The Program Evaluation of the Small Forest Landowner Office and Associated Programs of the Washington State Department of Natural Resources

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A thesis

submitted in partial fulfillment of the requirements for the degree of

Master of Science

University of Washington

2022

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Environmental and Forest Sciences

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Abstract

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The passage of Engrossed Substitute House Bill (ESHB) 2091, also known as the Forest and Fish Rules, by the Washington State Legislature in 1999 mandated the formation of the Small Forest Landowner Office within the Department of Natural Resources, tasked with being a focal point of small forest landowner concerns, have expertise on and operate certain governmental assistance programs for small forest landowners, and produce routine updates and recommendations to the Washington State Legislature. Evaluation of the Small Forest Landowner Office and its programs has been limited, until the Washington's Small Forest Landowners in 2020 report by the University of Washington, in part represented in this research. This research is a program evaluation of the Small Forest Landowner Office and its associated programs of (1) the Forestry Riparian Easement Program, (2) the Family Forest Fish Passage Program, and (3) the Alternate Plan process. The research will provide insights to small forest landowner community in Washington State along with the impacts and remediation efforts of the Forest and Fish Rules, including where there are strengths and avenues for improvement.

Using surveys, interviews, and agency reports, this research illustrates that the small forest landowner community of Washington State is diverse, with many different ownership objectives and motivations that lead to certain perceptions, management styles, and program usage. The research further finds that the Small Forest Landowner Office, the Forestry Riparian Easement

Program, the Family Forest Fish Passage Program, and the Alternate Plan process are all operating below desired levels, with the Small Forest Landowner Office also unable to complete legislative mandated duties. Nevertheless, the Small Forest Landowner Office and its associated programs are widely considered as positive for helping small forest landowners.

This work suggests that the Small Forest Landowner Office and its associated programs are underfunded and understaffed while still producing positive outcomes to a diverse client community. Understanding the limitations of the Small Forest Landowner Office and its associated programs, along with the diversity of the small forest landowner community, gives managers and administrators insight to best serve the small forest landowner community and uphold legislatively mandated duties while managing fiscal and personnel constraints.

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Acknowledgements

Thank you to my committee members, Kent Wheiler, Sergey Rabotyagov, Indroneil Ganguly, and Craig Thomas, for their support, encouragement, and mentorship during my research and through my degrees. My gratitude especially goes to Kent and Sergey for being co-chairs on my committee and providing me with boundless opportunities to explore my research and combine interdisciplinary instruction and thought to my work.

To the Center of International Trade of Forest Products (CINTRAFOR) and my colleagues over the years, Monica Huang, Francesca Pierobon, Kunlin Song, Cindy Fu, Hema Velappan, Nick Braun, Christina Bjarvin, Derrick Crawford, Blaze Burke, Sarah Pollack, Lieke Droog, and Shinju Yokoyama, I do not have the words for express my sheer gratitude for your support, patience, and camaraderie. CINTRAFOR has become a special place through which we endured life with laughter and friendship. I also recognize fellow graduate students across the School of Environmental and Forest Sciences (SEFS), especially Sadie Trush, Nolan Kitts, and Lauren Newton, for creating such a wonderful community we can all thrive.

To the small forest landowner research team, Sergey Rabotyagov, Luke Rogers, Brian Danley, Jeffrey Comnick, Andrew Cooke, Pranab Roy Chowdury, David Diaz, and Rachel Neroutsos, thank you for helping me explore my research, push past obstacles, and become the scholar I am today. Thank you for your continued interest and investment as I continue to explore this data and seek out its nuances.

Through these past three years, I could not have achieved and accomplished so much without the unwavering support of my friends and family from across the globe. To my immediate family, Marilyn, Keith, Ryan, and Allen Solemslie, thank you for the undying patience, words of advice, comforting words, and always a warm home and meal on the must struggling of days. To my mother Marilyn, thank you for your curiosity and reminding me I am more than my accomplishments. To my father Keith, thank you for teaching me perseverance and keeping me focused on the task at hand. To my brother Ryan, thank you for sharing your own experiences and keeping me grounded. To my grandfather Allen, thank you for your questions and keeping life in perspective. To all my aunts, uncles, and cousins, I thank you for your support and cheering me on. To all my childhood friends and friends from WSU, I thank you for being my steadfast support network. No matter how my life ebbs and flows, my ambitions get the better of me, and my passions and dreams shift and grow, I always know that

all of you will be there by my side, being my foundation no matter where life takes me. This accomplishment is in part only possible through you.

Dedication

To my parents, brother, and grandfather, Marilyn, Keith, Ryan, and Allen, for steadfast guidance and boundless devotion, carrying on the support of the generations that came before and those who are no longer here to see the fruits of their love.

Introduction

The Small Forest Landowner Office (SFLO Office) is a unique office in the Washington State Department of Natural Resources (DNR) to support small forest landowners (SFLOs) navigate Washington State's distinct forestry regulations. The forest practices rules of Washington State are some of the most stringent laws in the nation created through collaborative structures. The SFLO Office is the only entity of its type in the nation. The combination of unique forestry regulations and support mechanisms provide opportunities for research into small-scale forestry and landowner assistance programs.

The most recent publication regarding SFLOs in Washington State, *Washington's Small Forest Landowners in 2020: Status, trends and recommendations after 20 years of Forests and Fish,* illustrates a troubling trend in SFLOs. The researchers found that small forest land acreage is decreasing but small forest land ownerships are increasing (Rabotyagov et al., 2021).The SFLO Office is presented with a unique challenge of a decreasing resource but an increasing target population. A programmatic review of the SFLO Office will identify strengths and weakness of the program, including the two staple programs: Forestry Riparian Easement Program (FREP) and the Family Forest Fish Passage Program (FFFPP). This evaluation will be most beneficial to the administrators of the SFLO Office and those of related programs. Lessons presented in this evaluation will add to the published literature of programmatic evaluation in the natural resource assistance field.

This thesis provides a mixed methods evaluation of the SFLO Office: How effective is the Small Forest Landowner Office of the Washington State Department of Natural Resources, the Forestry Riparian Easement Program, and Family Forest Fish Passage Program according to key interest groups and agency documentation?

To answer this question, this thesis will begin with a literature review of SFLO literature and the regulatory environment of SFLOs. Following the literature review will be a review of data collection methods of the survey used in the Rabotyagov et al. (2021) legislative report, a semi-structured interview protocol, and agency artifacts. The data will then be analyzed in five parts: (1) a target population and needs assessment and (2) evaluation of the SFLO Office, (3) evaluation of the Forestry Riparian Easement Program, (4) evaluation of the Family Forest Fish Passage Program, and (5) evaluation of Alternate Plans. The thesis will conclude with a review of key findings and key lessons for natural resource assistance program evaluations.

Literature Review

Introduction

This chapter reviews the literature required to understand the basis and environment of a program evaluation of the Small Forest Landowner Office (SFLO Office). Six general areas will be explored: (1) small forest landowners, (2) governance and assistance of small forest landowners, (3) riparian impacts of forest management, (4) program evaluations in forestry and related fields, (5) the history of Washington State Forest Laws pertaining to small forest landowners (SFLOs), and (6) other SFLO programs in Washington State. The review of the literature, beyond garnering the required understanding for a program evaluation of the SFLO Office, will explore where the need of the SFLO Office came from and how the SFLO Office, including its staple programs, was designed to address this need.

Small Forest Landowners

Terminology and Definitions

There is no single definition for owners of small acreages of forest land in the literature. *Small-scale forestry*, a journal dedicated to issues regarding these owners, does not define these individuals, or research directed to these individuals, outright. As such, the literature presents a limitation on the groups of landowners in small forestry in which conclusions are relevant of small acreages of forest land found in the literature.

The terminology and definition of small forest landowners (SFLOs) varies. In the United States, SFLOs are also referred to as non-industrial private forests (NIPF), small-scale, family forestry, farm forestry, private forestry, and private forest landholders (Harrison et al., 2002). NIPF, being the most prevalent in the literature, is defined as "forestlands owned by farmers, other individuals, and corporations that do not operate wood-processing plants" (Harrison et al., 2002; Zhai & Harrison, 2000). In 2004, the Forest Stewardship Council defined a family forest as a "small and low intensity managed forest" meaning that the forest area under management is no more than 1,000 hectares (~2,470 acres) or the rate the harvest is "less than 20% of the mean annual increment" and annual harvest is less than 5,000 cubic meters (*FSC-US Forest Management Standard (v1.0)*, 2010). Family forestry is defined by Butler et al. (2016) as an individual or family owning 10 or more acres of forest land (B. Butler et al., 2016). Generally, small-scale forestry is not used in reference to forest landowners in the United States as there are

many individuals who own forest land in excess of 1,000 hectares in comparison to other countries (Harrison et al., 2002).

For this thesis, the definition of small forest landowner outlined by Washington State will be used, with some variation dependent on year and SFLO estimation methodology. In Washington State, under the Revised Code of Washington (RCW) 76.06.450, a small forest landowner has an average three-year harvest amount of no more than two million board feet, similar to that of the FSC definition when converted (RCW 76.09.450). This definition, like the FSC definition, provides an upper bound to who qualifies to be an SFLO. However, limiting the definition to solely a harvest amount presents a unique challenge, especially considering the wide range of climatic and forest conditions in Washington State that would vary a landowner's harvest capacity. Additionally, a landowner who owns a large tract of forest land and harvests minimally may be definable as an SFLO under this definition.

These challenges are made apparent in the 2008 and 2012 Small Forest Landowner Demographic Reports (Miketa, 2013) by the SFLO Office when a geospatial methodology of identifying SFLOs was introduced, through the commission of the Rural Technology Initiative (RTI) by the University of Washington. The SFLO Office, in the 2012 and current definition, defined SFLOs for estimation purposes as at least two contiguous acres of forest land and no more than 2,500 acres in Western Washington and no more than 9,990 acres in Eastern Washington, excluding any level of government lands. The lower bound of two contiguous acres qualifies the SFLO definition to conform with Washington Administrative Code (WAC) 222-16-050, which defines two contiguous acres as the minimum forest practices acreage standard. The upper bounds comply with the two million board feet harvest limit according to modeled yields per acre by average SFLO harvest rotation and specified site class soil (Miketa, 2013). Throughout this thesis, SFLO will be defined through the above estimation definition in methodology and calculated estimates. As demonstrated, owners of small acreages of forest land have varied definitions in the literature. While the definition used in this thesis differs from the literature, further review of the literature includes all definitions of SFLOs and research into SFLOs across different nations and cultures to best understand small private forest landowners to their fullest extent.

Typologies and Behaviors

To evaluate the SFLO Office, the understanding SFLOs in terms of their types and behaviors is imperative towards setting the basis of a needs assessment of the target population. While the SFLO Office is Washington State specific, literature from international, national, and local studies and reports are reviewed. Learning more about Washington SFLOs may be informed from international and national NIPF owners.

The literature has found several ways to describe the typologies of small forest landowners. A typology in Austria found seven different distinct types of private forest owners: farmer forest owners, part-time farmers, small-towners with rural background, forest owners previously employed in agriculture, farm leavers, urban forest owners, and forest owners without connection to agriculture (Hogl et al., 2005). In Sweden, a study presented two different typologies with one between forest owner association members and non-members and the other between residents and non-residents (Berlin et al., 2006). In Northern Spain, a distinct subset of NIPF owners stemmed from agricultural tradition (Rodriguez-Vicente & Marey-Perez, 2009). A Slovenia clustering study categorized small-scale owners into two types in terms of management: engaged and detached (Kumer & Strumbelj, 2017). In the States of Alabama, Georgia, and South Carolina, a cluster study found family forest owners could be classified into three attitudinal types in regard to ownership motivation: multiple-objective, nontimber, and timber (Majumdar et al., 2008). These international and national studies illustrate an agricultural tradition in forestry. Additionally, levels of engagement of forest owners may illustrate significant differences in behaviors. The literature confirms that different ownership motivations lead to significant differences. While agricultural tradition may not be as applicable to the United States, with a different natural and agricultural history compared to the international stage, consideration of levels of engagement and motivations may provide insight to Washington State SFLOs.

Several studies have been conducted in Washington State regarding private forest landowners. A report to the Washington State Legislature suggested two different types of forest landowners based on goals: economic focus and stewardship focus (Rabotyagov et al., 2021). When evaluating interest for ecosystem-based management in Washington State, Creighton et al. (2002) found distinct differences between educated and informed NIPF owners compared to those who were not (Creighton et al., 2002). A survey by Blatner and Baumgartner found that NIPF owners, who have recently completed a management practice, were more likely to use

landowner assistance and education programs. The authors also found that the larger the property, higher level of education, and living closer to or on the forested property increased likelihood of using assistance and education programs (Blatner & Baumgartner, 1991). These studies within the state illustrate the most applicable typologies for Washington SFLOs. The Rabotyagov et al. (2021) supports the Majumdar et al. (2008) study in defining different ownership motivations or objectives as distinct sub-groups of small private landowners. Creighton et al. (2002) and Blatner and Baumgartner (1991) bring a new dimension regarding the education of forest landowners.

The Family Forest Research Center of the United State Forest Service (USFS), University of Massachusetts Amherst, and Michigan State University has conducted the most extensive research into family forest owners in the United States through the USFS National Woodland Owner Survey (NWOS) and complimentary studies. Findings from the Family Forest Research Center on family forest owners may be rather applicable to Washington SFLOs out of other national and international studies.

Meier et al. (2019) found some differences between family forest owners who enrolled in state tax programs and those that did not, mainly that enrollees had larger tracts of land, were more likely to actively manage the land, and the land was less likely to be used for hunting (Meier et al., 2019). When comparing size, small family forest owners, or those who own less than 4.0 ha, are active but less active than larger landowners, with small owners less interested in firewood, timber, recreation, and hunting objectives regarding their ownership (Snyder et al., 2018). Using propensity score modelling of the NWOS data for the U.S. Northern Region, Song et al. (2014) found that family forest owners enrolled in cost-share programs were more active in management strategies, both silvicultural and conservation, compared to their non-participant counterparts. Generally, smaller-sized ownerships were less likely to be a participant in a cost-share program compared to larger-sized ownerships (Song et al., 2014). These studies illustrate the differences delineated from ownership size ranging from objectives to participation in assistance programs. These studies support further support the findings of Blatner and Baumgartner (1991) for Washington private forest landowners.

Using survey data from 2000, forest owners in Massachusetts were divided into three populations segments based on high privacy, high environmental quality, and otherwise indifferent to highlight the heterogeneity of private forest owners and the need to shape programs

according to the heterogeneity of the target population (Finley & Kittredge, 2006). In a social marketing research lens, using NWOS survey data and family forest owners between 1 and 999 acreage ownership, Butler et al. (2007) segmented the family forest owner population into four categories for tailoring programs: woodland retreat, working the land, supplemental income, and ready to sell. A prime prospect analysis targeted low-engagement but high-interest individuals for social marketing efforts, namely through newspaper and television communication (B. Butler et al., 2007). These studies, while finding three objective or motivational typologies, also underscore the need for tailoring programs to a diverse population with different goals.

A life cycle effect analysis by the Family Forest Research Center found that younger generations are more likely to manage for recreation and have recreation as an important objective compared to the older generations (S. Butler et al., 2017). Younger generations also found programs and advice more helpful than older generations. In the same manner, younger generations were more likely to receive or want advice or information compared to the older generations. As for timber harvesting, the older the landowner increased the likelihood of managing for or cutting timber on the property. While there was no significant difference between age cohort participating in cost-share programs, younger cohorts were more likely to find these programs helpful, possibly due to less experience and more financial constraints. Age and privacy objectives appear to be negatively correlated, with younger generations rating privacy objectives higher than older generations. The same applies to development concerns, with younger generations more concerned than older generations (S. Butler et al., 2017). This life cycle effect analysis illustrates age as a new delineator. While many factors affect age, such as education and time of ownership, age may inform the needs of a changing population of forest owners.

Using NWOS data, a distinction was drawn between unassisted and assisted family forest owners with assisted landowners more likely to have conducted management on their property, whether it be stewardship related or timber harvest related, which also concluded that individual type of assistance was not significant in increasing landowner activity, only receiving assistance in general (Kilgore et al., 2015). Snyder et al. (2020) surveyed family forest owners, finding that resident landowners are more active in management than absentee owners, with absentee owners who are members of a conservation association more active in management than non-member,

absentee owners (Snyder et al., 2020). Management of forest land, according to these studies, is not motivated by a single factor, but rather many.

In the most recent rendition of the NWOS survey conducted in 2018, family forest owners account for 33.8%, or an estimated 275.7 million acres, of the forest land in the United States, higher than any other category of ownership (B. Butler et al., 2021). However, family forest ownership dominates the eastern United States whereas federal and public ownership dominates the western United States. In terms of ownership, 61.5% of family forest owners in the United States own between 1 and 9 acres of forest land. For acreage, 93.2% of family forest land is owned by family forest landowners with 10 or more acres (B. Butler et al., 2021).

In the NWOS survey, Butler et al. (2021) found that, out of 13 choices, the top three reasons for owning forest land are: (1) to enjoy beauty or scenery, (2) to protect or improve wildlife habitat, and (3) to protect nature or biological diversity (B. Butler et al., 2021). Recreation occurs on most family forest land, at an estimated 93.8%. Most family forest landowners conduct a management activity on their land, ranging from timber sales, trail construction, or forest health activities. Nevertheless, 19.1% for family forest land, or 29.3% of ownerships, stated that they conducted none of the activities provided in the NWOS survey. An estimated 10.8% of ownerships have a written forest management plan, and an estimated 35.6% of ownerships have received advice. However, 26.1% of family forest ownerships stated that they do not want or need advice. Timber management, wildlife management, and transfer, invasive plants, and unwanted insects or diseases are the advice topics most wanted by ownerships (B. Butler et al., 2021).

A series of focus groups by Andrejczyck et al. (2016) found that family forest owners thought of their ownership as self-actualization and exhibiting “an innate stewardship ethic” for their land (Andrejczyk, Butler, Tyrrell, et al., 2016). In all the different types of distinctions and categorizations defined by the literature, Andrejcczyck et al. (2016) may have concluded a commonality. Other than forest landowners owning land, self-actualization and exhibiting “an innate stewardship ethic” provide insight to a diverse population and how program administrators and researchers can understand the needs and goals of family forest owners.

Overall, ownership typologies and behaviors depend on the metric being measured. Conclusively, however, private forest owners are heterogenous with many different goals and management styles. In the United States, most family forest owners have a stewardship ethic

regarding their land. For Washington and the SFLO Office, the literature indicates that SFLOs, if being represented by the global and national communities, are diverse with varying needs and require different strategies to be reached.

Current State of Washington SFLOs

Washington State is the only state within the United States to have a small forest landowner office. As of 2019, there are 19.2 million acres of forest land in Washington State, a decrease of 394,000 acres from the 2007 number of 19.6 million acres (Rabotyagov et al., 2021). Of these acres, 39% are in private ownership. SFLOs own 4.84 million acres of land and 2.88 million acres of forestland, or 15% of forestland in the State of Washington. An acknowledged under-estimated account suggested there were a total of roughly 218,000 SFLOs in Washington (Rabotyagov et al., 2021). Timber harvest from small harvesters, those under 1,000 acres without industrial milling abilities, amount to 15% of Washington State's total harvested timber, which represent only a fraction of SFLOs (Watts, 2018). Being of importance to the state's timber production and collective forested acreage, small forest landowners are critical to the economy of Washington State, and they play a vital role in preventing further conversion of forested land to other land uses. Washington State has recognized that small forest landowners have a large influence on the State's wildlife as outlined in the *Forest and Fish Report* of 1999, especially in terms of riparian ecosystems (*Forests and Fish Report*, 1999).

The release of the 2021 report presents the continued loss of forest land in Washington State, including loss of SFLO forest land acreage. Regarding forest land loss in general, a United States Forest Service (USFS) publication indicates that, between 1976 and 2006, an estimated 650,000 acres of forest land in Washington State had been converted to some other use (Gray et al., 2013). More recently, between 2007 and 2019, forest acres declined by 394,000 acres, primarily for private industry ownerships. However, SFLO forest acreage declined 103,000 acres over the same time period. While SFLO forest land acreage decreased, the number of SFLOs increased from the estimated 200,895 in 2007 to estimated 218,126 in 2019 (Rabotyagov et al., 2021). The average decline of all forest land acreage between 2007 and 2019 (~32,833 acres per year) is greater per year when compared to the average total forest land conversion per year between 1976 and 2006 (~21,667 acres per year). Current extent of SFLO land acreage is illustrated by Appendix 1. While the private industry ownership had the greatest decrease in

forest land acreage, the substantial decrease in SFLO forest land acreage presents a troubling trend for Washington State and the SFLO Office.

Governance of and Assistance for SFLOs

Forestry regulation, including SFLOs and variations of small ownership, has shifted from conventional government, top-down or command and control regulations, to governance, bottom-up mechanisms (Buttoud, 2009). Apart from moving away from conventional approaches, Creighton et al. (2002) suggests participatory consensus building will increase adoption of techniques by giving the forest owner a sense of "self-governance" (Creighton et al., 2002). Collaborative governance, stemming from participation and partnership, grows but also presents a challenge to the small ownership community which is comprised of many different stakeholders (Buttoud, 2009). Following collaborative governance structures, the institutional and societal mechanisms have shifted with government becoming the "negotiator" rather than the "arbiter" of regulations, "best science" has seen emergence of politization, and emerging interest groups have entered the regulatory environment (Hoffman et al. 2002).

Besides governance ideology, growth in voluntary, education and information, and technical assistance programs are acknowledgement of the limited effects and the cost of command-and-control in conservation policy (Diez and Stern, 2002; Kauneckis and York 2009). In a survey to gauge landowner response to conservation legislation, namely the Endangered Species Act, Brook et al. (2003) found that landowners presented a mix of those willing to help conserve species and others who wish to remove a threatened species habitat. The survey results also indicated that the majority of landowners would not want a biological survey to determine if the species was present on their property. Brook et al. (2003) determined that alleviation of economic concerns and institutionalized assurances to protect landowners attempting to manage for threatened or endangered species need to come from social network communication and collaborative processes (Brook et al., 2003). While the Endangered Species Act is largely a command-and-control mechanism through the penalties of "takings" of endangered or threatened species, the survey by Brooke et al. (2003) illustrates landowners wanting to avoid being subjugated to the federal regulations.

Some programs focus on assistance to support either compliance with regulations or encourage management that aligns with mandates. Focus groups by Andrejczyk et al. (2016) of participants of Forest Stewardship Program, by the USFS, found that advice and education were

effective in introducing new ideas or strategies for landowners to achieve their goals or management objectives whereas management plan assistance and cost-share components helped reinforce landowners to achieve their objectives through the perceived "right" way and more expansive coverage of management application (Andrejczyk, Butler, Dickinson, et al., 2016). Danley (2019) found that there is limited linkage between targeted policy instruments benefiting singular forest land ownership objective group, suggesting that policy instruments needs to be compatible with many different forest land ownership groups to be effective (Danley 2019). While these programs often seek to preserve forest land, it is unclear if the intervention is fruitful. Results from the NWOS survey suggest that receiving assistance increases the likelihood of management by the family forest owner; however, between assisted and unassisted family forest owners there was no significant difference in subdivision or selling of land (Kilgore et al., 2015).

The regulatory environment of SFLOs in Washington State represents the mixture of "old" and "new" tools described by Diez and Stern (2002). The Forest Practices Rules and the provisions under the Forests and Fish Law illustrate the traditional command-and-control regulation where violations are considered an illegal activity. However, changes to the Forest Practices Rules, stemming from the Forest Practices Board, are also a product of the Adaptive Management Program and the TFW Policy Committee, where new rules and amendments come from consensus building and collective governance. The SFLO Office represents a "new" tool, disseminating information and administering financial support mechanisms, such as the Forest Riparian Easement Program (FREP) and the Family Forest Fish Passage Program (FFFPP), for SFLOs to satisfy the Forest Practices Rules.

Riparian Impacts of Forest Management

While the literature expansively considers the impacts of various forest management strategies on the environment, there is a dearth of information on how small land ownerships, and their management, affect the environment. The post-Forest and Fish Law regulatory environment stems from degradation declining populations of endangered and threatened salmonids and other aquatic creatures.

Forest land and forest practices have a substantial effect on fish: an important component of the regulatory environment that brought the Small Forest Landowner Office (SFLO Office) into creation. Forests around waterways affect nutrients, temperature, solar input, sedimentation,

and channel structure (Gregory et al., 1987). Timber harvests are associated with increased nutrients, temperature, and sedimentation of waterways. Notably, elevated water temperatures can increase fish mortality. Nutrient benefits associated with a timber harvest may be negated by temperature, harmful sedimentation, and loss of over-wintering habitat. Road building associated with timber harvests can disrupt waterways and increase sedimentation. Fine sedimentation associated with clear-cuts in lower gradient streams can decrease macroinvertebrates, affecting the waterway's food network. However, sedimentation in bedrock waterways can increase spawning habitat. Stream habitats may see increased macroinvertebrate populations after a timber harvest, increasing prey abundance for predators such as salmonids and salamanders (Gregory et al., 1987). While forest management, including harvests, has its benefits to the aquatic habitat, the prominent negative factor is elevated water temperature directly affecting fish mortality.

A literature review of riparian forest best management practices in the United Kingdom (UK) found that the literature illustrates that a riparian buffer functions "to be sediment removal and erosion control, protection of water quality, moderation of shade and water temperature, maintenance of habitat structural diversity and ecological integrity, and improvement of landscape quality" (Broadmeadow & Nisbet, 2004; Castelle et al., 1994). Nevertheless, no riparian forest best management practice is best for all riparian forests (Broadmeadow & Nisbet, 2004). Smaller buffers tend to protect physical and chemical properties of the stream (Broadmeadow & Nisbet, 2004; Pinay et al., 1993; Swift & Norton, 1993). Larger buffers protect ecological integrity (Broadmeadow & Nisbet, 2004). Intervention activities, or active management, prove beneficial for some riparian forests (Broadmeadow & Nisbet, 2004; *Forests and Water Guidelines*, 2003). While the studies focused on UK systems, the conclusions are applicable to the United States, similar to those in the USFS document: *Riparian Forest Buffers* (Welsch, 1991).

While generally forest management impacts riparian systems, it is unclear how small ownerships, and their varying management strategies, impact a watershed as a sub-group. Small ownerships may create a mosaic of management objectives that positively or negatively affect riparian habitat on both the local and watershed scales. Nevertheless, forest management, in general, does impact riparian habitat. Buffers in forest management can help protect and regulate riparian functions from forest management activities, such as harvests.

Program Evaluations in Forestry and Related Fields

A search of the literature suggests a lack of published evaluations regarding forestry and related assistance programs similar to the SFLO Office. The few evaluations found are reviewed to garner methods and possible themes for evaluations in the field.

Butler et al. (2014) did one of the most detailed evaluations of a forest landowner assistance program in the United States, specifically the United States Department of Agriculture (USDA) Forest Service's (USFS) Forest Stewardship Program (FSP). This evaluation took a different approach compared to their reviewed literature by including qualifying non-participatory individuals in surveys rather than just state administrators and participants in the program. Non-participatory individuals could inform the degree of outreach and the reason why certain individuals did not participate in the program. Their methodology of surveys, agency reports, and focus groups found that one-on-one assistance had higher satisfaction rates than other forms of assistance, FSP needed better outreach efforts, and that there needed to be better documentation of the program (B. Butler et al., 2014).

Butler et al. (2014) illustrates an effective way to address program evaluation of a forest assistance program in the United States. By using federal documents and surveys of administrators, the researchers could determine how the program internally operated and what functioned along with recommendations and evaluations from administrators. Additionally, the qualitative aspect of understanding administrator, participant, non-participant perceptions to identify the strengths and weaknesses of the program provides perspectives from the entire program system, including the target population that did not receive programming. This can be used to describe the differences between those who participate and those who do not participate, both demographically and reasoning. The same methodology can be applied to the SFLO Office itself.

Race and Curtis (1996) conducted a highly detailed program evaluation of the Australian Farm Forestry Program (AFFP) with a detailed review of 26 AFFP projects, regional projects, and interviewing 85 participants including farmers, industry, and government staff for perceptions. The evaluation sought to assess appropriateness, efficiency, and effectiveness of AFFP to farm forestry. The authors found that there was "considerable potential" in farm forestry in Australia. The authors suggested that AFFP needed better funding coordination, awareness, and training (Race and Curtis, 1996). In a review of the evaluation of AFFP and

another evaluation commission in Australia, Curtis et al. (1998) notes the dearth of published evaluation information, noting a general lack of the dissemination of findings and peer review of evaluations, presenting an important challenge for accounting for public fund expenditures in natural resource programs (Curtis et al., 1998).

Compared to related literature, Race and Curtis (1996), interviewed a large portion of program participants to understand perceptions and needs. Interviews explained social factors affecting farm forestry. While their methods are not fully divulged, Race and Curtis (1996) demonstrates the importance of interviewing in the evaluation. Their study also gives insight to the need to explain the history and national, or cultural, approach to farm forestry in related studies.

Other articles describe the impact evaluations of smaller programs, similar to that of FREP or FFFPP. Scullion et al. (2011) evaluated environmental impacts of payments for ecosystem services programs in Mexico. The researchers used remote sensing and on-site interviews to determine a modest positive environmental impact of the programs and found six needs of the program, including monitoring and enforcement programs and education and trust-building (Scullion et al., 2011).

In Spain, Crespo (2004) reviewed evaluation systems of forest programs. Crespo found that the regional evaluation systems differed, some did not have a built-in mechanism for evaluation. In many cases, evaluation could only describe "accomplishment of the investments" in a quantitative manner. Other goals of the programs were difficult to evaluate due to their non-quantitative nature. Evaluation largely only assessed the "strategic-political" level rather than the "operative-technical" level. Crespo suggests three evaluation areas for forest programs: (1) success of a project measured by developed indicators of result progress and efficiency; (2) evaluation of goal achievement through measurements of validity of the diagnostic, mobilization of the local actor, mobilization of private forest ownership, and involvement of stakeholders; and (3) evaluation of specific actions on the field level through determining specific measures, how those measures address local actors, and if the process has treated focus areas. Crespo notes that future research is needed on understanding how to quantify each instrument of a program and how to link planning scales (Crespo, 2004).

The lack of published evaluations, as noted by Curtis et al. (1998) is a concerning trend for the field of natural resource program evaluation. Few lessons are present for future evaluators

and the lack of source material for cross-examination by program administrators presents a challenge in the environmental field. Lack of thorough documentation and metrics for programs may present a challenge for program evaluators and provide incomplete evaluation conclusions. Research needs to indicate that metrics for specific program instruments need to be developed for effective evaluation. Thorough representation of results, limitations, and challenges are the key lessons from this review apart from the lessons presented in the literature.

History of Washington State Forest Laws Pertaining to SFLOs

The SFLO Office is a product of the environmental regulatory era in the forestry sector and the need for avenues to help smaller landowners with less resources navigate regulations and assistance programs. As the environmental movement gained momentum in the latter part of the 20th century, litigation and lobbying started to question and challenge prevailing forest practices, especially in the Pacific Northwest.

Forest Practices Act of 1974 Era

The modern history of forestry regulation in Washington stems from the Forest Practices Act of 1945, which would later be replaced by the Forest Practices Act of 1974. The Forest Practices Act of 1945 required reforestation by at least leaving seed trees after logging for private landowners in the state and regulated logging that affected seed trees. The 1945 Act came in response to the Gifford Pinchot report of 1907 that warned of a "timber famine" in the nation. Between 1945 and 1974, new major legislation regarding forest practices came to a standstill (Plummer, 1981).

The Forest Practices Act of 1974 came during the slew of environmental legislation during the 1970s. The 1974 Act repealed the 1945 Act and instated strict reforestation regulations and aimed to protect soils and public resources. The Washington State Department of Natural Resources, founded in 1957, would be the enforcer of these regulations. All rule making processes would come from the Forest Practices Board unless there was a direct amendment from the legislature (Plummer, 1981). This structure created a command-and-control structure with the Forest Practices Board and DNR the authorities in creating rules and penalizing offenders, with stakeholders having little power in the rule-making process other than through lobbying efforts.

Two court decisions primed the Washington State regulatory environment for litigation and introduced empowered stakeholders that would rattle the Forest Practices Board and DNR as the proprietors of forest practices rules. The "Boldt Decision" empowered and respected

Washington State Treaty Tribes by establishing their right to an allocation of salmon and steelhead trout in Washington State boundaries (*United States v. State of Washington*, 1974). The following aftermath brought substantial negotiating power to the Treaty Tribes as the question of re-establishment of Treaty Tribes' right to protect fish habitat from actions like timber harvesting loomed, which would later be established through granting Treaty Tribes co-management status of Washington State' salmon (Flynn & Gunton, 1996; *United States v. State of Washington*, 1974). The decision from the Noel v. Cole case revoked timber sale exemptions from state environmental assessment laws (*Noel v. Cole*, 1982). This decision, and similar decisions, granted environmental groups an avenue to contest timber harvests in the state. With empowered stakeholders and a contentious legal atmosphere, the Forest Practices Board of Washington State found itself facing increasing demands for regulatory amendments that conflicted with one another (Flynn & Gunton, 1996).

Timber, Fish, Wildlife Era

In 1986, four interest groups—tribal, industry, state, and the environmental—converged in Washington State recognizing there were key sources of much of the litigation in the forestry sector: the then existing forest practices rules, the Endangered Species Act of 1973, and the Clean Water Act of 1972 (*Forests and Fish Report*, 1999). These interest groups became the Timber, Fish, Wildlife Caucus (TFW Caucus) composed of the tribal, industry, state, and environmental caucuses seeking to solve regulatory issues through collaborative means rather than demanding action by the Forest Practices Board (Flynn & Gunton, 1996; *Forests and Fish Report*, 1999). The TFW Caucus acknowledged the current rules, stemming from the 1974 Forest Practices Act, had two major mechanisms to address forest practices that would significantly affect public resources: Class IV Special classification that would trigger a State Environmental Protection Act (SEPA) review, and baseline regulations that grant the DNR authority to control practices through mechanisms like stop work orders and notices to comply (*Timber/Fish/Wildlife Agreement: A Better Future in Our Woods and Streams*, 1987). By 1987, the TFW Caucus published the *Timber, Fish, Wildlife Agreement*, recommending several changes to the forest practices rules and setting the foundations for a collaborative means of amending the forest practices rules permanently (*Forests and Fish Report*, 1999). The Washington State Legislature amended the Forest Practices Act of 1974 to incorporate the *Timber, Fish, Wildlife Agreement* recommendations and the four interest groups maintained their

dedication to the collaborative rule-making effort (*Forests and Fish Report*, 1999; Washington Forest Protection Association, n.d.).

The TFW Caucus recommendations led to a complex forestry regulatory arena. “Riparian buffer zones, clear cut size restrictions, green up requirements, unstable slope protections, water quality protections, endangered species rules, cultural resource protections, third-party review” and more were included in the post-TFW forest practices to protect the natural environment (Boyd et al., 2021). One of the primary rules recommended and later adopted with some revisions was the riparian management zones (RMZs). The RMZs introduced minimum widths, from the shoreline, varying depending on the water type and stream width that required leave trees (*Timber/Fish/Wildlife Agreement: A Better Future in Our Woods and Streams*, 1987). For the riparian zones, five water types were introduced:

- Type 1: All waters within their ordinary high-water mark, as inventoried as shorelines of the state.
- Type 2: Segments of natural waters which are not Type 1 and have high fish, wildlife, or human use.
- Type 3: Waters that are not Type 1 or Type 2 and have moderate fish, wildlife, or human use.
- Type 4: Waters that are not Type 1, Type 2, or Type 3 and are for the purpose of protecting water quality. These waters must be more than two feet in width between ordinary high-water marks.
- Type 5: Waters that are not Type 1, Type 2, Type 3, or Type 4 (Department of Natural Resources, 1992).

Of these waters, only Type 1, Type 2, and Type 3 would have required RMZs that would extend to where the plant community shifted from wetland to upland communities or to the prescribed maximum width, whichever came first. All required RMZs would have a minimum width of 25 feet. Type 4 waters would have an RMZ if determined by the Department of Natural Resources for the protection of water quality. The RMZ width, number of leave trees, and ratio of conifer to deciduous leave trees varied dependent on the water type, determinant substrate of the waterbed, and width of the water (Department of Natural Resources, 1987). **Table 1** describes the RMZ requirements.

Besides RMZs, the *Timber, Fish, Wildlife Agreement* also recommended many new regulations, increased restrictions, systems for review, and request for further research and assessment. New regulations included chemical application buffers, limitations to scarification, recommended practices for Upland Management Areas, and restrictions on roads, including comprehensive mapping of forest roads on public and private property. Recommended increased

Table 1*: Riparian Management Zone Requirements under the Timber, Fish, Wildlife Agreement and Resulting Forest Practices Rules*

Water Type; Average Width	**RMZ Maximum Width[1]**	**Ratio of Conifer to Deciduous[2]**	**Size of Leave Trees[2]**	**# of trees per 1000 feet of shore[3]**	
				Gravel Substrate	**Boulder/Cobble Bedrock (<10" diameter)**
Type 1 and Type 2; 75' and over	100'	Representative of Stand	Representative of Stand	50	25
Type 1 and Type 2; 75' and under	75'	Representative of Stand	Representative of Stand	100	50
Type 3; 5' and over	50'	2:1	12" or next largest; 8" or next largest in NE WA	75; 60 in NE WA	25
Type 3; 5' and under	25'	1:1	6" or next largest	25	25

[1]RMZ minimum for Types 1, 2, and 3 are 25'.
[2]Northeast Washington (Stevens, Pend Oreille, Spokane, Ferry, and Okanogan County east of the Okanogan River) would have different leave tree requirements due to ecology.
[3]Leave trees have a couple of requirements: 50% or more must be alive or undamaged upon completion of harvest and be randomly distributed when feasible. For Northeast Washington, leave trees have slightly different requirements: 40% or more must be alive or undamaged upon completion of harvest and be left in clumps whenever possible.

restrictions extended to unstable slopes, orphaned roads, notification of parties regarding archeological and cultural resources in the boundaries of a proposed forest practice, increased liability timeframe, and an imposed interim period where the forestry industry could not accept funds from the Washington State Legislature to compensate for potential losses associated with increased restrictions. The systems of review would extend review timeframes for Class III forest practices to improve investigation of impact to public resources, creation of an improved water user alert system regarding downstream uses, the creation of cumulative effects review,

recommended increased use of Inter-Disciplinary Teams, and increased enforcement capabilities of DNR. Finally, the report recommended research and assessments on large timber harvest, impacts of medium or large timber-holding companies, the impacts of slash burning, review of difficult regeneration site regulations, review of old growth management on the Olympic Peninsula, and general evaluation, monitoring, and research requirements within the Forest Practices Board umbrella (*Timber/Fish/Wildlife Agreement: A Better Future in Our Woods and Streams*, 1987).

Additionally, the TFW Caucus recognized that small landowners would be disproportionately impacted from the recommended RMZ rules in the *Timber, Fish, Wildlife Agreement.* The TFW Caucus proposed a small harvest exemption for small landowners to alleviate the impact. The exemption would apply to harvests of 30 acres or less by a landowner that is disproportionately impacted by the leave tree requirement. If the landowner qualifies, the landowner would be required to leave 50% of the required leave trees according to the RMZ type (*Timber/Fish/Wildlife Agreement: A Better Future in Our Woods and Streams*, 1987).

However, even with the introduction of regulations set to help protect the environment and keep the forestry industry healthy, troubling environmental issues arose. In 1991, the first Washington salmon species was listed under the Endangered Species Act as endangered: the Snake River sockeye salmon (*2020 State of Salmon in Watersheds*, 2020). By 1992, the summer and fall Chinook salmon were also listed as threatened (*2020 State of Salmon in Watersheds*, 2020). By the mid-1990s, Washington State began listing and setting waters in the state as candidates under the Clean Water Act for impaired waters (Boyd et al., 2021). The Forest Practices Board continued to amend rules during these times, with the significant addition of wetland management zones to the Forest Practices by 1992 (Department of Natural Resources, 1992).

In the early 1990s, DNR began to have small landowner stakeholder meetings to determine issues that small landowners were facing. DNR published a summary of these meetings in 1993. The document summarized that SFLOs needed to be involved in the decision-making process. The meetings indicated that SFLOs felt that the forest practices rules were complex, changed too often, and would occasionally override small landowner plans. Uncertainty in the regulatory environment was viewed as a threat to landowner return on investments and long-term planning. Generally, SFLOs felt that there were too many agencies to

deal with and there needed to be full-time forestry positions dedicated to assisting small landowners. From these meetings, DNR detailed that high priority issues for SFLOs included: slowing the pace of regulatory change, increasing applicability of management and stewardship plans to five years, educate the public about the small forestry, coordinate government activities, incentive non-clearcut management, maintain economic viability of tree farming, address inheritance tax, minimize penalties, and recognition of exemplar land stewards. DNR detailed that low priority issues for SFLOs included: opportunities to provide input, address growth management, provide county-level approaches, eliminate penalties of holding timber more than 50 years of age, standardize land management forms, evaluation of cultural and biological resources free of charge to the landowner, place DNR staff at local Soil Conservation Survey offices, address road and water quality issues, surface water management, eliminate restrictions regarding individual nest sites of endangered species, provide compensation for when a landowner cannot harvest, and increase funding for WSU Extension in Northeast Washington (Department of Natural Resources, 1993).

Forests and Fish Era

Less than a decade later after the TFW Caucus' initial agreement in 1986, with fish populations declining in Washington, employment of fishers dropping, and notable salmonids and fish being listed under the Endangered Species Act as endangered or threatened, the TFW Caucus agreed to develop solutions while adding the federal government and local governments caucuses to the TFW Caucus (*Forests and Fish Report*, 1999). This new TFW Caucus took several years to build relationships and create representative sessions so that all caucuses could understand and discuss possible recommendations and research produced from technical groups. However, consensus was not reached as the environmental caucus, one of the original four, retired from the discussions. The remaining five caucuses continued their work culminating in consensus of the *Forests and Fish Report* of 1999. The *Forest and Fish Report* concluded that significant changes were needed in riparian forest management policies, road inventory and abandonment processes, pesticide use near water and wetlands, wetland protection, watershed classification usage, alternate plan processes and review, small forest landowner assistance, enforcement, and funding (*Forests and Fish Report*, 1999).

