

Survey of Shoreline Property Owners Report

**Prepared for Colehour + Cohen
and the Washington State Department
of Fish and Wildlife**

By Applied Research Northwest

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EXECUTIVE SUMMARY

The Washington State Department of Fish and Wildlife has partnered with the Department of Natural Resources to reach a common goal: the restoration of healthy habitat along Puget Sound shorelines.

The Department identified residential landowners as a target audience for a program to educate and encourage shoreline property practices that will benefit Puget Sound. A team of content experts brought together by Colehour + Cohen studied the issues, conducted preliminary research and finally developed a survey of shoreline landowners to be fielded to a sample of the more than 35,000 residential landowners around the twelve counties of Puget Sound. This report presents the findings from that survey, along with some introduction to the content of the program and its likely components.

The Department's approach is to implement a program based on the principals of Social Marketing. Social Marketing integrates the science of behavior change with the principals of marketing to enable programs to meet the needs of their consumers while also creating positive social and environmental change.

Research in Social Marketing focuses on identifying *barriers* people may have in engaging with a particular activity as well as *motivators* that encourage them. Specific *incentives* can be provided to help overcome barriers – for example, by providing low interest loans or discounts if cost is known to keep people from engaging in an activity.

The survey conducted with shoreline landowners in Puget Sound asked about people's property, their concerns, their experiences with managing the shoreline, as well as their awareness of practices and choices that could impact the health of their shoreline's habitat. For each desired practice, the survey asked respondents to indicate aspects of the practice that was appealing or *motivated* them to take interest, what *incentives* might make them more likely to engage, as well as *barriers* that make them less willing to engage in the behavior.

The eleven key practices that were identified as being of interest to the Department included:

1. Planting native vegetation
2. Maintaining native vegetation
3. Reducing surface water drainage reaching bluffs
4. Leaving shorelines unarmored
5. Removing all existing armor

6. Removing a portion of existing armor
7. Replacing armor with engineered soft shore protection
8. Adding engineered soft shore protection to unarmored
9. Seeking professional advice, especially from a city or county planner or permitting official
10. Building new buildings further from the shoreline than current regulations require
11. Moving existing buildings back from the shoreline

METHODS

The Department of Fish and Wildlife invited a sample of 3,818 shoreline landowners to complete a survey online or over the phone. In all, 1,164 owners responded to the survey for a response rate of 30% and providing an estimated 3% margin of error.

The sample was distributed to try and capture properties with diverse characteristics that were relevant to the activities and practices the Department may address in the program. In particular, the presence of a home, presence of armor, and erosion potential were considered. Each combination of these three factors resulted in a *segment* of the target population being described; for example owners with no home on the property, no armor on the shoreline and no erosion potential made up one segment, while those with a home, with armor and with high erosion potential made up another. In all there were nine segments identified as follows:

No Armor

1. No home, no erosion potential
2. No home, some erosion potential (low, moderate or high)
3. Existing home, no erosion potential
4. Existing home, some erosion potential (low, moderate or high).

Armored

5. No home, no erosion potential
6. No home, some erosion potential (low, moderate or high)
7. Existing home, no erosion potential
8. Existing home, low or moderate erosion potential
9. Existing home, high erosion potential

This executive summary presents the key survey findings regarding the prevalence of each of the eleven land management practices as well as the likelihood of engaging in the practice among those who have not yet engaged in the approach. This summary also presents findings regarding what might make the practice more likely (motivators) or

less likely (barriers). Differences between various demographic groups or segments (as defined above) are noted where relevant.

FINDINGS

Respondent and property characteristics

Respondents tended to be male (68%) and more than half (59%) were retired. Respondents tended to be substantially older than the general population, with 58% reporting ages of 65 or more. Most had a college degree or higher (81%) and income levels tended to be high, with 41% reporting annual household incomes of \$125,000 or more.

Over half of the respondents (54%) have owned their property for 20 years and 59% use the property as their year-round home.

When asked to describe the property, about half (52%) said their home is more than 50 feet from the shoreline and 35% said the length of their shoreline is less than 100 feet; 24% said it 200 feet or more. Forty-two percent of properties were described as “low or no bank” and 21% were high bank.

Roughly 4 out of 10 (42%) of respondents identified that they have some sort of hard armor on their property, with a majority of them (71%) saying the armor extends the entire length of the property. Typically the armor was in place before they purchased the property (60%) though just under a third (31%) said that it was installed under their ownership. One-third have done maintenance or repaired the armor (31%) and 15% have replaced all or a portion of the armor.

Key findings from analysis of property types:

- Properties without a home and without armor were unlikely to be low or no bank properties.
- Those with both homes and armor had lower banks (~60%) as long as their erosion potential was not high.
- Those with homes, armor and high erosion potential were predominantly on medium or high banks.
- Houses were more often set back 100 feet or more among properties with no armor and no erosion potential.
- Houses were more often within 50 feet of the bluff or shoreline among properties with armor and a high erosion potential.

Respondents were asked to share any concerns they have about their property as a shoreline property. The most frequently mentioned concerns involved erosion, followed by concerns or frustrations with regulatory restrictions and permitting issues. Other common themes included pollution and water quality as well as existing bulkhead maintenance.

Planting native plants

Respondents asked to identify what planting and maintenance activities they have engaged in near the shoreline.

Prevalence: Half (51%) of respondents said they have planted native plants on the slope or near the shoreline.

- Those with a home on their property were almost three times as likely to have “planted additional native trees, shrubs or ground cover” as those without a home on their property. They were also more likely to have planted natives in order to stabilize their slope, especially if they had high erosion potential.
- Respondents with a college degree were more likely to have said they have planted native plants.

Likelihood: Thirteen percent had not planted native plants but were *somewhat* or *very likely* to do so.

- Age was related to the likelihood to plant native plants with younger respondents (especially under age 55) more inclined to say they are very or somewhat likely to do this.

Motivators: The strongest motivators included knowing it improves slope stability, getting a tax break, and having confidence that property will be enhanced. Seeing examples and working with neighbors were not as motivating to respondents. “Knowing my slope is more stable” was particularly important among unarmored property owners with some erosion potential.

Barriers: The expense was the biggest barrier, followed by knowledge of how to do this. Concerns over their view being blocked by plantings were also mentioned by more than 10% of those responding.

Maintain native vegetation

One example of native plant maintenance was defined for the purposes of this survey: limbing and pruning trees and plants instead of removing them to improve the view.

Prevalence: Eleven percent of respondents said that they have removed trees or plants in order to improve the view; the balance means that most (89%) have not engaged in this undesirable practice. The survey found that 37% have employed the alternative approach of limbing and pruning plants to improve the view and over half (61%) have neither removed trees or used the alternative pruning or limbing method. Only two percent of all respondents have removed trees or plants and have not engaged in the desired alternative (pruning).

- Properties with homes were more likely to have pruned or removed plants in order to improve the view.

Likelihood: Most who have removed trees or shrubs to improve the view (90%) said they are *somewhat* or *very likely* to actually prune or limb them instead of removing them

- Respondents with a college degree were more likely to indicate high likelihood of pruning and limbing trees near the shoreline instead of removing them.

Motivators: Respondents who had removed trees to improve the view were asked about what would make them more likely to prune or limb trees or shrubs near the shoreline instead of removing them. The top ranked motivators included knowing it improves slope stability, enjoying the natural look of it, and getting a tax break for it. Just over one-third (34%) said that providing healthy habitat for fish and wildlife is a motivating factor.

- “Enjoying the natural look of it” was particularly important to those with properties that had a home, but no armor and no erosion potential.

Barriers: The top barrier was not knowing enough about it.

Address water drainage reaching bluffs

Respondents with homes on moderate or high bank property were asked a series of questions about water drainage issues between the structure (home) and the shoreline.

