
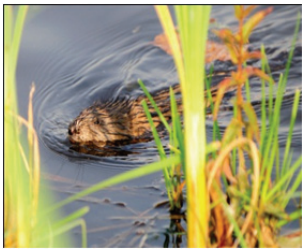

Landowner Incentives and Tolerances for Managing Beaver Impacts in Oregon

Final Report

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EXECUTIVE SUMMARY

Objectives

Many fish and wildlife biologists and land managers understand the critical role that beavers play in improving aquatic and floodplain functions, and have initiated reintroduction efforts to restore beavers to many areas in Oregon. Beavers are beneficial because their dams help to create wetlands and habitat for fisheries recovery, and some people enjoy the aesthetic value of seeing beavers. To realize these benefits of beavers, there is an urgent need to address current and potential future conflicts between landowners and this species. This is important if measures are sought to reintroduce beavers into unoccupied areas, especially on private lands.

This project, therefore, collected data in Oregon to reveal: (a) landowner attitudes and tolerance limits toward beavers and their habitat, and (b) the extent that incentives (e.g., reimbursements, expert site visits, technical assistance, equipment and labor, information and education) could be used in the future to encourage coexistence between beavers and humans. Understanding how humans can coexist with beavers and the role of possible incentives in this process are crucial from a monitoring and technical assistance perspective if restoration measures are taken to reintroduce beavers into areas with the goal of improving aquatic systems, watersheds, and fish populations. Specific objectives of this project were to assess private landowner:

- Attitudes toward (i.e., like, dislike, favor, disfavor), interests in, and experiences related to beavers (e.g., impacts, complained to agency).
- Knowledge of ecosystem and social benefits of beavers and their habitat, information needs about how to deal with beavers, and preferred sources for receiving this information.
- Perceptions of safety and emotional reactions to beavers and their impacts.
- Acceptance of management actions to address beavers and their impacts (e.g., do nothing, educate landowners, water control, capture and relocate, lethal control), and situational conditions where each of these actions would be either acceptable or unacceptable (e.g., if beavers are seen on property, chew trees, cause major property flooding).
- Likelihood of using financial (e.g., reimbursement for impacts) and non-financial (e.g., expert visits, technical assistance, equipment and labor, education) incentives to minimize beaver impacts, promote habitat enhancement, and maintain beavers on private property.
- Attributions of responsibility for beaver impacts (i.e., who they feel is responsible).
- Perceptions of similarity and trust in state wildlife agencies to manage beavers.
- Residential and sociodemographic characteristics (e.g., property size, value orientations, participation in trapping or hunting, gender, age).

Methods

This project began with a literature review of studies examining human dimensions of beavers, and holding focus group meetings. Two focus groups were held in Portland and Newport, with participants representing a range of agencies and interest groups (e.g., Wildlife Services [USDA-APHIS], City of Portland, Midcoast Watersheds Council, Plum Creek Timber, Beaver Advocacy Committee, Partnership for the Umpqua Rivers). Information collected from the literature review and focus groups was used to inform the development and design of a survey to be distributed to landowners across the state of Oregon.

Data for this project were then obtained from questionnaires administered by mail to random samples of private landowners living in one of four regions of Oregon: (a) East (e.g., Baker City,

Sumpter Valley / Phillips Lake, Haines, Keating, Richland, Halfway); (b) Coast (e.g., Lincoln City / Devils Lake, Otis, Seal Rock, Waldport, Tidewater); (c) Portland (e.g., Johnson Creek, Oaks Bottom, Sellwood, Reed College area); and (d) Southwest (e.g., Medford, Jacksonville, Central Point, White City, Selma, Kerby, Cave Junction). These regions were selected based on discussions during the focus group meetings; input from agency representatives; proximity to water bodies, riparian lowlands, and wetlands known to contain beavers or offer intrinsic habitat for beavers; and maps of known distributions of beavers and dam locations. Three separate mailings were implemented between January and March 2011 to collect the data (full mailing, postcard reminder, final full mailing). Questionnaires were mailed to 5,200 households (1,300 in each region) and n = 1,512 completed questionnaires were returned, yielding a 32% overall response rate. Among the four regions, sample sizes ranged from n = 302 (Portland; 25% response rate) to n = 432 (Eastern Oregon; 37% response rate). This total sample size allows generalizations about the population of Oregon landowners across these four regions at a margin of error of ± 2.5% at the 95% confidence level. To check for potential nonresponse bias, landowners who completed a mail questionnaire were compared against those who did not (i.e., nonrespondents). A sample of n = 142 nonrespondents was telephoned in May 2011 and asked eight questions from the questionnaire. Results showed that nonresponse bias was not a major problem, so the data were not weighted in response to this bias check.

Results

Landowner Experiences with Beavers

- In total, 20% of landowners surveyed have previously experienced impacts caused by beavers and 80% have not experienced impacts. Landowners in the East and Coast were more likely than those in Portland and the Southwest to have experienced impacts.
- Most respondents (85%) have seen beavers in the wild, 26% have seen them on their property or neighboring properties, and 16% have beavers currently living on their property or neighboring properties. Those living in the East and Coast were more likely to have seen beavers in the wild and on their property, and currently have beavers on their property or a neighboring property.
- The majority of respondents were interested in seeing (65%) and having (57%) beavers live on their property or neighboring properties. Interest was greatest on the Coast, but lowest in the East and for those who have previously experienced beaver impacts.
- Damage to trees (25%) and culverts (14%) and the overflow of water bodies (e.g., pond, stream; 13%) were the most frequently reported incidents caused by beavers, and these impacts were more frequent and considered to be bigger problems in the East and Coast.
- Landowners who have experienced impacts caused by beavers were much more likely (77%) than those who have not experienced impacts (6%) to consider the presence of beavers on private property to be a problem.
- Few landowners (10% or less) have taken actions to deal with beavers (e.g., wrapped trees, removed beaver dams or lodges, contacted agencies, frightened away beavers, installed exclusion devices). Landowners in the East region and those who have experienced beaver impacts were the most likely to have taken these actions than other respondents.

Landowner Knowledge, Attitudes, and Beliefs about Beavers

- Landowners were knowledgeable about beavers, with an average score of 8.69 out of 10 questions answered correctly. They were most likely to know that beavers build dams and lodges (99% correct), live in water bodies (98%), and create wetlands that are important for

living things other than fish (97%). Landowners were least likely to know that beavers do not eat fish (62%) and that beaver dams create ponds that are important for fish such as salmon (75%). Knowledge about beavers was lowest in the Southwest, but did not differ much between those who have and have not experienced beaver impacts.

- Respondents had generally positive attitudes about beavers (e.g., like, favor, beneficial). Attitudes were most negative in the East region and most positive in the Portland region. Landowners who have experienced beaver impacts had less positive attitudes about beavers than those who have not experienced impacts from this species.
- Most respondents believed that beavers create wetlands that benefit other living things (87%), are important to exist (86%), they would enjoy seeing beavers (83%), beavers are a sign of a healthy environment (82%), some beaver damage should be tolerated (75%), and beavers have a right to exist regardless of any impacts they cause (61%). Less than half of landowners believed that beavers should be controlled (47%), create damage that is problematic (24%), and are a nuisance (21%). Those in the East and who have experienced beaver impacts were more likely than those in other regions to disagree with statements that reflected beavers in a positive manner and more likely to agree that there is a need to control beavers, damage caused by beavers is a major problem, and beavers are a nuisance.
- Damage to property by beavers was a concern of most respondents (71%), but relatively considerable proportions were also concerned about the spread of diseases by beavers (48%) and the health or safety of pets (44%), children (42%), and themselves due to beavers (30%). Landowners in the East and those who have experienced beaver impacts were most concerned about property impacts, whereas those living in the Portland area were most concerned about beaver impacts on health and safety.

Landowner Responses to Increasing Beaver Impacts

- Seeing a beaver on private property triggers a positive emotional response from most landowners (e.g., happy, excited, curious, not angry, not frightened), but some negative emotions (e.g., anger, not excited) are likely to be instigated if impacts from beavers occur. Some emotions, however, do not change much as the severity of beaver impacts increases, as landowners are likely to remain curious and not frightened even if impacts are more severe (e.g., flooding building). Those who have experienced beaver impacts were more likely to express negative emotions than those who have not had impacts.
- Across all levels of severity of impacts caused by beavers, landowners believed that most of the responsibility for these impacts was attributed to the beavers. Equal amounts of some responsibility, however, were attributed to wildlife agencies, the landowners themselves, and neighbors, and this increased as the severity of impacts increased.
- Across all levels of severity of impacts caused by beavers, educating landowners about how to coexist with beavers was the most acceptable management response, and capturing and relocating beavers was also acceptable. Doing nothing and leaving the beaver alone were acceptable in cases of seeing a beaver and a beaver chewing trees, but not acceptable for more substantial impacts such as flooding of private property. No matter how severe the impact caused by beavers, lethal control (i.e., destroying beavers) and attempting to frighten beavers away were perceived as unacceptable responses.
- The majority of landowners believed that wrapping trees, installing control devices, and installing fences or screens were acceptable strategies for addressing beaver impacts. Removing beaver dams and lodges was unacceptable when seeing a beaver or if beavers chewed trees, but was more acceptable as the severity of impacts increased.

- Lethal control, capturing and relocating beavers, frightening beavers away, and removing beaver dams were most acceptable among landowners in the East and those who have experienced beaver impacts, and least acceptable among those in Portland, on the Coast, and who have not experienced impacts. Wrapping trees, installing fences / screens and other control devices, educating landowners, and doing nothing were least acceptable among respondents living in the East and those who have experienced beaver impacts, and most acceptable among those in Portland and who have not experienced impacts.
- Irrespective of the severity of impacts caused by beavers, results suggest that it is unlikely that most respondents would choose to not allow beavers to reside on their property or a neighboring property. Instead, landowners may be likely to take advantage of information sent to them about how to coexist with beavers, financial compensation to fix or prevent impacts, and have experts visit to provide information, plant trees, and provide equipment or labor to enable them to retain beavers on their land. Results also suggest, however, that landowners in the East and those who have experienced beaver impacts may be least likely to take advantage of these incentives and most likely to not maintain beavers on their property. Those in the Portland region and who have not experienced beaver impacts may be most likely to take advantage of these incentives to retain beavers on their property.

Landowner Beliefs about Management and Information

- Landowners were most likely to think that state agencies should be responsible for addressing beaver impacts on private property (84%), followed by residents experiencing the problems themselves (60%). This trend was consistent across regions and for those who have and have not experienced impacts caused by beavers. Less than the majority believed that federal agencies (49%), local or county agencies (48%), animal control personnel (34%), regulated trappers (26%), and citizen groups (13%) were responsible.
- The majority of landowners perceived that they shared similar values (56%), opinions (52%), and goals (52%) as ODFW. Less than half, however, perceived that they think in a similar way (45%) and would take similar actions (43%) as ODFW. Landowners in the East and those who experienced beaver impacts perceived the lowest similarity with ODFW, whereas those on the Coast and who have not had impacts reported the greatest similarity.
- The largest proportions of landowners trusted ODFW to provide the best information (70%), truthful information (67%), and enough information to decide what actions to take regarding wildlife (66%), and use the best available science to inform management (65%). The fewest landowners agreed that they trusted ODFW to use public input to inform wildlife management (57%). Landowners in the East and those who have previously experienced impacts caused by beavers had the lowest trust in ODFW.
- Pamphlets or brochures (49%) and newspapers (41%) were the most preferred sources for receiving information about beavers, but 29% of landowners said that they did not need information about beavers. Those living in the East were more likely than those in other regions to say that they did not need information and were least likely to want information from various sources. Respondents in Portland, on the other hand, were least likely to not want information and were most likely to prefer information from various sources.

Landowner Sociodemographic Characteristics

- The largest proportions of respondents had biocentric (nature-oriented) value orientations toward the environment in general (42%), and protectionist (38%) or mixed protection – use value orientations toward wildlife in particular (44%). Fewer landowners had

anthropocentric (human-oriented) environmental value orientations (18%) or use related wildlife orientations (19%). Those in the East and who have experienced impacts caused by beavers, however, were more likely to have anthropocentric and use orientations.

- Most respondents owned their current property (86%), the average length of residence at this property was 16 years, 63% lived on property that was smaller than five acres in size, the average household size was between two and three residents, and 78% of households contained nobody under the age of 18. Those living in the East had the largest property, whereas those in Portland had the smallest, and households in Portland were more likely to have people under the age of 18 living in the household. Those who have experienced beaver impacts were more likely than those who have not had impacts to have spent more years living at their current property and reside on larger properties.
- Most landowners currently use their land for residential purposes (86%) and plan to continue to do so in the future (82%). Those living in the East and who have experienced beaver impacts were much more likely to use their land currently and in the future for livestock grazing, agriculture, timber, hunting, all-terrain vehicle recreation, and trapping.
- Respondents were more likely to be male (57%) than female (43%), had an average age of 57 years, have lived in Oregon for an average of 38 years, and grew up in relatively small towns or rural areas (60% in towns with fewer than 25,000 people). Education achievement was bimodal with 43% having completed at least a 4-year college degree and 34% having a high school diploma or less. In total, 20% of respondents belonged to an environmental or wildlife related organization and most participated in activities related to wildlife. Those living in the East were more likely than those in other regions to be male, have lived longer in Oregon, grown up in rural areas or smaller towns, and participated in hunting, fishing, or trapping. Those living in the Portland region were more likely than those in other regions to be female, more highly educated, and visit zoos and aquariums.
- Landowners who have experienced impacts from beavers in the past were more likely than those who have not experienced impacts to be male, older, residents of Oregon for a longer period of time, participants in consumptive wildlife oriented recreation activities (e.g., fishing, hunting), and from smaller towns or rural areas.

Recommendations

- In total, 20% of landowners surveyed have experienced impacts caused by beavers with those living in the East (27%) and Coast (30%) even more likely than those in other regions to have experienced impacts. Likewise, 26% of landowners have previously had beavers on their property and 16% currently have beavers living on their property (20% in the East, 28% on the Coast). These percentages are not trivial and a large number of landowners in Oregon are actively dealing with beavers and their impacts.
- Most landowners have seen beavers in the wild (85%) and were highly knowledgeable of factual information about beavers and their habitat (e.g., 8.7 / 10 knowledge questions answered correctly). Many respondents, however, said that they need more information about how to coexist with beavers, and preferred sources for obtaining information included pamphlets, brochures, and direct mailings. From an outreach and education perspective, therefore, information on facts about beavers and their habitat may not be the best use of resources given that the public already seems to be knowledgeable about the species. Instead, an effective use of resources may be to disseminate information about how landowners can coexist with beavers, mechanisms for preventing beaver impacts, and any

current resources available to landowners for mitigating beaver impacts. This information may be most useful to people living in proximity to beavers and their habitat.

- The majority of landowners surveyed were interested in both seeing (65%) and having (57%) beavers on their property or neighboring properties, especially in the Coast region. In addition, landowners had more positive than negative attitudes and beliefs about beavers. Currently, state agencies are exploring the possibility of relocating beavers and restoring this species in various areas. Beaver relocation guidelines have been drafted and research has been conducted exploring the viability and success of beaver relocation. Results from this survey suggest that a large proportion of landowners may be amenable to having beavers on their property, but it remains a question of managers to ensure that the properties provide suitable habitat for successful beaver relocation and restoration.
- Damage to trees was the most frequently reported incident (25%) and most substantial perceived problem (77%) associated with beavers on private property, especially in the East and Coast regions. Fewer than 10% of landowners, however, had taken actions such as wrapping trees to mitigate or prevent these types of beaver impacts. An effective approach for managers may be to work with landowners to fix impacts and prevent future incidents such as tree damage caused by beavers. Providing information to landowners about how to coexist with beavers, wrapping trees, and providing equipment or labor to install things such as tree wrapping materials were all supported, on average, by landowners.
- Landowners were least aware that beavers do not eat fish (65%) and beavers can create wetlands and ponds that are important for fish such as salmon (73%). Respondents were also least likely to believe that beavers are beneficial (58%). Beavers play an important role in maintaining aquatic and floodplain functions, and reintroduction efforts have begun to restore beavers to many areas in Oregon because they have been identified as tools for fisheries recovery, watershed health, and habitat restoration (e.g., Oregon Plan for Salmon and Watersheds, Oregon Conservation Strategy, Mid-Columbia Recovery Plan). For these efforts to succeed, however, it will be imperative for agencies to have the understanding and support of landowners and other constituents. Increasing outreach and communication campaigns to aggressively target landowners and inform them about the fisheries and ecosystem benefits of beavers may assist in enhancing the cognitive linkages between beavers and indirect ecosystem benefits created by this species.
- Although landowners were most concerned about potential impacts from beavers on their own property (71%) and neighboring properties (71%), relatively large proportions of respondents were also concerned about the spread of disease by beavers (48%) and health or safety of pets (44%), children (42%), and themselves due to beavers (30%). These health and safety concerns were most pronounced in the Portland area. Including clear and straightforward messages about health and safety risks associated with beavers and how to minimize these risks should be critical components of any public outreach information to minimize the probability that people are basing concerns on inaccurate information.
- If beavers cause impacts on their own property or neighboring properties, landowners believed that doing nothing and leaving beavers alone were unacceptable. Educating landowners about how to coexist with beavers was the most acceptable management response. Wrapping trees, installing control devices and fences or screens, and capturing and relocating beavers were also acceptable. Removing beaver dams or lodges was even acceptable if the impact was severe (e.g., floods buildings). No matter how severe the impacts caused by beavers, however, lethal control (i.e., destroying beavers) and trying to frighten beavers away were perceived as unacceptable responses across all regions and

even among landowners who have already experienced impacts from beavers. It is clear that a "kill first" approach is likely not acceptable for most landowners, so it is suggested that managers encourage and work with landowners to implement a variety of management techniques to mitigate current impacts and prevent future incidents associated with beavers.

- Understanding how humans can coexist with beavers and the role of possible incentives in this process are crucial from a monitoring and technical assistance perspective if restoration measures are taken to reintroduce beavers into areas with the goal of improving aquatic systems, watersheds, and fish populations. Results from this project suggest that irrespective of the severity of impacts caused by beavers, it is unlikely that most respondents would avoid incentives and choose to not keep beavers on their property or a neighboring property. Instead, landowners may be likely to take advantage of information sent to them about how to coexist with beavers, financial compensation to fix or prevent impacts, and in-person visits by experts and agency personnel to provide information, plant trees, and provide equipment or labor to enable them to retain beavers on their land. No single incentive was preferred over another, so managers could offer one incentive or a suite of incentives, as long as they were efficient and effective for addressing the impacts. It remains an issue for managers to identify on a case by case basis what management strategies and possible incentives would work best for a given property and then work alongside landowners to address current impacts and prevent future incidents. Regardless, most landowners surveyed believed that lethal control is largely unacceptable. Results suggest that landowners are willing to try any alternative management approaches and incentives, which is important because constituent support for retaining beavers on private land is necessary for helping to achieve the ecosystem (e.g., aquatic, fish, watershed) benefits associated with restoring beavers and their habitats.
- The greatest proportion of landowners (84%) believed that state agencies should be responsible for addressing problems with wildlife such as beavers on private property. The majority of respondents (60%), however, also believed that residents experiencing the problem themselves were also responsible. These results suggest that state agencies might work together collaboratively with private landowners to empower them to address beaver impacts. Collaboration may be possible given that the majority of landowners surveyed trusted agencies such as ODFW. Managers might also create a plan for communicating with landowners and implementing collaborative strategies for managing beavers and their habitat. This plan may be most effective if it is transparent, has clear lines of accountability and identifiable lines of communication, is created collaboratively with landowners and other stakeholders (e.g., watershed councils), and outlines measurable goals and objectives for managing beavers and their impacts. Managers should work with experts in the fields of outreach and agency – public communications to help develop and disseminate this communication and management plan.
- The largest proportions of landowners had biocentric (i.e., nature-oriented; 42%) value orientations toward the environment in general and protectionist orientations toward wildlife in particular (38%), suggesting that strategies that have deleterious effects on beavers and their habitat are unlikely to be supported by a large number of landowners. Research has shown that individuals' value orientations influence their attitudes, intentions, and behaviors, so knowing landowner orientations can be useful for estimating possible reactions to potentially controversial management actions (e.g., relocation, lethal control). In addition, value orientations are stable and resistant to change, so attempts to inform individuals with biocentric or protectionist value orientations to consider adopting a

favorable attitude and vote in support of actions that may be harmful to beavers and their habitat are unlikely to be successful.

- There were some regional differences in landowner responses. Those living in the East and on the Coast, for example, had more experience with beavers on their property and dealing with impacts from beavers. Landowners in the East were also more likely than those in the other regions to: (a) be concerned about property impacts caused by beavers and have taken actions to deal with these impacts, (b) hold less positive attitudes toward beavers, (c) be less interested in having beavers on their land, (d) have the least trust in state wildlife agencies, (e) not want information about beavers, and (f) be least accepting of strategies and incentives designed to keep beavers on their land, and most accepting of lethal control and not retaining beavers on their property. On average, however, those in the East and all three other regions still had positive attitudes toward beavers, trusted state agencies, wanted information, and felt that non-lethal strategies were acceptable and preferred over lethal control, which they viewed as unacceptable irrespective of the severity of impacts caused by beavers. Regional-specific management might not be necessary, but agency awareness is needed regarding these regional differences, and that landowners in one region may be more amenable than those in other areas to certain tactics for managing beavers.
- Landowners provided a number of open-ended comments about information needs and other comments related to beavers and their management in the state. Many of these comments may provide insights for future planning and management. The most common comments, in no particular order, focused on the: (a) need for information and strategies about how to coexist with beavers instead of destroying them, (b) wanting more information about beaver location / distribution and population size, (c) concerns about impacts that beavers cause, (d) broader ecosystem benefits provided by beavers, (e) desire for beavers to be on their land or nearby, (f) concerns about human encroachment and damage to beaver habitat, (g) concerns about balancing the needs of beavers with those of humans, and (h) possible health and safety risks associated with beavers.

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INTRODUCTION

Background and Rationale

Historically, beavers have played a critical role in shaping and maintaining ecosystem functions for aquatic habitats. This species, however, was nearly extirpated from Oregon in the 19th century, primarily because of the economic value of beaver pelts. Concurrently, since the arrival of Euro-Americans, many aquatic systems have experienced substantial changes from other anthropogenic (i.e., human) activities. Conversion of floodplain habitats to farmlands and other uses, reduction of side channel habitats, and imposition of flood control features such as revetments and dams have resulted in significant alterations to water quality and quantity including changes in water temperatures and flows. Riparian habitats historically influenced by periodic floods and sedimentation were also impacted by changes in the dynamics and functions of river systems, particularly loss of connectivity between terrestrial and aquatic systems.

Many fish and wildlife biologists and land managers understand the critical role that beavers play in aquatic and floodplain functions, and have initiated reintroduction efforts to restore beavers to many areas in Oregon. These efforts reflect the broad mission of the Oregon Plan for Salmon and Watersheds, which is to restore native fish populations and aquatic systems supporting them to productive and sustainable levels that will provide substantial environmental, social, cultural, and economic benefits (OCSRI, 1997). In an effort to achieve this mission, agencies such as Oregon Watershed Enhancement Board (OWEB) have spent over $130 million on habitat restoration projects in the state during the last decade. These restoration dollars have funded various projects including placing large logs in stream channels, increasing in-stream habitat complexity, and thinning junipers along riparian areas to improve groundwater supplies and in-stream flows.

One important aspect of improving watershed health and stream and riparian habitat that has received relatively little attention is the benefits that may be obtained from beavers and the dams that they construct. In fact, beavers have been identified as a strategy monitoring species in the Oregon Conservation Strategy (OCS) because of their critical ecological role in maintaining and creating riparian habitats statewide. Beavers can be beneficial because their dams help to create wetlands and habitat for fisheries recovery and some people enjoy the aesthetic value of seeing beavers (Enck, Connelly, & Brown, 1997; McKinstry & Anderson, 1999). Ecosystem functions provided by beavers, such as maintaining wetlands and recharging local water tables, have also

been shown to be important for helping to mitigate any effects of climate change on stream ecosystems (Hood & Bayley, 2008).

To realize these important benefits of beavers, there is an urgent need to address current and potential future conflicts between landowners and this species. This is important if measures are taken to reintroduce beaver into unoccupied areas, especially on private lands. Wetland and fishery benefits created by beavers may be unacceptable to some landowners because of flooding and resulting impacts to roads and crops, and associated costs of repair or restoration (Loker, Decker, & Schwager, 1999). The presence of wildlife such as beavers in both rural and urban areas poses significant challenges for state and federal agencies, and other stakeholder groups (Knuth, Siemer, Duda, Bissell, & Decker, 2001). Increases in wildlife populations and human-wildlife interactions, for example, have resulted in wildlife-related vehicular accidents, vegetation impacts, and transmission of diseases (e.g., Deblinger, Rimmer, Vaske, Vecellio, & Donnelly, 1993; McCullough, Jennings, Gates, Elliott, & DiDonato, 1997; Wittmann, Vaske, Manfredo, & Zinn, 1998). Beavers are one species that cause destruction of trees and shrubs, and dams that they construct sometimes flood residences, roads, and fields (e.g., Enck, Connelly, & Brown, 1996; Ermer, 1988; Harbrecht, 1991; Jonker, Muth, Organ, Zwick, & Siemer, 2006). Although traditional methods for managing beavers and other wildlife (e.g., lethal trapping, relocation) can effectively reduce problem wildlife, these approaches are often controversial, may not be acceptable to some people, may not be feasible in relatively dense human population areas, and may not help to achieve the ecosystem (e.g., aquatic, fish, watershed) benefits associated with restoring beavers and their habitats (Zinn, Manfredo, Vaske, & Wittmann, 1998).

This project, therefore, addressed two critical needs. First, it collected data to reveal: (a) landowner attitudes and tolerance limits toward beavers and their habitat in Oregon, and (b) the extent that incentives (e.g., financial reimbursements, expert / agency site visits, technical assistance, equipment and labor, information and education) could possibly be used in the future to encourage coexistence between beavers and humans, and attempt to optimize ecological benefits and minimize social and economic costs. Understanding how humans can coexist with beavers and the role of possible incentives in this process are crucial from a monitoring and technical assistance perspective if restoration measures are sought to reintroduce beaver into areas with the goal of improving aquatic systems, watersheds, and native fish populations.

Second, this project improved communication and outreach with landowners, the general public, and other constituents affected by beavers and their habitat. This is important because recent demographic shifts (i.e., more urban, more educated; Cordell, Bergstrom, Betz, & Green, 2004; Manfredo & Zinn, 1996), changes in public attitudes and values (i.e., more environmental or nature-oriented; Manfredo, Teel, & Bright, 2003; Vaske & Needham, 2007), and the increased effectiveness of interest groups and other stakeholders (Decker, Brown, & Siemer, 2001; Needham, Rollins, & Wood, 2004) have influenced a broader spectrum of the public who now demand and expect involvement in decision making about wildlife. When some groups feel that their concerns are not being addressed, they may resort to administrative appeals, court cases, and ballot initiatives (Burnett, 2007; Manfredo, Fulton, & Pierce, 1997, Williamson, 1998). In addition, management actions not supported by the public may be ineffective. Just as fisheries and wildlife managers are reluctant to make decisions without biological and ecological data, it is suggested that they be equally reluctant to make decisions without rigorous information about the public and other stakeholders. Effective wildlife management, therefore, requires proactive acknowledgement of and consultation with potentially affected constituents (Manfredo, Vaske, Brown, Decker, & Duke, 2009). Studies on the human dimensions, or social science, aspects of wildlife such as this project can provide this input and information throughout the data collection and decision making processes. Simply defined, the field of human dimensions of wildlife describes, predicts, and affects human thought and action toward wildlife (Decker et al., 2001).

Synthesis of Literature on Human Dimensions of Beavers

There have only been a small number of empirical studies examining the human dimensions of beavers and their management (Deblinger, Field, Finn, & Loomis, 2004; Enck et al., 1996, 1997; Enck & Brown, 1996; Jonker et al., 2006; Loker et al., 1999; McKinstry & Anderson, 1999; Organ & Ellingwood, 2000; Purdy, Decker, Malecki, & Proud, 1985; Siemer, Brown, Jonker, & Muth, 2003; Siemer, Jonker, & Brown, 2004; Wittmann et al., 1998; Wittmann & Vaske, 1995; Zinn et al., 1998). Most of these studies have obtained data using mail surveys of the general public in Colorado, Massachusetts, New York, and Wyoming. Although beavers are a flagship species in Oregon (e.g., state animal, team mascot), little is known about the human dimensions of beavers and the management of this species in this state.

The main areas of investigation across most of these studies involve public attitudes toward beavers (i.e., whether people like or dislike beavers), tolerances for potential impacts caused by

this species (e.g., flood property, spread disease), and acceptance of management actions such as wrapping trees, educating the public, live trapping and relocation, and lethal control. Jonker et al. (2006), for example, found that Massachusetts residents generally had favorable attitudes toward beavers. Wittmann and Vaske (1995), Wittmann et al. (1998), and Zinn et al. (1998) found that most residents of the South Suburban area near Denver, Colorado: (a) had favorable attitudes toward beavers; (b) agreed that people should learn to coexist with beavers and that actions such as controlling the beaver population, wrapping trees to prevent vegetation impacts, and live trapping and relocating beavers were usually acceptable; and (c) believed that lethal trapping was unacceptable under all circumstances except in cases when beavers cause extensive flooding on private property and could potentially spread diseases to humans and domestic pets.

Other human dimensions research has examined residents' interest in seeing beavers, frequency of encountering this species, and the extent that they experienced any impacts from beavers (e.g., vegetation damage, flooding). Siemer et al. (2003, 2004) and Jonker et al. (2006), for example, reported that residents who experienced beaver related problems had less favorable or negative attitudes toward beavers than people who did not experience impacts. Attitudes toward beavers became increasingly negative as the severity of impacts experienced by people increased. In the Colorado study, few respondents had actually seen beavers in their residential area, but almost all were interested in seeing more beavers despite having experienced problems from impacts caused by this species (e.g., vegetation damage, flooding; Wittman & Vaske, 1995). In most of these studies, the majority of respondents were unsure whether there were too many, too few, or about the right number of beavers in their residential area or region (i.e., acceptance capacity).

Despite these studies, there are several gaps in scientific understanding of the human dimensions of beavers and their management. First, most studies have focused on the general public; few have targeted specific constituent groups or individuals impacted directly by beavers such as landowners living near beaver habitat or other ecologically significant areas. Second, little is known about public awareness and knowledge of benefits provided by beavers and their habitat (e.g., wetlands, fisheries), information needs about how to coexist with beavers and mitigate associated impacts, and preferred sources of obtaining information about this species (i.e., information, education). Third, there has been limited research examining who landowners feel is responsible for mitigating and managing beaver impacts. It is possible, for example, that some people attribute responsibility to state or federal fish and wildlife agencies, whereas others feel that landowners are responsible for addressing beaver impacts on their own lands. Fourth, little is

known about the extent that landowners would tolerate beaver impacts on their property and what incentives (e.g., financial reimbursements, expert / agency site visits, technical assistance, equipment and labor, information and education), if any, might encourage landowners to take non-lethal actions to maintain beavers and habitat on their property. Encouraging landowners to coexist with beavers is critical to watershed health and fish conservation and recovery, which can in turn mitigate potential impacts of climate change through increasing water storage capacities and maintaining seasonal flows. This project helped to address all of these knowledge gaps.

Project Goals and Objectives

Beavers and their habitat have been identified as tools for fisheries recovery, watershed health, and habitat restoration (e.g., Oregon Plan for Salmon and Watersheds, Oregon Conservation Strategy, Mid-Columbia Recovery Plan). Although beavers provide many ecosystem benefits, vegetation impacts and property flooding associated with their habitat can be destructive, expensive to repair, and cause animosity among constituents. It is important, therefore, to understand the human dimensions of beavers, their habitat, and their management. Broad goals of this project, therefore, were to: (a) understand private landowner attitudes and tolerance limits toward beavers and their habitat in Oregon, and (b) examine possible landowner incentives and management needs to optimize ecological benefits and minimize social and economic costs associated with beavers. Specific objectives of this project were to examine landowner:

- Attitudes toward (i.e., like, dislike, favor, disfavor) and interest in beavers.
- Experiences related to beavers (e.g., experienced any impacts, complained to agency).
- Intentions and capacity to engage in behaviors to mitigate beaver impacts, and when they would seek agency assistance (e.g., live trap / relocate, frighten away).
- Acceptance of agency management actions to address beavers and their impacts (e.g., do nothing, educate, water control, capture and relocate, lethal control), and situational conditions where each of these actions would be either acceptable or unacceptable (e.g., if beavers are seen on property, chew trees, cause major property flooding).
- Awareness and knowledge of ecosystem and social benefits of beavers and their habitat.
- Perceptions of safety related to beavers.
- Emotional reactions to beavers and their impacts.
- Information needs about how to deal with beavers and preferred sources of information.

- Current approaches used for managing beavers on their land and acceptance of possible alternative approaches that may provide ecosystem benefits (e.g., fish, watersheds).
- Acceptance and likelihood of using financial (e.g., reimbursement for impacts) and non-financial (e.g., expert / agency site visits, technical assistance, equipment and labor, information / education) incentives to minimize beaver impacts, promote habitat enhancement, and maintain beavers on private property.
- Attributions of responsibility for beaver impacts (i.e., who they feel is responsible).
- Perceptions of similarity and trust in government agencies to manage wildlife in general and beavers in particular.
- Residential and sociodemographic characteristics (e.g., property size, value orientations, participation in trapping or hunting, gender, age).

This final project report addresses these objectives by summarizing responses from a large mail survey conducted with private landowners in multiple regions across Oregon. It is hoped that results of this project will not only be used for understanding landowners and their perceptions of beavers and management of this species, but also for informing future planning, decision making, and management regarding wildlife in this state.

METHODS

This project began with a literature review of previous studies examining human dimensions of beavers, and holding focus group meetings to identify issues (e.g., possible incentives, current impacts, management actions, locations of beavers and impacts) that would then be used for informing development and design of a survey of landowners across the state of Oregon. Two onsite in-person focus group meetings were held in May and June 2010 in Portland and Newport, respectively, with participants representing a range of agencies and interest groups, including: Multnomah County Drainage District; Wildlife Services (USDA-APHIS); City of Portland, Environmental Services; City of Portland, Willamette Watershed Team; City of Portland, Johnson Creek Watershed Team; City of Portland Bureau of Parks and Recreation; Midcoast Watersheds Council; Plum Creek Timber Company; Beaver Advocacy Committee; South Umpqua Rural Community Partnership; and the Partnership for the Umpqua Rivers. Main goals of these focus groups were to identify financial and nonfinancial incentives that may encourage landowners to take non-lethal actions to maintain and manage beavers on private property, and

issues that could differentially affect tradeoffs in these decisions and incentives (e.g., type and extent of beaver impacts, opportunity costs). These focus group meetings also identified specific experiences and impacts associated with beavers, possible types of agency assistance to help landowners manage beavers, groups that individuals feel may be responsible for mitigating and managing beaver impacts, information needs and sources of information about beavers, and locations where beavers and their impacts are prevalent. Findings from both the literature review and these focus groups were used for informing development and design of a landowner survey.

Primary data for this project were obtained from questionnaires (see Appendix C) administered by mail to random samples of private landowners 18 years of age and older living in one of four regions of Oregon – East, Coast, Portland, and Southwest. The East sampling region included areas around Baker City, Sumpter Valley / Phillips Lake, Haines, North Powder, Keating, Richland, and Halfway. The Coast sampling region included areas around Lincoln City / Devils Lake, Otis, Rose Lodge, Seal Rock, Waldport, and Tidewater. The Portland region focused on areas along Johnson Creek, Oaks Bottom, Sellwood, and Reed College area. The Southwest included areas around Medford, Jacksonville, Central Point, White City, Selma, Kerby, and Cave Junction. Maps of these regions are in Appendix B. These regions were selected based on discussion in the focus groups; extensive input from representatives of state agencies and other organizations; agency maps of known distributions of beavers, dam locations, and pool sites; and proximity to water bodies, wetlands, and riparian lowlands known to contain beavers or offer intrinsic habitat for beavers (e.g., streams, ponds, floodplains, watersheds). This cross section of regions geographically represents most of Oregon (e.g., urban, rural; east, coast, north, south) and permits statistical comparisons of landowners across multiple areas of the state. Prior to data collection, these sampling areas and questionnaire instruments were extensively reviewed and approved by a subcommittee of the Beaver Working Group and other agency representatives.

Proportionate random samples of private landowners in each of these four regions were selected for inclusion in the sample to ensure adequate representation of and ability to generalize to landowners potentially affected by beavers across the state. The sample was not targeted toward just people with a vested interest in beavers or their impacts (e.g., only residents who have seen or experienced problems with beavers, representatives of watershed councils) because that would bias the sample and not be representative of all landowners. Instead, questionnaires were sent to large random samples of all residents in proximity of this species and its habitat in these regions

across the state. These samples were obtained from Marketing Systems Group (MSG) in Pennsylvania, which uses US Postal Service delivery sequence files to compile sampling lists.

Three separate questionnaire mailings were implemented between January and March 2011 to collect data. Multiple mailings are standard for social science studies and are necessary for increasing response rates, the ability to generalize, and representativeness of samples (Dillman, 2000, 2007; Vaske, 2008). Landowners were first sent a mail packet in late January 2011 containing a questionnaire booklet (see Appendix C), postage paid business reply envelope, and cover letter requesting their participation. Three weeks after this first mailing (mid February 2011), a postcard reminder was sent to those who had not yet completed the questionnaire requesting their participation. Three weeks after this postcard reminder (early March 2011), a final full mailing (i.e., letter, questionnaire, reply envelope) was sent to those who had still not completed and mailed back the questionnaire. No further mailings were sent, so landowners were considered a nonresponse if they did not complete the questionnaire following these three contacts (i.e., first mailing, postcard, final mailing). To ensure that respondents did not complete the questionnaire more than once, each residence randomly selected was given a unique identification (ID) code that was listed on the questionnaire. This is a standard approach for avoiding duplicate responses (i.e., people completing the questionnaire more than once), which would make the sample nonrandom and bias the representativeness and generalizability of results (Vaske, 2008). This ID code also allowed the researchers to identify who completed the questionnaire so that respondents were not contacted again in follow up correspondence and mailings, and to separate responses from those who provided them.

Table 1. Sample sizes and response rates for each region

	Mailed	Undeliverable	Completed surveys (*n*)	Response rate (%)	Margin of error
East	1,300	126	432	37	± 4.6
Coast	1,300	138	411	35	± 4.7
Portland	1,300	79	302	25	± 5.6
Southwest	1,300	77	367	30	± 5.0
Total	5,200	420	1,512	32	± 2.5

Questionnaires were mailed to 5,200 households in total (1,300 in each region). Across all four regions, 420 questionnaires were undeliverable (e.g., incorrect addresses, vacant household, moved) and n = 1,512 completed questionnaires were returned, yielding a 32% overall response rate (1,512 / 5,200 – 420; Table 1). This response rate is relatively consistent with many other

recent mail surveys asking about public responses to wildlife issues (see Connelly, Brown, & Decker, 2003; Vaske, 2008 for reviews). Among the four regions, sample sizes ranged from n = 302 (Portland; 25% response rate) to n = 432 (Eastern Oregon; 37% response rate). The combined sample size of n = 1,512 allows generalizations about the population of Oregon landowners across these four regions at a margin of error of ± 2.5% at the 95% confidence level, which is far better than the conventional standard of ± 5% that has been widely accepted and adopted in human dimensions of wildlife research (Mitra & Lankford, 1995; Vaske, 2008). Margins of error for each region ranged from ± 4.6% at the 95% confidence level for the East sampling region to ± 5.6% at the 95% confidence level for the Portland sampling region.

To check for potential nonresponse bias, landowners who completed a mail questionnaire were compared against those who did not (i.e., nonrespondents). A sample of n = 142 nonrespondents (East n = 42, Coast n = 38, Portland n = 28, Southwest n = 34) was telephoned in May 2011 and asked eight questions from the questionnaire (see Appendix D). Responses were examined for differences between respondents and nonrespondents in each of the four regions. In total, only 7 of 32 tests (4 regions * 8 questions = 32) for differences were significant at $p < .05$, but statistical significance is inflated by large sample sizes and differences in sample size (Vaske, 2008). Effect size statistics (V, ϕ, r_{pb}) that are influenced less by large sample sizes and sample size disparities ranged from only .01 to .15 and averaged .07. Using guidelines from Cohen (1988) and Vaske (2008), these effect sizes suggest that the strength of any differences between respondents and nonrespondents was ‘‘weak’’ or ‘‘minimal.” Taken together, findings suggest that nonresponse bias was not a major problem, so the data were not weighted in response to this bias check.

Previous research has shown that issues such as acceptance of strategies for managing wildlife impacts and attributions of responsibility for addressing these impacts can differ depending on the severity of impacts. Don Carlos, Bright, Teel, and Vaske (2009), for example, reported that leaving an animal such as a bear alone was acceptable if impacts were relatively minimal (e.g., seen in neighborhood, eats garbage), but this strategy was unacceptable if impacts became more severe (e.g., bear breaks into homes or is aggressive to humans). Similarly, Zinn et al. (1998) found that destroying mountain lions, coyotes, or beavers (i.e., lethal control) was publically unacceptable if members of these species were simply seen on private property and caused no impacts, but this management strategy became much more acceptable as the severity of impacts increased to a point where human health was at risk (e.g., transmits disease, injures humans). Given that public responses to wildlife impacts can be specific to situations, questionnaires used

in this project contained six hypothetical scenarios of impacts caused by beavers intended to represent a continuum of impact severity: (a) "a beaver is seen on your property or neighboring properties, but has not caused any impacts or damage;" (b) "a beaver chews down some trees on your property or neighboring properties;" (c) "a beaver plugs culverts on your property or neighboring properties causing damage to pipes, erosion, and ponds or streams to overflow;" (d) "a beaver floods a road or driveway on your property or neighboring properties;" (e) "a beaver floods crops or fields on your property or neighboring properties;" and (f) "a beaver floods a basement, building, or other structure on your property or neighboring properties." Following each scenario, respondents were asked to answer four sets of questions about their likely emotional responses to the situation described in each scenario (5 questions), attribution of who or what they felt should be responsible for the situation (4 questions), acceptance of possible management actions for addressing the situation (9 questions), and potential likelihood of taking advantage of possible incentives in return for keeping the beaver living on the property (7 questions). These scenarios and questions are presented in Appendix C.