The *Forests and Fish Report* authors sought to create a "biologically sound and economically practical solution that will improve and protect riparian habitat on non-federal

forest lands" in Washington State. In comparison to the resource-centric goals of the *Timber, Fish, Wildlife Agreement,* the *Forests and Fish Report* authors set four goals to fulfill their purpose, focusing more on compliance to federal rules:

1. "provide compliance with the Endangered Species Act for aquatic and riparian-dependent species on non-federal forest lands;
2. To restore and maintain riparian habitat on non-federal forest lands to support a harvestable supply of fish;
3. To meet the requirements of the Clean Water Act for water quality on non-federal forest lands; and
4. To keep the timber industry economically viable in the State of Washington." (*Forests and Fish Report*, 1999)

The *Forests and Fish Report* recommended complete revision of the RMZs that stemmed from the *Timber, Fish, Wildlife Agreement*. For all Forest Practices and visualizations of RMZs, the DNR's *Forest Practices Illustrated*[1] book contains simplified explanations of the WACs associated with the Forest Practices. Instead of Type 1, 2, 3, 4, and 5 waters, there would be Type S, Type F, and Type N waters. These are defined as follows in the *Forests and Fish Report*:

- Type S: "all waters within their ordinary high water marks, inventoried as 'shorelines of the state' under chapter 90.58 RCW and the related rules promulgated thereunder (currently Type 1 waters) but do not include such waters' associated wetlands as defined in chapter 90.58 RCW."
- Type F: "all segments of natural waters (other than Type S waters) (A) within the bankfull widths of defined channels or (B) within lakes, ponds, or impoundments having a surface area of 0.5 acre or greater at seasonal low water which, in either case, contain fish habitat" or are diverted waters for 10 or more residential or camping units or are waters diverted for fish hatcheries of any ownership.
- Type N: "all segments of natural waters within bankfull widths of defined channels that are not Type S or F waters and which are either perennial streams … or are physically connected by an above-ground channel system to downstream waters such that water or

[1] https://www.dnr.wa.gov/forest-practices-illustrated

sediment initially delivered to such waters will eventually be delivered to a Type S or F water. Type N waters include two subcategories of waters: seasonal and perennial."

For Type S and F waters, Westside and Eastside rules would differ, where Westside means west of the Cascade Mountains north of Mt. Adams and west of the ridge that divides the White Salmon River drainage and the Lewis River drainage and west of the ridge that divides the Little White Salmon River drainage and the Wind River drainage and where Eastside means east from the previously stated ridges and crest. All Type F and S waters will have three zones: a core zone, an inner zone, and an outer zone. In the core zone, no harvest of construction may be conducted. In the inner zone, there must be sufficient number of leave, standing trees must remain in accordance with the applicable "Stand Requirement," which is calculated based on site class, species, and trees-per-acre attributes. In the outer zone, a certain number of leave trees must remain per acre.

Table 2 and Table 3 describes the widths and requirements for Westside Type S and F waters. For Westside Type S and F waters, the landowner has two harvest options for the inner zone available dependent on if there is adequate shade and desired future conditions are met: (1) thin from below, (2) leave trees closest to the water. In the Westside outer zones, 20 riparian leave trees must be left per acre after harvest within specified species and size requirements (*Forests and Fish Report*, 1999).

Table 2: *Western Washington Water Type F and S RMZ Requirements under No Harvest Inner Zone Management (WAC 222-30-021)*

Site Class	Total RMZ Width	Core Zone Width[1]	Inner Zone Width[1]		Outer Zone Width	
			Stream ≤10'	Stream >10'	Stream ≤10'	Stream >10'
I	200'	50'	83'	100'	67'	50'
II	170'	50'	63'	78'	57'	42'
III	140'	50'	43'	55'	47'	35'
IV	110'	50'	23'	33'	37'	27'
V	90'	50'	10'	18'	30'	22'

[1]No harvest is allowed.

Table 3: *Western Washington Water Type F and S RMZ Requirements under Thinning from Below Inner Zone Management Option (WAC 222-30-021)*

	Inner Zone Width	Outer Zone Width

Site Class	Total RMZ Width	Core Zone Width[1]	Stream ≤10’	Stream >10’	Stream ≤10’	Stream >10’
I	200’	50’	83’	100’	67’	50’
II	170’	50’	63’	78’	57’	42’
III	140’	50’	43’	55’	47’	35’
IV	110’	50’	23’	33’	37’	27’
V	90’	50’	10’	18’	30’	22’

[1]No harvest is allowed

Table 4, Table 5, and Table 6 describe the widths and requirement for Eastside Type S and F waters. Eastside landowners have harvest options in the inner zone based on basal area, bull trout habitat, timber habitat type: Ponderosa Pine ($\leq$ 2,500ft), Mixed Conifer (2,501 – 5,000ft), and High Elevation ($>$ 5,000ft). In the outer zone, the number and type of leave trees depend on the timber habitat type: Ponderosa Pine type requires 10 dominant or co-dominant trees per acre, Mixed Conifer type requires 15 dominant or co-dominant trees per acre, and High Elevation type requires 20 dominant or co-dominant trees per acre (*Forests and Fish Report*, 1999).

Table 4: *Eastern Washington Water Type F and S RMZ Requirements under Leave Trees Closest to the Water Inner Zone Management Option (WAC 222-30-021)*

Site Class	Total RMZ Width	Core Zone Width[1]	Inner Zone Width				Outer Zone Width	
			Stream ≤10’	Stream ≤10’	Stream >10’	Stream >10’	Stream ≤10’	Stream >10’
				Minimum floor distance		Minimum floor distance		
I	200’	50’	84’	30’	84’	50’	66’	66’
II	170’	50’	64’	30’	70’	50’	56’	50’
III	140’	50’	44’	30’	**	**	46’	**

[1]No harvest is allowed
**No management allowed

Table 5*: Eastern Washington Water Type F and S RMZ Requirements for Streams of Bankfull Widths less than or equal to 15 feet (WAC 222-30-022)*

Site Class	Total RMZ Width	Core Zone Width[1]	Inner Zone Width[1]	Outer Zone Width
I	130’	30’	45’	55’
II	110’	30’	45’	35’
III	90’	30’	45’	15’
IV	75’	30’	45’	0’

V	75’	30’	45’	0’

[1]No harvest is allowed.

Table 6*: Eastern Washington Water Type F and S RMZ Requirements for Streams of Bankfull Widths greater than 15 feet (WAC 222-30-022)*

Site Class	Total RMZ Width	Core Zone Width[1]	Inner Zone Width[1]	Outer Zone Width
I	130’	30’	70’	30’
II	110’	30’	70’	10’
III	100’	30’	70’	0’
IV	100’	30’	70’	0’
V	100’	30’	70’	0’

[1]No harvest is allowed.

Type N waters have base rules for both Westside and Eastside with additional rules specific to each side of the state. All Type N waters, including seasonal (Ns) and perennial (Np), have a 30-foot zone measured on a horizontal basis from the edge of the water which is an equipment limitation zone. Mitigation must occur if more than 10% of the equipment limitation zone is disturbed. Table 7 describes the specific requirements for Westside Type Np waters. Eastside Type N waters have varying leave tree requirements according to management strategy and timber habitat type (*Forests and Fish Report*, 1999).

Table 7*: Western Washington RMZ 50-foot No Harvest Requirement for Np Waters (WAC 222-30-021)*

Length of Type Np Water from the Confluence of Type S or F Water	Length of 50’ buffer on Type Np Water Starting at the Confluence
Greater than 1,000’	500’
Greater than 300’ but less than 1,000’	Distance of the greater of 300’ or 50% of entire length of the Type Np Water
Less than or equal to 300’	The entire length of the Type Np Water

In Westside Np water types, there are an additional five sensitive site restrictions:

1. Headwater spring or upper most point of perennial flow: 56-foot radius buffer centered on sensitive site
2. Intersection of two or more Np water types: 56-foot radius buffer centered on intersection.
3. Perennially saturate side-slope seep: 50-foot buffer from outer edge of saturate area.

4. Perennially saturated headwall seep: 50-foot buffer from outer edge of saturated area.
5. Alluvial fan: No harvest within the alluvial fan.

With increased regulations, the authors of the *Forests and Fish Report* recommended the creation of a "Small Forest Landowner Office" and the Forest Riparian Easements (FRE). Similar to the *Timber, Fish, Wildlife Agreement*, the authors recognized small landowners would face a "disparate impact" with the proposed rules. The authors theorized that small landowners would be impacted from three points: (1) increased riparian buffers on lower elevation waters, where small landowners tended to be, (2) increased costs associated with hiring expert help with the recommended complex rules, and (3) diseconomies of scale. The authors noted that the Small Forest Landowner Office and FRE were not an exemption from the rule, but mechanisms to maintain viability of non-industrial forest landowners. As such, the authors affirmed their support of "approval of all necessary funding" for FRE to support the small landowners (*Forests and Fish Report*, 1999).

Compared to the *Timber, Fish, Wildlife Agreement,* the recommended rules in the *Forests and Fish Report* were more restrictive and introduced new classification schema for water. Focusing on riparian rules, forest landowners would be able to harvest less trees from the RMZs and would need to determine "Stand Requirements" for leave tree calculations within their buffers.

In 1999, Washington State passed ESHB 2091, known as the Forests and Fish Law, relating to forest practices as they affect the recovery of salmon and other aquatic resources, imposing more rules on harvesting timber on forested lands with riparian areas. Due to the assumed financial and technical burdens imposed on small forest landowners, as cited in the *Forests and Fish Report*, the state legislature included the formation of the Small Forest Landowner Office within the Department of Natural Resources to help small forest landowners navigate the statute and mitigate the reduced economic viability of their land to prevent the law from being the cause of small forest landowners selling their estates to individuals or entities that would convert the land to another land-use type. Additionally, the Forestry Riparian Easement Program (FREP), a prominent program associated with the SFLO Office, would be enacted as a relief program to partially compensate qualifying landowners for riparian timber in exchange for a state-owned 50-year easement on the standing timber (Engrossed Substitute House Bill 2091, 1999; *Forests and Fish Report*, 1999). In 1999, the SFLO Office would be established, and

emergency rules adopted. In 2001, the new forest practices rules stemming from the Forests and Fish Law, known as the Forests and Fish Rules, would be adopted (Engrossed Substitute House Bill 2091, 1999).

The Forests and Fish Rules resulted in more complex buffers extending to springs, headwaters, and wetlands and regulations regarding road management and fish passage. The Adaptive Management Program was implemented with the inclusion of more voting members in the TFW Caucus. In these new regulations, the increasingly complex buffers and regulations on roads ultimately represented the disproportionate impact on SFLOs (Boyd et al., 2021).

To help SFLOs, the SFLO Office was given the legislative duty to be a point of knowledge regarding small forestry issues to both SFLOs and the legislature. As well as being a point of knowledge, the SFLO Office was charged with administering FREP. The SFLO Office would additionally help develop alternate plan options for SFLOs that would meet the riparian requirements but lower the regulatory cost to the landowner. Biennium legislative reports were required to keep the Washington Legislature current on prevailing trends with Washington SFLOs. The entire legislative requirements of the SFLO Office in ESHB 2091 are listed in Appendix 2(Engrossed Substitute House Bill 2091, 1999).

By 2001, the Small Business Economic Impact Statement (SBEIS) of the new proposed forest practice rules was submitted to the Department of Natural Resources (Perez-Garcia et al., 2001). The SBEIS affirmed the warning of a disproportionate impact to SFLOs in the *Forests and Fish Report*. The SBEIS findings for Western Washington small businesses, or those with less than 50 employees, estimated a 25.6% loss in timber asset values compared to large businesses suffering a 18.5% loss in timber asset values. For Eastern Washington, small business would face a 31.0% loss compared to large businesses with a 22.1% loss in timber asset values. The majority of Western Washington losses would be largely associated with riparian management zone (RMZ) forgone sales under the new rules, totaling at an estimated 19.1% loss in timber asset values. Eastern Washington losses would mostly be associated with road maintenance and stream crossing regulations under the new rules, totaling at an estimated 12.2% loss in timber asset values, with RMZ foregone sales closely following. While the small business definition of the report includes more than the legal definition of SFLOs, it provides insight into the relative disproportionate impact that the smaller entities would incur from the Forests and Fish Law and Rules (Perez-Garcia et al., 2001).

Since the passage of the Forests and Fish Law, the Family Forest Fish Passage Program (FFFPP) was introduced as another landowner assistance program under the SFLO Office in 2003 (*Family Forest Fish Passage Program | WA - DNR*, n.d.). FFFPP's objective is to replace fish-blocking passages on small forest landowner waterways on a priority basis. Upon landowner application, the program also alleviates any obligation that the landowner may have under the forest practices rules. The program is now considered another staple of the SFLO Office (*Family Forest Fish Passage Program | WA - DNR*, n.d.).

Twenty years after the passage of ESHB 2091, the Washington State Legislature passed Engrossed Substitute Senate Bill (ESSB) 5330 in 2019 that called for the review of the programs, regulations, and the SFLO Office established by ESHB 2091. ESSB 5330 outlines questions the State Legislature wanted answered to understand the impact of ESHB 2091 and it tasked the School of Environmental and Forest Sciences within the College of the Environment at the University of Washington with completing a trend analysis addressing those questions (Engrossed Substitute Senate Bill 5330, 2019). In 2021, the School of Environmental and Forest Sciences research team released their findings in the report titled *Washington's Small Forest Landowners in 2020: Status, trends and recommendations after 20 years of Forests and Fish* (Rabotyagov et al., 2021).

With the issuance of this report by the University of Washington, the legislative requirements of the SFLO Office have remained relatively unchanged other than wording of directives regarding FREP and dates in which legislative reports are due. RCW 79.13.110 now lists the legislative requirements of the SFLO Office seen in Appendix 2 (RCW 79.13.110). The Forest Practices Rules regarding RMZs buffers have also remained unchanged (WAC 222-30-021; WAC 222-30-022).

Other SFLO Programs in Washington State

The SFLO Office is one of several SFLO support systems in Washington State. Currently, other support systems exist within DNR, Washington State University Extension (WSU Extension), the United States Department of Agriculture Forest Service, United States Department of Agriculture Natural Resources Conservation Service (NRCS), conservation districts, and community organizations, such as the Washington Farm Forestry Association (WFFA). These support systems provide SFLOs financial, technical, social, and educational assistance.

Of these SFLO support systems, state and federal-affiliated programs operate under a memorandum of understanding (MOU) from 2011 that clarifies the types of programs and services each member of the MOU shall deliver to NIPFs and how the members will cooperate (USDA, 2011). The MOU states that DNR, including the SFLO Office, is primarily responsible for technical and financial assistance to NIPFs in Washington State (USDA, 2011). While the SFLO Office is charged to be the focal point of SFLO issues, the MOU defines a boundary of what the SFLO Office can provide. The primary responsibilities for each member of the MOU are listed in Table 8.

For SFLOs, the federal support systems provide financial and administrative support, either directly to SFLOs and other landowners or indirectly to state agencies. State agencies provide direct financial and technical assistance or indirect administrative support to local

Table 8*: Description of MOU Members' Responsibilities for Delivery of Programs and Services to NIPF Landowners in Washington State**

MOU Member	Type of Services	Responsibilities
U.S. Forest Service (USFS)	Administrative Financial Research	The USFS must uphold the State and Private Forestry mission area, which includes the provision of advice, technology, and financial assistance, through grants and cooperative agreements. Annual federal appropriations are given to the Forest Health Management, Cooperative Fire Protection, and Cooperative Forestry program areas. To support these programs, the USFS "provides federal authority, programmatic guidance and standards, fiscal and technical support, and oversight and accountability." The Forest and Range Experiment stations support landowners and managers through research. USFS manages the National Forest System which may include benefits that cross ownership boundaries.
USDA Natural Resources Conservation Service (NRCS)	Administrative Financial Technical	The NRCS is responsible for the Farm Bill programs through local offices and service centers. The NRCS conservation planning process provides direct technical assistance. Technical assistance is provided to the county Conservation Districts.

		NRCS administers "competitive grant programs" that may provide financial assistance to landowners. Administration of the Soil Survey, Plant Materials Centers, and the Snowtel Program provide information to landowners
Washington State Conservation Commission (WSCC)	Administrative	The WSCC provides support to the county Conservation Districts for operations.
Washington Association of Conservation Districts (WACD)	Technical	WACD represents the individual Conservation Districts. Individual districts provide technical assistance alongside NRCS. WACD produces forest species at their nursery for landowners to purchase.
Washington State University Extension (WSU Extension)	Educational	WSU Extension conducts educational programs, materials, and resources for landowners, resource managers, and other professionals.
Washington State Department of Natural Resources (DNR)	Administrative Financial Technical	DNR administers and provides technical assistance through federally and state funded programs, such as: Forest Stewardship; Forest Legacy; Forest Health; Wildfire Prevention; Hazard Reduction; and Suppression; Genetic Tree Improvement; and Forest Nursery. The DNR Small Forest Landowner Office (SFLO Office) provides financial and technical assistance via state funded programs to mediate the impacts of complex state Forest Practices, including the Forest Riparian Easement Program, the Family Forest Fish Passage Program, the Riparian Open Space Program, and Long-Term Forest Practices Applications.

*All information derived from (USDA, 2011).

offices. WSU Extension provides educational assistance. These systems are regulated by the MOU, policy, and leadership, creating a disaggregated support system connected through agreements to cooperate and collaborate.

Community organizations present a more adaptable but less resourceful support system. WFFA provides members and other SFLOs with social networks through local chapters and statewide newsletters. Their website provides information to find educational and professional

assistance in the state. Local chapters, beyond serving as social networks, host a variety of events including educational sessions and tree sales. WFFA is also the primary representative of SFLO interests to the governing forestry bodies in Washington State, such as the Legislature, the Forest Practices Board, and the TFW Policy Committee (*Washington Farm Forestry Association | Stewards of the Land For Generations to Come*, n.d.). The Washington Tree Farm Program, a subsidiary of the American Tree Farm Program, provides a voluntary certificate program to promote sustainable forest management and educational resources (*Washington Tree Farm Program – Sustainable Forestry Started Here.*, n.d.).

Beyond the current support systems, between 2000 and 2012, the Rural Technology Initiative (RTI), funded through a federal pilot grant, operated to provide "dissemination of basic forest science and technology in response to rapidly changing regulations" (Lippke et al., 2007). The RTI received many endorsements from community leaders based on the innovative implementation of internet technology and networking. A review team from the USDA published a report on the RTI stating the RTI was praised for "quality, effectiveness, and timeliness of the products developed." During its operations, RTI published 44 fact sheets, ten working papers, and 123 publications. After losing its pilot grant in fiscal year 2007, the RTI continued to operate until officially being absorbed by the Precision Forestry Cooperative at the University of Washington School of Environmental and Forests Sciences. The technical outreach and education portions of RTI were taken over by WSU Extension (Lippke et al., 2007). Legacy products of RTI are still available online (*The Rural Technology Initiative Homepage*, 2011).

SFLOs have a network of support systems to use for assistance. The system is disaggregated according to government levels and with a separation into the private sector. While disaggregated, the system does provide many different avenues of assistance for a landowner. Nevertheless, the support system is in flux, as seen with the creation of the SFLO Office and the sunsetting of RTI.

Discussion and Research Needs

The SFLO literature provides a wealth of knowledge on private landowner typologies depending on varies selector variables. However, there are gaps in knowledge of specific impacts, economic and environmental, of SFLOs and program evaluations on programs that are more than financial or educational services. The legal background of the SFLO Office suggests that SFLOs are an important interest group in the natural resource sector, especially in forestry.

However, the significance of SFLOs has not granted large scale studies in Washington other than the 2007 report, *The Future of Washington's Forests and Forestry Industries,* and the 2021 demographic report, *Washington's Small Forest Landowners in 2020.*

When considering the typologies, the literature has granted several lenses to understand Washington SFLOs. For Washington SFLOs, association membership, objectives, and geographic location all may likely provide insight to a diverse population. If any commonality lies with SFLOs, it may be self-actualization in their ownership and a stewardship ethic. Further investigation into Washington SFLOs may inform other family forest ownership research across the nation.

The governance structure of SFLOs in Washington is unique as it has transformed from a command-and-control to a more collaborative governance approach. While regulations with associated penalties remain, the history of consensus between stakeholders presents a distinct future of collective governance but also the groundwork for dispute resolution processes. Support mechanisms, including the disaggregated support network, help SFLOs comply with regulations while also achieving their motivations. Uncertainty remains how these support mechanisms prevent land conversion and affect the flux of the SFLO population.

This literature review has also reviewed key areas of research needs for the forestry and greater environmental science field. First, published and peer-reviewed program evaluations in the forestry and landowner sectors are lacking in the literature. Without a more comprehensive literature associated with environmental program evaluation, cross-referencing and validation measures will not be strong. Best practices for program evaluation in the landowner assistance field need to be developed to help practitioners and program administrators. Second, more comprehensive studies on SFLOs in Washington are needed to inform trends and changes to a unique population operating under some of the most stringent forest practices rules in the nation. Finally, Washington State governance structures have been reviewed in the past after the publication of the *Timber, Fish, Wildlife Agreement.* There is a lack of reviews since the reviews in the 1980s in the published literature. The unique governance structure with some of the most stringent forest practices rules in the nation presents an opportunity for lessons in the collaborative governance field, especially in the environmental field.

This document will add to the program evaluation literature and the understanding of SFLOs in Washington. Nevertheless, there are many opportunities for further research into small-scale forestry in Washington State that will complement and add to this document.

Description of Data and Methodology

Introduction: Program Evaluation Methodology Description

This research is a mixed-method investigation of the effectiveness of DNR's SFLO Office. The principal methodology is program evaluation, relying on Newcomer et al.'s (2015) *Handbook of Practical Program Evaluation* and *Evaluation: A Systematic Approach* by Rossi et al. (2019) as the primary guides of the methodology. Simply put, "program evaluation is the systematic assessment of program results and, to the extent feasible, systematic assessment of the extent to which the program caused those results… Approaches used are based on social science research methodologies and professional standards." The term *practical* in the title refers to a program evaluation that can be done at a "reasonable cost" and "without extensive involvement of outside experts" since "resource constraints should not rule out evaluation" (Newcomer et al., 2015).

Many research design methods that are involved with program evaluation that vary depending on the type of evaluation to be conducted: formative or summative, ongoing or one-shot, qualitative or quantitative, problem orientation or non-problem orientation. These are not mutually exclusive categories but give insight to the spectrums program evaluation is conducted on. For this research, a qualitative and quantitative approach will be taken using surveys, interviews, agency records, and preexisting sources of data to inform the analysis and discussion, methods detailed in Newcomer et al. (2015) and Rossi et al. (2019).

Program evaluation is set apart as a research method as it includes the interaction of interest groups and can be ongoing. Compared to traditional social science, program evaluation calls for the collaboration and collection of data from many interest groups. Rather than separation between evaluator and interest group, there is discussion and the building of trust and rapport. The interest groups should be consulted in "evaluation design, data collection, interpretation of findings and framing of recommendations" (Newcomer et al., 2015).

The program evaluation of the SFLO Office can be considered an extension of a mixed-methods case study: a descriptive, one-shot evaluation with a goal of understanding and assessing the current condition of the SFLO Office and associated programs and the events leading up to the present structure. The SFLO Office is unique to Washington State and operates under a unique regulatory environment. This evaluation, and case study, is singular, due to the

lack of similar programs and regulatory environments. The findings from this methodology will be difficult to draw conclusions to other cases (Yin, 2003).

To discuss the quality of this research design, construct validity, external validity, and reliability will be discussed in each section. However, some general limitations to this research design are that there is a relatively small number of interviewees and only one coder analyzed the interviews. The small number of interviewees will be described in each section by the number of themes that emerge from pertinent questions to that section of the investigation. The saturation of themes will be used to determine the completeness of the data collection (Bernard et al., 2016). One coder prevents the usage of intercoder reliability metrics (Bernard et al., 2016). The codebooks developed are included in the appendices to provide transparency on analysis implementation.

Research Questions

The overarching guiding question for this research design is:

- How effective is the Small Forest Landowner Office of the Washington State Department of Natural Resources, the Forestry Riparian Easement Program, and Family Forest Fish Passage Program according to key interest groups and agency documentation?

This question leads to a series of smaller evaluation questions. There are five domains of evaluation questions: (1) need for the program, (2) program theory and design, (3) program process, (4) program impact, and (5) program efficiency (Rossi et al., 2019). The need for program, or needs assessment, is highlighted by the target population assessment of the SFLO Office, in which the questions asked are:

- What are the characteristics of the SFLO population in Washington State?
- What are the needs and desires of the SFLO population in Washington State?

The next series of evaluation questions, from theory to efficiency, are addressed in every section of this research after the target population assessment. For program theory, the evaluation questions are:

- What is the purpose, or theory of action, that the SFLO Office serves along with its associated programs?

For the program process, the evaluation questions are:

- How satisfied are participants with the SFLO Office and associated programs?

- To what degree is there an unserved population of SFLOs and is there reasoning that these SFLOs are unserved?
- Are the SFLO Office and associated programs managed well?

For impact and efficiency, merged for this research, the evaluation question is:

- To what degree are the SFLO Office and associated programs addressing their stated purpose and objectives?

Washington's Small Forest Landowners in 2020 Survey Methodology

The surveys from *Washington's Small Forest Landowners in 2020* report by Rabotyagov et al. (2021) and the resulting data are used in this program evaluation. Two surveys were conducted: (1) Survey of the General Population of Washington State SFLOs, and (2) Survey of Washington State SFLOs with Riparian Forests. These two surveys are not mutually exclusive; however, the second survey is more stringent, being a subpopulation of the total SFLO population. All methodology for survey design and implementation comes from *Washington's Small Forest Landowners in 2020* report. Both surveys underwent the review process of the University of Washington's Human Subjects Division and were granted exempt status (Category 2) as posing a minimal potential risk to participants (Rabotyagov et al., 2021).

Survey of the General Population of Washington State SFLOs

The "Survey of the General Population of Washington State SFLOs" (general survey) was designed to provide baseline knowledge of all SFLOs in Washington State. The general survey had a stratified random sample with two strata. The strata stemmed from total forest acreage holding of the SFLOs, using information from the 2019 Forestland Database, developed in part of ESSB 5330 legislative request. The first strata covered SFLO ownerships with 20 acres or less of total forestland. The second strata covered SFLO ownerships with more than 20 acres of total forestland. The research team used this stratification based on Karatasou and Karatassou (2013) to lower sample variance and increase the precision of estimates (Karatassou & Καρατάσου, 2013; Rabotyagov et al., 2021).

The survey used a different definition of SFLOs, a minor change, by extending the lower limit definition of SFLOs to owning at least one acre with 0.5 acres being forested. The original SFLO definition in the census and trend reporting tools requires at least two contiguous acres of

forest land. The survey team extended the definition to increase the sample size for the strata involving FREP and FFFPP (Rabotyagov et al., 2021).

The two strata resulted in owners with 20 acres or less of total forest land receiving 25% of the surveys. Those with more than 20 acres would receive 75% of all surveys. Sample design weights were created to compensate for the disparity in survey allocations as SFLOs owning 20 acres or less make up 87% of the total SFLO population and SFLOs owning more than 20 acres make up 13% of the population. The weights are inversely proportional to a respondent's probability of being selected into a sample (Cochran, 1977). The survey team created the sample design weights using the following equations in descending order:

$$f_h = \frac{n_h}{N_h}$$

Where:

h: the strata

N_h: The population of a given strata

n_h: the number of respondents of the given strata

f_h: the sampling fraction for a given strata

$$w_h = \frac{1}{f_h}$$

Where:

w_h: the sample design weight as the inverse of the sampling fraction for a given strata

Sample weights are the same for all respondents in the given stratum as the survey team gave the survey a one-stage sample design where a respondent is only present in one of the strata (Rabotyagov et al., 2021).

The general survey questions followed the Tailored Design Method by Dillman et al. (Dillman et al., 2014). Formatting of questions and answers, including some variation of questions, stemmed from already established landowner surveys when feasible, largely from the work of the Family Forest Research Center. From there, the survey was revised by the project's interest groups and other members of the academic field at the University of Washington. Before pilot surveys, landowner volunteers undertook cognitive interviews to assess the accessibility of

the survey. A pilot survey round, including 150 participants, was conducted. The results of the pilot survey helped determine the valuation of a willingness-to-accept bid-offer question (Rabotyagov et al., 2021).

Survey of Washington State SFLOs With Riparian Forests

The "Survey of Washington State SFLOs With Riparian Forests" (Forests and Fish survey) was designed to understand SFLOs who were regulated by the riparian forest regulations in the Forests Practices Rules of Washington State. Four criteria were created as a sampling frame. The first three are non-mutually exclusive, with the final criteria being mutually exclusive. All information about these owners was gathered from data provided by DNR. The first included SFLOs who have parcels on the FREP list, including those who had completed the FREP process and had a state-owned easement, those who had completed the FREP process but declined the payment offer, those who were currently on the waitlist for a payment offer, and those who may be of any combination of the previous conditions on the FREP list. The second included SFLOs who have parcels on the FFFPP list, including those who had a completed fish passage project, those who were on the waiting list, and those who may be a combination of the previous conditions on the FFFPP list. The third, and final condition, included owners who had an Alternate Harvest Plan on file. The fourth criterion includes SFLOs who may be eligible for FREP, FFFPP, or an Alternate Harvest Plan but have no record of being a participant in any of the programs or processes but did have a submitted application on record for commercial thinning or final felling in the past 10 years and have property regulated under the riparian forest regulations for type F and S streams. This fourth criterion was to create a control group for the Forests and Fish survey (Rabotyagov et al., 2021).

The Forests and Fish survey also went through a revision and editing process by including interest groups and experts from the University of Washington. Several extensive focus groups with knowledgeable SFLOs were conducted for revisions.

Delivery of Surveys

Both surveys involve three waves of mailings for each selected SFLO participant based on a recommended strategy by Dillman et al. (2014) in the Tailored Design Method (Dillman et al., 2014). Participants would receive the first mailing, then the second about five days after the first mailings, and then the third mailing about ten days after the second mailing. The first

mailing notified participants about the coming survey and explained its topics. The second mailing contained the survey and a description of its purpose, including a confidentiality statement. The third mailing contained another copy of the survey and a letter that thanked those who had already sent their survey in and that requested a returned survey from those who had not (Rabotyagov et al., 2021).

Survey Response Rates

The research team determined that the levels of usable responses from the surveys, received between June 11th and September 2nd of 2020 (84 days), were within reasonable expectations. The general survey was sent out to 3,000 potential participants. By the end of the 84 days, 737 surveys were returned in usable condition, with 21 additional surveys being unusable due to incompletion. This results in a response rate of 24.6%. The Forests and Fish survey was sent out to 1,750 potential participants. By the end of the 84 days, 445 surveys were returned in usable condition, with 2 additional surveys being unusable due to incompletion. This results in a response rate of 25.4%.

The authors of the report discuss that this percentage is lower than other national surveys conducted by the Family Forest Research Center but is higher than other surveys conducted in Washington State. The 2018 NWOS survey by the Family Forest Research Center had a response rate of 39.7% with some regions being more cooperative than others, ranging from above 60% to below 30% (Butler et al., 2020). A more recent survey in Washington State with SFLOs in 2009 had a response rate of 15% (Rozance & Rabotyagov, 2014). Based on these response rates, and the public health crisis (COVID-19 Pandemic) occurring during the time of the surveys, the researchers decided that the general survey and Forests and Fish survey were reasonable (Rabotyagov et al., 2021).

Interview Methodology

While a large survey endeavor was part of the ESSB 5330 effort to evaluation the SFLO Office and the impacts of the Forests and Fish Rules on SFLOs, expansion of the program evaluation through interviews appeared recommended. Semi-structured interviews, first described by Dexter in 1970, then republished in 2006, in *Elite and Specialized Interviewing*, often is conducted with experts, due to the time and resources necessary for interviewing, allowing a mix of closed and open-ended questions to explore topics as they emerged (Dexter,

2006). Semi-structured interviews can add depth to other parts of an evaluation, by avoiding the restrictions of a survey and exploring topics as they emerge (Adams, 2010). Understanding that the SFLO population is diverse and a formal evaluation of the SFLO Office and its programs have yet to be undertaken, interviews were key to expanding on surveys and understanding nuances within the system.

As a semi-structured approach, we considered those who would participate as experts. "Experts" often are those who are well involved with the program in question for program evaluation, which includes three general categories: program recipients, interested parties, and administration (Adams, 2010). For the SFLO Office program evaluation, these three categories are identified into four major groups of interest groups as the administrators of the SFLO Office and other staff in DNR who have considerable knowledge of the SFLO Office, SFLOs who use the SFLO Office and affiliated programs, WSU Extension whose staff are charged with considerable knowledge of SFLOs, and landowner associations that have a vested interest in the SFLO Office. To deepen the program evaluation, another target population was considered: SFLOs who had no experience with the SFLO Office or its programs. While not "experts" of the SFLO Office, these SFLOs are "experts" of their situation, including why they may not have experience with the SFLO Office.

While major categories of target populations were identified for the interviews, sampling strata were developed for groups that had large populations, namely the SFLO interviewees. For DNR affiliated staff and WSU Extension, the sampling strategy was based on key informants: those with keen knowledge on the subject that are willing to share that knowledge. The relatively small populations of these individuals in DNR and WSU Extension were conducted in the interviewing of all key informants identified by the research team, exhausting the population of key informants at the institutions. The interview process underwent the review process of the University of Washington's Human Subjects Division and was granted exempt status (Category 2) as posing a minimal potential risk to participants.

For the landowner associations, a modified network sampling through snowball sampling was employed as described by Bernard et al. (2016). The research team reached out to the landowner association directors, or equivalents, and asked for a short list of names, up to 4 SFLOs, who would best represent their organization in the process.

For SFLOs, the research team developed criteria to interview 29 participants. First, the SFLO population was divided into two groups: (1) SFLOs in Western Washington, by county, and (2) SFLOs in Eastern Washington, by county. From there, the criteria were to find equal amounts of participants in both Western and Eastern Washington represented SFLOs who varied in association membership, ownership acreage, and previous knowledge of the SFLO Office. The information for the criteria came from survey results that had been delivered by August 2020. This sampling can be best described through purposive sampling, stemming from Bernard et al. (2016), as while respondents were narrowed by the criteria, the research made the final judgement on the combination of criteria to select a participant who may provide the most information of their representative peers.

Three separate scripts were created for the interviewees, who were categorized into five distinct groups. The groups identified were WSU Extension Forestry, State Employees, Affiliated SFLOs, Unaffiliated SFLOs, and Tribal Representatives. Each group is defined by its name: WSU Extension Forestry includes WSU Extension Forestry staff and faculty, State Employees includes those who are employed by DNR, Affiliated SFLOs includes SFLOs who have a membership with one of the two major landowner associations identified in Washington: the Washington Farm Forestry Association and the Washington Tree Farm Program, Unaffiliated SFLOs includes SFLOs who are not members of these organizations, and Tribal Representatives include interviewees who represent one of the Native Nations in Washington and who have ties to the forestry regulatory environment. For these groups, the three scripts are State/Extension, Affiliated, and Unaffiliated. The WSU Extension and State Employee groups received the State/Extension script. The Affiliated SFLOs and the Tribal Representatives received the Affiliated script. The Unaffiliated SFLOs received the Unaffiliated script. The number of interviews and type of scripts used for each interview group are described in Table 9:

Table 9: Interview Groups and Respective Scripts and Number of Interviewees

Interview Group	*Number of Interviews*	*Script Type (Core Questions)*
WSU Extension Forestry	4	State/Extension (13 Questions)
State Employees	5	State/Extension (13 Questions)
Affiliated SFLOs	10	Affiliated (14 Questions)
Unaffiliated SFLOs	8	Unaffiliated (12 Questions)

Tribal Representatives	2	Affiliated (14 Questions)

These scripts maintain the same introduction. While the question remained largely exploring the same concepts, certain scripts had more questions than others and the phrasing of questions was altered. The Unaffiliated script, in which all scripts were based, asked 12 questions with several follow-up questions asking directly about landowner experiences. The Affiliated script asks 14 questions. With a mixed focus on landowner experiences—with all NGO members slated to be interviewed being landowners themselves—the NGO script asks about the organization's perception of landowner experiences and the perceptions the NGO has on programs and the SFLO Office. The State/Extension script asked 13 questions focused on how the organization interacted with SFLOs and perceptions of the SFLO world. The Affiliated script is included in Appendix 4, the Unaffiliated script in Appendix 5, and the State/Extension script in Appendix 6. During the interview process, Question 10 on the Affiliated script Question 8 on the Unaffiliated script, and question 9 on the State/Extension script was altered for clarity, initially being a double-barreled question regarding FREP and FFFP. While a revision was made, no data needed to be removed due to the lack of clarity.

The interviews were designed to take between sixty and ninety minutes. Interviews were conducted on Zoom or via telephone. Participants were asked if they consented to the recording and transcribing of the interviews. Otter.ai was used to transcribe the recordings rather than the Zoom transcription service. An undergraduate assistant and the author proofed the transcription completed by Otter.ai. Interviewees were informed that that identifying features of the interview would be removed and that their participation was entirely voluntary. Interviewees were also informed that quotes from the interview may be used in the 2020 demographic report and future academic research with a vague description of their position in the forestry world. Interviewees were then asked if they had any questions about the background of the ESSB 5330 study or if they would like a summary of the effort.

In total, 28 interviews were conducted with 29 interviewees with one two-person interview in the state employee category from the five major interest groups. Eight were non-affiliated landowners, ten were affiliated landowners, four were WSU Extension Forestry, five were state employees, and two were tribal representatives. Interviews lasted roughly between 35 minutes and 300 minutes with a total of 50 hours and 20 minutes of interviews. Coding and

theme development of the interviews was added by using the program ATLAS.ti, following analysis techniques described in Bernard et al. (Bernard et al., 2016).

Other Sources of Data: Agency Archives

DNR and the SFLO Office have also supplied several other sources of data along with publicly available legislative reports. The SFLO Office supplied operational and capital budgetary information up starting with the 2001-2003 biennium to the 2019-2021 biennium along with a narrative of the budgetary history. However, information for the 2001-2003 biennium could not be located for the operational budget. The DNR provided notes and minutes from the Small Forest Landowner Advisory Committee for the entire duration of the committee until the end of 2019

Target Population Assessment

The target population assessment is to determine the objectives and the needs of the SFLO Office clientele: all SFLOs who are impacted by the Forests and Fish Rules. A needs assessment would aim to diagnose the underlying social needs or issues that a target population faces to help select a solution to remedy the need (Rossi et al., 2019). The SFLO community presents a unique needs assessment for this research as the impacts of the Forests and Fish Rules, the mitigative origins of the SFLO Office, have already been predetermined through both research and stakeholder involvement. These are the financial impacts to SFLOs trying to manage their land for income, continuous or intermediate. However, while the Forests and Fish Rules had financial impacts on SFLOs, there are other concerns about keeping SFLOs on the landscape and achieving their ownership objectives. The SFLO, charged with being a focal point of SFLO concerns then encompasses more than Forests and Fish mitigation and must, in some form, address or be aware of the composition and concerns of the SFLO community.

This needs assessment will work to deepen the understanding of the SFLO community through their objectives and consequential behaviors. Needs and concerns will be identified and attributed to certain ownership objectives and behaviors. While typologies and issue sets cannot be pinpointed to individual SFLOs for management, understanding typologies and the composition of the SFLO community will allow the managers to determine key issue sets that need to be addressed and how likely a given issue set will need to be addressed by programs or other assistance.

Through the two surveys—General Population and Forests and Water—and the interviews, this research has the necessary information to perform a needs assessment on the Washington State SFLO community, develop a typology of owners, and develop possible issue sets or areas that need to be addressed outside of the Forests and Fish Rules impact.

General Methods

The surveys were scanned and uploaded to papersurvey.io which recoded the respondent answers. The recoded data was downloaded to Excel. All data cleaning and preparation was conducted in Excel. All analysis of the data, from creation of figures, statistical tests, and simple descriptive statics, was conducted in RStudio relying on the packages factoextra, cluster, dplyr, parameters, psych, corrplot, ggplot2, and dbplyr. A factor analysis is used followed by

multivariate and simple linear regressions and logistic regressions. For ordinal data from Likert scale survey questions, the distance between options is assumed equal. Additional demographic results from the survey are described in Appendix 3 (Rabotyagov et al. 2020).

General Survey Factor Analysis

To form a typology of SFLOs in Washington State to describe SFLO demographics, a factor analysis was conducted on ranked importance questions to determine ownership objective value sets. These value sets will explain the groups of values landowners have towards their land, which may inform their management decisions and what kind of needs they might have.

From the survey data, an exploratory factor analysis was conducted based on the answers to the importance ranking questions in the general survey which asked respondents to rank the importance of a certain factor in regard to their ownership on a Likert scale of 1-5 ranging from "Not Important" to "Very Important." The aspects that the respondents ranked included:

- My forest land provides environmental benefits (Provides Environmental Benefits)
- My forest land protects water resources (Protects Water Resources)
- I have privacy on my forest land (Privacy)
- Spending time on my forest land (Spending Time)
- Raising my family on the land (Raising Family)
- Income from potential development or the sale of my forest land for residential use (Income from Residential Development)
- Income from forest management contributes to my household's annual income (Income from Forest Management)
- Harvesting timber for sale (Harvesting Timber)
- Income from potential development or the sale of my forest land for commercial use (Income from Commercial Development)
- Firewood and/or other non-timber products (Firewood/NTFP)
- Hunting on my forest land (Hunting)
- Recreation on my forest land, other than hunting (Recreation)
- Future ownership of my forest land stays within the family (Future Family Ownership)
- My personal attachment to the land (Personal Attachment)
- My forest land provides benefits to the community (Benefits to Community)

These importance rankings can be interpreted as ownership objectives. An exploratory factor analysis would identify if there were any distinct groupings of importance factors according to certain respondents that a SFLO typology could be derived.