Prevalence: Over one-third of these respondents said that they had done something to address water drainage on the property between their home and the shore. When asked to specify, the majority mentioned installing something like a drain pipe, tight line, curtain drain, or French drain. A similar proportion (35%) did not believe that they had drainage issues on their shoreline.

- Owners of properties with homes but no erosion potential were least likely to have done anything to address drainage. They were also more likely to say that they didn't have any drainage issues.
- Respondents with a college degree were more likely to say they had not done anything to address drainage issues on their property. Respondents with less

than a college degree were more likely to say that they don't have drainage issues.

Likelihood: Fourteen percent (14%) of respondents who had not yet done anything to address drainage said that they were *somewhat* or *very likely* to do something.

Motivators: Respondents who had not yet done anything to address water drainage but were at all likely to do so said that strongest motivators included knowing it improves slope stability, knowing more about it and how to do it, and getting a tax break for doing it or help paying for it.

Barriers: The same respondents indicated that they believed the drainage issue was minimal or non-existent. The expense of addressing water drainage was also mentioned as a barrier.

Leave shore unarmored

Prevalence: Fifty-eight percent of respondents said that their shoreline is currently unarmored. Two percent of these respondents said that they plan to add hard armor in the next five years. Another 11% said they have considered adding hard armor, but did not plan to do this in the next five years. Most said they either didn't have concerns with erosion (27%) or they have not considered anything to address the concerns that they have (38%).

- Owners of property without a home or armor reported the least concern about erosion followed by those with a home, but no armor and no erosion potential. Concern was most often reported among those with some identified erosion potential. These respondents were also more likely to have considered doing something to address erosion.
- Respondents aged 65 and older were less concerned about erosion on their property.

Likelihood: Ninety-four percent (94%) of respondents with unarmored property and erosion concerns said they were *somewhat* or *very likely* to leave it in its current state.

- Respondents over the age of 65 were particularly inclined towards leaving the shoreline in its current state.

Motivators: Respondents who were at all likely to leave their shoreline in its current state said that the top motivators included being confident that the property will be protected or enhanced, enjoying the natural look of it, and providing healthy habitat for fish and wildlife.

Barriers: Key perceived barriers were erosion events and concerns.

Remove or replace hard armor

Prevalence: Just under one percent (.9%) of respondents with unarmored properties (.5% overall) indicated that they had armor on their property when they first became an owner and that they removed it. Two percent (2%) of respondents with armored properties said that they have removed a portion of their armor (1% overall). Altogether, 1.5% of respondents surveyed have removed all or a portion of their armor.

The majority of respondents said that they had not considered removing armor from their property (84%), however 11% said that they had considered having all or some of the hard armor replaced with engineered soft shore protection.

- Younger respondents (under the age of 55) were more likely to say they had considered replacing armor with soft shore protection, when compared to their older counterparts. Men were more likely to say this than women.
- Analysis found that respondents under age 65 were also more likely to have considered removing all armor and letting the beach naturalize.
- Respondents age 65 and older were the most likely age group to say they had considered none of these options.

Likelihood: Respondents were asked how likely they would be to actually have all or some of the hard armor removed and either let it naturalize or replace it with soft shore protection. Eighteen percent (18%) of respondents said they were *somewhat* or *very likely* to have all or some of the hard armor replaced with engineered soft shore protection. This is slightly higher than the proportion who are *somewhat* or *very likely* to have a portion of the armor removed and let the beach naturalize (14%). Eight percent (8%) were *somewhat* or *very likely* to all of the armor removed and let the beach naturalize

- A larger portion of owners of properties with a home and no erosion potential reported being *somewhat* or *very likely* to actually remove all their hard armor and let the beach naturalize than did others. A much larger portion of those with homes and high erosion potential reported being *not at all likely* to do so, though interestingly 7% also said they would be *somewhat likely* to do so.
- Younger respondents were more inclined to say they were *somewhat* or *very likely* to do each of these three approaches to removing hard armor. Respondents with the highest income (\$250k+) were the least inclined to actually have all hard armor removed and let the beach naturalize.

Motivators: Respondents who were at all likely to remove or replace hard armor were asked about what would make them more likely to do this. The top motivator for each of the three scenarios was being confident that the property will be protected or enhanced.

Getting a tax break and getting a loan or grant also resonated with about a quarter to one-third of those respondents who are at all likely to take these steps.

Barriers: The top barrier was concern that the property would not be protected from flooding and erosion. Also prominent was the barrier of cost (the expense of doing this).

- Respondents with a home, armor and no erosion potential indicated they were not as sensitive to concerns that their property would not be protected by it soft-shore engineered protection.

Install engineered soft shore protection

Fifty-nine percent (59%) of respondents with unarmored properties said that they had heard of soft-shore protection alternatives.

Likelihood: When asked whether they had considered having this type of protection installed, 41% said that they had. In addition, 39% said that they were *very* or *somewhat likely* to actually have engineered soft shore protection installed

Motivators: The top motivator for installing soft shore protection was being confident it would protect or enhance the property. Getting a tax break or reduced fees and streamlined permitting were also attractive.

- Respondents with a home but no erosion potential were especially interested in getting a loan or grant to help pay for it.
- Those with a home and some erosion potential were more likely to choose “being confident my property will be protected or enhanced by it”. This segment was also much more likely to say that “knowing my neighbors are doing this or working together with my neighbors” was a motivator.

Barriers: Key barriers were difficulties with regulations and permitting and expense. Some concern about the efficacy of the approach was also highlighted.

Obtain expert advice

Prevalence: Sixteen percent (16%) said they have obtained advice from a city or county planner or permitting official. A slightly larger portion (20%) said that they have consulted with a private consultant like a geologist, shoreline engineer or landscape architect.

- Respondents with a home, armor and high erosion potential were much more likely to have consulted with a county or city planner or permitting official. This segment was also much more likely to have talked to a private consultant, and somewhat more likely to have talked to longtime local residents, friends or family members.

- Younger respondents (<55) were more likely to have consulted with a city or county planner or permitting official.
- Respondents with armor were much more likely to have talked with a contractor than those with no armor.
- Respondents with no armor and no home were unlikely to have talked to anyone about their shoreline.

Likelihood: Twenty percent (20%) of all respondents had not consulted with a planner or permitting official but said that they were *somewhat* or *very likely* to do this.

- Likelihood to consult with a planner or permitting official increased with the presence of a home, armor and erosion potential.
- Respondents under age 65 were more likely to say they were *somewhat* or *very likely* to do this in the future.

Motivators: Respondents indicated they would be most motivated by substantial changes in erosion of the shore or bluff, followed by storms, waves or tides changing the shore dramatically and if it made them confident that the property would be protected or enhanced.

- Storms, waves or tides changing property dramatically were particularly motivating to owners with a home, no armor and some erosion potential. Landowners with a home, armor and high erosion potential were least motivated by this.
- Owners with a home, no armor and some erosion potential were most likely to say that “substantial changes in erosion of the shore or bluff” would motivate them. Owners of armored properties were least motivated by this.
- Respondents with a home, armor and high erosion potential were especially motivated by being confident that their property would be protected or enhanced by it. Those without a home or armor were much less motivated by this.

Barriers: Respondents identified the top barrier as the expense associated with it. Over one-quarter (29%) said that they don’t see any value in doing this.

- Respondents with a home, no armor and no erosion potential were less likely to cite expense. Most concerned by expense were those with a home, armor and no erosion potential.

Build further from the shoreline

Respondents without homes on the property were asked whether they plan to add buildings to the property in the next five to ten years. One quarter (26%) said that they do plan to build.

- Respondents with armor were more likely than those with no armor to plan to do so, though this should be considered with care since only eight respondents fell into the armored/no home segment.

- Respondents under the age of 65 were more likely to say they plan to add buildings to their property.

Likelihood: Seven percent of those planning to build said they were *somewhat likely* to build further from the shoreline than is required by current regulations. Half said this was *not at all likely* and another 43% said it was *not very likely*.

