

22. Which option would you choose?
    - Vegetation Enhancement
    - Conservation Easement
    - Status Quo

23. How many acres would you enroll in your choice? _____

***Page Break***

Scenario 2 of 6

| | Vegetation Enhancement | Conservation Easement | Status Quo |
|---|---|---|---|
| Annual payment to landowner | $1400 per acre | $1400 per acre | $0 |
| Contract length | 40 years | 5 years | 0 |
| Monitoring visits | 1 per year | 4 per year | None |

24. Which option would you choose?
    - Vegetation Enhancement
    - Conservation Easement
    - Status Quo

25. How many acres would you enroll in your choice? _____

***Page Break***

Scenario 3 of 6

| | Vegetation Enhancement | Conservation Easement | Status Quo |
|---|---|---|---|
| Annual payment to landowner | $350 per acre | $350 per acre | $0 |
| Contract length | 10 years | 20 years | 0 |
| Monitoring visits | 2 per year | 2 per year | None |

26. Which option would you choose?
    - Vegetation Enhancement
    - Conservation Easement
    - Status Quo

27. How many acres would you enroll in your choice? _____

***Page Break***

Scenario 4 of 6

| | Vegetation Enhancement | Conservation Easement | Status Quo |
|---|---|---|---|
| Annual payment to landowner | $700 per acre | $700 per acre | $0 |
| Contract length | 10 years | 20 years | 0 |
| Monitoring visits | 1 per year | 4 per year | None |

28. Which option would you choose?
    - Vegetation Enhancement
    - Conservation Easement
    - Status Quo

29. How many acres would you enroll in your choice? _____

***Page Break***

Scenario 5 of 6

| | Vegetation Enhancement | Conservation Easement | Status Quo |
|---|---|---|---|
| Annual payment to landowner | $1050 per acre | $1050 per acre | $0 |
| Contract length | 40 years | 5 years | 0 |
| Monitoring visits | 4 per year | 1 per year | None |

30. Which option would you choose?
    - Vegetation Enhancement
    - Conservation Easement
    - Status Quo

31. How many acres would you enroll in your choice? _____

***Page Break***

Scenario 6 of 6

| | Vegetation Enhancement | Conservation Easement | Status Quo |
|---|---|---|---|
| Annual payment to landowner | $700 per acre | $350 per acre | $0 |
| Contract length | 40 years | 5 years | 0 |
| Monitoring visits | 2 per year | 2 per year | None |

32. Which option would you choose?
    - Vegetation Enhancement
    - Conservation Easement

- Status Quo

33. How many acres would you enroll in your choice? _____

34. How certain are you of your choices in these scenarios?
    - Very Certain
    - Somewhat Certain
    - No Opinion
    - Somewhat Uncertain
    - Very Uncertain

35. For the scenario(s) you selected status quo for, what was the reason: (Select all that apply)
    - ☐ I do not trust receiving the payment as promised
    - ☐ I do not want any monitoring activity on my land
    - ☐ I do not think my land is eligible for these programs
    - ☐ I do not think my land is in need of restoration
    - ☐ I do not trust the State or any Government-funded program
    - ☐ These programs do not provide enough funding or compensation
    - ☐ I think it will decrease my income from my working land
    - ☐ I am worried these programs will increase the risk of flooding or erosion on my property
    - ☐ I do not think these programs will help create cleaner waters, increased salmon runs, or improved economic conditions.
    - ☐ Other: _____

***In this final section, we'd like to ask you a few questions about yourself. Please remember everything is completely confidential and results will only be reported anonymously as part of a larger group.***

36. What is your age?
    - 18-19 years
    - 20-29 years
    - 30-39 years
    - 40-49 years
    - 50-59 years
    - 60-69 years
    - 70-79 years
    - 80 years and older
    - Prefer not to answer

37. What is your sex?
    - Male
    - Female
    - Prefer not to answer

38. How would you best describe yourself? (Select all that apply)

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Middle Eastern or North African
- ☐ Native Hawaiian or Pacific Islander
- ☐ White
- ☐ Prefer not to answer

39. What is the highest level of education you have completed?
    - Some High School or less
    - High School/GED
    - Some College or trade school
    - Associates/2-year degree
    - Bachelors/4-year degree
    - Graduate level