After removing missing data (resulting in n=349), Kaiser-Meyer-Olkin (KMO) factor adequacy was conducted to determine if the importance data was factorable. The overall KMO scored at 0.77 with all variables independently ranking between 0.69 and 0.85 (**Table 10**). This passes the KMO factor adequacy test with all factors greater than or equal to 0.60 (Kaiser, 1974).

Table 10*: Kaiser-Meyer-Olkin Facto Adequacy Scores for Importance Variables*

Factor	KMO	Factor	KMO
Provides Environmental Benefit	0.69	**Protects Water Resources**	0.70
Privacy	0.78	**Spending Time**	0.81
Raising Family	0.85	**Income from Residential Dev**	0.72
Income from Forest Management	0.71	**Harvesting Timber**	0.70
Income from Commercial Dev	0.73	**Firewood/NTFP**	0.82
Hunting	0.81	**Recreation**	0.85
Future Family Ownership	0.82	**Personal Attachment**	0.85
Benefits to Community	0.83		
Overall	0.77		

With all KMO scores being greater than the threshold, a scree plot is produced to determine the number of factors for the factor analysis (**Figure 1**) The scree plot indicates the majority of information can be explained by four factors, as four factors is the highest number of factors that still has an initial eigenvalue greater than 1. The rest of the analysis will be conducted assuming four factors is appropriate.

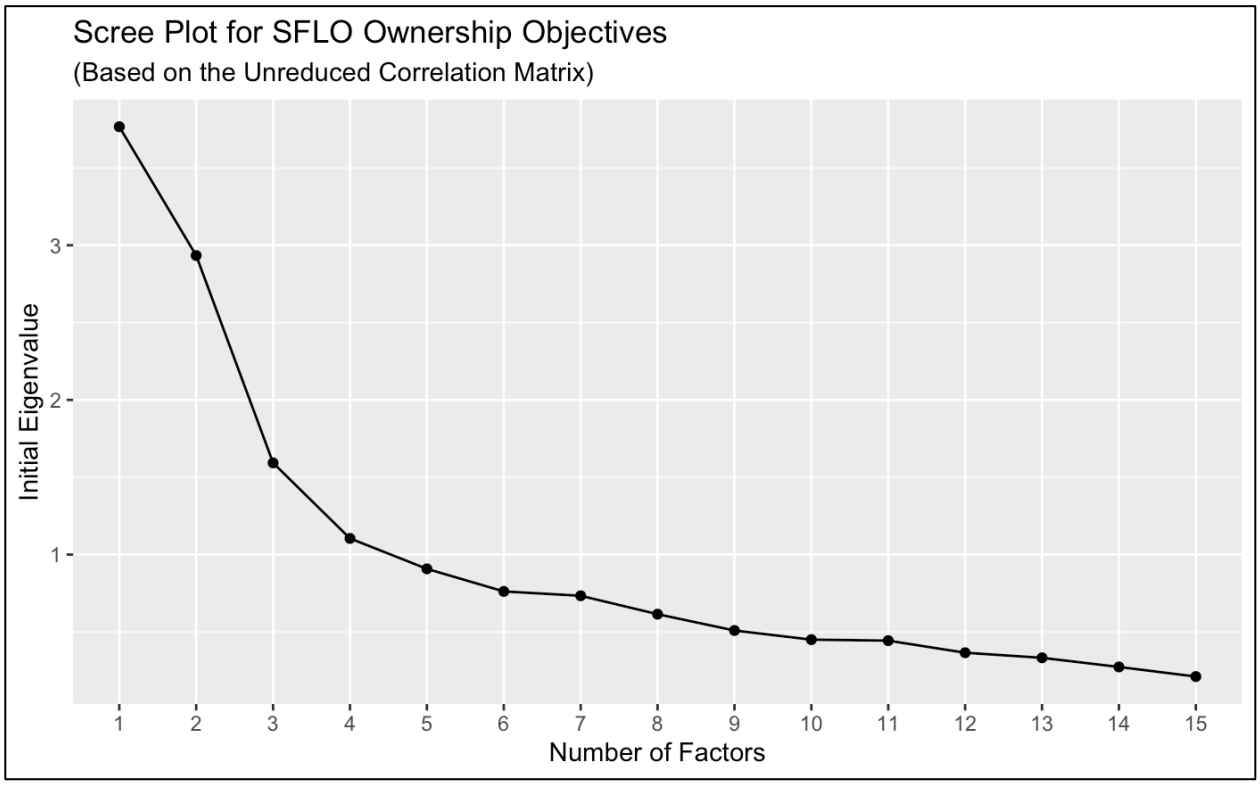

Figure 1: *Scree Plot for SFLO Ownership Objectives for Factor Retention*

An initial factor analysis with a scoring method of regression and no rotation is conducted to determine if different rotations are needed on the data using Thurstone's (1947) simple factor structure. Without rotation, the analysis determines that three factors are sufficient. However, 10 of the 15 factors have cross-loading where the factor score for a certain variable is greater than |0.3| for two or more factors (Table 11) (Thurstone, 1947).

Table 11*: Importance Variable Factor Scoring Without Rotation*

	Factor Loadings			
Aspects	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
Provides Environmental Benefits	0.830	-	0.378	-
Protects Water Resources	0.788	-	0.323	-
Privacy	0.494	0.254	-0.385	0.229
Spending Time	0.595	0.394	-0.426	0.227
Raising Family	0.383	0.329	-0.283	-
Income from Resident Development	-0.426	0.325	0.409	0.453
Income from Forest Management	-0.137	0.690	0.280	-0.223
Harvesting Timber	-0.200	0.702	0.282	-0.260
Income from Commercial Development	-0.425	0.381	0.354	0.370
Firewood/NTFP	-	0.470	-0.143	-0.174
Hunting	-0.121	0.528	-0.182	-

Recreation	0.312	0.510	-0.203	-
Future Family Ownership	0.239	0.441	-0.168	-0.197
Personal Attachment	0.445	0.345	-0.219	-0.107
Benefits to Community	0.377	0.107	0.227	-

For ease of interpretation, an orthogonal rotation is used. The varimax rotation, which maximizes variance for indicators across factors as described by Kaiser (1958), is used for its widespread acceptance (Finch, 2020; Kaiser, 1958). Running the factor analysis again with a varimax rotation results in one indicator with cross-loading out of the 15 indicators, significantly improving the results of the analysis (Table 12).

***Table 12**: Importance Variable Factor Scoring with Varimax Rotation*

	Factor Loadings			
Aspects	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
Provides Environmental Benefits	0.157	-0.113	0.883	-0.151
Protects Water Resources	0.195	-	0.815	-0.141
Privacy	0.694	-	0.129	-
Spending Time	0.836	-	0.179	-
Raising Family	0.561	0.114	0.109	-
Income from Residential Development	-0.135	0.118	-	0.788
Income from Forest Management	-	0.737	-	0.272
Harvesting Timber	-	0.776	-	0.273
Income from Commercial Development	-0.107	0.200	-0.177	0.723
Firewood/NTFP	0.274	0.444	-	-
Hunting	0.261	0.461	-0.216	-
Recreation	0.549	0.299	0.102	-
Future Family Ownership	0.356	0.408	-	-0.139
Personal Attachment	0.482	0.248	0.201	-0.207
Benefits to Community	0.111	-	0.433	-

Taking the highest scoring loading of an indicator and associating it with the correlating factor results in the following indicators associated with the following factors in Table 13.

***Table 13**: Importance Aspects Grouped by Factor with Proposed Naming Schema*

Factor (Proposed Name)			
Factor 1 (Recreationist)	**Factor 2 (Utilitarian)**	**Factor 3 (Preservationist)**	**Factor 4 (Developer)**
▪ Spending Time ▪ Privacy ▪ Raising Family ▪ Recreation ▪ Personal Attachment	▪ Timber Harvesting ▪ Income from Forest Management ▪ Firewood/NTFP ▪ Hunting	▪ Provides Environmental Benefit ▪ Protects Water Resources	▪ Income from Residential Development ▪ Income from Commercial Development

	▪ Future Family Ownership	▪ Benefits to Community	

Factor scores are redistributed to the respondent from which the total determinacy stemmed from. From these scores, regressions were conducted on other survey responses to determine if these groupings of individuals are significantly different in perceptions and demographics.

From the results, a typology of four distinct value factors for small landowners emerges. Factor 1, ownership objectives of Spending Time, Recreation, Personal Attachment, Privacy, and Raising Family on an individual's forest land suggest an ownership value of recreation. Factor 1 then represents the Recreationalist value. For Factor 2, ownership objectives of Timber Harvesting, Income from Forest Management, Firewood/NTFP, Hunting, and Future Family Ownership on an individual's forest land suggest an ownership value of utility associated with the land, through the resources on the land. Factor 2 then represents the Utilitalitarian value. For Factor 3, ownership objectives of Provides Environmental Benefit, Protects Water Resources, and Benefits to Community from an individual's forest land suggest an ownership value of the environmental benefits and functions of the land. Factor 3 then represents the Preservationist value. For Factor 4, ownership objectives of Income from Residential Development and Income from Commercial Development of an individual's land suggest a developmental value of the land, care for the monetary value the land has for potential future development. Factor 4 then represents the Developer value.

While these four groups do form, it does not mean that every individual falls neatly into one category or another. Rather these four categories explain three dominant types of behaviors according to associated ownership objectives. An individual may have high positive loadings for multiple categories, suggesting that individual has more than one major category of ownership objectives, such as being a Recreationalist and a Utilitalitarian. Negative loadings suggest that the individual does not value such ownership objective category that much, as in a negative loading of the Developer factor value group would indicate that the owner does not value the monetary developmental potential of their land.

With these factor value groups, the predictive power of responses to key survey questions are generated. The predictive powers explain how individuals with high or low scores to a certain value factor would like to perceive the world or take certain actions.

Assessing Impacts

In the survey respondents were asked to rank their concern on several variables that impact their forest land ownership and household. The question was in Likert scale format on a scale of 1-5 from "No Impact" to "High Impact" along with a "Not Applicable" sixth option. The aspects respondents were asked to rank impact from included:

- Forest Practices regulations for timber harvesting (Timber Regulations)
- Forest Practices regulations for road maintenance (Road Regulations)
- Other Forest Practices regulations (Other Forest Regulations)
- Wildfire hazard (Wildfire)
- Climate change (Climate Change)
- Extreme weather events (Extreme Weather)
- Air or water pollution (Pollution)
- Damage from other people (Damage from People)
- Property Taxes (Taxes)
- Development of nearby lands for residential use (Residential Development)
- Development of nearby lands for commercial use (Commercial Development)
- Regulations preventing development for residential use (Residential Regulations)
- Regulations preventing development for commercial use (Commercial Regulations)

Predictive power was determined through a series of linear regressions testing each of these factor value groups against impact aspects. The linear regressions were tested independent of one another. These regressions resulted in Table 14.

For the Recreationist value set, which comprised of recreational and private importance values, the Taxes, Residential Development, Commercial Development, and Residential Development Regulations emerged as significantly predicted. Taxes, Residential Development, and Commercial Development predicted in a positive manner, indicating that if a respondent scores high in the Recreationists value group,

***Table 14**: Perceived Impacts based on General Survey Factor Value Sets*

	Factors							
	Recreationist		Utilitarian		Preservationist		Developer	
Impacts	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**
Timber Regs.	0.04852	*0.509*	0.77782	*<2e-16* ***	0.01973	*0.780*	0.44557	*1.17e-08* ***
Road Regs.	-0.00493	*0.945*	0.60760	*1.31e-14* ***	0.05995	*0.391*	0.35419	*5.45e-06* ***
Other Forest Regs.	0.04936	*0.482*	0.76465	*<2e-16* ***	0.02007	*0.771*	0.35805	*2.04e-06* ***
Wildfire	0.08119	*0.268949*	0.19725	*0.010548* *	0.26816	*0.000235* ***	-0.10161	*0.194025*
Climate Change	-0.00603	*0.9394*	-0.20009	*0.0159* *	0.636279	*5.99e-15* ***	-0.10693	*0.2097*
Extreme Weather	0.001764	*0.9812*	-0.07972	*0.3034*	0.345873	*3.34e-06* ***	-0.15474	*0.0511*
Pollution	0.00775	*0.9179*	-0.14734	*0.0607*	0.43159	*1.17e-08* ***	-0.06591	*0.4095*
Damage by People	-0.01767	*0.825*	0.11739	*0.158*	0.12938	*0.101*	0.13746	*0.105*
Taxes	0.14995	*0.0418* *	0.14794	*0.0532*	-0.16050	*0.0284* *	0.32071	*4.93e-05*
Residential Dev.	0.15323	*0.0500*	0.01959	*0.8091*	0.13885	*0.0710*	0.19054	*0.0224* *
Commercial Dev.	0.19997	*0.0344* *	-0.07261	*0.4570*	0.20004	*0.0306* *	0.12534	*0.2057*
Residential Regs.	-0.15478	*0.0593*	0.12565	*0.1462*	-0.08539	*0.2926*	0.53099	*2.52e-09* ***
Commercial Regs.	0.01305	*0.885792*	0.11914	*0.215184*	-0.02216	*0.810455*	0.33684	*0.000518* ***

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

***Table 15:** Management Behaviors based on General Survey Factor Value Sets*

	Factors							
	Recreationist		Utilitarian		Preservationist		Developer	
Impacts	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**
SFLO Office	0.02732	0.836047	0.51350	0.000142 ***	0.48710	0.000332 ***	0.30875	0.025235 *
FPA	-0.0469	0.7468	1.1462	1.12e-12 ***	0.2524	0.0727	0.2903	0.0457 *
New FPA	-0.03914	0.804666	1.49858	7.71e-16 ***	0.53139	0.000753 ***	0.13953	0.371915
Imp Forest Land	0.31628	8.63e-08 ***	0.18788	0.00171 ***	0.47205	1.25e-15 ***	-0.44870	1.35e-12 ***
Tax Program	-0.14310	0.27989	0.89799	1.43e-09 ***	0.29219	0.02292 *	0.08362	0.55361
Alternate Plan	-0.14942	0.659414	1.35680	0.000392 ***	-0.34504	0.185105	0.08543	0.768056
FREP	0.32442	0.5487	0.9980	0.0367 *	0.07316	0.8537	0.38863	0.2968
FFFPP	-0.4989	0.29101	1.8851	0.00401 **	-0.2962	0.45372	-0.4187	0.44397
Riparian	-0.03572	0.779	0.71966	2.7e-07 ***	0.17920	0.147	-0.14151	0.291

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

they perceive themselves and their forest lands to be more so impacted by residential and commercial development near their land along with property taxes. Conversely, regulations that prevent residential development are negatively weighted in predictive power, suggesting that respondents with Factor 1 values do not perceive residential development regulations as impacting their forest land or household. This means for respondents with Recreationist values, the respondents will feel more impacted by development and taxes and less so by residential development regulations. All other impact factors are non-significant.

For the Utilitarian value set, which comprised of land management values, the Timber Regulations, Road Regulations, Other Forest Regulations, Wildfire, Climate Change, Pollution, and Taxes emerged as significantly predicted aspects. Timber Regulations, Road Regulations, Other Forest Regulations, Wildfire, and Taxes aspects signify a positive predictive power, suggesting that if respondents have high Utilitarian value group scoring, the individual is more likely to perceive their forest land ownership and household to be impacted by the Forest Practices regulations, wildfire hazards, and taxes. However, the Pollution and Climate Change aspects are negatively predictive, suggesting that individuals with high Factor 2 value grouping are likely perceive climate change as less of an impact to their forest land and ownership. All other impact factors are non-significant.

For a Preservationist set, which comprised of environmental values, the Wildfire, Climate Change, Extreme Weather, Pollution, Taxes, Residential Development, and Commercial Development aspects emerged as significantly predicted aspects. Wildfire, Climate Change, Extreme Weather, Pollution, Residential Development and Commercial Development aspects had positive predictive power, indicating that respondents with high Preservationist value group scores perceived greater impacts from environmental conditions and development to their forest land and household. The Taxes aspects emerged with negative predictive power, suggesting that high Preservationist score loading of a respondent indicates that the individual does not see as great of an impact from property taxes on their ownership. All other impact factors are non-significant.

For the Developer value set, which is comprised of development potential values, the Timber Regulation, Road Regulations, Other Forest Regulations, Extreme Weather, Residential Development, Residential Development Regulations, and Commercial Development Regulations aspects emerged as significantly predicted aspects. Timber Regulation, Road Regulation, Other

Forest Regulations, Residential Development, Residential Development Regulations, and Commercial Development Regulations all had associated positive predictive power from the Developer value set scoring, indicating that individuals with high Factor 4 scoring tend to perceive regulations and some development as more impactful to their forest land ownership and household objectives. Conversely, the Extreme Weather aspect is negatively predicted by the Developer value set scoring, indicating that these respondents do not foresee their ownership as significantly impacted by extreme weather events. All other impact factors are non-significant.

The predictive power of factor value groups predicting impact concerns support the validity of their naming along with the ownership objectives. The Recreationalist value is more likely to perceive impacts from development and property taxes, elements of forest landownership that are more likely to decrease privacy and impact their financial viability of owning the land. Those with Recreationalist value weighting feel less impacted by residential development regulations, which could be explained by not being concerned with regulations around residential development. Nevertheless, ownership objectives of privacy, attachment, recreation, and spending time on the land may all be negatively impacted by increased development that would decrease perceived privacy and property rights.

The Utilitalitarian value is more likely to perceive regulations and wildfire hazards as impacting their ownership. This likely can be adhered to the individual's value in the land and the products that the land provides, such as timber. Aspects that threaten timber production could be viewed as more impactful to an ownership. Contrary, aspects such as climate change and pollution are viewed as less impactful, even though climate change could be impactful to timber production. Climate change being negatively predicted, and wildfire being positively predicted goes against wildfire's association being climate change. However, wildfire could be seen as a more immediate effect on timber value compared to long term climate change. Pollution may not have as strong of effects on timber production.

The Preservationist value is more likely to perceive environmental elements and development as impacting their ownership, which coincide with their environmental objectives and values. Wildfire, pollution, and climate change all can degrade or impact environmental conditions of their ownership's potential to provide environmental benefits. Development likely impacts their ownership objectives to provide environmental benefits, if not the individual's view of environmental benefits from nature. The negative association with property taxes may

illustrate that these owners are not as concerned about the financial viability of keeping the land, or the financial impact on their financial status.

The Developer value is more likely to perceive regulatory elements as impacting their ownership. This supports their objectives to develop their land. Regulations that reduce developable area or increase the costs of development would be detrimental to their ownership objectives.

Assessing Management Decisions

Several questions in the survey asked respondents to list certain actions they have taken and other important aspects of their ownership. These questions included whether or not the individuals have submitted a Forest Practices Application (FPA) in the past ten years, plan on submitting another FPA application in the next 10 years, whether they have heard of the Small Forest Landowner (SFLO) Office, and how important it is that their ownership, especially their forest land, stays in forest after it is no longer in their ownership. Additional information about their parcel was gathered from county and state databases to determine if the parcel had a Designated Forest Land or Open Space tax designation and if the parcel had a alternate plan application associated with it. These were translated into binary data of whether or not the parcel was in any kind of designated tax program and whether the parcel had any amount of alternate plans associated with it. A logistic regression was conducted on the binary answers regarding the SFLO Office and FPA application tendencies along with database information to determine if the factor value groupings predict these actions. Another linear regression was conducted on the importance of their forest land remaining, to determine if factor value groupings predict future forestland presence is importance (Table 15).

Recreationist value set significantly predicts Importance of Forest Land in a positive manner. This indicates that those with high recreational value scoring find that their forest land remaining in forest land after their ownership is important.

Utilitarian value set significantly predicts all evaluated variables: SFLO Office knowledge, Previous FPA, New FPA, Importance of Forest Land, Tax Program Presence, and Alternate Plan Application. All variables were positively predicted, indicating that individuals with a high Utilitarian value grouping set will more likely have heard of the SFLO Office, have applied for and will apply again for an FPA, are more likely to want their forest land to remain forest land, have an active tax program on their land, have a FREP application, have a FFFPP

application, have riparian property, and have previously applied for an alternate plan for their forest land.

Preservationist value grouping significantly predicts SFLO Office knowledge, Previous FPA, Future FPA, Importance of Forest Land, and Tax Program Presence. All significantly predicted variables are predicted positively, indicating that those with a high environmental based value set are more likely to have heard of the SFLO Office, have applied for and will apply again for an FPA, want their forest land to remain in forest land, and to have a designated tax program active on their land.

Developer value grouping significantly predicts SFLO Office knowledge, previous FPA application, and Importance of Forest Land. SFLO Office Knowledge and Previous FPA Application are positively predicted, suggesting that those with high development values are more likely to have heard about the SFLO Office and have previous submitted an FPA. Conversely, Importance of Forest Land is negatively predicted, suggesting that these individuals are less likely to find keeping their land in forest in the future is important.

Assessing Demographics

Key demographic information was gathered from survey respondents via survey questions and a geospatial information effort conducted by Rogers et al. (2020). The demographic information was used to determine if certain demographic features predict ownership values. A linear regression was conducted on six key variables: ownership acres, duration of ownership, geographic distribution of ownership, education level, income bracket, and whether or not the respondent had a home on or within five miles of the ownership. Ownership acreage was derived from geospatial information, recorded in acres, and recalculated into acreage bins that represent the quartiles of the total respondent acreage range. The duration is calculated from the survey year of 2020 minus the respondent's stated acquisition of ownership year. Geographic dispersion is a binary variable on whether the ownership is in Western Washington or Eastern Washington. Education is a bracket answer from the respondent, ranging from high school to a graduate degree. Income is self-selected by the respondent by brackets. Proximity of the respondent's home near the ownership is also self-selected by the respondent in the survey. The linear regression outcome is illustrated in Table 16.

Table 16: *Demographic Variables based on General Survey Factor Value Sets*

	Factors							
	Recreationist		**Utilitarian**		**Preservationist**		**Developer**	
Demographics	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**
Parcel Size	0.0731	*0.0991*	0.3482	*2.57e-14* ***	0.0487	*0.3374*	0.1029	*0.0261* *
Duration	-0.0007	*0.8211*	0.0069	*0.0171* *	0.0019	*0.5794*	0.0054	*0.0802*
West/East[2]	-0.1536	*0.1205*	-0.0392	*0.6852*	0.0652	*0.5651*	0.2944	*0.0045* **
Education	-0.0740	*0.0536*	0.0502	*0.2829*	0.0227	*0.6046*	0.0092	*0.8167*
Income	0.0442	*0.1208*	0.0128	*0.6448*	0.0378	*0.2483*	0.0136	*0.6461*
Home Nearby	0.9482	*2.66e-16* ***	0.1016	*0.3399*	0.3215	*0.0104* *	-0.2044	*0.0720*

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

[2] Binary indicators: 1 if West, 0 if East.

Table 17: *Topics General Survey Factors Value Sets Want to Know More About*

	Factors							
	Recreationist		**Utilitarian**		**Preservationist**		**Developer**	
Topics	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**	**Coef.**	**P-value[1]**
Will	0.2871	*0.125*	0.02127	*0.899*	0.11860	*0.473*	-0.20943	*0.255*
Trust	0.3480	*0.120*	0.2117	*0.275*	-0.2205	*0.187*	-0.2151	*0.299*
Conservation Easement	-0.0788	*0.578116*	-0.15244	*0.301843*	0.57465	*0.000698* ***	-0.11374	*0.470229*
Property Tax	0.3366	*0.0239* *	-0.15546	*0.2652*	-0.11920	*0.3543*	-0.02123	*0.8824*
Financial Value	0.2040	*0.16351*	-0.0983	*0.48857*	0.1501	*0.28184*	0.4399	*0.00183* **
Ecological Value	0.2117	*0.21395*	-0.5386	*0.00164* **	0.6001	*0.00201* **	-0.3664	*0.05994*
Taxes	0.2374	*0.0857*	-0.22242	*0.1038*	-0.21964	*0.0787*	0.07729	*0.5743*
Professional Assistance	-0.0113	*0.965*	-0.09510	*0.720*	0.30120	*0.297*	-0.01071	*0.969*
Family	-0.0394	*0.83392*	0.53589	*0.00479* **	0.46278	*0.02870* *	-0.08723	*0.65125*
Interested Owners	-0.4833	*0.0441* *	-0.6730	*0.0444* *	0.6856	*0.0734*	0.4734	*0.1133*
Extreme weather	0.6070	*0.0737*	-0.04299	*0.8624*	0.74273	*0.0240* *	-0.31059	*0.2955*
Nothing	0.0562	*0.716*	0.0076	*0.961*	-0.0387	*0.790*	-0.1966	*0.241*

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

The regression indicates that parcel size is positively predictive of Utilitarian value grouping and Developer value grouping indicating that larger ownerships are more likely to have these value sets. Of these two value sets, Utilitarian has a higher associated coefficient (0.3482) compared to the Developer coefficient (0.1029) suggesting that the Utilitarian value set has stronger association with larger parcel sizes. Duration of ownership is positively predictive of Utilitarian value grouping and Developer value grouping, indicating that management values and development values are associated with longer durations of ownership. Geographic distribution is positively predictive of Developer value grouping, indicating ownership located in western Washington is more likely to be associated with development values. Education is negatively predictive of Recreationist value grouping, indicating that lower education levels are associated with recreational values. Income is a non-significant predictor of all factor value groupings. Having a home in close proximity to the ownership is positively predictive of Recreationist value grouping and Preservationist factor grouping, suggesting that having a home near the ownership is predictive of environmental and recreational values.

Assessing Needs

Respondents were asked to indicate whether certain topics would be helpful for them to know more about in order to make a decision about future ownership and/or use of their forest land. The question was designed as a check all that apply. The topics available to respondents were as follows:

- Will and/or living will (Will)
- Conservation easement and/or restriction (Conservation Easement)
- Financial value of my land (Financial Value)
- Tax issues (Taxes)
- Ways to work with my family to achieve future goals (Family Goals)
- Information on extreme weather events (Extreme Weather)
- Trust (Trust)
- Current use property tax programs (Property Tax)
- Ecological value of my land (Ecological Value)
- Finding a local professional (Professional)
- How to find people interested in becoming forest owners (Interested Owners)

- I don't need any information (No Information)

A linear regression was conducted with each topic to determine if certain factor value groups predicted a respondent's desire to learn more about a certain topic. The linear regression was repeated for each topic to product Table 17.

Recreationist value grouping significantly predicted Property Tax, Taxes, Interested Owners, and Extreme Weather as topics to learn more about. Property Taxes, Taxes, and Extreme Weather were positively predicted, suggesting that a respondent with high recreational values is interested to learn more about current use property tax programs, tax issues, and extreme weather events. Conversely, Interested Owners was negatively predicted, suggesting that individuals with high Recreationist value grouping scores are not inclined to learn about finding people who are interested in becoming forest owners.

Utilitarian value grouping significantly predicted Ecological Value, Family Goals, and Interested Owners. Family Goals was positively predicted, suggesting that a respondent with high management values would want to learn more about finding ways to work with family to achieve future goals. Ecological Value and Interested Owners were negatively predicted, suggesting that high management values are not as curious about learning more about ecological value or interested owners.

Preservationist value grouping significantly predicted Conservation Easement, Ecological Value, Taxes, Family Goals, Interested Owners, and Extreme Weather. Conservation Easements Ecological Value, Family Goals, Interested Owners, and Extreme Weather were all positively predicted, suggesting that individuals with high environmental value scores are more likely to want to learn more about ecological aspects and forest land legacy of their ownership. However, Taxes is negatively predicted, suggesting that these individuals are not as inclined to learn about current use tax programs.

Developer value grouping significantly predicted Financial Value and Ecological Value. Financial Value was positively predicted, suggesting an individual with a high developmental interest would want to know more about the monetary value of their land. Conversely, these individuals would be less likely to want to know about the ecological value of their land.

General Survey Cluster Analysis

With an exploratory factor analysis identifying key value groupings that individuals might have, a cluster analysis can describe how these factors may be grouping in the data. This

will cluster individuals from the survey to form describable portions of the SFLO community, which management decisions and needs assessment may be better determined from compared to understanding value groups.

To visualize the data and determine the number of clusters appropriate for the data, a hierarchy cluster analysis was conducted based on the factor value groupings. The data of the factor value groupings were normalized and transformed into a distance matrix. The hierarchy cluster analysis was conducted on this distance matrix, creating the hierarchy plot in **Figure 2:** Hierarchy Clustering Based on General Survey Factor Value SetsFigure 2.

From the hierarchy plot, about five clusters could be formed form this data. To confirm, a *k* means gap statistic is calculated and plotted, based on the factor value grouping data. The k means gap statistic had the highest gap static value for k at five clusters, where it further elbowed, suggesting five clusters would be appropriate for this data as seen in Figure 3.

To further support the conclusion that five clusters should be retained, a meta-analysis was conducted across several methods. The method agreement procedure tested 29 methods available in R. Out of the 29 methods for clustering, nine supported that five clusters should be retained, with the next greatest consensus being two clusters with seven supporting methods Figure 4. Five clusters are retained to support the greatest consensus of the various methods.

With five clusters identified, k means were conducted again on the data with the specification of five centers, then clustered with a clustering function resulting in Figure 5.

From this analysis, Cluster 1 is likely to have Utilitarian and Developer values. Cluster 2 is likely to have Recreationalist and Utilitarian values and is not likely to have Preservationist values. Cluster 3 is a unique group with no strong positive association with any value grouping. Instead, Cluster 3 is less likely to have Recreationalist, Utilitarian, and Preservationist values. Cluster 4 is likely to have Recreationalist, Utilitarian, and Preservationist values and less likely to have Developer values. Cluster 5 is likely to have Recreationalist and Preservationist values and less likely to have Utilitarian and Developer values.

After the T-Test analysis, a Tukey HSD ANOVA was conducted with each factor value group against each of the clusters to determine on the clusters. This analysis resulted in Table 18, Table 19.

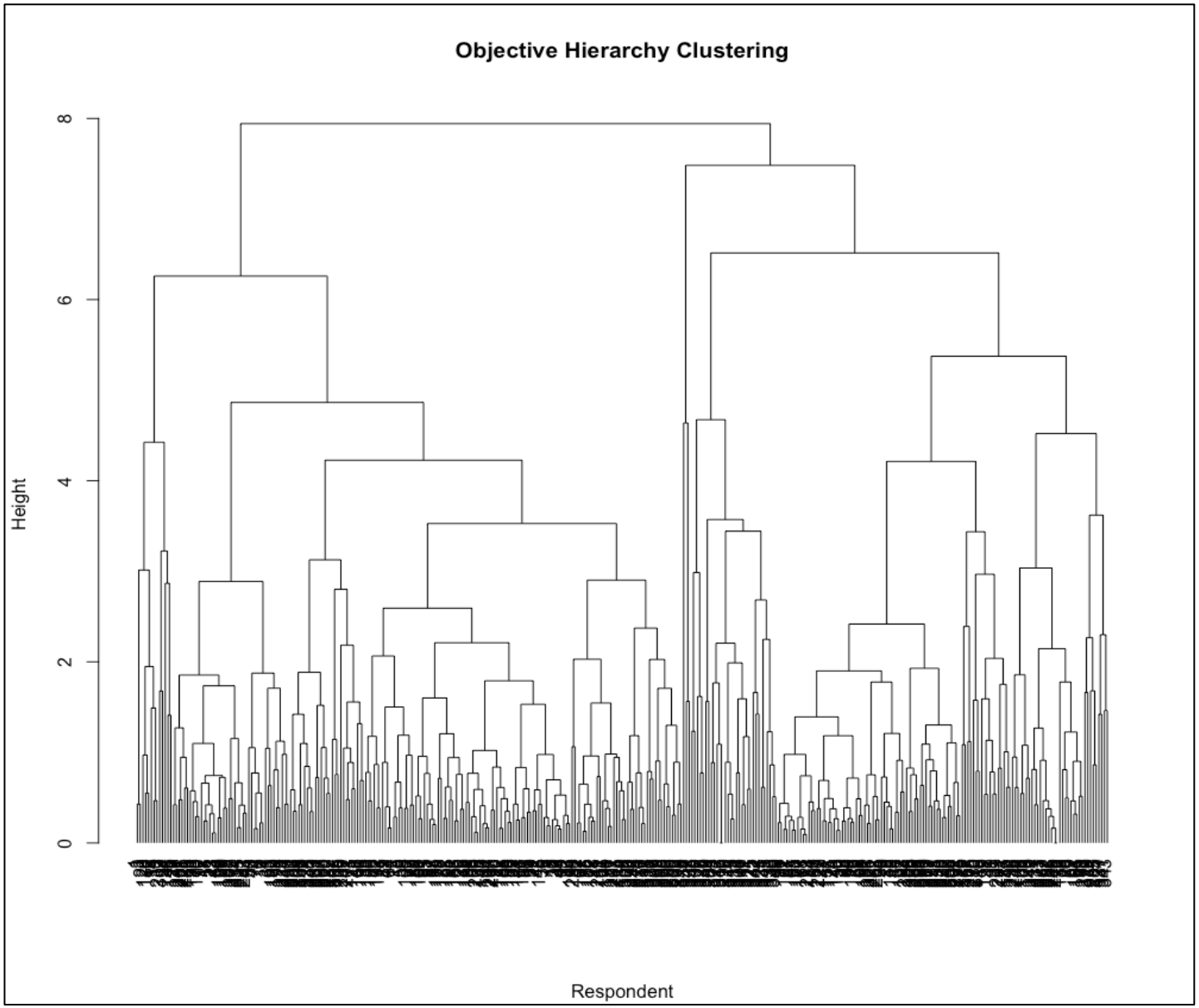

Figure 2: Hierarchy Clustering Based on General Survey Factor Value Sets

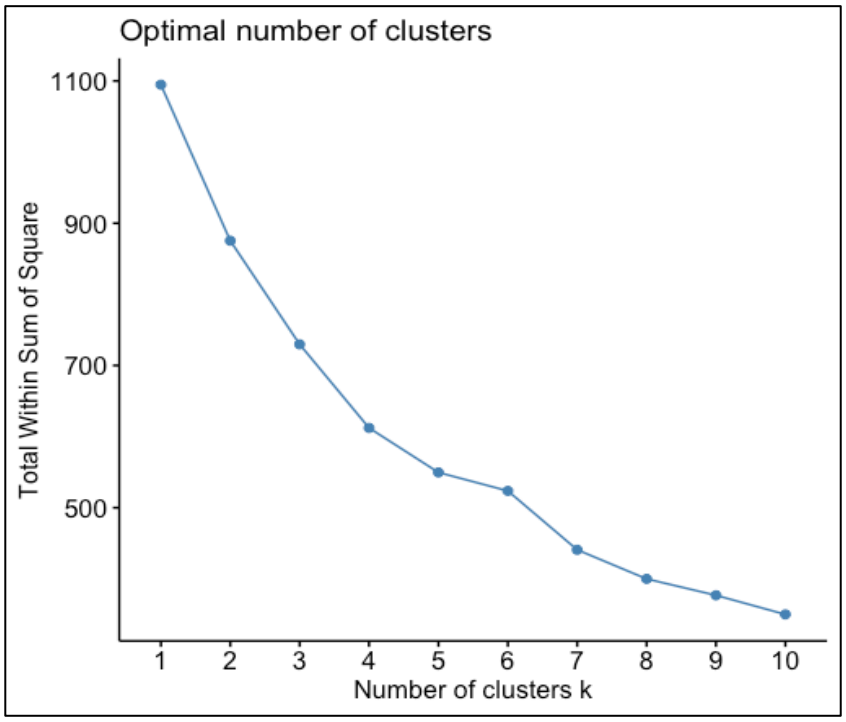

Figure 3: *Determining Optimal Number of Clusters based on General Survey Factor Value Sets by Sum of Squares for k Means*

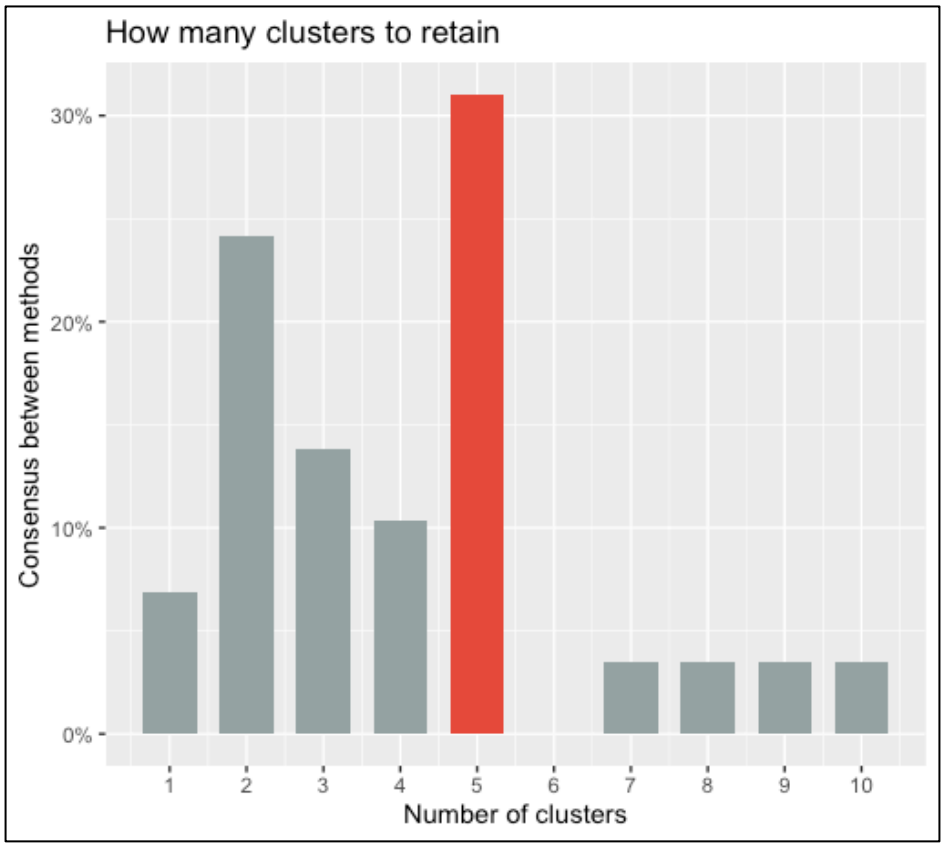

Figure 4*: Determining Optimal Number of Clusters based on review of Common Methods for the General Survey*

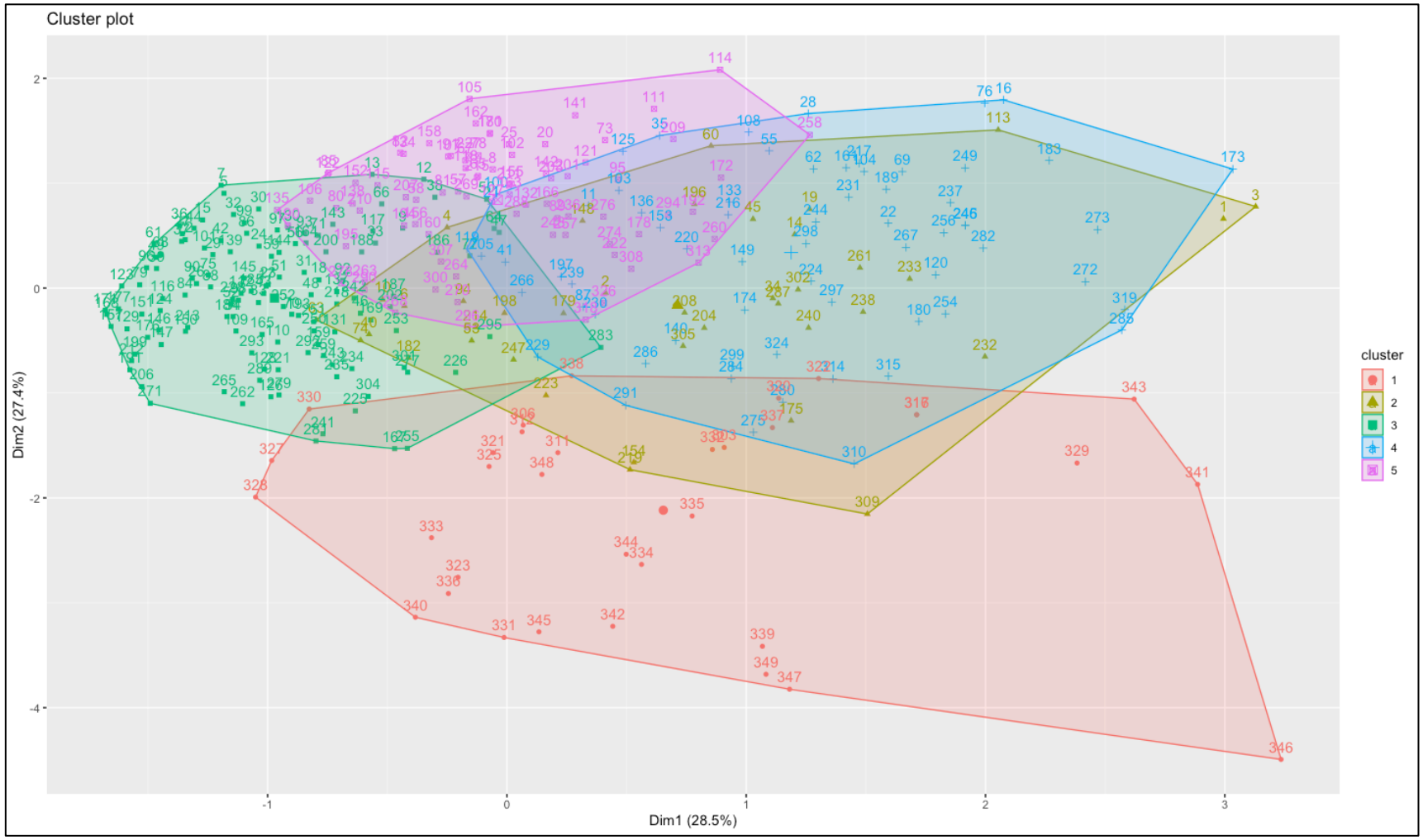

***Figure 5**: General Survey Clusters Overlayed*

To determine the objectives of these clusters, T-Tests were conducted to determine the significance of each factor value group to the cluster. The T-Test analysis resulted in Table 18.