The questionnaire also included questions on a range of other topics such as landowners' past experiences with beavers and beaver impacts; knowledge, attitudes, and beliefs about beavers; opinions about management and information needs related to beavers; and sociodemographic characteristics. Results in this report are grouped into subsections according to these questions. Within each subsection, analysis is conducted to reveal total responses across regions, compare responses among each of these four regions, and compare responses between those who have previously experienced impacts caused by beavers and those who have not experienced any impacts. Percentages, crosstabulations, and bivariate and multivariate inferential statistical tests were used to analyze and present results. Many of these tests produce *p*-values and when a *p*-value associated with any test (i.e., χ^2, F) presented in this report is $p \leq .05$, a statistically significant relationship or difference was observed between regions or groups. In addition to these tests of statistical significance, effect size statistics (e.g., Cramer's V, eta η) were used to compare the strength of relationships. As described earlier, an effect size of .10 suggests a "minimal" (Vaske, 2008) or "weak" (Cohen, 1988) relationship or difference. An effect size of .30 is considered "medium" or "typical," and .50 or greater is a "large" or "substantial" relationship or difference; larger effect sizes imply stronger relationships or differences. To highlight findings, data were recoded into major response categories (e.g., agree, disagree), but descriptive results of all questions uncollapsed (i.e., strongly, slightly agree) are in Appendix E.

RESULTS

Landowner Experiences with Beavers

Landowners were asked how often beavers have caused damage to their property or neighboring properties. In total, 80% of landowners surveyed have never had beaver impacts and 20% have experienced impacts (Table 2). Landowners in the East (27%) and Coast (30%) were more likely than those in Portland (6%) and the Southwest (9%) to have experienced beaver impacts.

Table 2. Beaver damage experienced by landowners *in each region* [a]

Experienced beaver damage to property or neighboring properties	East	Coast	Portland	Southwest	Total
Never	73	70	94	91	80
Once or twice	9	15	1	4	8
Sometimes	10	9	4	3	7
Many times	8	6	1	2	5

[a] Cell entries are percentages (%). In total, 20% have experienced damage caused by beavers. $\chi^2(9, N = 1464) = 132.43, p < .001, V = .16$.

The questionnaire also asked landowners how often they have seen beavers in the wild and on their property or neighboring properties, and if there were any beavers currently living on their property or neighboring properties. Most respondents have seen beavers in the wild (85%), and the majority have seen beavers multiple times in the wild (73%; Table 3). Fewer respondents have seen beavers on their property or neighboring properties (26%) and 16% indicated that beavers are currently living on their property or a neighboring property. A number of respondents (17%), however, were unsure whether beavers were living on their property or a neighboring property. These results differed among the four regions. Respondents in the East were most likely to have seen beavers in the wild (92%), whereas those in Portland were least likely to have seen beavers in the wild (77%). Landowners in the East (34%) and Coast (41%) were more likely than those in the other areas (11% to 13%) to have seen beavers on their property or neighboring properties. In addition, those in the East (20%) and Coast (28%) were more likely than those in the other regions (5% to 9%) to have beavers currently on their land.

Those who have experienced impacts caused by beavers reported greater frequency of seeing beavers in the wild (96%; Table 4). Similarly, those who have experienced impacts (79%) were much more likely than those who have not experienced impacts (14%) to have seen beavers on their property or neighboring properties. In addition, 53% of respondents who have experienced

impacts currently have beavers living on their property or neighboring properties, whereas only 7% of those without impacts have beavers on their property or neighboring properties.

Table 3. Frequency of beaver sightings *in each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Actually seen beavers in the wild						104.68	< .001	.15
Never	8	13	23	19	15			
Once	8	11	18	14	12			
2 – 5 times	28	31	35	32	31			
6 – 10 times	13	10	9	12	11			
More than 10 times	43	35	16	23	31			
Actually seen beavers on property or neighboring properties						149.91	< .001	.18
Never	66	59	89	87	74			
Once	7	10	4	3	6			
2 – 5 times	13	14	5	6	10			
6 – 10 times	4	4	0	2	3			
More than 10 times	10	13	2	2	7			
Have beavers currently living on property or neighboring properties						114.48	< .001	.19
No	68	49	74	78	67			
Unsure	12	23	17	17	17			
Yes	20	28	9	5	16			

[a] Cell entries are percentages (%). In total, 85% have seen beavers in the wild, 26% have seen beavers on their property or neighboring properties, and 16% currently have beavers living on their property or neighboring properties.

Table 4. Frequency of beaver sightings *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	*V*
Actually seen beavers in the wild				121.49	< .001	.29
Never	18	4	15			
Once	14	5	12			
2 – 5 times	32	25	31			
6 – 10 times	11	11	11			
More than 10 times	25	55	31			
Actually seen beavers on property or neighboring properties				495.07	< .001	.63
Never	86	21	74			
Once	6	9	6			
2 – 5 times	5	32	10			
6 – 10 times	1	9	3			
More than 10 times	2	28	7			
Have beavers currently living on property or neighboring properties				310.56	< .001	.51
No	76	28	67			
Unsure	16	19	17			
Yes	7	53	16			

[a] Cell entries are percentages (%).

Landowners were asked how interested they would be in both seeing and having beavers on their property or neighboring properties. Across all respondents, the majority were interested in both seeing (65%) and having beavers live on their property or neighboring properties (57%; Table 5). A greater proportion of respondents in the Coast sampling region were interested in seeing (74%) and having (67%) beavers on their property or neighboring properties, whereas those living in the East region were least interested (59% and 50%, respectively).

Table 5. Interest in having beavers *in each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Interest in *seeing* beavers on property or neighboring properties	59	74	65	63	65	22.06	< .001	.12
Interest in having beavers *living* on property or neighboring properties	50	67	54	54	57	28.11	< .001	.14

[a] Cell entries are percentages (%) that are interested (slightly, moderately, or extremely).

Those who have experienced impacts caused by beavers were less interested (55%) than those who have not experienced impacts (67%) in seeing beavers on their property or neighboring properties (Table 6). Interest in having beavers living on their property or neighboring properties was higher for those who have never experienced impacts caused by beavers (58%) compared to those who have experienced impacts (51%), but this difference was not statistically significant.

Table 6. Interest in having beavers *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Interest in *seeing* beavers on property or neighboring properties	67	55	65	13.72	< .001	.10
Interest in having beavers *living* on property or neighboring properties	58	51	57	3.62	.057	.05

[a] Cell entries are percentages (%).

In total, only 24% of landowners did not want beavers living on their property or neighboring properties (Table 7) and even fewer agreed that beavers were common on their property or neighboring properties (15%), beavers were destroying trees or other vegetation on their property or neighboring properties (15%), the number of beavers and beaver damage on their property or neighboring properties has increased over time (8% to 9%), beavers have damaged other items on their property or neighboring properties (6%), and that there are too many beavers on their property or neighboring properties (5%). Agreement differed statistically among the four regions for all of these issues, as landowners on the Coast were most likely to agree that beavers were

common on their property or neighboring properties (26%). Those living in the East, however, were most likely to agree with the other issues.

Table 7. Experiences with beavers *in each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
I do not want beavers on my property or neighboring properties.	28	20	23	24	24	8.23	.042	.08
Beavers are common on my property or neighboring properties.	17	26	7	8	15	70.86	< .001	.22
Beavers are destroying trees or other vegetation on my property or neighboring properties.	22	18	8	7	15	48.12	< .001	.18
The number of beavers on my property or neighboring properties has increased over time.	13	12	5	4	9	31.91	< .001	.14
Beaver damage on my property or neighboring properties has increased over time.	14	7	2	5	8	40.94	< .001	.17
Beavers are damaging other items on my property or neighboring properties (for example: driveway, flooding).	10	8	1	4	6	31.56	< .001	.14
There are too many beavers on my property or neighboring properties.	9	5	1	4	5	32.82	< .001	.14

[a] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

Table 8. Experiences with beavers *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
I do not want beavers on my property or neighboring properties.	21	36	24	26.76	< .001	.14
Beavers are common on my property or neighboring properties.	6	51	15	287.49	< .001	.50
Beavers are destroying trees or other vegetation on my property or neighboring properties.	4	60	15	460.68	< .001	.64
The number of beavers on my property or neighboring properties has increased over time.	3	34	9	192.27	< .001	.42
Beaver damage on my property or neighboring properties has increased over time.	2	32	8	216.97	< .001	.45
Beavers are damaging other items on my property or neighboring properties (for example: driveway, flooding).	1	26	6	202.84	< .001	.44
There are too many beavers on my property or neighboring properties.	1	20	5	135.00	< .001	.36

[a] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

Agreement on these issues also differed statistically between landowners who have and have not experienced impacts caused by beavers, as those who have experienced impacts were more likely to agree with all of the issues (Table 8). For example, 60% of respondents who have experienced beaver impacts agreed that beavers were destroying trees or other vegetation on their property or neighboring properties, whereas almost none of those who have not experienced impacts agreed with this issue. Effect sizes suggested substantial differences among groups. A weak relationship existed only for "I do not want beavers on my property or neighboring properties" where 36% of those who experienced impacts agreed with this statement and 21% of those who have not experienced impacts associated with beavers agreed with this statement.

Landowners were also asked how often beavers have caused specific types of impacts on their property or neighboring properties. Damage to trees was the most frequently reported incident (25%; Table 9) followed by damage to culverts (14%); overflow of a pond, lake, or stream (13%); and damage to flowers or bushes (10%). Less than 10% of respondents reported flooding of a road or driveway, crops or fields, a well or septic system, or basements or other buildings. Landowners on the Coast reported the greatest frequency of impacts to flowers and bushes (15%) and flooding of a well or septic system (9%), whereas those living in the East reported the greatest frequency of impacts among all other incident categories.

Table 9. Damage caused by beavers *in each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Damage to trees	38	29	14	13	25	90.83	< .001	.25
Damage to culverts (for example: plugged pipes, bank erosion)	22	17	4	7	14	64.97	< .001	.21
Overflow of a pond, lake, or stream	20	19	3	7	13	75.86	< .001	.22
Damage to flowers or bushes	13	15	4	6	10	37.94	< .001	.16
Flooding of a road or driveway	13	11	2	4	8	41.20	< .001	.16
Flooding of crops or fields	15	5	1	5	7	62.21	< .001	.21
Flooding of a well or septic system	4	9	2	3	5	23.69	< .001	.13
Flooding of a basement or other building	3	1	0	2	2	8.04	.045	.07

[a] Cell entries are percentages (%) that reported event occurred on their property or neighboring properties at least once (once or twice, sometimes, or many times).

Respondents were then asked to what extent it would be a problem if beavers caused each of these impacts on their property or neighboring properties. The majority of respondents believed that damage to trees (77%), damage to culverts (76%), flooding of a road or driveway (72%), flooding of a well or septic system (71%), flooding of a basement or other building (69%), damage to flowers or bushes (67%), overflow of a pond, lake, or stream (66%), and flooding of

crops or fields (61%) would be problematic (Table 10). Only 20% of respondents, however, felt that the presence of beavers on their property or a neighboring property would be a problem. This finding suggests that for many respondents, beaver presence alone would not be a problem, but issues arise when beavers start causing impacts. Perceived impacts to culverts and flooding of a well or septic system did not differ across the four regions. There were, however, significant differences among the four regions for the remaining incidents. Those living on the Coast were almost consistently less likely to perceive a problem, whereas those living in the East were most likely to report each incident as problematic. The only exception to this pattern was those living both on the Coast and in the East who perceived the presence of beavers on their property or neighboring properties to be a much greater problem compared to those in the other regions.

Table 10. Perceived problems of particular damages if caused by beavers *in each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Damage to trees	83	75	79	72	77	16.14	.001	.11
Damage to culverts (for example: plugged pipes, bank erosion)	79	74	75	74	76	4.39	.222	.06
Flooding of a road or driveway	78	68	70	70	72	11.94	.008	.09
Flooding of a well or septic system	74	67	71	69	71	4.93	.177	.06
Flooding of a basement or other building	75	58	76	67	69	33.34	< .001	.15
Damage to flowers or bushes	71	58	72	66	67	19.11	< .001	.12
Overflow of a pond, lake, or stream	74	59	61	67	66	22.31	< .001	.12
Flooding of crops or fields	70	50	62	63	61	34.95	< .001	.16
Beavers on my or my neighbor's property	30	28	8	10	20	95.37	< .001	.25

[a] Cell entries are percentages (%) that reported event would be a problem if it occurred on their property or neighboring properties (slight, moderate, or extreme problem).

Respondents who have previously experienced impacts caused by beavers were more likely to perceive each of these incidents as problematic (Table 11). For example, 77% of landowners who have experienced beaver impacts believed that the mere presence of a beaver on their property or neighboring properties was a problem, whereas only 6% of those who have never experienced impacts perceived the presence of beavers to be problematic. Likewise, 81% of those who have experienced impacts caused by beavers believed that the overflow of a pond, lake, or stream would be problematic, whereas 62% of those who have not experienced impacts from beavers believed that this incident would be a problem. This pattern in differences between these two groups was evident and statistically significant for seven of the nine incidents.

Table 11. Perceived problems of particular damages if caused by beavers *for those who have and have not had beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Damage to trees	74	92	77	53.13	< .001	.18
Damage to culverts (for example: plugged pipes, bank erosion)	74	84	76	14.09	< .001	.10
Flooding of a road or driveway	70	79	72	10.55	.001	.08
Flooding of a well or septic system	70	74	71	2.35	.125	.04
Flooding of a basement or other building	68	71	69	0.60	.441	.02
Damage to flowers or bushes	65	74	67	7.93	.005	.07
Overflow of a pond, lake, or stream	62	81	66	36.51	< .001	.16
Flooding of crops or fields	59	70	61	11.32	.001	.09
Beavers on my or my neighbor's property	6	77	20	608.47	< .001	.70

[a] Cell entries are percentages (%) that reported event would be a problem if it occurred on their property or neighboring properties (slight, moderate, or extreme problem).

Respondents were also asked how often they have taken actions to deal with beavers on their property or neighboring properties. Few landowners surveyed, however, have taken actions to deal with beavers (Table 12). Only 10% of landowners, for example, have wrapped trees, 7% have removed beaver dams or lodges, and 6% have contacted wildlife agencies, frightened away beavers, and / or installed exclusion devices (e.g., fences, screens). In most cases, landowners in the East region were slightly more likely than those living elsewhere to have taken these actions.

Table 12. Actions taken to deal with beavers *in each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Wrapped trees with materials to prevent beavers from chewing them	14	15	4	3	10	54.02	< .001	.18
Removed beaver dams / lodges myself	14	7	1	4	7	48.22	< .001	.18
Contacted wildlife agencies about how to deal with beavers	13	7	1	2	6	51.56	< .001	.18
Frightened beavers away myself	11	7	2	4	6	32.24	< .001	.15
Installed other exclusion devices such as fences or screens	9	10	2	2	6	36.61	< .001	.15
Asked regulated trapper to remove beavers	10	5	1	2	5	41.22	< .001	.17
Destroyed beavers myself (lethal control)	8	4	1	1	4	34.43	< .001	.15
Contacted other groups about how to deal with beavers	7	4	1	3	4	15.91	.001	.11
Installed control devices such as water control pipes	3	2	1	1	2	7.08	.069	.07
Hired animal control personnel to remove beavers	5	1	1	1	2	19.94	< .001	.13
Captured and relocated beavers myself	3	1	1	1	1	6.65	.084	.07

[a] Cell entries are percentages (%) that reported taking the action at least once to deal with beavers on their property or neighboring properties (once or twice, sometimes, or many times).

Those who have experienced impacts caused by beavers were significantly more likely than those who have not experienced impacts to participate in all of these actions to deal with beavers (Table 13). Actions such as wrapping trees, removing beaver dams or lodges, contacting wildlife agencies about how to deal with beavers, frightening beavers away, and installing exclusion devices were initiated by a range of 25% to 37% of landowners who have experienced beaver impacts. A small number of landowners who have never experienced impacts also participated in some of these actions, likely as preventative measures to possibly deal with beavers in the future.

Table 13. Actions taken to deal with beavers *for those who have and have not had beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Wrapped trees with materials to prevent beavers from chewing them	3	37	10	239.90	< .001	.47
Removed beaver dams / lodges myself	2	29	7	189.50	< .001	.42
Contacted wildlife agencies about how to deal with beavers	1	28	6	213.88	< .001	.45
Frightened beavers away myself	1	28	6	209.34	< .001	.44
Installed other exclusion devices such as fences or screens	2	25	6	164.55	< .001	.39
Asked regulated trapper to remove beavers	1	20	5	147.08	< .001	.37
Destroyed beavers myself (lethal control)	1	16	4	108.78	< .001	.32
Contacted other groups about how to deal with beavers	1	16	4	101.49	< .001	.31
Installed control devices such as water control pipes	1	7	2	31.08	< .001	.17
Hired animal control personnel to remove beavers	1	9	2	47.37	< .001	.21
Captured and relocated beavers myself	0	5	1	29.39	< .001	.17

[a] Cell entries are percentages (%) that reported taking the action at least once to deal with beavers on their property or neighboring properties (once or twice, sometimes, or many times).

Section Summary

- In total, 20% of landowners surveyed have previously experienced impacts caused by beavers and 80% have not experienced impacts. Landowners in the East and Coast were more likely than those in Portland and the Southwest to have experienced impacts.
- Most respondents (85%) have seen beavers in the wild, 26% have seen them on their property or neighboring properties, and 16% have beavers currently living on their property or neighboring properties. Those living in the East and Coast were more likely to have seen beavers in the wild and on their property, and currently have beavers on their property or a neighboring property.

- The majority of respondents were interested in seeing (65%) and having (57%) beavers live on their property or neighboring properties. Interest was greatest on the Coast, but lowest in the East and for those who have previously experienced beaver impacts.
- Damage to trees (25%) and culverts (14%) and the overflow of water bodies (e.g., pond, stream; 13%) were the most frequently reported incidents caused by beavers, and these impacts were more frequent and considered to be bigger problems in the East and Coast.
- Landowners who have experienced impacts caused by beavers were much more likely (77%) than those who have not experienced impacts (6%) to consider the presence of beavers on private property to be a problem.
- Few landowners (10% or less) have taken actions to deal with beavers (e.g., wrapped trees, removed dams or lodges, contacted agencies, frightened away beavers, installed exclusion devices). Landowners in the East region and those who have experienced beaver impacts were the most likely to have taken these actions than other respondents.

Landowner Knowledge, Attitudes, and Beliefs about Beavers

Knowledge about Beavers. The questionnaires contained 10 statements about beavers and asked respondents if they believed each was true or false. Landowners were highly knowledgeable about beavers because, on average, they correctly answered 8.69 out of 10 questions (Table 14). In total, 99% of respondents knew that beavers build both dams and lodges, 98% were aware that beavers typically live in water, and 97% knew that beaver dams create wetlands that are important for living things besides fish. "Beavers do not eat fish" (62%) and "beaver dams can create ponds that are important for fish such as salmon" (75%) were the items that the fewest landowners knew were true. Average scores were slightly but statistically different among the four regions, with landowners in the Southwest earning slightly lower scores (M = 8.35 / 10) than those in the other three regions (M = 8.68 to 8.88 / 10). There were statistically significant differences among the regions for five statements: "historically, Oregon generally has had a large beaver population," "historically, beavers were almost eliminated in Oregon because the value of their furs / pelts," "beavers have webbed feet," "beaver dams can create ponds that are important for fish such as salmon," and "beavers do not eat fish." Again, landowners living in the Southwest region of the state were least likely to answer these statements correctly.

Table 14. Knowledge about beavers *in each region* [1]

	East	Coast	Portland	Southwest	Total	χ^2 or F value	p value	V or η
Beavers build both dams and lodges (T)	99	98	100	98	99	5.13	.162	.06
Beavers typically live in waters such as ponds, marshes, or streams (T)	99	98	97	98	98	2.52	.471	.04
Beaver dams can create wetlands that are important for other living things besides fish (T)	97	97	98	97	97	1.05	.789	.03
Historically, Oregon generally has had a large beaver population (T)	89	94	95	88	91	17.09	.001	.11
Beaver dams can create ponds that help replenish groundwater supplies (T)	93	91	91	87	90	6.35	.096	.07
Historically, beavers were almost eliminated in Oregon because the value of their furs / pelts (T)	88	92	90	85	89	9.23	.026	.08
Beavers have webbed feet (T)	92	86	79	84	86	24.90	< .001	.13
Beavers must chew on wood because their teeth do not stop growing (T)	85	84	86	82	84	1.86	.602	.04
Beaver dams can create ponds that are important for fish such as salmon (T)	70	80	84	68	75	31.98	< .001	.15
Beavers do not eat fish (T)	69	66	52	58	62	23.93	< .001	.14
Average (mean) total knowledge score / 10	8.82[a]	8.88[a]	8.68[a]	8.35[b]	8.69	9.16	< .001	.15

[1] Cell entries are percentages (%) that responded correctly, unless averages (means). Means with different letter superscripts differ at $p <$ .05 using Tamhane's T2 post-hoc tests for unequal variances. In total, 97% of respondents knew that there are beavers living in Oregon.

Table 15. Knowledge about beavers *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 or t value	p value	ϕ or r_{pb}
Beavers build both dams and lodges (T)	98	99	99	0.19	.667	.01
Beavers typically live in waters such as ponds, marshes, or streams (T)	98	97	98	0.26	.611	.01
Beaver dams can create wetlands that are important for other living things besides fish (T)	97	96	97	1.87	.172	.04
Historically, Oregon generally has had a large beaver population (T)	91	92	91	0.59	.444	.02
Beaver dams can create ponds that help replenish groundwater supplies (T)	91	88	90	1.88	.170	.04
Historically, beavers were almost eliminated in Oregon because the value of their furs / pelts (T)	90	83	89	10.27	.001	.09
Beavers have webbed feet (T)	85	90	86	5.88	.015	.06
Beavers must chew on wood because their teeth do not stop growing (T)	83	88	84	4.04	.045	.05
Beaver dams can create ponds that are important for fish such as salmon (T)	76	71	75	3.15	.076	.05
Beavers do not eat fish (T)	59	75	62	22.80	< .001	.13
Average (mean) total knowledge score / 10	8.66	8.80	8.69	1.41	.159	.04

[a] Cell entries are percentages (%) that responded correctly, unless averages (means).

Average knowledge about beavers did not statistically differ between those who have and have not experienced impacts caused by beavers (Table 15). Frequency of correct responses differed

between those who have experienced impacts and those who have not experienced impacts for four of the 10 statements, but the effect sizes were minimal or weak.

Attitudes toward Beavers. The questionnaires contained five pairs of words each on 5-point semantic differential scales (e.g., dislike – like, negative – positive) to measure landowner attitudes about beavers. Across all respondents, attitudes about beavers were generally positive (M = 3.99 / 5; Table 16). The majority of respondents like (75%) and favor (70%) beavers, and think they are good (70%), positive (69%), and beneficial (58%). Among the four regions, those living in the East (M = 3.79) had significantly less positive average attitudes than those in the other three regions (M = 4.02 to 4.16). Landowners in the East were also more likely than those in the other regions to respond more negatively to each of the five attitude items about beavers, whereas those living in Portland were likely to respond most positively for all of the items.

Table 16. Attitudes toward beavers *in each region* [1]

	East	Coast	Portland	Southwest	Total	χ^2 or F value	p value	V or η
I like beavers	69	74	81	76	75	12.18	.007	.09
Beavers are good	63	71	76	71	70	12.35	.006	.10
I favor beavers	63	70	77	72	70	16.33	.001	.11
Beavers are positive	61	71	76	69	69	18.18	< .001	.12
Beavers are beneficial	50	63	63	59	58	16.31	.001	.11
Average (mean) attitude [2]	3.79[a]	4.02[b]	4.16[b]	4.02[b]	3.99	7.82	< .001	.13

[1] Items were asked on 5-point semantic differential scales (e.g., 1 "dislike" to 5 "like;" 1 "harmful" to 5 "beneficial"). Cell entries are percentages (%) that circled 4 or 5 for each pair unless specified as averages (means).

[2] Represents the overall average (mean) on 5-point scale for all 5 items combined where 1 represents the most negative attitude and 5 represents the most positive attitude. Means with different letter superscripts differ at $p < .05$ using Tamhane's T2 post-hoc tests for unequal variances. Cronbach alpha reliability = 0.96.

Table 17. Attitudes toward beavers *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 or t value	p value	ϕ or r_{pb}
I like beavers	78	60	75	34.51	< .001	.17
Beavers are good	74	54	70	37.72	< .001	.17
I favor beavers	74	55	70	32.64	< .001	.16
Beavers are positive	73	51	69	45.09	< .001	.19
Beavers are beneficial	62	43	58	28.64	< .001	.15
Average (mean) attitude [b]	4.11	3.48	3.99	7.61	< .001	.24

[a] Items were asked on 5-point semantic differential scales (e.g., 1 "dislike" to 5 "like;" 1 "harmful" to 5 "beneficial"). Cell entries are percentages (%) that circled 4 or 5 for each pair unless specified as averages (means).

[b] Represents the overall average (mean) on 5-point scale for all 5 items combined where 1 represents the most negative attitude and 5 represents the most positive attitude. Cronbach alpha reliability = 0.96.

Not surprisingly, landowners who have never experienced beaver impacts were more likely (M = 4.11) than those who have experienced impacts (M = 3.48) to have a positive overall attitude about beavers (Table 17). Those who have experienced beaver impacts were also more likely than those who have not had impacts to respond less positively to each of the five attitude items.

Beliefs about Beavers. Landowners were asked the extent that they disagreed or agreed with 12 statements about beavers. Similar to their attitudes, landowners' beliefs about beavers were also generally positive (Table 18). The majority of respondents agreed that beavers create wetlands that benefit other living things (87%), the existence of beavers is important (86%), they would get enjoyment from seeing beavers (83%), beavers are a sign of a healthy environment (82%), people should be willing to tolerate some conflicts with beavers (75%), beavers have a right to exist regardless of any impacts they cause (61%), and beaver populations should be left alone (58%). Less than half of respondents agreed that beaver populations should be controlled (47%), no beaver should be destroyed (46%), beaver impacts to roads or other property is a major problem (24%), beavers are a nuisance animal (21%), and they are afraid of beavers (4%). These beliefs, however, differed among the four regions. Landowners in the East were consistently more likely to disagree with statements that reflected beavers in a positive manner, and agree that there is a need to control beavers (even lethal control), beaver damage is a major problem, and beavers are nuisance animals. For example, between 61% and 70% of respondents in Portland, the Southwest, and the Coast agreed that beavers have a right to exist regardless of any impacts they cause, whereas 46% of those in the East agreed that beavers have a right to exist regardless of impacts. Conversely, 61% of landowners in the East agreed that beaver populations should be controlled, whereas 33% to 45% of those living in the other regions agreed with this statement.

Those who have experienced impacts caused by beavers were less likely that those who have not had impacts to agree with statements that reflected beavers in a positive manner (Table 19). For example, 65% of those who have not experienced impacts agreed that beavers have a right to exist regardless of their impacts, whereas 46% of those who have experienced impacts agreed with this statement. In addition, those who have experienced impacts were more likely to believe that beavers should be controlled, beaver damage is a major problem, and that beavers are a nuisance. For example, 70% of landowners who have experienced impacts agreed that beavers should be controlled, whereas 41% of those who have not experienced impacts agreed with this statement. Responses to "I am afraid of beavers" did not differ between these two groups.

Table 18. Beliefs about beavers *in each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Beavers create wetlands that benefit other living things	84	90	89	86	87	8.57	.036	.08
I may never see a beaver, but it is important to me that they exist	78	89	93	87	86	36.43	< .001	.16
I would get enjoyment from seeing beavers	78	82	87	85	83	11.68	.009	.09
Beavers are a sign of a healthy environment	75	85	86	82	82	18.97	< .001	.12
People should be willing to tolerate some conflicts with beavers	66	78	85	75	75	38.05	< .001	.16
Beavers have a right to exist regardless of any damage they cause	46	69	70	64	61	63.35	< .001	.21
Beaver populations should be left alone	46	62	66	59	58	34.26	< .001	.15
Beaver populations should be controlled	61	45	33	43	47	57.14	< .001	.20
No beaver should be destroyed	30	50	58	49	46	65.00	< .001	.21
Beaver damage to roads or other property is a major problem	34	26	11	21	24	56.41	< .001	.19
Beavers are a nuisance animal	30	20	9	22	21	48.37	< .001	.18
I am afraid of beavers	2	3	7	5	4	8.97	.030	.08

[a] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

Table 19. Beliefs about beavers *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Beavers create wetlands that benefit other living things	89	79	87	15.02	< .001	.11
I may never see a beaver, but it is important to me that they exist	88	76	86	23.89	< .001	.14
I would get enjoyment from seeing beavers	85	71	83	29.06	< .001	.15
Beavers are a sign of a healthy environment	83	75	82	9.78	.002	.09
People should be willing to tolerate some conflicts with beavers	78	64	75	21.65	< .001	.13
Beavers have a right to exist regardless of any damage they cause	65	46	61	32.67	< .001	.15
Beaver populations should be left alone	62	37	58	58.16	< .001	.20
Beaver populations should be controlled	41	70	47	78.24	< .001	.23
No beaver should be destroyed	50	29	46	37.76	< .001	.16
Beaver damage to roads or other property is a major problem	18	47	24	91.85	< .001	.27
Beavers are a nuisance animal	16	42	21	77.31	< .001	.25
I am afraid of beavers	4	4	4	0.15	.701	.01

[a] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

Concerns about Beavers. Landowners were asked how concerned they would be about property damage and health and safety issues if beavers were on their property or neighboring properties. Damage to their property and neighboring properties by beavers were of greatest concern (71%;

Table 20). Relatively large proportions of respondents were also concerned about the spread of diseases by beavers (48%) and health or safety of pets (44%), children (42%), and themselves due to beavers (30%). Those in the East were most concerned about damage to their own (77%) or neighboring properties (77%), and those in Portland were most concerned about the spread of diseases (55%) and the health and safety of pets (55%), children (55%), and themselves (39%). Landowners in the East were least concerned about these health and safety risks (25% to 41%).

Table 20. Concerns about beavers *in each region* [a]

Level of concern about:	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Potential damage to your own property by beavers	77	67	72	69	71	10.22	.017	.08
Potential damage to neighboring properties by beavers	77	68	71	69	71	10.93	.012	.09
Spread of diseases by beavers	41	49	55	50	48	15.05	.002	.10
Health or safety of pets	35	44	55	46	44	28.10	< .001	.14
Health or safety of children	33	43	55	40	42	37.17	< .001	.16
Your own personal health or safety	25	33	39	27	30	20.54	< .001	.12

[a] Cell entries are percentages (%) that expressed some level of concern (slightly, moderately, or extremely) if beavers were ever to be found on their property or neighboring properties.

Those who have experienced impacts caused by beavers were significantly more likely to be concerned about potential damage to their own property (85%) or neighboring properties (83%) than those who have not experienced impacts (68%; Table 21). Concerns about potential spread of diseases by beavers and the health or safety of pets, children, and themselves due to beavers were not statistically different between those who have and have not experienced beaver impacts.

Table 21. Concerns about beavers *for those who have and have not experienced beaver damage* [a]

Level of concern about:	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Potential damage to your own property by beavers	68	85	71	34.48	< .001	.15
Potential damage to neighboring properties by beavers	68	83	71	25.67	< .001	.13
Spread of diseases by beavers	49	46	48	0.83	.364	.02
Health or safety of pets	45	41	44	1.42	.234	.03
Health or safety of children	43	38	42	2.48	.115	.04
Your own personal health or safety	31	29	30	0.32	.573	.02

[a] Cell entries are percentages (%) that expressed some level of concern (slightly, moderately, or extremely) if beavers were ever to be found on their property or neighboring properties.

Section Summary

- Landowners were knowledgeable about beavers, with an average score of 8.69 out of 10 questions answered correctly. They were most likely to know that beavers build dams and lodges (99% correct), live in water bodies (98%), and create wetlands that are important for living things other than fish (97%). Landowners were least likely to know that beavers do not eat fish (62%) and that beaver dams create ponds that are important for fish such as salmon (75%). Knowledge about beavers was lowest in the Southwest, but did not differ much between those who have and have not experienced beaver impacts.
- Respondents had generally positive attitudes about beavers (e.g., like, favor, beneficial). Attitudes were most negative in the East region and most positive in the Portland region. Landowners who have experienced beaver impacts had less positive attitudes about beavers than those who have not experienced impacts from this species.
- Most respondents believed that beavers create wetlands that benefit other living things (87%), are important to exist (86%), they would enjoy seeing beavers (83%), beavers are a sign of a healthy environment (82%), some beaver damage should be tolerated (75%), and beavers have a right to exist regardless of any impacts they cause (61%). Less than half of landowners believed that beavers should be controlled (47%), create damage that is problematic (24%), and are a nuisance (21%). Those in the East and who experienced beaver impacts were more likely than those in other regions to disagree with statements that reflected beavers in a positive manner and more likely to agree that there is a need to control beavers, beavers impacts are a major problem, and beavers are a nuisance.
- Damage to property by beavers was a concern of most respondents (71%), but relatively considerable proportions were also concerned about the spread of diseases by beavers (48%) and the health or safety of pets (44%), children (42%), and themselves due to beavers (30%). Landowners in the East and those who have experienced beaver impacts were most concerned about property impacts, whereas those living in the Portland area were most concerned about beaver impacts on health and safety.

Landowner Responses to Increasing Beaver Impacts

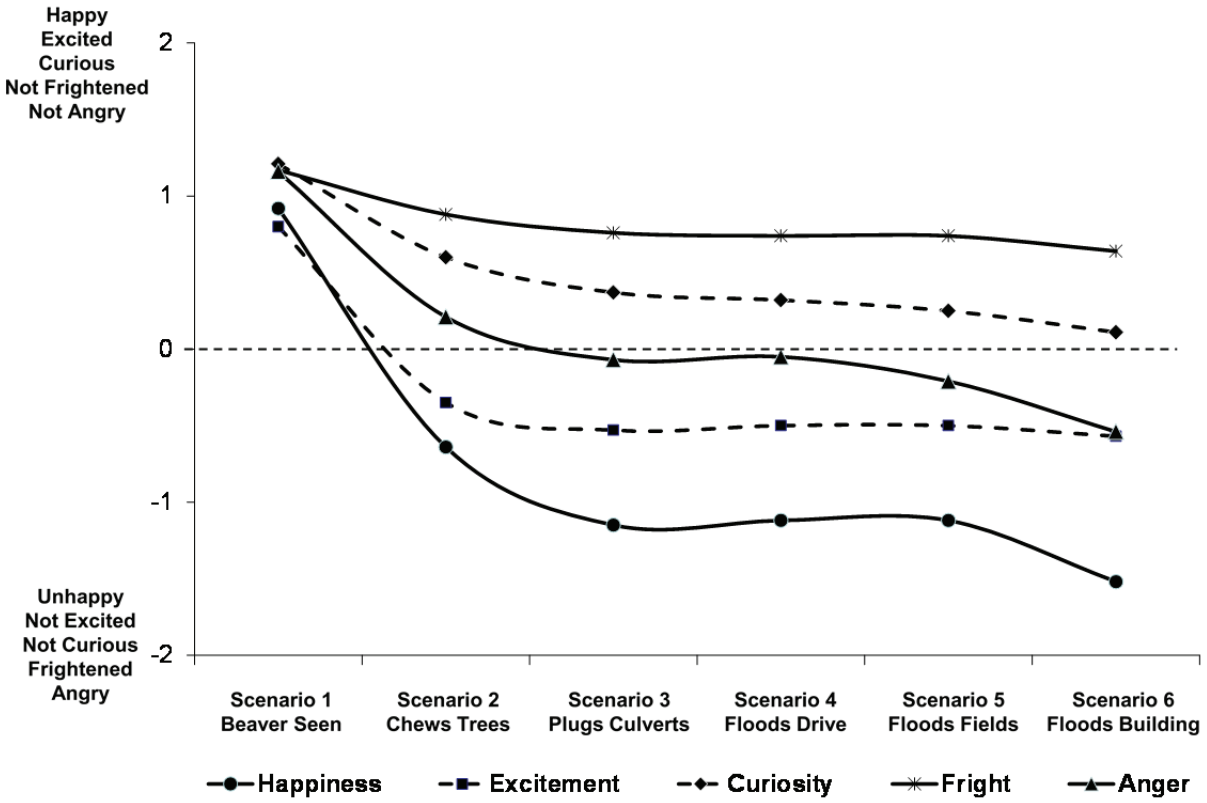
Using the approach described earlier in the methods, this section provides a comparative analysis of landowner responses to the six hypothetical scenarios describing increasing impacts caused by beavers on private property (e.g., chews down some trees, floods a road or driveway, floods a

basement or other structure). The purpose of these scenarios was to understand how increasing beaver impacts would influence landowner: (a) emotions (e.g., happy, angry), (b) attributions of who or what is responsible for the situation (e.g., beaver, landowner, agencies), (c) acceptance of managerial responses (e.g., do nothing and leave beaver alone, wrap trees, remove beaver dams, capture and relocate beaver, lethal control), and (d) likelihood of taking advantage of incentives for retaining beavers on their property and not destroying beavers because of these impacts (e.g., information sent about coexisting with beavers, expert visits, financial compensation).

Most results in this section are presented as means on graphs called social norm curves or impact acceptability curves (see Manning 2007, 2010; Needham & Rollins, 2009 for reviews). These graphs represent the scenarios and amount of beaver impacts increasing from left to right along the horizontal axis. The vertical axis represents the evaluative responses with the most positive evaluation at the top of the axis, most negative on the bottom, and a neutral category in between.

Emotional Responses. Emotional responses to the scenarios were measured in the questionnaire with five pairs of opposing words on 5-point sematic differential scales (e.g., unhappy – happy, frightened – not frightened, angry – not angry). A generally negative trend existed across the scenarios starting with simply seeing a beaver on their property or neighboring properties (scenario 1) to a beaver flooding a building (scenario 6; Figure 1). Consistently positive emotions were illustrated with seeing a beaver. Emotions changed, however, as scenarios began to depict beavers causing more severe impacts. Happiness showed the most drastic decline in emotional response, as respondents suggested unhappiness starting with scenario 2 (i.e., beaver chews trees) and continuing through scenario 6 (i.e., floods buildings). Excitement also declined from positive to negative between scenarios 1 and 2, but was fairly consistent across the remaining scenarios. Anger increased across all scenarios, but landowners would not be angry until scenario 3 (plugs culverts) and then anger increased as the severity of impacts increased. Although landowners became more frightened and less curious as impacts increased, neither of these emotions became negative. Although a few statistically significant differences were revealed among the four regions, no clear pattern emerged and the effect sizes were minimal.

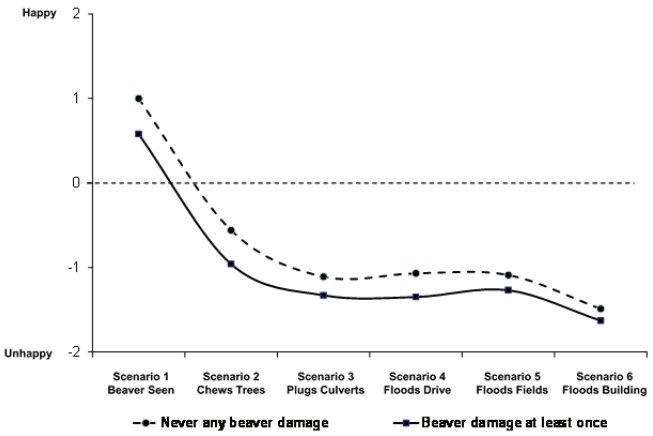
Figure 1. Average emotions of total landowners in response to increased beaver damage [a]



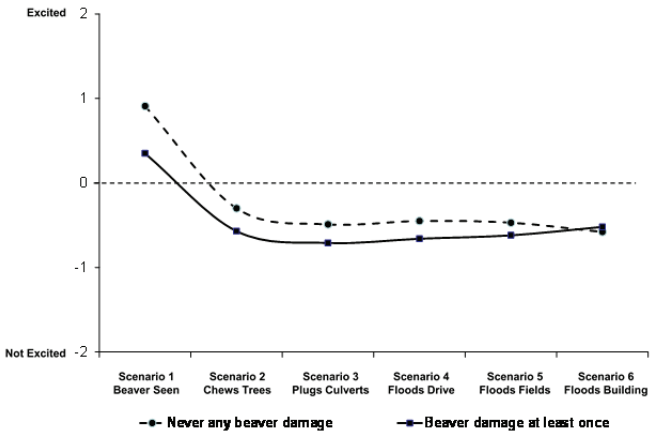
[a] There were statistically significant ($p < .05$) differences between regions (east, coast, Portland, southwest) for only 16 of 30 comparisons (53%), but there were no consistent patterns and the eta (η) effect sizes were all less than .19 and averaged .09, suggesting that these differences were "minimal" (Vaske, 2008) or "small" (Cohen, 1988).

Across scenarios, there were differences in happiness, curiosity, and anger between those who have and have not previously experienced impacts caused by beavers (Figure 2). Those who have experienced impacts had consistently more negative emotions than those who have not had impacts. Most emotions dropped from positive to negative between scenarios 1 (beaver seen) and 2 (beaver chews trees), but the change from positive to negative for curiosity and anger occurred between scenarios 2 and 3 (plugs culverts). Respondents had negative emotions for excitement (i.e., not excited) beginning with scenario 2, but limited differences in excitement existed between those who have and have not experienced beaver impacts as the severity of impacts increased. Irrespective of the scenario and amount of previous experience with beaver impacts, beavers did not provoke an emotion of fright among the landowners surveyed.