Motivators and Barriers: A very small group of respondents (n=7) were asked about their motivators and barriers around building further from the shoreline than required by current regulations. As a group, the top motivator was knowing that their home would be better protected from floods and erosion. The biggest barrier they cited was that the property isn't big enough to allow for building further from the shore.

Move home further from shoreline

Prevalence: One-third (33%) of respondents with a home on the property said that their house is set back further from the shoreline than current regulations require.

- These were more likely to be segments without armor, suggesting some interplay – that either building the home closer to the shore prompts the installation of armor, or that the presence of armor leads people to build closer to the shore.
- Analysis found that men were more likely than women to say that their house is set back.

Likelihood: One percent (1%) of respondents with a home said their home was not already set back further than current requirements and that they would be *somewhat* or *very likely* to actually move their home further from the shoreline. An additional five percent (5%) were *not very likely*.

- Those most amenable to considering the idea were those without armor but some erosion potential and those with armor and no erosion potential

Motivators: Respondents whose homes are not already back further than currently required and are at all likely to actually move their home (*very likely*, *somewhat likely* or *not very likely*) indicated that the strongest motivators would include experiencing a major erosion or flood event and being confident that the property will be protected or enhanced by this step.

Barriers: Half of these respondents don't think this is necessary and one-third said that their property isn't big enough to allow for moving the house further from the shore. Concerns about damage to the house were also salient.

SUMMARY

Shoreline landowners in Puget Sound are key stakeholders in the process of helping restore habitat around the Sound. This survey showed that many are already engaged in many of the desirable behaviors and that more are likely to become engaged. Some are one-time behaviors, such as building a new home further from the shoreline than regulations require. Others require ongoing attention, such as maintaining native vegetation.

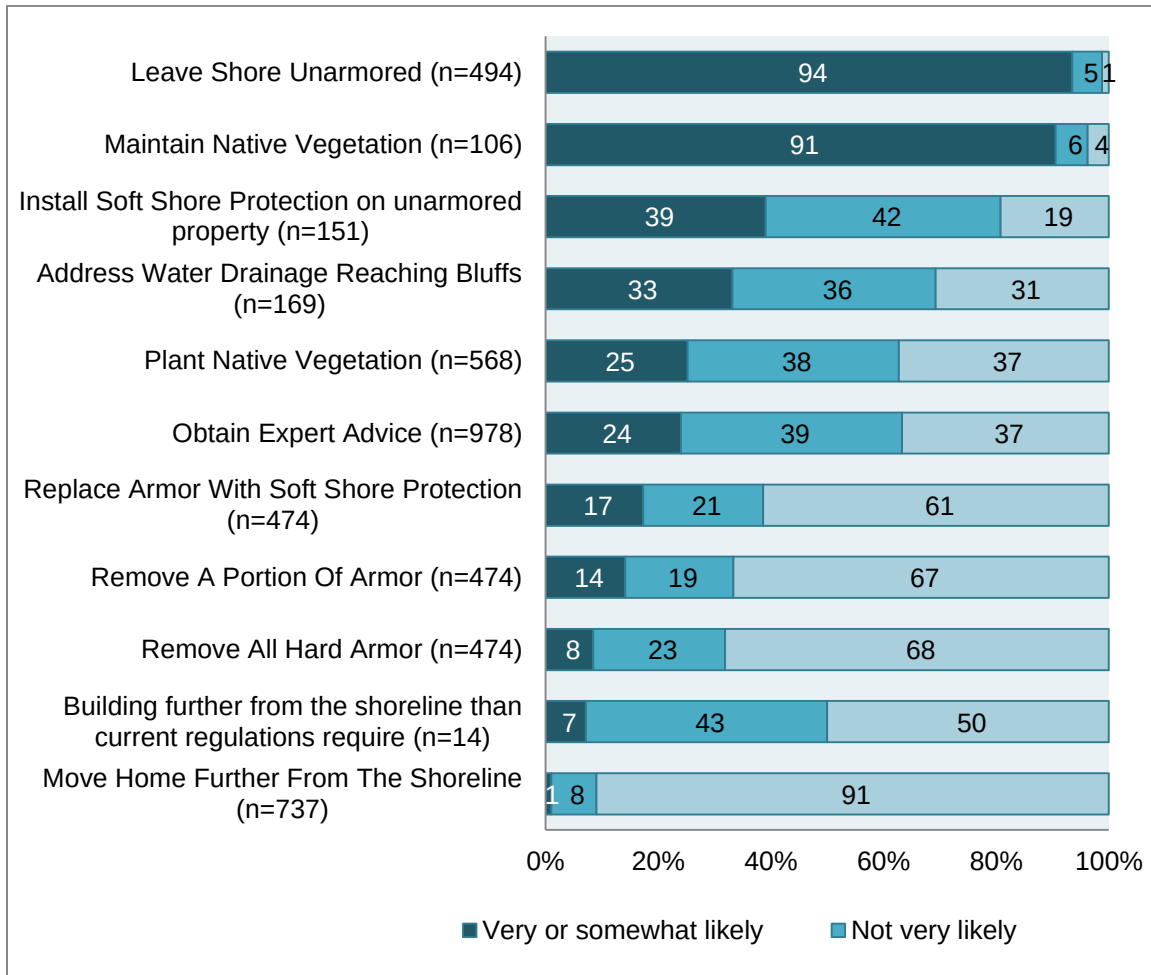
Table ES1 shows the relative frequency with which respondents said they had already engaged in the behaviors. Those that require no action (*not* removing native plants and *not* armoring the shore) were most commonly found. Least common was removing armor. Reducing surface water drainage has been done by less than half of the respondents with high or moderate bluffs and homes on their property, but nearly the same portion (35%) reported having no drainage problems. It is likely that these property owners are unaware of drainage issues that are impacting their bluff or shoreline. Raising awareness for those owners would be a recommended first step for the campaign.

Table ES1. Shoreline landowners participation in behaviors	
Maintained native vegetation (has not removed vegetation to improve the view)	89%
Shoreline is currently unarmored	58%
Planted native vegetation	51%
Reduced surface water drainage reaching bluffs	39%
Home is further from shoreline than regulations require	33%
Ever sought professional advice from a city or county planner or permitting official	16%
Removed all or a portion of existing armor	1.5%

Note: Respondents were not asked if they had already installed engineered soft shore protection.

Figure ES1 shows the likelihood of those who have not engaged in the behavior doing so. At the high end, 94% of respondents with unarmored properties said they are *very* or *somewhat likely* to leave the shore unarmored. At the low end, only 1% are *very* or *somewhat likely* to move their home further from the shoreline.

Figure E1. Shoreline landowners' likelihood of engaging in targeted practices (for those who are not yet doing so)



Note: these figures are based on the number of respondents who were asked the question; some numbers will differ from those presented in the body of the report.

Adding, maintaining or removing armor are among of the most impactful decisions landowners can make on helping or harming habitat and shorelines. Removing all or portions of the armor are the lowest rated behaviors of the group, though more than 30% expressed some likelihood of doing so. Presented with relevant information to cue their motivation and proper incentives, even this difficult, expensive task may be undertaken by some. It is very promising to note that unarmored shoreline owners seem very willing to leave their property as is or use habitat-friendly engineered soft shore protection if needed.

Program outreach will need to attend carefully to the many varied characteristics of each shoreline property. Segmentation helps to identify some of the opportunities for customizing the program design. Below we present the likelihood of participating in behaviors within each of the nine segments explored in the survey analysis.

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INTRODUCTION

The Washington State Department of Fish and Wildlife has partnered with the Department of Natural Resources to reach a common goal: the restoration of healthy habitat along Puget Sound shorelines. Private shoreline property owners are key stakeholders in Puget Sound shorelines, with those holding residential properties among the many diverse owners in Puget Sound. Others include tribal lands, the railroad, commercial interests, the State itself and local government entities.