Table 18: *General Survey Factor Value Set Scores for Optimal Clusters*

	Factors							
	Recreationist		Utilitarian		Preservationist		Developer	
Cluster	**Mean**	**P-value**	**Mean**	**P-value**	**Mean**	**P-value**	**Mean**	**P-value**
1	0.0126	0.8696	0.2706	0.0045	0.0827	0.3095	1.2985	2.2e-16
2	0.3072	0.00372	0.3244	0.0252	-1.7066	2.2e-16	-0.1321	0.3357
3	-2.0850	2.2e-16	-0.4556	0.0015	-0.4454	0.0244	-0.0116	0.9465
4	0.1337	0.0360	0.8566	2.2e-16	0.4206	1.10e-10	-0.3436	3.71e-11
5	0.3663	7.84e-15	-0.6543	2.2e-16	0.3270	2.80e-11	-0.4056	2.2e-16

The Tukey HSD ANOVA found that Cluster 1 has the greatest Developer value set out of the clusters. All pairings are significantly different from one another for the Preservationist value set other than Cluster 2 and Cluster 1 and Cluster 5 and Cluster 3. Cluster 4 has the greatest Utilitarian value set. Cluster 5 and Cluster 3 are significantly less Utilitarian value set compared to all other clusters. Cluster 1 and Cluster 2 are significantly greater than Cluster 5 and Cluster 3 but significantly less compared to Cluster 4 in terms of the Utilitarian value set. Cluster 2 has the least Preservationist value set compared to all other clusters. Cluster 3 has the least Recreationalist value set. Cluster 5 had no distinct significance against all other clusters. Within these groups there are significant differences between some pairs, such as Cluster 5 has a significantly greater Recreationist value set compared to Cluster 1 (Table 19).

From the cluster analysis, it appears that the clusters can be named by their objective styles. Cluster 1 could be named Managing Developers, focusing on objectives that tend to bring in financial revenue such as the Utilitarian and Developer value sets, and being the highest cluster with the Developer value set. Cluster 2 could be named Managing Recreationists with their focus on Recreationist value set and relatively strong Utilitarian value set. Cluster 3 could be named the Ambiguous Owners as those that do not have strong association with any of the value sets. Cluster 4 represents the Environmental Managers who have the greatest Utilitarian value set but significantly positive Preservationist and significantly negative Developer value set. Cluster 5, while not having one distinct value set compared to the other clusters, has a significant positive Recreationist and Preservationist value sets, suggesting they could be called Environmental Recreators.

Similar tests as with the exploratory factor analysis are further conducted to determine how clusters differ in their concerns, actions, interests, and demographics. Tukey HSD ANOVAs were used to determine the differences between groups.

Assessing Management Decisions

In assessing certain actions that the cluster take, it is apparent that all clusters have some significant portion of their population, greater than none, having knowledge about the SFLO Office, previously submitting an FPA, planning a future FPA, and having a tax program active on their parcel. Managing Developers, Managing Recreationalists, and Environmental Managers all have significantly greater than zero portions of their population using an alternate plan. Managing Developers has a significant portion using FREP and Environmental Managers has a significant number using FFFPP. Ambiguous Owners have no reported active or previous applications for Alternate Plans, FREP, or FFFPP (Table 20).

Some differences apply between clusters. Managing Developers has heard about the SFLO Office more so than Managing Recreationists (p-value = 0.0242) and Environmental Recreators (p-value = 0.0374). Managing Developers and Environmental Managers have conducted more previous FPAs compared to Environmental Recreators (p-values < 0.001). Environmental Managers are more likely to have completed a previous FPA compared to Ambiguous Owners (p-value = 0.0125). A greater proportion of Managing Developers plan to apply for a future FPA compared to Environmental Recreators (p-value = 0.0002), but a greater proportion of Environmental Managers plans to apply for a future FPA compared to all other clusters (p-values <= 0.0256). Environmental Managers and Environmental Recreators find keeping their ownership to remain in forest land more important than the other clusters (p-values < 0.001). Environmental Managers is more likely to be in a Tax Program compared to Environmental Recreators and Managing Recreationists (p-value = 0.0000; 0.0102). Managing Developers is more likely to be in a Tax Program compared to Environmental Recreators (p-value = 0.0038). There are no significant differences between clusters and alternate plan usage, FREP application, and FFFPP application (p-values > 0.05) (Table 21).

***Table 19**: Determining Differences between Clusters from Factor Value Sets from the General Survey*

	Factors							
Pairing	**Recreationist**	**Adjusted p-value[1]**	**Utilitarian**	**Adjusted p-value[1]**	**Preservationist**	**Adjusted p-value[1]**	**Developer**	**Adjusted p-value[1]**
2-1	0.2946	0.0786	0.0539	0.9930	-1.7892	0.0000 ***	-1.4306	0.0000 ***
3-1	-2.0976	0.0000 ***	-0.7261	0.0000 ***	-0.5281	0.0013 **	-1.3101	0.0000 ***
4-1	0.1211	0.7000	0.5840	0.0000 ***	0.3379	0.0154 *	-1.6421	0.0000 ***
5-1	0.3537	0.0005 ***	-0.9249	0.0000 ***	0.2443	0.0948	-1.7041	0.0000 ***
3-2	-2.3922	0.0000 ***	-0.7801	0.0000 ***	1.2612	0.0000 ***	0.1205	0.8971
4-2	-0.1735	0.5195	0.5321	0.0002 ***	2.1272	0.0000 ***	-0.2115	0.3194
5-2	0.0591	0.9794	-0.9788	0.0000 ***	2.0335	0.0000 ***	-0.2735	0.0690
4-3	2.2187	0.0000 ***	1.3121	0.0000 ***	0.8660	0.0000 ***	-0.3320	0.0378 *
5-3	2.4513	0.0000 ***	-0.1987	0.4678	0.7724	0.0000 ***	-0.3940	0.0036 **
5-4	0.2326	0.0332	-1.5108	0.0000 ***	-0.0936	0.8462	-0.0620	0.9403

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

***Table 20:** Assessing General Survey Cluster Significance of Certain Management Decisions*

	Management Behavior					
	Managing Developers		**Managing Recreationists**		**Ambiguous Owners**	
Mgmt Behavior	**Mean**	**P-value[1]**	**Mean**	**P-value[1]**	**Mean**	**P-value[1]**
SFLO Office	0.6406	1.24e-15 ***	0.3333	0.0001831 ***	0.4118	3.261e-05 ***
Previous FPA	0.5000	1.97e-05 ***	0.3846	1.97e-05 ***	0.2647	0.001567 **
Future FPA	0.4848	6.057e-11 ***	0.2973	0.0004001 ***	0.2353	0.003143 **
Tax Program	0.6667	2.2e-16 ***	0.4872	5.545e-07 ***	0.5588	2.469e-07 ***
Alternate Plan	0.0606	0.04462 *	0.0769	0.08315	0.0000	-
FREP	0.0606	0.004462 **	0.0256	0.3236	0.0000	-
FFFPP	0.0152	0.321	0.0513	0.16	0.0000	-

Management Behavior

	Environmental Managers		Environmental Recreators	
Variable	**Mean**	**P-value[1]**	**Mean**	**P-value[1]**
SFLO Office	0.5926	2.2e-16 ***	0.4264	2.2e-16 ***
Previous FPA	0.5696	6.208e-16 ***	0.2109	4.384e-08 ***
Future FPA	0.7051	2.2e-16 ***	0.1920	2.876e-07 ***
Tax Program	0.7901	2.2e-16 ***	0.4109	2.2e-16 ***
Alternate Plan	0.0617	0.0244 *	0.0155	0.1581
FREP	0.0246	0.1586	0.0078	0.3192
FFFPP	0.0370	0.08324	0.0000	-

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

***Table 21**: Assessing Management Behavior Differences between General Survey Clusters*

	Management Behavior							
Pairing	**SFLO Office**	**Adjusted p-value[1]**	**Previous FPA**	**Adjusted p-value[1]**	**Future FPA**	**Adjusted p-value[1]**	**Remain Forest**	**Adjusted p-value[1]**
2-1	-0.3073	0.0242 *	-0.1154	0.7311	-0.1876	0.2409	-0.1026	0.9891
3-1	-0.2289	0.1853	-0.2353	0.1154	-0.2496	0.0615	-0.3240	0.6044
4-1	-0.0448	0.9774	0.0696	0.8960	0.2203	0.0264 *	1.0104	0.0000 ***
5-1	-0.2143	0.0374 *	-0.2891	0.0005 ***	-0.2928	0.0002 ***	0.9201	0.0000 ***
3-2	0.0784	0.9634	-0.1199	0.8042	-0.0620	0.9768	-0.2214	0.9015
4-2	0.25293	0.0672	0.1850	0.2479	0.4078	0.0001 ***	1.1130	0.0000 ***
5-2	0.0930	0.8539	-0.1737	0.2437	-0.1053	0.7109	1.0226	0.0000 ***
4-3	0.1808	0.3762	0.3049	0.0125 *	0.4698	0.0000 ***	1.3345	0.0000 ***
5-3	0.0146	0.9999	-0.0538	0.9747	-0.0433	0.9869	1.2441	0.0000 ***
5-4	-0.1662	0.1224	-0.3587	0.0000 ***	-0.5131	0.0000 ***	-0.0903	0.9745

Management Behavior Continued

Pairings	Tax Program	Adjusted p-value[1]	Alternate Plan	Adjusted p-value[1]	FREP	Adjusted p-value[1]	FFFPP	Adjusted p-value[1]
2-1	-0.1795	0.3340	0.0163	0.9939	-0.0350	0.7747	0.0361	0.6402
3-1	-0.1078	0.8185	-0.0606	0.5851	-0.0606	0.3075	-0.0152	0.9813
4-1	0.1235	0.5183	0.0011	0.9999	-0.0349	0.5957	0.0219	0.8466
5-1	-0.2558	0.0038 **	-0.0451	0.5488	-0.0529	0.1354	-0.0152	0.9382
3-2	0.0716	0.9678	-0.0769	0.4512	-0.0256	0.9490	-0.0513	0.4431
4-2	0.3029	0.0102 *	-0.0152	0.9947	-0.0009	1.0000	-0.0142	0.9801
5-2	-0.0763	0.9040	-0.0614	0.4250	-0.0179	0.9656	-0.0513	0.1950
4-3	0.2313	0.1217	0.0617	0.5353	0.0247	0.9278	0.0370	0.6286
5-3	-0.1480	0.4871	0.0155	0.9940	0.0078	0.9989	-0.0000	1.0000
5-4	-0.3792	0.0000 ***	-0.0462	0.4569	-0.0169	0.9305	-0.0370	0.2600

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

***Table 22**: General Survey Clusters Perceived Impact of Forest Land Ownership Related Issues*

	Impact Level					
Cluster	**None**	**A Little**	**Moderate**	**Substantial**	**High**	**NA**
Forest Harvest Regulations						
Managing Developers	0.06	0.06	0.24	0.27	0.30	0.06
Managing Recreationists	0.10	0.21	0.21	0.15	0.18	0.15
Ambiguous Owners	0.24	0.24	0.24	0.12	0.03	0.15
Environmental Managers	0.09	0.10	0.32	0.15	0.27	0.07
Environmental Recreators	0.36	0.26	0.18	0.05	0.06	0.09
Forest Road Regulations						
Managing Developers	0.12	0.14	0.27	0.21	0.15	0.11
Managing Recreationists	0.28	0.18	0.23	0.08	0.05	0.18
Ambiguous Owners	0.38	0.12	0.26	0.12	0.03	0.09
Environmental Managers	0.16	0.19	0.21	0.27	0.07	0.10
Environmental Recreators	0.43	0.24	0.16	0.01	0.05	0.12
Other Forest Regulations						
Managing Developers	0.08	0.14	0.23	0.23	0.23	0.11
Managing Recreationists	0.10	0.26	0.15	0.08	0.23	0.18
Ambiguous Owners	0.31	0.31	0.11	0.11	0.00	0.17
Environmental Managers	0.07	0.15	0.32	0.20	0.14	0.12
Environmental Recreators	0.36	0.26	0.16	0.03	0.05	0.15
Climate Change						
Managing Developers	0.30	0.15	0.21	0.14	0.09	0.11
Managing Recreationists	0.41	0.31	0.10	0.00	0.05	0.13
Ambiguous Owners	0.24	0.21	0.18	0.24	0.06	0.09
Environmental Managers	0.17	0.20	0.22	0.16	0.16	0.09
Environmental Recreators	0.14	0.10	0.22	0.21	0.26	0.06

	Impact Level					
Cluster	**None**	**A Little**	**Moderate**	**Substantial**	**High**	**NA**
Commercial Development						
Managing Developers	0.15	0.21	0.24	0.12	0.20	0.08
Managing Recreationists	0.28	0.26	0.13	0.05	0.10	0.18
Ambiguous Owners	0.26	0.24	0.12	0.12	0.15	0.12
Environmental Managers	0.21	0.16	0.17	0.12	0.22	0.11
Environmental Recreators	0.21	0.14	0.19	0.12	0.27	0.08
Commercial Development Regulations						
Managing Developers	0.15	0.15	0.17	0.30	0.17	0.06
Managing Recreationists	0.28	0.06	0.19	0.08	0.14	0.25
Ambiguous Owners	0.26	0.24	0.06	0.18	0.18	0.09
Environmental Managers	0.28	0.22	0.20	0.09	0.14	0.07
Environmental Recreators	0.34	0.14	0.13	0.14	0.17	0.08
Trespass and Damage by People						
Managing Developers	0.11	0.26	0.24	0.15	0.20	0.05
Managing Recreationists	0.23	0.23	0.18	0.05	0.15	0.15
Ambiguous Owners	0.12	0.21	0.32	0.24	0.06	0.06
Environmental Managers	0.06	0.30	0.22	0.21	0.16	0.05
Environmental Recreators	0.19	0.30	0.21	0.09	0.16	0.04
Extreme Weather						
Managing Developers	0.23	0.17	0.35	0.14	0.06	0.06
Managing Recreationists	0.15	0.44	0.13	0.05	0.05	0.18
Ambiguous Owners	0.21	0.18	0.26	0.15	0.12	0.09
Environmental Managers	0.11	0.19	0.28	0.27	0.09	0.06
Environmental Recreators	0.11	0.13	0.34	0.18	0.20	0.04

	Impact Level					
Cluster	**None**	**A Little**	**Moderate**	**Substantial**	**High**	**NA**
Pollution						
Managing Developers	0.27	0.21	0.21	0.17	0.08	0.06
Managing Recreationists	0.41	0.28	0.05	0.05	0.05	0.15
Ambiguous Owners	0.09	0.29	0.35	0.15	0.03	0.09
Environmental Managers	0.16	0.27	0.25	0.17	0.07	0.07
Environmental Recreators	0.16	0.20	0.28	0.14	0.18	0.05
Residential Development						
Managing Developers	0.06	0.18	0.27	0.24	0.18	0.06
Managing Recreationists	0.18	0.15	0.18	0.18	0.15	0.15
Ambiguous Owners	0.24	0.26	0.15	0.21	0.09	0.06
Environmental Managers	0.05	0.19	0.26	0.27	0.16	0.07
Environmental Recreators	0.13	0.15	0.29	0.19	0.22	0.03
Residential Development Regulations						
Managing Developers	0.08	0.09	0.23	0.26	0.30	0.05
Managing Recreationists	0.15	0.23	0.15	0.13	0.13	0.21
Ambiguous Owners	0.09	0.18	0.21	0.18	0.29	0.06
Environmental Managers	0.20	0.20	0.32	0.10	0.12	0.06
Environmental Recreators	0.32	0.15	0.19	0.14	0.13	0.07
Property Taxes						
Managing Developers	0.00	0.12	0.30	0.20	0.32	0.06
Managing Recreationists	0.00	0.10	0.26	0.08	0.41	0.15
Ambiguous Owners	0.09	0.18	0.26	0.15	0.26	0.06
Environmental Managers	0.05	0.16	0.25	0.19	0.31	0.05
Environmental Recreators	0.09	0.20	0.26	0.21	0.21	0.02

	Impact Level					
Cluster	**None**	**A Little**	**Moderate**	**Substantial**	**High**	**NA**
Wildfire						
Managing Developers	0.06	0.18	0.36	0.18	0.15	0.06
Managing Recreationists	0.13	0.15	0.21	0.21	0.15	0.15
Ambiguous Owners	0.12	0.21	0.26	0.18	0.18	0.06
Environmental Managers	0.02	0.10	0.21	0.22	0.41	0.04
Environmental Recreators	0.06	0.08	0.31	0.21	0.29	0.05

Assessing Impacts

When considering the clusters, perceived impacts appear to support their value sets. Proportion of clusters against all perceived impacts are seen in Table 22. Managing Developers tend to report feeling more impacted by harvesting regulations, road regulations, other forest regulations, commercial development regulations, residential development regulations, and property taxes. These respondents tend to feel less impacted by climate change and pollution. Managing Recreationists tend to report feeling more impacted by property taxes. These respondents tend to report feeling less impacted by pollution, commercial development regulations, commercial development, climate change, and forest road regulations. Ambiguous Owners tend to feel more impacted by residential development regulations and property taxes. Conversely, Ambiguous Owners tend to feel less impacted by forest harvest regulations, forest road regulations, other forest regulations, climate change, commercial development, and commercial development regulations. Environmental Managers tend to feel more impacted by forest harvest regulations, property taxes, and wildfire. These respondents tend to feel less impacted by commercial development regulations, pollution, and residential development regulations. The Environmental Recreators tend to report feeling more impacted by climate change, commercial development, property taxes, and wildfire. They feel less impacted by forest harvesting, forest road, other forest, residential, and commercial regulations.

Assessing Demographics

The demographic variables tested with the factors are tested against the clusters, to determine if the clusters have any significant differences. Differences were tested using a series of Tukey HSD ANOVAs.

From the demographic data, Environmental Recreators and Managing Developers tend to have larger acreage size compared to Environmental Recreators. Managing Developers tends to have a longer duration of ownership compared to Environmental Recreators. Managing Developers tends to be more Western Washington than Managing Recreationists and Environmental Recreators. Environmental Recreators tends to be more Western Washington than Environmental Managers. There are no significant differences in education levels or income brackets between the groups. Environmental Recreators is more likely to not have a home near their property compared to all other groups. Managing Developers and Managing Recreators are more likely to be riparian compared to Environmental Recreators.

***Table 23**: Demographic Differences between General Survey Clusters*

	Demographic Variables							
Pairing	**Parcel Size**	**Adjusted p-value[1]**	**Ownership Duration**	**Adjusted p-value[1]**	**West/East**	**Adjusted p-value[1]**	**Education**	**Adjusted p-value[1]**
2-1	-0.2739	0.3011	-4.0459	0.7543	-0.2762	0.0405	0.2098	0.8690
3-1	-0.5303	0.0035 **	-7.2250	0.2504	-0.1239	0.7458	-0.1053	0.9894
4-1	-0.0241	0.9996	-2.3152	0.9197	-0.2924	0.0029 **	0.1241	0.9544
5-1	-0.5070	0.0000 ***	-6.3031	0.0960	-0.0765	0.8359	0.0328	0.9996
3-2	-0.2564	0.5249	-3.1791	0.9265	0.1523	0.6674	-0.3152	0.7088
4-2	0.2498	0.3591	1.7308	0.9835	-0.0161	0.9998	-0.0857	0.9940
5-2	-0.2332	0.3636	-2.2572	0.9453	0.1998	0.1629	-0.1770	0.8953
4-3	0.5062	0.0042 **	4.9098	0.5980	-0.1685	0.4356	0.2294	0.8170
5-3	0.0233	0.9998	0.9219	0.9985	0.0474	0.9866	0.1381	0.9588
5-4	-0.4829	0.0000 ***	-3.9879	0.4226	0.0273	0.0157 *	-0.0913	0.9728

	Demographic Variables Continued					
Pairing	**Income**	**Adjusted p-value[1]**	**Home Nearby**	**Adjusted p-value[1]**	**Riparian Owner**	**Adjusted p-value[1]**
2-1	-0.1401	0.9969	0.0744	0.8953	-0.1597	0.4971
3-1	-0.7282	0.3557	0.0387	0.9912	-0.1800	0.4180
4-1	0.0527	0.9998	-0.0355	0.9846	0.0208	0.9991
5-1	-0.0062	1.0000	-0.3413	0.0000 ***	-0.1949	0.0709
3-2	-0.5881	0.6959	-0.0356	0.9958	-0.0204	0.9998
4-2	0.1929	0.9875	-0.1099	0.6328	0.1804	0.3323
5-2	0.1339	0.9962	-0.4156	0.0000 ***	-0.0352	0.9951
4-3	0.7810	0.2373	-0.0743	0.8945	0.2008	0.2724
5-3	0.7220	0.2549	-0.3800	0.0000 ***	-0.0148	0.9999
5-4	-0.0589	0.9994	-0.3058	0.0000 ***	-0.2156	0.0188 *

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

***Table 24**: Desired Topics the General Survey Clusters Wish to Learn More About*

Topics	Clusters				
	Managing Developers	**Managing Recreationists**	**Ambiguous Owners**	**Environmental Managers**	**Environmental Recreators**
Will	0.0909	0.1795	0.1176	0.1481	0.2403
Trust	0.0909	0.2051	0.0588	0.1111	0.1318
Conservation Easements	0.2273	0.1026	0.2941	0.2593	0.3023
Property Tax	0.2576	0.3077	0.2647	0.2716	0.3256
Financial Value	0.3939	0.1282	0.2353	0.2840	0.2868
Ecological Value	0.1212	0.0769	0.1765	0.1852	0.3101
Taxes	0.3030	0.3590	0.2353	0.2840	0.3566
Professional Assistance	0.0303	0.0000	0.1176	0.0617	0.0775
Family	0.1364	0.1026	0.1176	0.2222	0.0930
Interested Owners	0.0455	0.0000	0.1471	0.0000	0.0543
Extreme Weather	0.0303	0.0256	0.0000	0.1481	0.0930
Nothing	0.1515	0.1795	0.2353	0.1738	0.2326

***Table 25:** Comparing General Survey Clusters' Desired Topics of Information*

	Knowledge Variables							
Pairing	**Will**	**Adjusted p-value[1]**	**Trust**	**Adjusted p-value[1]**	**Conservation Easement**	**Adjusted p-value[1]**	**Property Taxes**	**Adjusted p-value[1]**
2-1	0.0886	0.7696	0.1142	0.4125	-0.1247	0.6149	0.0501	0.9828
3-1	0.0267	0.9972	-0.0321	0.9902	0.0668	0.9498	0.0071	1.0000
4-1	0.0572	0.8894	0.0202	0.9958	0.0320	0.9919	0.0140	0.9997
5-1	0.1494	0.0674	0.0409	0.9213	0.0751	0.7847	0.0680	0.8629
3-2	-0.0618	0.9560	-0.1463	0.3110	0.1916	0.3311	-0.0430	0.9945
4-2	-0.0313	0.9930	-0.0940	0.5750	0.1567	0.3470	-0.0361	0.9943
5-2	0.0608	0.9018	-0.0733	0.7321	0.1998	0.0897	0.0179	0.9995
4-3	0.0305	0.9947	0.0523	0.9346	-0.0349	0.9950	0.0069	1.0000
5-3	0.1227	0.4386	0.0730	0.7727	0.0082	1.0000	0.0609	0.9584
5-4	0.0922	0.4161	0.0207	0.9916	0.0431	0.9567	0.0540	0.9203

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.00

	Knowledge Variables							
Pairing	**Financial Value**	**Adjusted p-value[1]**	**Ecological Value**	**Adjusted p-value[1]**	**Taxes**	**Adjusted p-value[1]**	**Professional Assistance**	**Adjusted p-value[1]**
2-1	-0.2657	0.0291 **	-0.0443	0.9818	0.0559	0.9761	-0.0303	0.9698
3-1	-0.1586	0.4496	0.0553	0.9652	-0.0677	0.9593	0.0873	0.4090
4-1	-0.1100	0.5762	0.0640	0.8691	-0.0191	0.9992	0.0314	0.9310
5-1	-0.1071	0.5117	0.1889	0.0160	0.05356	0.9424	0.0472	0.6825
3-2	0.1071	0.8468	0.0995	0.8242	-0.1237	0.7915	0.1176	0.2171
4-2	0.1557	0.3851	0.1083	0.6314	-0.0750	0.9231	0.0617	0.6700
5-2	0.1586	0.2998	0.2332	0.0128 **	-0.0024	1.0000	0.0775	0.3828
4-3	0.0487	0.9841	0.0087	1.0000	0.0487	0.9864	-0.0559	0.7781
5-3	0.0515	0.9756	0.1336	0.4107	0.1213	0.6622	-0.0401	0.9053
5-4	0.0029	1.0000	0.1249	0.1776	0.0726	0.8082	0.0158	0.9900

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.00

	Knowledge Variables							
Pairing	**Family**	**Adjusted p-value[1]**	**Interested Owners**	**Adjusted p-value[1]**	**Extreme Weather**	**Adjusted p-value[1]**	**Nothing**	**Adjusted p-value[1]**
2-1	-0.0338	0.9881	-0.0455	0.7929	-0.0047	1.0000	0.0280	0.9969
3-1	-0.01887	0.9990	0.1016	0.1157	-0.0303	0.9827	0.0838	0.8584
4-1	0.0859	0.5484	-0.0455	0.6466	0.1178	0.0576	0.0213	0.9977
5-1	-0.0433	0.9172	0.0088	0.9984	0.0627	0.5188	0.0810	0.6665
3-2	0.0151	0.9997	0.1471	0.0159	-0.0256	0.9938	0.0558	0.9758
4-2	0.1197	0.3720	0.0000	1.0000	0.1225	0.1236	-0.0066	1.0000
5-2	-0.0095	0.9999	0.0542	0.5727	0.0674	0.6310	0.0530	0.9502
4-3	0.1046	0.5599	-0.1471	0.0033 **	0.1481	0.0498 *	-0.0625	0.9405
5-3	-0.0246	0.9957	-0.0928	0.1156	0.0930	0.3602	-0.0027	1.0000
5-4	-0.1292	0.0590	0.0525	0.3115	-0.0551	0.5817	0.05997	0.8298

[1] * indicates p-value less than alpha = 0.05; ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

Of the respondents to the survey after data cleaning, 66 (19%) are Managing Developers, 38 (11%) are Managing Recreationists, 34 (10%) are Ambiguous Owners, 81 (23%) are Environmental Managers, and 129 (37%) are Environmental Recreators.

Assessing Needs

The rendition of survey questions that inquired about what the respondent would like to know more about were tested for the clusters. The means were derived, as seen in Table 24, and Tukey HSD ANOVAs were conducted to determine if there were differences between clusters, resulting in Table 25.

Generally, all clusters have similar levels of desires for knowledge on all subjects. A few differences existed between individual clusters for some topics, but not enough to develop meaningful conclusions across clusters. The topics with the greatest number of respondents indicating desire to know more about were conservation easements, property taxes, financial value of the land, and taxes in general. This presents an overall trend in the desire to know more about financial matters relating to their ownerships.

Forests and Water Survey Factor Analysis

The strata for the Forests and Water Survey, as described in the Data Description Section, distinctly does not include individuals who are not managing or have an application for FREP, FFFPP, or Alternate Plans. As such, the results of this analysis will omit the non-manager riparian forest landowners. As such, these results should not be extended beyond the population sampled.

From the Forests and Water Survey data, an exploratory factor analysis was conducted based on the answers to the opinion ranking question in the survey which asked respondents to rank their agreement level to topics of water, streams, fish, and regulations regarding their forest land on a Likert scale of 1-5 ranging from “Strongly disagree” to “Strongly agree” including a not applicable option. The topics that the respondents ranked included:

- I wish there were substantially more salmon in Washington State rivers and streams (More Salmon)
- I think my forest land ownership in general is beneficial for salmon and/or other fish (Forests for Fish)

- I think what happens on and near my forest land has an important impact on fish (Other Forests for Fish)
- Conditions on lands and streams upstream of my forest land have an important impact on fish passage on my forest land (Upstream Conditions)
- Conditions on lands and streams downstream of my forest land have an important impact on fish passage on my forest land (Downstream Conditions)
- I think regulations regarding water, streams, and fish in the State of Washington are fairly applied to small forest lands compared to other land uses (Fair Regulations)
- I think active forest management within the riparian buffers on my forest land would not interfere with stream functions (Active Forest Management)
- I have given much thought to the regulations regarding the protection of water, streams, and fish on my forest land (Thinking About Regulations)

These opinion rankings can be interpreted as owner value sets based around connections between forests and aquatic environmental health. An exploratory factor analysis would identify if there were any distinct groupings of opinion topics according to certain respondents that a riparian SFLO typology, concerning forests and water, could be derived.

After removing missing data, Kaiser-Meyer-Olkin (KMO) factor adequacy was conducted to determine if the importance data was factorable. The overall KMO scored at 0.82 with all variables independently ranking between 0.58 and 0.87 (Table 26). This passes the KMO factor adequacy test with the overall KMO score greater than or equal to 0.60 and all factors greater than 0.50 (Dziuban & Shirkey, 1974; Kaiser & Rice, 1974).

Table 26*: Kaiser-Meyer-Olkin Factor Adequacy Scores for Forests and Water Attitude Variables*

Factor	KMO Score	Factor	KMO Score
More Salmon	0.87	**Downstream Conditions**	0.86
Forests for Fish	0.87	**Fair Regulations**	0.86
Other Forests for Fish	0.81	**Active Forest Management**	0.70
Upstream Conditions	0.80	**Thinking About Regulations**	0.58
Overall	0.82		

With all KMO scores being greater than the threshold, a scree plot is produced to determine the number of factors for the factor analysis (Figure 6) The scree plot indicates the majority of information can be explained by two factors, as two factors is the highest number of

factors that still has an initial eigenvalue greater than 1. The rest of the analysis will be conducted assuming two factors is appropriate.

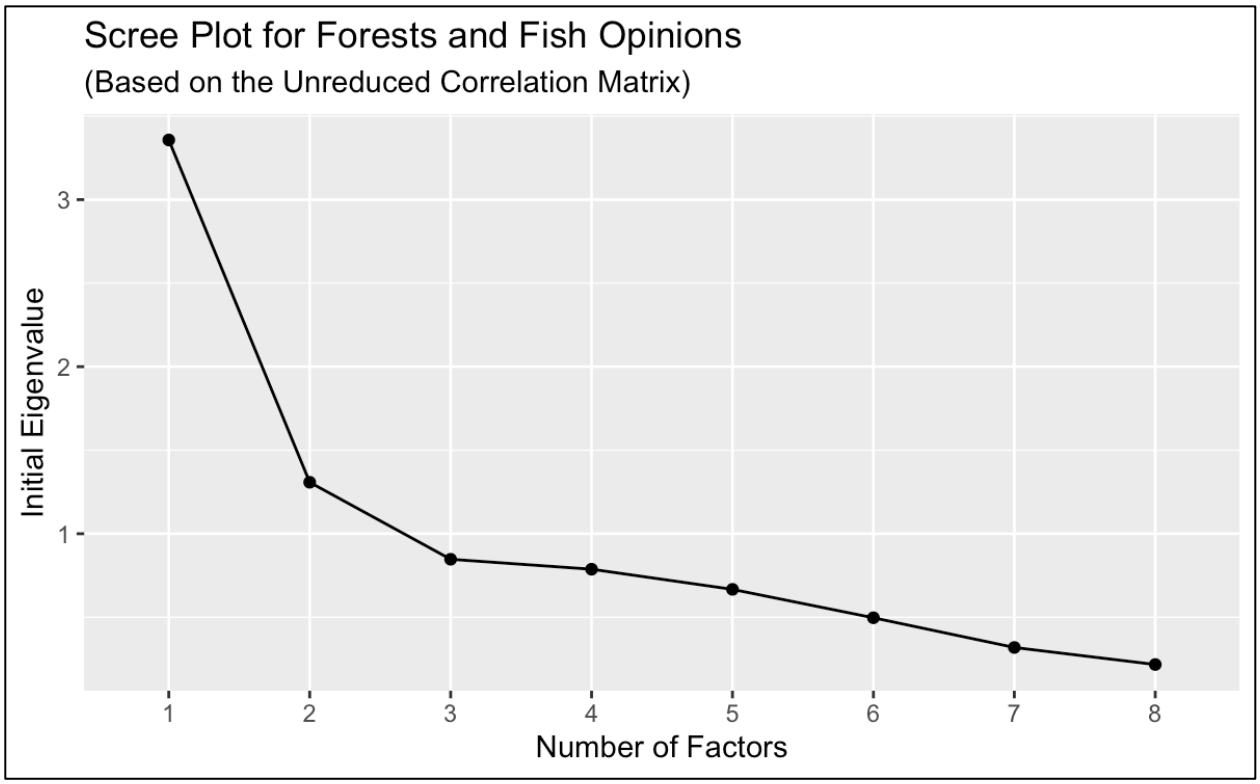

Figure 6: *Scree Plot for Forests and Water Attitudes to Determine Number of Factors*

An initial factor analysis with a scoring method of regression and no rotation is conducted to determine if different rotations are needed on the data using Thurstone's (1947) simple factor structure. Without rotation, the analysis determines that two factors are sufficient. There were no factors with cross-loading in both factors with a value greater than |0.3|. However, Factor 2 only has two aspects that have a significant value (>|0.3|) (Table 25) (Thurstone, 1947).

Table 27*: Forests and Water Attitude Factor Scoring Without Rotation*

	Factor Loadings	
Aspects	**Factor 1**	**Factor 2**
More Salmon	0.438	0.124
Forests for Fish	0.599	0.238
Other Forests for Fish	0.889	-
Upstream Conditions	0.873	-
Downstream Conditions	0.774	0.123
Fair Regulations	0.409	-0.244
Active Forest Management	-0.275	0.396

Thinking About Regulations	0.105	0.539

For ease of interpretation, an orthogonal rotation is used. The varimax rotation, which maximizes variance for indicators across factors as described by Kaiser (1958), is used for its widespread acceptance (Finch 2020). Running the factor analysis again with a varimax rotation results in one indicator with cross-loading out of the eight indicators, violating the simple structure. However, Factor 2 now has three significant aspects. The varimax rotation is kept empowering Factor 2 with more significant factors, acknowledging that one of the aspects has been cross loaded (Table 28).

Table 28*: Forests and Water Attitude Factor Scoring with Varimax Rotation*

	Factor Loadings	
Aspects	**Factor 1**	**Factor 2**
More Salmon	0.455	-
Forests for Fish	0.638	-
Other Forests for Fish	0.848	-0.275
Upstream Conditions	0.844	-0.233
Downstream Conditions	0.782	-
Fair Regulations	0.341	-0.333
Active Forest Management	-0.175	0.449
Thinking About Regulations	0.228	0.500

Taking the highest scoring loading of an indicator and associating it with the correlating factor results in the following indicators associated with the following factors, granting Fair Regulations to Factor 2 to empower the factor (Table 29):

Table 29*: Forests and Water Attitude Aspects Grouped by Factor with Proposed Naming Schema*

Factor (Proposed Name)	
Factor 1 (Environmental)	**Factor 2 (Regulatory)**
▪ Other Forests for Fish ▪ Upstream Conditions ▪ Downstream Conditions ▪ Forests for Fish ▪ More Salmon	▪ Thinking About Regulations ▪ Active Forest Management ▪ Fair Regulations (Negative)

Factor scores are redistributed to the respondent from which the total determinacy stemmed. From these scores, regressions were conducted on other survey responses to determine if these groupings of individuals are significantly different in perceptions and demographics.

Assessing Impacts from Forests and Fish Rules

Respondents to the Forests and Water Survey were asked to rank how Forests and Fish Rules impacted them financial and their assessment of the environmental impacts on a Likert Scale of five options from "Very Negative" (1) to "Very Positive" (5). The respondents were also asked to rank how well the efforts and services to address economic impacts on SFLOs had worked on a Likert Scale of five options from "Not at All" (1) to "Very Much" (5). Factor attitude sets were used in linear regressions with these variables to determine if attitudes sets predicted perspectives on Forests and Fish Rules impacts seen in Table 30.

***Table 30**: Forests and Fish Rules Impacts According to Forests and Water Respondent Factor Value Sets*[1]

	Factor			
	Environmental	**P-value**[2]	**Regulatory**	**P-value**[2]
Financial	0.27054	4.81e-05 ***	-0.53984	5.63e-09 ***
Environmental	0.43929	4.72e-09 ***	-0.73655	3.97e-13 ***
Remediation	0.32879	1.1e-06 n***	-0.29764	0.00102 **

[1] Assumes Likert scale data is of equal interval
[2] ** indicates p-value less than alpha = 0.01; *** indicates p-value less than alpha = 0.001

The environmental value set general sees the financial impact of the Forests and Fish Rules being less negative and more positive or neutral. The same applies to the environmental aspect of the Forest and Fish Laws. In the converse manner, the active managers believe that the regulations have had a negative financial and environmental impact on their ownership. In terms of the remediation efforts, the environmental value set positively predicts better views on remediation whereas regulatory value set predicts a more negative outlook (p-value = 0.00102).

Assessing Demographics

General demographic variables of parcel size, duration of ownership, education, income bracket, and geographic location are used to determine if certain demographic variables predict value sets. Parcel size and geographic location information was gathered from other geographic information sources as provided by Rogers et al. (2020). Duration of ownership, education, and income information were derived from survey data. Multivariate linear regressions were conducted (Table 31).

***Table 31**: Demographic Variables Predicting Forests and Water Attitude Factor Value Sets*

	Demographics Variables				
Factors	**Parcel Size**	**Duration**	**Education**	**Income**	**West/East**

Environmental	1.470e-06	-3.481e-03	1.299e-01 *	-1.719e-02	6.230e-02
Regulatory	2.199e-04 *	7.034e-03 **	-3.638e-02	2.166e-02	1.0000e-01

[1] * indicates p-value less than alpha = 0.05 ** indicates p-value less than alpha = 0.01

Education positively predicts the Environmentalist value set. Duration and Acreage positively predicts the Regulatory value set. Income and geographic location do not predict either of the value sets.

To determine how value sets predict actions, logistic regressions were used. Using survey data on answers to if the respondent had submitted an FPA in the previous 10 years, if the respondent had knowledge of the SFLO Office, along with data collected by Rogers et al. (2020) on whether the respondent's parcel(s) had an alternate plan, FREP, FFFPP, and/or designated land use tax code associated with it, the analysis produced the results as seen in Table 32.

Table 32*: Forests and Water Attitude Factors Predicting Management Decisions*

	Factors			
Behaviors	**Environmental**	***P-value***	**Regulatory**	**P-value**
FPA	-0.06686	*0.0109 **	0.08634	*0.0135 **
Alternate Plan	-0.02920	*0.3016*	0.122720	*0.0008 ****
Tax Program	-0.002192	*0.935*	0.148636	*3.93e-05 ****
FREP	0.03141	*0.2530*	0.06491	*0.0764*
FFFPP	0.038351	*0.183*	0.006359	*0.868*
Heard SFLO Office	0.05729	*0.0472 **	0.18789	*1.98e-06 ****

[1] * indicates p-value less than alpha 0.05; *** indicates p-value less than alpha = 0.001

The Environmentalist value set negatively predicts usage of an FPA and positively predicts knowledge about the SFLO Office. The Regulatory value set positively predicts having an FPA, Alternate Plan, and FREP on file while also being in a Designated-Use Tax Program and having knowledge about the SFLO Office. Neither value set predicted FFFPP application on file.

Assessing Additional Needs

The Forests and Water survey includes a question for respondents to indicate what kind of additional measures they would like to see to address the impacts on their riparian ownership. Logistic regressions were conducted to determine if value sets predicted additional measure requestions. The following suggested measures were available to respondents:

- Additional technical assistance in the form of stewardship foresters (Stewardship Foresters)
- Additional Alternate Plan Templates (Alternate Plan Templates)
- Technical assistance to apply for Alternate Harvest Plans (Alternate Plan Assistance)

- Technical assistance to apply for FREP/FFFPP (FREP/FFFP Assistance)
- Additional funding for FREP and FFFPP (FREP/FFFPP Funding)
- Opportunities to sell the development rights to my forest land (usually via a conservation easement) (Development Rights)
- Opportunities to be paid for the carbon value of my forest land (Carbon Payments)
- Help with protocol stream typing (Stream Typing)
- Help with steep slope delineation (Slope Delineation)
- More regulatory flexibility (Regulatory Flexibility)

***Table 33**: Forests and Water Attitude Factors Predicting Desired Additional SFLO Assistance Measures*

	Factors			
Measure	**Environmental**	***P-value*[1]**	**Regulatory**	***P-value*[1]**
Stewardship Foresters	0.3825	*0.0112 **	0.1741	*0.3634*
Alternate Plan Templates	0.5982	*0.00111 ***	1.3883	*3.08e-08 ****
Alternate Plan Assistance	0.1675	*0.261*	0.7929	*8.8e-05 ****
FREP/FFFPP Assistance	0.2397	*0.127*	0.1566	*0.440*
FREP/FFFPP Funding	0.4919	*0.00048 ****	0.5463	*0.002465 ***
Development Rights	0.5011	*0.0129 **	0.3309	*0.1811*
Carbon Payments	0.3207	*0.0190 **	0.2947	*0.0959*
Stream Typing	0.3977	*0.0341 **	1.0669	*2.36e-05 ****
Slope Delineation	0.3581	*0.0920*	0.6388	*0.0192 **
Regulatory Flexibility	-0.1537	*0.259*	0.9911	*3.09e-07 ****

[1] * indicates a p-value less than alpha = 0.05; ** indicates a p-value less than alpha = 0.01; *** indicates a p-value less than alpha 0.001

The Environmentalist value set positively predicts the desire for stewardship forester assistance, alternate plan template development, increased funding for FREP and FFFPP, programs for development right markets, programs for carbon payments, more stream typing assistance, and more slope delineation assistance. The Regulatory value set positively predicts the desire for more alternate plan templates, more alternate plan assistance, more FREP and FFFPP funding, programs for carbon payments, more stream typing assistance, more slope delineation assistance, and regulatory flexibility. More FREP and FFFPP technical assistance was not significantly predicted by either value set.