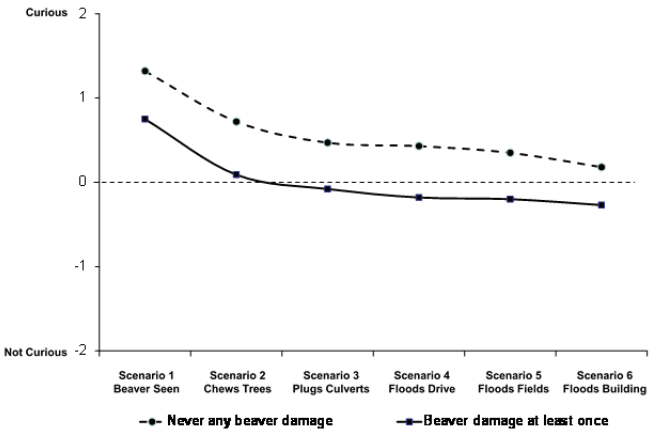
Figure 2. Average emotions *for those who have and have not experienced beaver damage*



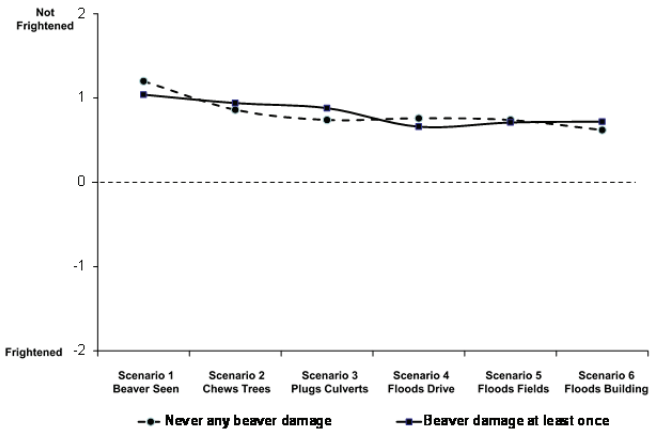
Happiness:
$t = 2.29$ to 5.06, $p = .023$ to $< .001$, $r_{pb} = .06$ to $.14$



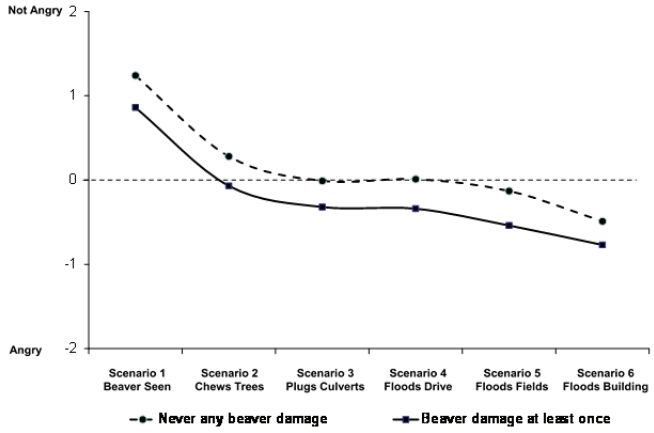
Excitement:
$t = 0.55$ to 6.78, $p = .581$ to $< .001$, $r_{pb} = .02$ to $.18$



Curiosity:
$t = 3.98$ to 6.70, $p < .001$, $r_{pb} = .12$ to $.21$



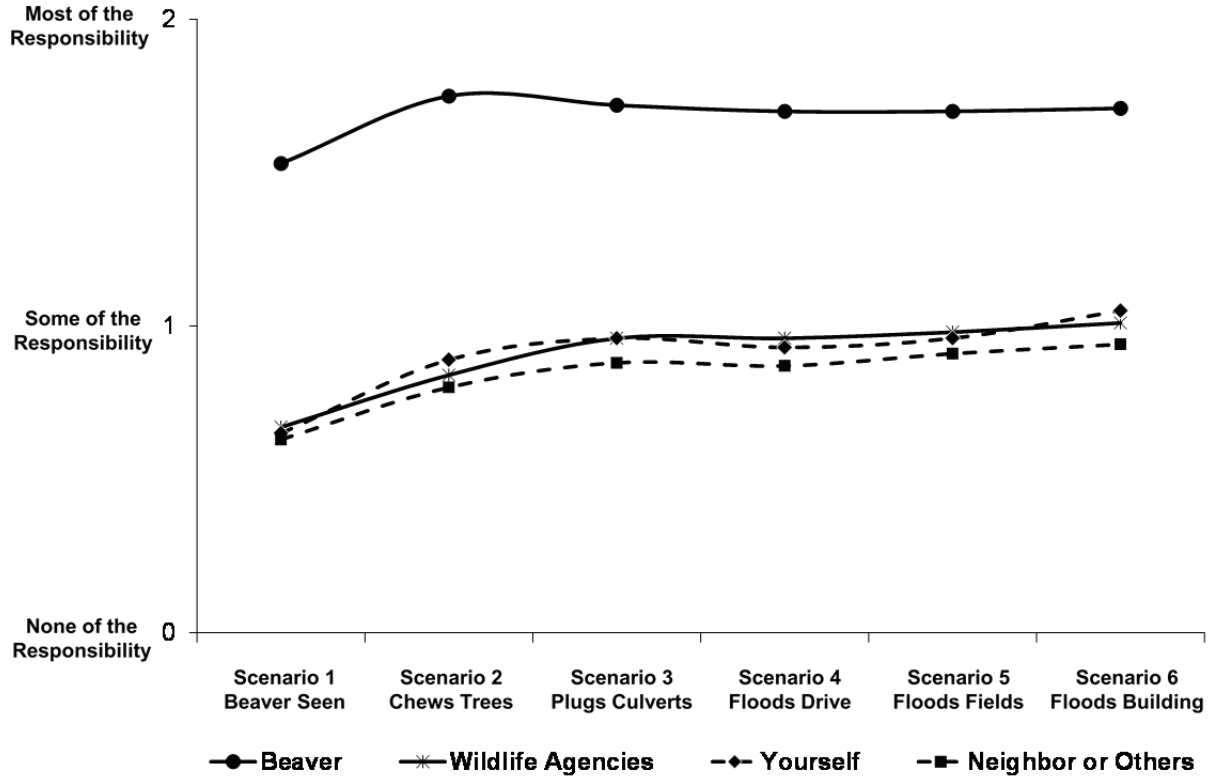
Fright:
$t = 0.27$ to 1.25, $p = .097$ to $.785$, $r_{pb} = .01$ to $.05$



Anger:
$t = 2.58$ to 3.90, $p = .010$ to $< .001$, $r_{pb} = .07$ to $.12$

Attribution of Responsibility. Landowners were then asked who or what they would assume is responsible for the situations described in each of the six scenarios (e.g., beaver, wildlife agencies, landowner themselves) on 4-point scales from none of the responsibility to all of the responsibility. Across all respondents and scenarios, most of the responsibility for impacts caused by beavers was attributed to the beavers themselves (Figure 3). Respondents attributed some of the responsibility to wildlife agencies, themselves, and neighbors or others, and this increased slightly across the scenarios. It is also interesting to note that landowners attributed relatively equal amounts of responsibility to each of these three groups (i.e., themselves, agencies, neighbors). There were a few minor differences in attribution of responsibility among the four sampling regions and between those who have and have not experienced impacts caused by beavers, but there were no consistent patterns and the effect sizes were minimal.

Figure 3. Average attribution of responsibility of total landowners in response to increased beaver damage [a]



[a] There were statistically significant ($p < .05$) differences between regions (east, coast, Portland, southwest) for only 14 of 24 comparisons (58%), but there were no consistent patterns and the eta (η) effect sizes were all less than .12 and averaged .07, suggesting that these differences were "minimal" (Vaske, 2008) or "small" (Cohen, 1988).

There were also statistically significant ($p < .05$) differences between those who have and have not experienced beaver damage for only 8 of 24 comparisons (33%), but there were no consistent patterns and the point-biserial correlation (r_{pb}) effect sizes were all less than .11 and averaged .04, suggesting that these differences were also "minimal" (Vaske, 2008) or "small" (Cohen, 1988).

Acceptance of Management Responses. In response to each of the six scenarios, landowners were asked how unacceptable or acceptable it would be to take a number of possible non-structural (e.g., educate landowners, capture and relocate the beaver, destroy the beaver) and structural management strategies (e.g., wrap trees, install control devices, remove dams or lodges) on 5-point scales from very unacceptable to very acceptable. For *non-structural* strategies, doing nothing and leaving the beaver alone was acceptable for the first scenario (i.e., beaver seen on property and no impacts), but acceptance declined rapidly as the severity of impact increased (Figure 4). However, average landowner acceptance of the other non-structural responses to increasing impacts did not vary much across scenarios. Educating landowners to coexist with beavers was the most acceptable option across all scenarios. Capturing and relocating the beaver was also acceptable and acceptance with this strategy increased slightly as the severity of impacts increased. Destroying the beaver was by far the most unacceptable option across all scenarios, and frightening the beaver away was also unacceptable for all scenarios.

Figure 4. Average landowner acceptance of *non-structural* management responses to increased beaver damage

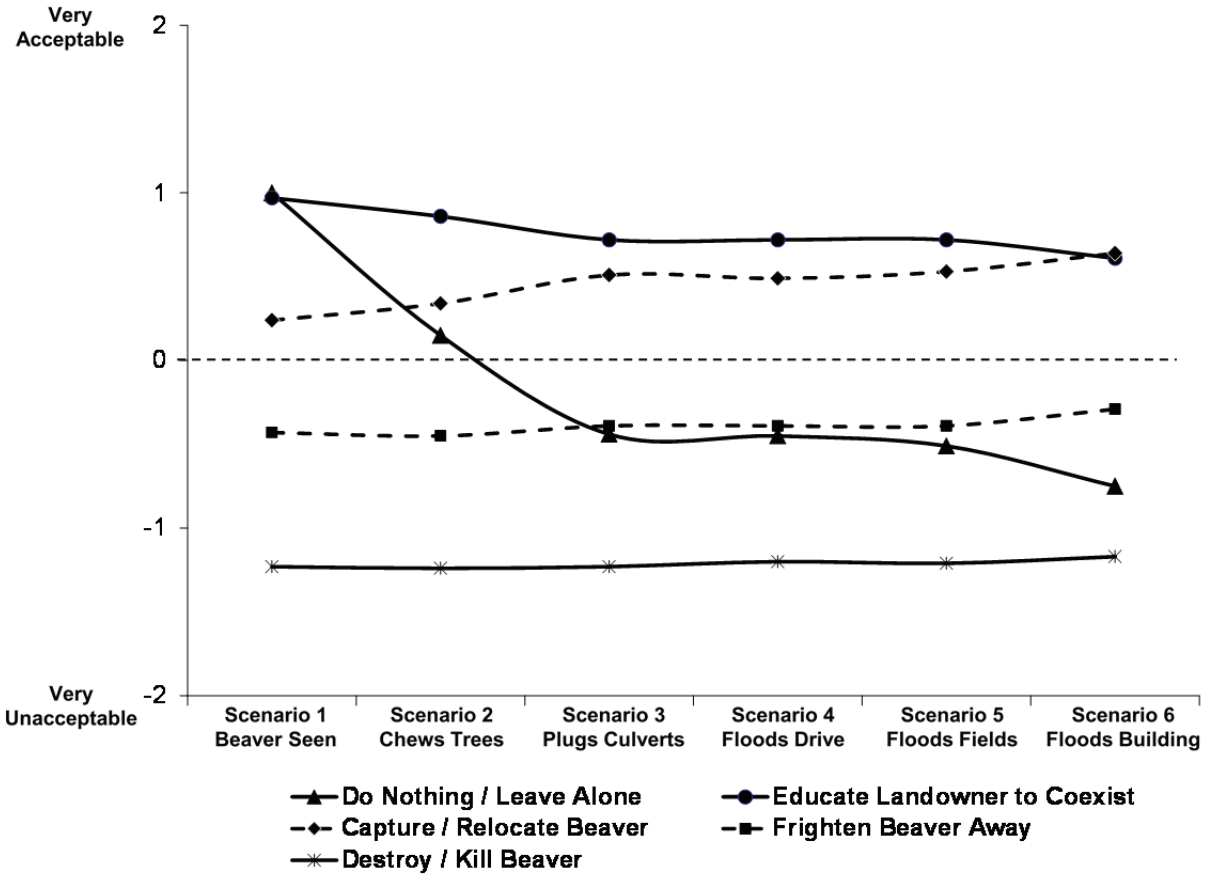
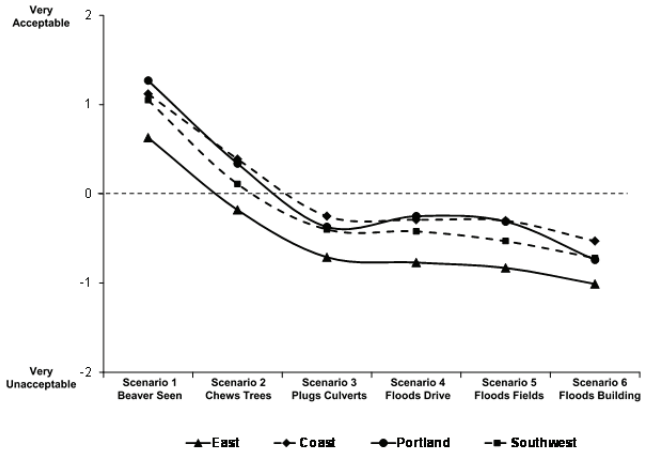
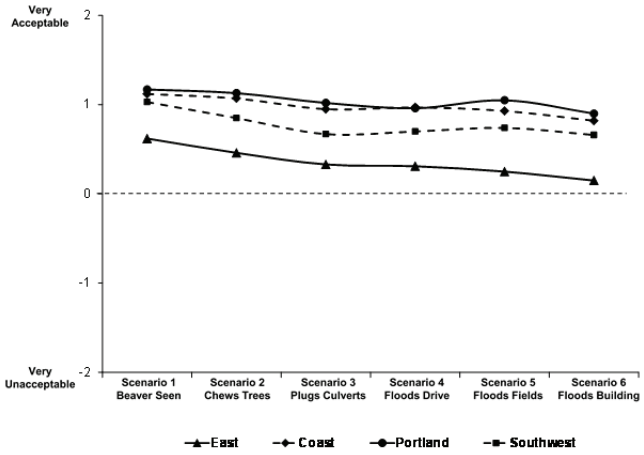


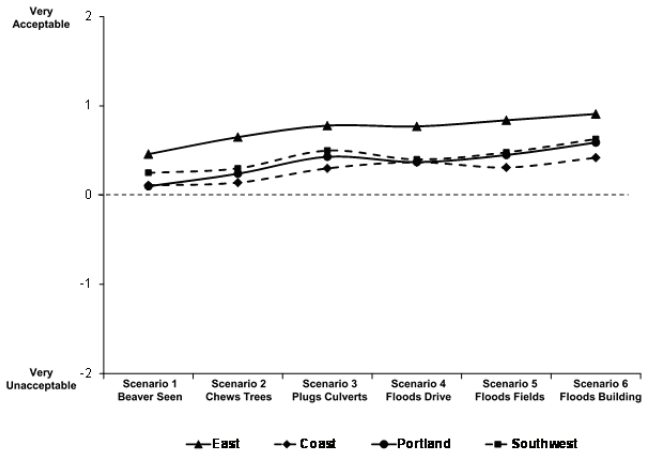
Figure 5. Average acceptance of *non-structural* management *in each region*



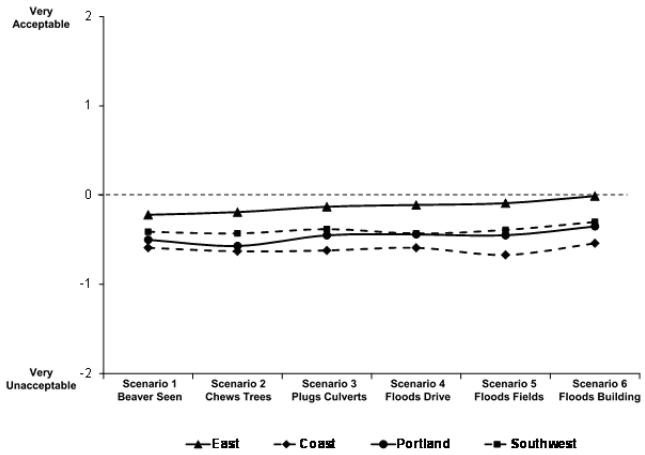
Do Nothing / Leave Beaver Alone:
$F = 6.32$ to 15.87, $p < .001$, $\eta = .12$ to $.18$



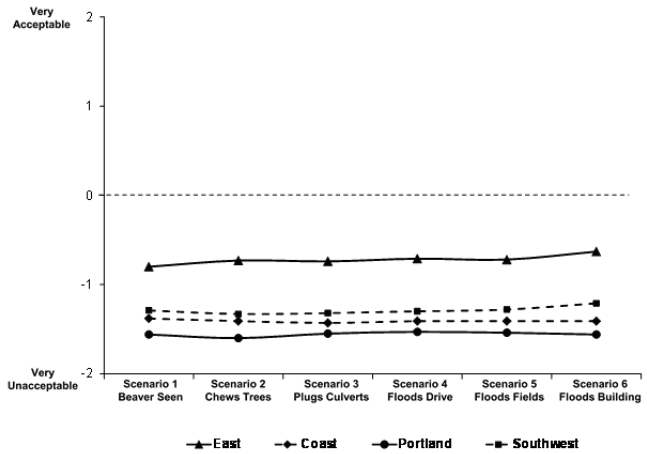
Educate Landowners on How to Coexist with Beavers:
$F = 16.02$ to 20.05, $p < .001$, $\eta = .18$ to $.21$



Capture and Relocate Beaver to Another Location:
$F = 4.75$ to 8.60, $p = .003$ to $< .001$, $\eta = .10$ to $.14$

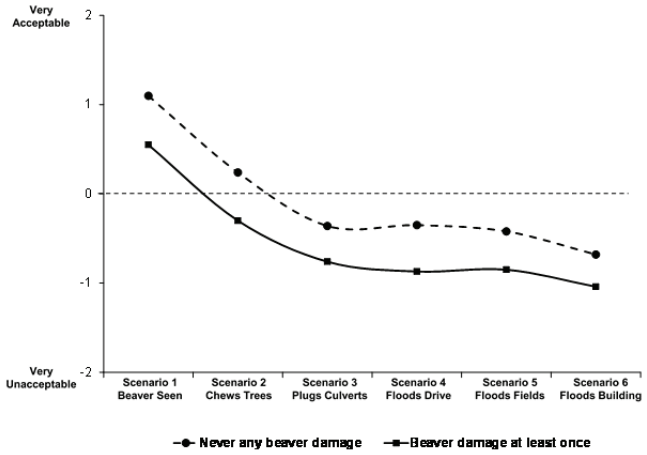


Frighten the Beaver Away:
$F = 4.94$ to 8.94, $p = .002$ to $< .001$, $\eta = .10$ to $.15$

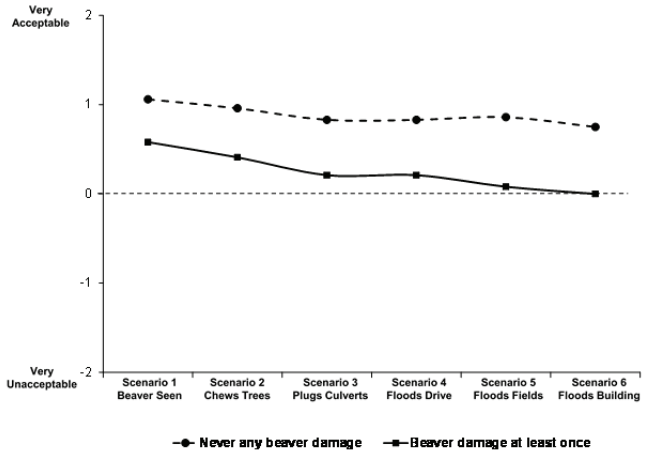


Destroy the Beaver (Lethal Control):
$F = 23.21$ to 31.30, $p < .001$, $\eta = .22$ to $.25$

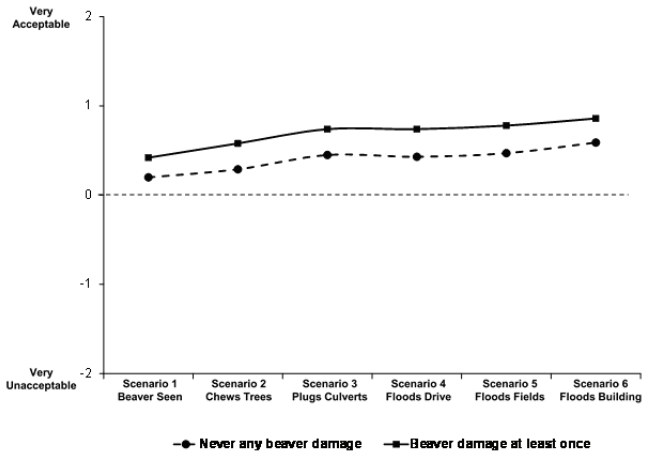
Figure 6. Average acceptance of *non-structural* management *for those who have and have not experienced beaver damage*



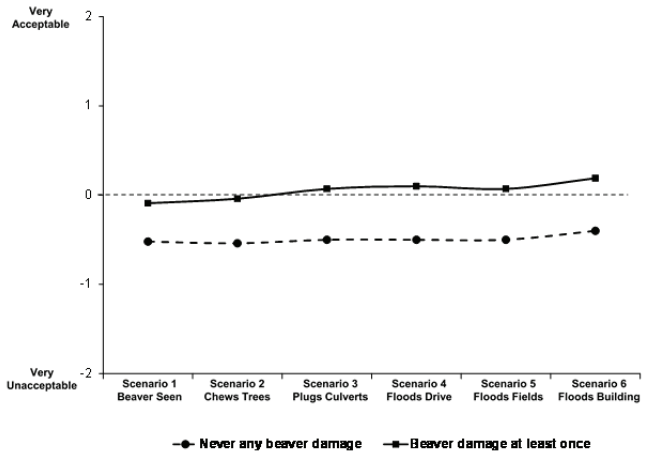
Do Nothing / Leave Beaver Alone:
$t = 3.40$ to 5.55, $p \leq .001$, $r_{pb} = .10$ to $.16$



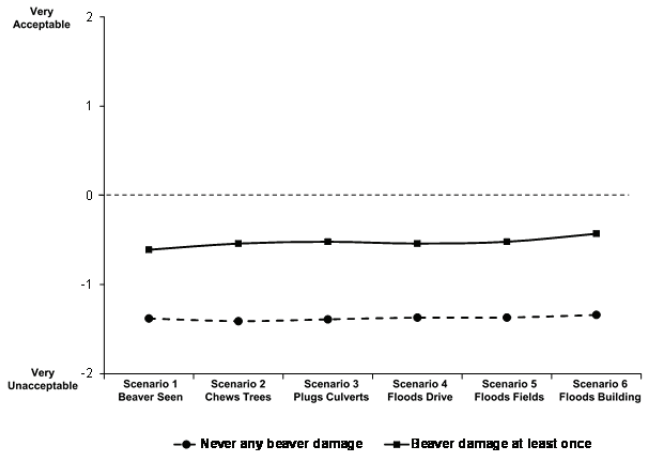
Educate Landowners on How to Coexist with Beavers:
$t = 5.25$ to 6.95, $p < .001$, $r_{pb} = .15$ to $.21$



Capture and Relocate Beaver to Another Location:
$t = 2.18$ to 2.97, $p = .029$ to $.003$, $r_{pb} = .06$ to $.08$



Frighten the Beaver Away:
$t = 4.33$ to 5.50, $p < .001$, $r_{pb} = .12$ to $.16$



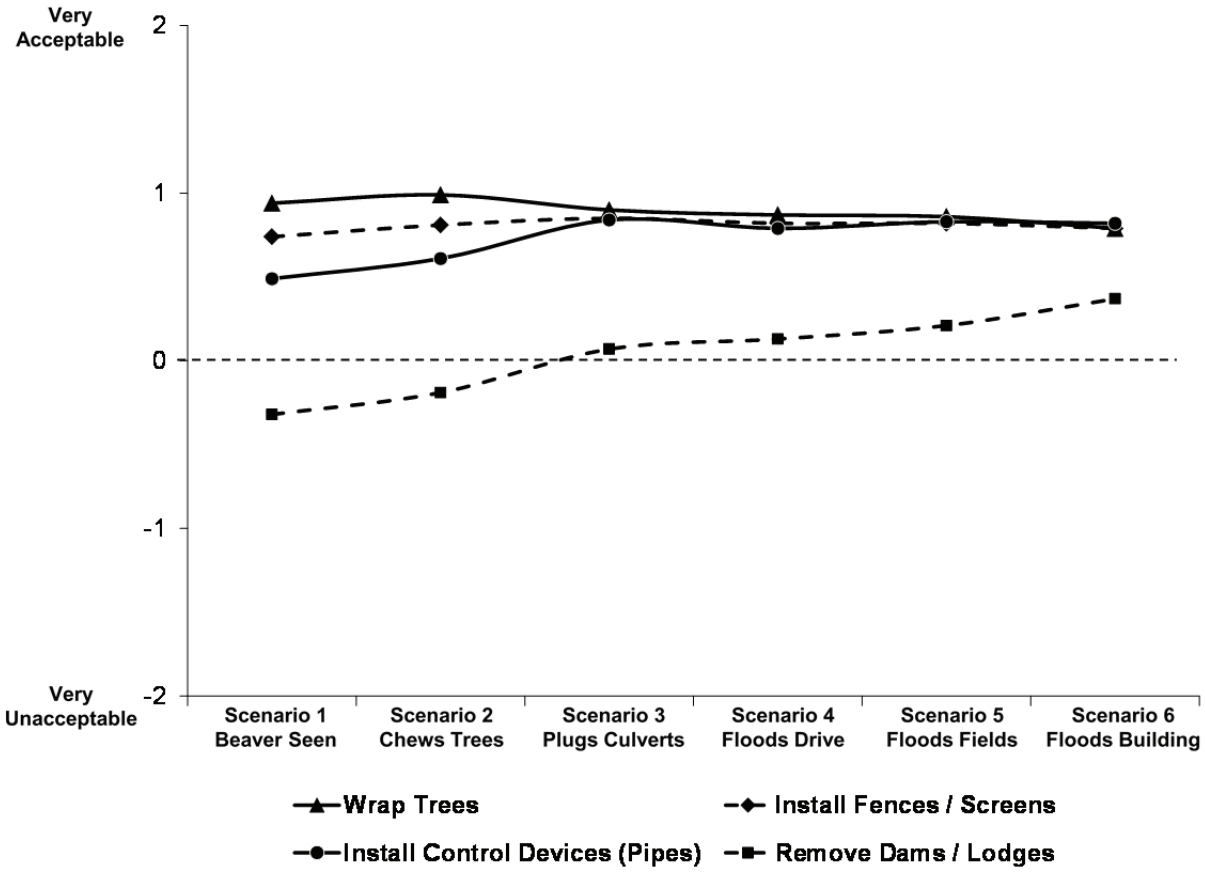
Destroy the Beaver (Lethal Control):
$t = 7.10$ to 8.00, $p < .001$, $r_{pb} = .24$ to $.26$

Landowner acceptance of non-structural management actions in response to increasing beaver impacts differed among the four sampling regions (Figure 5). Both educating landowners on how to coexist with beavers and capturing and relocating beavers to another location were acceptable across the six scenarios and four regions. Those in the East, however, considered education of landowners to be less acceptable, whereas those in the Portland and Coast regions felt that education was most acceptable. Conversely, those in the East felt that capturing and relocating the beaver was most acceptable, whereas this strategy was less acceptable among landowners in the other regions. Doing nothing and leaving the beaver alone was acceptable in all four regions only for the first scenario (i.e., beaver seen and no impacts), but became unacceptable as the severity of impacts increased, especially in the East where this strategy was least acceptable among regions and across scenarios. Frightening the beaver away and lethal control were unacceptable across all six scenarios and four regions. Compared to landowners in the other regions, however, those in the East were more likely to be amenable to these two strategies.

Acceptance of these non-structural management strategies also differed between landowners who have and have not experienced impacts caused by beavers (Figure 6). Compared to landowners who have not experienced impacts from beavers, those who have experienced impacts believed that both doing nothing and educating landowners were less acceptable across all scenarios. On the other hand, landowners who have never experienced beaver impacts were less accepting of actions such as capturing and relocating beavers, frightening beavers away, and lethal control.

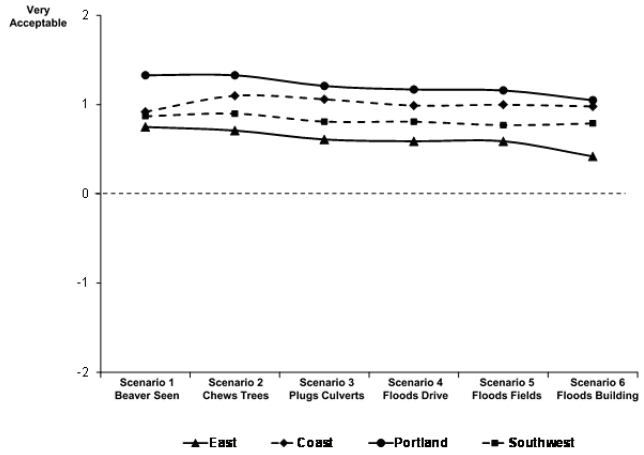
For *structural* management strategies, the majority of landowners believed that wrapping trees, installing control devices (e.g., water control pipes), and installing fences or screens to prevent beaver impacts in the future were acceptable actions (Figure 7). Removing beaver dams and lodges, however, was considered to be unacceptable by landowners for the first two scenarios (i.e., beaver seen, chews trees), but acceptance of this strategy increased as the severity of impacts caused by beavers increased and this strategy was acceptable, on average, if beavers plugged culverts or flooded fields, driveways, or buildings on private property.

Figure 7. Average landowner acceptance of *structural* management responses to increased beaver damage

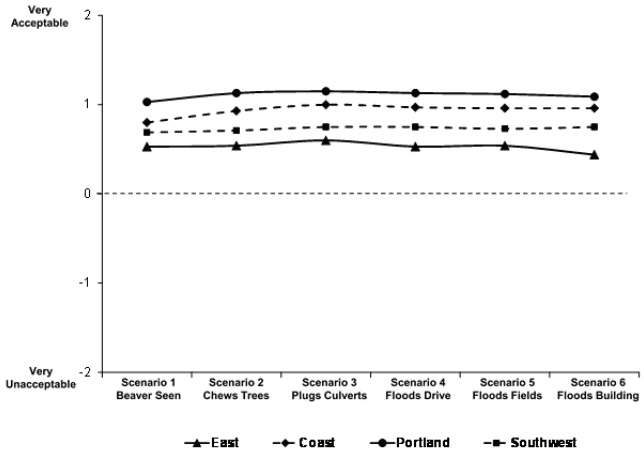


Three of these four structural management strategies for addressing beaver related impacts were generally acceptable across all four of the sampling regions (i.e., wrapping trees, installing fences or screens, installing control devices such as pipes; Figure 8). Respondents in the Portland region were most likely to feel that these three management strategies would be acceptable, whereas those in the East reported that these management strategies would be less acceptable. In addition, landowners in the East considered the removal of beaver dams and lodges to be more acceptable across most scenarios, whereas those living in the other three sampling regions (i.e., Coast, Portland, Southwest) considered this strategy to be acceptable only once impacts caused by beavers were most severe (e.g., flooding of fields or buildings on private property).

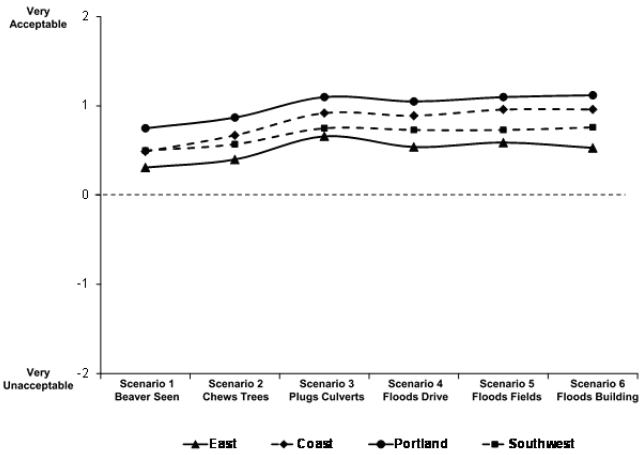
Figure 8. Average acceptance of *structural* management *in each region*



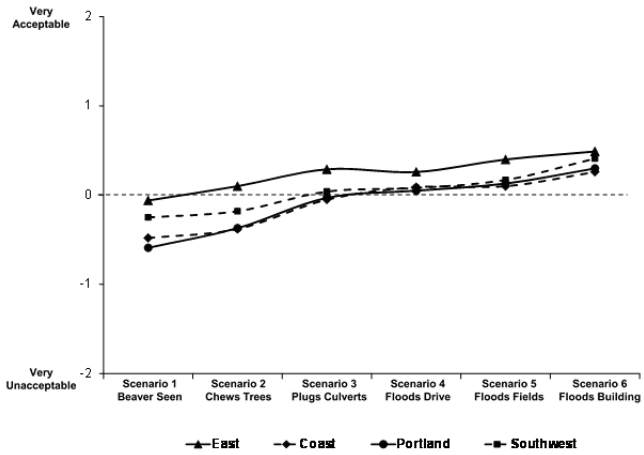
Wrap Trees to Prevent Beavers from Chewing Them:
$F = 10.48$ to 14.68, $p < .001$, $\eta = .16$ to $.18$



Install Fences / Screens to Prevent Beaver Damage:
$F = 8.39$ to 13.20, $p < .001$, $\eta = .13$ to $.18$



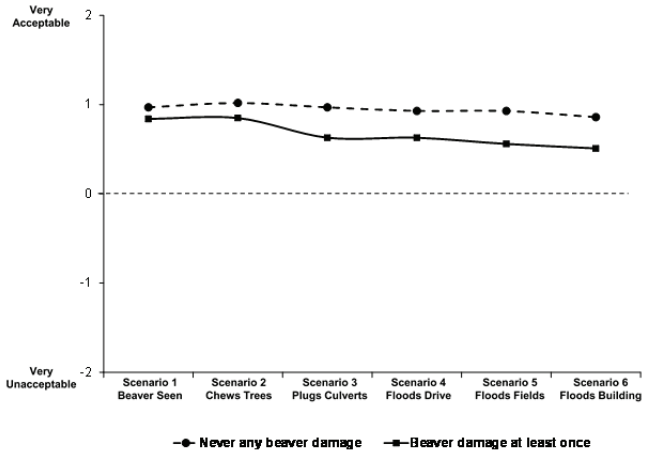
Install Control Devices (e.g., Water Pipes):
$F = 5.86$ to 10.42, $p \leq .001$, $\eta = .11$ to $.16$



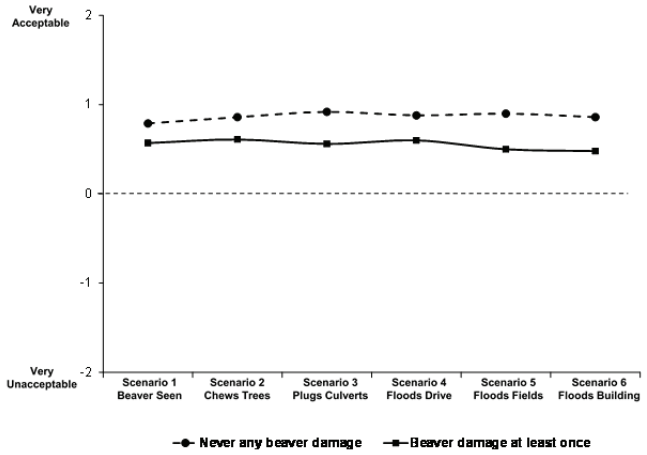
Remove any Beaver Dams / Lodges in the Area:
$F = 1.44$ to 10.35, $p = .228$ to $< .001$, $\eta = .06$ to $.15$

Wrapping trees, installing fences or screens, and installing control devices (e.g., pipes) were acceptable among landowners across all six scenarios for both those who have and have not experienced impacts caused by beavers in the past (Figure 9). Those who have not experienced beaver impacts, however, reported stronger acceptance of these management strategies. Removing beaver dams and lodges was acceptable across all scenarios for respondents who have previously experienced beaver impacts, but this management strategy became acceptable for those landowners who have not experienced beaver impacts only once impacts were most severe (e.g., flooding of fields or buildings on private property).

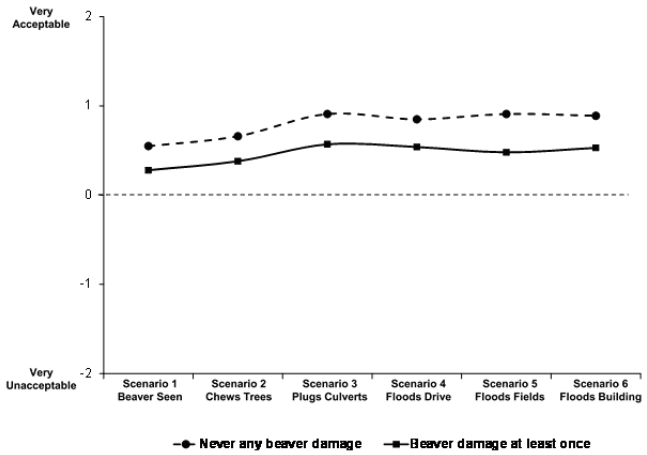
Figure 9. Average acceptance of *structural* management *for those who have and have not experienced beaver damage*



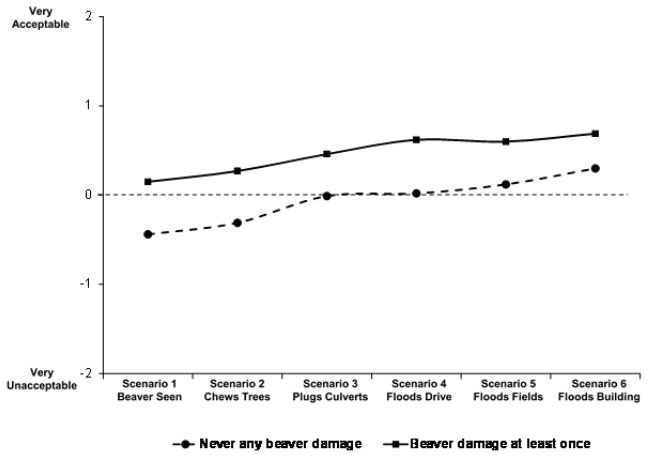
Wrap Trees to Prevent Beavers from Chewing Them: t = 1.45 to 3.43, p = .147 to .001, r_{pb} = .04 to .11



Install Fences / Screens to Prevent Beaver Damage: t = 2.30 to 3.52, p = .022 to < .001, r_{pb} = .07 to .11



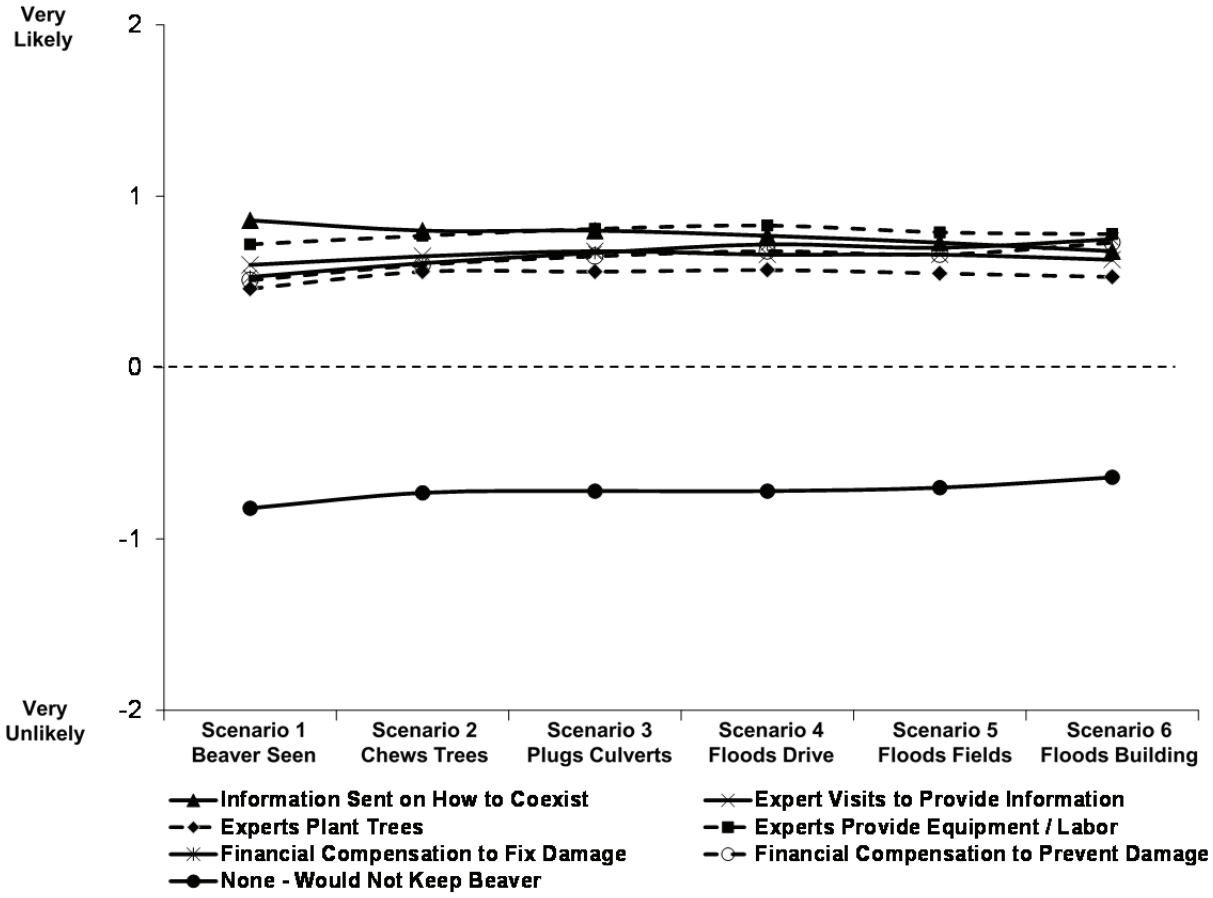
Install Control Devices (e.g., Water Pipes): t = 2.82 to 3.77, p = .005 to < .001, r_{pb} = .08 to .12



Remove any Beaver Dams / Lodges in the Area: t = 3.57 to 5.91, p < .001, r_{pb} = .10 to .17

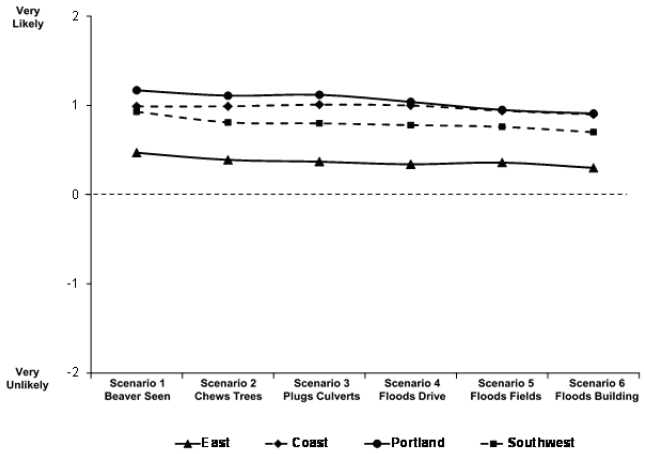
Potential Use of Incentives. Respondents were asked to report their likelihood of taking advantage of several possible incentives for keeping beavers living on their property or neighboring properties despite the various impacts described in the scenarios. Results suggest that landowners would be equally likely to take advantage of information sent to them about how to coexist with beavers, financial compensation to fix or prevent impacts caused by beavers, and having experts visit their property to provide information, plant trees, and provide equipment or labor (Figure 10). Conversely, results also suggest that landowners are unlikely to take advantage of none of these incentives and not keep beavers living on their property or neighboring properties. In other words, landowners would be likely to take advantage of any incentive instead of removing beavers from private property.

Figure 10. Average landowner likelihood of taking advantage of possible incentives to keep beavers living on their property or neighboring properties

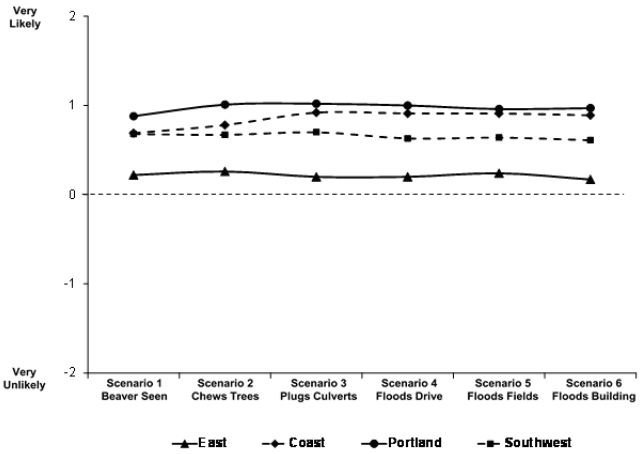


There were some statistically significant differences among the four regions in landowners' likelihood of taking advantage of these incentives. Across scenarios, landowners in the Portland region were most likely to say that they would take advantage of information sent to them about how to coexist with beavers, financial compensation to fix or prevent damage, and having experts visit to provide information, plant trees, and provide equipment or labor (Figure 11). Conversely, landowners in the East were least likely say that they would take advantage of these incentives. Those living in the East were also more likely to take advantage of none of these incentives and simply not keep beavers living on their property or neighboring properties, whereas those living on the Coast were least likely to say that they would not take advantage of these incentives and not keep beavers on their property or neighboring properties.