Puget Sound provides a wealth of resources to the region, including being the feeding grounds for young salmon. The Department reported that the fishing industry in Washington State that relies in part on salmon spawned around the Sound contributes \$540 million in personal income and more than 16,000 jobs to the economy.¹ Like a canary in a coal mine, the health of the salmon fishery is an indicator of many aspects of life in the region, from a robust economy, access to quality food, sports fishing, quality of life and a balanced and healthy ecosystem.

The beauty of the region can be deceiving. Research has shown that habitats in Puget Sound have been on the decline for many years. Restoring healthy habitat along Puget Sound shorelines requires that private owners be aware of how decisions they make about their property impact the shoreline. Ideally, they will know what kinds of options they can choose that will lead to the best results, both for their property and for life of the Sound. The options provided need to be mutually beneficial – while some landowners may be ready, able and willing to adopt practices that meet the needs of a healthy Puget Sound, others may have more significant challenges to face. Some solutions can be costly. Others may seem risky. And others may simply be unappealing. Home properties are real investments that are expected to hold or grow in value; they represent a piece of the owners' identity and are a reflection of their values and position in life. Persuading people to do what they can to save Puget Sound needs to take all these factors into account.

The Department identified residential landowners as a target audience for a program to educate and encourage shoreline property practices that will benefit Puget Sound. A team of content experts brought together by Colehour and Cohen studied the issues, conducted preliminary research and finally developed a survey of shoreline landowners to be fielded to a sample of the more than 35,000 residential landowners around the

¹ TCW Economics. 2008. Economic analysis of the non-treaty commercial and recreational fisheries in Washington State. December 2008. Sacramento, CA. With technical assistance from The Research Group, Corvallis, OR.

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SOCIAL MARKETING STRATEGY

The Department's approach is to implement a program based on the principles of Social Marketing. Social Marketing integrates the science of behavior change with the principals of marketing to enable programs to meet the needs of their consumers while also creating positive social and environmental change. Social marketing has been used widely to help increase recycling, diminish pollution in waterways, reduce the use of chemicals applied in yard care, and myriad public health efforts – for example encouraging hand washing, use of seatbelts or smoking cessation.

Research in Social Marketing focuses on identifying *barriers* people may have in engaging with a particular activity as well as *motivators* that encourage them. Specific *incentives* can be provided to help overcome barriers – for example, by providing low interest loans or discounts if cost is known to keep people from engaging in an activity.

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- 15. No home, some erosion potential (low, moderate or high)
- 16. Existing home, no erosion potential
- 17. Existing home, low or moderate erosion potential
- 18. Existing home, high erosion potential

Members of each segment were asked about relevant behaviors relating to the list of nine key practices (see above). The full sample was analyzed to identify overall results. Characteristics of the respondents and the properties were also examined. Some segments had a very small numbers of respondents, which becomes problematic for statistical analysis. To address this, segments 1 & 2 were combined for these analyses (n=45, 31 in segment 1 and 14 in segment 2), as were segments 5 & 6 (n=8, 3 from segment 5 and 5 from segment 6).

A complete discussion of the research methods is provided in Appendix A. The complete text of the invitation, reminder and survey administered is provided in Appendix B.

Frequency reports of responses to all close-ended items are provided in Appendix C. Finally, open-ended responses are provided in Appendix D. In addition, tables of responses to each question by segment are provided under separate cover.

Appendices will be provided in the final draft.

FINDINGS

The following section describes the findings from a randomly selected audience of over 1,000 shoreline landowners in Puget Sound. Respondents were asked to describe their property, themselves and their experiences managing their property. Specific practices were presented and respondents were asked to assess their willingness to engage in the practices as well as identifying what would make them more or less likely to engage.

ABOUT THE PROPERTY

Respondents were asked a series of questions about their property. Table 1 shows how respondents described their property and ownership. Key findings include:

- Over half (54%) have owned their property for 20 years or more.
- Fifty-nine percent (59%) said they use the property as their year-round home.
- Forty-two percent (42%) described their property as low or no bank
- Roughly half (52%) said their home is more than 50 feet from the shoreline; five percent said their home is within ten feet of the shore.
- Thirty-five percent (35%) said the length of their shoreline is less than 100 feet; 24% said it 200 feet or more.

Table 1. Property description		
	n	%
Years of ownership (n=1,164)		
Less than 10 years	220	19
10-14 years	183	16
15-19 years	130	11
20-39 years	354	30
40 years or more	277	24
How property is used (n=1,164)		
It is my/my family's year-round home	683	59
As a seasonal/vacation property for me/my family	391	34
As a rental property	65	6
It is not used for any of these	42	4
Bank height (n=1,164)		
No bank or low	492	42
Medium	428	37
High	244	21
Distance between house and shore (n=1,111)		
Less than 10 feet	54	5
10 to 29 feet	191	17
30 to 49 feet	268	24
50 to 99 feet	342	31
100 feet or more	237	21
Don't know	19	2
Feet of shoreline (n=1,164)		
Less than 100 feet	402	35
100-149 feet	347	30
150-199 feet	133	11
200-499 feet	198	17
500+ feet	84	7

Respondents were presented with images and descriptions of seawalls, concrete walls, bulkheads, rip rap and other examples of structures that all fall under the category of “hard armor” and 42% said their property had such structures. Respondents with unarmored shorelines were asked if there had been hard armor on their property in the past that was since removed; less than one percent identified this on their property.

Respondents with armor on their shoreline were asked to describe it. A majority (71%) said that the entire length of their shoreline has armor. Over half (60%) said that the armor was in place before they purchased the property, though just under a third (31%) said that it was installed under their ownership. One-third have done maintenance or repaired the armor (31%) and 15% have replaced all or a portion of the armor.

Table 2. Property/owner armor history			
		<u>n</u>	<u>%</u>
Presence of armor (n=1,164)			
Seawall, bulkhead, concrete wall or rip rap present		485	42%
How much of shoreline has armor (n=485)			
All		346	71
More than half, but not all		56	12
Half or less		84	17
When armor was installed (n=485)			
It was all in place before I/my family owned it		293	60
Some in place before I/my family owned it and some added since that time		43	9
It was all installed since I/my family have owned the property		149	31
Work done with armor (n=485)			
Replaced all or a portion of the hard armor		75	15
Repaired or done maintenance on the hard armor		151	31
Removed any of the hard armor		11	2
None of the above		280	58

Throughout the report significant differences among owners with different types of properties are presented wherever they were detected.

Property characteristics within the segments

Two significant associations were found between property characteristics and segments. The first related to the height of the properties' embankments:

- Properties without a home and without armor (segments 1 and 2) were unlikely to be low or no bank properties (22% compared to 44% of the sample overall).
- Those with both homes and armor (segments 6 and 7) had lower banks (~60%) as long as their erosion potential was not high.

- Those with homes, armor and high erosion potential (segment 9) were predominantly on medium or high banks (65% compared to 58% of the sample overall).

The second association related to the distance between the house (if present) and the top of the property's bluff or shoreline:

- Houses were more often set back 100 feet or more among properties with no armor and no erosion potential (segment 3).
- Houses were more often within 50 feet of the bluff or shoreline among properties with armor and a high erosion potential (segment 9).

Property concerns

Respondents were asked early on in the survey to describe any current concerns that they have about their property as a shoreline property. Their responses were grouped by theme and tallied. Table 3 shows that the most frequent concerns involved erosion or stability of the property (23% of respondents surveyed). Twelve percent (12%) mentioned concerns or frustrations with regulatory restrictions and permitting issues. Other common themes included pollution and water quality as well as existing bulkhead maintenance. Respondents who chose to comment often touched on more than one issue, and half of respondents did not mention any concerns at all.