Discussion

The factor analysis here is limited by the lack of other questions in the survey to build upon objectives and management styles based on value sets. Further analysis is needed to determine how individuals compare when value sets are mixed, both scored strongly in positive or negative directions, or weakly scored in general. Nevertheless, the value sets do recognize that there is likely an Environmentalist viewpoint that some individuals have to some degree which concerns the health and wellbeing of salmon in relation to forests, including whether or not it is possibly thought forests help salmon. The other viewpoint, Regulatory, focuses on the regulations and whether active management of the riparian area is harmful to salmon. According to factor loadings, the Regulatory viewpoint is not necessarily at odds with the Environmentalist value set when it comes to salmon. Disagreement, of significant loadings, appears in the cross loading of the aspect Fair Regulations, with non-significant cross loading on other aspects related to the environment. The Regulatory and Environmentalist value set may be supportive of one another.

In terms of needs, acknowledging that all respondents from the Forests and Water Survey are managers of some sort, having applied for a program offered through the SFLO Office or having applied for an FPA in the previous 10 years puts additional measures suggested, or desired, into context. From both value sets, there is strong predictive power for stream typing, FREP/FFFPP funding, and more alternate plan templates. This perhaps suggests that these are universal needs, or desires from managers. Further analysis may support this conclusion.

Using these two value sets gives insight to the worldview of actively managing SFLOs with riparian property. Understanding that both of these value sets are on a spectrum of positive and negative for each owner and interact with one another can help program managers understand how to “walk the stream” so to speak as an SFLO.

Cluster Analysis of Forests and Water Survey

With an exploratory factor analysis identifying key value groupings that individuals might have, a cluster analysis can describe how these factors may be grouping in the data. This will cluster individuals from the survey to form describable portions of the riparian SFLO community, which management decisions and needs assessment may be better determined from compared to understanding value groups.

To visualize the data and determine the number of clusters appropriate for the data, a hierarchy cluster analysis was conducted based on the factor value groupings. The data of the factor value groupings were normalized and transformed into a distance matrix. From the clusters, a series of regressions, T-tests, Wilcox tests, and descriptive statistics are conducted to illustrate the data.

The hierarchy cluster analysis was conducted on this distance matrix, creating the hierarchy plot in Figure 7.

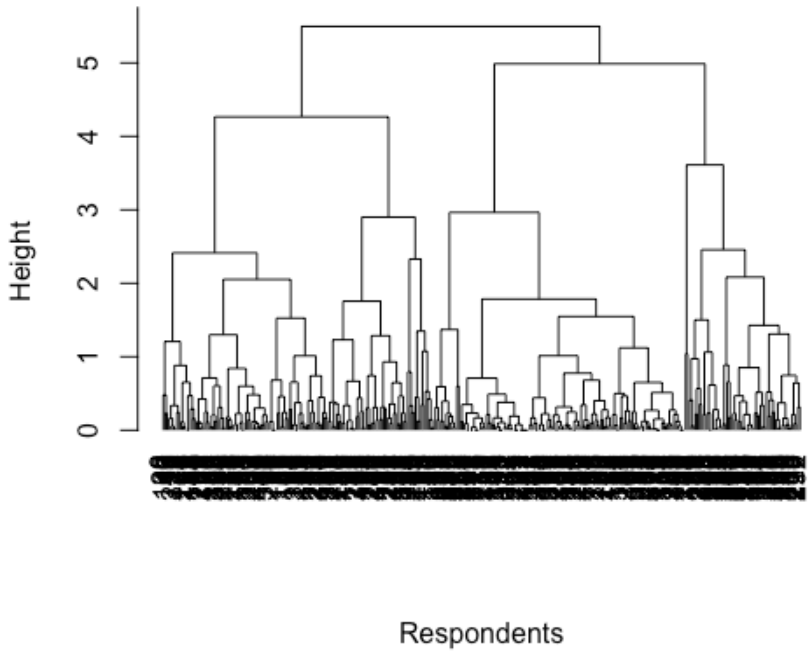

***Figure** 7: Hierarchy Clustering for Forests and Water Attitudes*

From the hierarchy plot, about two or four clusters could be formed form this data. To confirm, a k means gap statistic is calculated and plotted, based on the factor value grouping data. The k means gap statistic had the highest gap static value for k at two clusters, where it further elbowed, suggesting two clusters would be appropriate for this data as seen in Figure 9.

To further support the conclusion that two clusters should be retained, a meta-analysis was conducted across several methods. The method agreement procedure tested 29 methods available in R. Out of the 29 methods for clustering, 12 supported that 2 clusters should be retained, with the next greatest consensus being four clusters with seven supporting methods (Figure 8). Five clusters are retained to support the greatest consensus of the various methods.

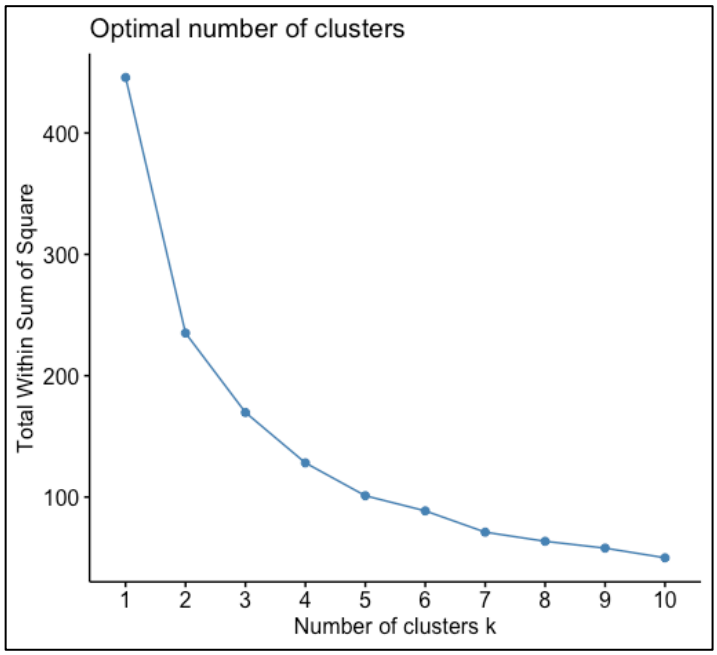

***Figure 9**: Optimal Number of Forests and Water Cluster by Sum of Squares of k Means*

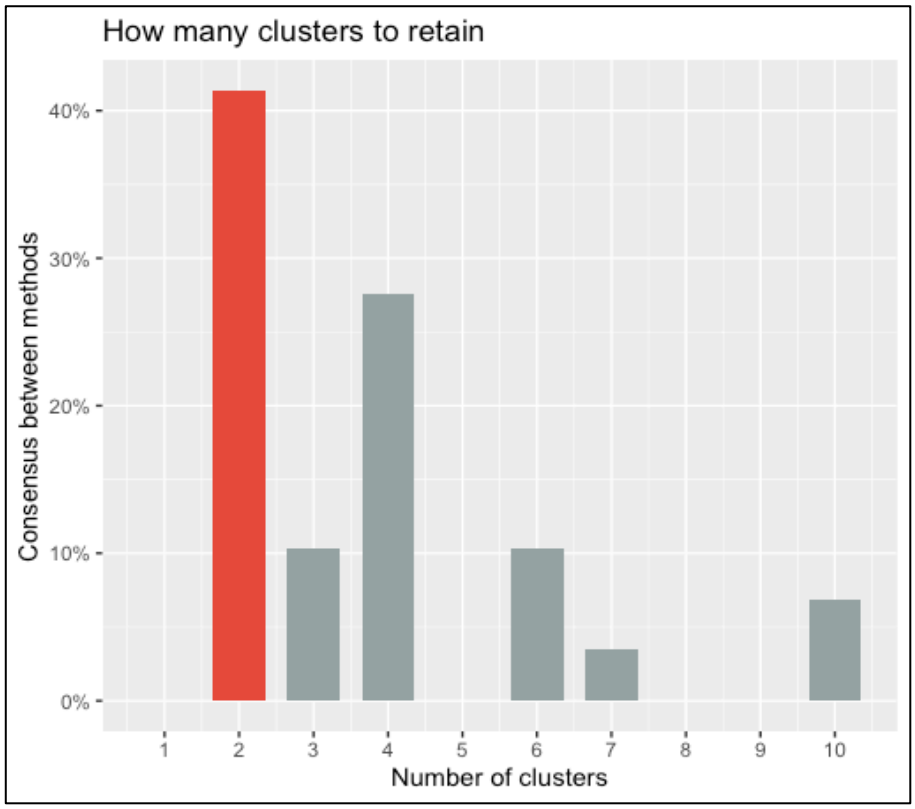

***Figure 8:** Methods Review to Determine Optimal Number of Clusters to Remain for Forests and Water Survey*

With two clusters identified, k means were conducted again on the data with the specification of fivtwoe centers, then clustered with a clustering function resulting in Figure 10.

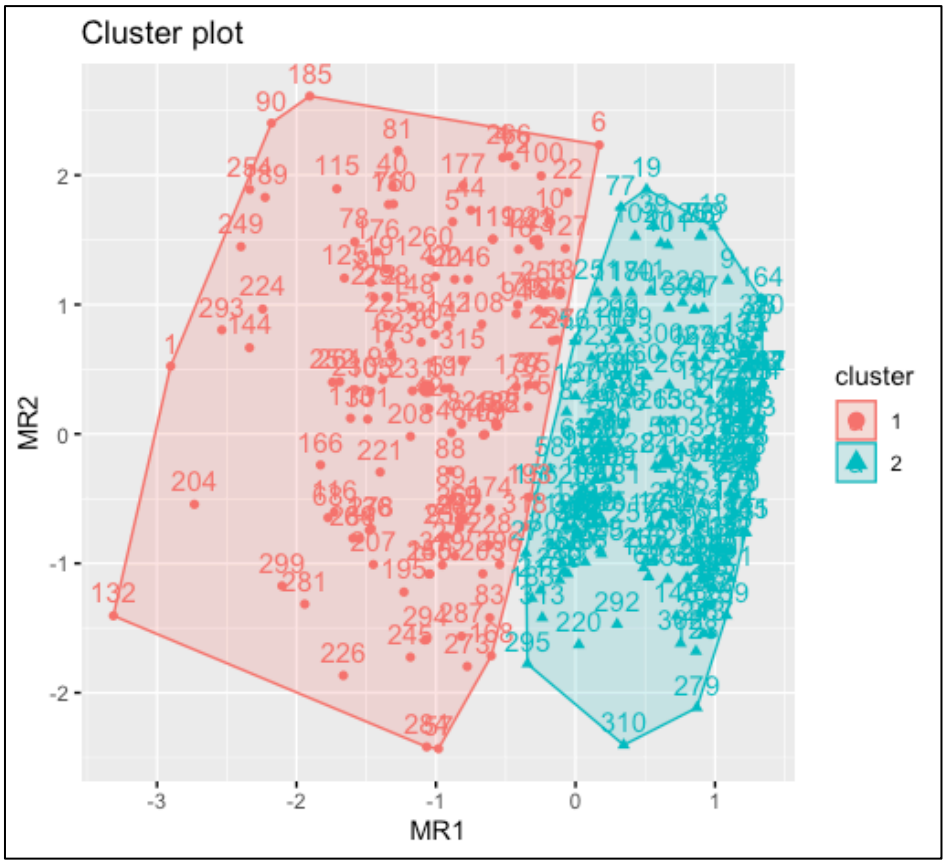

Figure 10: Overlay of Forests and Water Survey Clusters

To determine the objectives of these clusters, T-Tests were conducted to determine the significance of each factor value group to the cluster. The T-test analysis resulted in Table 34.

***Table 34**: Proposed Forests and Water SFLO Clusters Based on Attitude Factor Sets*

	Factors				
Cluster (Proposed Name)	**Environmental Mean**	**P-value[1]**	**Regulatory Mean**	**P-value[1]**	**Difference P-value[1]**
Cluster 1 (Riparian Managers)	-1.0003	2.2e-16 ***	0.2480	0.0011 **	2.2e-16 ***
Cluster 2 (Holistic Managers)	0.6121	2.2e-16 ***	-0.1518	0.0002 ***	4.271e-06 ***

[1] ** indicates p-value of less than alpha = 0.01; *** indicates p-values of less than alpha = 0.001

Cluster 1 has a significantly negative Environmentalist value set and a significantly positive Regulatory value set, with the Environmentalist value set being more heavily weighted

compared to the Regulatory value set. Cluster 1 could be named Riparian Managers. Cluster 2 has a significantly positive Environmentalist value set and a significantly negative Regulatory value set, with the Environmentalist value set being more heavily weighted compared to the Regulatory value set. Cluster 2 could be named Holistic Managers. Cluster 1 and Cluster 2 are significantly different from one another in both value sets.

Assessing Management Behaviors

While the Forests and Water survey participants are inclined to have management focused actions due to the sampling strata, management actions are tested between the clusters to determine if the clusters have different management practices. These include submitting an FPA, having an active FREP project or application, having an active FFFPP project or application, having an Alternate Plan application on file, being part of a designated land use tax program, and if the respondent had heard of the SFLO Office before (Table 35).

***Table 35**: Assessing the Behaviors of Forests and Water Cluster Sets*

	Clusters		
	Riparian Managers (Mean)	**Holistic Managers** (Mean)	**P-value**[1]
FPA	0.7967	0.6915	0.03238 *
FREP	0.2683	0.3140	0.3352
FFFPP	0.3496	0.3582	0.8754
Alternate Plan	0.3902	0.3333	0.3047
Tax Program	0.7236	0.6915	0.5385
Heard SFLO Office	0.5983	0.6205	0.6986

[1] * indicates a p-value of less than alpha = 0.05.

Of the detected clusters, both sets of landowners tend to have similar proportion of individuals either applying for programs, applications, or knowing about the SFLO Office. Usage of FREP, FFFPP, Alternate Plans, Designated Use Tax Programs, and knowledge of the SFLO Office are all similar between groups. The only significant difference of these actions is having filed an FPA in the past 10 years, with more Riparian Managers submitting FPAs compared to Holistic Managers (P-Value = 0.03238). Generally, FPA, Designated Use Tax Programs, and knowledge of the SFLO Office are high in both groups. Conversely, having FREP, FFFPP, or having a previous Alternate Plan on file are generally low.

Assessing Demographics

T-tests were conducted between demographic data to determine if the clusters were significantly different from one another. Demographic variables are the same as those conducted in the factor analysis: parcel size, duration of ownership, education, income, and geographic location. The results are seen in Table 36. No demographic variable significantly predicts one cluster over another.

Table 36: *Assessing the Demographics of the Forests and Water Cluster Sets*

	Clusters		
Demographics	**Riparian Managers** (Mean)	**Holistic Managers** (Mean)	**P-value**
Parcel Size	277.13	303.06	0.7759
Duration	28.58	27.63	0.6442
Education	3.7000	3.8564	0.1867
Income	4.2925	4.2281	0.7693
West/East	0.8130	0.8209	0.8595

Of the respondents to the survey after data cleaning 123 (38%) are Riparian Managers and 201 (62%) are Holistic Managers.

Assessing Forests and Fish Rules Impact

Impact scoring on regulatory impacts on the environment and the landowner's financial viability were tested between clusters. The assessment of remediation efforts was also tested. The results appear in Table 37.

Table 37*: Forests and Fish Rules Impacts According to Forests and Water Respondent Clusters*

	Clusters			
Regulatory Impacts	**Riparian Managers**	**Holistic Managers**	**Wilcox Value**	**P-value[1]**
Environmental	2.1524	3.2722	4257.5	7.805e-12 ***
Financial	1.8857	2.5676	5114.5	1.425e-06 ***
Remediation Efforts	2.1149	2.8712	3315.5	2.966e-08 ***

[1] *** indicates p-value less than alpha = 0.001

Riparian Managers are significantly more likely to find that there is a more negative environmental impact and financial impact regarding the Forest and Fish Rules compared to Holistic Managers (p-value = 7.805e-12; 1.425e-06). Riparian Managers are also less likely to think that the remediation efforts associated with the Forest and Fish Rules have made up for the economic impacts compared to Holistic Owners (p-value = 2.966e-08).

Assessing Additional SFLO Assistance Measures

Clusters were tested to determine differences between desired additional measures using T-tests, resulting in Table 38.

***Table 38**: Assessing Desired Additional SFLO Assistance Measures by Forests and Water Cluster Sets*

	Clusters		
Measure	**Riparian Managers**	**Holistic Managers**	**P-value[1]**
Stewardship Foresters	0.1870	0.2886	0.03398 *
Alternate Plan Templates	0.1789	0.1990	0.6528
Alternate Plan Assistance	0.2358	0.2338	0.9682
FREP/FFFPP Assistance	0.1789	0.2189	0.3783
FREP/FFFPP Funding	0.2927	0.3731	0.1341
Development Rights	0.1057	0.1542	0.1999
Carbon Pricing	0.2927	0.3333	0.4437
Stream Typing	0.1382	0.1592	0.6052
Slope Delineation	0.1138	0.1045	0.7953
Regulatory Flexibility	0.3821	0.2488	0.01349 *

[1] * indicates p-value less than alpha = 0.05.

Holistic Managers are more likely to want more stewardship forester assistance to help mitigate Forests and Fish Rules whereas Riparian Managers would be more likely to want more regulatory flexibility. All other measures are not significantly different between clusters. However, simply considered both clusters have higher rankings for carbon pricing, FREP/FFFPP funding, Alternate Plan assistance, and regulatory flexibility.

Discussion

This analysis indicates that there are two types of riparian property owning SFLOs who manage: one that generally agrees that forest land impacts salmon (Holistic Managers) and another group that feels that they should be more able to manage the riparian area (Riparian Managers). There are not many significant differences between these two clusters other than how each cluster feels that the Forests and Fish Rules have impacted them and how well the mitigation programs are functioning. This may be indicative of general support of the Forest and Fish Rules and the beliefs individuals have around the properties and effects riparian areas have on fish.

Interview Analysis of SFLOs

As discussed in the Data Collection discussion, a series of interviews were conducted with experts, SFLOs, tribal representatives, and administrators of the SFLO Office. The participants were asked a series of questions about what they found to be their goals of their forest land, their concerns, and issues the SFLO ownership at large faces, or what experts and administrators believed these goals, concerns, and issues to be. These answers inform the composition of the SFLO population along with the needs the population faces.

Methods

Interviews were stripped of identifying information and coded using descriptive coding procedure laid out by Saldana (2009) along with latent and manifest coding form Bernard et al. (2015). Each interview was coded twice to decrease omission of pertain coding. Codes and quotations were grouped by theme and further analyzed.

Results

Goals

SFLOs ownership goals can be grouped into three major themes from the interviews: Recreation, Environmental, and Economic. While some interviewees identified strongly with one type of major thematic group, others identified goals in multiple categories.

The majority of interviewees indicated that their forest land ownership maintained a goal of forest health. Forest health could be categorized in two ways: (1) for the environmental benefits that it brings, and (2) the value of the land in terms of land assets. Other interviews suggested that their land ownership was solely for timber production and economic output. Others indicated that their ownership was sole for aesthetics and recreation.

While three major themes emerged from the interviews on goals, another theme emerged several times: SFLO Diversity. Interviewees indicated that SFLOs are a diverse community with many different goals. Even among similarly minded individuals, goals are also achieved in different ways. The level of engagement and management vary across individuals, creating a mosaic of management styles and objectives on the SFLO landscape.

Concerns

Concerns of SFLOs could be derived in several ways. There were similar themes of concerns as goals, mainly focusing on Environmental and Economic concerns. These concerns varied from forest health issues in general to specifics, such as wildfire, water quality and

invasive species, to concerns that focused on the economic viability and ease of management of forest land ownership from regulatory burden, lack of timber infrastructure, lack of timber markets, and cost of management. A third theme arose from societal pressures. Interviewees indicated that public perception of SFLOs impact their ownership and the encroachment of development, along with concerns of family legacy on the land and damage from trespassing and timber theft.

All these concerns suggest a much broader and universal theme of Security. Interviewees suggest that their land, and their ownership, is threatened by the inability to continue to maintain it to achieve their goals, that the forest land tradition will not be continued, or that their forest land—including neighboring forest land—will become unhealthy. The sense of security changes according to concerns. Financial security is different from family security, which is also different from security from environmental processes.

Issues

Issues fell three major thematic groupings: Environmental Pressures, Economic Pressures, Knowledge-Based Issues. Environmental Pressures follow previous goals and concerns laid out by interviewees, such as forest health, climate change, and wildfire. Economic Pressures similarly follow previous goals and concerns, such as development and parcelization, regulatory burdens, financial return of the land, and taxes. The third issue of Knowledge-Based Issues describes the need for education for both the small forest landowner community and the public. Education includes the need for technical assistance, education about rules and regulations, and education about land management and stewardship. Additional support for education being an issue is highlighted by interviewees indicating long wait times, upwards of months, to see a stewardship forester and well attended Washington State University Extension classes.

Additional Impacts

Outside of the stated goals, concerns, and issues, interviewees were asked about the impact of the Forest and Fish Rules (FFRs) on their ownership and on the SFLO community. Recurrent themes for the impact of the FFRs was Complexity, Variable Impact, and Broken Promises. The complexity of the FFRs is described in many ways, including the need for consultation even when a landowner is well experienced, individuals describing the time and

effort required to fill out the Forest Practices Application, and expressed frustration on the lack of technical assistance available by the state. Variable Impact emerged from interviewees either having little knowledge of the FFRs, others expressing significant financial ramifications the decreased manageable land, and others expressing positive perceptions of the strengthened environmental laws. Experts and administrators highlighted the impact was variable, extreme for some and little to none for others who had no intention to manage near the riparian area. Broken Promises was expressed by many, from landowners to experts. Interviewees expressed that the legislature had broken the promise of FFR by not fully funding and staffing the SFLO Office and the initial mitigation program FREP and later FFFPP. The Broken Promises suggests a lack of trust, or broken trust, which stems from landowners feeling betrayed by the legislature and/or DNR.

This issue of trust is further expanded by landowners describing perceived issues with the adaptive management program and others believing that there is little SFLO voice within DNR. When asked what success would look like when interacting with an agency, the concept of respect emerged as interviewees suggested as long as the agency treated them or landowners with respect in their interactions then the interaction would be successful even if it meant revising the landowner's intentions or planned management.

Suggested Policies

At the end of the interview, interviewees were asked to improve a current policy or program or create a new policy or program that would benefit SFLOs. The programs and policies developed fell into the categories of regulatory, education, financial, and infrastructure.

On the regulatory side, interviewees suggested many different policies that could improve SFLO conditions. These suggestions generally considered either more flexibility or avenues for regulatory flexibility for SFLOs or reconsideration of the science behind the Forests and Fish Rules. The regulatory flexibility could come in the form of SFLO specific rules that are not as arduous, best management practices rather than mandated rules, expansion of the 20 acre-exemption, or more alternate plan templates. Reconsideration of the Forest Practices considered either a scientific review of the practices or a separate set of Forest Practices for Eastern Washington.

The educational category included suggestions from interviewees to expand technical assistance and general education. Technical assistance could take the form of more stewardship

foresters or an individual that could walk the land with them to help them understand their ownership and their objectives. Experts and state employees noted that education of SFLOs is an issue that needs to be addressed, supported by landowner interviewees indicating that they would like to learn more.

The financial assistance category comes from several suggested tax incentive programs. Interviewees described either a general tax incentive or a tax incentive similar to the Public Benefit Rating System, or a tax system that recognizes the societal benefits that forest lands provide to the public.

Infrastructure suggestions considered the regulatory burden on SFLOs compared to other entities and lack of timber production infrastructure. While the State of Washington is required to replace culverts on public roads, interviewees suggested there is more work to be down to improve fish passage that is not on SFLO land alone. Improving fish passage on other lands would increase fish passage on their land. In some parts of the state, especially Eastern Washington, interviewees indicated that there is a lack of timber infrastructure for landowners to manage their forest land for timber, or even provide forest health treatments. This also impacts the landowners financially if delivery costs outweigh the return value of the timber.

Discussion

The interviews triangulate with the survey data in terms of objectives and impacts. However, interviews failed to capture the Developer value set that emerged from the survey analysis, indicating that the interviews did not fully grasp the SFLO population views.

The needs to the SFLO community according to the interviews are possibly interconnected. Issues of forest health can be addressed through education and proper management of the land, which may only be possible if there is the infrastructure for SFLOs to conduct certain forest practices.

Population and Needs Assessment Conclusion

The SFLO community is a diverse community of varying objectives and concerns. The diversity community is highlighted through the many different methods and attempts to classify and categorize them. This analysis, using an objective-based typology, finds that the SFLO community of Washington has four significant objective value sets: Recreationist, Utilitarian, Preservationist, and Developer. These value sets are not mutually exclusive, and landowners may

score high or low is all value sets. These value sets suggest that there are five major portions of the SFLO community: Managing Developers, Managing Recreationists, Ambiguous Owners, Environmental Managers, and Environmental Recreators. These clusters are unique in their management, concerns, and the type of assistance or information they would like to have. Interviews further suggest that there are other fundamental needs and issues that SFLOs face.

When considering the riparian property owning SFLOs that have managed their land, there are two clusters that appear: Holistic Managers and Riparian Managers, who are founded on two attitude sets: Environmental and Regulatory. These clusters are fairly similar in most regards; however, they have different viewpoints on the impacts of the Forest and Fish Rules impacts on the SFLO community and the environment.

The SFLO community, experts, and administers have found that the SFLO community has the following needs in education, efforts to address environmental pressures, and efforts to address economic pressures, as illustrated in Table 39. For environmental pressures, some of the SFLO community are concerned about wildfire, extreme weather, climate change, pollution, and overall forest health. For economic pressures, some of the SFLO community are concerned about development and parcelization, regulatory burden on production with the land, the financial return of the land, and property taxes. In terms of education, there is a suggested need for more technical assistance, education about rules and regulations, education about family matters, education about financial and ecological value of the land, and education about land management and stewardship.

Table 39: *General Needs Identified by Survey and Interview Data*

General Needs Area		
Environmental Pressures	**Economic Pressures**	**Education Needs**
▪ Wildfire ▪ Extreme Weather ▪ Climate change ▪ Pollution ▪ Forest Health	▪ Development and Parcelization ▪ Regulatory Burden on Economic Management ▪ Financial Return of Land ▪ Property Taxes	▪ Technical Assistance ▪ Rules and Regulations ▪ Family Matters ▪ Financial and Ecological Value of Land ▪ Land Management and Stewardship

Evaluation of the SFLO Office and Associated Programs[2]

Part of the Forests and Fish Report of 1999 recommended the creation of a Small Forest Landowner Office. This recommendation was carried over into ESHB 2091, now known as the Forests and Fish Rule. Washington RCW 76.13.110 describes the Small Forest Landowner Office as being "a resource and focal point for small forestland owner concerns and policies and shall have significant expertise regarding the management of small forest holdings, governmental programs applicable to such holdings, and the forestry riparian easement program [FREP]." Along with providing expertise on governmental programs, the Small Forest Landowner Office was charged with administering "the provisions of the forestry riparian easement program" along with assisting "in the development of small landowner options through alternate management plans or alternate harvest restrictions appropriate to small landowners" and "develop criteria to be adopted by the forest practices board in rules and a manual for alternate management plans or alternate harvest restrictions." The SFLO Office was also charged with evaluating the "cumulative impacts" of these alternate plans within "subbasin or watershed level" and adjusting alternate plans to minimize "negative impacts on essential riparian function within a subbasin or watershed." The final charge of the SFLO Office is "a report to the board and the legislature containing" estimates, recommendations, and trends concerning small forest landowners. In addition to FREP and alternate plans, the SFLO Office acquired the Family Forest Fish Passage Program (FFFPP) to administer for SFLOs. To evaluate the SFLO Office and its associated programs the evaluation shall consider the following:

- Stakeholder perceptions and descriptions of what the purpose is of the Small Forest Landowner Office and fulfillment of that purpose;
- Stakeholder opinions of interactions with and the staff members within the Small Forest Landowner Office;

[2] The majority of this evaluation was previously conducted for the *Washington's Small Forest Landowners in 2020* report by Rabotyagov et al. (2020). I conducted and wrote the interview analysis, budget analysis, and legislative report analysis in the report. Much of the language will be the same here, as the analysis and writing served the same purpose. Other members of the team include survey and matching analyses for the evaluation. I will be conducting a separate analysis of the survey data. The matching analysis will be referenced to support the evaluation.

- Stakeholder perceptions of the resources and the quality of those resources that the Small Forest Landowner Office has at its disposal;
- A basic budgetary review of the Small Forest Landowner Office and associated programs;
- A review of legislative reports, as charged to complete, by the Small Forest Landowner Office.
- Stakeholder perceptions of the Forest Riparian Easement Program;
- Stakeholder perceptions of the Family Forest Fish Passage Program; and
- Stakeholder perceptions of the Alternate Plan.

Methods

For the interview analysis, interviewees were asked a series of questions regarding the SFLO Office and the affiliated programs. Interviews were coded using the descriptive coding procedure laid out by Saldana (2009) along with latent and manifest coding from Bernard et al. (2016). Each interview was coded twice to decrease the omission of pertinent coding. Codes and quotations were grouped by theme and further analyzed. Differences in perceptions were separated by stakeholder group.

For the surveys, the cleaned data from both the general and forests and water surveys from the previous cluster analysis in the target population assessment is used for the sake of consistency. Using the clusters, some of the data is further analyzed to describe how certain groups of SFLOs perceive the SFLO Office and the associated programs. T-tests and Wilcox tests are used when comparing differences between previously created survey clusters for SFLOs.

Using agency records, analysis of the Legislative Reports and the SFLO Office budgets were conducted to determine trends in data and reporting. A descriptive analysis is presented.

Evaluation of the Small Forest Landowner Office

Understanding the SFLO Office's Purpose

The SFLO Office is charged with several purposes:

1. A resource and focal point for small forestland owner concerns and policies
2. Shall have significant expertise regarding the management of small forest holdings
3. Shall have significant expertise regarding governmental programs applicable to such holdings

4. The administration of the provisions of the Forestry Riparian Easement Program
5. Assisting in the development of small landowner options through alternate management plans or alternate harvest restrictions
6. Evaluating the cumulative impacts of alternate plans with subbasin or watershed level
7. Reporting the legislature on estimates, recommendations, and trends concerning small forest landowners

Later in 2003, by the passage of Second Substitute House Bill 1095, under Section 7, creating the SFLO Office was also charged with:

8. The administration of the provisions of the Family Forest Fish Passage Program.

These eight charges of the SFLO Office are all in the pursuit to mitigate the impacts of the Forest and Fish Rules disproportionately affecting SFLOs, as recommended by the Forests and Fish Report. The principal charge of the SFLO Office, which encapsulates all other charges, is to be "a resource and focal point of small forestland owner concerns." While the charge of the SFLO Office is in statute, understanding the perceived purpose of the SFLO Office by its clientele, experts, and administrators may provide insight into what this broad purpose means in practice.

Before stating results, the SFLO Office is also beholden to the Memorandum of Understanding between the U.S. Forest Service, USDA Natural Resources Conservation Service, Washington State Conservation Commission, Washington Association of Conservation Districts, Washington State University Extension, and Washington State Department of Natural Resources, where the SFLO Office is specified to provide financial and technical assistance via state-funded programs to mediate the impacts of complex state Forest Practices.

Interviewees suggested a range of purposes they believed the SFLO Office should serve. These purposes can fall into three major categories: Education, Technical Assistance, and Administrative. While some interviewees recognized the SFLO Office was set up because of the Forests and Fish Rules, to navigate the complex Forest Practices, the range of identified purposes extended beyond those charged by the legislature. In detail the purpose of the SFLO Office, as perceived by interviewees, is to support SFLOs through technical assistance, regulatory

assistance, stewardship education, regulatory education, general education, administrating assistance programs, advocacy, supporting landowner objectives, adapting to landowner needs, providing information to other resources available to landowners, and advocating for SFLOs at the agency and state-level.

Extension officers described the purpose of the SFLO Office as supporting small forest landowners through financial means, regulatory education, stewardship education, and technical assistance. As one extension officer remarked:

"I think the Small Forest Landowner Office in spirit was set up to help landowners and really ought to have somebody there that can take the time and [...] help owners understand [...] why something is the way it is."

Another extension officer stated that the SFLO Office was "to alleviate some if not all of that [regulatory] pressure." This statement was qualified with financial and regulatory support to the landowners. Nevertheless, not all extension officers agreed on the purpose of the Small Forest Landowner Office. While some supported an SFLO Office that focused on regulatory pressure, others thought that the SFLO Office should encompass more. As one extension officer stated:

"I think it should be about a lot more than forest practice."

The extension officer continued by stating the SFLO Office should also consider forest health, stewardship, and on-the-ground assistance.

Interviewees from landowner associations extended beyond that what the extension officers described and deviated from certain purposes. Association members suggested that the SFLO Office has the purpose of education, developing alternate plans, advocating for small forest landowners, providing technical and regulatory assistance, and serving as administrators of assistance programs. Association members targeted regulatory assistance more often compared to other interviewees in describing the purpose. One association member stated:

"I think the role of the office should be to be a voice of support and policy and [sic] to the forest practice board of the needs of small forest landowners of the state."

Association members listed a variety of technical assistance they believed the SFLO Office should provide, including working through Forest Practice Applications, water typing,

road maintenance and abandonment plans, alternate plans, slope delineation, and buffer delineation.

State employees described the SFLO Office as providing technical assistance, regulatory assistance, education, administering assistance programs, alleviating economic burdens, supporting landowners in all of their management objectives, and adapting to landowner concerns in the future. As one state employee summarized:

"Well, I think the [...] purpose that our organization, the Small Forest Landowner Office really is a main focal point is to try to keep forest land in forest land and we do everything we can to help landowners do that, to keep them from converting, to help them maintain healthy forest, to help them protect the resources out there, and to help them [...] reach their management objectives."

Most state employees emphasized the broad range of duties of the SFLO Office, correlating with the broad range of objectives that small forest landowners have. As a unique comment, some state employees highlighted the adaptability of the SFLO Office for the future needs and objectives of small forest landowners and concerning the new scientific and technical information. Another highlight is a state employee stating that the SFLO Office listens to small landowners who are not as actively involved with the office, to ensure their needs are addressed and represented in the office. A concluding remark on this adaptability and hearing from all landowners is as follows:

"So that's, uh, I guess I'm saying that we have to change with what the landowners want, as far as to keep their land and forest land, whether it's more expertise on timber harvests, whether it's more expertise on how to increase water quality, whatever [...] they want, we're going to have to be able to adapt in the future. And they're going to let us know. And we should be asking them."

Unaffiliated landowners presented a unique perspective, with some suggesting the SFLO Office should be more focused on regulatory practices and others saying the SFLO Office should be universally providing regulatory and non-regulatory assistance. Interviewees from this group, overall, suggested that the SFLO Office's purpose should include stewardship assistance, regulatory assistance, technical assistance, and general education. As one interviewee suggested:

"I think, it's probably its most useful, it would have two pieces in my mind. One would be to help people like myself, manage their forests to increase its habitat value. And the other would be to help people who want to commercially log their forest; do it in a way that meets all the state laws and regulations."

From these interviews, a general purpose of the SFLO Office could be stated as helping SFLOs achieve their management objectives, no matter what those objectives maybe, by state statutes and codes.

SFLO Office Fulfilling Purpose

Interviewees across the stakeholder groups varied on the degree to which the SFLO Office was fulfilling perceived purposes. Overall, most interviewees, who could comment on the SFLO Office as it is currently, indicated that the SFLO Office had room for improvement but also presented several strengths. Interviewees indicate that the SFLO Office does not provide all the services that the office's perceived purposes suggest. However, most interviewees also indicate that this is not a failure of the office but a lack of funding and staffing which will be discussed in the budget analysis section. The purpose that is perceived to not be fulfilled is the SFLO Office being an advocate for small forest landowners. An association member provided a summary that embodies this overall commentary:

"Well, what it was intended to be, is not what it is."

Association member interviews indicated that the SFLO Office is not providing the technical assistance, regulatory assistance, and advocacy that they believe it should be. Some of these interviewees felt like the SFLO Office had not advocated the Forest Practices Board or the State of Washington enough to ease the regulatory burden through the implementation of new alternate plans or other small forest landowner rules. Of these interviewees, a subset thought that DNR was not allowing the SFLO Office to advocate for the small forest landowners. Other association members feel that the SFLO Office no longer provides the technical assistance that they were promised. This varies from slope delineation to help with Forest Practices Applications.

However, even with these stated shortfalls, association members indicated that they remain supportive of the SFLO Office, especially of its existence and its staff. As one association member said:

"I may have mentioned that earlier but over the past 20 years whereas the mission of the office hasn't changed its ability to fulfill its mission has changed."

Positive comments of the SFLO Office regard its newsletter and the staff providing information and answering questions regarding pertinent topics. Some supported the recent hiring of a regulatory assistance forester.

Shifting to extension officer interviews, not all interviewees believe that the SFLO Office has fulfilled this purpose, or the purpose they believe the office should have, commenting on the SFLO Office's perceived focus on the forest practice rules. This included one extension officer commenting:

"They don't serve the small forest landowner community."

The extension officer also remarked that the SFLO Office should be renamed the "Small Harvester's Office" instead, due to the office's perceived focus on forest practices.

However, extension officers have a positive perception of the SFLO Office, including its staff. One extension officer reflected positively regarding the newsletter and other brochures that the SFLO Office provides. Extension officers also offered positive reflections on the provision of technical assistance:

"And they're doing really good job in terms of providing technical assistance for the rules."

State employees recognized the office is not living up to its requirements. Nevertheless, most of the interviews were positive, usually saying that they were doing the best they could and focused more on the shortfalls in funding and staffing. One state employee emphasized this point when asked what success would look like for the SFLO Office:

"So, having enough money to fulfill the program requirements and then have enough staffing to be able to help all the landowners that really need help."

Many of the unaffiliated landowners could not comment on the SFLO Office's fulfillment of its purpose. Those who could comment varied from the SFLO Office writing too much instead of acting to being supportive of SFLO Office sponsored classes. Other than these comments, the unaffiliated landowners were unaware or did not interact with the office enough to want to comment.

SFLO Office Expertise and Staffing

A key component of the SFLO Office is the expertise that it holds in programs for and concerns of SFLOs. Assessing this expertise is difficult without assessing the individuals that work at the SFLO Office directly. However, the interviews and interviewees provided a proxy measure for describing the expertise and staffing quality of the SFLO Office.

The interviews illustrated an overall positive perception of the SFLO Office staff in terms of interactions and expertise. Only one interviewee indicated that some of the SFLO Office staff may not truly be there for small forest landowners. In addressing the RCW, an Extension officer summarized the overall view of the SFLO Office staff with:

"[...] the expertise is there. Presently, there's just not that much of it."

Interviewees indicated that the staff is dedicated, knowledgeable, competent, helpful, and supportive. A couple of criticisms are that some staff members may not be as dedicated as they should be, which is a minority opinion in the interviews, and that the SFLO Office is understaffed. One interviewee suggested that the SFLO Office is not as helpful due to the understaffing, with another calling the SFLO Office "criminally understaffed." One interviewee stated that they became involved by helping with the backlog of helping people, with sometimes the SFLO Office redirecting calls to the interviewee.

In the fulfillment of the RCW of having the expertise to help and inform small forest landowners, the SFLO Office fulfills its duty when only considering the quality of the staff that is currently within the SFLO Office. The SFLO Office is not in fulfillment when considering the quantity of the staff within the office to provide expertise to landowners. One interviewee stated that they helped out the SFLO Office, while not being an employee of the office, which suggests a lack of capacity to address small forest landowner concerns, needs, and questions. However, while the RCWs do not require the SFLO Office to be sufficiently providing this expertise, the argument could be made that quality and quantity are both necessary to have "significant expertise" (RCW 76.13.110).

Budgetary Analysis

The Small Forest Landowner Office has received funding from multiple sources throughout its history. Budgetary data available described the sources and levels of funding since the 2001- 2003 biennium for the Small Forest Landowner Office, the Forestry Riparian Easement Program, the Family Forest Fish Passage Program, and the Forest Stewardship

Program, and the Regulatory Technical Assistance Program. Additionally, full-time employment (FTE) information was provided for the Small Forest Landowner Office, Forestry Riparian Easement Program, and the Family Forest Fish Passage Program. All data was provided by the DNR. Data was not located for the 2001-2003 biennium for the Small Forest Landowner Operating Budget (Hitchens and McDonald 2020).

The Small Forest Landowner Office received funding from the State of Washington in a General Fund, Forests and Fish Support Account, State Building Construction Account, and State Toxics Control Account. The Forest Stewardship Program was funded through Federal funds. Table 40 and Table 41 describes the allocation of funds from each account to the Forestry Riparian Easement Program (Figure 12) and the Family Forest Fish Passage Program (Figure 11), with Table 42 describing allocations to the operating budget of the Small Forest Landowner Office (Figure 13). The General Fund from the State of Washington makes up most of the operating budget for the Small Forest Landowner Office and is present in every biennium. The Forests and Fish Support Account is funds restricted to specific uses and was allotted to the Small Forest Landowner Office from 2011 to 2015 by the State Legislature. The State Building Construction Account provides the funding for the Forestry Riparian Easement Program and the Family Forest Fish Passage Program. The State Toxics Control Account is funds restricted to specific uses and was allotted to the Small Forest Landowner Office from 2015 to the biennium of 2019-2021. The federal funds are from the United State Forest Service and are specifically for the forest stewardship program for stewardship foresters, a wildlife biologist, and cost-share assistance programs. The Forestry Riparian Easement Program received one-time supplemental funding in the 2009-2011 biennium from the Forests and Fish Support Account. The Family Forest Fish Passage Program received one-time supplemental funding in the 2011-2013 biennium from the Jobs Bill. The federal funds are from the United State Forest Service and are specifically for the forest stewardship program for stewardship foresters and cost-share assistance programs (Hitchens and McDonald 2020).