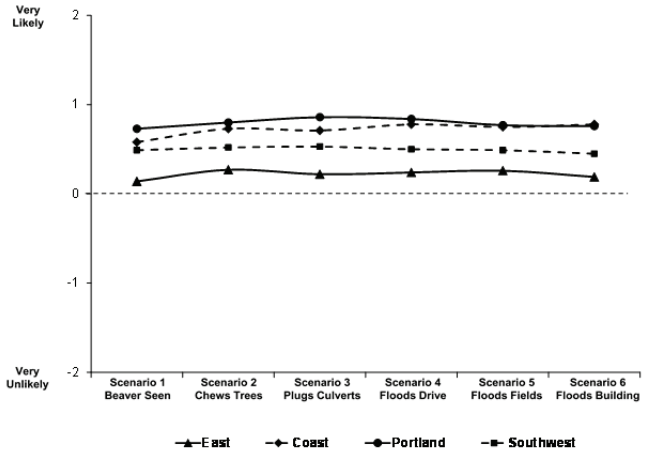
Figure 11. Average likelihood of taking advantage of possible incentives to keep beavers living on their property or neighboring properties *in each region*



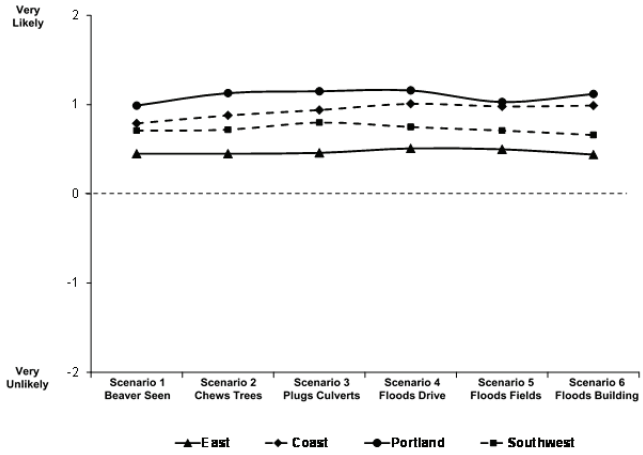
Information Sent on How to Coexist with Beavers:
$F = 10.76$ to 17.42, $p < .001$, $\eta = .16$ to $.20$



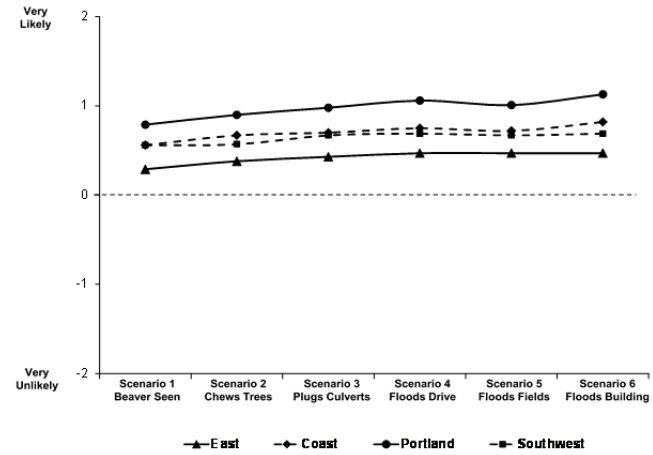
Experts Visit to Provide Technical Information:
$F = 13.40$ to 20.96, $p < .001$, $\eta = .17$ to $.21$



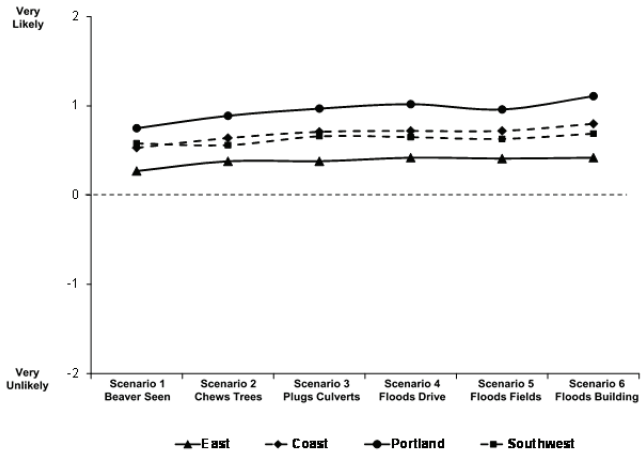
Experts Plant Trees Near Your Home for Beavers:
$F = 7.84$ to 11.08, $p < .001$, $\eta = .14$ to $.16$



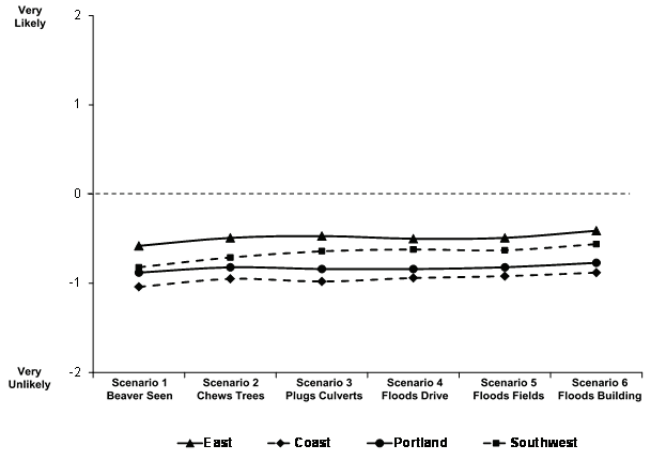
Experts Provide Equipment / Labor:
$F = 8.37$ to 13.63, $p < .001$, $\eta = .13$ to $.18$



Financial Compensation for *Fixing* Beaver Damage:
$F = 6.19$ to 10.28, $p < .001$, $\eta = .12$ to $.16$



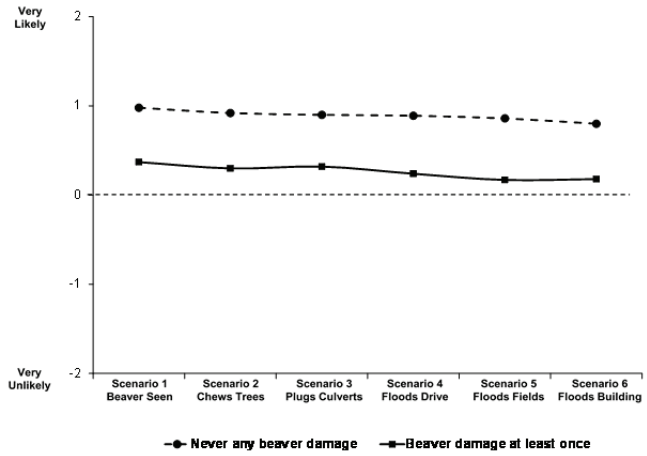
Financial Compensation for *Preventing* Beaver Damage:
$F = 6.07$ to 10.56, $p < .001$, $\eta = .12$ to $.16$



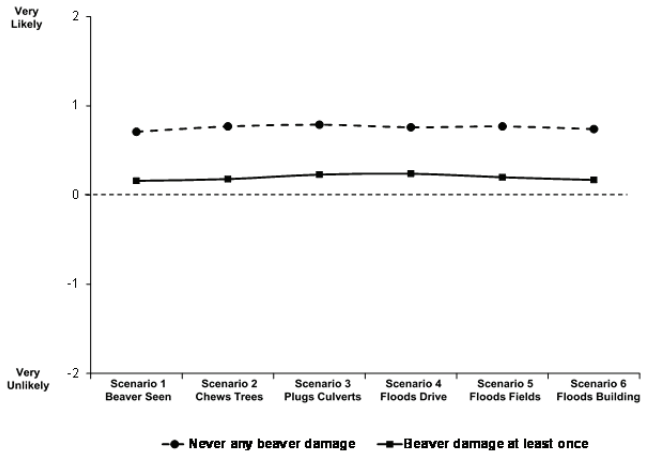
No Incentives – Not Keep Beaver Living on Land:
$F = 5.14$ to 7.80, $p = .002$ to $< .001$, $\eta = .11$ to $.13$

Both respondents who have and have not experienced impacts caused by beavers would be likely to take advantage of information sent to them about how to coexist with beavers, financial compensation to fix or prevent damage, and having experts visit to provide information, plant trees, and provide equipment or labor (Figure 12). In all cases, however, those who have not experienced any previous beaver impacts would be significantly more likely to take advantage of these incentives across all scenarios. Both groups also reported that they were unlikely to not take advantage of these incentives and not keep beavers living on their property or neighboring properties, but those who have experienced previous beaver impacts would be more likely to not take advantage of incentives and simply not retain beavers on their property.

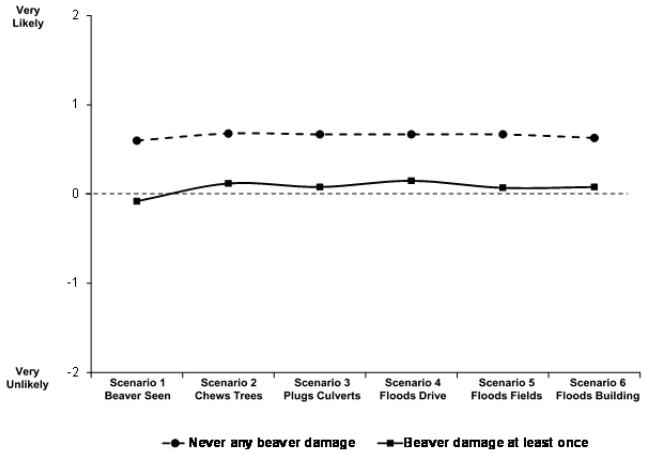
Figure 12. Average likelihood of taking advantage of possible incentives to keep beavers living on their property or neighboring properties *for those who have and have not experienced beaver damage*



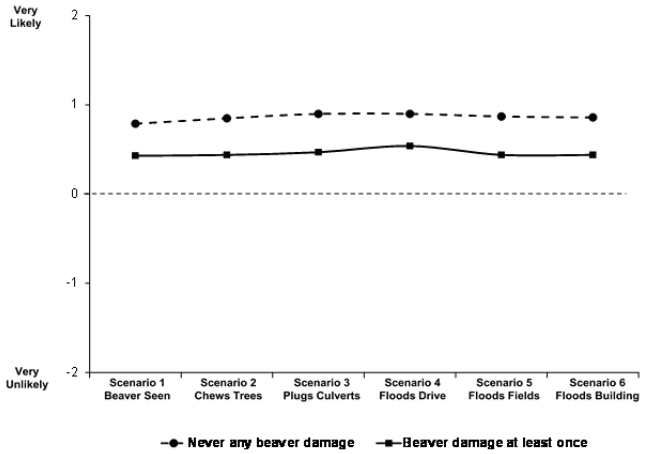
Information Sent on How to Coexist with Beavers:
$t = 4.97$ to 6.01, $p < .001$, $r_{pb} = .15$ to $.18$



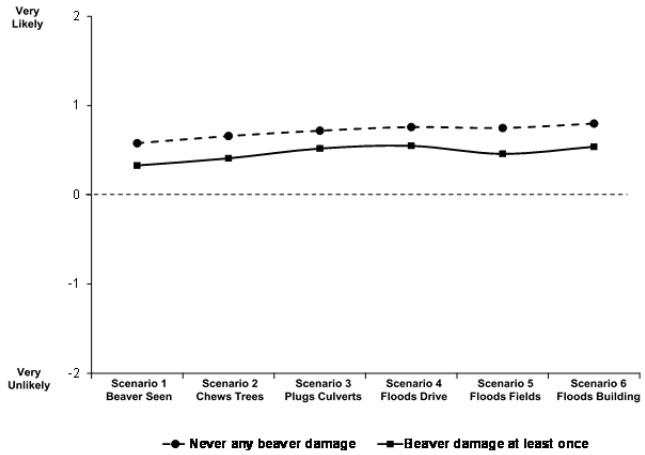
Experts Visit to Provide Technical Information:
$t = 4.39$ to 5.31, $p < .001$, $r_{pb} = .13$ to $.16$



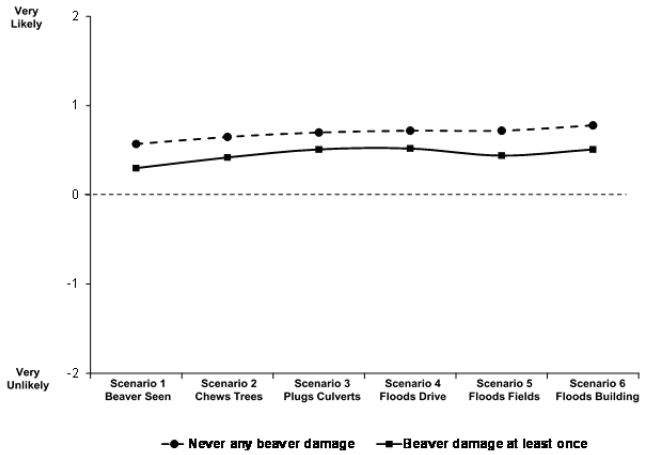
Experts Plant Trees Near Your Home for Beavers:
$t = 4.44$ to 6.42, $p < .001$, $r_{pb} = .14$ to $.18$



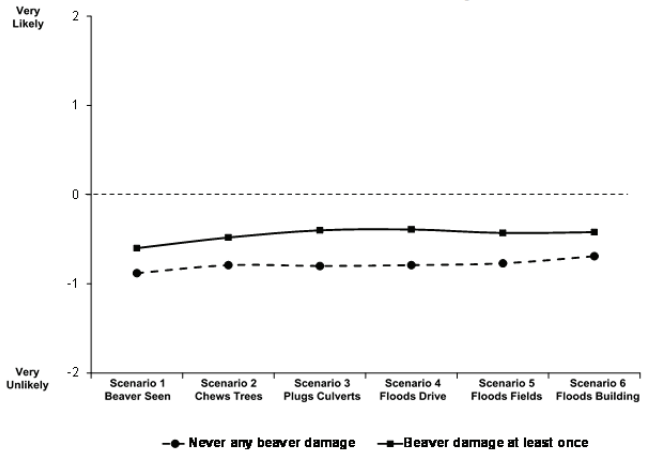
Experts Provide Equipment / Labor:
$t = 3.26$ to 3.87, $p \leq .001$, $r_{pb} = .10$ to $.12$



Financial Compensation for *Fixing* Beaver Damage:
$t = 1.77$ to 2.53, $p = .078$ to $.012$, $r_{pb} = .05$ to $.08$



Financial Compensation for *Preventing* Beaver Damage:
$t = 1.66$ to 2.50, $p = .098$ to $.013$, $r_{pb} = .05$ to $.07$



No Incentives – Not Keep Beaver Living on Land:
$t = 2.24$ to 3.50, $p = .026$ to $.001$, $r_{pb} = .07$ to $.10$

Section Summary

- Seeing a beaver on private property triggers a positive emotional response from most landowners (e.g., happy, excited, curious, not angry, not frightened), but some negative emotions (e.g., anger, not excited) are likely to be instigated if impacts from beavers occur. Some emotions, however, do not change much as the severity of beaver impacts increases, as landowners are likely to remain curious and not frightened even if impacts are more severe (e.g., flooding building). Those who have experienced beaver impacts were more likely to express negative emotions than those who have not had impacts.
- Across all levels of severity of impacts caused by beavers, landowners believed that most of the responsibility for these impacts was attributed to the beavers. Equal amounts of some responsibility, however, were attributed to wildlife agencies, the landowners themselves, and neighbors, and this increased as the severity of impacts increased.
- Across all levels of severity of impacts caused by beavers, educating landowners about how to coexist with beavers was the most acceptable management response, and capturing and relocating beavers was also acceptable. Doing nothing and leaving the beaver alone were acceptable in cases of seeing a beaver and a beaver chewing trees, but not acceptable for more substantial impacts such as flooding of private property. No matter how severe the impact caused by beavers, lethal control (i.e., destroying beavers) and attempting to frighten beavers away were perceived as unacceptable responses.
- The majority of landowners believed that wrapping trees, installing control devices, and installing fences or screens were acceptable strategies for addressing beaver impacts. Removing beaver dams and lodges was unacceptable when seeing a beaver or if beavers chewed trees, but was more acceptable as the severity of impacts increased.
- Lethal control, capturing and relocating beavers, frightening beavers away, and removing beaver dams were most acceptable among landowners in the East and those who have experienced beaver impacts, and least acceptable among those in Portland, on the Coast, and who have not experienced impacts. Wrapping trees, installing fences / screens and other control devices, educating landowners, and doing nothing were least acceptable among respondents living in the East and those who have experienced beaver impacts, and most acceptable among those in Portland and who have not experienced impacts.

- Irrespective of the severity of impacts caused by beavers, results suggest that it is unlikely that most respondents would choose to not allow beavers to reside on their property or a neighboring property. Instead, landowners may be likely to take advantage of information sent to them about how to coexist with beavers, financial compensation to fix or prevent impacts, and have experts visit to provide information, plant trees, and provide equipment or labor to enable them to retain beavers on their land. Results also suggest, however, that landowners in the East and those who have experienced beaver impacts may be least likely to take advantage of these incentives and most likely to not maintain beavers on their property. Those in the Portland region and who have not experienced beaver impacts may be most likely to take advantage of these incentives to retain beavers on their property.

Landowner Beliefs about Management and Information

***Responsibility for Problems with Beavers*.** Landowners were asked who they thought should be responsible for addressing problems with wildlife such as beavers on their own property or neighboring properties. The highest proportion of respondents (84%) believed that state agencies should be responsible for addressing problems with wildlife such as beavers on private property (Table 22). The majority of respondents (60%) also believed that residents experiencing the problem themselves were responsible, whereas less than the majority believed that federal agencies (49%), local or county agencies (48%), animal control personnel (34%), regulated trappers (26%), and citizen groups (13%) were responsible. In each of the four regions, state agencies were selected most frequently as the organization that should have the greatest responsibility, although those in Portland were most likely to select state agencies as those responsible (90%), whereas those in the East were least likely (79%). Landowners in the East were more likely to think that residents experiencing the problem (66%) and regulated trappers (33%) should be responsible for addressing beaver impacts, whereas they were least likely to feel that federal agencies (43%), local or county agencies (41%), and citizen groups (9%) should be responsible. Respondents from Portland, on the other hand, were less likely to suggest that regulated trappers should be responsible for addressing beaver impacts (17%) and more likely to believe that local or county agencies (59%) and citizen groups (20%) should be responsible.

Table 22. Landowner beliefs about who *should be* responsible for addressing problems with wildlife such as beavers on private property *for each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
State agencies (e.g., ODFW)	79	85	90	82	84	14.43	.002	.10
Residents experiencing the problem	66	59	55	58	60	9.33	.025	.08
Federal agencies (e.g., USFWS)	43	52	52	46	49	8.37	.039	.08
Local or county agencies	41	49	59	45	48	21.92	< .001	.13
Animal control personnel	30	35	40	34	34	6.85	.077	.07
Regulated trappers	33	28	17	21	26	25.91	< .001	.14
Citizen groups	9	15	20	12	13	15.78	.001	.11
Other	3	5	4	4	4	2.14	.543	.04

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

Compared to landowners who have not experienced impacts caused by beavers, those who have experienced impacts were more likely to believe that residents experiencing the problem (68% vs. 58%) and regulated trappers (38% vs. 23%) should be responsible for addressing problems with wildlife on private property (Table 23). Beliefs about the level of responsibility of all other organizations were statistically equivalent between these two groups.

Table 23. Landowner beliefs about who *should be* responsible for addressing problems with wildlife such as beavers on private property *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
State agencies (e.g., ODFW)	84	80	84	2.84	.092	.05
Residents experiencing the problem	58	68	60	9.74	.002	.08
Federal agencies (e.g., USFWS)	50	45	49	1.91	.167	.04
Local or county agencies	48	46	48	0.62	.432	.02
Animal control personnel	33	39	34	2.81	.094	.05
Regulated trappers	23	38	26	26.02	< .001	.14
Citizen groups	14	11	13	1.33	.248	.03
Other	4	3	4	0.02	.881	.01

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

Perceptions of Similarity and Trust in Oregon Department of Fish and Wildlife. Respondents were asked the extent that they disagreed or agreed with five statements measuring their perceptions of similarity with Oregon Department of Fish and Wildlife (ODFW). The majority of landowners perceived that this agency shared similar values (56%), opinions (52%), and goals (52%) as them. Less than half of respondents, however, perceived that ODFW thinks in a similar way (45%) and takes similar actions (43%) as them (Table 24). An overall average (i.e., mean) similarity score was computed from these five statements, which was 3.34 out of a maximum of

5 where 1 represents the least similar and 5 represents the most similar. Landowners in the East perceived the lowest mean similarity (M = 3.08), whereas those on the Coast (M = 3.52) reported the highest similarity. Respondents in the East and Portland regions were least likely to feel that ODFW shares similar values, opinions, and goals, and thinks similarly and takes similar actions. Those living on the Coast were more likely to report similar opinions, goals, and thoughts. Compared to landowners who have experienced beaver impacts before, respondents who have not had any impacts had higher mean similarity with ODFW and were more likely to agree that they shared similar values, opinions, goals, actions, and thoughts as this agency (Table 25).

Table 24. Landowner perceptions of similarity with ODFW *for each region* [1]

I feel that the Oregon Department of Fish and Wildlife:	East	Coast	Portland	Southwest	Total	χ^2 or F value	p value	V or η
Shares similar values as I do	53	62	53	57	56	7.41	.060	.08
Shares similar opinions as I do	47	57	50	54	52	8.35	.039	.08
Shares similar goals as I do	48	58	48	53	52	8.25	.041	.08
Thinks in a similar way as I do	40	52	42	46	45	11.26	.010	.09
Takes similar actions as I would	39	49	38	45	43	10.57	.014	.09
Average (mean) similarity score [2]	3.08[a]	3.52[b]	3.41[b]	3.38[b]	3.34	11.18	< .001	.16

[1] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

[2] Represents the overall average (mean) on 5-point scale for all 5 items combined where 1 represents the least similarity with ODFW and 5 represents the most similarity. Means with different letter superscripts differ at $p < .05$ using Tamhane's T2 post-hoc tests for unequal variances. Cronbach alpha reliability = 0.96.

Table 25. Landowner perceptions of similarity with ODFW *for those who have and have not experienced beaver damage* [a]

I feel that the Oregon Department of Fish and Wildlife:	Never any beaver damage	Beaver damage at least once	Total	χ^2 or t value	p value	ϕ or r_{pb}
Shares similar values as I do	57	50	56	4.25	.039	.06
Shares similar opinions as I do	53	46	52	4.50	.034	.06
Shares similar goals as I do	54	43	52	8.92	.003	.08
Thinks in a similar way as I do	46	38	45	4.72	.030	.06
Takes similar actions as I would	44	36	43	4.50	.034	.06
Average (mean) similarity score [b]	3.39	3.07	3.34	3.90	< .001	.12

[a] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

[b] Represents the overall average (mean) on 5-point scale for all 5 items combined where 1 represents the least similarity with ODFW and 5 represents the most similarity. Cronbach alpha reliability = 0.96.

Landowners were then asked the extent that they disagreed or agreed with eight statements measuring their level of social trust in ODFW (e.g., trust to provide the best available information about wildlife issues, trust to properly address wildlife issues). The largest proportions of respondents agreed that they trusted ODFW to provide the best available information about wildlife issues (70%), provide truthful information (67%), provide enough information to decide

what actions to take regarding wildlife (66%), and use the best available science to inform wildlife management (65%; Table 26). The majority of landowners also agreed that they trusted ODFW to provide timely information about wildlife issues (64%), properly address wildlife issues (60%), and make good wildlife management decisions (59%). The fewest landowners agreed that they trusted ODFW to use public input to inform wildlife management (57%). An overall average (i.e., mean) trust score was computed from these eight statements, which was 3.66 out of a maximum of 5 where 1 represents the least social trust and 5 represents the most trust. Landowners in the East had a significantly lower trust score (M = 3.35) than those in the other regions (M = 3.76 to 3.83), and were less likely than those in the other regions to agree with each of the eight trust statements. Respondents who have experienced impacts caused by beavers were also less likely (M = 3.37) than those who have not experienced impacts (M = 3.73) to trust this agency (Table 27). Those who have experienced beaver impacts were also less likely than those who have not experienced impacts to agree with each of the eight trust statements.

Table 26. Landowner trust in ODFW *for each region* [1]

Trust the Oregon Department of Fish and Wildlife to:	East	Coast	Portland	Southwest	Total	χ^2 or F value	p value	V or η
Provide the best available information about wildlife issues	62	73	73	74	70	15.37	.002	.11
Provide truthful information about wildlife issues	56	72	73	70	67	30.14	< .001	.15
Provide me with enough information to decide what actions I should take regarding wildlife	58	70	68	71	66	15.18	.002	.11
Use the best available science to inform management of wildlife	56	71	68	67	65	22.81	< .001	.13
Provide timely information about wildlife issues	55	70	64	69	64	23.23	< .001	.13
Properly address wildlife issues	50	65	66	61	60	22.61	< .001	.13
Make good decisions regarding management of wildlife	47	66	65	62	59	37.95	< .001	.17
Use public input to inform management of wildlife	47	61	59	61	57	20.40	< .001	.12
Average (mean) trust score [2]	3.35[a]	3.83[b]	3.77[b]	3.76[b]	3.66	15.57	< .001	.18

[1] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

[2] Represents the overall average (mean) on 5-point scale for all 8 items combined where 1 represents the lowest trust in ODFW and 5 represents the highest trust. Means with different letter superscripts differ at $p < .05$ using Tamhane's T2 post-hoc tests for unequal variances. Cronbach alpha reliability = 0.97.

Table 27. Landowner trust in ODFW *for those who have and have not experienced beaver damage* [a]

Trust the Oregon Department of Fish and Wildlife to:	Never any beaver damage	Beaver damage at least once	Total	χ^2 or t value	p value	ϕ or r_{pb}
Provide the best available information about wildlife issues	72	60	70	13.13	< .001	.10
Provide truthful information about wildlife issues	69	57	67	12.03	.001	.10
Provide me with enough information to decide what actions I should take regarding wildlife	68	57	66	12.06	.001	.10
Use the best available science to inform management of wildlife	68	54	65	15.35	< .001	.11
Provide timely information about wildlife issues	67	54	64	14.11	< .001	.11
Properly address wildlife issues	62	49	60	14.11	< .001	.10
Make good decisions regarding management of wildlife	62	49	59	13.60	< .001	.10
Use public input to inform management of wildlife	59	48	57	8.85	.003	.08
Average (mean) trust score [b]	3.73	3.37	3.66	4.36	< .001	.13

[a] Cell entries are percentages (%) that agreed (slightly or strongly) with each statement.

[b] Represents the overall average (mean) on 5-point scale for all 8 items combined where 1 represents the lowest trust in ODFW and 5 represents the highest trust. Cronbach alpha reliability = 0.97.

Preferred Sources for Information about Beavers. Respondents were asked by what means, if any, they would prefer to receive information about beavers in Oregon. Across all landowners, a pamphlet or brochure was the most preferred media source for landowners to receive information about beavers (49%; Table 28). Newspapers (41%), government agency websites (34%), and television news (30%) were also preferred by at least 30% of respondents. However, 29% of landowners indicated that they did not need information about beavers. Landowners in the East were more likely than those in the other regions to say that they did not need information about beavers and were also least likely to want information from pamphlets, agency websites, television news, email, radio, other websites, or conservation / environmental groups. Conversely, respondents living in Portland were least likely to say that they did not want information and were also most likely to prefer information from these sources. Preferred sources of information about beavers did not differ between those who have versus have not experienced beaver impacts (Table 29). Respondents were also asked what they would like to know about beavers, their impacts, and / or how to coexist with them, and verbatim responses are listed in Appendix A.

Table 28. Landowner preferred sources of any information about beavers *for each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Pamphlet / brochure	42	52	51	50	49	8.48	.037	.08
Newspapers	39	42	46	37	41	5.23	.156	.06
Government agency internet website	29	34	46	27	34	29.15	< .001	.15
Television news	22	33	36	30	30	18.96	< .001	.12
Do not need information about beavers	36	25	23	31	29	17.40	< .001	.11
Magazines	22	23	23	19	22	1.99	.573	.04
Email	16	20	30	17	20	21.36	< .001	.13
Public information meeting / session	23	17	20	18	20	5.82	.121	.07
Other television program	16	22	19	18	19	4.96	.175	.06
Radio	15	18	24	14	18	12.93	.005	.10
Other internet website	14	19	27	14	18	21.95	< .001	.13
Conservation / environmental groups	12	20	25	13	17	23.12	< .001	.13
Compact disk or DVD	16	20	14	16	16	4.51	.211	.06
VCR tape	4	4	3	3	4	0.90	.826	.03
Other	2	2	2	3	2	1.20	.752	.03

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

Table 29. Landowner preferred sources of any information about beavers *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Pamphlet / brochure	49	48	49	0.13	.723	.01
Newspapers	42	36	41	3.64	.057	.05
Government agency internet website	34	30	34	1.62	.202	.04
Television news	31	26	30	2.63	.105	.04
Do not need information about beavers	29	27	29	0.39	.530	.02
Magazines	22	21	22	0.03	.861	.01
Email	20	21	20	0.06	.812	.01
Public information meeting / session	20	18	20	0.43	.512	.02
Other television program	19	18	19	0.06	.809	.01
Radio	18	14	18	3.08	.079	.05
Other internet website	18	19	18	0.08	.783	.01
Conservation / environmental groups	18	14	17	2.96	.085	.05
Compact disk or DVD	16	19	16	1.76	.185	.04
VCR tape	3	6	4	4.13	.042	.06
Other	3	2	2	0.38	.539	.02

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

Section Summary

- Landowners were most likely to think that state agencies should be responsible for addressing beaver impacts on private property (84%), followed by residents experiencing

the problems themselves (60%). This trend was consistent across regions and for those who have and have not experienced impacts caused by beavers. Less than the majority believed that federal agencies (49%), local or county agencies (48%), animal control personnel (34%), regulated trappers (26%), and citizen groups (13%) were responsible.

- The majority of landowners perceived that they shared similar values (56%), opinions (52%), and goals (52%) as ODFW. Less than half, however, perceived that they think in a similar way (45%) and would take similar actions (43%) as ODFW. Landowners in the East and those who experienced beaver impacts perceived the lowest similarity with ODFW. Those on the Coast and who have not had impacts reported the greatest similarity.
- The largest proportions of landowners trusted ODFW to provide the best information (70%), truthful information (67%), and enough information to decide what actions to take regarding wildlife (66%), and use the best available science to inform management (65%). The fewest landowners agreed that they trusted ODFW to use public input to inform wildlife management (57%). Landowners in the East and those who have previously experienced impacts caused by beavers had the lowest trust in ODFW.
- Pamphlets or brochures (49%) and newspapers (41%) were the most preferred sources for receiving information about beavers, but 29% of landowners said that they did not need information about beavers. Those living in the East were more likely than those in other regions to say that they did not need information and were least likely to want information from various sources. Respondents in Portland, on the other hand, were least likely to not want information and were most likely to prefer information from various sources.

Landowner Sociodemographic Characteristics

Environmental Value Orientations. The public is heterogeneous and often exhibits different preferences, attitudes, and behaviors in relation to natural resource issues such as wildlife. To understand various subgroups of the public, individuals have been grouped according to their value orientations toward general objects or natural resources (Bright, Manfredo, & Fulton, 2000; Vaske & Needham, 2007). Value orientations refer to general classes of objects and are revealed through the pattern, direction, and intensity of basic beliefs (Fulton, Manfredo, & Lipscomb, 1996; Vaske & Donnelly, 1999). Value orientations toward wildlife, for example, have been reliably measured by asking individuals how strongly they identify with biocentric or protectionist belief statements (e.g., “wildlife should have equal rights as humans”) and

utilitarian or use beliefs about wildlife (e.g., "wildlife should be used by humans to add to the quality of human life;" Bright et al., 2000; Fulton et al., 1996). In most studies, these basic beliefs have reliably and consistently factored into value orientation continuums such as the biocentric – anthropocentric continuum for broader environmental value orientations (Steel, List, & Shindler, 1994; Vaske & Donnelly, 1999) and the protection – use continuum for value orientations related to more specific objects such as forests and wildlife (Bright et al., 2000; Fulton et al., 1996; Needham, 2010; Vaske & Needham, 2007). An anthropocentric or use orientation reflects human centered or utilitarian views of the nonhuman world (Eckersley, 1992). This approach assumes that providing for human use and benefits are the primary goals of natural resource allocation and management regardless of whether uses are for commodity (e.g., timber), aesthetic, or physical (e.g., recreation) benefits. Natural resources are viewed as materials to be used by humans and there is little recognition that nonhuman aspects of nature are valuable in their own right or for their own sake (Scherer & Attig, 1983). A use orientation emphasizes the instrumental value of natural resources for humans rather than any inherent worth of these resources (Vaske, Donnelly, Williams, & Jonker, 2001).

A biocentric or protectionist value orientation is a more nature centered approach. The value of ecosystems, species, and natural resources is elevated to a more prominent level (Eckersley, 1992). Human needs and desires are still important, but are viewed within a larger perspective. This approach assumes that environmental and natural resource objects have instrumental and inherent worth, and that human uses and benefits are not always the most important uses of these resources. In a natural resource management context, these inherent values are to be respected and preserved even if they conflict with human centered values (Thompson & Barton, 1994; Vaske et al., 2001). Biocentric or protectionist orientations and anthropocentric or use orientations are not mutually exclusive; they can be arrayed along continuums with biocentric or protectionist orientations at one end and anthropocentric or use orientations at the other end; the midpoint represents a mix of these two extremes (Vaske & Donnelly, 1999). Users arranged along this value orientation continuum can then be grouped into more meaningful homogeneous subgroups (Bright et al., 2000; Vaske & Needham, 2007). These value orientations are important because they can be used to predict higher order cognitions such as attitudes, behavioral intentions, and actual behavior toward natural resource issues (Fulton et al., 1996; Vaske & Donnelly, 1999). Individuals with more biocentric or protectionist orientations, for example, may

be less inclined to engage in behavior such as trapping or hunting, and may be more likely to support policies such as wildlife reintroduction or protection.

Table 30. Reliability analyses of NEP variables measuring broad environmental value orientations

Orientations and variables	Mean [a]	Percent Agree (%)	Item total correlation	Alpha (α) if deleted	Cronbach alpha (α)
Anthropocentric orientation					.77
Humans have the right to modify the natural environment to suit their needs	-0.09	44	.50	.75	
Humans were meant to rule over the rest of nature	-0.59	27	.64	.68	
The so-called ecological crisis facing humans has been greatly exaggerated	-0.47	31	.58	.71	
The balance of nature is strong enough to cope with impacts of modern industrial nations	-0.97	15	.59	.71	
Biocentric orientation					.87
If things continue on their present course, we will soon experience a major ecological catastrophe	0.42	55	.67	.85	
We are approaching the limit of the number of people the earth can support	0.49	56	.64	.86	
The balance of nature is very delicate and easily upset	0.75	67	.67	.85	
When humans interfere with nature, it often produces disastrous consequences	0.79	68	.68	.85	
Plants and animals have as much right as humans to exist	0.81	68	.63	.86	
Humans are severely abusing the environment	0.90	72	.74	.84	
Overall environmental value orientation index					.89

[a] Variables measured on 5-point recoded scales of -2 strongly disagree to +2 strongly agree.

Broad environmental value orientations of landowners were measured using 10 variables from the popular New Environmental Paradigm scale (NEP, Dunlap & Van Liere, 1978) and its more recent version, the Revised New Ecological Paradigm scale (Dunlap, Van Liere, Mertig, & Jones, 2000). These variables are shown in Table 30. On average, landowners agreed with the six biocentric variables and disagreed with the four anthropocentric variables. For example, respondents agreed most strongly with the belief statement that "humans are severely abusing the environment" (72% agreed) and disagreed most strongly with the statement that "the balance of nature is strong enough to cope with impacts of modern industrial nations" (only 15% agreed). Measurement reliability of variables measuring these dimensions was examined using Cronbach's alpha (α) reliability coefficients, which ranges from 0 (no reliability) to 1 (perfect reliability). An alpha coefficient of ≥ 0.65 is considered by most researchers to be acceptable and indicates that multiple items are measuring the same broad concept or dimension, and justifies combining individual variables into broad composite indices representing these dimensions

(Cortina, 1993; Nunnally & Bernstein, 1994; Vaske, 2008). The alpha reliability coefficients were 0.77 for the anthropocentric orientation and 0.87 for the biocentric orientation, suggesting that variables for each reliably measured their respective orientation (Table 30). Deletion of any variable from its respective orientation did not improve reliability and overall reliability of the final environmental value orientation scale was high at 0.89.

K-means cluster analysis was then performed on these variables to group landowners. Cluster analysis classifies individuals into groups based on statistical patterns of responses across multiple variables or factors (Hair & Black, 2000). A series of two to six group cluster analyses showed that a three group solution provided the best fit for the data. To validate this solution, the data were randomly sorted and a cluster analysis was conducted after each of four random sorts. These analyses supported the solution identifying three distinct clusters of individuals, labeled:

- Biocentric orientation – 42%
- Mixed anthropocentric – biocentric orientation – 40%
- Anthropocentric orientation – 18%

These groups were compared in terms of their responses to the original value orientation belief statements. Respondents with an anthropocentric orientation reported agreement with all four of the anthropocentric statements and disagreement with all six biocentric variables. Those with a biocentric orientation reported agreement with all of the biocentric variables and disagreement with all anthropocentric variables. Responses from those with a mixed anthropocentric – biocentric orientation fell in between these two groups.

Table 31. Landowner environmental value orientations *for each region* [a]

	East	Coast	Portland	Southwest	Total
Biocentric orientation cluster	29	45	56	41	42
Mixed orientation cluster	43	43	37	37	40
Anthropocentric orientation cluster	28	12	8	22	18

[a] Cell entries are percentages (%). $\chi^2 = 78.80$, $p < .001$, $V = .17$.

In total, the largest proportion of landowners surveyed had a biocentric (i.e., nature-oriented) environmental value orientation (42%) and the smallest proportion had an anthropocentric orientation (i.e., human-oriented, 18%). There was, however, a statistically significant difference among the four regions. The East region contained the fewest landowners with a biocentric

orientation (29%) and the most with an anthropocentric orientation (28%), whereas the Portland region contained the fewest with an anthropocentric orientation (8%) and the most with a biocentric orientation (56%; Table 31). In addition, landowners who have never experienced any impacts caused by beavers were most likely to have a biocentric environmental orientation (43%), whereas those who have experienced impacts from beavers were relatively evenly split among the three value orientation groups (Table 32).

Table 32. Landowner environmental value orientations *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total
Biocentric orientation cluster	43	34	42
Mixed orientation cluster	41	36	40
Anthropocentric orientation cluster	16	30	18

[a] Cell entries are percentages (%). $\chi^2 = 23.78$, $p < .001$, $V = .15$.

Wildlife Value Orientations. Research has also measured value orientations toward specific objects such as forests and wildlife, as opposed to just broader environmental value orientations. This is especially important in the context of a wildlife species such as beavers, which is the focus of this project. An individual's specific value orientation toward wildlife, therefore, was constructed from five survey variables designed to measure protectionist basic beliefs toward wildlife and four variables measuring use related beliefs about wildlife. These variables are shown in Table 33. On average, respondents disagreed with all of the use related variables and agreed with most of the protectionist variables (Table 33). For example, respondents agreed most strongly with the belief statement that "wildlife should be protected for their own sake rather than to simply meet the needs of humans" (71% agreed) and disagreed most strongly with the statement that "humans should manage wildlife so that only humans benefit" (only 6% agreed). Alpha reliability coefficients were 0.79 for the use orientation and 0.80 for the protectionist orientation, suggesting that variables for each reliably measured their respective orientation (Table 33). Deletion of any variable from its respective orientation did not improve reliability and reliability of the final scale measuring value orientations toward wildlife was high at 0.84.

Table 33. Reliability analyses of variables measuring specific wildlife value orientations

Orientations and variables	Mean [a]	Percent Agree (%)	Item total correlation	Alpha (α) if deleted	Cronbach alpha (α)
Use orientation toward wildlife					.79
Humans should manage wildlife so that *only* humans benefit	-1.48	6	.46	.79	
The needs of humans are more important than the needs of wildlife	-0.37	32	.56	.76	
The primary value of wildlife is to provide benefits for humans	-0.84	19	.68	.69	
Wildlife exists primarily to be used by humans	-1.15	12	.70	.68	
Protectionist orientation toward wildlife					.80
The rights of wildlife are more important than human uses of wildlife	-0.34	28	.48	.79	
Wildlife should be protected for their own sake rather than to simply meet the needs of humans	0.90	71	.47	.79	
I care about wildlife as much as I do other people	0.24	48	.59	.75	
Wildlife are like family so they should be protected	0.06	43	.69	.72	
We should focus on doing what is best for wildlife instead of what is best for humans	-0.35	26	.65	.73	
Overall wildlife value orientation index					.84

[a] Variables measured on 5-point recoded scales of -2 strongly disagree to +2 strongly agree.

K-means cluster analysis was then performed on these variables to group respondents based on their wildlife value orientations. A series of two to six group cluster analyses showed that a three group solution provided the best fit for the data. To validate this solution, the data were randomly sorted and a cluster analysis was conducted after each of four random sorts. These additional analyses supported the solution identifying three distinct groups of individuals, labeled:

- Protectionist orientation – 38%
- Mixed protection – use orientation – 44%
- Use orientation – 19%

These groups were compared in terms of their responses to the original wildlife value orientation belief statements. Respondents with a use orientation toward wildlife reported agreement with all four of the use oriented statements and disagreement with all five protectionist variables. Those with a protectionist wildlife orientation reported agreement with all of the protectionist variables and disagreement with all use oriented variables. Responses from those with a mixed orientation fell in between these two groups.

Table 34. Landowner wildlife value orientations *for each region* [a]

	East	Coast	Portland	Southwest	Total
Protectionist orientation cluster	26	45	46	36	38
Mixed orientation cluster	43	43	47	42	44
Use orientation cluster	31	12	7	21	19

[a] Cell entries are percentages (%). $\chi^2 = 84.28$, $p < .001$, $V = .18$.