Table 3. Please describe any current concerns about your property as a shoreline property		
	<u>n</u>	<u>%</u>
Erosion/stability	261	23
Too many regulatory restrictions/permitting issues/government agencies/taxes	134	12
Pollution/contaminants/water quality/storm water runoff/septic systems/ecosystem health	75	6
Existing bulkhead maintenance	57	5
Rising tides/global warming	38	3
Trespassing/the public (wants beach private)	35	3
Beach/property access	20	2
Wants more armoring or protection	17	1
Need more government regulation, action and enforcement	15	1
Sediment, silt, debris accumulation	15	1
Wake from watercraft	15	1
Shellfish farming	14	1
Other: Miscellaneous and site specific	105	9
Nothing/None	584	50

n=1,164; Multiple responses permitted- percentages total more than 100%

Here are selected representative comments:

“Very concerned about the stability and health of the bluff”

“Water quality of seasonal stream as it relates to golf course runoff”

“Access to city water, new set-back rules, oil pollution from refinery, wave action from boats, future sea level rise”

“There is no bulkhead on the property. Shoreline management makes it impossible (and cost prohibitive) to install a bulkhead.”

“Very little beach left, not enough to leave kayak or rowboat overnight. I would like to construct a ramp, platform or dock, I'm now 70 and it is becoming more difficult to haul a boat from house to water. Concerned about rising sea level. Concerned about installing well on property. Occasional theft and vandalism”

ABOUT THE RESPONDENTS

The survey asked that an owner who “makes most of the decisions or who shares equally in decision making about this property” should be the person to respond to survey questions. Most respondents (68%) were male. More than half (59%) were retired, and most had a college degree or higher (81%). Owners tended to be substantially older than the general population, with 58% reporting ages of 65 or more. Income levels tended to be high, with 41% reporting annual household incomes of \$125,000 or more. More detail is presented in Table 4.

Table 4. Respondent demographics		
	<u>n</u>	<u>%</u>
Current employment (n=1,104)		
Employed full time	376	34
Employed seasonally or part time	66	6
Unemployed	16	1
Retired	646	59
Highest level of education (n=1,108)		
High school or less	46	4
Some college	163	15
College degree	384	35
Graduate/professional school	515	46
Age (n=1,112)		
Under 55	126	11
55-64	338	30
65 or older	648	58
Annual household income (n=771)		
Less than \$60,000	173	22
\$60,000-124,000	281	36

\$125,000-\$249,000	202	26
\$250,000 or more	115	15

Throughout the report significant differences between owners with varied demographic characteristics are highlighted where they were detected.

PLANT OR MAINTAIN NATIVE VEGETATION

Planting and maintaining native vegetation can help stabilize shoreline slopes and prevent erosion. Characteristics of native plants are such that their root systems provide better stabilization than non-native plants, they require less care and are more resilient in drought and cold.

Respondents were presented with definitions and photographs of native plant vegetation. They were asked to identify what planting and maintenance activities they have engaged in near the shoreline. Table 5 shows each of the activities and how many respondents have engaged in that practice. Most desirable are the activities that support existing or native vegetation. Over one-third (37%) of respondents indicated that they have pruned or limbed trees and/or plants in order to improve the view. A slightly smaller proportion (31%) said that they have planted additional native plants and one-quarter (25%) have replaced invasive weeds with native vegetation. Twenty-seven percent (27%) said they had engaged in none of these planting activities.

Table 5. Which of the following have you done at the property near the shoreline or between the house and the shoreline?		
	n	%
Pruned or limbed trees and/or plants in order to improve the view	430	37
Planted additional native trees, shrubs, or groundcover	359	31
Removed invasive weeds or plants and replaced them with native plants	288	25
Removed trees because they were about to fall	273	23
Planted native trees, shrubs or groundcover to stabilize your slope	180	15
Removed trees and plants in order to improve the view	128	11
Removed trees, shrubs or ground cover to install lawn	77	7
Removed all or part of the lawn and put in native trees, shrubs or groundcover	56	5
Other	159	14
None of these	315	27

n=1164; Multiple responses permitted- percentages total more than 100%

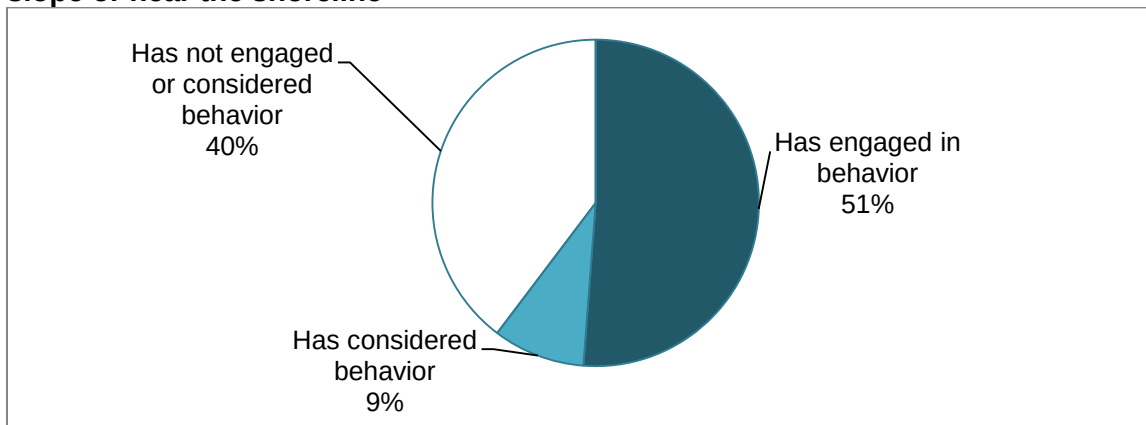
Planting native plants

Altogether, 51% of respondents said they have planted native plants on the slope or near the shoreline, including doing so after removing invasive weeds. Those with a home on their property (segments 3, 4 and 7-9) were almost three times as likely to have “planted additional native trees, shrubs or ground cover” as those without a home on their property. They were also more likely to have planted natives in order to stabilize their slope, especially if they had high erosion potential (segment 9, 30% compared to 15% for the full sample). This pattern is not evident for “removing invasive weeds and replacing them with natives.”

Respondents with a college degree were more likely to have said they have planted native plants (53% vs. 44%).

Those who had not planted natives were asked whether they had considered it. Figure 1 shows that 9% had not done this but had considered it and four out of ten had not planted native plants and had not considered doing so.

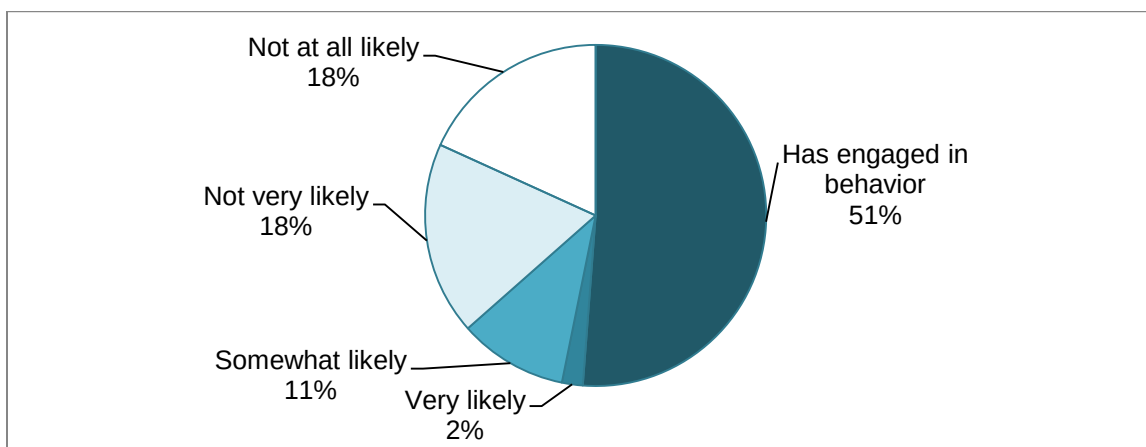
Figure 1. Prevalence and consideration of actually planting native plants on the slope or near the shoreline



n=1164

Respondents who had not planted native plants (49% of respondents) were further asked how likely they are to actually plant native plants on the slope or near the shoreline. Figure 2 shows that 14% had not planted native plants but were *somewhat* or *very likely* to do so.