Table 40*: Forestry Riparian Easement Program Funding Allocation by Biennium*

Biennium Allocation	SBCA Allocation	FFSA Allocation	FTE
2001-2003	$3,750,000	-	1.8
2003-2005	$4,000,000	-	3.5
2005-2007	$8,000,000	-	2.0
2007-2009	$10,300,000	-	2.5
2009-2011	$500,000	$600,000	2.1

2011-2013	$1,000,000	-	-
2013-2015	$2,000,000	-	2.5
2015-2017	$3,500,000	-	3.5
2017-2019	$3,500,000	-	3.5
2019-2021	$2,900,000	-	3.8

Table 41*: Family Forest Fish Passage Program Funding Allocation by Biennium*

Biennium Allocation	SBCA Allocation	State Toxics Account/Capital	FTE
2003-2005	$2,000,000	-	1.0
2005-2007	$4,000,000	-	-
2007-2009	$6,000,000	-	1.0
2009-2011	$5,000,000	-	1.0
2011-2013	$2,000,000	$10,000,000	1.0
2013-2015	$2,000,000	-	1.0
2015-2017	$5,000,000	-	1.0
2017-2019	$5,000,000	-	1.0
2019-2021	$5,000,000	-	1.0

Table 42: *Small Forest Landowner Office Operating Funding Allocation by Biennium without Federal Forest Stewardship Funding*

Biennium Allocation	GF-State	FFSA	STCA	FTE
2001-2003	$559,995	-		1.8
2003-2005	$894,300	-		3.5
2005-2007	$664,786	-		2.0
2007-2009	$2,514,586	-		2.5
2009-2011	$320,000	-		2.1
2011-2013	$371,700	$89,400		-
2013-2015	$372,300	$179,800		2.5
2015-2017	$267,400	-	$113,600	3.5
2017-2019	$300,000	-	$121,000	3.5
2019-2021	$413,200	-	$132,100	3.8

Table 43*: Federal Funding Allocation to the Small Forest Landowner Office for the Operation of the Forest Stewardship Program*

Biennium Allocation	SBCA Allocation	Forest Stewardship FTE
2001-2003	-	-
2003-2005	$125,000	1.2
2005-2007	$525,500	2.1
2007-2009	$1,894,400	5
2009-2011	$2,871,800	3
2011-2013	$3,147,700	3
2013-2015	$4,130,400	4.5
2015-2017	$2,663,951	3.7

2017-2019	$800,900	3
2019-2021	-	-

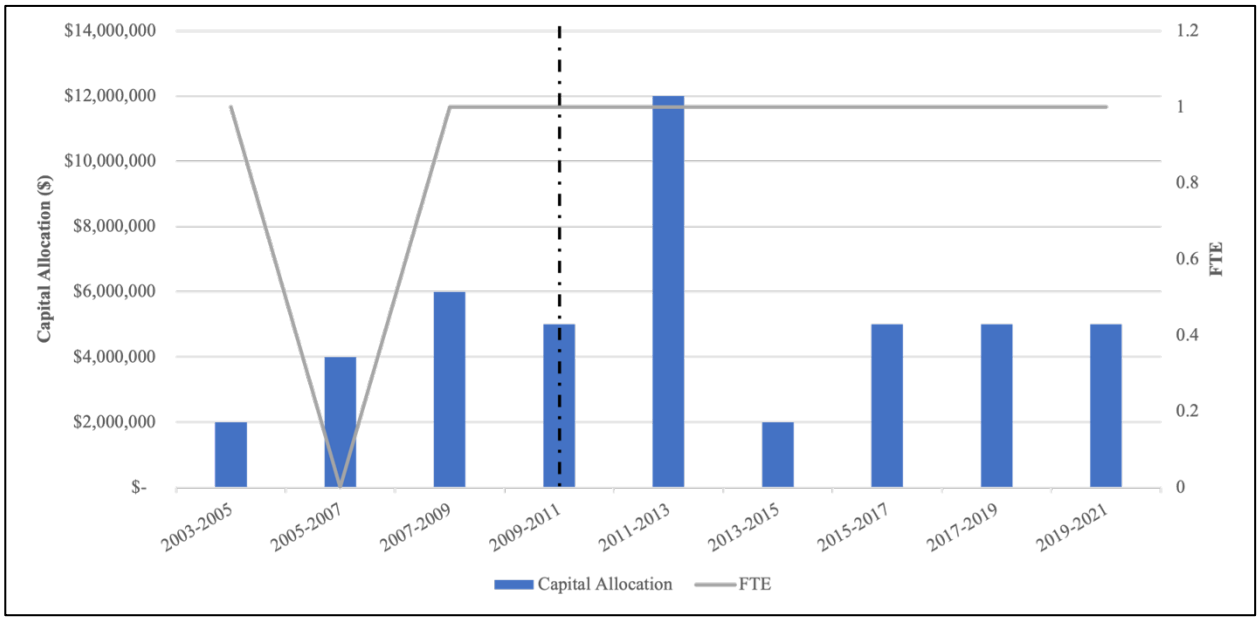

Figure 11: *Family Forest Fish Passage Program Capital Fund Allocation and FTE by Biennium*

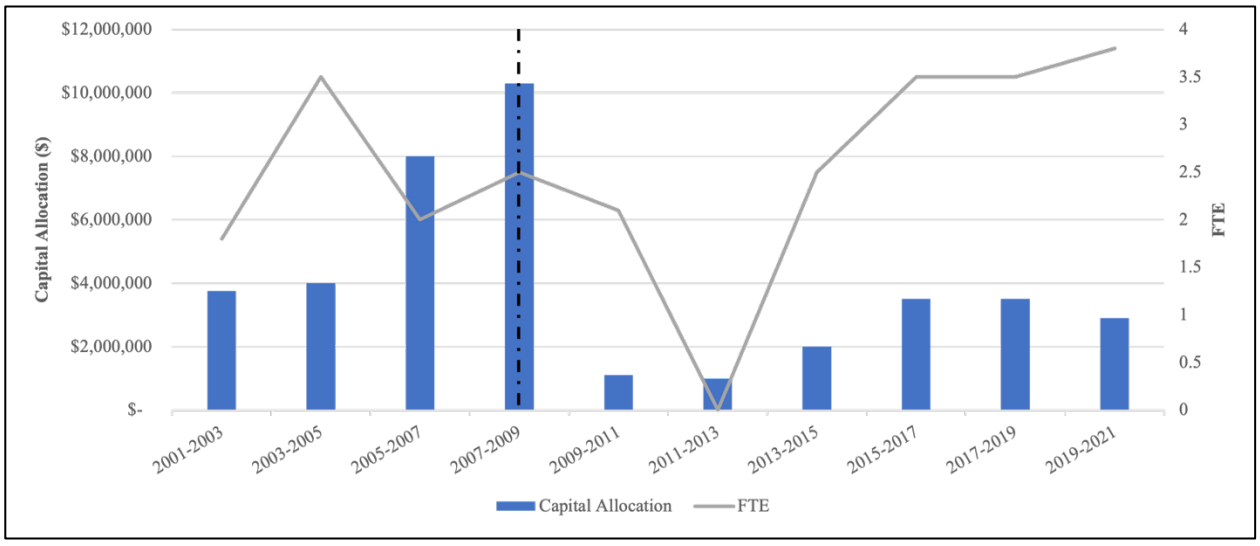

Figure 12*: Forestry Riparian Easement Program Capital Fund Allocation and FTE by Biennium*

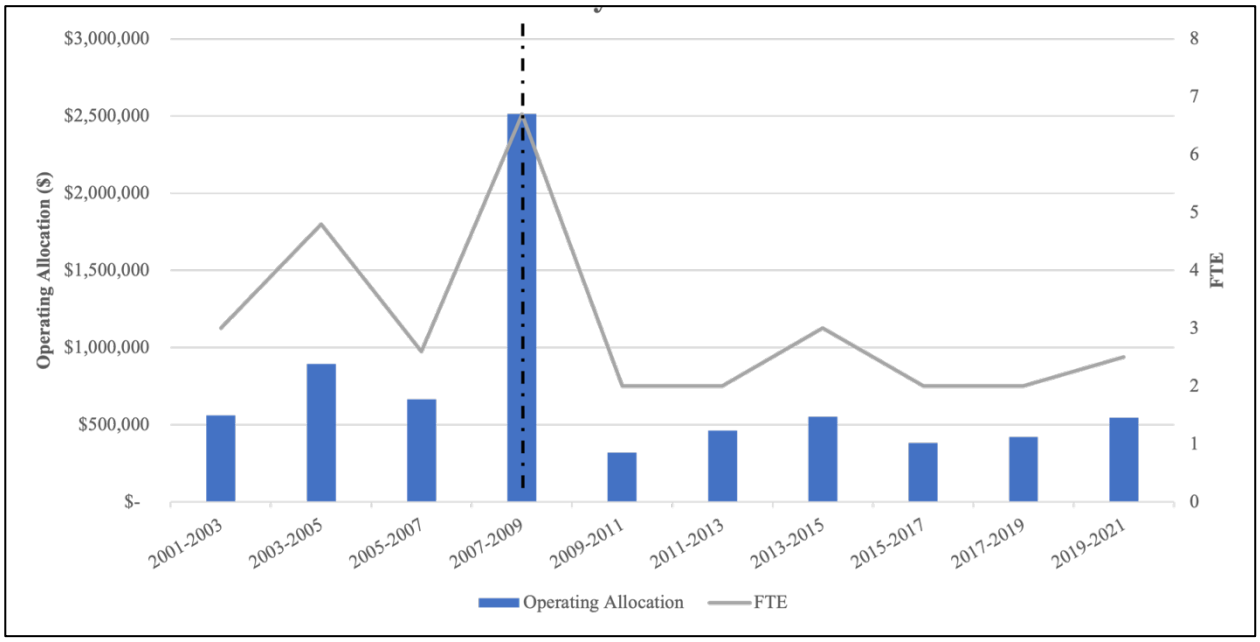

Figure 13: *Small Forest Landowner Office Operating Fund Allocation and FTE by Biennium without Federal Funding Allocations for the Forest Stewardship Program*

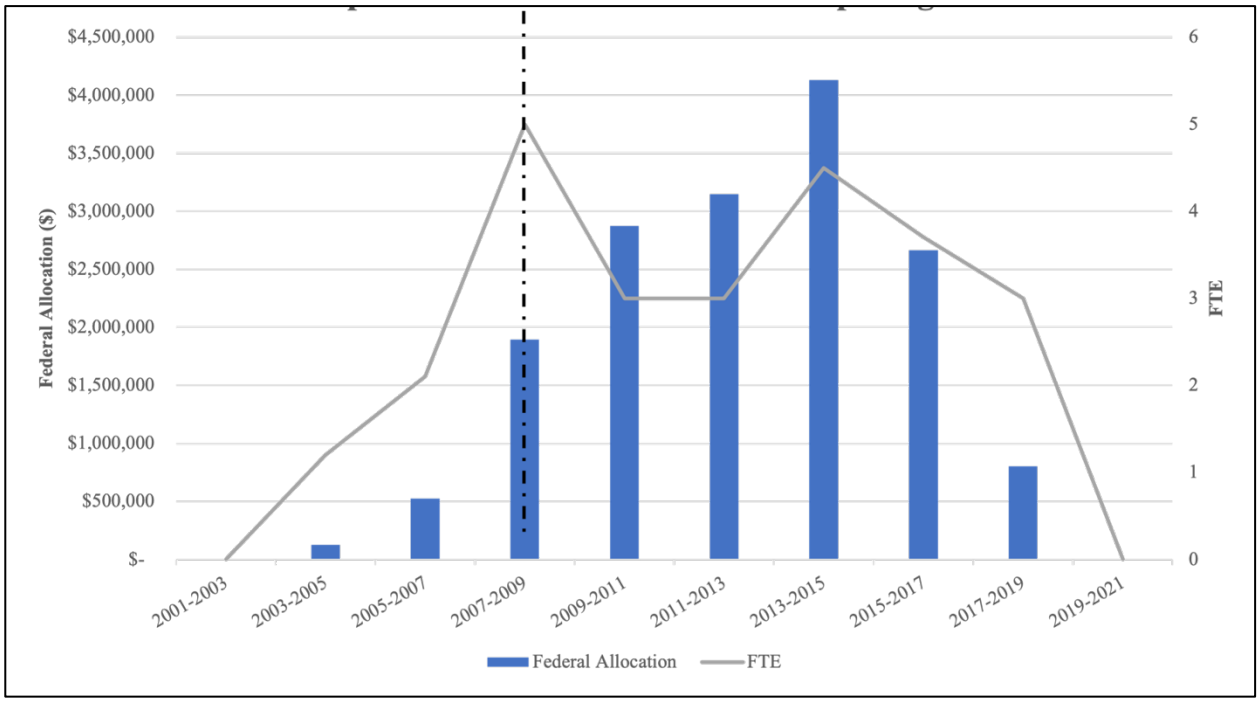

Figure 14*: Federal Funding Allocation to Small Forest Landowner Office for the Operation of the Forest Stewardship Program*

The SFLO Office budgets show an overall decrease in budgetary highs since 2001. Before further discussion, the SFLO Office no longer houses the Forest Stewardship Program, which moved to DNR's Forest Health and Resiliency Division in July of 2019 with Cost-Share

Assistance funding being moved to regions in 2017. The Small Forest Landowner Office no longer receives federal funding to support the Forest Stewardship Program due to these changes in the administrative structure. Federal funding to the Forest Stewardship Program during the program's time in the SFLO Office is illustrated in Table 43 and Figure 14. The Forest Health and Resiliency Division continues to receive federal funding to support the Forest Stewardship Program. The federal funding of the Forest Stewardship Program in the Forest Health and Resiliency Division is not reflected in this report.

The SFLO Office Operating Fund (state funds) and the Forest Riparian Easement Capital Fund both experienced financial highs in the 2007-2009 biennium with $2,514,586 and $10,300,000, respectively. The following biennium of 2009-2011 gave steep decreases in funding for both accounts, with the Small Forest Landowner Office Operating Fund (state funds) falling 87% to $320,000 and the Forestry Riparian Easement Capital Fund falling 89% to $1,100,000. The Family Forest Fish Passage Program also experienced a financial high in the 2007-2009 biennium with $6,000,000. The following biennium of 2009-2011 did bring a decrease in fund allocation with a 17% decrease to $5,000,000. The Family Forest Fish Passage Program, however, received a significant increase in funds from the 2012-2014 Jobs Bill of $10,000,000. Since the Jobs Bill, the Family Forest Fish Passage Program has remained at state funding of a $5,000,000 allotment.

Due to the Forest Stewardship Program no longer being within the Small Forest Landowner Office, meaningful trends cannot be described for the program.

Interviewee Perceptions on the SFLO Budget

The interviews tell a story of the SFLO Office once being fully functioning and providing the resources that it was charged with providing. The extension officer, association member, and state employee stakeholder groups all indicated that there have been dramatic losses in funding and staffing for the SFLO Office and the Capital programs, which is supported by the above budgetary data. Of these stakeholder groups, some interviewees point to the Great Recession of 2007-2009, being the turning point in SFLO budgets.

"But as soon as the Great Recession took place, they're down to I think this year there's four people on it, it used to have 18 people. And much of the services that were promised, technical assistance services that were promised under Forest and Fish are no longer there."

"Of course, the first administrator was Steve Stinson. And I think they had like 12 or 15 people in the department providing services and, of course, are supposed to manage the FFFPP program. But that was considered non-essential work when the 2008 recession hit and just got [...] wiped out."

"[T]he budget has [...] been decreased dramatically from when the small landowner office was first created."

"Yes, so I'd say funding has definitely changed and initially started like what [Interviewee 36a] said there were region staff and in every program or in every region, and now we're down to none in the region and one assisting."

"I've worked with the Small Forest Landowner Office quite closely my entire career. They've been whittled down quite a bit from what the original office was. They used to have an education and outreach person. And then they had several people that worked on the easement, the riparian easement program, several people that worked on the fish passage program. And they had all these, what they called alternate plan foresters, and those guys all kind of helped each other with [...] some other of the road maintenance and abandonment foresters..."

Budgetary data illustrates financial highs for the operating budget and the FREP capital budget during the Great Recession biennium, followed by financials that are lower than pre-recession allocations. FFFPP shows a localized high financial biennium allocation during the Great Recession biennium, followed by a decrease, then another increase to the operational high from the federal Jobs Bill. However, when not considering federal supplementation of the Jobs Bill through state accounts, FFFPP had its financial high during the Great Recession biennium. The program now operates at higher levels than pre-recession allocations.

The interviews also indicate that stakeholders believe that the SFLO Office needs more funding and more staffing. State employees suggest that the SFLO Office needs more funding and staffing to fulfill program requirements and to help landowners. One state employee stated they "don't want to increase the awareness without having the funding to back" those programs up. The employee later included that this lack of funding is a "huge impediment" to getting eligible landowners involved. An association member thought the staffing levels in the SFLO office were not adequate, stating that there are only two or three people available for more than 200,000 small forest landowners.

"That office needs to be fully funded as promised."

Survey Responses for the SFLO Office

Both the general survey and the forests and fish survey asked respondents about their interactions with the SFLO Office.

The general survey asked respondents if they had interacted with the SFLO Office in the past 10 years, and what was the reason for the visit or contact. Respondents had the choice of the following:

- They helped me find another resource (Another Resource)
- Forest Stewardship Program (FSP)
- Forestry Riparian Easement Program (FREP)
- Family Forest Fish Passage Program (FFFPP)
- Road Maintenance & Abandonment Requirements (RMAR)
- Federal Cost Share Programs (Federal Cost Share)
- Forest Practices Applications (FPAs)
- Alternate Harvest Plans (Alternate Plans)
- Regulation Assistance (Regulation)
- Events for landowners (SFLO Events)

The cleaned survey data from the cluster analysis was used. The proportion of the respondents that contacted the SFLO Office was recorded. Then for each of the possible answers, the proportions of those that contacted the SFLO Office for that particular reason were calculated.

Roughly 26% of the respondents to the general survey contacted the SFLO Office with large discrepancies between clusters with higher engagement rates with the Managing Developers (44%) and the Environmental Managers (41%), lower engagement rates with the Managing Recreationalists (5%), and moderate engagement rates with Ambiguous Owners (21%) and Environmental Recreators (15%) (Table 44).

Table 44*: Contact with SFLO Office for Respondents to the General Survey*

	Contact with SFLO Office	
Cluster	**Contacted SFLO Office**	**Have Not Contacted SFLO Office**
Managing Developers	29 (44%)	37 (56%)
Managing Recreationists	2 (5%)	37 (95%)
Ambiguous Owners	7 (21%)	27 (79%)

Environmental Managers	33 (41%)	48 (59%)
Environmental Recreators	19 (15%)	110 (85%)
All Respondents	*90 (26%)*	*259 (74%)*

Respondents overall were most likely to contact the SFLO Office for help with FPAs, the Forest Stewardship Program, or SFLO Events. Other groups were more likely to contact the SFLO Office for other reasons, such as the Environmental Recreators contacting the SFLO Office more so for Alternate Plan information compared to other groups. However, it is critical to note that some cluster groups had low response rates to this question which will skew the results seen in Figure 15 and Table 45.

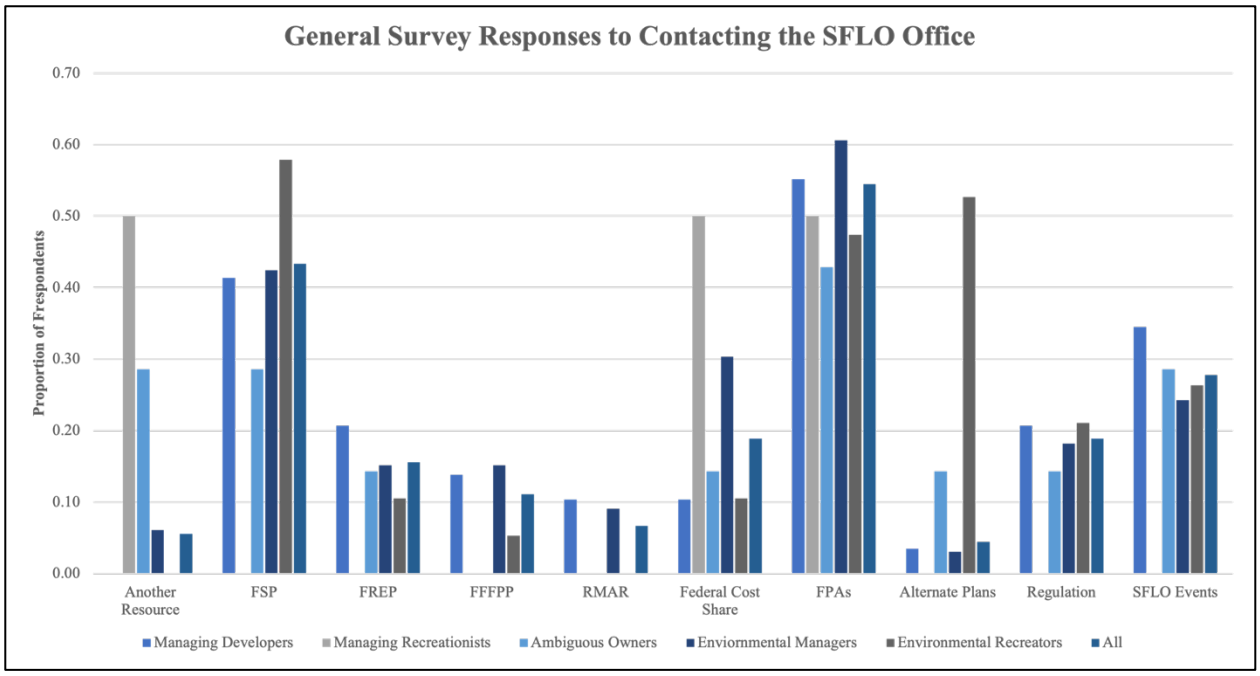

***Figure 15**: General Survey Responses to Contacting the SFLO Office*

Table 45: *Reasons Respondents from the General Survey Contacted the SFLO Office*

	Topics for SFLO Office Contact									
Clusters	**Another Resource**	**FSP**	**FREP**	**FFFPP**	**RMAR**	**Federal Cost Share**	**FPAs**	**Alternate Plans**	**Regulation**	**SFLO Events**
Managing Developers *N=29*	0 (0%)	12 (41%)	6 (21%)	4 (14%)	3 (10%)	3 (10%)	16 (55%)	1 (3%)	6 (21%)	10 (34%)
Managing Recreationists *N=2*	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (50%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)
Ambiguous Owners *N=7*	2 (29%)	2 (29%)	1 (14%)	0 (0%)	0 (0%)	1 (14%)	3 (43%)	1 (14%)	1 (14%)	2 (29%)
Environmental Managers *N=33*	2 (6%)	14 (42%)	5 (15%)	5 (15%)	3 (9%)	10 (30%)	20 (61%)	1 (3%)	6 (18%)	8 (24%)
Environmental Recreators *N=19*	0 (0%)	11 (58%)	2 (11%)	1 (5%)	0 (0%)	2 (11%)	9 (47%)	1 (5%)	4 (21%)	5 (26%)
All Respondents *N=90*	5 (6%)	39 (43%)	14 (16%)	10 (11%)	6 (7%)	17 (19%)	49 (54%)	4 (4%)	17 (19%)	25 (28%)

The general survey also asked respondents if they had received information in the last 10 years about the care, management, or protection of their forest land, then how satisfied they were with the information from the source they received the information from, with a list following from the possible sources of information and a Likert Scale of three rankings: "Less than satisfied," "Neutral," and "Satisfied." This included a "Not applicable" option. The respondents had the following options:

- Small Forest Landowner Office (SFLO Office)
- Government Agency (not the Small Forest Landowner Office) (Gov't Agency)
- Private or non-profit organization (Organization)
- Professional forester (Professional)
- Conservation district (Conservation)
- Extension forester (Extension)
- Neighbor
- Relative

Across all services, SFLOs have higher satisfaction rates compared to less than satisfied rates (Figure 16). In particular, SFLOs have the highest rates of satisfaction with the SFLO Office and professional foresters. The highest dissatisfaction rate is the other government agencies that are not the SFLO Office. In ranked order, the satisfaction rates are as follows: 69% for professional foresters (n=102), 64% for SFLO Office (n=84), 56% for private or non-profit organizations (n=57), 55% for WSU Extension (n=38), 54% for Conservation Districts (n=69), 52% for relatives (n=52), 48% for neighbors (n=62), and 41% for other government agencies (n=66). While not all satisfaction rates are significantly high, or greater than 60%, dissatisfaction rates are generally low, all below 12% other than other government agencies which is at 24%.

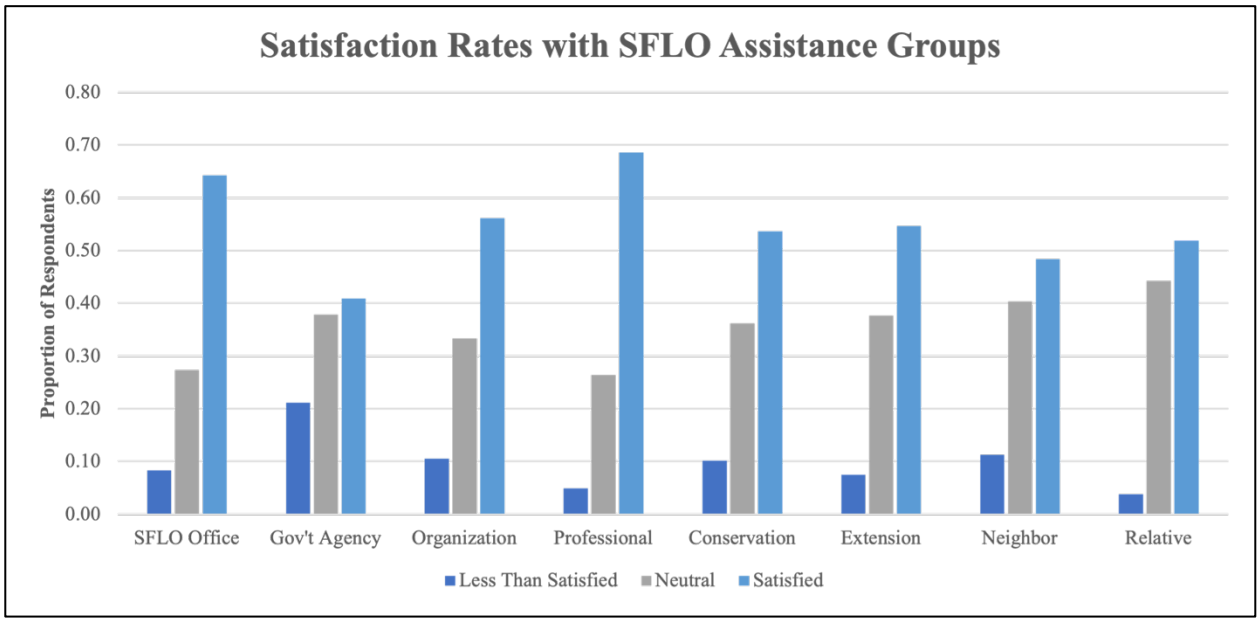

***Figure 16**: General Survey Respondent Satisfaction Rates with SFLO Assistance Groups*

The Forests and Water survey asked respondents if they had interacted with the SFLO Office in the past 10 years, and what was the reason for the visit or contact. The respondents had the same answer options as the general survey.

Roughly 40% of respondents contacted the SFLO Office for some service (Table 46). This is comparable between cluster groups.

***Table 46**: Respondents from the Forests and Fish Survey that Contacted the SFLO Office*

	Riparian Managers	Holistic Managers	Total
Contacted SFLO Office	50 (41%)	81 (40%)	131 (40%)
Have Not Contacted SFLO Office	73 (59%)	120 (60%)	193 (60%)

The main reasons for contacting the SFLO Office from the actively managing SFLOs with riparian property were FREP, FPAs, FSP, SFLO events, and FFFPP (Figure 17). The Riparian Managers cluster contacted the SFLO office more for regulation assistance and alternate plans compared to the holistic cluster. The Holistic Manager cluster contacted the SFLO Office more for SFLO events and to find another resource compared to their counterparts.

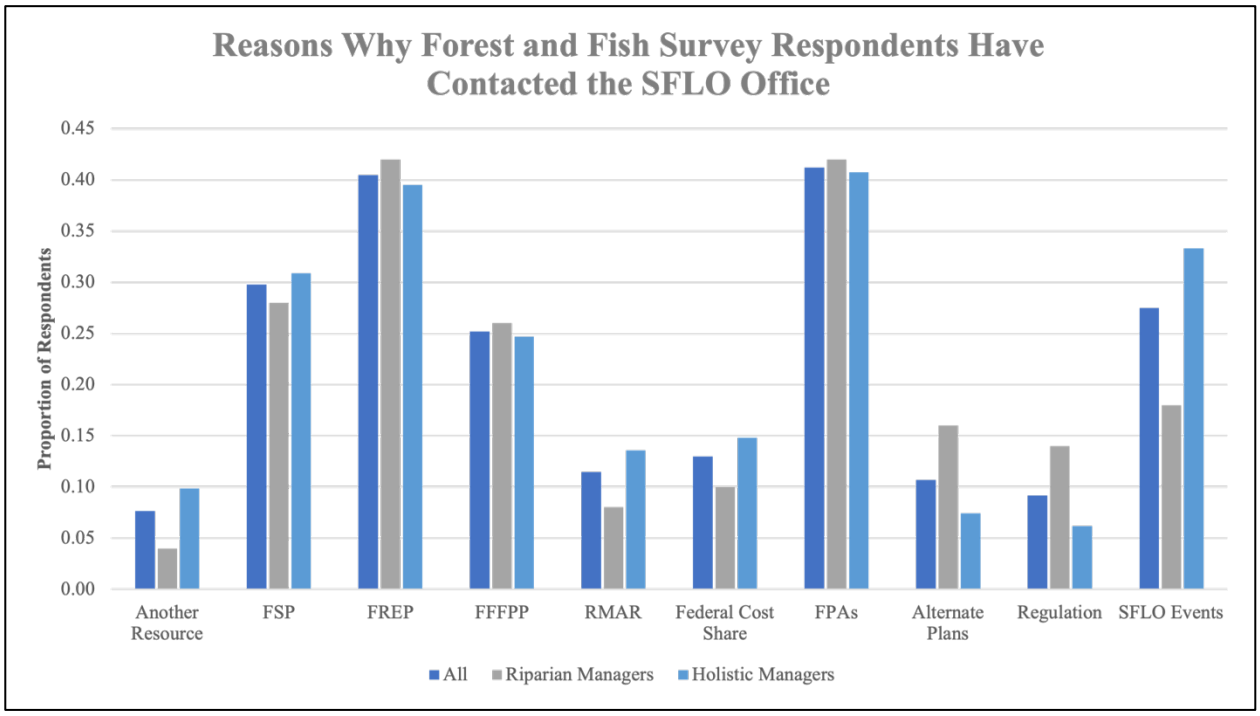

***Figure 17**: Reasons Why Forest and Fish Survey Respondents have Contacted the SFLO Office*

The SFLO Office is generally contacted by the Forests and Water respondents for FPAs, FREP, the Forest Stewardship Program, FFFPP, and SFLO events.

Compared to the general survey respondents, riparian forest owners have a higher contact rate with the SFLO Office compared to the entire population type (p-value < 0.001).

Legislative Reporting Requirements

The SFLO Office is also charged with creating reports to the Forest Practices Board and the State Legislature containing the following information and timeline as defined in RCW 76.13.110:

"(5) By December 1, 2002, the small forestland owner office shall provide a report to the board and the legislature containing:

(a) Estimates of the amounts of nonindustrial forests and woodlands in holdings of twenty acres or less, twenty-one to one hundred acres, one hundred to one thousand acres, and one thousand to five thousand acres, in western Washington and eastern Washington, and the number of persons having total nonindustrial forest and woodland holdings in those size ranges;

(b) Estimates of the number of parcels of nonindustrial forests and woodlands held in contiguous ownerships of twenty acres or less, and the percentages of those parcels containing improvements used: (i) As primary residences for half or more of most years; (ii)

as vacation homes or other temporary residences for less than half of most years; and (iii) for other uses;

(c) The watershed administrative units in which significant portions of the riparian areas or total land area are nonindustrial forests and woodlands;

(d) Estimates of the number of forest practices applications and notifications filed per year for forest road construction, silvicultural activities to enhance timber growth, timber harvest not associated with conversion to nonforestland uses, with estimates of the number of acres of nonindustrial forests and woodlands on which forest practices are conducted under those applications and notifications; and

(e) Recommendations on ways the board and the legislature could provide more effective incentives to encourage continued management of nonindustrial forests and woodlands for forestry uses in ways that better protect salmon, other fish and wildlife, water quality, and other environmental values.

(6) By December 1, 2004, and every four years thereafter, the small forestland owner office shall provide to the board and the legislature an update of the report described in subsection (5) of this section, containing more recent information and describing:

(a) Trends in the items estimated under subsection (5)(a) through (d) of this section;

(b) Whether, how, and to what extent the forest practices act and rules contributed to those trends; and

(c) Whether, how, and to what extent: (i) The board and legislature implemented recommendations made in the previous report; and (ii) implementation of or failure to implement those recommendations affected those trends."

The SFLO Office submitted reports to the Forest Practices Board and the State Legislature for the years 2001, 2002, 2004, 2008, 2012, and 2016. The initial report in 2001, not required by RCW 76.13.110, provides an initial overview of the SFLO Office and a demographic report of Washington State small forest landowners based on previous surveys. This report requested the creation of a GIS database of small forest landownership and warned that without such a database, the SFLO Office would not be able to fulfill its legislative duties in providing meaningful information and trends in future legislative reports.

The 2002 report provided the first legislatively mandated report to the Forest Practices Board and the State Legislature based on RCW 76. This report defined small forest landowners as being between 5- and 5,000-acres using tax records from the 35 forested counties in Washington State, effectively defining a small forest landowner as having at least 5 acres. The SFLO Office noted that this data was coarse and found it very difficult to be able to be used for approximating proximity to water types and watersheds and determining contiguous land ownership. As a result, this report continued the request for the creation of a state-wide GIS database on small

forest landownership. Overall, the 2002 report was unable to provide full answers to (5)(b) and (5)(d) as contiguous ownership could not be defined with tabular data, and FPA data was not yet been million for the 2003-2005 biennium, streamlining the processing of FREP applications, revising valuation methods for FREP, legally protecting FREP easements without degrading property value, the creation of an alternate plan process, the creation of alternate plan templates, the creation of an alternate plan monitoring program, the creation of long-term applications, the creation of an SFLO database, pursuance of educational outreach regarding the Forest and Fish Rules, the hiring of a grants funds manager, the creation of a programmatic habitat conservation program, and investment in small forestry business development.

The 2004 legislative report provided less information than the 2002 report. The SFLO Office was only able to collect information for two counties in 2004 for (5)(a) and could not yet provide a trends analysis due to only two years of information for the two counties information was collected for (2001 and 2004 data from Thurston and Okanogan County). The SFLO Office stated that it did not have enough resources to collect data from the two counties it received data from regarding (5)(b) and so was unable to provide information in the report. The same was stated for (5)(c), that the SFLO Office did not have the resources to re-collect data. For (5)(d) the Forest Practice Application Review System (FPARS), which could provide information for October 28, 2002, to October 31, 2003 calendar year, did not have the information to determine small forest landowner FPAs. So, the SFLO Office provided an estimation for SFLO applications. The SFLO Office made the following recommendations in 2004: increasing funding for FREP to decrease the backlog of 75 applicants, the creation of rules so small forest landowners could use the alternate plan process to create long-term permits, fully fund the FFFPP, a small forest land GIS analysis, and increased staffing for the SFLO Office. The SFLO Office stated it was unable to complete (6)(a), (6)(b), and (6)(c) due to the lack of data to provide trends. Regarding previous recommendations, the SFLO Office noted it was no longer pursuing a private effort for programmatic habitat conservation plans, the office had decreased FREP processing time, an overstocked conifer stands template was created, an alternate plan monitoring process was still being developed, and a grant writer had been hired.

In 2008, the SFLO Office reported its use of the Rural Technology Initiative (RTI) database of forest parcels for its demographic report. The definition of a small forest landowner used in this report changed to a landowner whose potential harvest was under 2 MMBF, which

calculated out to be 2500 acres for Western Washington and 9990 acres for Eastern Washington, with at least 1 acre of forested land. With the RTI database, the SFLO Office was able to fully answer (5)(a) and (5)(c) with a high degree of confidence. (5)(b) was still estimated due to no statewide code for residency. For (5)(d), FPARS was only able to provide information on small forest landowner FPAs from 2007 onwards. Recommendations of 2008 included: fully funding FREP, fully funding FFFPP, developing more alternate plan templates and other regulatory incentives, securing funding for an inventory of fish passage barriers on small forest landowner forest land, securing federal stimulus dollars for more fish passage repairs, seek to improve and update the RTI database, develop a conifer restoration template, increase funding and staffing for the Forest Stewardship Program, support the establishment of the "Office of Conservation of Family Forest Landowner" within the Office of the Governor. The SFLO Office stated that it was not able to complete (6)(a), (6)(b), and (6)(c) due to the differences between data collected in previous reports and the new RTI database. The SFLO Office noted that the RTI database would need to be updated for future trends, Regarding previous recommendations, the SFLO Office stated that FREP required an increase in funding even with previous increases in funding to decrease the backlog of applicants, the Forest Practices Board created long term FPAs (LTAs) for small forest landowners outside of the alternate plan process, the overstocked conifer-dominated RMZ template was approved, FFFPP was popular and there was a need for more funding, more funding would be needed to update the RTI database, and that more staff had been hired in the SFLO Office which decreased FREP processing times and supported LTAs.

In the 2012 legislative report, the definition of a small forest landowner changed to increase the lower range of acreage for one acre of forested land to contiguous ownership of 2 or more forested acres. Without recent updates to the RTI database, (5)(a) was based on the 2008 data with the new small forest landowner definition applied. (5)(b) was still an estimate due to no state-wide code for residency. (5)(c) was completed. The SFLO Office was able to complete (5)(d) for the entire time between reports for the first time. The SFLO Office was unable to provide trends in (6)(a), (6)(b), and (6)(c) without an updated RTI database and warned that, without funding and updates to the RTI database, future reports would also not be able to report trend data. The SFLO Office made the following recommendations in 2012: an update to the SFLO database, increase funding and staffing for FREP, increase funding and staffing FFFPP, develop a conifer restoration template and other regulatory incentives, secure funding for a state-

wide inventory of fish passage barriers on small forest landowner lands, and increase funding and staffing for the Forest Stewardship Program. Regarding previous recommendations, the SFLO Office noted that funding had decreased for FREP and FFFPP and no action had been taken or achieved on the remaining recommendations that were explained previously, including the creation of the "Office of Conservation of Family Forest Landowner" within the Office of the Governor.

In the latest report before this study, the 2016 legislative report had similar information compared to the 2012 report due to no new update to the RTI database, leaving (5)(a) based on the 2007 data. (5)(b) was still an estimate due to no state-wide code for residency. (5)(c) and (5)(d) were completed. (6)(a), (6)(b), and (6)(c) were not able to show meaningful trends due to the RTI database not been updated since 2007 and none of the previous recommendations had been implemented. The recommendations and updates on previous recommendations were the same as in the 2012 report.

Overall, the SFLO Office has not been able to fulfill the requests set out by RCW 76.13.110 (5) and (6). The SFLO Office has stated that a lack of resources, previously unavailable information, and the lack of a dynamic state-wide database of small forest landowners are the causes of its inability to answer these requests in a meaningful way. Table 47 reflects and summarizes the fulfillment of these requests:

***Table 47**: Small Forest Landowner Office Degree of Fulfillment of RCW 76.13.110 (5) and (6)*

	Legislative Duties of RCW 76.13.110							
Year	**5(a)**	**5(b)**	**5(c)**	**5(d)**	**5(e)**	**6(a)**	**6(b)**	**6(c)**
2002	I	I	I	N	Y	N	N	N
2004	I	N	N	I	Y	N	N	N
2008	Y	I	Y	I	Y	N	N	N
2012	I	I	Y	Y	Y	N	N	N
2016	I	I	Y	Y	Y	N	N	N

Conclusions

The SFLO Office is charged with a broad mission to serve small forest landowners across Washington State. The SFLO Office is generally seen as a positive entity, sometimes called a win, with a majority of satisfactory responses according to the survey and interview data. The personnel of the SFLO Office is considered strong and knowledgeable. However, the SFLO Office is largely underfunded and understaffed to meet the needs of SFLOs. The SFLO Office also does not have the necessary resources and information to fulfill its reporting requirements

set out by the Legislature. The SFLO Office, thus, is not fulfilling its legislative duty due to the lack of staffing and resources necessary to address SFLO concerns and make comprehensive reports to the State Legislature.

Evaluation of Forestry Riparian Easement Program

Understanding Purpose

FREP was created as part of the recommendation from the Forests and Fish Report as part of the Forests and Fish Act. As described by DNR, FREP is "a voluntary program that reimburses landowners for the value of the trees they are required to leave to protect fish habitat" (*Forestry Riparian Easement Program | WA - DNR*, n.d.). The RCWs that pertain to all matters of FREP is RCW 76.13.120. In short, according to statute and official agency language, FREP is a remediation program to mitigate the impacts of Forests and Fish Rules on SFLOs due to the widening and more stringent riparian management zone buffers, including no harvest buffers.