In total, the largest proportion of landowners surveyed had a mixed protection – use value orientation toward wildlife (44%), the smallest proportion had a purely use orientation (i.e., human-oriented, 19%), and 38% had a protectionist orientation toward wildlife (Table 34). There was, however, a statistically significant difference among the four regions. The East region contained the fewest landowners with a protectionist wildlife orientation (26%) and the most with a use related orientation (31%), whereas the Portland region contained the fewest with use orientations (7%) and the most with protectionist orientations toward wildlife (46%; Table 34). In addition, landowners who have never experienced any impacts caused by beavers were more likely to have a protectionist orientation toward wildlife (40%), whereas those who have experienced impacts from beavers were more likely to have a use orientation (30%; Table 35).

Table 35. Landowner wildlife value orientations *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total
Protectionist orientation cluster	40	29	38
Mixed orientation cluster	44	42	44
Use orientation cluster	16	30	19

[a] Cell entries are percentages (%). $\chi^2 = 24.98$, $p < .001$, $V = .15$.

Property Characteristics. The majority of respondents surveyed owned their current property (86%), and the average length of residence at this property was 16 years (Table 36). In total, 63% of respondents resided in property that was less than five acres in size with 40% living on property less than one acre in size. The average household size was between two and three residents, and 78% of households contained no children or youth under the age of 18 years old. Neither the proportion of respondents who owned their current property nor the average length of living at this property differed among the four regions. Those living in the East were most likely to have the largest property (48% with 10 acres or more), whereas those in Portland were most likely to have the smallest (83% with less than one acre). Household sizes were slightly smaller

on the Coast (*M* = 2.2 individuals) and those in Portland (32%) were more likely than the other regions (16% to 23%) to have people under the age of 18 years old living in the household.

Table 36. Landowner property characteristics *for each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 or *F* value	*p* value	*V* or η
Own or rent current property						11.78	.067	.07
Own	87	85	82	89	86			
Rent / Lease	11	14	16	9	12			
Other	2	1	2	3	2			
Years at current property						27.61	.068	.08
Less than 5 years	15	22	26	20	20			
5 – 9 years	20	21	23	23	22			
10 – 14 years	18	13	13	16	15			
15 – 19 years	12	14	8	9	11			
20 – 29 years	14	16	13	16	15			
30 – 39 years	10	8	10	9	9			
40 or more years	11	7	8	8	8			
Average (mean) years	17.3	15.3	14.6	15.7	15.8	2.42	.064	.07
Size of property						476.64	< .001	.35
Less than 1.00 acre	24	42	83	25	40			
1.00 to 4.99 acres	12	31	13	34	23			
5.00 to 9.99 acres	17	11	2	21	14			
10.00 to 19.99 acres	9	6	0	9	6			
20.00 to 49.99 acres	11	5	1	7	6			
50.00 to 99.99 acres	6	3	1	2	3			
100.00 to 999.999 acres	14	2	1	2	5			
1000.00 acres or more	8	1	0	0	3			
Number of people in household						45.84	< .001	.10
1 person	16	20	20	13	17			
2 people	57	54	38	56	52			
3 people	12	15	19	13	15			
4 people	9	7	16	12	11			
5 or more people	6	4	6	6	6			
Average (mean) people	2.3[ab]	2.2[a]	2.5[b]	2.5[b]	2.4	5.30	.001	.11
Number of people under 18 years of age in household						27.95	< .001	.08
0 people	77	84	68	80	78			
1 person	10	7	13	8	9			
2 people	9	5	14	8	9			
3 or more people	4	3	5	4	4			

[a] Cell entries are percentages (%) unless specified as averages (means).
Means with different letter superscripts differ at $p < .05$ using Tamhane's T2 post-hoc tests for unequal variances.

Those who have experienced impacts caused by beavers did not differ from those who have not experienced impacts in terms of ownership of their current property, household size, or number of children in the household (Table 37). Those who have experienced impacts, however, were more likely (*M* = 19 years) than those who have not experienced impacts (*M* = 15 years) to have

spent more years living at their current property. Those who have experienced beaver impacts were also more likely to reside on larger properties than those who have not experienced beaver impacts. Almost half (45%) of those who have not experienced beaver impacts reside on property that is less than one acre in size, whereas 22% of respondents who have experienced impacts live on property less than one acre in size and 42% live on property of 10 acres or larger.

Table 37. Landowner property characteristics *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 or t value	p value	ϕ or r_{pb}
Own or rent current property				0.42	.809	.02
Own	86	87	86			
Rent / Lease	12	11	12			
Other	2	2	2			
Years at current property				24.95	< .001	.13
Less than 5 years	21	18	20			
5 – 9 years	24	13	22			
10 – 14 years	16	14	15			
15 – 19 years	10	14	11			
20 – 29 years	14	17	15			
30 – 39 years	8	12	9			
40 or more years	7	12	8			
Average (mean) years	14.9	18.8	15.8	3.79	< .001	.11
Size of property				107.38	< .001	.31
Less than 1.00 acre	45	22	40			
1.00 to 4.99 acres	24	21	23			
5.00 to 9.99 acres	13	14	14			
10.00 to 19.99 acres	6	7	6			
20.00 to 49.99 acres	6	9	6			
50.00 to 99.99 acres	3	5	3			
100.00 to 999.999 acres	3	13	5			
1000.00 acres or more	1	8	3			
Number of people in household				3.32	.505	.05
1 person	18	14	17			
2 people	51	54	52			
3 people	14	16	15			
4 people	11	11	11			
5 or more people	6	5	6			
Average (mean) people	2.4	2.4	2.4	0.11	.916	.01
Number of people under 18 years of age in household				2.47	.480	.04
0 people	77	81	78			
1 person	10	8	9			
2 people	9	8	9			
3 or more people	4	3	4			

[a] Cell entries are percentages (%) unless specified as averages (means).

Most respondents *currently* use their property for residential purposes (86%; Table 38) although other land uses reported by at least 10% of landowners include livestock grazing (24%), agriculture for annuals (16%), timber / forestry management (13%), orchards (11%), and hunting (11%). These land use activities differed among the four regions. Landowners in Portland reported the highest frequency of residential land use (95%), whereas those in the East reported the lowest (75%). Those in the East were most likely to use their land for livestock (53%), agriculture – annuals (28%), hunting (27%), timber / forestry management (18%), and all-terrain vehicle recreation (13%). Landowners on the Coast reported a similar frequency as those in the East for using their land for timber (17%). In addition, 13% of respondents in the East and Southwest and 10% living on the Coast used their land for orchards. Respondents who have experienced beaver impacts were less likely than those who have not experienced impacts to use their land for residential activity and were more likely to use their land for livestock, agriculture, timber, orchards, hunting, all-terrain vehicle recreation, beekeeping, and trapping (Table 39).

Table 38. Landowner *current* activities on their property *for each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Residential	75	91	95	84	86	67.14	< .001	.22
Livestock grazing	53	11	2	20	24	302.30	< .001	.47
Agriculture – annuals	28	8	5	19	16	88.22	< .001	.25
Timber / forestry management	18	17	2	11	13	59.26	< .001	.18
Orchards	13	10	4	13	11	20.95	< .001	.12
Hunting	27	8	1	5	11	144.97	< .001	.33
Agriculture – perennials	9	5	5	5	6	5.78	.123	.07
All-terrain vehicle recreation	13	5	0	3	5	60.59	< .001	.20
Vineyard or hops production	3	0	3	5	3	27.46	< .001	.12
Beekeeping	3	1	3	5	3	9.63	.022	.08
Commercial / industrial	3	1	1	2	2	3.76	.288	.05
Trapping	6	1	0	1	2	37.26	< .001	.17

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

Table 39. Landowner *current* activities on their property *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Residential	88	78	86	14.32	< .001	.11
Livestock grazing	19	42	24	58.12	< .001	.12
Agriculture – annuals	13	25	16	20.76	< .001	.13
Timber / forestry management	9	27	13	55.82	< .001	.22
Orchards	9	16	11	9.58	.002	.09
Hunting	7	27	11	68.88	< .001	.25
Agriculture – perennials	5	10	6	8.68	.003	.09
All-terrain vehicle recreation	4	12	5	20.77	< .001	.14
Vineyard or hops production	2	5	3	3.18	.075	.05
Beekeeping	3	6	3	6.93	.008	.08
Commercial / industrial	2	3	2	2.33	.127	.05
Trapping	1	8	2	40.57	< .001	.20

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

Table 40. Landowner *future* activities on their property *for each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 value	*p* value	*V*
Residential	72	87	94	79	82	63.01	< .001	.21
Livestock grazing	56	14	2	22	25	288.09	< .001	.46
Agriculture – annuals	26	9	5	16	15	68.34	< .001	.23
Timber / forestry management	20	17	2	10	13	64.42	< .001	.20
Orchards	17	12	4	12	12	28.94	< .001	.14
Hunting	28	8	1	5	11	142.69	< .001	.33
Agriculture – perennials	12	6	4	7	8	16.41	.001	.12
Beekeeping	8	5	6	8	7	5.75	.124	.07
All-terrain vehicle recreation	12	4	0	4	5	57.10	< .001	.20
Vineyard or hops production	5	1	2	8	4	19.83	< .001	.12
Subdivide / sell for development	5	3	3	6	4	6.30	.098	.07
Commercial / industrial	4	1	2	4	3	5.46	.141	.06
Trapping	8	1	0	1	3	50.96	< .001	.20

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

In the *future*, most respondents still want to use their land for residential purposes (82%; Table 40). Livestock grazing (25%), agriculture – annuals (15%), timber / forestry management (13%),

orchards (12%), and hunting (11%) were other land use activities that many landowners hope to use their property for in the future. Landowners in Portland and on the Coast were more likely to want to use their land for residential purposes in the future, whereas respondents in the East were more likely to want to use their land for livestock grazing, agriculture – annuals, timber / forestry management, orchards, hunting, agriculture – perennials, and all-terrain vehicle recreation in the future. Those who have experienced impacts from beavers were less likely than those who have not experienced impacts to want to use their land for residential activities in the future, but were more likely to want to use their land for livestock, agriculture, timber, orchards, hunting, all-terrain vehicle recreation, beekeeping, and trapping in the future (Table 41).

Table 41. Landowner *future* activities on their property *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 value	*p* value	ϕ
Residential	85	73	82	16.15	< .001	.12
Livestock grazing	21	44	25	53.77	< .001	.21
Agriculture – annuals	12	25	15	25.43	< .001	.15
Timber / forestry management	9	28	13	56.87	< .001	.23
Orchards	10	20	12	18.92	< .001	.13
Hunting	8	26	11	60.85	< .001	.24
Agriculture – perennials	6	12	8	9.37	.002	.09
Beekeeping	6	10	7	5.14	.023	.07
All-terrain vehicle recreation	4	12	5	20.26	< .001	.14
Vineyard or hops production	4	4	4	0.01	.931	.00
Subdivide / sell for development	4	6	4	2.50	.114	.05
Commercial / industrial	3	3	3	0.08	.771	.01
Trapping	1	9	3	41.40	< .001	.21

[a] Cell entries are percentages (%) that do not sum to 100% because respondents could check more than one item from the list.

Demographic Characteristics. In total, 57% of respondents were male and 43% were female, the average age was 57 years old, and landowners surveyed have lived in Oregon for an average of 38 years (Table 42). Most respondents participated in a number of activities related to wildlife; activities with the highest participation included watching wildlife related television shows or movies (84%), viewing wildlife (81%), reading books or magazines about wildlife (71%), and visiting zoos or aquariums (61%). Few respondents participate in trapping (5%). In total, 20% of respondents are members of an environmental or wildlife related organization (e.g., Ducks Unlimited, Audubon). The majority of respondents (60%) grew up in towns of less than 25,000 people and education achievement was bimodal with 43% having completed at least a 4-year college degree and 34% having a high school diploma or less.

Table 42. Landowner demographics *for each region* [a]

	East	Coast	Portland	Southwest	Total	χ^2 or F	p value	V or η
Gender						42.16	< .001	.16
Male	69	53	45	59	57			
Female	31	47	55	41	43			
Age						89.93	< .001	.15
20 – 29 years old	5	3	6	3	4			
30 – 39 years old	7	5	16	10	9			
40 – 49 years old	12	11	22	12	14			
50 – 59 years old	26	27	26	27	26			
60 – 69 years old	26	32	19	30	27			
70 – 79 years old	19	16	4	13	14			
80 or older	6	5	6	6	6			
Average (mean) years	58.6[a]	59.0[a]	51.9[b]	57.9[a]	57.2	16.32	< .001	.19
How long lived in Oregon						48.62	.001	.11
Less than 10 years	6	14	13	11	11			
10 – 19 years	10	13	16	13	13			
20 – 29 years	13	15	13	11	13			
30 – 39 years	16	15	18	21	17			
40 – 49 years	13	14	12	16	14			
50 – 59 years	16	11	14	12	13			
60 – 69 years	13	11	11	11	12			
70 or more years	12	7	4	4	7			
Average (mean) years	42.2[a]	36.0[b]	34.6[b]	36.1[b]	37.5	9.45	< .001	.14
Wildlife related activities participated								
Watch wildlife TV, video, movie	85	84	83	83	84	0.46	.928	.02
Wildlife viewing	87	80	75	80	81	18.03	< .001	.11
Read wildlife books, magazines	74	72	73	66	71	6.80	.079	.07
Visit zoos / aquariums	55	66	68	58	61	18.20	< .001	.11
Fishing	74	55	36	57	57	98.53	< .001	.26
Wildlife photography	54	43	35	40	44	28.50	< .001	.14
Hunting	64	29	17	39	39	177.35	< .001	.35
Trapping	10	4	1	2	5	35.04	< .001	.16
Member of environmental / wildlife organization (Greenpeace, Audubon)						6.97	.073	.07
No	82	80	74	81	80			
Yes	18	20	26	19	20			
Community where grew up						323.55	< .001	.28
Large city with 250,000 or more	8	18	42	14	19			
City with 100,000 to 249,000	2	3	10	6	5			
City with 50,000 to 99,999	5	6	12	14	9			
Small city with 25,000 to 49,999	3	8	8	14	8			
Town with 10,000 to 24,999	14	8	12	15	12			
Town with 5,000 to 9,999	22	18	5	8	14			
Small town with less than 5,000	11	18	4	13	12			
Farm or rural area	37	22	9	18	22			
Highest education achieved						62.52	< .001	.12
Less than high school diploma	4	4	3	1	3			
High school diploma or GED	31	36	17	35	31			
2 year associates or trade school	24	25	20	26	24			
4 year college degree (BS)	24	20	36	22	25			
Advanced degree (PhD, MS, MD)	16	16	25	16	18			

[a] Cell entries are percentages (%) unless specified as averages (means).
Means with different letter superscripts differ at $p < .05$ using Scheffe or Tamhane's T2 post-hoc tests.

Table 43. Landowner demographics *for those who have and have not experienced beaver damage* [a]

	Never any beaver damage	Beaver damage at least once	Total	χ^2 or t value	p value	ϕ or r_{pb}
Gender				31.44	< .001	.15
Male	53	72	57			
Female	47	28	43			
Age				11.43	.046	.09
20 – 29 years old	5	3	4			
30 – 39 years old	10	5	9			
40 – 49 years old	14	13	14			
50 – 59 years old	26	30	26			
60 – 69 years old	27	29	27			
70 – 79 years old	13	15	14			
80 or older	6	6	6			
Average (mean) years	56.6	58.8	57.2	2.41	.016	.06
How long lived in Oregon				37.55	< .001	.16
Less than 10 years	12	7	11			
10 – 19 years	15	5	13			
20 – 29 years	13	12	13			
30 – 39 years	17	17	17			
40 – 49 years	13	17	14			
50 – 59 years	13	17	13			
60 – 69 years	12	13	12			
70 or more years	6	12	7			
Average (mean) years	35.9	43.5	37.5	5.32	< .001	.14
Wildlife related activities participated						
Watch wildlife TV, video, movie	84	82	84	0.61	.435	.02
Wildlife viewing	80	84	81	1.70	.193	.04
Read wildlife books, magazines	71	72	71	0.33	.566	.02
Visit zoos / aquariums	62	58	61	1.57	.210	.03
Fishing	54	69	57	18.57	< .001	.12
Wildlife photography	42	50	44	5.70	.017	.07
Hunting	35	57	39	42.25	< .001	.18
Trapping	3	13	5	33.93	< .001	.18
Member of environmental / wildlife organization (Greenpeace, Audubon)				2.42	.120	.04
No	81	77	80			
Yes	19	23	20			
Community where grew up				54.78	< .001	.20
Large city with 250,000 or more	21	11	19			
City with 100,000 to 249,000	5	3	5			
City with 50,000 to 99,999	9	5	9			
Small city with 25,000 to 49,999	9	5	8			
Town with 10,000 to 24,999	13	9	12			
Town with 5,000 to 9,999	14	15	14			
Small town with less than 5,000	12	15	12			
Farm or rural area	19	37	22			
Highest education achieved				1.18	.882	.03
Less than high school diploma	3	2	3			
High school diploma or GED	30	32	31			
2 year associates or trade school	24	25	24			
4 year college degree (BS)	25	25	25			
Advanced degree (PhD, MS, MD)	18	17	18			

[a] Cell entries are percentages (%) unless specified as averages (means).

These demographics, however, differed among the four regions. Those who responded from the East were most likely to be male (69%), whereas those who responded from Portland were most likely to be female (55%; Table 42). Respondents from Portland were, on average, slightly younger (*M* = 52 years) than those in the other regions (*M* = 58 to 59). Landowners in the East (*M* = 42 years) were more likely than those in the other regions (*M* = 35 to 36 years) to have resided in Oregon for a longer period of time. Those in the East were also more likely than those in the other regions to fish, photograph wildlife, hunt, and trap, whereas those in Portland were least likely to do these activities and most likely to visit zoos and aquariums. Landowners in Portland were more likely to have grown up in a larger city (i.e., population over 250,000; 42%), whereas those in the East and Coast regions were most likely to have grown up in a smaller town or rural area. Respondents from the Portland area were more likely to have a higher level of education completed, as 61% in this area had at least a 4-year college degree compared to 36% to 40% in the other regions. There was no statistical difference among these four regions in membership in environmental or wildlife related organizations. Landowners who have experienced impacts from beavers were statistically more likely than those who have not experienced impacts to be male, older, residents of Oregon for a longer period of time, participants in consumptive wildlife oriented recreation activities (e.g., fishing, hunting), and from smaller towns or rural areas (Table 43).

Section Summary

- The largest proportions of respondents had biocentric (nature-oriented) value orientations toward the environment in general (42%), and protectionist (38%) or mixed protection – use value orientations toward wildlife in particular (44%). Fewer landowners had anthropocentric (human-oriented) environmental value orientations (18%) or use related wildlife orientations (19%). Those in the East and who have experienced impacts caused by beavers, however, were more likely to have anthropocentric and use orientations.
- Most respondents owned their current property (86%), the average length of residence at this property was 16 years, 63% lived on property that was smaller than five acres in size, the average household size was between two and three residents, and 78% of households contained nobody under the age of 18. Those living in the East had the largest property, whereas those in Portland had the smallest, and households in Portland were more likely to have people under the age of 18 living in the household. Those who have experienced beaver impacts were more likely than those who have not had impacts to have spent more years living at their current property and reside on larger properties.

- Most landowners currently use their land for residential purposes (86%) and plan to continue to do so in the future (82%). Those living in the East and who have experienced beaver impacts were much more likely to use their land currently and in the future for livestock grazing, agriculture, timber, hunting, all-terrain vehicle recreation, and trapping.
- Respondents were more likely to be male (57%) than female (43%), had an average age of 57 years, have lived in Oregon for an average of 38 years, and grew up in small towns or rural areas (60% in towns with fewer than 25,000 people). Education achievement was bimodal with 43% having completed at least a 4-year college degree and 34% having a high school diploma or less. In total, 20% of respondents belonged to an environmental or wildlife related organization and most participated in activities related to wildlife. Those living in the East were more likely than those in other regions to be male, have lived longer in Oregon, grown up in rural areas or smaller towns, and participated in hunting, fishing, or trapping. Those living in the Portland region were more likely than those in other regions to be female, more highly educated, and visit zoos and aquariums.
- Landowners who have experienced impacts from beavers in the past were more likely than those who have not experienced impacts to be male, older, residents of Oregon for a longer period of time, participants in consumptive wildlife oriented recreation activities (e.g., fishing, hunting), and from smaller towns or rural areas.

MANAGEMENT RECOMMENDATIONS

Based on these results from this survey of landowners, the following broad recommendations, in no particular order, are proposed for management of beavers and their habitat in Oregon:

- In total, 20% of landowners surveyed have experienced impacts caused by beavers with those living in the East (27%) and Coast (30%) even more likely than those in other regions to have experienced impacts. Likewise, 26% of landowners have previously had beavers on their property and 16% currently have beavers living on their property (20% in the East, 28% on the Coast). These percentages are not trivial and a large number of landowners in Oregon are actively dealing with beavers and their impacts.
- Most landowners have seen beavers in the wild (85%) and were highly knowledgeable of factual information about beavers and their habitat (e.g., 8.7 / 10 knowledge questions answered correctly). Many respondents, however, said that they need more information

about how to coexist with beavers, and preferred sources for obtaining information included pamphlets, brochures, and direct mailings. From an outreach and education perspective, therefore, information on facts about beavers and their habitat may not be the best use of resources given that the public already seems to be knowledgeable about the species. Instead, an effective use of resources may be to disseminate information about how landowners can coexist with beavers, mechanisms for preventing beaver impacts, and any current resources available to landowners for mitigating beaver impacts. This information may be most useful to people living in proximity to beavers and their habitat.

- The majority of landowners surveyed were interested in both seeing (65%) and having (57%) beavers on their property or neighboring properties, especially in the Coast region. In addition, landowners had more positive than negative attitudes and beliefs about beavers. Currently, state agencies are exploring the possibility of relocating beavers and restoring this species in various areas. Beaver relocation guidelines have been drafted and research has been conducted exploring the viability and success of beaver relocation. Results from this survey suggest that a large proportion of landowners may be amenable to having beavers on their property, but it remains a question of managers to ensure that the properties provide suitable habitat for successful beaver relocation and restoration.

- Damage to trees was the most frequently reported incident (25%) and most substantial perceived problem (77%) associated with beavers on private property, especially in the East and Coast regions. Fewer than 10% of landowners, however, had taken actions such as wrapping trees to mitigate or prevent these types of impacts. An effective approach for managers may be to work with landowners to fix impacts and prevent future incidents such as tree damage caused by beavers. Providing information to landowners about how to coexist with beavers, wrapping trees, and providing equipment or labor to install things such as tree wrapping materials were all supported, on average, by landowners.

- Landowners were least aware that beavers do not eat fish (65%) and beavers can create wetlands and ponds that are important for fish such as salmon (73%). Respondents were also least likely to believe that beavers are beneficial (58%). Beavers play an important role in maintaining aquatic and floodplain functions, and reintroduction efforts have begun to restore beavers to many areas in Oregon because they have been identified as tools for fisheries recovery, watershed health, and habitat restoration (e.g., Oregon Plan for Salmon and Watersheds, Oregon Conservation Strategy, Mid-Columbia Recovery

Plan). For these efforts to succeed, however, it will be imperative for agencies to have the understanding and support of landowners and other constituents. Increasing outreach and communication campaigns to aggressively target landowners and inform them about the fisheries and ecosystem benefits of beavers may assist in enhancing the cognitive linkages between beavers and indirect ecosystem benefits created by this species.

- Although landowners were most concerned about potential impacts from beavers on their own property (71%) and neighboring properties (71%), relatively large proportions of respondents were also concerned about the spread of disease by beavers (48%) and health or safety of pets (44%), children (42%), and themselves due to beavers (30%). These health and safety concerns were most pronounced in the Portland area. Including clear and straightforward messages about health and safety risks associated with beavers and how to minimize these risks should be components of any public outreach information to minimize the probability that people are basing concerns on inaccurate information.

- If beavers cause impacts on their own property or neighboring properties, landowners believed that doing nothing and leaving beavers alone were unacceptable. Educating landowners about how to coexist with beavers was the most acceptable management response. Wrapping trees, installing control devices and fences or screens, and capturing and relocating beavers were also acceptable. Removing beaver dams or lodges was even acceptable if the impact was severe (e.g., floods buildings). No matter how severe the impacts caused by beavers, however, lethal control (i.e., destroying beavers) and trying to frighten beavers away were perceived as unacceptable responses across all regions and even among landowners who have already experienced impacts from beavers. It is clear that a "kill first" approach is likely not acceptable for most landowners, so it is suggested that managers work with landowners to implement a variety of management techniques to mitigate current impacts and prevent future incidents associated with beavers.

- Understanding how humans can coexist with beavers and the role of possible incentives in this process are crucial from a monitoring and technical assistance perspective if restoration measures are taken to reintroduce beavers into areas with the goal of improving aquatic systems, watersheds, and fish populations. Results from this project suggest that irrespective of the severity of impacts caused by beavers, it is unlikely that most respondents would avoid incentives and choose to not keep beavers on their property or a neighboring property. Instead, landowners may be likely to take advantage

of information sent to them about how to coexist with beavers, financial compensation to fix or prevent impacts, and in-person visits by experts and agency personnel to provide information, plant trees, and provide equipment or labor to enable them to retain beavers on their land. No single incentive was preferred over another, so managers could offer one incentive or a suite of incentives, as long as they were efficient and effective for addressing the impacts. It remains an issue for managers to identify on a case by case basis what management strategies and possible incentives would work best for a given property and then work alongside landowners to address current impacts and prevent future incidents. Regardless, most landowners surveyed believed that lethal control is largely unacceptable. Results suggest that landowners are willing to try any alternative management approaches and incentives, which is important because constituent support for retaining beavers on private land is necessary for helping to achieve the ecosystem (e.g., fish, watershed) benefits associated with restoring beavers and their habitats.

- The greatest proportion of landowners (84%) believed that state agencies should be responsible for addressing problems with wildlife such as beavers on private property. The majority of respondents (60%), however, also believed that residents experiencing the problem themselves were also responsible. These results suggest that state agencies might work together collaboratively with private landowners to empower them to address beaver impacts. Collaboration may be possible given that the majority of landowners surveyed trusted agencies such as ODFW. Managers might also create a plan for communicating with landowners and implementing collaborative strategies for managing beavers and their habitat. This plan may be most effective if it is transparent, has clear lines of accountability and identifiable lines of communication, is created collaboratively with landowners and other stakeholders (e.g., watershed councils), and outlines measurable goals and objectives for managing beavers and their impacts. Managers should work with experts in the fields of outreach and agency – public communications to help develop and disseminate this communication and management plan.
- The largest proportions of landowners had biocentric (i.e., nature-oriented; 42%) value orientations toward the environment in general and protectionist orientations toward wildlife in particular (38%), suggesting that strategies that have deleterious effects on beavers and their habitat are unlikely to be supported by a large number of landowners. Research has shown that individuals' value orientations influence their attitudes,

intentions, and behaviors, so knowing landowner orientations can be useful for estimating possible reactions to potentially controversial management actions (e.g., relocation, lethal control). In addition, value orientations are stable and resistant to change, so attempts to inform individuals with biocentric or protectionist value orientations to consider adopting a favorable attitude and vote in support of actions that may be harmful to beavers and their habitat are unlikely to be successful.

- There were some regional differences in landowner responses. Those living in the East and on the Coast, for example, had more experience with beavers on their property and dealing with impacts from beavers. Landowners in the East were also more likely than those in the other regions to: (a) be concerned about property impacts caused by beavers and have taken actions to deal with these impacts, (b) hold less positive attitudes toward beavers, (c) be less interested in having beavers on their land, (d) have the least trust in state wildlife agencies, (e) not want information about beavers, and (f) be least accepting of strategies and incentives designed to keep beavers on their land, and most accepting of lethal control and not retaining beavers on their property. On average, however, those in the East and all three other regions still had positive attitudes toward beavers, trusted state agencies, wanted information, and felt that non-lethal strategies were acceptable and preferred over lethal control, which they viewed as largely unacceptable irrespective of the severity of impacts caused by beavers. Regional-specific management might not be necessary, but agency awareness is needed regarding these regional differences, and that landowners in one region may be more amenable than those in other areas to certain tactics for managing beavers.

- Appendix A is a listing of verbatim open-ended comments about information needs and other comments related to beavers and their management in the state. Many of these comments may provide insights for future planning and management. The most common comments, in no particular order, focused on the: (a) need for information and strategies about how to coexist with beavers instead of destroying them, (b) wanting more information about beaver location / distribution and population size, (c) concerns about impacts that beavers cause, (d) broader ecosystem benefits provided by beavers, (e) desire for beavers to be on their land or nearby, (f) concerns about human encroachment and damage to beaver habitat, (g) concerns about balancing the needs of beavers with those of humans, and (h) possible health and safety risks associated with beavers.

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APPENDIX A: OPEN-ENDED COMMENTS

Information Needs

- I would like information on beavers and their habits.
- Whatever information I need to protect my now chewed in half peach tree. Although, my grandchildren loved to see up close the marks the beaver left on each side of the tree.
- Any and all information regarding beavers or any wildlife will be readily absorbed in this household.
- I always thought beavers were helpful; I didn't think they were that destructive, so I would like to know more about them.
- What help is available for landowners affected.
- What health problems do beavers present to pets?
- How long do beavers live?
- How often do they reproduce?
- How many young are birthed?
- Why do beavers choose one area and stay there?
- Natural history.
- Historic populations and ranges.
- Reintroduction programs back to historic ranges/sites.
- Their range or territory spread.
- Beavers existing in our neighboring property would likely have little impact on my property, but I would like information.
- I already did research and know they are a positive impact to ecosystems. Can they harm humans?
- What impact on water quality in public sources that could be a health issue.
- I'm not real old but getting there, used to seem them 2-5 times a year but hardly see them anymore. Why?
- Are Beavers causing a lot of statewide damage? This is the "Beaver" State, so where are all of them?
- Usefulness of beaver impacts on streams and lands.
- I would like to know more about the ecosystem created by beaver dams.
- What the cost of Beaver damage is.
- Health issues.
- How to control if they create damage.
- I want to know how to co-exist with them and perhaps enhance area for them.
- Where are most of them, how can we help them and co-exist with them.
- Do we have a healthy Beaver population in Oregon?
- Do they pose any health threat to pets and children (when encountered in the wild)?
- I would like to know how to coexist with them and their impacts.
- What are the impacts of Beavers in this area?
- How to coexist with them. How to be safe.
- What to do if I have beavers on my land!
- Could a beaver live in a ravine with a small stream running thru?
- What diseases they can carry or transfer to pets and humans.
- An occasional article in the newspaper or TV report
- Co-existing with beavers should be a public education. Perhaps OPB?
- All the information I could get. I would like one on my 20 acres.
- Why nothing has been done about what damage they have caused.
- What would keep beavers happy, out of trouble, and controlled on my property.
- How to protect fruit trees in Baker City.
- All I ever see is the negative impact they have on areas.
- What trees will they eat?
- Where are beavers currently causing problems?
- What are current population levels?
- If a beaver causes damage on my property, can I remove it?
- I want to know if they are aggressive or dangerous.
- I would mostly like information about damage mitigation.
- How many are in Oregon now and where are they found?

- When I see one in my back yard at night, what do I do - they have been on my fence - first time last summer - they eat the neighbors garden food.
- Is there a regulated hunting season for beavers?
- How is the population being managed today?
- Are beavers an issue in my area?
- How much damage do they do to properties they live on?
- To work with nature of beavers and impact of humans. How, what, "damage" do beaver dams cause to river flow and trees, and is there a positive impact?
- Once they build dams, do they settle down for a while?
- All available info.
- Where beaver dams are located.
- I know virtually nothing about beavers, so I need all the information I can get.
- As much as possible.
- How to keep them wild (as in not unknowingly cause them to look for food from me - skunks eating cat food in the garage comes to mind).
- How to encourage better environments for beavers.
- How Beaver families and communities are structured.
- What causes beavers to enter, stay in, or leave an area.
- How do we prevent beaver related bank erosion?
- Blockage of areas where populations have existed for years should not happen. It's too late-there has to be a better answer.
- I'd like to know if they can spread disease to pets or humans-bite or scratch.
- Please send me a DVD. We live on the Alsea River.
- Information about personal behavior and life.
- Feel free to send whatever info you have.
- Let people know where beavers should exist because I think most people are ignorant because beavers do not exist in the numbers or range that they have historically.
- Is there any wild place to see beaver?
- Are there urban beaver?
- I live in the city of Portland and I have never seen a beaver, are they living in this area?
- ODF&W does not evaluate individual circumstances. Every situation must fit within their set regulations. There should be more practical conversation.
- Population numbers in specific areas, general info.
- What to do if problems and who to contact.
- I would like information about beavers based on the watershed I share with them. Johnson Creek Watershed.
- How many properties are actually affected by over-flooding due to beavers?
- I need basic information on beavers, impacts, and how to co-exist with them.
- I would be interested in knowing their impact as I know virtually nothing about beavers.
- I know very little about beavers and their habitats in general. Any information would be valuable.
- How far do beavers wander from creeks and wetlands?
- What human behaviors are impacting their existence?
- Are they important for metropolitan areas?
- What is the benefit in urban areas?
- Is there a way to manage beavers in an urban environment.
- How many really exist along the Springwater Corridor at the Willamette (I've only seen one in 10 years)?
- How to protect growing trees while co-existing.
- What concern should I have about my home being so close to Oaks Bottom and beavers that live there.
- We live in the heart of a residential neighborhood. We could, and do, co-exist with beavers in Oak's Bottom but could not live with beavers any closer.
- Are there many beavers in Oaks Bottom?
- Their distribution in Baker County.
- How beavers and me and my family can co-exist?
- What do beavers need to thrive in my area?
- I would be interested in general information about beaver / human interaction.
- How much problems are there with beavers here?
- Impact on stream flow, water quality, and fish and other wildlife.

- I would like to know how beavers can thrive without impacting local residents.
- Where can we find beavers in our area?
- Their numbers, their effects on the human and natural environment, where they are found.
- What makes a beaver leave its usual environment?
- When would I most likely encounter a beaver (season, time of day)?
- I know very little, being an urban dweller. How do you maintain clear routes on salmon streams and allow beavers to build?
- What impacts beavers have on the environment.
- Good and bad aspects of having beavers on your land.
- What would be the plan of action if we saw a beaver on our property.
- I don't really understand how they help or hurt fish populations and spawning. I understand the wetlands they create can benefit birds and other wildlife. Would love to see beavers nearby.
- I'd like to know about beavers, but not how to exist with them. We have enough trouble with deer, opossum, and raccoons.
- How best to co-exist, failing that, what i can do to protect my property.
- I don't live in an area with beavers and have never experienced damage to property but would be interested to learn more about them.
- Do beavers carry any diseases which might impact humans or livestock?
- There has been no impact from beavers on my property- I can learn whatever I wish to know from many sources.
- Everything
- It would please me to know that are not around me.
- I would like to know how the beavers are doing in Oregon and what impact they are making.
- Do they eat fish?
- Educate me as to what to do to coexist with them so we can save them and enjoy them in the wild or in some cases zoos.
- What is the threat of beavers in my area?
- I would like to know how to keep them off of my property and away from my gardens.
- Lifespan, movement patterns, reproductive rate, impact on vegetation, incidents of damage to human habitat, impact on fish, population size.
- Any information. I don't really know much about coexisting with beavers.
- I would like to know the outcome of this study. I like learning about any animals.
- I would like to know more about potential impact to our property and neighborhood and how do we co-exist with them yet protect property from damage.
- Information on areas populated.
- Beaver populations per region, policies and problems, future issues per community expansion.
- What is their impact and numbers?
- The best way to relocate them.
- How to coexist with them.
- How we can coexist with different land uses farm, recreation, urban, etc.
- Do they live in groups and are they territorial?
- What is the likelihood of having beavers relocated to my area?
- How are beavers related to mtn beavers and what is there impact in Oregon today.
- Send more information about them.
- Send all info possible.
- When are they most active and the current population and life span, food sources.
- How to coexist with beavers and other wildlife - they were here first.
- How to keep people from screwing up their habitat.
- How to manage the environment so all species can coexist.
- What can we do to coexist and what impacts are the beaver having on the land?
- What is a water control pipe and how does it work?
- Whatever you want to share.
- How to control beavers.
- What is their impact on crops like vineyards?
- Do not know how to co-exist with beavers.
- Would beavers survive in this area or is it too populated?
- How to have them on my property and coexist while controlling damage.

- How much will you charge for a tag?
- Do beavers self regulate populations and how many are there in Josephine and Jackson counties?
- How to coexist and not kill them.
- Is the beaver population declining or threatened?
- I'm at risk of having beavers negatively impact my property. Should I be scared of beavers?
- I would like to know how we can have more in this area.
- I am near Johnson Creek and 82nd. Do they live in town in Johnson Creek? Can you send info on how to coexist?
- Where are they now?
- I don't know much about beavers, so I suppose I'd be curious to know just about anything.
- Is there is a concern for beaver population?
- Beavers' spread of disease / safety threat to humans.
- Is it reasonable to have beavers living in urban areas; is there really enough space and solitude?
- Lifestyle of beavers, time of year most problems occur, why beavers move, and what water systems are impacted by beavers.
- More about beavers in general (habitat, etc.).
- How to better coexist and encourage more.
- Are there concerns about beavers as disease vectors for humans and pets?
- How to coexist.
- I have seen beaver damage where I work SE 138 + Airport Way. Beavers have cut down a number of trees but they are small. Is that all they tend to go after, rather than mature trees?
- Are they thriving?
- How much damage do they cause?
- It would be nice to know where they live currently.
- Negative aspects such as pet dangers.
- Can a person just kill them without contacting agencies for help?
- Can they be relocated successfully without impacting them or the area negatively?
- Can they be controlled by taste aversion?
- Can they be controlled by birth control?
- Know more about habitat, impact and beavers in general.
- Where I can go and see more in the wild.
- Past and present population extent, remaining habitat, population viability.
- What to do when I see one, will they attack, should I try and remove dams or leave them alone?
- I actually don/t know a lot about them. I think they are cute to watch in the wild but I don't think I'd like to have them on my property. I didn't think before about the problems, I didn't think they would stay by people.
- Everything- life cycle, mating, eating, problems. They are really neat interesting animals.
- Ways in which people can coexist with the wildlife around them.
- I don't know much about the OR Department of Fish and Wildlife.
- I could read about them on the internet.
- Yes, I would like information about their ways and food.
- Any information on coexisting with them.
- Are they considered a problem in Oregon?
- How to get rid of them if on my property -not on my property now though.
- How could we increase the number of beavers and stop any trapping of beavers?
- Coexisting with beavers within city limits is a challenge. Experts providing information and materials to secure trees and flooding is essential.
- I would like to know everything about how to make a healthier more beautiful and productive world with them.
- Which area in Oregon have the largest concentrations of beavers?
- Result of any research to estimate populations.
- How to keep neighbors from trapping them.
- I know nothing about beavers. Did see evidence of their activity near our home.
- Diseases that can hurt humans or pets.
- Do you know the beaver population in Oregon?
- I really don’t know that there's much beaver impact in this region. If so, I'd like to know.
- Do you plan to do things to bring more beavers to our area?
- Reproductive rates, area or amount of area they need to exist in an area.
- Everything, they are in the pond in my backyard - 3 beaver dams.

- Where can I see them?
- Number of incidents per watershed, estimated damage by watershed, specific methods to peacefully coexist.
- Information specific to my watershed.
- Do they have webbed feet?
- Do they cause beaver fever?
- How can landowners encourage beaver populations?
- Are beavers edible, and if so why don't people eat them?
- I would enjoy an online resource to locate and visit beaver populations near me.
- Are beavers thriving in Oregon?
- Are they considered endangered?
- Are they a nuisance?
- What are they capable of doing to property and would ODFW help with the problem.
- I would like to know the degree of success of beaver relocations and reintroductions.
- How has climate patterns affected perennial beaver pond persistence?
- Information on co-existence would be valued.
- Why is the beaver on our state flag?
- How to repair damage to my watershed.
- How to co-exist with them.
- I know very little about beavers but willing to be educated.
- Need to know how to coexist with them it's part of a healthy and diverse ecosystem.
- Proper ways to prevent flooding damage while maintaining beaver environmental habitat.
- How long they live, are the populations increasing or decreasing.
- I would like to know who will resolve a property damage situation.
- I would like to know what county highway departments allow beaver ponds near roads.
- Anything and everything.
- What the beaver habit law is currently, and how that applies to landowners.
- Best way to coexist.
- How to exist without problems.
- How adaptable are beavers in relocation efforts?
- As much available info possible.
- How to coexist.
- Their habits.
- Should I contact ODFW if I see any beavers?
- What they eat.
- Habitat for existence.
- Impact where they currently live.
- What is the beaver population in Oregon and how much of a problem are they?
- If they are causing damage and if they are protected in all wilderness areas.
- Educate the public on all aspects of beavers - benefits and dangers.
- Anything that is able at this time.
- Where can I get some to "drop" some trees that are blocking my view from my home?
- Are they endangered in Lincoln County?
- While i have not seen them, I'm told there is a dam on my property. Want to know how to protect them.
- Is it possible to coexist with them given land use - a or near water table level?
- All information about beavers.
- Population in Oregon.
- Negative impact they actually have vs. positive impacts.
- Population estimate per county.
- Population in our area. Is there a growing problem in my area?
- I would like to know how to protect property and coexist with beavers.
- How can we provide the best habitat for beavers?
- Information on how to prevent beaver predation.
- How to coexist with them if possible.
- I would like to know about local populations and how to interact with them to benefit them.
- Do they have a special reserve just for beavers where they can have a healthy environment?

- How to live together - people, animals, nature. They were here first and serve a purpose.
- Beavers taking too many trees on rivers. Why do they cut and leave?
- We love beavers - please tell us more about them and how to coexist with them.
- What beneficial impacts they have on their environment and best ways to live in harmony with them.
- Please let the public know how beneficial these animals are.
- How threatened are they?
- How to coexist?
- Would like to know about tree wraps or fencing to protect trees near or on river bank.
- Population trends.
- How can inform or help educate friends and neighbors on how to coexist with beavers?
- General beaver information like what to expect.
- No thanks. I can use the web. Don't spend more tax money please.
- How to coexist with them.
- Are there any plans in Oregon to increase beaver populations and to protect them as non-game animals?
- A general brochure would be nice.
- How to manage them on your property without killing them.
- Can beavers be selectively bred so they would live at higher elevations in high gradient streams rather than agricultural lands?
- Do beavers exist only in the valley floors at lower elevations?
- I know nothing about beavers - any information would be good.
- Plants to plant for beavers.
- How citizens can encourage and protect native wildlife of area they live.
- I like the beavers but not the destruction. Can you control the destruction and have beavers?
- What is their population in this area, how that compares historically and what if anything is being done to reintroduce and / or control them?
- Location of current beaver population in powder basin.
- As much information as possible.
- Tree size they commonly chew down and species.
- Who is the predator of the beaver?
- I would like to know more about how to coexist with them, and how to minimize their impacts.
- I would like to know about any incentive program.
- How to attract beavers to an area.
- How to maintain populations and yet all harvesting of animals to maintain healthy population.
- Population information, social structure animal mannerisms, habits, habitat, interaction policies and current legal restrictions.
- Benefits and wisdom in coexisting with beavers.
- When beavers like other wildlife start causing problems.
- How fast they multiply.
- How to move them.
- Real population numbers and real financial amount of losses.
- I would be interested in any information available.
- Do you have a map identifying where beavers exist at the present time?
- Besides allowing beavers to co-exist with humans, are there issues about beavers co-existing with other animals?
- I used to see beavers on Devil's Lake often, but haven't for a while; what happened?
- I do not have nor expected to have contact. Any information I need can be gotten elsewhere.
- How to coexist, dangers, who to contact (telephone numbers).
- Any information on how to coexist or move / relocate to more productive areas.
- Who to contact if a beaver becomes a problem on or near my house / property.
- Mainly how to coexist without harming the beaver and with no harm to my pets and property.
- Where are they located? I live in Otis.
- Everything.
- Where are the beavers?
- How often the water is contaminated by the beavers!
- The Beaver Creek State Natural Area is just a few miles up South Beaver Creek Road from here. It is doing a great job educating about beavers.
- More interested in nutria control and eradication.