Figure 2. Likelihood of actually planting native plants on the slope or near the shoreline



n=1164

Analysis found that age was related to the likelihood to plant native plants with younger respondents (especially under age 55) more inclined to say they are *very* or *somewhat likely* to do this.

Respondents who had not planted native plants but were at all likely to do so (*very likely*, *somewhat likely* or *not very likely*) were asked about what would make them more likely to plant native plants. Table 6 shows that the strongest motivators included knowing it improves slope stability, getting a tax break, and having confidence that property will be enhanced. Seeing examples and working with neighbors were not as motivating to respondents. “Knowing my slope is more stable” was particularly important among unarmored property owners with some erosion potential (segments 2 and 4).

Table 6. Which of the following would make you more likely to plant native plants on the slope or near the shoreline?		
	<u>n</u>	<u>%</u>
Knowing my slope is more stable because of it	134	38
Getting a tax break for doing it or help paying for it	115	32
Being confident that my property will be protected or enhanced by it	113	32
Enjoying the natural look of it	80	22
Providing healthy habitat for fish and wildlife	80	22
Knowing more about this and how to do it	72	20
Knowing where to get expert advice about it	54	15
Knowing how to plant so they don't block the view	49	14
Seeing examples of where this has been done	37	10
Knowing my neighbors are doing this or working together with my neighbors on this	22	6
Other	48	13

n=356; Multiple responses permitted- percentages total more than 100%

The same respondents were also asked what makes them less likely to plant native plants. Table 7 shows that the expense was the biggest barrier, followed by knowledge of how to do this. Concerns over their view being blocked by plantings were also mentioned by more than 10% of those responding.

Table 7. Which of the following makes you less likely to plant native plants on the slope or near the shoreline?		
	<u>n</u>	<u>%</u>
The expense of doing it	131	20
I don't know enough about this to do it	115	18
Trees and shrubs might block my view	77	12
The time it takes to do it	63	10
I don't know who to talk to about how to do it	58	9
They might block the view	57	9
I'd be concerned that my property would not be safe	20	3
I don't like the look of it	20	3
Other	102	16

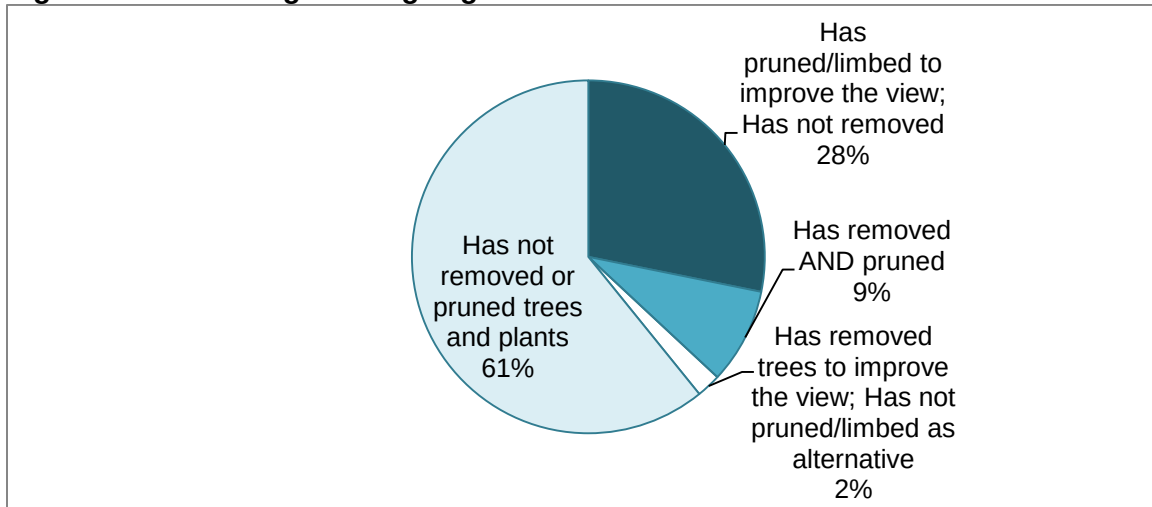
n=356; Multiple responses permitted- percentages total more than 100%

Maintain native vegetation

Maintaining native vegetation helps to keep slopes stable. One example of native plant maintenance was defined for the purposes of this survey: limbing and pruning trees and plants instead of removing them to improve the view.

Over half of the respondents indicated that they have not removed trees to improve the view, nor have they limbed or pruned for this purpose (61%). Just over one-quarter of respondents (28%) said that they have pruned or limbed to improve the view and have not removed trees for this purpose. Two percent of all respondents have removed trees or plants and have not engaged in the desired alternative (pruning).

Figure 3. Maintaining existing vegetation

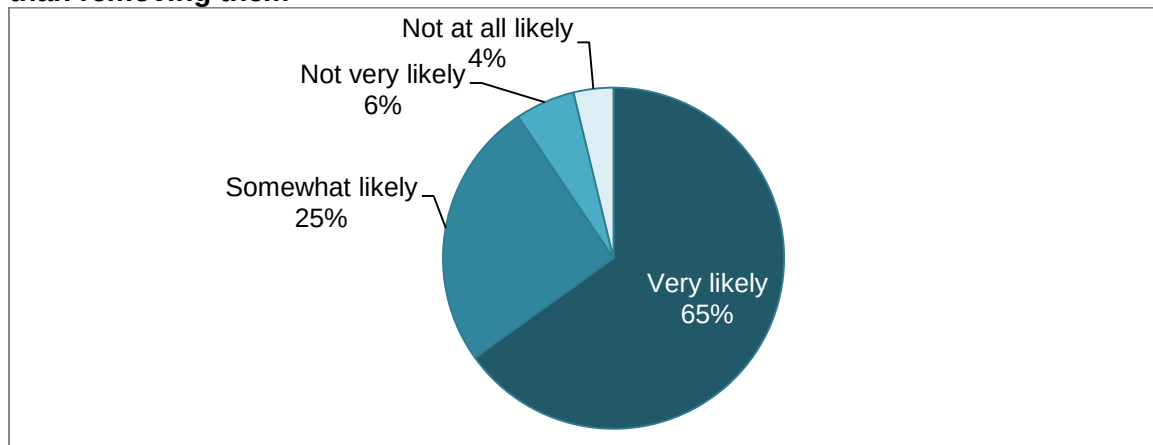


n=1,164

Properties with homes (segments 3, 4 and 7-9) were more likely to have pruned or removed plants in order to improve the view.

Those who had removed trees or shrubs to improve the view were asked how likely they would be to prune or limb trees and shrubs near the shoreline rather than removing them. Most (90%) are *somewhat* or *very likely* to actually prune or limb them instead of removing them (Figure 4).

Figure 4. Likelihood of actually pruning trees and shrubs near the shoreline rather than removing them



n=106

Demographic analysis found that respondents with a college degree were more likely to indicate high likelihood of pruning and limbing trees near the shoreline instead of removing them (compared to those respondents without a college degree).

Respondents who had removed trees to improve the view were asked about what would make them more likely to prune or limb trees or shrubs near the shoreline instead of removing them. Table 8 shows that the strongest motivators include knowing it improves slope stability, enjoying the natural look of it, and getting a tax break for it. Just over one-third (34%) said that providing healthy habitat for fish and wildlife is a motivating factor. “Enjoying the natural look of it” was particularly important to those with properties that had a home, but no armor and no erosion potential (57% of segment 3).