Interviewees were asked about what they thought the goal for FREP was to understand how stakeholders described FREP. Across stakeholder groups, there were the common themes of economic alleviation of the disproportionate regulatory burden of increased buffers and protecting riparian function. Individual interviewees varied on what they considered the main goal of FREP to be, with economic alleviation of regulatory takings being the most common. One state employee summarized FREP as being predominantly for the economic alleviation with the additional benefit of protecting riparian function:

"...first with FREP the additional buffers, the wider width and buffers on small forest landowners and their having planned to utilize some of that economic benefit from those buffers and that was taken away from them. [...] But additional benefit is conservation easement for 50 years and the protection of riparian functions on fish bearing and non-fish bearing stream, then that's provided to the citizens of Washington for 50 years. So that is a subsequent benefit. The goal, though, was for economic mitigation..."

However, the state employee and affiliated landowner interviews had variations from these two common themes. State employees also suggested that FREP was to maintain forest land and prevent conversion. One state employee stated that landowners might feel like they are getting a "good deal" compared to other landowners and they will take the easement while also considering that the next generation will deal with the aftermath once the 50 years easement is complete.

For the affiliated landowner interviews, several interviewees brought up that FREP is to compensate for the "regulatory taking" of their private property. One affiliated landowner stated that FREP was to "satisfy WFFA" so that WFFA would support the Forests and Fish Legislation.

"The goal of FREP is to compensate landowners for trees they have to leave in the buffer and, and this is the interesting legal social issue is that normally when you have a taking, like condemning land for a freeway or whatever you got to you have to compensate the landowner, typical, but this whole thing was framed slightly differently to avoid that legal requirement."

Interview Perceptions of FREP

Perceptions about the Program Functions

The interviewees varied on how they felt about FREP. Overall, the majority of our interviewees supported FREP as written or as a concept. In practice, interviewees appear divided on whether FREP is a good or practical program. The greatest division between interviewees comes from the affiliated landowner stakeholder group. Otherwise, state employees who support FREP acknowledged that FREP is not operating optimally. One state employee said that they understood that landowners may not like or want FREP as a landowner might not want a government-related easement on their property or do not appreciate that FREP is a partial compensation program.

"The Forestry Riparian Easement Program has given out millions of dollars to landowners for the buffers that they're required to leave around water and wetlands, streams and wetlands. That's huge, right? Because just 20 years ago, you know, the buffers on these things were essentially minimal. They were practically non-existent. And now, you know, depending on the [...] site class you have, you might be leaving upwards of a 200-foot buffer, which if you only have 10, or 15 acres is a maybe a big chunk of your property, right. And, so, these programs have allowed landowners to keep their land and forest and I think that's a huge win, right?"

In the affiliated landowner stakeholder group, there is frustration around FREP ranging from the waiting period, partial compensation, or having their property rights taken away. Some of our interviewees from Eastern Washington stated that they would rather maintain their rights to the RMZ with the hope that they could manage the RMZ at a later date, referring to their belief the current Forest Practices Rules do not apply to the Eastern Washington regional ecology and that they would like to manage their riparian areas for fire resiliency. A similar concept was brought up by other affiliated landowners and an unaffiliated landowner where these interviewees suggested that there needs to be follow-up management of the riparian easement, either for achieving the desired future condition or to check that the easement is respected.

"It's, so FREP [...] the program has given some relief to some landowners. [...] I don't want to participate in FREP, I would rather manage my trees and that includes right to the stream to get us back to fire resilience."

The affiliated landowner interviews also ranged from calling FREP a "wonderful program" to "inherently flawed." One interviewee called it the "wrong program, but there was no other alternative." Another interviewee suggested that they do not like FREP since landowners could provide the same benefits for a lesser cost through alternative plans. Another affiliated landowner considered FREP a "good model" for other programs regarding cultural resources. Finally, the affiliated landowner interviews, with one extension interview, referred to the uncertainty of what happens after the 50-year easement is complete, with the affiliated landowner interviewees suggesting it will be another "battle."

Across stakeholder groups, there is support and positive perceptions regarding FREP from the majority of interviewees and stakeholder groups, with unaffiliated landowners and state employees being universally supportive and extension universally supporting FREP, though having some disagreement about the legislative promise of FREP. Some affiliated landowners supported FREP as a concept, whereas others had frustrations concerning FREP. Universal negative perceptions of FREP referred to the long waitlist. Other negative perceptions appear to stem from the ideology of property rights or about the management of easements after they are established.

Perceptions about Financial Conditions

FREP was also largely considered to be underfunded by state employees, extension officers, association members, and unaffiliated landowners. These stakeholder groups give ranges of four to twenty years of small forest landowners waiting to receive funding from the FREP program. Some extension officers indicated that the lack of funding has made landowners take FREP less seriously. One state employee suggested that the lack of funding for FREP and other programs means the forest practices laws remain "slanted against" small forest landowners. Association member interviews suggest that small forest landowners have not received what they were promised in Forests and Fish. Association member interviews also claim that by not fully funding FREP, the State of Washington gets to say, "we're compensating landowners for the take of forest land," while only making a "token effort." Unaffiliated landowners who know of

FREP also suggest that the program is underfunded, with one claiming that it took six and a half years to receive their allocation.

"Financially, you know, it's seven years in the hole. What more can I say?"

"But FREP for sure is underfunded: absolutely underfunded."

Our interviews suggest that not all believe FREP should be funded. However, this statement is often supplemented with caveats. Some association member interviews suggest that the creation of a small forest landowner rule, which would allow for more harvest within the riparian management zones, would alleviate some if not all financial burden of FREP on the state. Some of the association members also state the vice versa converse of this comment: if FREP was fully funded, there would be less pressure for another alternate plan template or a small forest landowner rule.

Some of the interviews with extension officers, association members, and state employees call FREP a broken promise due to the lack of funding. One extension officer called FREP a broken promise yet indicated that perhaps the funding should be invested in stewardship instead, while also recognizing FREP as a regulatory obligation. Other extension officer interviews do not blame DNR or the SFLO Office for the lack of funding but place the responsibility on the Legislature. Several association member interviews directly call FREP a promise that was not fulfilled or kept. One interviewee suggested that it was after 2007 that FREP no longer kept up with funding and another suggested after ten years.

As explained previously in the evaluation of the SFLO Office itself, FREP has seen a decrease in its budget (nominal) since the Great Recession. While FTEs have increased for the program, as of the 2019-2021 biennium, there has not been a significant recovery in the capital allocations to FREP for easement purchases (Table 40; Figure 14).

Survey Considerations for FREP

The cleaned data resulted in 97 respondents with a FREP application associated with their parcel. Respondents were asked to rank their satisfaction with the financial compensation received or anticipated to be received from FREP on a Likert Scale of 1 to 5, where 1 is "Not At All Satisfied and 5 is "Very Satisfied." Respondents that had a FREP application associated with their ownership but did not answer the question were given a "Not Applicable" scoring. The respondents answered according to Figure 18.

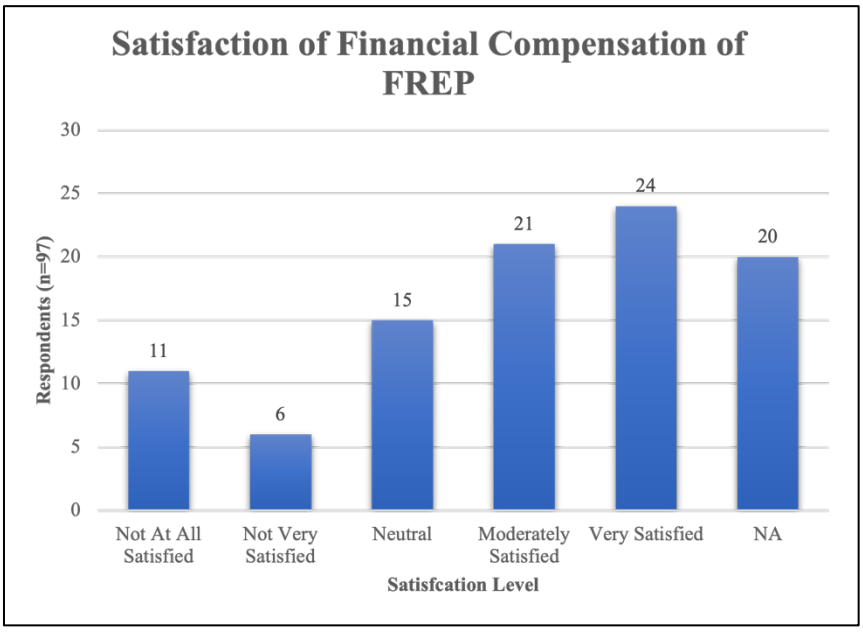

***Figure 18**: Forests and Water Survey Respondents Financial Compensation Satisfaction FREP*

Adjusting for the Not Applicable category, 77 respondents provided a ranking. Out of the 77, 11 (14%) indicated Not At All Satisfied, 6 (8%) indicated Not Very Satisfied, 15 (19%) indicated Neutral, 21 (27%) indicated Moderately Satisfied, and 24 (31%) indicated Very Satisfied. These results generally indicate that individuals are satisfied with the compensation from FREP.

When considering the decision to apply for FREP, respondents were asked to rank topics based on importance. The ranking is on a Likert Scale of five options "Very Unimportant," "Somewhat Unimportant," "Neutral," "Important," and "Very Important" including a "Not Applicable" option. The topics include:

- How important is it that conditions of the easement match your management objectives? (Matched Conditions)
- How important was the information you received from friends or other land owners in your decision regarding FREP? (Information From Friends)
- How important was the information you received from a government representative in your decision regarding FREP? (Information From Government)

- How important was the financial compensation in your decision? (Financial Compensation)

The results of these are indicated in Table 48 and Figure 19.

Table 48: *Forestry Riparian Easement Program Decision Factors by Forests and Water Survey Respondents*

	Importance Rankings					
	Very Unimportant	**Somewhat Unimportant**	**Neutral**	**Important**	**Very Important**	**NA**
Matched Conditions	3 (3%)	3 (3%)	15 (15%)	15 (15%)	42 (43%)	19 (20%)
Information From Friends	6 (6%)	8 (8%)	25 (26%)	16 (16%)	12 (12%)	30 (31%)
Information From Government	2 (2%)	5 (5%)	20 (21%)	22 (23%)	22 (23%)	26 (27%)
Financial Compensation	2 (2%)	4 (4%)	11 (11%)	19 (19%)	37 (38%)	24 (25%)

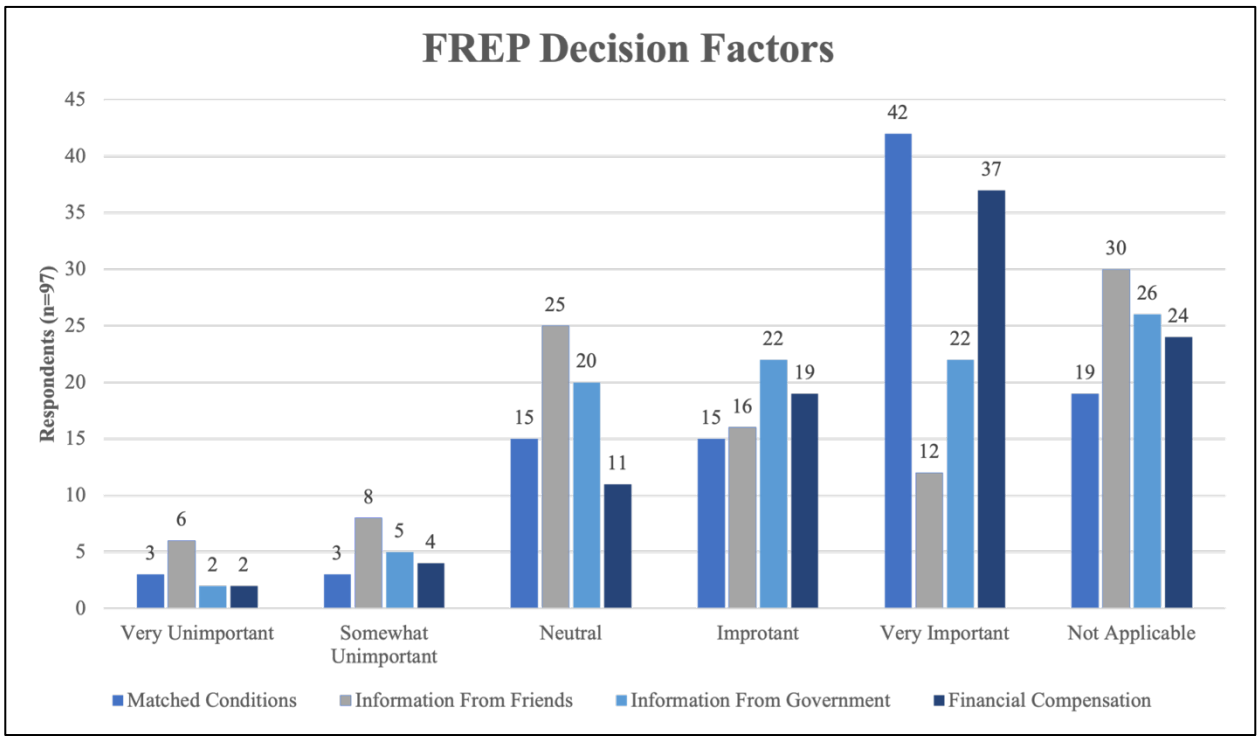

Figure 19*: Forestry Riparian Easement Program Decision Factors by Forests and Water Survey Respondents*

For the respondents that ranked these important factors, the majority found that each factor was at least neutral in their decision, if not within the importance categories. Generally, matched conditions and financial compensation appear to be the dominant important factors when considering FREP.

From these descriptive statistics, FREP is generally satisfactory for most respondents. For the SFLO Office, when focusing on helping SFLOs decide on FREP, understanding the conditions of the easement and the ownership objectives, along with the information on financial compensation will be the most beneficial for prospective applicants.

When considering the earlier cluster analysis, the data may indicate if there is a certain group of SFLOs that have certain opinions about FREP. For the satisfaction of FREP, considering the financial compensation, the Holistic Managers appear to have a stronger satisfaction rate compared to Riparian Managers, as seen in Figure 20. A Wilcox test confirms this with W = 460.5 and a p-value of 0.02473.

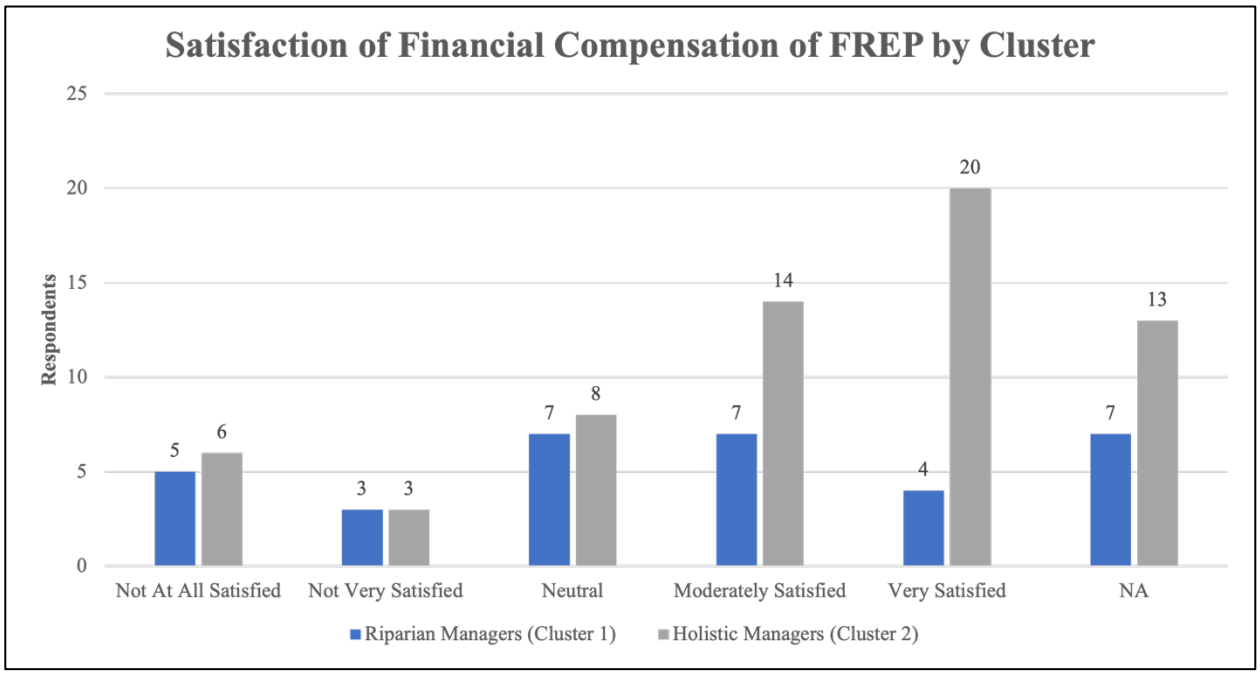

Figure 20: *Satisfaction of Financial Compensation of FREP by Forests and Water Survey Clusters*

As seen in Figure 21 and Table 49, the Riparian Managers cluster indicates that the financial compensation and matched easement conditions with ownership objectives were important to their FREP application decision. For the Holistic Managers cluster, matched easement conditions and the financial compensation were important to their decision, as seen in

Figure 22 and Table 49. Compared to the Riparian Managers, however, the Holistic Managers also found that information from friends or the government were important to their decision. Wilcox tests support this claim, finding significant differences between the Riparian Managers and the Holistic Managers for the information categories of at least alpha < 0.05.

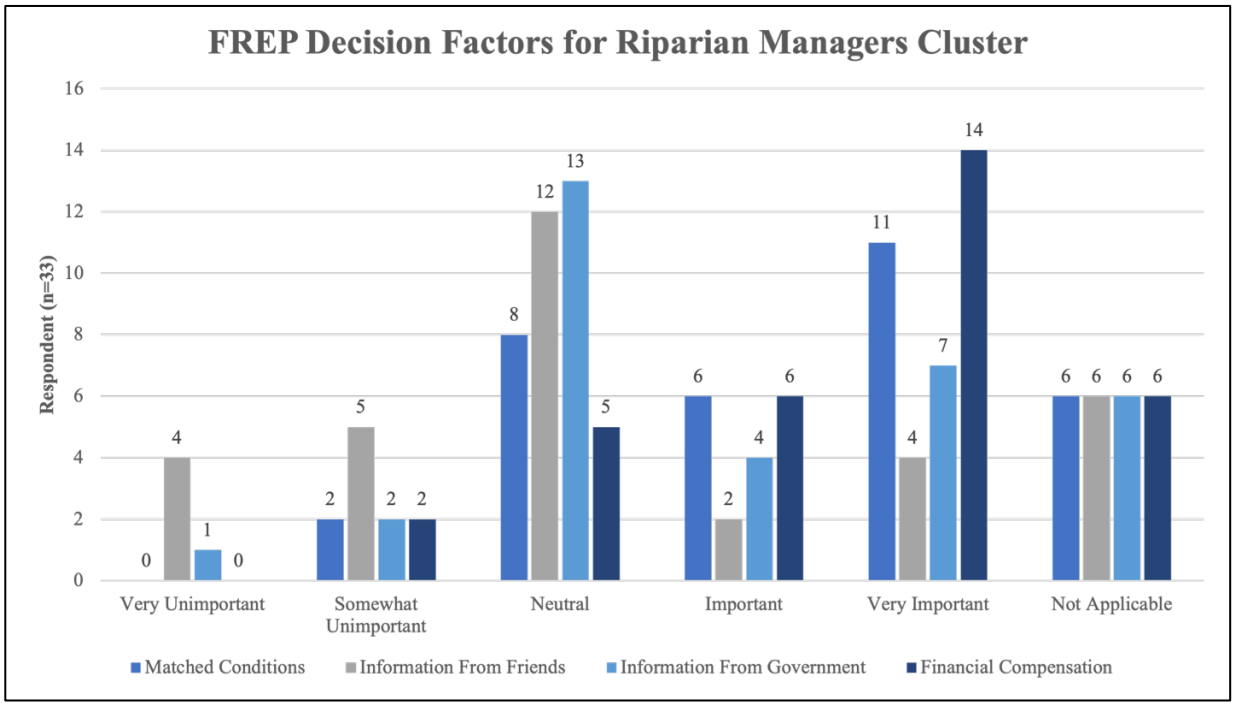

***Figure 21**: Forestry Riparian Easement Program Decision Factors by Riparian Manager Cluster*

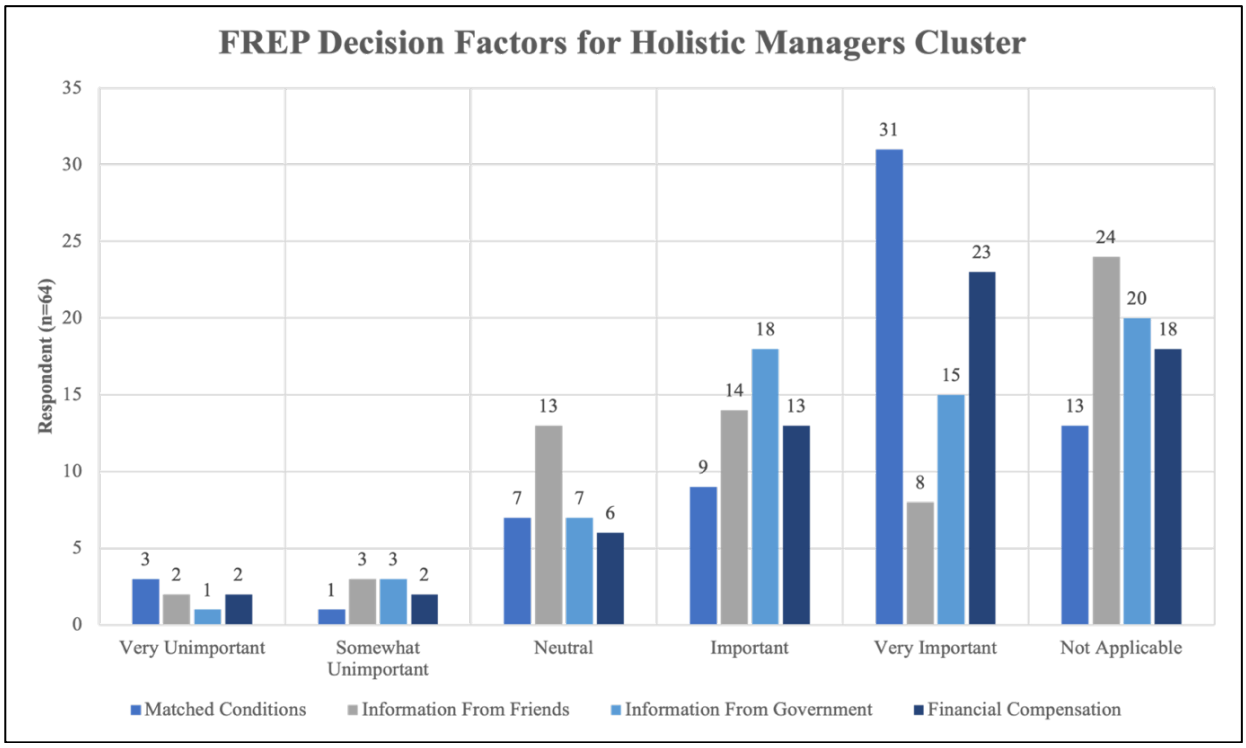

***Figure 22**: Forestry Riparian Easement Program Decision Factors by Holistic Managers Cluster*

***Table 49**: Forestry Riparian Easement Program Decision Factors by Forests and Water Survey Clusters*

	Importance Rankings (Riparian Managers[1], Holistic Managers[2])												
	Very Unimportant		Somewhat Unimportant		Neutral		Important		Very Important		NA		Wilcox Value3
Matched Conditions	0 (0%)	3 (5%)	2 (6%)	1 (2%)	8 (24%)	7 (11%)	6 (18%)	9 (14%)	11 (33%)	31 (48%)	6 (18%)	13 (20%)	602
Information From Friends	4 (12%)	2 (3%)	5 (15%)	3 (5%)	12 (36%)	13 (20%)	2 (6%)	14 (22%)	4 (12%)	8 (13%)	6 (18%)	24 (38%)	399 ***
Information From Government	1 (3%)	1 (2%)	2 (6%)	3 (5%)	13 (39%)	7 (11%)	4 (12%)	18 (28%)	7 (21%)	15 (23%)	6 (18%)	20 (31%)	486 **
Financial Compensation	0 (0%)	2 (3%)	2 (6%)	2 (3%)	5 (15%)	6 (9%)	6 (18%)	13 (20%)	14 (42%)	23 (36%)	6 (18%)	18 (28%)	671.5

[1] Sample size = 33

[2] Sample size = 64

[3] *** denotes alpha < 0.05; ** denotes alpha < 0.01

Conclusions

FREP is generally considered a good program and seen positively. The major criticism of FREP, stemming from our interviews, is the lack of funding. The survey results suggest that the actively managing SFLOs with a riparian property are generally satisfied with the compensation that FREP provides. However, a select subset of these SFLOs, the Riparian Managers, appear to find less satisfaction in the compensation compared to their Holistic Manager counterparts. From the interviews, FREP is seen as a good program though there are complaints regarding the compensation and the premise of needing the program in the first place. While funding the program is the largest concern, there are considerations about the management buffers under FREP and future implications of no active management by the State. The waitlist is suggested to be a barrier to the program being more effective and trusted.

Evaluation of Family Forest Fish Passage Program

Understanding Purpose

The Family Forest Fish Passage Program (FFFPP) was established in 2003 by the Washington State Legislature as an effort to achieve the goals and objectives of the Forests and Fish Report of 1999. The legislature found it necessary to assist SFLOs in the removal of fish passage barriers on their lands to fulfill state laws. All RCWs that apply to FFFPP is RCW 76.13.150.

Interviewees were asked what they thought the goal of FFFPP was. Across stakeholder groups, interviews gave three common goals with one of these goals being universal to all stakeholder groups. Interviewees widely think that FFFPP is to improve fish passage by removing barriers. Meanwhile, state employees, affiliated landowners, and extension officers considered FFFPP as an economic mitigation mechanism to help landowners remove their fish barriers. These stakeholder groups also highlighted the regulatory obligation alleviation of removing inadequate passages during harvests, as long as the passage is on the FFFPP list. Specifically, RCW 76.09.440 states: “The department shall not disapprove a forest practices application filed by a small forestland owner on the basis that fish passage barriers have not been removed or replaced if the small forestland owner applying has committed to participate in the program established in RCW 76.13.150 for all fish passage barriers existing on the block of forestland covered by the forest practices application, and the fish passage barriers existing on the block of forestland covered by the forest practices application are lower on the funding order

list established for the program than the current projects that are capable of being funded by the program."

Interview Perceptions of FFFPP

Perceptions about Program Functions

FFFPP is widely considered a positive program with the interviewees. None of the interviewees suggested that the program should be removed. However, some of the interviewees discuss that the idea of public funds going to a private individual conflicted with their ideology. Nevertheless, our interviewees highlighted the benefits of landowners receiving a permanent upgraded structure on their property that relieves them of the regulatory obligation of removing the fish barrier, which is described in RCW 76.09.440, and, once a barrier is replaced, the fish habitat is opened up. Lack of funding and staff underlined some of the drawbacks that interviewees considered.

Overall, all of the stakeholder groups stated that FFFPP is a benefit for landowners. Some interviewees suggested that losing the program would be detrimental. Several interviewees stated that FFFPP helps landowners stay on the land by allowing for affordable stream crossings that are feasible within small landowner budgets.

"If you're gonna replace a culvert, I mean, that could be a fifty or one-hundred-thousand-dollar proposition if it's on a fish-bearing stream. For a landowner, like us, if we had 20 or 30 acres of forest land, that might force you to sell your property, right. And so that does a really good job of, at least I like to think it's a good job of helping to keep land in forest."

One major complaint revolved around the resulting structure after the project. As a state employee described, the landowners get a permanent, upgraded structure on their property that immediately opens up fish habitat. However, some of the affiliated landowners indicated that they felt that the projects were over-engineered and cost the program more than necessary. These interviewees think that these projects could be done at a lower cost so that more projects could be completed. Other affiliated landowners had frustration with lower priority projects that may never be funded, and sometimes the landowners will need to pay out of pocket to complete the project if that crossing is necessary. A state employee noted that some of the high and medium priority projects are not being completed due to many high priority projects being added to the FFFPP list. While interviewees have frustration about lower priority projects being funded, the

priority system is considered a positive aspect of the program. A state employee interviewee said that reducing the waitlist requires more staffing and funding for FFFPP.

"But we want to try to hit we want to try to get the highest priority projects always and that's our requirement is we're supposed to fix the worst first the ones that provide the most benefit to the resource: meaning how many how many miles a habitat it opens up? The number of species of benefit? So, we're always looking for the good higher priority projects. Even though we've got 1,000 on the list, we want to get the biggest bang for our buck. And we that takes an ongoing outreach effort to to [sic] find those. So, needing the resources to be able to do that, I think is is [sic] needed and I don't have enough staffing to be able to do that."

Perceptions about Financial Conditions

FFFPP is also considered underfunded according to our interviews with all stakeholder groups. State employee, extension officer, and association member groups all include an interview in which the waitlist for FFFPP is mentioned. One state employee suggested that some landowners may never receive their FFFPP funding. An extension officer stated that the demand is greater than the supply. One association member stated that the last time they printed out the waitlist, it was seven pages long. Beyond not being able to provide for the landowners that signed up, one state employee stated the following:

"The FFFPP: we don't have enough resources to conduct all the outreach that we need to conduct to be able to get landowners to sign up for the program."

While FFFPP is considered underfunded by all stakeholder groups, our interviews with association members indicated that FFFPP is funded more so than FREP. According to the budgetary data, this is true for every year after the 2007-2009 biennium, excluding the 2013-2015 biennium when FREP and FFFPP received the same allotment. One interviewee with the association member group stated that it is important to remember that FFFPP was not part of the original Forests and Fish Rule, since:

"The reason that's important to me [...], is because the legislature started funding FFFPP and not funding the forest, FREP, the Forest Riparian Easement Program."

Another association member interviewee suggested that the state likes to fund FFFPP more than FREP:

"...they get to claim a victory on 'aren't we good stewards of our habitat of our environment?' Look, we funded this program and it's replaced so many barriers and now we've gained this many more miles of potential fish habitat."

At the same time, no interview suggested that FFFPP should receive less funding. While some interviews suggested that the fish passage culverts funded by FFFPP are over-engineered and could be made simpler with fewer funds, these suggestions did not include overall remarks on less funding for the program. Like FREP, FFFPP is considered a broken promise in some interviews with association members and extension officers.

Survey Considerations for FFFPP

In the Forests and Water Survey, several questions were asked about FFFPP. Using the cleaned data from the cluster analysis, perceptions about FFFPP were analyzed.

Respondents were asked to assess their perception of FFFPP based on information they had received about the program from another landowner or neighbor on a Likert scale of three choices: Negative, Neither Positive or Negative, or Positive. Out of the 135 respondents, 14 (10%) had a negative perception, 52 (39%) had neither a positive nor negative perception, and 69 (51%) had a positive perception as seen in Figure 23.

General satisfaction with FFFPP was also assessed for those who have an FFFPP project completed on their land on a five-point Likert scale of Not At All Satisfied (1), Not Very Satisfied, Neutral, Moderately Satisfied, and Very Satisfied (5). With 75 total respondents to this question, the majority had a satisfactory opinion of the project at 59 (78%). Overall, 9 (12%) were not at all satisfied, 2 (2%) were not very satisfied, 6 (8%) were neutral about the project, 10 (13%) were moderately satisfied, and 49 (65%) were very satisfied.

Among the proposed clusters, the majority satisfactory trend continues. Out of the 75 respondents, 30 were from the Riparian Managers cluster with a 61% satisfactory rate (Figure 27). The remaining 35 respondents came from the Holistic Managers cluster with an 85% satisfactory rate (Figure 26).

Respondents were given several factors to consider and select as it applies to them and their FFFPP project/application. As illustrated in Figure 24, factors include:

- I am/was able to apply for timber harvest because I applied for FFFPP (Allowed Harvest)
- The fish passage barrier was correct (Passage Corrected)
- More of my forest land is now accessible for harvesting (More Accessible)

- I am too far down the priority list to expect a FFFPP project to actually be completed on my forest land (Too Far Down List)
- I applied to FFFPP because I had to (Had To Apply)
- I think FFFPP is a good use of public funds on my forest land (For Public Funding)
- I *do not* think FFFPP is a good use of public funds on my forest land (Against Public Funding)
- I have an existing barrier to fish passage on my land that is preventing access to a substantial portion of my forest land (Inaccessible Barriers)

When considering aspects of their FFFPP project or application, the top three responses from the survey indicated that respondents were for FFFPP being funded by public funds, the fish passage was corrected, and several believe they are too far down the list to see their project completed. These responses indicated that FFFPP is believed to be a positive program that should be funded by the public; however, the waitlist remains an issue.

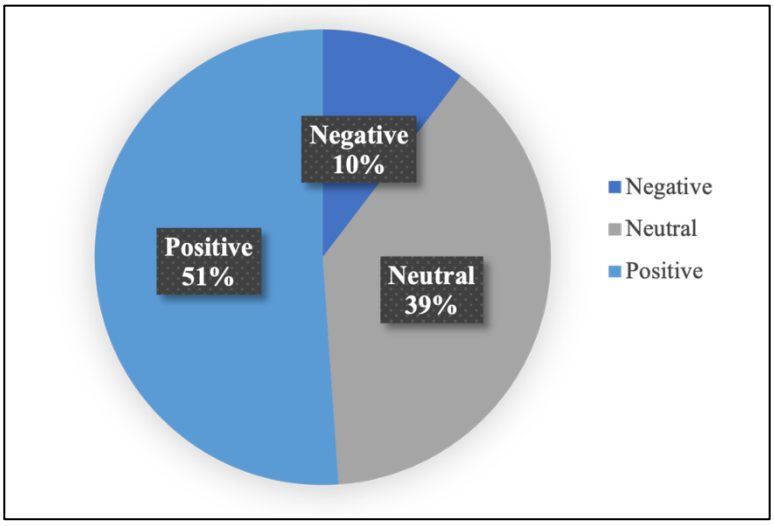

Figure 23: Perceptions about Information Received about the Family Fish Passage Program by Forests and Water Respondents

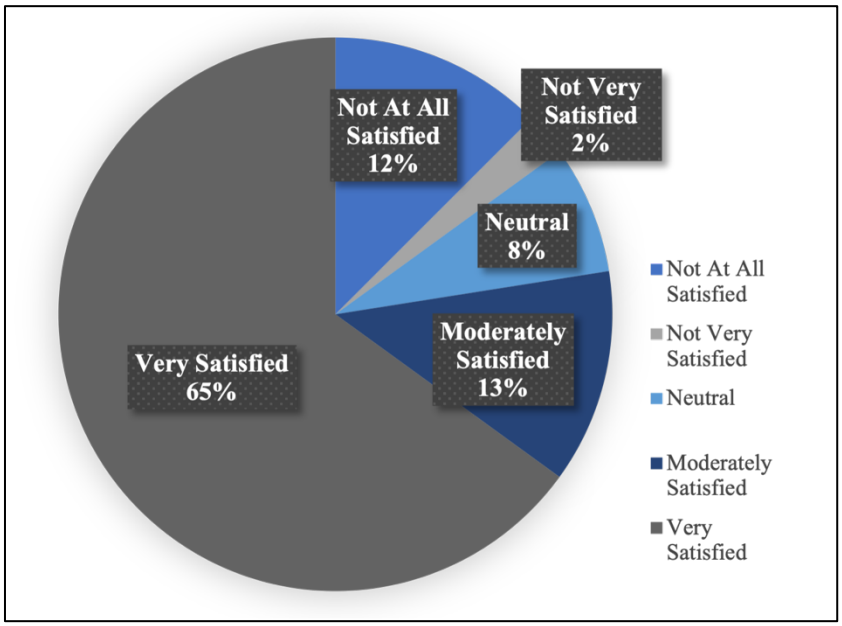

***Figure 25**: Satisfaction Rates with the Family Forest Fish Passage Program with Forests and Water Respondents*

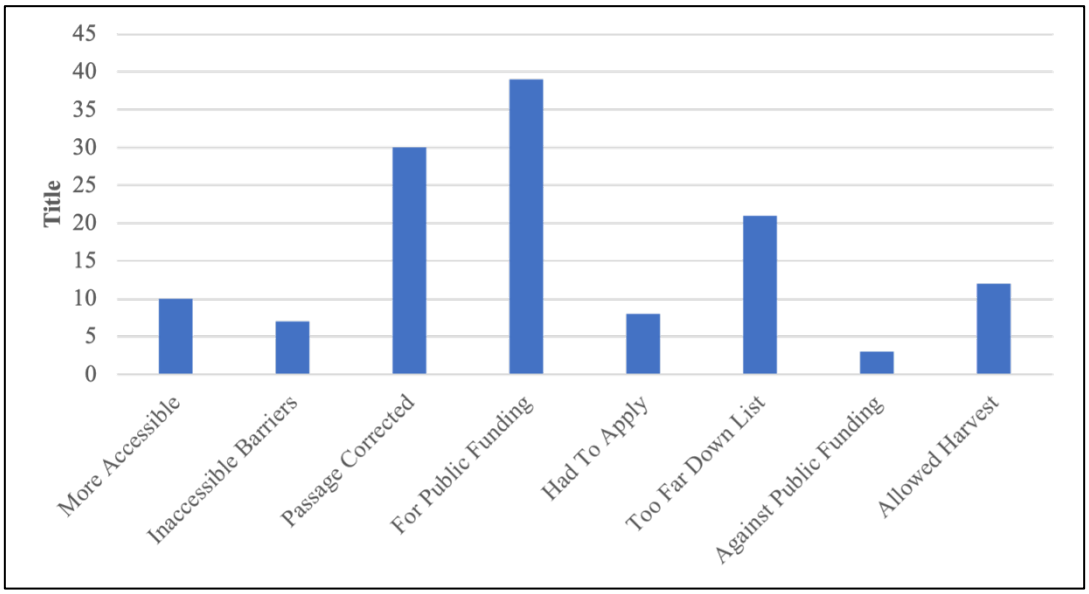

***Figure 24:** Experiences with Family Forest Fish Passage Program with Forests and Water Respondents*

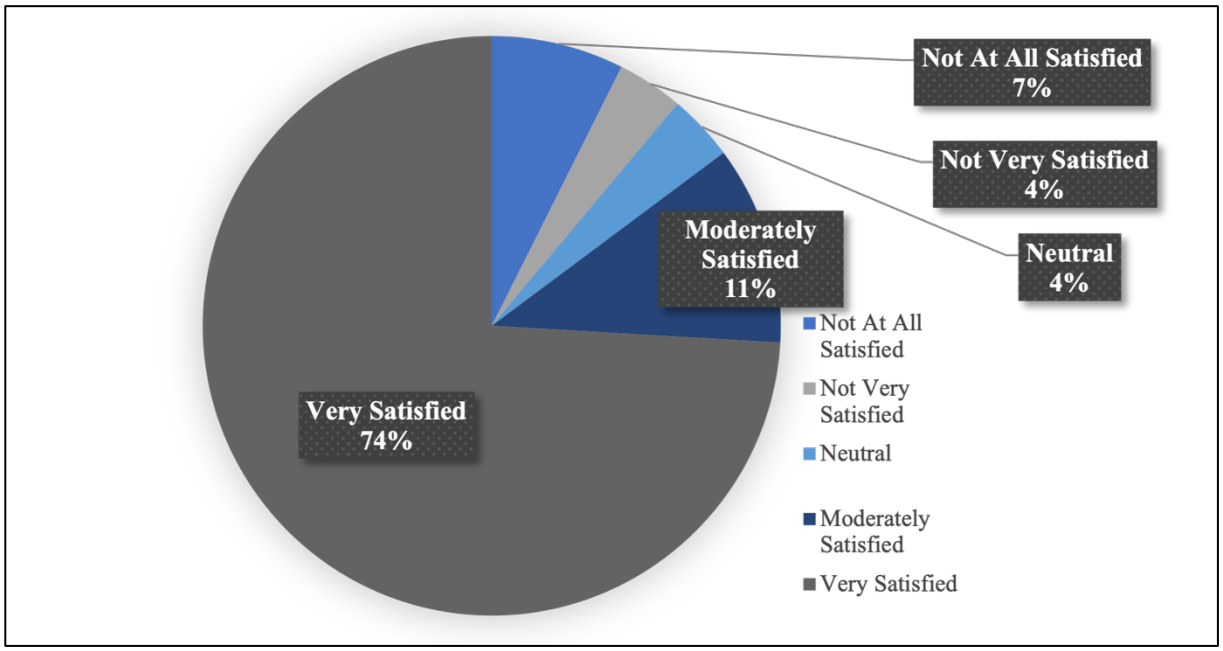

Figure 27: *Holistic Managers Satisfaction with the Family Forest Fish Passage Program*

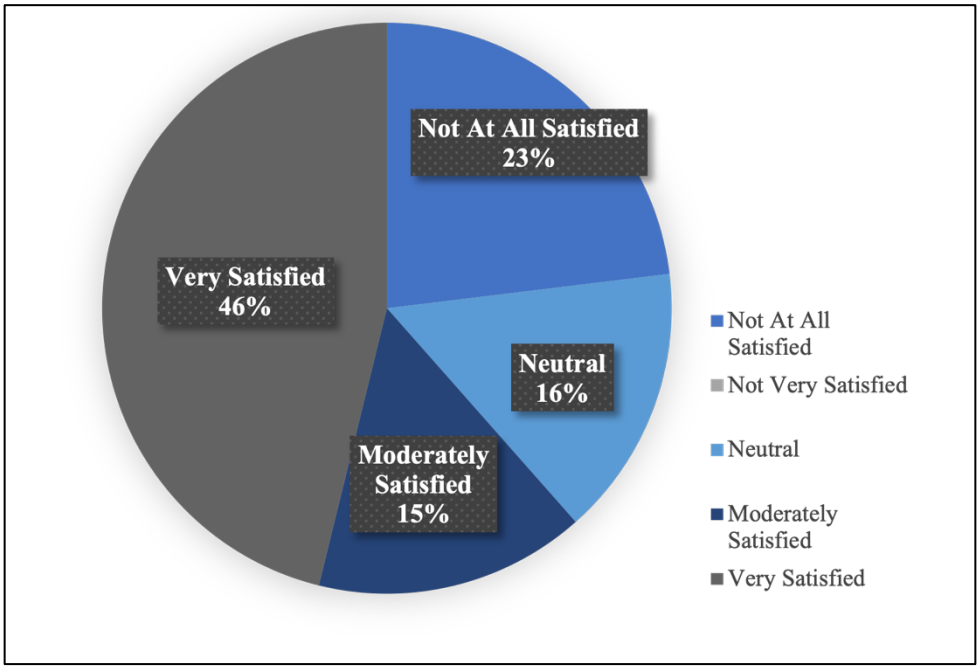

Figure 26*: Riparian Managers Satisfaction with the Family Forest Fish Passage Program*

Survey responses indicate that FFFPP has a high satisfaction rate amongst the majority of respondents that have a completed FFFPP project on their property. The positive perceptions are lower when respondents only considered information they received from other landowners and

neighbors. Generally, the respondents believe the program should be funded using public funds and that the waitlist may prevent some projects from occurring.