- I would like to know whatever there is to know.
- Everything. Would like all information emailed or mailed to me. Find it fascinating.
- Are beaver populations healthy and stable? Seems I haven't seen as many or as often as I used to.
- Biggest concern is fecal-"beaver fever" to my water systems.
- I'm curious where they live, that's all.
- I know nothing about them, except that they can cause damage. Any and all information on them would be helpful.
- What they are good for or not.
- Information on how to co-exist.
- Do they carry disease or are they dangerous.
- All you have to help us promote beaver-human coexistence.
- I would like to know just how much of a problem and damage beavers really cause.
- Does relocation work?
- Beavers are important to our habitats and we need to see and incline in the population. What is the impact of nutria on the beaver population?
- I don't know anything about beavers or ODFW.
- I would be interested in knowing to what extent beavers historically occupied the Johnson Creek watershed.
- How does the beaver population impact the salmon run? Are they, like the seals, depleting the salmon?
- What diseases can beavers carry that infect humans? I understand that giardia is one such disease.
- Their habits, needs, life patterns, humane control measures.
- I am curious about their natural history: live patterns, competition, ecological niche, habitat needs, adaptation.
- How to coexist.
- How close are they to my house / neighborhood and any potential danger/damage to my property?
- How are they doing overall?
- I don't see them that often on the lake any more – why?
- How do I coexist with them?
- Nonlethal control / management.
- I don't have any, but would like to know where I can see them.
- How to let them live their environment, and how to protect our property without destroying the animal or their habitat, unless over population is an issue.
- General pamphlet would be interesting.
- How we can coexist.
- Everything.
- Everything about them.
- Have not seen beavers in our area in 10 years - why?
- Would like information on coexisting with any animals making impacts on humans.
- If they exist on my property or a neighbor’s property.
- What impact do they have on salmon or steelhead?
- Is there an overpopulation or under-population?
- Are beaver currently being trapped in Oregon?
- Are beaver protected?
- Is it desirable to wrap trees in beaver areas?
- Although I live in a residential area, I would like to know if beavers live in nearby areas.
- Is it true their fecal matter is dangerous to our water supply?

Other Comments

- Problem is that we have allowed over development of riparian / wetland areas. We have channelized our rivers and have not invested in proper road / stream development crossings. I basically live in a subdivision that has allowed residential development on the stream. Of course, any flooding due to beaver dams we (society) need to allow land owner to protect investment. The mistake was first made by allowing development too close to rivers, now is the tough road to undo what has been allowed.
- We had a beaver family on Salmon River (by the bridge) in 2004 - 6. Then something happened & they were gone.
- I have no problem with beavers, I realize they can damage things, trees and they build dams. I think there cool creatures.
- We live on a tidal river and are surprised to find beavers in salt water.
- There is one or more in my back yard currently and it's pretty cool that they are there. They don't bother me, so I don't bother them.
- I have supported two students that graduated from OSU. Does that count?
- They deserve our respect, our protection, and our concern.
- Stop trapping with leg hold and steel jawed traps. This is very unnecessary and non-selective. That is any living creature can be injured or killed with the leg hold and steel jawed traps including our pets, cats and dogs!
- I wish there were enough beavers in Oregon to actually be a problem.
- I know that beavers exist in the wetlands adjacent to our property (saw a dead one hit by car). I can't really observe them from my property but would like to.
- This was there land, before it was ours.
- When I first moved here, there was a beaver lodge and family in the creek behind my house. Over time it disappeared don't know why. I really would love to see beavers return.
- I wish you would ask me about deer. Is there help available for me, deer damage my orchard about 50 fruit trees and 1100 blueberry bushes.
- We have skunks - get rid of them. You already gave us skunks without asking. No beavers, just skunk.
- It's good to see some information being gathered. What a shame that beaver, premier creator of wildlife and fish habitat, are managed as a "pest" by ODA. Shame on ODFW-fish division research demonstrates positive impacts of beaver in juvenile coho over winter survival. Politics, timber and agricultural interests prevail, ODFW is publicly silent. I hope this survey is part of an effort to end non-discriminate, unregulated killing of beaver.
- I do not think I would be adverse to the introduction of beavers to the area "if" we had more knowledge as to how you are going to manage it and guarantee compatibility.
- As we encroach upon their habitat, I would love it if we could find a way to co-exist. They need trees and water. So do we.
- I hope that the beavers are thriving in Oregon; unfortunately, we rarely see them.
- Will results be published?
- What you environmentalists need to do is worry about the increase in the human population.
- Live in the middle of neighborhood. No wetlands, so no habitat for beavers - don't really feel this area has much to do with beaver-control or enhancement of beaver habitat.
- I kind of feel if you live by water you need to expect them, however because I live with mountain lions and bears you can run into problems.
- The education about a beaver's impact should begin in elementary school or even preschool, and also should be talked about in the public media.
- I would not have a problem if there was a beaver on my property. I might even enjoy it. But I would not want a beaver on my property because ODFW does not manage their animals in a responsible way. Currently I deal with Elk damage because they put a feeding station .5 miles away from my property and all summer they are in my hay fields. Now they are introducing wolves what kind of help will I get if I lose livestock, none! Therefore if I see a beaver on my property I will kill it before I lose any more of my rights to manage my own property!
- I think a Beaver would help my ponds.
- Your questionnaire regarding beaver in Oregon opens much wider our concerns of where this once great nation is headed. I will remind you that neither the state of Oregon nor the U.S.A. will suffer any great loss for the lack of beaver or any other species of wildlife that may turn up missing. Human life must never be placed on a par with any other living creature.
- It bothers me seeing all the trees they destroy, but they are an important part of the ecosystem.

- I think every animal has its place and roll. I think they should be managed properly, and not be for one animal at the costs of others. There has to be a balance, like with everything.
- There is no potential for beavers to live on my property or the nearby neighbors. We are in upland sage grass habitat.
- Due to increasing encroachment of man on wildlife habitat, both wildlife and man needs to be managed. A balance needs to be made so both will have a future. I wish I could believe ODFW could and would do the right thing. However my trust in their ability to manage wildlife to the mutual benefit of both is nonexistent.
- Beaver chewing down trees in Wade William Bell Park.
- Beaver management plans and state water need to be changed somewhat to allow for moderate increase in beaver numbers and improving habitat for them.
- Beavers are OK! Don't put beavers where they aren't normally.
- There are enough beavers living in Oregon right now. We do not need to increase their numbers.
- Do a survey on elk!
- I think all animals have the right to live and be respect.
- I would consider sharing them with my property if I'm given the information and tools to help us co-exist.
- I like beavers, but I don't want them on my property. There is a place for them and we need them. (80 acres pond and stream). We have too many people and we are pushing animals of all kinds into smaller areas. Don't overpopulate and save what we have left - as silly as this sounds we are running out of water and wilderness areas.
- They are fun to watch.
- We live close to Johnson Creek and the woods. Please do all you can to help us understand more.
- Will the beaver population get to a level that would allow recreational hunting? I want a beaver skin hat.
- I enjoy seeing beavers in the wild, but our area here is more residential and small farms. I would think beavers would do quite a bit of damage here.
- No comments about beavers, but we have a major raccoon problem in the Rogue Valley (Southern Oregon). This problem should be addressed.
- I think putting beavers on Kane Creek would be a death sentence for them. Poor location.
- If you want beavers, then keep them on your place and pay for any damage caused by them to other property!
- I am an outdoor enthusiast, commercial fisherman, prospector, and hunter/fisherman. I see the benefits of a healthy ecosystem. The beaver in the wild is wonderful. The beaver in Portland in harmful.
- I do not want beaver around river. They eat a lot of fish and destroy fruit trees.
- Beavers do a tremendous amount of damage and need to be controlled by lethal means.
- We learned more about our neighbors (the beavers) and the ODFW because of this survey.
- Most beavers I have seen are road kill. Too slow crossing the roads. Whatever happens, in 20,000 years, the earth will still be here, the environment will survive.
- Beavers are great to see, but are very destructive, so should not be allowed to stay in neighborhoods, even out of town neighborhoods, like ours.
- I discovered a beaver den by falling into a den up to my armpits on the Alsea bank. Beaver are the most curious animals I have ever seen and have had them close as 6" from my face when I was prone on a river bank.
- I think beavers are great! Otters are great too.
- There are some at Johnson Creek Park and Crystal Springs Rhode Gardens. These are good places for them and I am glad they are there.
- On our walks to Johnson Creek we see evidence of beavers and enjoy seeing their progress on several trees. We've never seen them, but someone pointed out their dam to me. We prefer no interference with their habitat. Keep it natural. Destroying them would disrupt nature in unknown ways. Of course if a beaver dam causes flooding in a neighbor's property, I'd want it moved, but I think this beaver dam is far enough away from homes.
- Save the beavers, but control them so trees along Johnson Creek don't disappear.
- We like and value beavers. Their habitat should be protected.
- Will you be doing something like this about skunks, raccoons, coyotes which are in my urban environment? How about non-natives like opossums?
- We live near an animal and bird sanctuary and beavers have damaged trees there. We didn't consider that wildlife refuge a neighboring property.
- I think beavers are needed in our environment, unless they become destructive then they should be removed either by relocating or trapping.
- Beavers can be destructive. They should stay out in the mountains. Spend time dealing with the white tail deer invasion in eastern Oregon.

- Beavers, like all wildlife, need to be managed and controlled. Society has advanced and we can never return to the good old days. Environmentalists suing to get what they want is not the proper way to protect wildlife. A good example is the shape our forests are in.
- Beavers just do what they know how, I kind of admire their abilities.
- Truth based on actual facts is a direct road to good solutions! Common sense over rules clouds logic. Good intentions can cause bad consequences.
- I enjoy seeing beavers and other wildlife in my community. I find them interesting animals and not likely to interfere with me and my life in a negative way. They keep busy living their lives and don't intentionally impact humans. Their fur is soft, they make nice warm coats.
- The ODFW should get off their butts and do something.
- There is a strong need to increase the habitat and numbers of beavers, especially east of the Cascades, north east Oregon really needs them!
- Don't get the idea of threatening beaver population. They're surviving very well in Baker County. Evidently someone on your end is dreaming up something that isn't needed. Spend time and money on what to do with the killer wolves/ pattern it after Wyoming.
- There is no room for beavers on my property. I don't believe in killing all the creatures, but they have no room on cropland.
- We see the chewed trees at the parks, but we don't see the beavers themselves.
- Even though I don't have land that could ever attract beavers, we do live with numerous raccoons and skunks which can be a nuisance, but we adapt to them. We live across from oaks bottom wildlife refuge and see bald eagles and osprey daily. Beavers should be like rain: something we tolerate and adapt to because we're Oregonians.
- We live near oaks bottom and have seen beavers there, but not on our property.
- Please let public know about your results and conclusions.
- I would love to see beavers near me, but my neighborhood is residential. I hope they are at oak's bottom, but I have not seen them.
- For years we had a cabin at Diamond Lake and loved to watch beaver activity at Silent Creek.
- Beavers are interesting animals. It played an important role in the exploration and early settlement of our state. I would be very disappointed to hear that they were being destroyed for no reason. Oregon is known as the beaver state; education is very important.
- Beavers were here before humans. We are living on their homeland!
- Being our state animal and portrayed on our state flag, I feel it is our responsibility as Oregonians to lead the understanding and conservation of the beaver, throughout our state and the country. I have run across beavers both in my trips into the mountains and a few times nuisance beavers, but I stick by the belief that beavers are an important part of our area and our responsibility to protect and understand and enjoy.
- People should live in towns. Only people who are farmers should live in the country. Preserve habitat! Continue good land-use laws and urban growth boundaries. We who live in towns should subsidize beaver damage to farms and edges of towns. If a type of farming does not coexist with beavers, transplant them to another area. If ODFW feels that carrying capacity is at its limit, trapping is fine.
- Beavers need space, they are not good suburban or semi-rural neighbors, unfortunately.
- I like to watch beavers working in the wild, but think they should be controlled on private property.
- They make great fishing ponds.
- They are amazing.
- The beavers are just fine in this area. Leave them alone and provide jobs with our tax money.
- Balance is the key. We don't want beaver populations out of balance- too large or too small. We should leave them alone for the most part. I'm not against hunting/trapping in a purpose such as for food or fur. I'm against sport killing. We can coexist with nature instead of constantly destroying it or trying to damage it.
- I used to love the idea of having beavers on my property. Now, I understand why people don't like beavers. Maybe I don't want them.
- I appreciate the opportunity to be involved. I do hope that despite my differing views (I don't feel we should manage or take responsibility for wildlife) you still count my comments.
- Even though they cause some damage to human's property they build their dams and that stores water for wildlife and keeps our residents land from flooding when we have storms. Beavers in their own way protect our environment. Save our beavers.
- They have done much damage here. Ruined our pond, downed and destroyed 20-30 fruit trees and vines. You can have them all for free.

- Feeding habits, impacts on vegetation (diseases introduced to plants), common diseases within population, reproductive rate / population trends, heavy metal loads found in Portland specimens, health impacts from increased sewage effluent, blood composition, vision accuracy, occurrences of attacks on humans, territorial range of individuals, current market value for pelts. I want to know it all.
- Have seen beaver dams in many places in national forests, etc.
- I assume that because you are surveying the beaver issues must be controversial. I never even considered that beavers could do so much damage and enjoyed our one beaver sighting without even thinking that the beaver could harm anything. Hopefully we can preserve these amazing animals.
- Would like to see a documentary on TV on beavers on Oregon Field Guide on OPB.
- Beaver sighting experience while fly fishing on the Snake River 40 years ago. A beautiful animal and a wonderful experience to share with others.
- There is evidence of beavers on Devil's Lake and across the street on neighbors land. Residents enjoy beavers.
- Thanks for the opportunity for the input about beavers, which have caused damage and flooding on property. It has been exciting to have beavers on our creek.
- They have a place.
- Save them and their environment.
- I feel beavers are very important and we need to coexist with them.
- Let the beavers live and let live.
- In this area I do not believe there is suitable habitat.
- Beavers should not be in populated areas in the wild they should be left alone.
- I do not know enough about beavers to understand the damage or benefits of them.
- Would love to see more beavers my other property was better suited to them.
- There is enough federal land to relocate beavers from any issue caused by man's encroachment into their habitat.
- We need to preserve and maintain wildlife areas.
- We should not make decision without fully understanding how it will affect others.
- A beaver living on my property would be misplaced - too many people and dogs live here.
- Results will be interesting to see.
- ODFW must protect animals, however if they damage property they must favor the landowner before animals.
- We love them! Bring them to Johnson Creek. We look every day!
- I do not live in beaver habitat. My sympathy for urban property owners who live in beaver habitat is slim.
- Although occasionally dealing with beaver damage, it has never been severe enough to merit a response beyond protecting some plants. If it became severe or potentially damaging in a major way (flooding buildings or property) then it would merit some preferably non-lethal control.
- I'm always pleasantly surprised to see wildlife in the city. I would like to see more and help encourage steps to give them a home.
- The public should know where beavers are living so that the communities can come together and support them.
- I always enjoy seeing beavers.
- We don't have beavers, but are willing to do anything to help beavers coexist with human development.
- People should get to do what they want. Government is evil.
- I live on a class 1 stream that has been heavily impacted by many mean of clearcutting above. In the 20+ years I have lived there, I have not seen even one fish. Maybe relocating problem beavers to creeks like mine (in a non-agricultural area) would be of benefit to the impacted streams and beavers as well as to ranchers and farmers who are suffering financial losses from flood and crop damage.
- We could use a whole lot more beavers a whole lot less of the current knuckleheads that live in Oregon. They are absolutely vital to the health of our ecosystems with repercussions extending far beyond visible riparian alterations.
- I would love for the beaver population to rise in Oregon. My children have never seen one in the wild and to hear a beaver slap his tail on the water is amazing! I believe humans should do everything possible to keep from damaging any more wildlife habitat. There are definitely too many humans and not enough wildlife!
- I wouldn't want to have beavers on my property causing problems but as I stated I didn't think beavers would stay around people. Where they live I've only seen them in the wild building dams and playing in the waters.
- Common sense should prevail concerning beavers as well as all other wildlife. As humans, we have dominion over the rest of creation and should take responsibility seriously. Human needs should be first priority, but we should not neglect the needs of the rest of creation.
- As a young girl I had the pleasure of observing beavers and their activities in Canada while visiting my paternal grandparents who were avid hunters and very active in fishing. I watched them take down trees, swim, eat, and build lodges.

- Would love to have them down at the creek at the back of our property.
- I think it's a shame the I've lived in the "Beaver State" for over 20 years and have spent hundreds of hours in the woods along creeks and rivers and have only caught a glimpse of a beaver two times.
- I am eager to learn more and to know how the results of this survey are used. I am curious and always interested in wildlife and how I can be a good steward.
- I like beavers.
- Ironically, one of my first jobs out of undergrad was to help trap and relocate problem beavers for the forest service in Montana.
- Too much diverted irrigation- just to keep grass green! Beaver dams on our creek destroyed twice due to summer time irrigation and lack of downstream water. Only one house is dependent on irrigation for their livelihood- what a waste for wildlife- beaver and salmon. Owners need to be better educated as to use of available water and effects on wildlife.
- I feel beavers are an interesting animal and good little builders, but I know they can cause damage in some areas. I don't think we have any here. I don't want to see them destroyed or families separated.
- They are beautiful and necessary.
- Beavers should be left alone. If they cause nuisance trap them and take them in the wilderness. Oregon has areas.
- If we can entice humans to learn more and they would learn more about themselves.
- I have seen all types of beaver pond and habitat. If not managed they will destroy there one habitat and have to move on or die. They need to be managed and removed when necessary or trapped out when damage is done.
- The flooding they cause is short term; the flooding they prevent is long term. Redesign to accommodate them.
- Beavers should be left alone unless damage to property exists and handled on a case by case basis.
- I believe if beavers are doing harm to property they should be killed. People need to be able to make a living without these beavers, wolves, etc.
- Keep beavers in our streams and ponds! If they are a problem, relocate them (do not destroy them) they are a part of Oregon.
- Beavers are not the problem; government and its costs and liberal agenda are the problem.
- Beavers are great in the proper environment; but they can cause serious damage if left with no controls.
- Thanks for the opportunity to share my thoughts and feelings.
- I like to see them in the wild and have never had to co-exist with them. Action needs to be taken if property is damaged in the best interest of both the beavers and people.
- Kelly's Slough and Gold Ray Dam was a major beaver habitat. I don't think the animal life of the sloughs was considered enough in the decision to remove the dam.
- This is the beaver state. Let's keep it that way. They do have a legit purpose.
- If ODFW did their job - protect wetlands - then all of us would have had something to be proud of.
- At this point I have no issues with beavers and don't expect any here.
- I would hope there are plenty of areas other than farming/residential areas where they can exist.
- Again, there is a place for all animals and some places they don't belong.
- People in areas of conflict should have "way more" say in policy than people in non-conflict areas. Cougar and bear hunting policy is a great example. Beavers, not so much - mainly due to the aggression factor.
- I have done my share of managing beavers and lost plenty of trees to them. However, I was sad when the neighbors excavation caused a large flood that broke out the beaver dam on our property and destroyed their pond, resulting in no more beaver sightings here.
- Want to learn if they are okay. I saw oil floating on the pond 2 weeks ago. Never seen this before, worried about wildlife and the beavers.
- I'd like to see a nutria eradication campaign to eliminate potential competition with beavers. Very strong need to educate people about how to live with wildlife, specifically those who choose to live in wildlife habitat and those who complain.
- I would be interested in reading about the results of your study.
- Beavers are one of nature's most amazing keystone species and is major aquatic restoration focus in my profession. Finding ways to educate landowners and control damage in non-lethal ways should be the focus in Oregon.
- Populations should be at natural levels in Oregon.
- Beavers help balance human interference in the ecology of an area. They provide habitat and prevent run-off.
- Had beavers until clearcutting on forest land around my property 15 years ago.
- Let them live but not damage our homes.
- Our land includes a lagoon plus streams - perfect for relocation of beavers. We have 14+ acres of forest also - use our land and waterways!

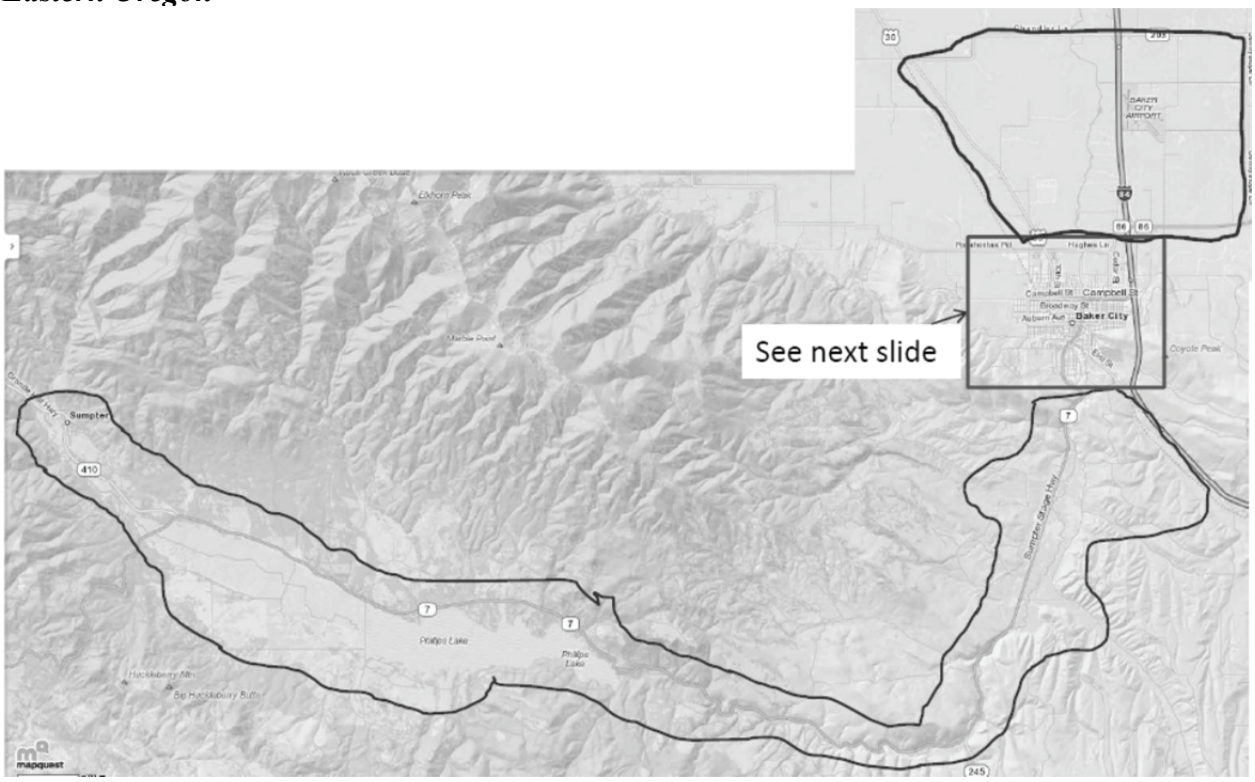
- I strongly oppose wildlife and habitat extinction, but feel society needs to pay the cost.
- I've noticed that when beavers come into an area and take up residence, the diversity of the wildlife increases.
- Beaver need areas to live and survive just as we do. If only someone or something could control our overpopulation, wildlife would not need to be controlled, captured or killed.
- I like beavers, but commercial landowners have rights if the beavers cause problems.
- Beavers and all wildlife should be left alone. They're just doing what they do naturally.
- I believe that humans don't know enough about why certain species live or how important they are to our world.
- I believe in animal rights - coexist as equals.
- Oregon history began because of frontiers searching for beaver. Then they realized what Gods country really was. But it was the beaver that brought people here.
- Beavers should be managed taking into account watersheds and disease control. Professional trappers only.
- They are one of God's creatures. Thanks for your time and effort.
- Get rid of raccoons instead.
- Beavers have damaged one bush on property, and I have seen two others.
- I support beaver rights. Attempt to relocate if problem.
- Saw first 2 beavers crossing road 2 weeks ago.
- We have beavers and have had no major problems - except a few downed trees caused by them.
- Thanks for doing this.
- I hope we can have some in our local environment that we can see and enjoy.
- I think they will all live together.
- Commercial trapping should be stopped.
- Educate people about the benefits of having beavers on or near land. We should help them not cut them off their land.
- Hate to see recreation areas closed because of beavers. I'd like landowners to be able to deal with troublesome beavers.
- Learned of wildlife from being around it all my life. Wildlife can exist with industry.
- There are signs of beavers activity along small river throughout our town. This is recent. More activity in countryside in past 10 years.
- Beavers have rights. Should be free in their habitat.
- Leave the beavers alone. They make better neighbors than most people.
- Would love to see a beaver.
- I believe all wildlife should be reserved but I do think beavers can be destructive.
- Around here beavers still have a lot of habitat there are hardly any trappers and they seem to be doing quite well.
- It's important for beavers and humans to coexist. Beavers are a keystone species.
- I have heard that to tear out beaver dam or lodge was illegal.
- Beavers should be managed and enjoyed because they create habitat for numerous other wildlife species.
- Get them controlled.
- I believe beavers are on indicator of healthy stream environment. In right places beavers can coexist with humans. Need to be controlled in residential areas though.
- Growing up I have seen beavers working. I also saw them raise their young.
- ODFW should be responsible as they don't allow landowners to manage beavers.
- Coexistence with beavers can be achieved. I need to follow through with appropriate agencies.
- I happen to deal with beavers in my work. Work for railroad. Can be destructive if populations are not controlled.
- Beaver taught salmon to jump.
- Landowners should be given more authority to manage wildlife problems on their property. Over regulation of wildlife has caused problems with predators.
- I enjoy seeing them in the wild and do not know of major destruction they caused, but I am sure there's a possibility if not controlled.
- Live in town, always enjoyed seeing wild beavers. Can be destructive locally. I have hunted and harvested a few beavers. Prefer live trapping and relocation - no leg hold traps.
- I'll take some!
- No protected species designation. Needs to be a balance for damage to private property.
- Beavers should exist, coexist. Can be destructive and installing devices to prevent this is important.
- Beavers were on my property, tried to reintroduce them, no luck. Probably good because of negative experiences with ODFW with wolves and elk.
- Keep beavers in western Oregon. The wolves are going to eat everything in the eastern part of the state.

- Beavers should be on national forest land, not agricultural land. I blew up many beaver homes in 31 years, they flooded my fields and crops.
- I don't think beavers would survive here long. I think some or most of my neighbors would trap or kill them.
- Would love to learn more about beavers and actually see some in the wild.
- Rural area, most damage to fruit trees or dams in irrigation ditches.
- I hope an effort will be made to restore and protect beaver in all of their native range.
- Everywhere I have seen beaver they are detrimental to fish and trees.
- Beavers are unlikely to venture onto this property as there are few trees. Create beaver habitat, but no wolves please.
- Manage Oregon wildlife as a renewable resource for the public and not animal rights first.
- Live in town adjacent to Powder River. Own 120 acres in Sumpter Valley. Beavers are and have been problem in town. No problem in rural areas.
- Beavers good in right places - need to be controlled where they could do damage.
- I like beavers, they create diverse environments. But they can be nuisance blocking ditches and cutting trees down.
- As long as they are not a nuisance they don't bother me.
- Beavers serve purpose, we must look at the big picture.
- Beaver should be transplanted only on public land or planted in remote areas of public land.
- Beavers are important for the environment. They belong in the woods and forests. They make bad neighbors if we try to coexist with them in suburban areas or around irrigation systems.
- Beavers in Baker County seem to be coming back in strong condition. Please don't let ODFW start managing them.
- Believe there is happy middle ground. Don't believe beaver populations are out of control.
- Part of our land is devoted to raising poplar trees. Not a good mix with beavers.
- I have lived close to beavers my entire life and have been in agriculture my entire life. I have never experienced a positive beaver experience. Less damaging on public lands.
- I had a lodge of beavers at my cabin. Really liked seeing them. Flooded last spring, now gone.
- Beavers have existed along our creek for many years and cut down most all the trees that grow along the creek. They don't use them for dams, just keep cutting them down.
- Beavers are important in the keeping of watersheds and animal habitat in marshes, estuaries in the larger tracts of land. They can be a problem in small acreages.
- No beavers living here. Don't think they should be introduced, but fine if naturally occur.
- Beavers that cause problems need to be managed by destroying them or relocating them. It's not about liking beavers or not.
- I enjoy watching them.
- Hard to make judgment calls about one beaver, might change if 10 beavers were here on my property though.
- I'm for more beavers and less people!
- People don't seem to get it about keeping water in the system longer or habitat diversity need for all living things.
- I think that the people who make decisions about how things are in wildlife all live in the big cities in their nice secure areas. We live with the wildlife every day and now I suppose you are going to tell me how to live in the county?
- I hope my kids will be able to see a live beaver in its natural form and area sometime in their lives.
- Leave the beavers alone as much as possible.
- Beavers have been here longer than humans. It cannot be said they are to be blamed for what they have done naturally for millions of years. Management is necessary, but unless damage is intolerable, non-lethal measures should be used appropriately.
- If I lived on a property with a beaver I would do anything to co-exist or re-locate. I do not believe in destroying animals for doing what is in their nature.
- Some wetlands/lakes are not too far from our house. I enjoy looking for the beavers when I walk our dogs on a path at the wetlands. We usually walk in the daytime, though and generally don't see the beavers.
- We live near a lake, stream and marshland, all impacted by flooding due to beaver dams. Highway 101 runs through our town, it has to be constantly maintained in spots to keep the area from flooding. Beavers have not come onto our property.
- Wildlife should be left alone with minimal human interference.
- You can relocate beavers at my place.
- We need to stop killing beavers on highways.
- I would love to see beavers, especially on our larger creeks.
- They belong here in Oregon. They were here first!
- We live on a hill and have no streams or water ponds, but live in a wetlands area. We love the wildlife around here and would do whatever we could to protect and preserve it.

- I would be happy to see a beaver, I would not be concerned if it chewed some trees, plugged culverts would be somewhat concerning, flooding crops and fields happens, a basement/building flooding would not be fun. I would not be afraid, I would be curious.
- Beavers are fascinating. They've caused some damage to our property, but we don't mind. They are a natural part of their environment. They were here first. We encroach on their territory.
- In my opinion ODFW is primarily interested in replenishing stocks of salmon and elk. They should be renamed ODSE, they caused the collapse of beaver because they only care about salmon and elk.
- They're beautiful, interesting creatures.
- Beavers are an important park of Oregon's history. They do serve a purpose and need to be protected but not to the detriment of the people living in and around water. If the beavers can make a new pond without destroying good land and property, more power to them.
- Beavers rule and I would get one on my land.
- I like beavers.
- ODFW has it in control.
- I would like for my grandchildren to see them.
- How about an elk survey?
- No one really knows how they would react to beavers on their property causing damage. But I believe that all animals have a right to be here and that people should try to coexist with them. I also believe they were here before humans. We owe them that much.
- I don't have beavers on my property but if I did I'd be concerned about my pets and wouldn't want them around.
- Beavers are wild critters that should be treated with respect, and although their activities cause concern for some, beavers should be treated with the most respect possible.
- They are smart and fascinating animals. I would like to learn more about them.
- As we live in an urban neighborhood at some distance from any bodies of water, we see raccoons, but never beavers.
- Beavers and all other wildlife should be allowed to co-exist with humans. Animals should not be displaced by humans. With proper planning, accommodation could be reached for both.
- I have seen a few at Johnson Creek-very exciting. Would love to participate in promoting greater habitat spread to increase beaver populations.
- They need to be kept in society and being able to coexist with humans.
- I love beavers!
- I enjoy seeing beavers, but not on my 100'x100' lot.
- We've noticed major increase in beaver activity in Johnson Creek.
- I would like to see more beavers in Oregon, whether they do damage or not. Oregon needs to get back to what it was long ago.
- Beavers are fun to watch and kayak with. I do not know of the issues around beavers.
- Let them be
- I like beavers, but would be upset if my basement flooded, regardless of the cause.
- Beavers would not live on my property as there is no open water.
- I live in Portland - within the city limits. Although I do have beavers within 2 miles.
- They are living in our watershed that our water system comes from and has no filter system for Beaver fever.
- I like beavers in the wild and under proper control. On my property there is no habitat for them but property below me has stream where they might live.
- Beavers like all wildlife have the right to exist. Maybe ranchers should get tax deductions for wildlife caused losses and damages.
- I don't want any in our area.
- Beavers should be in the high country, not in the area of homeowners due to damage the do.
- I find it amusing that we live in "The Beaver State" and people don't know about or care about them. If there was a beaver in my creek behind the house it would be very welcome.
- If people don't like wildlife pros/cons they can go live in a condo in town.
- For what reason would a beaver leave it's environment and go to a road or highway? Two years in a row I've seen a beaver dead on HWY 101 south of Neskowin.
- Love the "abstract presence" of beavers but would not be happy about them building a dam in the creek near my house, or destroying fruit trees.
- All animals are wonderful, but humans are more so. Humans should care for animals, but with balance.
- I used to watch beavers build dams, chew trees and look after them on my uncle's farm in upstate New York. I am very pro-beaver.

APPENDIX B: SAMPLING AREA MAPS

Eastern Oregon



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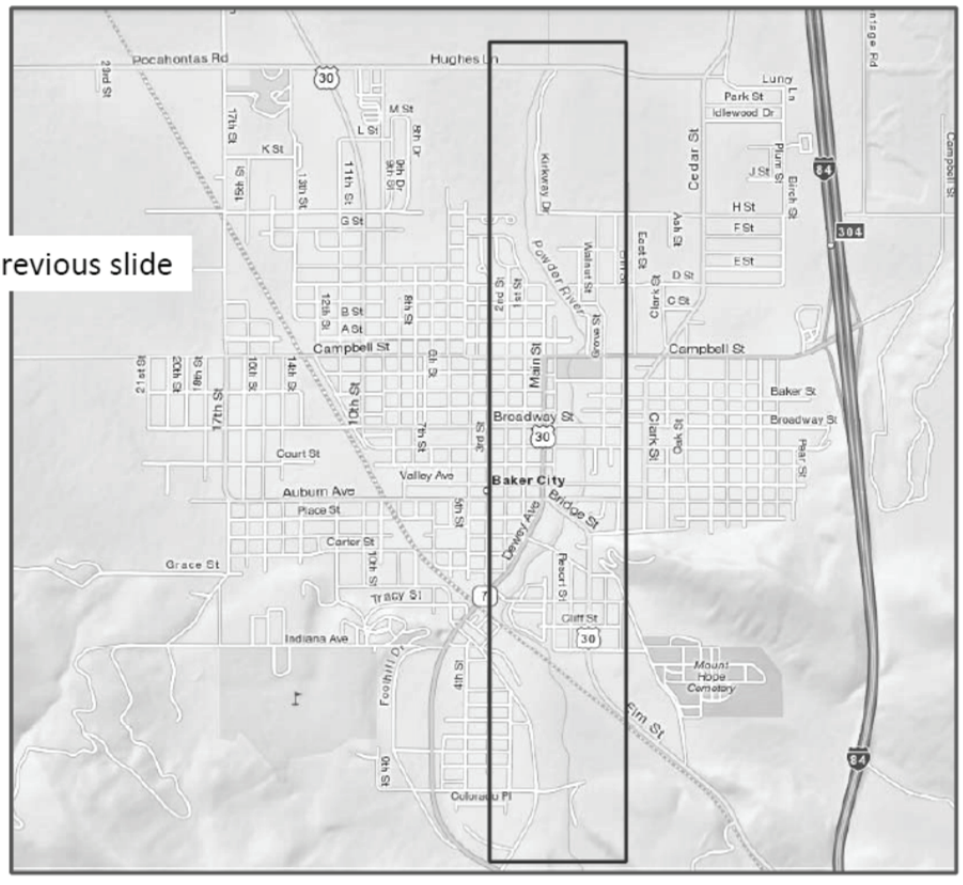
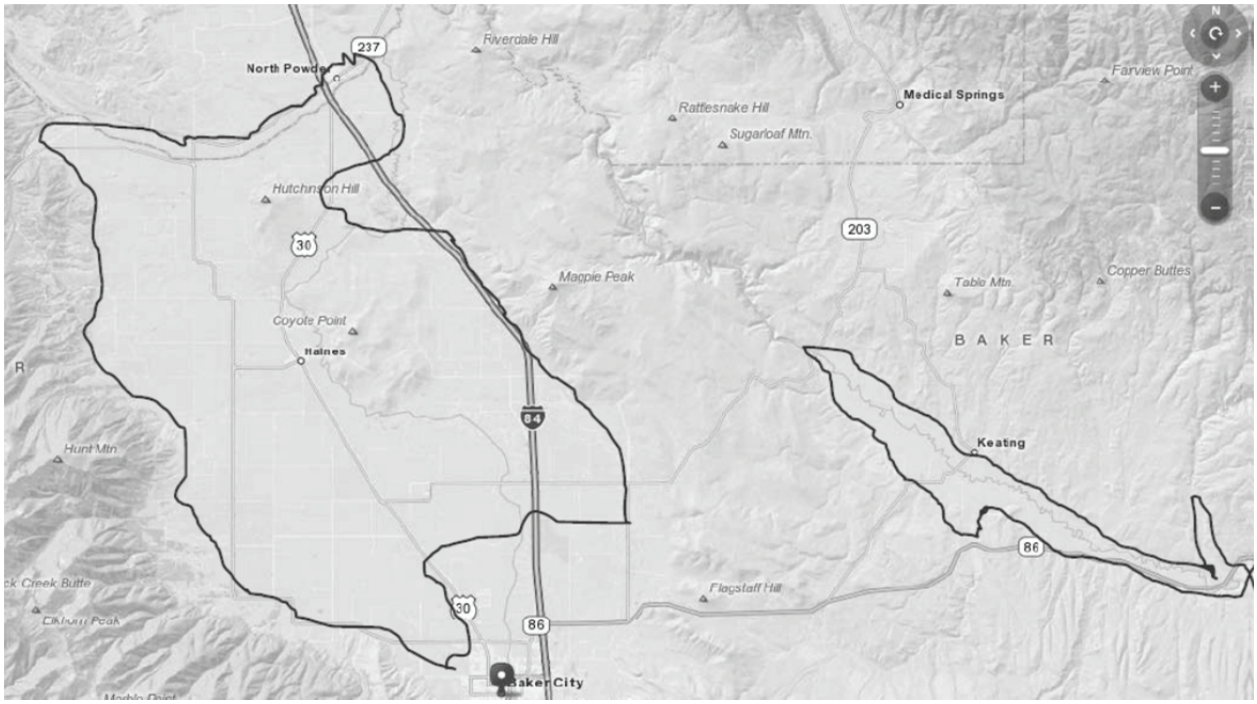
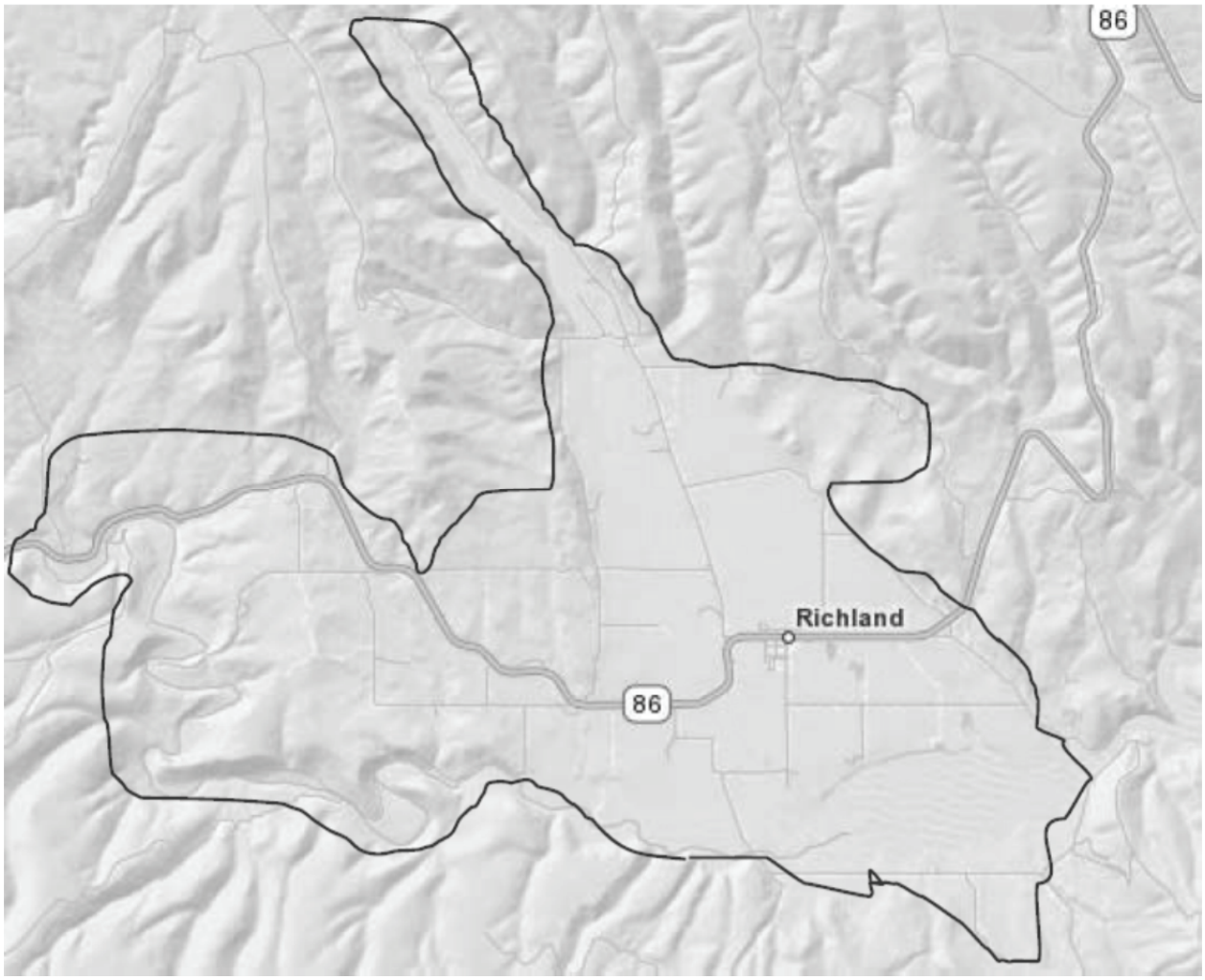
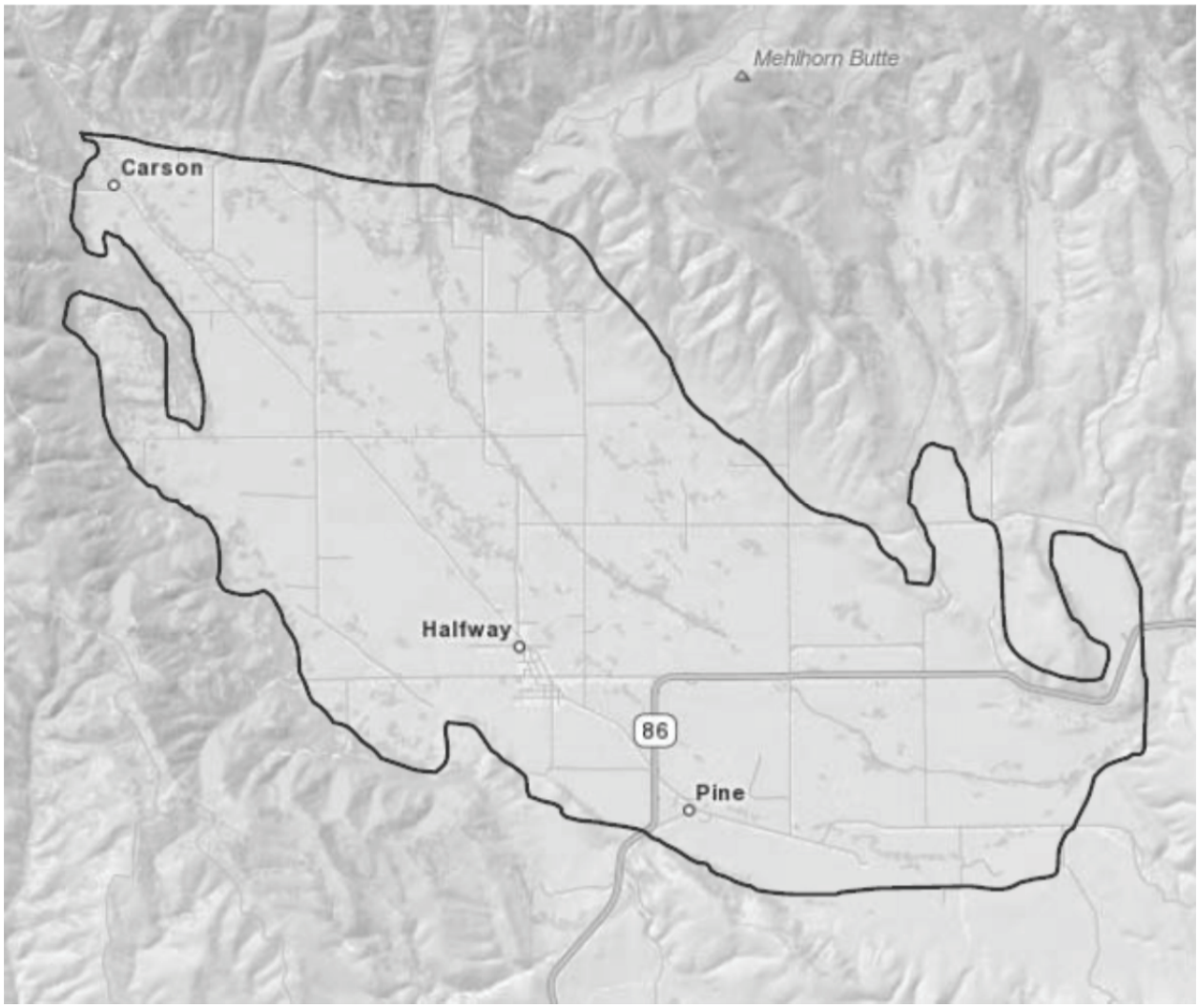