Table 8. Which of the following would make you more likely to prune or limb trees and shrubs near the shoreline rather than removing them (choose up to three)		
	<u>n</u>	<u>%</u>
Knowing my slope is more stable because of it	61	60
Enjoying the natural look of it	41	40
Getting a tax break for doing it or help paying for it	36	35
Providing healthy habitat for fish and wildlife	35	34
Being confident that my property will be protected or enhanced by it	32	31
Knowing where to get expert advice about it	15	15
Knowing my neighbors are doing this or working together with my neighbors on this	12	12
Knowing more about this and how to do it	8	8
Seeing examples of where this has been done	6	6
Other	4	4

n=102; Multiple responses permitted- percentages total more than 100%

Respondents who had removed trees to improve the view were also asked about what makes them less likely to prune or limb trees or shrubs near the shoreline instead of removing them. Table 9 shows that the biggest barrier was not knowing enough about it.

Table 9. Which of the following makes you less likely to prune or limb trees and shrubs near the shoreline rather than removing them?		
	<u>n</u>	<u>%</u>
I don't know enough about this to do it	22	22
I don't like the look of it	16	16
I don't know who to talk to about how to do it	12	12
Other	26	25

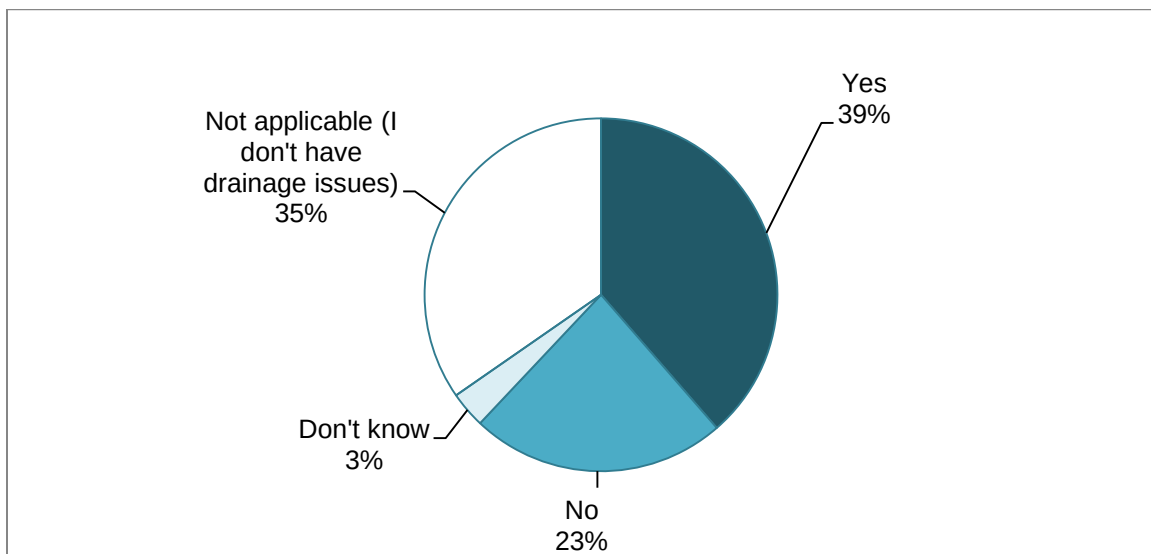
n=102; Multiple responses permitted- percentages total more than 100%

ADDRESS WATER DRAINAGE REACHING BLUFFS

Respondents with homes on moderate or high bank property were asked a series of questions about water drainage issues between the structure (home) and the shoreline.

Figure 5 shows that over one-third of these respondents said that they had done something to address water drainage on the property between their home and the shore. When asked to specify, the majority mentioned installing something like a drain pipe, tight line, curtain drain, or French drain. A similar proportion (35%) did not believe that they had drainage issues on their shoreline.

Figure 5. Have you done anything to address water drainage on the property between the structures and the shoreline?



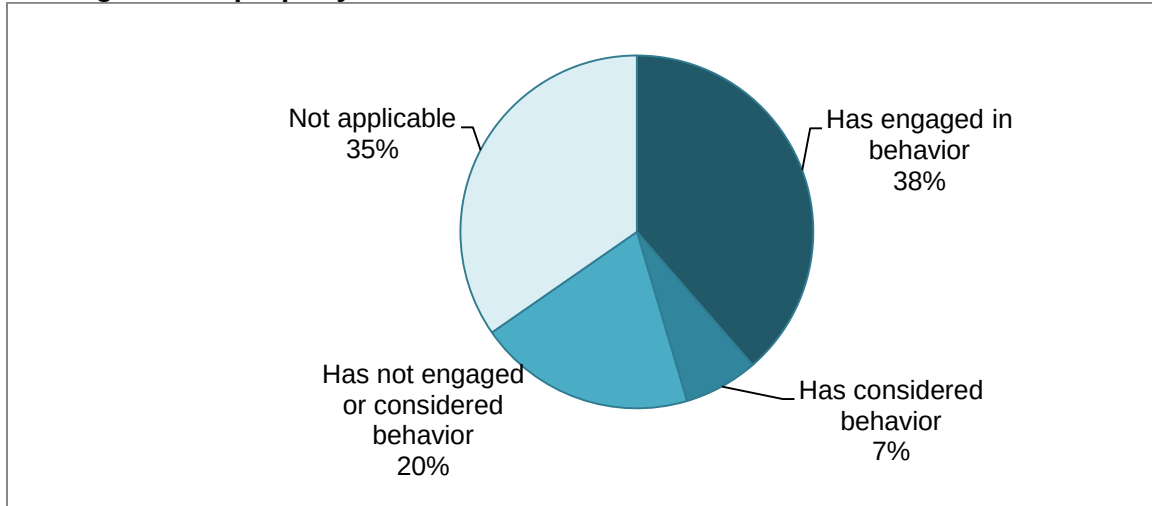
n=632, respondents with a home on their property

Owners of properties with homes but no erosion potential were least likely to have done anything to address drainage (~28% compared to 39% overall). They were also more likely to say that they didn't have any drainage issues (~44% compared to 35% overall).

Analysis also found that respondents with a college degree were more likely to say they had not done anything to address drainage issues on their property (26% vs. 11% of those without a college degree). Respondents with less than a college degree were more likely to say that they don't have drainage issues (47% vs 32%).

Respondents who had not done anything to address drainage were asked if they had considered doing something. Figure 6 shows that 7% said that they had and 20% had not.

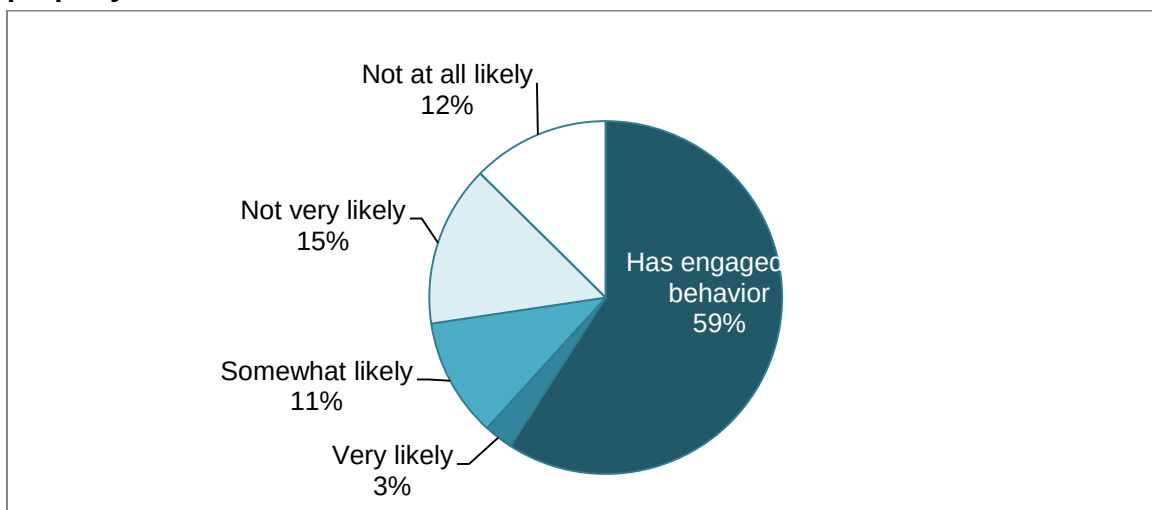
Figure 6. Prevalence and consideration of doing something to address water drainage on the property



n=632

Respondents who had not yet done anything to address drainage were asked how likely they were to actually do something to address water drainage on their property. Figure 7 shows that 14% said that they were *somewhat* or *very likely* to do something.