Understanding FFFPP Effectiveness from Agency Documentation

In 2021, the SFLO Office released the 2021 Implementation Report for FFFPP. Since the program's creation in 2003 until June 30th, 2021, 433 FFFPP projects have been completed with 1,256 projects remaining on the waiting list. With this, 74.4% of all projects are waitlisted. In Western Washington, 314 projects have been completed out of 1,273 leaving 75.3% on the waitlist. In Eastern Washington, 119 projects have been completed out of 416 leaving 71.4% on the waitlist. Western Washington represents 75.3% of all projects, and Eastern Washington represents 24.6% of all projects. In total, the completed projects have resulted in an estimated gain of 1,149 miles of habitat (Miketa, 2021).

The legislative reports have continuously requested that FFFPP be fully funded with an ever-increasing waitlist since the program's inception (McDonald et al., 2004; Miketa, 2013, 2016; Rodgers & Walters, 2009). The 2016 legislative report suggested that the average cost of a project was $102,154 over the past 88 projects that were completed but approximates that a typical project costs $100,000 to complete (Miketa, 2016). Assuming this holds for all projects, FFFPP would need between $125,600,000 and $128,305,424 in 2016 dollars to be fully funded.

Conclusions

The Family Forest Fish Passage program is widely considered a positive program that has strengths in prioritizing fish passage projects and alleviating landowners from legal obligations during a timber harvest. The failure of FFFPP comes from the lack of funding and a growing waitlist. FFFPP is an effective program for the mitigation of forest regulations in Washington State both once a project is completed and when a project is waitlisted by alleviating legal obligations of SFLOs at a fraction of the cost. However, the program in practice is ineffective at mitigating the impacts on all SFLOs, noting that some may need to replace their fish passages to have a passage that is structurally sound for timber harvests. In terms of the environmental benefits of the program, FFFPP has reopened a large amount of habitat for fish and prioritized where the need is greatest for fish passage. Nevertheless, many projects are waitlisted, indicating the possibility of many miles of fish habitat remaining blocked until the program is fully funded. Satisfaction rates are high for those with completed projects (78%); however, positive perceptions are lower when considering only information from other landowners and neighbors, but negative perceptions are lower than dissatisfaction rates.

Alternate Plans

Alternate Plans were established as a mechanism to alleviate the economic burden of SFLOs by increasing the efficiencies of certain harvests or allowing inaccessible harvests, as long as the entire alternate plan has at least equal protection to public resources compared to the current protections provided by regulations. This mitigation process allows SFLOs to submit an alternate plan that departs from provisions in the forest practices as stated, to be reviewed by an interdisciplinary team (ID Team). Several templates have been developed to expedite the process for SFLOs including the Overstocked Stand Template and Fixed Width Riparian Management Zones Template. The Alternate Plan process and policy are described in WAAC 222-12-040 and WAC 222-12-0401 with the guidelines for alternate plans found in the Forest Practices Board Manual, Section 21.

Interview Perceptions about Alternate Plans

The alternate plan process received more commentary than the other assistance programs in our interviews. For all stakeholders, the concept of alternate plans for SFLOs is a beneficial thing. The implementation of the alternate plan process, the available templates, and Interdisciplinary Teams (ID Teams) resulted in many different perspectives, ranging from "heartache" to a "good process." Overall, across stakeholder groups a single positive aspect is detected: the alternate plan process allows for regulatory flexibility for SFLOs. Amongst stakeholder groups, other positive benefits are that alternate plans keep SFLOs financially viable in forestry and that these plans can help the RMZ. The negative perceptions of alternate plans across stakeholder groups—except for the unaffiliated landowner group, in which several of the interviewees were unfamiliar with the alternate plan process—are that alternate plans are too complex for landowners who are not trained in forestry and the process is intimidating even for those who are familiar. Other negative perceptions from individual or two stakeholder groups included that the monitoring and follow-up are poor, some consulting foresters will not help with alternate plans due to complexity, and professional help from a consulting forester makes an alternate plan minimally, if at all, financially viable, and ID Teams are inconsistent, and that alternate plans are not financially feasible for Eastern Washington.

For the extension stakeholder group, the interviewees overall had positive perceptions about the alternative plan process. One extension officer suggested that active management would achieve the objectives, in terms of future desired conditions, better than alternate plans. Another acknowledged the complexity of alternate plans for landowners due to a lack of

experience in timber management. This interviewee accredited this complexity and lack of experience to the intimidation that some landowners may have concerning the alternate plan process.

"I think it's, it's needed. I think it's good. I think it also makes it there's always a challenge when a landowner can't just go and look up the forest practices rules that apply to them."

State employees stated that alternate plans are a good thing, specifically highlighting templates and the flexibility that all alternate plans provide to the landowner. One interviewee stated that alternate plans are becoming more common and increased usage should be considered a win. This state employee also recognized that landowners may feel a "little disconcerted" with alternate plans due to the "arduous process," amount of time, and ID Teams. State employees also agreed that alternate plans are complex while also acknowledging that alternate plans are complex since they are specific management deviations from the rules, making the complex process necessary. Our interviews also indicated that the SFLO Office no longer has the "expertise" in the form of enough staffing to help with the alternate plan process. Similar to the affiliated landowners, a state employee noted that there is no alternate plan template for Eastern Washington and that a template would be well adopted. Finally, several state employees thought that the SFLO Office does not have the resources to adequately monitor alternate plans, as required by statute, and that DNR has been "trying to institute a real robust monitoring plan for alternate plans."

"It's something that landowners feel a little disconcerted about because of the amount of time and this process and having to have ID teams and that sort of thing. But I think those are necessary."

Affiliated landowner interviews suggest interviewees valued alternate plans but had frustrations about several components of the process. First, several affiliated landowners indicated that the alternate plan process is complex and "very intimidating." A couple of the interviewees stated that their consulting foresters will not conduct an alternate plan due to their complexity. For those whose consulting foresters will complete an alternate plan, interviewees suggested that alternate plans will not increase profit marginally due to the incurred costs of having a consulting forester. The alternate plan would need to include high-value timber to be financially feasible rather than a loss. These interviewees also said that Eastern Washington, with

its lower timber values, does not have financially beneficial alternate plans when using a consulting forester. For one interviewee who is otherwise employed, the alternate plan process forced them to take time off multiple times when the first ID Team did not work out well and cost them by bringing their forester back in for support and in the form of facing the "hostilities" of the ID Team again. Those who do not have a consulting forester and conduct the alternate plan themselves, state that the process takes up a great deal of time. A retired affiliated landowner completes the alternate plans on their own time and says that it would be "tough" to have a consultant do the work. This interviewee also said that without the alternate plan process, "we would lose our family."

With ID Teams, interviewees have had mixed experiences, from hostile to mutually beneficial. One affiliated interviewee spoke of a time when a member of an ID Team requested that the interviewee do an inventory of their alternate plan zone only to be told by the ID Team member that "we can't trust you people." Another interviewee said that it was a learning experience for the members of the ID Team and the landowner, and the process was enjoyable. The main complaints concerning ID Teams are that the teams are inconsistent, and the results depend on who speaks the loudest or what kind of mood the team is in.

For the templates, affiliated landowners again have mixed opinions. The overstocked stand template is considered good; however, it is not used much and is not economically viable. The fixed-width buffer template is considered easy, but some interviewees suggest that it leaves more buffers than less in some situations. Overall, the affiliated landowners are supportive of templates, but they would like a simpler option and a template for Eastern Washington.

"But the intimidation, the personal, I was very intimidated and now I only did it because I had done a lot of research. And I wanted to learn more about the process. I wouldn't of benefit out of it. You know, and I in hindsight, I do believe they helped me. But did I have a lot of fear in doing that? Yes, I did. If I was an, more of an average small landowner, not involved and not caught up in all of this policy stuff, I wouldn't have done it for anything."

Only a couple of our unaffiliated landowners were familiar with alternate plans. Those who said that they were familiar have a positive perception of alternate plans though note that the process is complicated, and that follow-up is poor.

Conclusions

Alternate plans may be the least appreciated part of the mitigation programs set forth by the Washington State Legislature, not due to outcomes, but due to inefficiencies, loss of trust and

respect, and complexity. Generally, alternate plans are viewed positively, in theory, and in the majority of cases. However, interviewees indicate there are cases of poor interactions with members of ID Teams and a sense of disrespect. The time and fiscal effort required for full alternate plans appear to be a barrier. Templates are generally seen positively, but the templates appear to be more weighted for Western Washington.

Program Evaluation Discussion and Conclusions

General Conclusions

All programs evaluated in this paper are lacking in the fulfillment of stated duties and intents. While not all programs violate the legislative mandates that formed the programs, shortcomings prevent the programs from being effective at accomplishing the stated intents and purposes. All programs are to be mitigation efforts for SFLOs, to help alleviate the disproportionate impacts of the Forests and Fish Rules. As evaluated, the SFLO Office is underfunded and understaffed to provide enough assistance to SFLOs and monitor program outcomes effectively, and the SFLO Office does not have the necessary resources and information to provide the legislature with complete reports within the state intervals, violating the RCWs. There is concern that the SFLO Office focuses on a certain group of the SFLO community; however, the nuances of the SFLO Office and agency agreements make it difficult to determine the authority of the SFLO Office in terms of its clientele. The Forestry Riparian Easement Program, developed to offset the loss value of forest land put into the new buffer zones, is underfunded as demonstrated by long wait times upwards of years and a substantial waitlist. The Family Forest Fish Passage Program, developed to help landowners to restore fish passage and be able to complete certain harvests, is critically underfunded, with a growing waitlist that outnumbers completed projects since 2003. Alternate plans, developed to provide landowners with ways to decrease efficiencies to accomplish viable forest practices, have become an arduous process associated with mistrust and increased time and labor for SFLOs, and a lack of templates to expedite processes.

Nevertheless, these programs are all considered as providing benefits to SFLOs with relatively high satisfaction rates. The SFLO Office boasts a high satisfaction rate, including being higher than other assistance programs for SFLOs, and has a strong staff that is generally considered trustworthy, experts, and a strength of the Office. FREP applicants are generally satisfied with the compensation the program provides and is widely seen as a beneficial program. FFFPPP applicants are generally satisfied with the results and seen as a beneficial program to

both the environment and landowners. Alternate plan applicants are generally satisfied with the results, and it is suggested that these plans have granted some landowners opportunities they would not have had under the current regulations.

While the programs evaluated fail to operate at optimal efficiency and effectiveness, these programs are producing positive results that are reflected in the survey and interview data. Even with a lack of resources, the programs are functional and produce beneficial outcomes. The shortcomings of the SFLO Office are external to its operations, with internal functions still producing outcomes despite the external challenges.

Discussion

While improvements for the programs are needed, these vastly fall outside of the capacity of the program managers, as the resources are generally, fiscal resources for staffing, program operations, and information gatherings, which are the responsibility of the Washington State Legislature. Funding and staffing already plague many government agencies, making this issue not an uncommon one. Continued advocacy for increased funding could address these shortcomings. Nevertheless, there are possible ways to improve outcomes without additional resources. Finding ways to increase communication and transparency may help with frustrations about discussions that occurred during the Forests and Fish Report. The concept of "broken promises" indicates that restoring trust with SFLOs may prevent burnout and negative sentiments from the target population. Other avenues to mitigate the Forests and Fish impacts may also alleviate the constraints of fiscal resources. These can come in the form of recommendations for new programs to assist landowners through education and financial assistance.

Routine evaluations may also help provide feedback and strengthen programs. Either internally or externally, a continuous evaluation would provide consistent satisfaction rates, recommendations for improvements, and recommendations for new programs. Such feedback may generate ideas that will increase the efficiency of current resources, allowing for more resources to be devoted to where there is currently a lack.

Demographic and Program Evaluation Conclusions

The demographic results indicate the SFLO community is diverse with distinct values that create complex clusters of SFLOs that are difficult to tell apart by demographic data. The factor value sets of Recreationist, Utilitarian, Preservationist, and Developer provide clear and distinct differences and motivations that create the more nuanced clusters of Managing Developers, Managing Recreators, Ambiguous Owners, Environmental Managers, and Environmental Recreators to describe SFLOs. These clusters of owners may have distinct ownership objectives and different levels of attachment and value associated with their land but remain difficult to differentiate in the field. Generally, SFLOs have indicated they need additional technical, financial, and educational assistance, signaling the need for more assistance to help achieve their ownership objectives.

From the program evaluation, the SFLO Office and its associated programs of FREP, FFFPP, and alternate plans are described as positive programs with a beneficial impact on small forest landowners. However, these programs have not lived up to their full potential with waitlists preventing complete implementation of several programs, impeded data collection efforts, and lack of assistance provision leading to a sense of distrust and hesitancy in landowners. Other legislative mandates and duties have not been fulfilled in monitoring and reporting. These shortcomings of the SFLO Office and its associated programs appear to be attributed to the lack of funding and staffing required, resulting in a sense of a "broken promise" to landowners for well-received programs.

The SFLO Office faces a diverse SFLO community that has a shrinking land base but increasing number of ownerships. The diversity and lack of clear demographic differences between SFLOs makes targeted efforts difficult for the SFLO Office in implementing assistance programs and conducting outreach efforts. Under financial constraints, this impedes the SFLO Office's ability to increase efficiency when conducting outreach and education. Lack of data gathering and analysis prevents the SFLO Office to provide other targeted outreach through trends in land-use change or SFLO parcelization or development. Under resource constraints, the SFLO Office may face an increasingly difficult situation to address the growing SFLO community, provide outreach and resources, and implement programs to benefit SFLOs and Washington State through keep small forests lands forested.

New Policy Developments and Further Research Needs

New Policy Developments

Policy is ever-changing. Since the work of data collection and analysis for this thesis began in 2019 for the original *Washington's Small Forest Landowners in 2020* report, several new policies and legislation have been put into effect, addressing the report recommendations or altering aspects of the Small Forest Landowner (SFLO) Office and its associated programs.

In the 2021 legislative session, Second Substitute House Bill 1168 was passed, creating RCW 76.13.190: Integrated small forestland owner forest health program. The program is to promote "the coordination and delivery of services" of all entities that can be used by small forest landowners to the small forest landowners. The program was put under the State Forester's direction with the objective to integrate the suggestions of the 2020 report, "identify and remove barriers to technical assistance, funding, and forest health management planning… increase education and outreach… distribute funding effectively to move high wildfire risk areas to lower risk." The program, as stipulated, states that assistance to landowners cannot be prohibited if they are outside of designated zones identified for forest health treatments (Forest Health and Wildfires - Various Provisions, 2021).

Again, in 2021, Engrossed Second Substitute Senate Bill 5126, also known as the Climate Commitment Act, was passed. The Climate Commitment Act created the "natural climate solutions account" in the state treasury that could be used to help fund the Forestry Riparian Easement Program (FREP) and the Family Forest Fish Passage Program (FFFPP). The legislation continued to specify that the legislature intends "that not less than $10,000,000 be expended each biennium for the forestry riparian easement program… or similar riparian enhancement programs" (Washington Climate Commitment Act, 2021).

In the 2022 legislative session, Engrossed Substitute Senate Bill 5693 was passed. This budget proviso allotted $1,000,000 of general funds for the fiscal year 2022 and again in 2023 to be given to the SFLO Office explicitly "to restore staffing capacity reduced during the great recession and to support small forest landowners including assistance related to forest and fish act regulations" (Supplemental Operating Budget, 2022).

It is unclear how this additional funding and program creation will help address the needs of SFLOs and support the SFLO Office in achieving its mission. These will affect the conclusions of this research. However, no new legislation has been created to help the SFLO

Office fulfill its reporting duties of continued updates to the Rural Technology Initiative (RTI) SFLO database.

Further Research

Continued updates and investigation into the SFLO community in Washington State is needed for a comprehensive set of data and conclusions to find trends in SFLO typologies and behaviors. Continued pressures, identified by this thesis, suggest that impacts from climate change, invasive species, wildfire, state-wide forest health, trespass, timber theft, regulations, all available assistance programs, development, and educational resources need to be investigated to inform future management decisions. The growing concern for family legacy also suggests a need to understand family dynamics, incentives, motivations, and considerations for newer generations to take on small forest land ownership.

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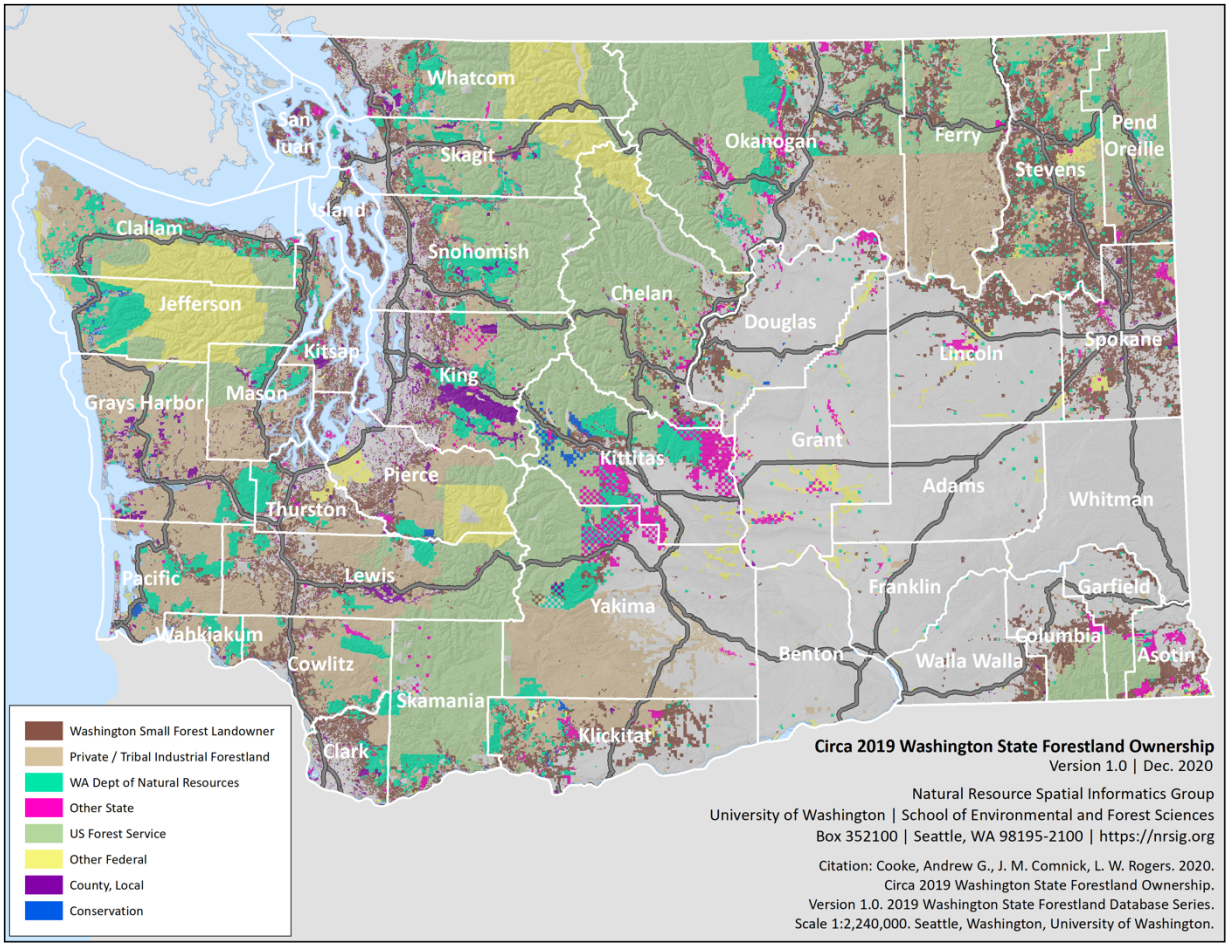
Appendix 1: Circa 2019 Washington State Forestland Ownership



Appendix 2: Engrossed Substitute House Bill 2091 Small Forest Landowner Office Language

NEW SECTION. **Sec. 503.** A new section is added to chapter 76.13 RCW to read as follows:
(1) The department of natural resources shall establish and maintain a small forest landowner office. The small forest landowner office shall be a resource and focal point for small forest landowner concerns and policies and shall have significant expertise regarding the management of small forest holdings, governmental programs applicable to such holdings, and the forestry riparian easement program.

(2) The small forest landowner office shall administer the 38 provisions of the forestry riparian easement program created under section 504 of this act. With respect to that program, the office shall have the authority to contract with private consultants that the office finds qualified to perform timber cruises of forestry riparian easements.

(3) The small forest landowner office shall assist in the development of small landowner options through alternate management plans or alternate harvest restrictions appropriate to small landowners. The small forest landowner office shall develop criteria to be adopted by the forest practices board in a manual for alternate management plans or alternate harvest restrictions. These alternate plans or alternate harvest restrictions shall meet riparian functions while requiring less costly regulatory prescriptions. At the landowner's option, alternate plans or alternate harvest restrictions may be used to further meet riparian functions. The small landowner office shall evaluate the cumulative impact of such alternate management plans or alternate harvest restrictions on essential riparian functions at the subbasin or watershed level. The small forest landowner office shall adjust future alternate management plans or alternate harvest restrictions in a manner that will minimize the negative impacts on essential riparian functions within a subbasin or watershed.

(4) An advisory committee is established to assist the small forest landowner office in developing policy and recommending rules to the forest practices board. The advisory committee shall consist of seven members, including a representative from the department of ecology, the department of fish and wildlife, and a tribal representative. Four additional committee members shall be small forest landowners who shall be appointed by the commissioner of public lands from a list of candidates submitted by the board of directors of the Washington farm forestry association or its successor organization. The association shall submit more than one candidate for each position. Appointees shall serve for a term of four years. The small forest landowner office shall review draft rules or rule concepts with the committee prior to recommending such rules to the forest practices board. The office shall reimburse nongovernmental committee members for reasonable expenses associated with attending committee meetings as provided in RCW 43.03.050 and 43.03.060.

(5) By December 1, 2000, the small forest landowner office shall 39 provide a report to the board and the legislature containing:

(a) Estimates of the amounts of nonindustrial forests and woodlands 2 in holdings of twenty acres or less, twenty-one to one hundred acres, one hundred to one thousand acres, and one thousand to five thousand acres, in western Washington and eastern Washington, and the number of persons having total nonindustrial forest and woodland holdings in those size ranges;

(b) Estimates of the number of parcels of nonindustrial forests and woodlands held in contiguous ownerships of twenty acres or less, and the percentages of those parcels containing improvements used: (i) As primary residences for half or more of most years; (ii) as vacation homes or other temporary residences for less than half of most years; and (iii) for other uses;

(c) The watershed administrative units in which significant portions of the riparian areas or total land area are nonindustrial forests and woodlands;

(d) Estimates of the number of forest practices applications and notifications filed per year for forest road construction, silvicultural activities to enhance timber growth, timber harvest not associated with conversion to nonforest land uses, with estimates of the number of acres of nonindustrial forests and woodlands on which forest practices are conducted under those applications and notifications; and

(e) Recommendations on ways the board and the legislature could provide more effective incentives to encourage continued management of nonindustrial forests and woodlands for forestry uses in ways that better protect salmon, other fish and wildlife, water quality, and other environmental values.

(6) By December 1, 2002, and every four years thereafter, the small forest landowner office shall provide to the board and the legislature an update of the report described in subsection (5) of this section, containing more recent information and describing:

(a) Trends in the items estimated under subsection (5)(a) through (d) of this section;

(b) Whether, how, and to what extent the forest practices act and rules contributed to those trends; and

(c) Whether, how, and to what extent: (i) The board and legislature implemented recommendations made in the previous report; and (ii) implementation of or failure to implement those recommendations affected those trends.

Appendix 3: SFLO Demographics from the 2020 Demographic Report

	mean	SE (standard error)	lower bound-95%	upper bound-95%	# ownerships lower bound	# ownerships upper bound
Participation in Designated Forestland tax program	15.8%	0.0210	11.7%	19.9%	31,872	54,287
Has a conservation easement (development rights have been sold on the property)	3.9%	0.0129	1.4%	6.4%	3,682	17,451
Anticipates selling SOME forest land in next 5 years	13.9%	0.0234	9.3%	18.5%	25,431	50,408
Have ever sold or given away forest land	8.4%	0.0172	5.0%	11.8%	13,636	31,995
If the owner also farms on or near the forest land	10.4%	0.0186	6.7%	14.0%	18,258	38,111
Have a home on or near the forest land	76.4%	0.0287	70.7%	82.0%	192,607	223,241
Experience with Forest Practices applications						
Done in past 10 years	12.9%	0.0200	8.9%	16.8%	24,318	45,666
Will do in next 10 years	13.4%	0.0211	9.3%	17.6%	25,313	47,835
Either	20.3%	0.0253	15.4%	25.3%	41,849	68,854

(Total number of estimated Washington State SFLOs: 272,291. Estimated number of ownerships with 20 or fewer forested acres: 237,397. Estimated number of ownerships with more than 20 acres of forest land: 34,894.)

	mean	SE	lower bound-95%	upper bound-95%
Age (average)*	63.8	0.8677	62.1	65.5
compare to 2019 US Census estimate that 15.9% of WA residents are 65 or older				
Income (average)^	$115,375.00	$5,220.20	$105,143.41	$125,606.59
while US Census estimate WA median household income was $70,116 between 2014 and 2018, Washington average household income is $110,680 based on 2020 IPUMS-CPS data				

(*missing 69 responses, or 9% of the sample did not report age, ^missing 130 responses, or 18% did not report income)

Appendix 4: Affiliated Interview Script

Introduction:

Interviewer: Hi, I'm Alec: the one who has been sending you the emails. How are you doing today?

Participant: *[response]*

Interviewer: I am going to let my colleagues introduce themselves that are on this call…

Colleagues: *[introductions]*

Interviewer: Before we continue, do we have your consent to record this Zoom meeting to produce a transcript of this interview?

Participant: *[gives their consent]*

Interviewer: Okay, so we have begun recording and you will be prompted to consent through Zoom.

…wait a few moments for the participant to agree to Zoom's consent question…

Now, I am going to go through the fine print regarding some disclosure information and then give you a moment to agree that you understand this information and also give you the opportunity to ask any questions.

Interviewer: First, we deeply value your privacy and will remove identifying features of this interview. We may use quotes from the transcript in our report and future academic research with a vague description of your position within the forestry world: i.e. *[landowner, extension officer, government employee].* This interview is completely voluntary, and you may opt out of any question at any time. Do you have any questions about your participation?

Participants: *[Asks any questions]*

Interviewer: *[Answers any questions]*

Interviewer: In the email I sent you with the link to this meeting, there was a detailed review of our study. Do you have any questions about our study or would you like me to go over it prior to our questions?

Participant: *[Asks any questions or asks for a short recap]*

Interviewer: *[Answers any question or gives the following recap(s):*

Quick Answer: We have been commissioned by the Washington State Senate to write a report about small forest lands and the people who own them. Part of that report is about keeping small forest lands as forests as opposed to being converted to other uses like commercial real

estate. Another part of that report is evaluating a number of the state's efforts to protect endangered salmon habitat on small forest lands.

Long answer: In 1999, legislation known as the Forest and Fish Agreement was passed to better protect the habitat of endangered salmon species in Washington streams and rivers. The State recognized that this legislation would most likely have a negative economic impact to small forest landowners and thus formed assistance programs such as the Forest Riparian Easement and the Family Forest Fish Passage Program along with the establishment of the Small Forest Landowner Office to provide technical support. Related to all this is Washington State's priority to keep forests as forests due to the ecosystem services and commercial products that our forests supply us. The twentieth anniversary of the adoption of the Forest and Fish Agreement into law presents an opportunity to review how the state's regulatory actions have affected small forest landowners.]

Interviewer: Okay, this interview will be about an hour to an hour and a half long. We will be asking questions regarding your personal and professional relationship with small forest landowners, some about any associated organizations you are a part of, and finally a few questions regarding policies that may affect small forest landowners.

Interviewer: Let's begin with our first question:

1. As a small forest landowner yourself, what is your main goal with your forest land? What are your main concerns? Have these goals/concerns changed over time and how so?
    - If you were to interact with a government agency or forest landowner organization, what would a successful interaction look like?

2. How would you describe your organization's purpose in regard to small private forest landowners?
    - How about in regard to small private forest land?
    - How has that purpose developed over time?

3. Main Goals:
    a. What is your organization's main goal in its interactions with or governance of small forest landowners? Has this goal shifted over time?
        - If your organization was to succeed in its interactions with or governance of small forest landowners, what would that success look like?

4. How would you describe the current state of small forest land in Washington State?
    - How would you describe the state of small private forest land over the course of time since 2000?
    - What would you say are the top three issues facing small private forest landowners?
    - In your eyes, have there been any "wins" for small private forest landowners recently?

5. The phrase “working forest” is used a lot in discussion of forestry issues. How do you define a “working forest”? How do you feel about the term “working forest”?
    - How does your organization define a “working forest”?

   Transition: NOW that we have discussed some introductory and background issues, let’s move on to some specifics of laws, policies, and programs concerning small forest landowners in Washington.

6. How would you describe the impact that the Forest Practices have had on small private forest landowners?
    - How about over time?

7. What do you/your organization think the role of the small forest landowner office should be? Are there areas for improvement or areas of strength?
    - Why is that?

8. There is the DNR, WSU Extension, NRCS, Conservation Districts, and the landowner associations work collectively, together or apart, to keep landowners informed. How well do you think state agencies, NGOs, and WSU extension are doing collectively at keeping SFLOs informed of the assistance programs available to them?
    - Are there any trends in the feedback you hear from SFLOs themselves about the state's assistance programs?
    - How would you describe the effectiveness of these programs?
    - How do you self-evaluation your own programs?

9. What are your views on resources and the distribution of these resources as provided to small private forest landowners by DNR?
    - What had DNR been doing really well in? What would be the top two or three things?
    - What are the top two or three things DNR could do better or differently?
    - Are there better resources being provided by a different entity?
    - How has this changed over time?

10. What are your views on the Forestry Riparian Easement Program (FREP) and the Family Forest Fish Passage Program (FFFPP)?
    - What do you think about the goals of these programs?
    - How well do you think they are functioning? Financially? Practically?
    - Should anything be done differently?

11. Are you familiar with the alternate harvest plan process? If so, how do you feel about the current alternate harvest plan?
    - Do you think the application approval process strikes the right balance between protecting important riparian features and

allowing timber harvests? How smoothly do you think the process runs from application to approval?

12. If you could change an existing policy or devise a new policy, incentive, or program directly affecting small forest landowners or small private forest land, what would it be or how would you describe it?
    - What would the primary objective of the policy focus on?
    - How would this policy be funded?
    - Where would the policy have an impact?

13. Carbon Sequestration Efforts
    a. In your opinion, how suitable would it be to have a carbon sequestration program or effort directed towards small private forest landowners?

14. Is there anything we have not addressed that you think we should know?

Interviewer: And that concludes our interview. Thank you so much for your time! Do you have any additional questions for us?

Participant: *[Asks any question]*

Interviewer: Great! Again, thank you for your time! Our report will be out late this year or early 2021 if you would like to read it. Have a great day!

Appendix 5: Unaffiliated Interview Script

Introduction:

Interviewer: Hi, I'm Alec: the one who has been sending you the emails. How are you doing today?

Participant: *[response]*

Interviewer: I am going to let my colleagues introduce themselves that are on this call…

Colleagues: *[introductions]*

Interviewer: Before we continue, do we have you consent to record this Zoom meeting to produce a transcript of this interview?

Participant: *[gives their consent]*

Interviewer: Okay, so we have begun recording and you will be prompted to consent through Zoom.

…wait a few moments for the participant to agree to Zoom's consent question…

Now, I am going to go through the fine print regarding some disclosure information and then give you a moment to agree that you understand this information and also give you the opportunity to ask any questions.

Interviewer: First, we deeply value your privacy and will remove identifying features of this interview. We may use quotes from the transcript in our report and future academic research with a vague description of your position within the forestry world: i.e. *[landowner, extension officer, government employee].* This interview is completely voluntary, and you may opt out of any question at any time. Do you have any questions about your participation?

Participants: *[Asks any questions]*

Interviewer: *[Answers any questions]*

Interviewer: In the email I sent you with the link to this meeting, there was a detailed review of our study. Do you have any questions about our study or would you like me to go over it prior to our questions?

Participant: *[Asks any questions or asks for a short recap]*

Interviewer: *[Answers any question or gives the following recap:*
In 1999, legislation known as the Forest and Fish Agreement was passed to better protect the habitat of endangered salmon species in Washington streams and rivers. The State recognized that this legislation would most likely have a negative economic impact to small forest

landowners and thus formed assistance programs such as the Forest Riparian Easement and the Family Forest Fish Passage Program along with the establishment of the Small Forest Landowner Office to provide technical support. Related to all this is Washington State's priority to keep forests as forests due to the ecosystem services and commercial products that our forests supply us. The twentieth anniversary of the adoption of the Forest and Fish Agreement into law presents an opportunity to review how the state's regulatory actions have affected small forest landowners.]

Interviewer: Okay, this interview will be about an hour to an hour and a half long. We will be asking questions regarding your personal and professional relationship with small forest landowners, some about any associated organizations you are a part of, and finally a few questions regarding policies that may affect small forest landowners.

Interviewer: Let's begin with our first question:

1. Main Goals:
    a. What is your main goal with your forestland? What are your main concerns? Have these goals/concerns changed over time and how so?
        - If you were to interact with a government agency or forest landowner organization, what would a successful interaction look like?

2. How would you describe the current state of small private forest land in Washington State?
    - How would you describe the state of small private forest land over the course of time since 2000?

3. How do you define a "working forest"? How do you feel about the usage of the phrase?

Transition: Now that we have covered some background information, we are going to go into some questions about policies and programs that affect small forest landowners.

4. How would you describe the impact that the Forest Practices have had on small private forest landowners?

5. What do you/your organization think the role of the Small Forest Landowner Office should be? Are there areas for improvement or areas of strength?
    - Why is that?

6. Are you familiar with the programs, as provided through DNR and the Small Forest Landowner Office? If so, which ones?
    - How would you describe the effectiveness of these programs?

7. What are your views on resources and the distribution of these resources as provided to small private forest landowners by DNR?

- What had DNR been doing really well in? What would be the top two or three things?
- What are the top two or three things DNR could do better or differently?
- Are there better resources being provided by a different entity?
- How has this changed over time?

8. What are your views on the Forestry Riparian Easement Program (FREP) and the Family Forest Fish Passage Program (FFFPP)?
    - Have you applied to any of these programs? If so, which one and how do you feel about the process?
    - What do you think the goals are for these programs? How do you feel about these goals?
    - How well do you think these programs are functioning?
    - Should anything be done differently?

9. Are you familiar with the alternate harvest plan process? If so, how do you feel about the current alternate harvest plan?

    - Do you think this strikes the right balance between protecting riparian features and allowing for timber harvests?
    - Have you applied for one? How was the application process?

10. If you could change an existing policy or devise a new policy, incentive, or program directly affecting small forest landowners or small private forest land, what would it be or how would you describe it?
    - What would the primary objective of the policy focus on?
    - How would this policy be funded?
    - Where would the policy have an impact?

11. Carbon Sequestration Efforts
    Are you familiar with carbon credit or carbon payment programs? **Explain what a general carbon sequestration program would do if necessary** How would you feel about this being implemented in Washington State for small forest landowners?
    - Why is that?

12. Is there anything we have not addressed here that you think we should know?

Interviewer: And that concludes our interview. Thank you so much for your time! Do you have any additional questions for us?

Participant: *[Asks any question]*

Interviewer: Great! Again, thank you for your time! Our report will be out late this year or early 2021 if you would like to read it. Have a great day!

Appendix 6: Extension/State Interview Script

Introduction:

Interviewer: Hi, I'm Alec: the one who has been sending you the emails. How are you doing today?

Participant: *[general response]*

Interviewer: I am going to let my colleagues introduce themselves that are on this call…

Colleagues: *[introductions]*

Interviewer: Before we continue, do we have your consent to record this Zoom meeting to produce a transcript of this interview?

Participant: *[gives their consent]*

Interviewer: Okay, so we have begun recording and you will be prompted to consent through Zoom.

…wait a few moments for the participant to agree to Zoom's consent question…

Now, I am going to go through the fine print regarding some disclosure information and then give you a moment to agree that you understand this information and also give you the opportunity to ask any questions.

Interviewer: First, we deeply value your privacy and will remove identifying features of this interview. We may use quotes from the transcript in our report and future academic research with a vaguedescription of your position within the forestry world: i.e. *[landowner, extension officer, government employee].* This interview is completely voluntary, and you may opt out of any question at any time. Do you have any questions about your participation?

Participants: *[Asks any questions]*

Interviewer: *[Answers any questions]*

Interviewer: In the email I sent you with the link to this meeting, there was a detailed review of our study. Do you have any questions about our study or would you like me to go over it prior to our questions?

Participant: *[Asks any questions or asks for a short recap]*

Interviewer: *[Answers any question or gives the following recap(s):*

Quick Answer: We have been commissioned by the Washington State Senate to write a report about small forest lands and the people who own them. Part of that report is about keeping small forest lands as forests as opposed to being converted to other uses like commercial real

estate. Another part of that report is evaluating a number of the state's efforts to protect endangered salmon habitat on small forest lands.

Long answer: In 1999, legislation known as the Forest and Fish Agreement was passed to better protect the habitat of endangered salmon species in Washington streams and rivers. The State recognized that this legislation would most likely have a negative economic impact to small forest landowners and thus formed assistance programs such as the Forest Riparian Easement and the Family Forest Fish Passage Program along with the establishment of the Small Forest Landowner Office to provide technical support. Related to all this is Washington State's priority to keep forests as forests due to the ecosystem services and commercial products that our forests supply us. The twentieth anniversary of the adoption of the Forest and Fish Agreement into law presents an opportunity to review how the state's regulatory actions have affected small forest landowners.]

Interviewer: Okay, this interview will be about an hour to an hour and a half long. We will be asking questions regarding your personal and professional relationship with small forest landowners, some about any associated organizations you are a part of, and finally a few questions regarding policies that may affect small forest landowners.

Interviewer: Let's begin with our first question:

1. How would you describe your organization's purpose in regard to small private forest landowners?
    - How about in regard to small private forest land?
    - How has that purpose developed over time?

2. Main Goals:
    a. What is your organization's main goal in its interactions with or governance of small forest landowners? Has this goal shifted over time?
        - If your organization was to succeed in its interactions with or governance of small forest landowners, what would that success look like?

3. How would you describe the current state of small forest land in Washington State?
    - How would you describe the state of small private forest land over the course of time since 2000?
    - What would you say are the top three issues facing small private forest landowners?
    - In your eyes, have there been any "wins" for small private forest landowners recently?

4. The phrase "working forest" is used a lot in discussion of forestry issues. How do you define a "working forest"? How do you feel about the term "working forest"?
    - How does your organization define a "working forest"?

Transition: NOW that we have discussed some introductory and background issues, let's move on to some specifics of laws, policies, and programs concerning small forest landowners in Washington.

5. How would you describe the impact that the Forest Practices have had on small private forest landowners?
    - How about over time?

6. What do you/your organization think the role of the small forest landowner office should be? Are there areas for improvement or areas of strength?
    - Why is that?

7. There is the DNR, WSU Extension, NRCS, Conservation Districts, and the landowner associations work collectively, together or apart, to keep landowners informed. How well do you think state agencies, NGOs, and WSU extension are doing collectively at keeping SFLOs informed of the assistance programs available to them?
    - Are there any trends in the feedback you hear from SFLOs themselves about the state's assistance programs?
    - How would you describe the effectiveness of these programs?
    - How do you self-evaluation your own programs?

8. What are your views on resources and the distribution of these resources as provided to small private forest landowners by DNR?
    - What had DNR been doing really well in? What would be the top two or three things?
    - What are the top two or three things DNR could do better or differently?
    - Are there better resources being provided by a different entity?
    - How has this changed over time?

9. What are your views on the Forestry Riparian Easement Program (FREP) and the Family Forest Fish Passage Program (FFFPP)?
    - What do you think about the goals of these programs?
    - How well do you think they are functioning? Financially? Practically?
    - Should anything be done differently?

10. Are you familiar with the alternate harvest plan process? If so, how do you feel about the current alternate harvest plan?
    - Do you think the application approval process strikes the right balance between protecting important riparian features and allowing timber harvests? How smoothly do you think the process runs from application to approval?

11. If you could change an existing policy or devise a new policy, incentive, or program directly affecting small forest landowners or small private forest land, what would it be or how would you describe it?
    - What would the primary objective of the policy focus on?
    - How would this policy be funded?
    - Where would the policy have an impact?

12. Carbon Sequestration Efforts
    a. In your opinion, how suitable would it be to have a carbon sequestration program or effort directed towards small private forest landowners?

13. Is there anything we have not addressed that you think we should know?

Interviewer: And that concludes our interview. Thank you so much for your time! Do you have any additional questions for us?

Participant: *[Asks any question]*

Interviewer: Great! Again, thank you for your time! Our report will be out late this year or early 2021 if you would like to read it. Have a great day!