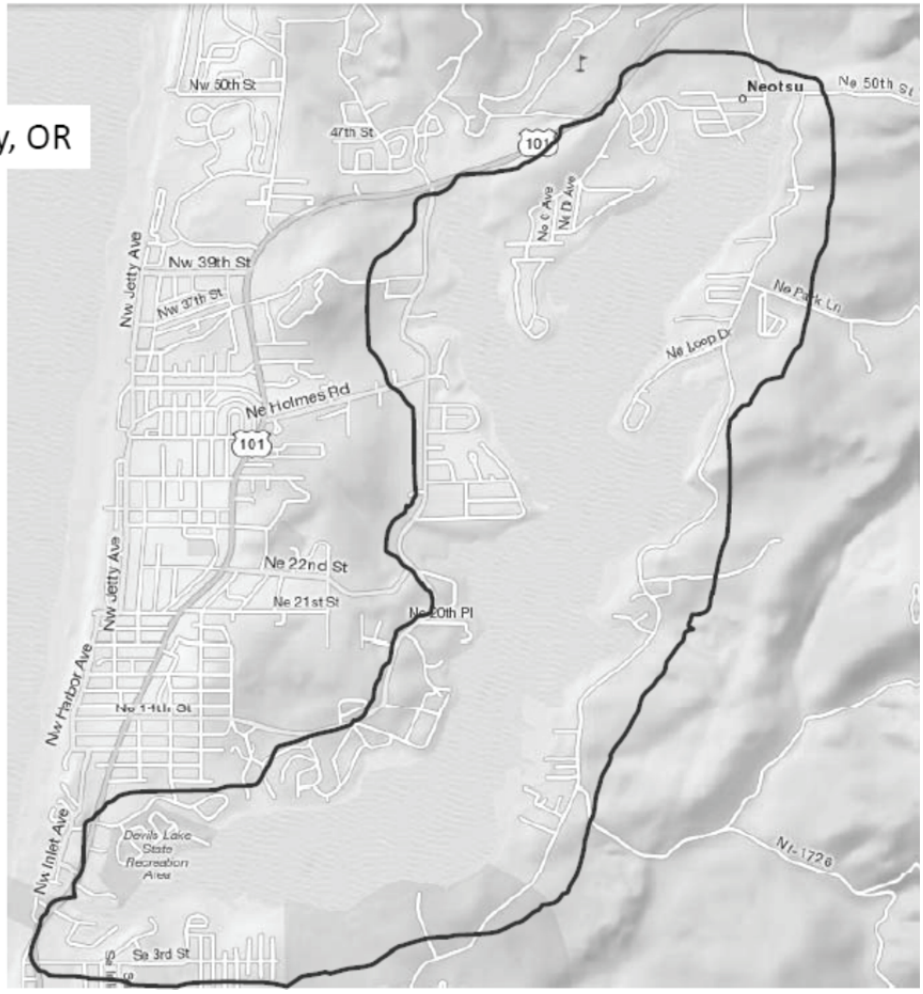

237
North Powder
Riverdale Hill
Rattlesnake Hill
Sugarloaf Mtn.
Medical Springs
Fairview Point
Hutchinson Hill
30
203
Magpie Peak
Table Mtn.
Copper Buttes
Coyote Point
Haines
B A K E R
84
Hunt Mtn.
Keating
86
Flagstaff Hill
30
86
Baker City


86
Richland
86

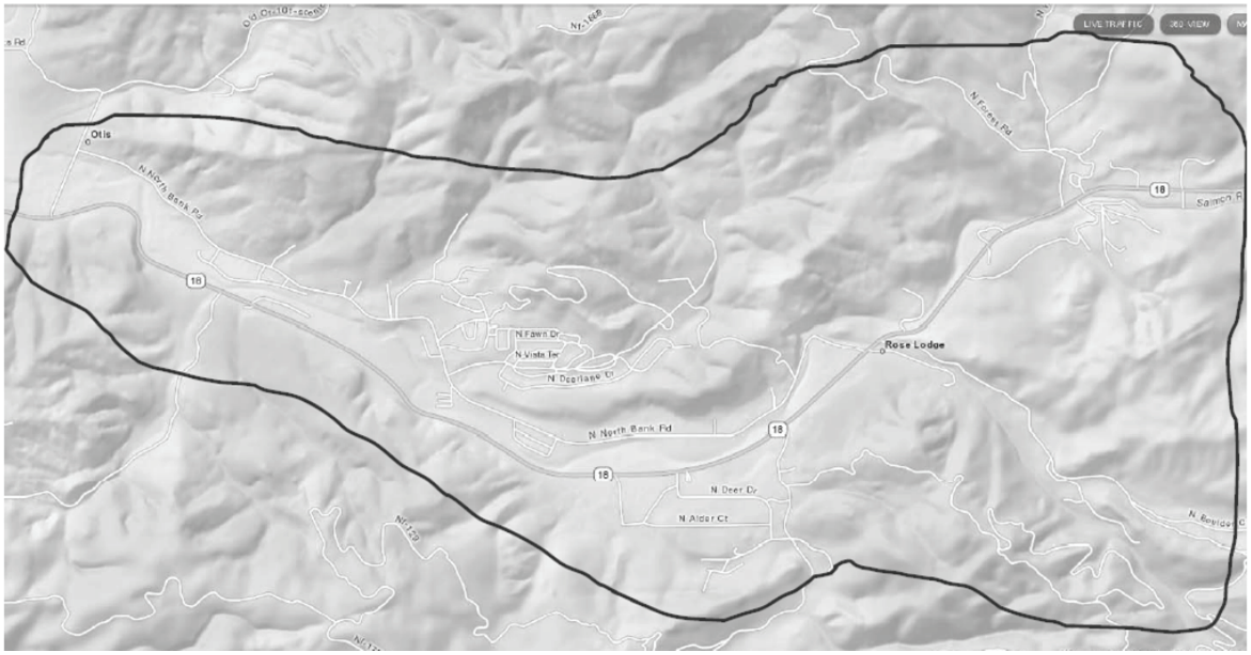

Mehlhorn Butte
Carson
Halfway
86
Pine

Coastal Oregon

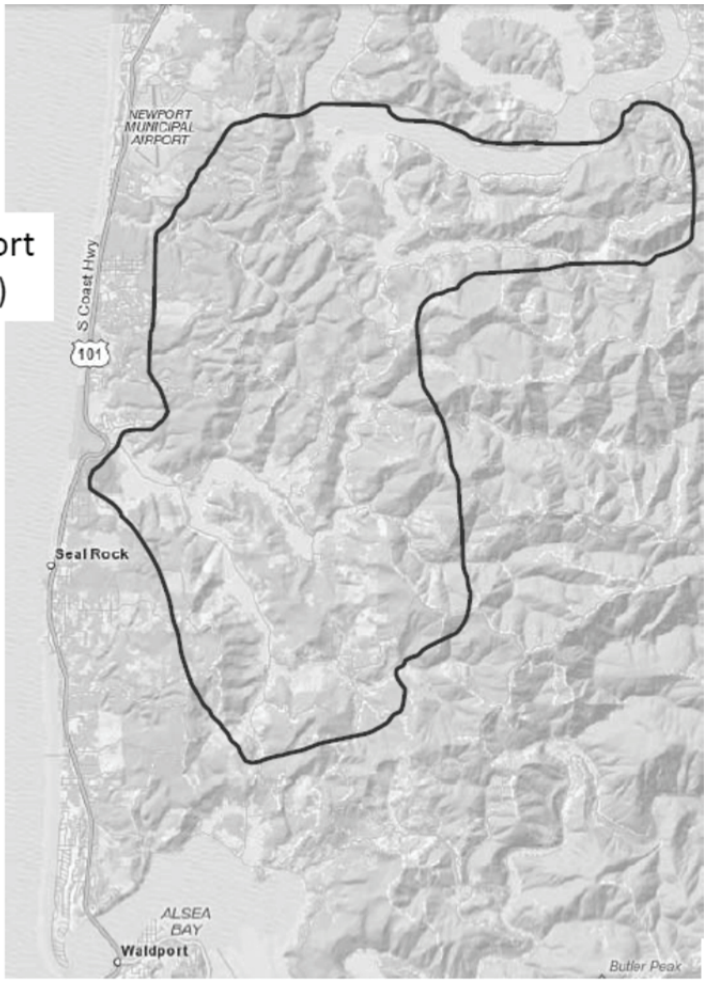
Lincoln City, OR

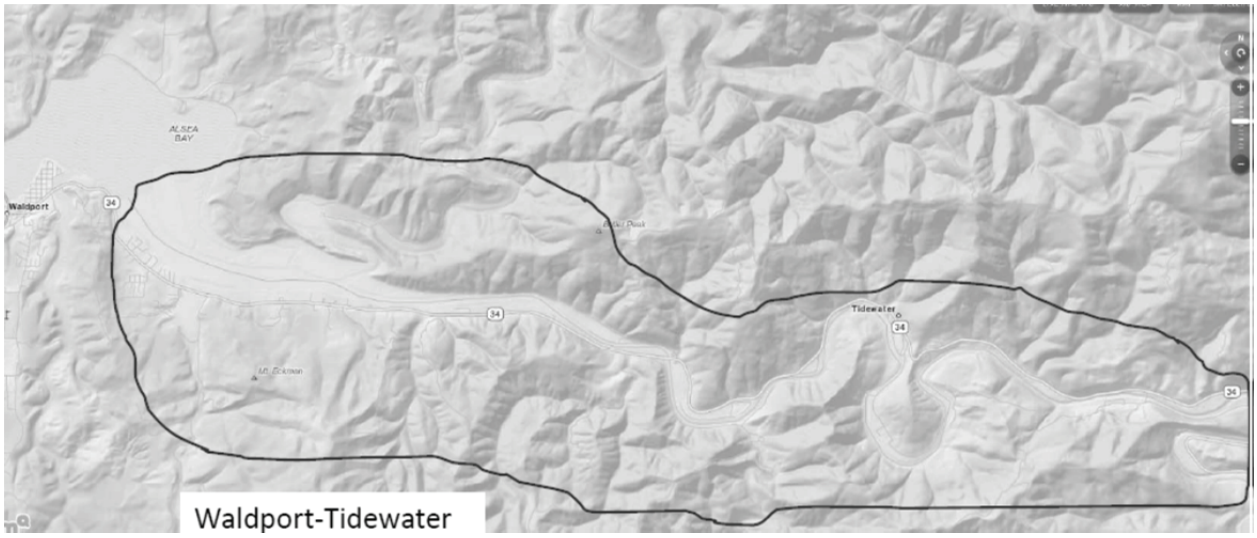


Otis and Rose Lodge area – NE of Lincoln City, and just east of HWY101-RTE18 intersection



Seal Rock-Newport
(east side of 101)

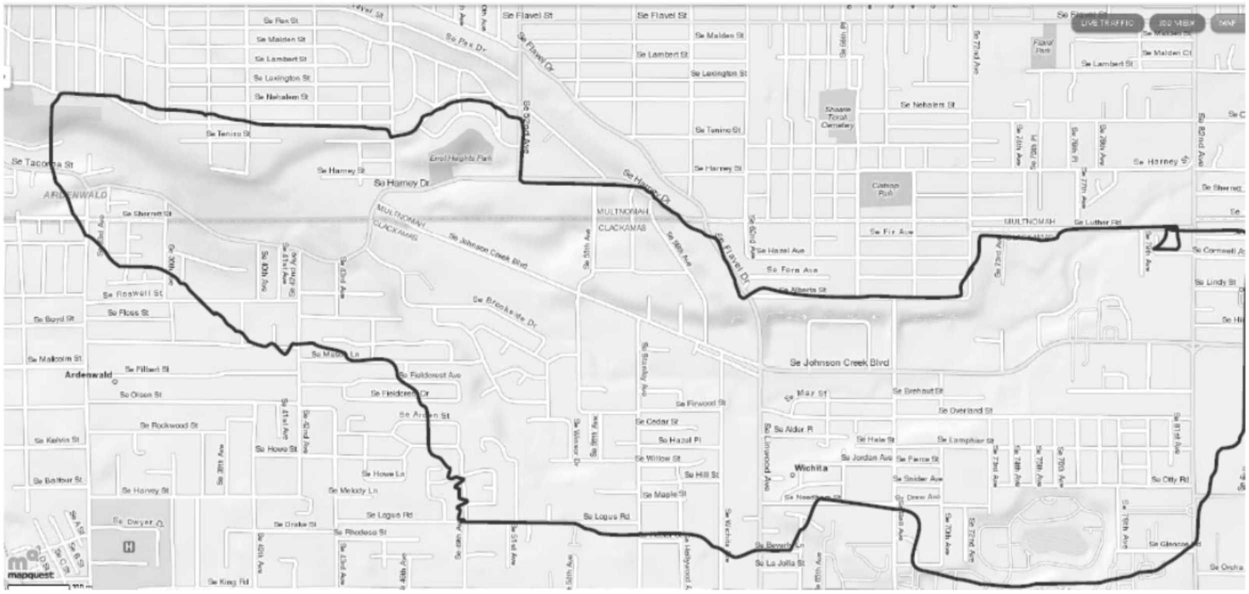




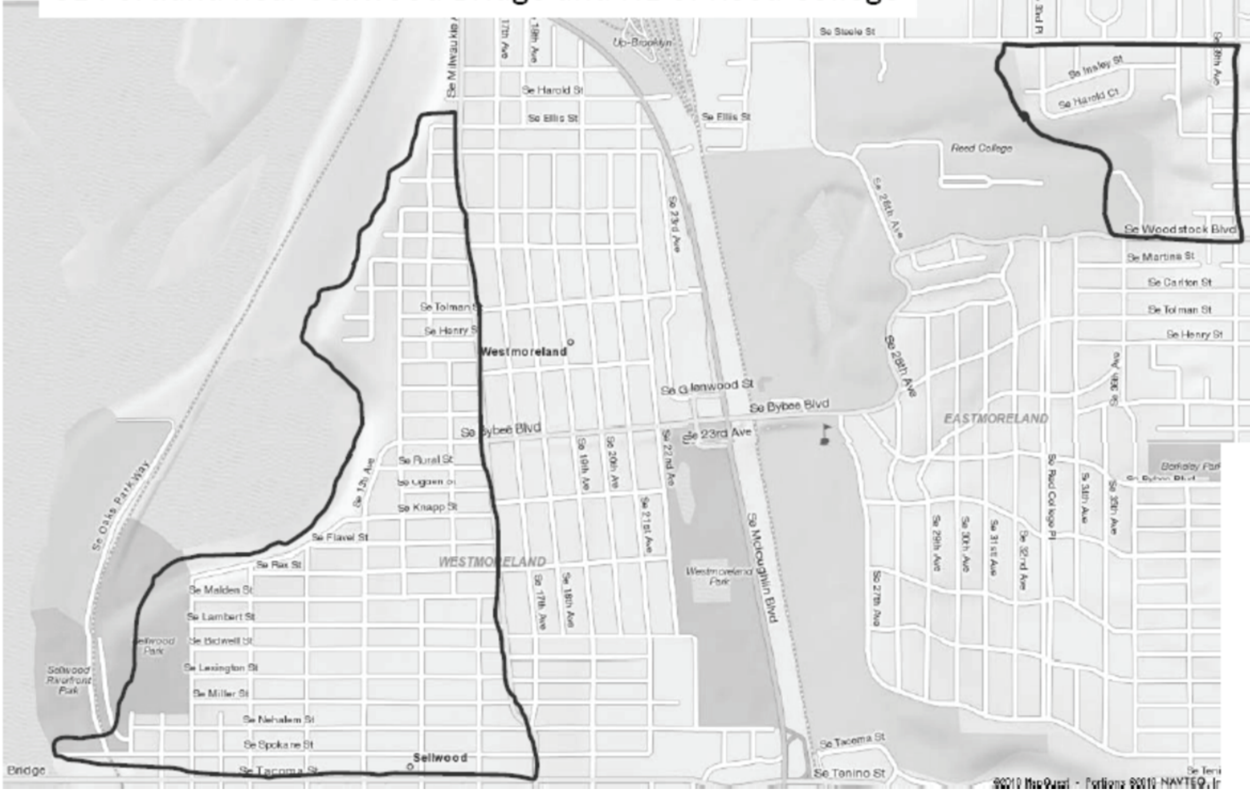
Waldport-Tidewater

Portland Metro, Oregon

SE Portland, along Johnson Creek

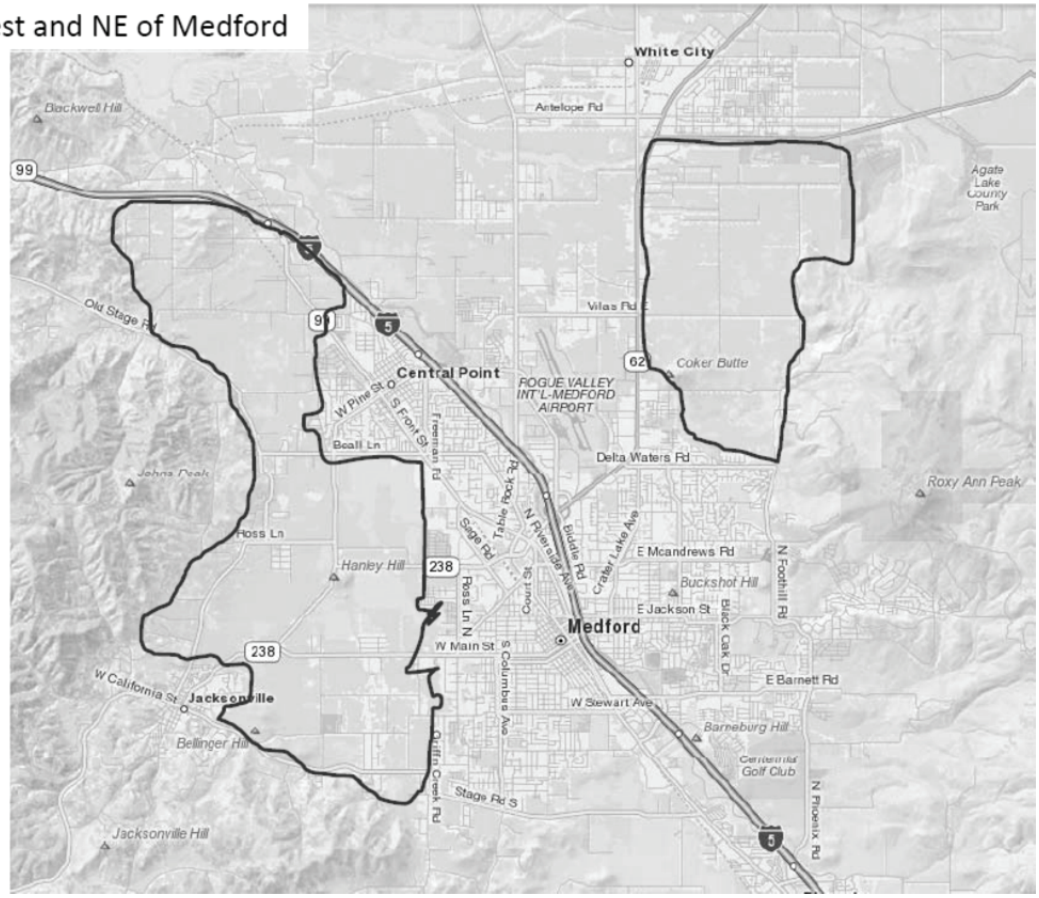


SE Portland near Sellwood Bridge and NE of Reed College

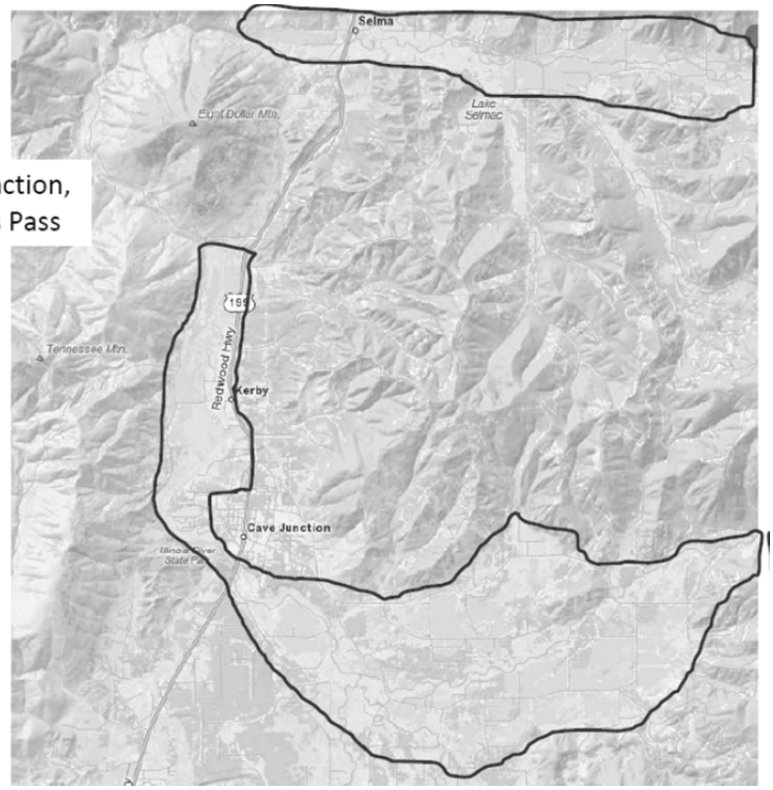


Southwest Oregon

West and NE of Medford



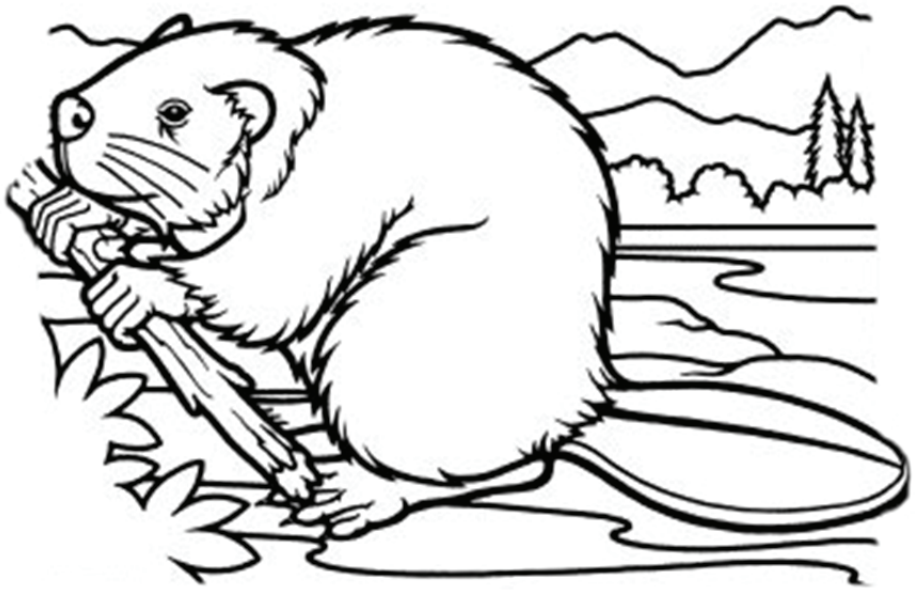
Selma-Cave Junction, south of Grants Pass



APPENDIX C: MAIL QUESTIONNAIRE

Your Opinions About Beavers in Oregon

Important Questions for Oregonians



Please Complete this Survey and Return it in the Envelope as Soon as Possible

Participation is Voluntary and Responses are Anonymous

Thank You for Your Participation

A Study Conducted Cooperatively by:

OREGON Fish & Wildlife

OREGON WATERSHED ENHANCEMENT BOARD OWEB

OSU Oregon State University

We are conducting this survey to learn about your opinions about beavers and their habitat in Oregon. Your input is important and will assist natural resource managers. ***Please complete this survey and return it in the addressed postage-paid envelope.***

1. Before receiving this questionnaire, did you know that there are beavers living in Oregon? **(check *ONE*)** ☐ No ☐ Yes

2. How often have you seen beavers in the wild? **(check *ONE*)**
☐ Never ☐ Once ☐ 2 to 5 times ☐ 6 to 10 times ☐ More than 10 times

3. How interested would you be in seeing beavers on your property or neighboring properties? **(check *ONE*)**
☐ Not at all Interested ☐ Slightly Interested ☐ Moderately Interested ☐ Extremely Interested

4. How often have you actually seen beavers on your property or neighboring properties? **(check *ONE*)**
☐ Never ☐ Once ☐ 2 to 5 times ☐ 6 to 10 times ☐ More than 10 times

5. How interested would you be in having beavers living on your property or neighboring properties? **(check *ONE*)**
☐ Not at all Interested ☐ Slightly Interested ☐ Moderately Interested ☐ Extremely Interested

6. Currently, are there beavers living on your property or neighboring properties? **(check *ONE*)** ☐ No ☐ Yes ☐ Unsure

7. Please indicate on each of the following scales ***how you generally feel about beavers***. **(circle one number for *EACH*)**

Dislike	1	2	3	4	5	Like
Bad	1	2	3	4	5	Good
Disfavor	1	2	3	4	5	Favor
Negative	1	2	3	4	5	Positive
Harmful	1	2	3	4	5	Beneficial

8. To what extent do you disagree or agree with each of the following statements? **(circle one number for *EACH*)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Beavers have a right to exist regardless of any damage they cause.	1	2	3	4	5
Beavers are a sign of a healthy environment.	1	2	3	4	5
I may never see a beaver, but it is important to me that they exist.	1	2	3	4	5
I would get enjoyment from seeing beavers.	1	2	3	4	5
Beaver populations should be left alone.	1	2	3	4	5
No beaver should be destroyed.	1	2	3	4	5
People should be willing to tolerate some conflicts with beavers.	1	2	3	4	5
Beavers create wetlands that benefit other living things.	1	2	3	4	5
Beavers are a nuisance animal.	1	2	3	4	5
I am afraid of beavers.	1	2	3	4	5
Beaver damage to roads or other property is a major problem.	1	2	3	4	5
Beaver populations should be controlled.	1	2	3	4	5

9. Please indicate if you believe that each of the following statements related to beavers is true or false. **(circle a letter for *EACH*)**

	True	False
Historically, Oregon generally has had a large beaver population.	T	F
Historically, beavers were almost eliminated in Oregon because of the value of their furs or pelts.	T	F
Beavers typically live in waters such as ponds, marshes, or streams.	T	F
Beavers build both dams and lodges.	T	F
Beavers do not eat fish.	T	F
Beavers must chew on wood because their teeth do not stop growing.	T	F
Beavers have webbed feet.	T	F
Beaver dams can create ponds that help replenish groundwater supplies.	T	F
Beaver dams can create ponds that are important for fish such as salmon.	T	F
Beaver dams can create wetlands that are important for other living things besides fish.	T	F

10. ***If beavers were present on your property or neighboring properties***, how concerned would you be about each of the following? **(circle one number for *EACH*)**

	Not at all Concerned		Slightly Concerned		Moderately Concerned			Extremely Concerned	
Your own personal health or safety.	0	1	2	3	4	5	6	7	8
Health or safety of children.	0	1	2	3	4	5	6	7	8
Health or safety of pets.	0	1	2	3	4	5	6	7	8
Spread of diseases by beavers.	0	1	2	3	4	5	6	7	8
Potential damage to your own property by beavers.	0	1	2	3	4	5	6	7	8
Potential damage to neighboring properties by beavers.	0	1	2	3	4	5	6	7	8

11. How often have beavers caused damage to your property or neighboring properties? **(check *ONE*)**

☐ Never ☐ Once or Twice ☐ Sometimes ☐ Many Times

12. To what extent do you consider beavers to be a problem on your property or neighboring properties? **(check *ONE*)**

☐ Not a Problem ☐ Slight Problem ☐ Moderate Problem ☐ Extreme Problem

13. To what extent do you disagree or agree with each of the following statements? **(circle one number for *EACH*)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Beavers are common on my property or neighboring properties.	1	2	3	4	5
There are too many beavers on my property or neighboring properties.	1	2	3	4	5
The number of beavers on my property or neighboring properties has increased over time.	1	2	3	4	5
Beavers are destroying trees or other vegetation on my property or neighboring properties.	1	2	3	4	5
Beavers are damaging other items on my property or neighboring properties (for example: driveway, flooding).	1	2	3	4	5
Beaver damage on my property or neighboring properties has increased over time.	1	2	3	4	5
I do not want beavers on my property or neighboring properties.	1	2	3	4	5

14. How ***often*** have beavers caused each of the following on your property or neighboring properties?
(circle one number for *EACH*)

	Never	Once or Twice	Sometimes	Many Times
Overflow of a pond, lake, or stream.	0	1	2	3
Flooding of a road or driveway.	0	1	2	3
Flooding of crops or fields.	0	1	2	3
Flooding of a basement or other building.	0	1	2	3
Flooding of a well or septic system.	0	1	2	3
Damage to trees.	0	1	2	3
Damage to flowers or bushes.	0	1	2	3
Damage to culverts (for example: plugged pipes, bank erosion).	0	1	2	3
Other (write response) _____.	0	1	2	3

15. To what extent would it be a ***problem*** if beavers caused each of the following on your property or neighboring properties?
(circle one number for *EACH*)

	Not a Problem	Slight Problem	Moderate Problem	Extreme Problem
Overflow of a pond, lake, or stream.	0	1	2	3
Flooding of a road or driveway.	0	1	2	3
Flooding of crops or fields.	0	1	2	3
Flooding of a basement or other building.	0	1	2	3
Flooding of a well or septic system.	0	1	2	3
Damage to trees.	0	1	2	3
Damage to flowers or bushes.	0	1	2	3
Damage to culverts (for example: plugged pipes, bank erosion).	0	1	2	3
Other (write response) _____.	0	1	2	3

16. How often have you taken each of the following actions to deal with beavers on your property or neighboring properties?
(circle one number for *EACH*)

	Never	Once or Twice	Sometimes	Many Times
Contacted wildlife agencies about how to deal with beavers.	0	1	2	3
Contacted other groups about how to deal with beavers.	0	1	2	3
Wrapped trees with materials to prevent beavers from chewing them.	0	1	2	3
Installed other exclusion devices such as fences or screens.	0	1	2	3
Installed control devices such as water control pipes.	0	1	2	3
Frightened beavers away myself.	0	1	2	3
Removed beaver dams or lodges myself.	0	1	2	3
Captured and relocated beavers myself.	0	1	2	3
Destroyed beavers myself (lethal control).	0	1	2	3
Hired animal control personnel to remove beavers.	0	1	2	3
Asked a regulated trapper to remove beavers.	0	1	2	3
Other (write response) _____.	0	1	2	3

The next 6 shaded boxes contain ***hypothetical scenarios*** related to beavers. ***NO TWO SCENARIOS ARE THE SAME***.
Carefully read each scenario and then please answer the questions after EACH scenario.

Scenario 1: A beaver is seen on your property or neighboring properties, but has *not* caused any impacts or damage.

17. Please indicate on each of the following scales how you would react to Scenario 1. **(circle one number for *EACH*)**

Unhappy	1	2	3	4	5	Happy
Not Excited	1	2	3	4	5	Excited
Not Curious	1	2	3	4	5	Curious
Frightened	1	2	3	4	5	Not Frightened
Angry	1	2	3	4	5	Not Angry

18. Without learning more detail, who would you assume is responsible for Scenario 1? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for being in the area.	0	1	2	3
Wildlife agencies for not controlling beaver populations.	0	1	2	3
Yourself as the resident involved in the situation.	0	1	2	3
Neighbors or others in the area involved in the situation.	0	1	2	3

19. How unacceptable or acceptable would it be to take each of the following actions for Scenario 1? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	1	2	3	4	5
Inform landowners about how to coexist with the beaver.	1	2	3	4	5
Wrap trees to prevent the beaver from chewing trees.	1	2	3	4	5
Install fences or screens to prevent beaver damage.	1	2	3	4	5
Install control devices such as water control pipes.	1	2	3	4	5
Remove any beaver dams or lodges in the area.	1	2	3	4	5
Capture and relocate the beaver to another location.	1	2	3	4	5
Frighten the beaver away.	1	2	3	4	5
Destroy the beaver (lethal control).	1	2	3	4	5

20. Given Scenario 1, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	1	2	3	4	5
Experts visit your home to provide technical information.	1	2	3	4	5
Experts plant trees near your home for food / shelter for beavers.	1	2	3	4	5
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	1	2	3	4	5
Financial compensation for *fixing* any potential future damage caused by the beaver.	1	2	3	4	5
Financial compensation for *preventing* future beaver damage.	1	2	3	4	5
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	1	2	3	4	5

Scenario 2: A beaver chews down some trees on your property or neighboring properties.

21. Please indicate on each of the following scales how you would react to Scenario 2. **(circle one number for *EACH*)**

Unhappy	1	2	3	4	5	Happy
Not Excited	1	2	3	4	5	Excited
Not Curious	1	2	3	4	5	Curious
Frightened	1	2	3	4	5	Not Frightened
Angry	1	2	3	4	5	Not Angry

22. Without learning more detail, who would you assume is responsible for Scenario 2? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	0	1	2	3
Wildlife agencies for not controlling beaver populations.	0	1	2	3
Yourself as the resident involved in the situation.	0	1	2	3
Neighbors or others in the area involved in the situation.	0	1	2	3

23. How unacceptable or acceptable would it be to take each of the following actions for Scenario 2? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	1	2	3	4	5
Inform landowners about how to coexist with the beaver.	1	2	3	4	5
Wrap trees to prevent the beaver from chewing trees.	1	2	3	4	5
Install fences or screens to prevent beaver damage.	1	2	3	4	5
Install control devices such as water control pipes.	1	2	3	4	5
Remove any beaver dams or lodges in the area.	1	2	3	4	5
Capture and relocate the beaver to another location.	1	2	3	4	5
Frighten the beaver away.	1	2	3	4	5
Destroy the beaver (lethal control).	1	2	3	4	5

24. Given Scenario 2, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	1	2	3	4	5
Experts visit your home to provide technical information.	1	2	3	4	5
Experts plant trees near your home for food / shelter for beavers.	1	2	3	4	5
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	1	2	3	4	5
Financial compensation for *fixing* damage caused by the beaver.	1	2	3	4	5
Financial compensation for *preventing* future beaver damage.	1	2	3	4	5
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	1	2	3	4	5

Scenario 3: A beaver plugs culverts on your property or neighboring properties causing damage to pipes, erosion, and ponds or streams to overflow.

25. Please indicate on each of the following scales how you would react to Scenario 3. **(circle one number for *EACH*)**

Unhappy	1	2	3	4	5	Happy
Not Excited	1	2	3	4	5	Excited
Not Curious	1	2	3	4	5	Curious
Frightened	1	2	3	4	5	Not Frightened
Angry	1	2	3	4	5	Not Angry

26. Without learning more detail, who would you assume is responsible for Scenario 3? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	0	1	2	3
Wildlife agencies for not controlling beaver populations.	0	1	2	3
Yourself as the resident involved in the situation.	0	1	2	3
Neighbors or others in the area involved in the situation.	0	1	2	3

27. How unacceptable or acceptable would it be to take each of the following actions for Scenario 3? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	1	2	3	4	5
Inform landowners about how to coexist with the beaver.	1	2	3	4	5
Wrap trees to prevent the beaver from chewing trees.	1	2	3	4	5
Install fences or screens to prevent beaver damage.	1	2	3	4	5
Install control devices such as water control pipes.	1	2	3	4	5
Remove any beaver dams or lodges in the area.	1	2	3	4	5
Capture and relocate the beaver to another location.	1	2	3	4	5
Frighten the beaver away.	1	2	3	4	5
Destroy the beaver (lethal control).	1	2	3	4	5

28. Given Scenario 3, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	1	2	3	4	5
Experts visit your home to provide technical information.	1	2	3	4	5
Experts plant trees near your home for food / shelter for beavers.	1	2	3	4	5
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	1	2	3	4	5
Financial compensation for *fixing* damage caused by the beaver.	1	2	3	4	5
Financial compensation for *preventing* future beaver damage.	1	2	3	4	5
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	1	2	3	4	5

Scenario 4: A beaver floods a road or driveway on your property or neighboring properties.

29. Please indicate on each of the following scales how you would react to Scenario 4. **(circle one number for *EACH*)**

Unhappy	1	2	3	4	5	Happy
Not Excited	1	2	3	4	5	Excited
Not Curious	1	2	3	4	5	Curious
Frightened	1	2	3	4	5	Not Frightened
Angry	1	2	3	4	5	Not Angry

30. Without learning more detail, who would you assume is responsible for Scenario 4? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	0	1	2	3
Wildlife agencies for not controlling beaver populations.	0	1	2	3
Yourself as the resident involved in the situation.	0	1	2	3
Neighbors or others in the area involved in the situation.	0	1	2	3

31. How unacceptable or acceptable would it be to take each of the following actions for Scenario 4? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	1	2	3	4	5
Inform landowners about how to coexist with the beaver.	1	2	3	4	5
Wrap trees to prevent the beaver from chewing trees.	1	2	3	4	5
Install fences or screens to prevent beaver damage.	1	2	3	4	5
Install control devices such as water control pipes.	1	2	3	4	5
Remove any beaver dams or lodges in the area.	1	2	3	4	5
Capture and relocate the beaver to another location.	1	2	3	4	5
Frighten the beaver away.	1	2	3	4	5
Destroy the beaver (lethal control).	1	2	3	4	5

32. Given Scenario 4, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	1	2	3	4	5
Experts visit your home to provide technical information.	1	2	3	4	5
Experts plant trees near your home for food / shelter for beavers.	1	2	3	4	5
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	1	2	3	4	5
Financial compensation for *fixing* damage caused by the beaver.	1	2	3	4	5
Financial compensation for *preventing* future beaver damage.	1	2	3	4	5
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	1	2	3	4	5

Scenario 5: A beaver floods crops or fields on your property or neighboring properties.

33. Please indicate on each of the following scales how you would react to Scenario 5. **(circle one number for *EACH*)**

Unhappy	1	2	3	4	5	Happy
Not Excited	1	2	3	4	5	Excited
Not Curious	1	2	3	4	5	Curious
Frightened	1	2	3	4	5	Not Frightened
Angry	1	2	3	4	5	Not Angry

34. Without learning more detail, who would you assume is responsible for Scenario 5? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	0	1	2	3
Wildlife agencies for not controlling beaver populations.	0	1	2	3
Yourself as the resident involved in the situation.	0	1	2	3
Neighbors or others in the area involved in the situation.	0	1	2	3

35. How unacceptable or acceptable would it be to take each of the following actions for Scenario 5? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	1	2	3	4	5
Inform landowners about how to coexist with the beaver.	1	2	3	4	5
Wrap trees to prevent the beaver from chewing trees.	1	2	3	4	5
Install fences or screens to prevent beaver damage.	1	2	3	4	5
Install control devices such as water control pipes.	1	2	3	4	5
Remove any beaver dams or lodges in the area.	1	2	3	4	5
Capture and relocate the beaver to another location.	1	2	3	4	5
Frighten the beaver away.	1	2	3	4	5
Destroy the beaver (lethal control).	1	2	3	4	5

36. Given Scenario 5, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	1	2	3	4	5
Experts visit your home to provide technical information.	1	2	3	4	5
Experts plant trees near your home for food / shelter for beavers.	1	2	3	4	5
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	1	2	3	4	5
Financial compensation for *fixing* damage caused by the beaver.	1	2	3	4	5
Financial compensation for *preventing* future beaver damage.	1	2	3	4	5
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	1	2	3	4	5

Scenario 6: A beaver floods a basement, building, or other structure on your property or neighboring properties.

37. Please indicate on each of the following scales how you would react to Scenario 6. **(circle one number for *EACH*)**

Unhappy	1	2	3	4	5	Happy
Not Excited	1	2	3	4	5	Excited
Not Curious	1	2	3	4	5	Curious
Frightened	1	2	3	4	5	Not Frightened
Angry	1	2	3	4	5	Not Angry

38. Without learning more detail, who would you assume is responsible for Scenario 6? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	0	1	2	3
Wildlife agencies for not controlling beaver populations.	0	1	2	3
Yourself as the resident involved in the situation.	0	1	2	3
Neighbors or others in the area involved in the situation.	0	1	2	3

39. How unacceptable or acceptable would it be to take each of the following actions for Scenario 6? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	1	2	3	4	5
Inform landowners about how to coexist with the beaver.	1	2	3	4	5
Wrap trees to prevent the beaver from chewing trees.	1	2	3	4	5
Install fences or screens to prevent beaver damage.	1	2	3	4	5
Install control devices such as water control pipes.	1	2	3	4	5
Remove any beaver dams or lodges in the area.	1	2	3	4	5
Capture and relocate the beaver to another location.	1	2	3	4	5
Frighten the beaver away.	1	2	3	4	5
Destroy the beaver (lethal control).	1	2	3	4	5

40. Given Scenario 6, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	1	2	3	4	5
Experts visit your home to provide technical information.	1	2	3	4	5
Experts plant trees near your home for food / shelter for beavers.	1	2	3	4	5
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	1	2	3	4	5
Financial compensation for *fixing* damage caused by the beaver.	1	2	3	4	5
Financial compensation for *preventing* future beaver damage.	1	2	3	4	5
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	1	2	3	4	5

41. Who do you think ***should be*** responsible for addressing problems with wildlife such as beavers on your property or neighboring properties? **(check *ALL THAT APPLY*)**

- ☐ Local or county agencies
- ☐ State agencies such as Oregon Department of Fish and Wildlife
- ☐ Federal agencies such as U.S. Fish and Wildlife Service
- ☐ Animal control personnel
- ☐ Citizen groups
- ☐ Individual residents experiencing the problem
- ☐ Regulated trappers
- ☐ Other (write response) _____

42. The Oregon Department of Fish and Wildlife is currently responsible for managing most wildlife issues in Oregon. To what extent do you disagree or agree with each of the following statements about this agency? **(circle a number for *EACH*)**

I feel that the Oregon Department of Fish and Wildlife …	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
… shares similar values as I do.	1	2	3	4	5
… shares similar opinions as I do.	1	2	3	4	5
… shares similar goals as I do.	1	2	3	4	5
… thinks in a similar way as I do.	1	2	3	4	5
… takes similar actions as I would.	1	2	3	4	5

43. To what extent do you disagree or agree with each of the following statements? **(circle one number for *EACH*)**

I trust the Oregon Department of Fish and Wildlife to …	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
… provide the best available information about wildlife issues.	1	2	3	4	5
… provide timely information about wildlife issues.	1	2	3	4	5
… provide truthful information about wildlife issues.	1	2	3	4	5
… provide me with enough information to decide what actions I should take regarding wildlife.	1	2	3	4	5
… use the best available science to inform management of wildlife.	1	2	3	4	5
… use public input to inform management of wildlife.	1	2	3	4	5
… make good decisions regarding management of wildlife.	1	2	3	4	5
… properly address wildlife issues.	1	2	3	4	5

44. Please tell us what you would like to know about beavers, their impacts, and / or how to coexist with them. **(write response)**

_____

_____

45. By what means, if any, would you prefer to receive any information about beavers in Oregon? **(check *ALL THAT APPLY*)**

- ☐ Newspapers
- ☐ Magazines
- ☐ Pamphlet / brochure
- ☐ Television news
- ☐ Other television program
- ☐ Radio
- ☐ Compact disk or DVD
- ☐ VCR tape
- ☐ Government agency internet website
- ☐ Other internet website
- ☐ E-mail
- ☐ Public information meeting / session
- ☐ Conservation / environmental groups
- ☐ Other (write response) _____
- ☐ I do not need information about beavers

46. To what extent do you disagree or agree with each of the following statements? **(circle one number for ***EACH***)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Humans should manage wildlife so that *only* humans benefit.	1	2	3	4	5
It is important for humans to control wildlife populations.	1	2	3	4	5
It is acceptable for human uses to cause the loss of some wild animals as long as wildlife populations are not jeopardized.	1	2	3	4	5
If wildlife populations are not threatened, we should use wildlife to add to the quality of human life.	1	2	3	4	5
The needs of humans are more important than the needs of wildlife.	1	2	3	4	5
The primary value of wildlife is to provide benefits for humans.	1	2	3	4	5
Wildlife exists primarily to be used by humans.	1	2	3	4	5
The rights of wildlife are more important than human uses of wildlife.	1	2	3	4	5
Wildlife should be protected for their own sake rather than to simply meet the needs of humans.	1	2	3	4	5
People should not be allowed to use wildlife for any reason.	1	2	3	4	5
I care about wildlife as much as I do other people.	1	2	3	4	5
Wildlife are like family so they should be protected.	1	2	3	4	5
We should focus on doing what is best for wildlife instead of what is best for humans.	1	2	3	4	5
People should not treat wildlife in ways that cause pain or suffering to wildlife, no matter how much humans benefit.	1	2	3	4	5
If we cannot minimize pain or suffering caused to wildlife by human activities, then we should not allow those activities.	1	2	3	4	5
Humans should be allowed to cause some short-term pain or suffering to wildlife as long as humans benefit.	1	2	3	4	5

47. To what extent do you disagree or agree with each of the following statements? **(circle one number for ***EACH***)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Having wildlife around my home is important to me.	1	2	3	4	5
I enjoy seeing wildlife around my home.	1	2	3	4	5
I notice the wildlife around me every day.	1	2	3	4	5
An important part of my neighborhood is the wildlife I see there.	1	2	3	4	5
It is important to take care of wildlife for future generations.	1	2	3	4	5
It is important to always have an abundance of wildlife.	1	2	3	4	5
It is important to know that wildlife exists.	1	2	3	4	5
It is important to know that there are healthy populations of wildlife.	1	2	3	4	5
I enjoy learning about wildlife.	1	2	3	4	5
It is important that we learn as much as we can about wildlife.	1	2	3	4	5
It is important that all residents have a chance to learn about wildlife.	1	2	3	4	5
I am not interested in knowing anything more about wildlife.	1	2	3	4	5

48. Listed below are statements about relationships between humans and the environment.
To what extent do you disagree or agree with each of the following statements? **(circle one number for *EACH*)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Humans have the right to modify the natural environment to suit their needs.	1	2	3	4	5
Humans were meant to rule over the rest of nature.	1	2	3	4	5
The so-called ecological crisis facing humans has been greatly exaggerated.	1	2	3	4	5
The balance of nature is strong enough to cope with impacts of modern industrial nations.	1	2	3	4	5
If things continue on their present course, we will soon experience a major ecological catastrophe.	1	2	3	4	5
We are approaching the limit of the number of people the earth can support.	1	2	3	4	5
The balance of nature is very delicate and easily upset.	1	2	3	4	5
When humans interfere with nature it often produces disastrous consequences.	1	2	3	4	5
Plants and animals have as much right as humans to exist.	1	2	3	4	5
Humans are severely abusing the environment.	1	2	3	4	5

49. Are you: **(check *ONE*)** ☐ Male ☐ Female

50. What is your age? **(write age)** _____ years old

51. What wildlife related activities do you participate in? **(check *ALL THAT APPLY*)**

- ☐ Hunting
- ☐ Fishing
- ☐ Trapping
- ☐ Wildlife viewing
- ☐ Wildlife photography
- ☐ Watching television shows, videos, or movies about wildlife
- ☐ Reading books, magazines, or other articles about wildlife
- ☐ Visiting zoos or aquariums

52. Approximately how many years have you lived ***in Oregon***? **(write response)** _____ year(s)

53. Do you own or rent / lease the residence where you currently live? **(check *ONE*)** ☐ Own ☐ Rent / Lease ☐ Other

54. Approximately how many years have you lived ***at this current address***? **(write response)** _____ year(s)

55. Approximately how large is the property (area of land) that you own or live on? **(write response)** _____ acre(s)

56. What land use activities ***currently occur*** on the land that you own or live on? **(check *ALL THAT APPLY*)**

- ☐ Timber / forestry management
- ☐ Agriculture – annuals (for example: grass seed)
- ☐ Agriculture – perennials (for example: Christmas trees)
- ☐ Orchards
- ☐ Vineyard or hops production
- ☐ Beekeeping
- ☐ Livestock grazing
- ☐ Commercial or industrial (non-agriculture)
- ☐ Residential
- ☐ Hunting
- ☐ Trapping
- ☐ All-terrain vehicle recreation
- ☐ Other (write response) _____
_____

57. What land use activities do you ***expect will occur in the future*** on the land that you own or live on? **(check *ALL THAT APPLY*)**

- ☐ Timber / forestry management
- ☐ Agriculture – annuals (for example: grass seed)
- ☐ Agriculture – perennials (for example: Christmas trees)
- ☐ Orchards
- ☐ Vineyard or hops production
- ☐ Beekeeping
- ☐ Livestock grazing
- ☐ Commercial or industrial (non-agriculture)
- ☐ Residential
- ☐ Hunting
- ☐ Trapping
- ☐ All-terrain vehicle recreation
- ☐ Subdivide and sell for development
- ☐ Other (write response) _____

58. ***Including yourself***, how many people are ***currently*** living in your household? **(write response)** _____ person(s)

59. How many people ***under 18 years of age*** are ***currently*** living in your household? **(write response)** _____ person(s)

60. How would you describe the type of community in which you ***primarily grew up***? **(check *ONE*)**

- ☐ Large city with 250,000 or more people
- ☐ City with 100,000 to 249,999 people
- ☐ City with 50,000 to 99,999 people
- ☐ Small city with 25,000 to 49,999 people
- ☐ Town with 10,000 to 24,999 people
- ☐ Town with 5,000 to 9,999 people
- ☐ Small town / village with less than 5,000 people
- ☐ A farm or rural area

61. Are you a member of any environmental or wildlife related organizations (for example: Ducks Unlimited, Audubon Society, Greenpeace)? **(check *ONE*)**

- ☐ No
- ☐ Yes → if yes, what organization(s) are you a member of? **(write response)** _____

62. What is the ***highest*** level of education that you have achieved? **(check *ONE*)**

- ☐ Less than high school diploma
- ☐ High school diploma or GED
- ☐ 2-year associates degree or trade school
- ☐ 4-year college degree (for example: bachelors degree)
- ☐ Advanced degree beyond 4-year degree (for example: masters, Ph.D., medical doctor, law degree)

If you have any other comments about beavers, please write them here:

THANK YOU FOR COMPLETING THIS SURVEY, YOUR INPUT IS VERY IMPORTANT

PLEASE RETURN THIS COMPLETED SURVEY AS SOON AS POSSIBLE IN THE ENCLOSED ADDRESSED AND POSTAGE-PAID ENVELOPE

APPENDIX D: NONRESPONSE QUESTIONNAIRE

ID number: _____

Opening Script

Hello, my name is _____. I'm calling from Oregon State University regarding a survey of public opinions about beavers that was sent to your address several weeks ago.

We have noticed that you have not responded to the survey, but your input is very valuable. Instead, we would like you to answer just a few quick questions, which will take less than 2 minutes to complete.

If no (refusal): Sorry to bother you; have a good evening. (hang up and record response)

If yes: Thank you; I have just a few short questions.

(1). How often have you seen beavers on your property or neighboring properties?

☐ Never ☐ Once ☐ 2 to 5 times ☐ 6 to 10 times ☐ More than 10 times

(2). How often have beavers caused damage to your property or neighboring properties?

☐ Never ☐ Once or Twice ☐ Sometimes ☐ Many Times

(3). Hypothetically, if a beaver were to ever flood a basement, building, or other structure on your property or neighboring properties, how unacceptable or acceptable would it be to destroy the beaver (i.e., lethal control)?

Very Unacceptable Slightly Unacceptable Neither Slightly Acceptable Very Acceptable

(4). To what extent do you disagree or agree that: *beavers are a nuisance animal*?

Strongly Disagree Slightly Disagree Neither Slightly Agree Strongly Agree

(5). To what extent do you disagree or agree that:
beavers have a right to exist regardless of any damage they cause?

Strongly Disagree Slightly Disagree Neither Slightly Agree Strongly Agree

(6). To what extent do you disagree or agree that:
you trust the Oregon Department of Fish and Wildlife to properly address wildlife issues?

Strongly Disagree Slightly Disagree Neither Slightly Agree Strongly Agree

(7). Approximately how many years have you lived at your current address? _____ year(s)

(8). Finally, what is your age? _____ years old

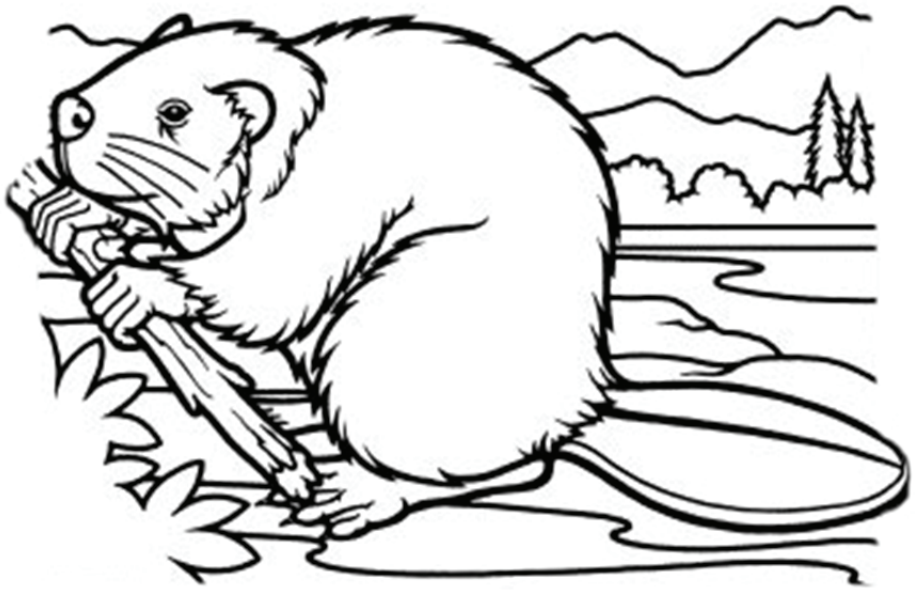
Then, record their gender or ask if unsure: ☐ Male ☐ Female

Ending Script: That's all the questions that I have; thank you for your time and have a great evening.

APPENDIX E: UNCOLLAPSED PERCENTAGES

Your Opinions About Beavers in Oregon

Important Questions for Oregonians



Please Complete this Survey and Return it in the Envelope as Soon as Possible

Participation is Voluntary and Responses are Anonymous

Thank You for Your Participation

A Study Conducted Cooperatively by:

OREGON Fish & Wildlife

OREGON WATERSHED ENHANCEMENT BOARD OWEB

OSU Oregon State University

We are conducting this survey to learn about your opinions about beavers and their habitat in Oregon. Your input is important and will assist natural resource managers. ***Please complete this survey and return it in the addressed postage-paid envelope.***

1. Before receiving this questionnaire, did you know that there are beavers living in Oregon? **(check *ONE*)** 3% No 97% Yes

2. How often have you seen beavers in the wild? **(check *ONE*)**

15% Never 12% Once 31% 2 to 5 times 11% 6 to 10 times 31% More than 10 times

3. How interested would you be in seeing beavers on your property or neighboring properties? **(check *ONE*)**

35% Not at all Interested 21% Slightly Interested 22% Moderately Interested 22% Extremely Interested

4. How often have you actually seen beavers on your property or neighboring properties? **(check *ONE*)**

74% Never 6% Once 10% 2 to 5 times 3% 6 to 10 times 7% More than 10 times

5. How interested would you be in having beavers living on your property or neighboring properties? **(check *ONE*)**

44% Not at all Interested 20% Slightly Interested 19% Moderately Interested 18% Extremely Interested

6. Currently, are there beavers living on your property or neighboring properties? **(check *ONE*)** 67% No 16% Yes 17% Unsure

7. Please indicate on each of the following scales ***how you generally feel about beavers***. **(circle one number for *EACH*)**

Dislike	4%	3%	19%	22%	53%	Like
Bad	4	4	23	25	45	Good
Disfavor	4	4	22	24	46	Favor
Negative	5	4	22	24	45	Positive
Harmful	7	6	29	22	37	Beneficial

8. To what extent do you disagree or agree with each of the following statements? **(circle one number for *EACH*)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Beavers have a right to exist regardless of any damage they cause.	13%	15%	10%	30%	32%
Beavers are a sign of a healthy environment.	3	3	13	31	51
I may never see a beaver, but it is important to me that they exist.	3	3	9	22	64
I would get enjoyment from seeing beavers.	4	3	11	28	55
Beaver populations should be left alone.	8	14	20	29	28
No beaver should be destroyed.	21	17	16	17	29
People should be willing to tolerate some conflicts with beavers.	5	9	11	38	37
Beavers create wetlands that benefit other living things.	2	3	9	27	60
Beavers are a nuisance animal.	34	21	24	17	4
I am afraid of beavers.	76	7	13	3	1
Beaver damage to roads or other property is a major problem.	24	22	30	18	6
Beaver populations should be controlled.	18	14	21	30	17

9. Please indicate if you believe that each of the following statements related to beavers is true or false. **(circle a letter for ***EACH***)**

	True	False
Historically, Oregon generally has had a large beaver population.	91%	9%
Historically, beavers were almost eliminated in Oregon because of the value of their furs or pelts.	89	11
Beavers typically live in waters such as ponds, marshes, or streams.	98	2
Beavers build both dams and lodges.	99	1
Beavers do not eat fish.	62	38
Beavers must chew on wood because their teeth do not stop growing.	84	16
Beavers have webbed feet.	86	14
Beaver dams can create ponds that help replenish groundwater supplies.	90	10
Beaver dams can create ponds that are important for fish such as salmon.	75	25
Beaver dams can create wetlands that are important for other living things besides fish.	97	3

10. ***If beavers were present on your property or neighboring properties***, how concerned would you be about each of the following? **(circle one number for ***EACH***)**

	Not at all Concerned		Slightly Concerned		Moderately Concerned			Extremely Concerned	
Your own personal health or safety.	48%	21%	10%	7%	3%	5%	2%	2%	2%
Health or safety of children.	41	18	12	9	6	5	4	3	4
Health or safety of pets.	40	16	15	9	6	5	3	3	3
Spread of diseases by beavers.	32	20	16	11	4	5	5	3	4
Potential damage to your own property by beavers.	19	10	19	11	8	9	7	7	10
Potential damage to neighboring properties by beavers.	18	11	19	13	7	10	7	7	9

11. How often have beavers caused damage to your property or neighboring properties? **(check ***ONE***)**

81% Never 8% Once or Twice 7% Sometimes 5% Many Times

12. To what extent do you consider beavers to be a problem on your property or neighboring properties? **(check ***ONE***)**

80% Not a Problem 12% Slight Problem 6% Moderate Problem 2% Extreme Problem

13. To what extent do you disagree or agree with each of the following statements? **(circle one number for ***EACH***)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Beavers are common on my property or neighboring properties.	64%	9%	13%	7%	8%
There are too many beavers on my property or neighboring properties.	75	6	15	2	3
The number of beavers on my property or neighboring properties has increased over time.	65	5	22	5	3
Beavers are destroying trees or other vegetation on my property or neighboring properties.	67	5	14	10	5
Beavers are damaging other items on my property or neighboring properties (for example: driveway, flooding).	76	5	14	4	2
Beaver damage on my property or neighboring properties has increased over time.	72	4	16	4	3
I do not want beavers on my property or neighboring properties.	43	10	23	8	16

14. How ***often*** have beavers caused each of the following on your property or neighboring properties?
(circle one number for *EACH*)

	Never	Once or Twice	Sometimes	Many Times
Overflow of a pond, lake, or stream.	87%	6%	5%	3%
Flooding of a road or driveway.	92	4	3	1
Flooding of crops or fields.	93	3	3	2
Flooding of a basement or other building.	98	1	1	0
Flooding of a well or septic system.	95	3	1	1
Damage to trees.	76	9	9	7
Damage to flowers or bushes.	90	4	5	2
Damage to culverts (for example: plugged pipes, bank erosion).	86	6	5	4
Other (write response) _____.	1	1	1	1

15. To what extent would it be a ***problem*** if beavers caused each of the following on your property or neighboring properties?
(circle one number for *EACH*)

	Not a Problem	Slight Problem	Moderate Problem	Extreme Problem
Overflow of a pond, lake, or stream.	35%	25%	24%	17%
Flooding of a road or driveway.	28	22	28	21
Flooding of crops or fields.	39	16	23	23
Flooding of a basement or other building.	31	10	19	40
Flooding of a well or septic system.	29	10	19	42
Damage to trees.	23	27	30	21
Damage to flowers or bushes.	34	29	23	14
Damage to culverts (for example: plugged pipes, bank erosion).	24	17	28	30
Other (write response) _____.	0	0	1	2

16. How often have you taken each of the following actions to deal with beavers on your property or neighboring properties?
(circle one number for *EACH*)

	Never	Once or Twice	Sometimes	Many Times
Contacted wildlife agencies about how to deal with beavers.	94%	4%	2%	1%
Contacted other groups about how to deal with beavers.	96	2	1	1
Wrapped trees with materials to prevent beavers from chewing them.	91	4	3	3
Installed other exclusion devices such as fences or screens.	94	3	1	2
Installed control devices such as water control pipes.	98	1	0	1
Frightened beavers away myself.	94	2	2	2
Removed beaver dams or lodges myself.	93	3	2	3
Captured and relocated beavers myself.	99	1	0	0
Destroyed beavers myself (lethal control).	96	1	1	1
Hired animal control personnel to remove beavers.	98	1	1	0
Asked a regulated trapper to remove beavers.	96	3	1	1
Other (write response) _____.	1	0	0	1

The next 6 shaded boxes contain ***hypothetical scenarios*** related to beavers. ***NO TWO SCENARIOS ARE THE SAME***.
Carefully read each scenario and then please answer the questions after EACH scenario.

Scenario 1: A beaver is seen on your property or neighboring properties, but has *not* caused any impacts or damage.

17. Please indicate on each of the following scales how you would react to Scenario 1. **(circle one number for *EACH*)**

Unhappy	5%	5%	28%	20%	43%	Happy
Not Excited	7	6	26	23	38	Excited
Not Curious	5	3	14	23	55	Curious
Frightened	9	4	13	11	64	Not Frightened
Angry	8	3	15	9	64	Not Angry

18. Without learning more detail, who would you assume is responsible for Scenario 1? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for being in the area.	32%	16%	21%	32%
Wildlife agencies for not controlling beaver populations.	51	34	11	4
Yourself as the resident involved in the situation.	55	31	10	5
Neighbors or others in the area involved in the situation.	53	34	9	4

19. How unacceptable or acceptable would it be to take each of the following actions for Scenario 1? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	9%	8%	12%	17%	54%
Inform landowners about how to coexist with the beaver.	7	4	21	19	48
Wrap trees to prevent the beaver from chewing trees.	9	6	14	26	46
Install fences or screens to prevent beaver damage.	11	7	17	27	38
Install control devices such as water control pipes.	13	8	26	24	29
Remove any beaver dams or lodges in the area.	28	19	24	16	13
Capture and relocate the beaver to another location.	20	14	16	24	27
Frighten the beaver away.	32	18	22	16	12
Destroy the beaver (lethal control).	67	10	10	6	7

20. Given Scenario 1, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	13%	5%	10%	26%	46%
Experts visit your home to provide technical information.	16	8	14	26	37
Experts plant trees near your home for food / shelter for beavers.	19	9	14	22	36
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	15	7	12	25	42
Financial compensation for *fixing* any potential future damage caused by the beaver.	18	7	15	23	37
Financial compensation for *preventing* future beaver damage.	18	7	15	24	35
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	51	10	20	6	12

Scenario 2: A beaver chews down some trees on your property or neighboring properties.

21. Please indicate on each of the following scales how you would react to Scenario 2. **(circle one number for *EACH*)**

Unhappy	29%	25%	33%	9%	5%	Happy
Not Excited	23	21	34	14	9	Excited
Not Curious	11	7	24	28	31	Curious
Frightened	14	6	14	10	56	Not Frightened
Angry	18	14	26	14	28	Not Angry

22. Without learning more detail, who would you assume is responsible for Scenario 2? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	22%	17%	25%	36%
Wildlife agencies for not controlling beaver populations.	41	40	14	5
Yourself as the resident involved in the situation.	40	38	15	7
Neighbors or others in the area involved in the situation.	42	41	12	5

23. How unacceptable or acceptable would it be to take each of the following actions for Scenario 2? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	20%	18%	14%	23%	25%
Inform landowners about how to coexist with the beaver.	11	7	13	26	44
Wrap trees to prevent the beaver from chewing trees.	9	5	11	28	47
Install fences or screens to prevent beaver damage.	11	6	13	29	41
Install control devices such as water control pipes.	12	9	19	27	33
Remove any beaver dams or lodges in the area.	26	20	19	18	17
Capture and relocate the beaver to another location.	18	13	14	25	30
Frighten the beaver away.	34	18	18	16	13
Destroy the beaver (lethal control).	69	8	9	6	8

24. Given Scenario 2, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	15%	7%	9%	22%	47%
Experts visit your home to provide technical information.	17	7	11	24	41
Experts plant trees near your home for food / shelter for beavers.	19	8	11	22	41
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	15	7	10	25	44
Financial compensation for *fixing* damage caused by the beaver.	17	7	15	22	40
Financial compensation for *preventing* future beaver damage.	17	7	15	22	40
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	50	11	17	8	15

Scenario 3: A beaver plugs culverts on your property or neighboring properties causing damage to pipes, erosion, and ponds or streams to overflow.

25. Please indicate on each of the following scales how you would react to Scenario 3. **(circle one number for *EACH*)**

Unhappy	46%	31%	19%	3%	2%	Happy
Not Excited	30	22	29	11	9	Excited
Not Curious	15	10	25	24	26	Curious
Frightened	16	7	15	9	53	Not Frightened
Angry	23	18	25	11	23	Not Angry

26. Without learning more detail, who would you assume is responsible for Scenario 3? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	21%	20%	27%	33%
Wildlife agencies for not controlling beaver populations.	36	40	17	7
Yourself as the resident involved in the situation.	36	41	16	8
Neighbors or others in the area involved in the situation.	38	42	14	6

27. How unacceptable or acceptable would it be to take each of the following actions for Scenario 3? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	34%	22%	14%	14%	16%
Inform landowners about how to coexist with the beaver.	13	7	15	24	41
Wrap trees to prevent the beaver from chewing trees.	10	6	13	27	45
Install fences or screens to prevent beaver damage.	11	6	12	28	43
Install control devices such as water control pipes.	11	6	15	28	42
Remove any beaver dams or lodges in the area.	21	17	18	21	23
Capture and relocate the beaver to another location.	16	13	12	25	35
Frighten the beaver away.	35	16	17	18	15
Destroy the beaver (lethal control).	70	7	7	6	9

28. Given Scenario 3, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	16%	6%	8%	22%	48%
Experts visit your home to provide technical information.	18	7	9	23	44
Experts plant trees near your home for food / shelter for beavers.	19	9	11	22	40
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	15	6	9	24	47
Financial compensation for *fixing* damage caused by the beaver.	17	6	12	23	42
Financial compensation for *preventing* future beaver damage.	17	6	12	23	42
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	50	11	17	7	16

Scenario 4: A beaver floods a road or driveway on your property or neighboring properties.

29. Please indicate on each of the following scales how you would react to Scenario 4. **(circle one number for *EACH*)**

Unhappy	45%	28%	22%	3%	2%	Happy
Not Excited	30	19	28	13	8	Excited
Not Curious	17	9	25	25	25	Curious
Frightened	16	8	14	10	52	Not Frightened
Angry	24	19	22	11	25	Not Angry

30. Without learning more detail, who would you assume is responsible for Scenario 4? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	20%	22%	27%	31%
Wildlife agencies for not controlling beaver populations.	36	39	19	6
Yourself as the resident involved in the situation.	37	40	16	7
Neighbors or others in the area involved in the situation.	38	43	14	6

31. How unacceptable or acceptable would it be to take each of the following actions for Scenario 4? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	35%	21%	14%	14%	17%
Inform landowners about how to coexist with the beaver.	14	7	15	22	42
Wrap trees to prevent the beaver from chewing trees.	11	7	12	26	45
Install fences or screens to prevent beaver damage.	12	7	11	27	43
Install control devices such as water control pipes.	12	7	13	27	41
Remove any beaver dams or lodges in the area.	21	17	16	20	26
Capture and relocate the beaver to another location.	16	13	12	24	35
Frighten the beaver away.	36	16	15	19	15
Destroy the beaver (lethal control).	70	7	8	6	10

32. Given Scenario 4, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	17%	6%	8%	22%	47%
Experts visit your home to provide technical information.	18	7	10	22	43
Experts plant trees near your home for food / shelter for beavers.	18	9	12	20	41
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	14	6	10	24	47
Financial compensation for *fixing* damage caused by the beaver.	16	6	11	24	43
Financial compensation for *preventing* future beaver damage.	17	6	11	24	42
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	51	10	6	7	17

Scenario 5: A beaver floods crops or fields on your property or neighboring properties.

33. Please indicate on each of the following scales how you would react to Scenario 5. **(circle one number for *EACH*)**

Unhappy	48%	25%	21%	3%	3%	Happy
Not Excited	31	19	29	11	10	Excited
Not Curious	19	8	26	23	24	Curious
Frightened	17	7	15	9	53	Not Frightened
Angry	30	18	20	9	23	Not Angry

34. Without learning more detail, who would you assume is responsible for Scenario 5? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	19%	23%	26%	32%
Wildlife agencies for not controlling beaver populations.	35	40	19	7
Yourself as the resident involved in the situation.	35	40	17	7
Neighbors or others in the area involved in the situation.	36	42	15	6

35. How unacceptable or acceptable would it be to take each of the following actions for Scenario 5? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	38%	22%	11%	13%	17%
Inform landowners about how to coexist with the beaver.	15	8	13	22	44
Wrap trees to prevent the beaver from chewing trees.	12	6	12	25	45
Install fences or screens to prevent beaver damage.	13	6	13	26	44
Install control devices such as water control pipes.	12	6	13	25	44
Remove any beaver dams or lodges in the area.	20	15	15	21	28
Capture and relocate the beaver to another location.	16	13	12	23	37
Frighten the beaver away.	36	17	14	18	16
Destroy the beaver (lethal control).	71	6	7	6	10

36. Given Scenario 5, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	18%	6%	7%	21%	47%
Experts visit your home to provide technical information.	19	6	9	23	43
Experts plant trees near your home for food / shelter for beavers.	19	9	11	19	42
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	15	6	10	23	46
Financial compensation for *fixing* damage caused by the beaver.	17	6	11	24	42
Financial compensation for *preventing* future beaver damage.	17	7	11	23	42
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	50	10	17	6	17

Scenario 6: A beaver floods a basement, building, or other structure on your property or neighboring properties.

37. Please indicate on each of the following scales how you would react to Scenario 6. **(circle one number for *EACH*)**

Unhappy	70%	17%	10%	1%	2%	Happy
Not Excited	41	14	20	11	14	Excited
Not Curious	25	8	22	20	24	Curious
Frightened	18	8	14	9	50	Not Frightened
Angry	40	19	15	9	17	Not Angry

38. Without learning more detail, who would you assume is responsible for Scenario 6? **(circle one number for *EACH*)**

	None of the Responsibility	Some of the Responsibility	Most of the Responsibility	All of the Responsibility
The individual *beaver* for causing the impact.	18%	23%	27%	31%
Wildlife agencies for not controlling beaver populations.	35	38	20	8
Yourself as the resident involved in the situation.	32	41	19	9
Neighbors or others in the area involved in the situation.	35	42	16	7

39. How unacceptable or acceptable would it be to take each of the following actions for Scenario 6? **(circle a number for *EACH*)**

	Very Unacceptable	Slightly Unacceptable	Neither	Slightly Acceptable	Very Acceptable
Do nothing by leaving the beaver alone.	47%	19%	10%	11%	14%
Inform landowners about how to coexist with the beaver.	18	8	12	20	42
Wrap trees to prevent the beaver from chewing trees.	14	7	11	24	45
Install fences or screens to prevent beaver damage.	14	7	12	23	45
Install control devices such as water control pipes.	13	6	13	23	46
Remove any beaver dams or lodges in the area.	18	13	14	22	32
Capture and relocate the beaver to another location.	15	11	9	24	41
Frighten the beaver away.	35	15	13	18	19
Destroy the beaver (lethal control).	70	6	7	6	11

40. Given Scenario 6, how unlikely or likely would you take advantage of each of the following possible ***incentives that would allow the beaver to live on your property or neighboring properties***? **(circle one number for *EACH*)**

	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
Information sent to you about how to coexist with beavers.	19%	7%	8%	19%	42%
Experts visit your home to provide technical information.	20	6	9	21	44
Experts plant trees near your home for food / shelter for beavers.	20	9	11	18	42
Experts provide equipment / labor to install things such as tree wrapping materials, fences, or water control pipes.	16	7	10	20	48
Financial compensation for *fixing* damage caused by the beaver.	16	6	11	20	46
Financial compensation for *preventing* future beaver damage.	17	6	11	21	46
None of these incentives because I would not keep the beaver living on my property or neighboring properties.	49	10	15	6	19

41. Who do you think ***should be*** responsible for addressing problems with wildlife such as beavers on your property or neighboring properties? **(check *ALL THAT APPLY*)**

48% Local or county agencies	13% Citizen groups
84% State agencies such as Oregon Department of Fish and Wildlife	60% Individual residents experiencing the problem
48% Federal agencies such as U.S. Fish and Wildlife Service	26% Regulated trappers
34% Animal control personnel	4% Other (write response) _____

42. The Oregon Department of Fish and Wildlife is currently responsible for managing most wildlife issues in Oregon. To what extent do you disagree or agree with each of the following statements about this agency? **(circle a number for *EACH*)**

I feel that the Oregon Department of Fish and Wildlife …	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
… shares similar values as I do.	8%	12%	24%	38%	18%
… shares similar opinions as I do.	8	13	27	37	15
… shares similar goals as I do.	8	12	28	35	17
… thinks in a similar way as I do.	11	13	31	32	13
… takes similar actions as I would.	12	13	32	29	14

43. To what extent do you disagree or agree with each of the following statements? **(circle one number for *EACH*)**

I trust the Oregon Department of Fish and Wildlife to …	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
… provide the best available information about wildlife issues.	6%	10%	14%	37%	33%
… provide timely information about wildlife issues.	7	10	19	37	27
… provide truthful information about wildlife issues.	7	10	16	32	35
… provide me with enough information to decide what actions I should take regarding wildlife.	7	10	17	35	32
… use the best available science to inform management of wildlife.	8	10	17	34	31
… use public input to inform management of wildlife.	9	13	21	32	24
… make good decisions regarding management of wildlife.	9	13	19	32	27
… properly address wildlife issues.	9	12	19	33	27

44. Please tell us what you would like to know about beavers, their impacts, and / or how to coexist with them. **(write response)**

See Appendix A of Report

45. By what means, if any, would you prefer to receive any information about beavers in Oregon? **(check *ALL THAT APPLY*)**

41% Newspapers	18% Radio	20% E-mail
22% Magazines	16% Compact disk or DVD	20% Public information meeting / session
49% Pamphlet / brochure	4% VCR tape	17% Conservation / environmental groups
30% Television news	34% Government agency internet website	2% Other (write response) _____
19% Other television program	18% Other internet website	29% I do not need information about beavers

46. To what extent do you disagree or agree with each of the following statements? **(circle one number for ***EACH***)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Humans should manage wildlife so that *only* humans benefit.	71%	15%	8%	4%	3%
It is important for humans to control wildlife populations.	12	18	12	36	21
It is acceptable for human uses to cause the loss of some wild animals as long as wildlife populations are not jeopardized.	15	16	12	34	23
If wildlife populations are not threatened, we should use wildlife to add to the quality of human life.	6	6	13	31	44
The needs of humans are more important than the needs of wildlife.	31	18	19	20	12
The primary value of wildlife is to provide benefits for humans.	45	22	15	11	8
Wildlife exists primarily to be used by humans.	57	19	12	7	5
The rights of wildlife are more important than human uses of wildlife.	27	21	23	15	14
Wildlife should be protected for their own sake rather than to simply meet the needs of humans.	8	7	14	29	42
People should not be allowed to use wildlife for any reason.	53	20	14	7	8
I care about wildlife as much as I do other people.	15	19	19	23	25
Wildlife are like family so they should be protected.	19	16	22	25	18
We should focus on doing what is best for wildlife instead of what is best for humans.	24	24	26	14	11
People should not treat wildlife in ways that cause pain or suffering to wildlife, no matter how much humans benefit.	13	14	15	20	38
If we cannot minimize pain or suffering caused to wildlife by human activities, then we should not allow those activities.	18	15	17	24	26
Humans should be allowed to cause some short-term pain or suffering to wildlife as long as humans benefit.	32	22	22	14	10

47. To what extent do you disagree or agree with each of the following statements? **(circle one number for ***EACH***)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Having wildlife around my home is important to me.	2%	1%	7%	25%	64%
I enjoy seeing wildlife around my home.	1	1	4	22	72
I notice the wildlife around me every day.	1	1	5	22	70
An important part of my neighborhood is the wildlife I see there.	2	3	11	25	60
It is important to take care of wildlife for future generations.	1	0	3	15	81
It is important to always have an abundance of wildlife.	1	3	8	25	62
It is important to know that wildlife exists.	0	1	3	16	81
It is important to know that there are healthy populations of wildlife.	0	0	3	15	81
I enjoy learning about wildlife.	1	1	6	19	74
It is important that we learn as much as we can about wildlife.	1	1	8	23	68
It is important that all residents have a chance to learn about wildlife.	1	1	9	23	66
I am not interested in knowing anything more about wildlife.	73	10	9	3	5

48. Listed below are statements about relationships between humans and the environment.
To what extent do you disagree or agree with each of the following statements? **(circle one number for *EACH*)**

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
Humans have the right to modify the natural environment to suit their needs.	19%	23%	14%	36%	8%
Humans were meant to rule over the rest of nature.	43	15	16	14	14
The so-called ecological crisis facing humans has been greatly exaggerated.	36	16	17	19	12
The balance of nature is strong enough to cope with impacts of modern industrial nations.	45	27	14	10	5
If things continue on their present course, we will soon experience a major ecological catastrophe.	13	14	18	27	28
We are approaching the limit of the number of people the earth can support.	14	11	19	24	32
The balance of nature is very delicate and easily upset.	7	13	14	32	34
When humans interfere with nature it often produces disastrous consequences.	7	11	14	33	35
Plants and animals have as much right as humans to exist.	11	10	11	22	45
Humans are severely abusing the environment.	10	9	9	27	46

49. Are you: **(check *ONE*)** 57% Male 43% Female

50. What is your age? **(write age)** See Report years old

51. What wildlife related activities do you participate in? **(check *ALL THAT APPLY*)**

39% Hunting
57% Fishing
5% Trapping
81% Wildlife viewing
44% Wildlife photography
84% Watching television shows, videos, or movies about wildlife
71% Reading books, magazines, or other articles about wildlife
61% Visiting zoos or aquariums

52. Approximately how many years have you lived ***in Oregon***? **(write response)** See Report year(s)

53. Do you own or rent / lease the residence where you currently live? **(check *ONE*)** 86% Own 12% Rent / Lease 2% Other

54. Approximately how many years have you lived ***at this current address***? **(write response)** See Report year(s)

55. Approximately how large is the property (area of land) that you own or live on? **(write response)** See Report acre(s)

56. What land use activities ***currently occur*** on the land that you own or live on? **(check *ALL THAT APPLY*)**

13% Timber / forestry management
16% Agriculture – annuals (for example: grass seed)
6% Agriculture – perennials (for example: Christmas trees)
11% Orchards
3% Vineyard or hops production
3% Beekeeping
24% Livestock grazing
2% Commercial or industrial (non-agriculture)
86% Residential
11% Hunting
2% Trapping
6% All-terrain vehicle recreation
16% Other (write response) _____
_____

57. What land use activities do you ***expect will occur in the future*** on the land that you own or live on? **(check *ALL THAT APPLY*)**

13% Timber / forestry management
15% Agriculture – annuals (for example: grass seed)
8% Agriculture – perennials (for example: Christmas trees)
12% Orchards
4% Vineyard or hops production
7% Beekeeping
25% Livestock grazing
3% Commercial or industrial (non-agriculture)
82% Residential
11% Hunting
3% Trapping
5% All-terrain vehicle recreation
4% Subdivide and sell for development
9% Other (write response) _____

58. ***Including yourself***, how many people are ***currently*** living in your household? **(write response)** See Report person(s)

59. How many people ***under 18 years of age*** are ***currently*** living in your household? **(write response)** See Report person(s)

60. How would you describe the type of community in which you ***primarily grew up***? **(check *ONE*)**

19% Large city with 250,000 or more people
5% City with 100,000 to 249,999 people
9% City with 50,000 to 99,999 people
8% Small city with 25,000 to 49,999 people
12% Town with 10,000 to 24,999 people
14% Town with 5,000 to 9,999 people
12% Small town / village with less than 5,000 people
22% A farm or rural area

61. Are you a member of any environmental or wildlife related organizations (for example: Ducks Unlimited, Audubon Society, Greenpeace)? **(check *ONE*)**

80% No
20% Yes → if yes, what organization(s) are you a member of? **(write response)** _____

62. What is the ***highest*** level of education that you have achieved? **(check *ONE*)**

3% Less than high school diploma
31% High school diploma or GED
24% 2-year associates degree or trade school
25% 4-year college degree (for example: bachelors degree)
18% Advanced degree beyond 4-year degree (for example: masters, Ph.D., medical doctor, law degree)

If you have any other comments about beavers, please write them here:

See Appendix A of Report

THANK YOU FOR COMPLETING THIS SURVEY, YOUR INPUT IS VERY IMPORTANT

PLEASE RETURN THIS COMPLETED SURVEY AS SOON AS POSSIBLE IN THE ENCLOSED ADDRESSED AND POSTAGE-PAID ENVELOPE