Figure 7. Likelihood of actually doing something to address water drainage on the property



n=413, note that those who said they did not have drainage issues are not represented in this graph

Respondents who had not yet done anything to address water drainage but were at all likely to do so (*very likely*, *somewhat likely* or *not very likely*) were asked what would make them more likely to address water drainage on the property. Table 10 shows that the strongest motivators included knowing it improves slope stability (53%), knowing more about it and how to do it (41%), and getting a tax break for doing it or help paying for it (38%). Working with neighbors was not as motivating to respondents.

Table 10. Which of the following would make you more likely to address water drainage on the property? (choose up to three)		
	<u>n</u>	<u>%</u>
Knowing my slope is more stable because of it	62	53
Knowing more about this and how to do it	48	41
Getting a tax break for doing it or help paying for it	44	38
Knowing where to get expert advice about it	28	24
Providing healthy habitat for fish and wildlife	22	19
Seeing examples of where this has been done	19	16
Knowing my neighbors are doing this or working together with my neighbors on this	12	10
Other	15	13

n=117; Multiple responses permitted- percentages total more than 100%

The same respondents were also asked what makes them less likely to address drainage on the property. Table 11 shows that half of these respondents felt that the drainage issue was minimal or non-existent (52%). The expense of addressing water drainage was also mentioned as a barrier (41%).

Table 11. Which of the following makes you less likely to address water drainage on the property?		
	<u>n</u>	<u>%</u>
Drainage issue is minimal/non-existent	61	52
The expense of doing it	48	41
I don't know enough about this to do it	31	26
I don't know who to talk to about how to do it	26	22
The time it takes to do it	12	10
I don't think my property is right for it	12	10
I don't like the look of it/how it would change my property	2	2
Other	6	5

n=117; Multiple responses permitted- percentages total more than 100%

LEAVE SHORE UNARMORED

Respondents with unarmored property were asked a series of questions about their concerns with erosion and whether they had considered or planned to add hard armor. Table 12 shows that roughly one-quarter (27%) said they don't have concerns with erosion on the property; the remaining majority has at least some concerns. Only 2% said that they plan to add hard armor in the next five years. Eleven percent (11%) had considered adding hard armor, but did not plan to do this in the next five years.

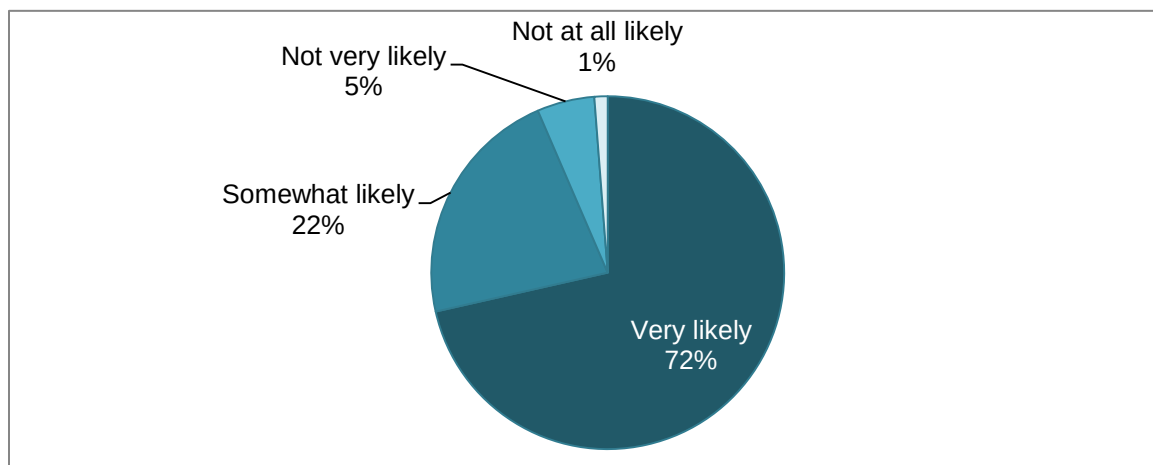
Table 12. Erosion concerns and plans to address them		
	n	%
No concerns with erosion on the property	185	27
Erosion concerns; has not considered anything to address concerns	260	38
Erosion concerns; has not considered hard armor	152	22
Erosion concerns; considered hard armor but not in the next 5 years	71	10
Erosion concerns; plans for hard armor in next 5 years	11	2

n=679

Owners of property without a home or armor (segments 1 & 2) reported the least concern about erosion (68% *not very* or *not at all concerned*) followed by those with a home, but no armor and no erosion potential (segment 3, 68% *not very* or *not at all concerned*). Concern was most often reported among those with some erosion potential (segment 4, 43% *not very* or *not at all concerned*). These respondents were also more likely to have considered doing something to address erosion (57% compared to 47% overall).

Analysis also found that age was related to erosion concerns; respondents over the age of 65 were less concerned about erosion on their property.

Respondents with any concerns about erosion were asked how likely they were to actually leave the shoreline in its natural state. Figure 8 shows that 72% of respondents with erosion concerns were *very likely* to leave it in its current state. Six percent (6%) were *not very* or *not at all likely* to do this.

Figure 8. Likelihood of leaving the shoreline in its current state

n=494

Analysis found that respondents over the age of 65 were particularly inclined towards leaving the shoreline in its current state (79% *very likely* vs 64% of those under the age of 65 and 61% of those under age 55).

Respondents who were at all likely to leave their shoreline in its current state (*very likely*, *somewhat likely* or *not very likely*) were asked about what would make them more likely to do this. Table 13 shows that the strongest motivators included being confident that the property will be protected or enhanced (54%), enjoying the natural look of it (46%), and providing healthy habitat for fish and wildlife (42%).

Table 13. Which of the following would make you more likely to leave your shoreline in its current state?

	<u>n</u>	<u>%</u>
Being confident that my property will be protected or enhanced by leaving it in its natural state	265	54
Enjoying the natural look of leaving it in its natural state	226	46
Providing healthy habitat for fish and wildlife	205	42
Getting a tax break for leaving it in its natural state	175	36
Keeping maintenance costs and maintenance time at a minimum	152	31
Knowing my neighbors are doing this or working together with my neighbors on this	60	12
Having easier access to the beach	45	9
Other	39	8

n=488; Multiple responses permitted- percentages total more than 100%

The same respondents were also asked what makes them less likely to leave their shoreline in its current state. Table 14 shows that erosion events and concerns were key barriers.

Table 14. Which of the following makes you less likely to leave your shoreline in its current state?

	<u>n</u>	<u>%</u>
If there were substantial changes in erosion of the shoreline	288	59
If I were concerned that my property would not be protected from erosion	270	55
If storms, waves or tides changed the shoreline dramatically	244	50
If it meant I couldn't extend the yard or lawn by using hard armor	8	2
Other	48	10

n=488; Multiple responses permitted- percentages total more than 100%

FAMILIARITY WITH SOFT SHORE PROTECTION

Respondents were presented with examples of engineered soft shore protection. Each was asked if they'd ever seen or heard of such work before, and 58% said they had.

Analysis found that men were more likely than women to say they have heard of soft shore protection (61% vs. 52%).

REMOVE OR REPLACE HARD ARMOR

Just under one percent (.9%) of unarmored properties (.5% overall) indicated that they had armor on their property when they first became an owner and that they removed it. Two percent (2%) of respondents with armored properties said that they have removed a portion of their armor (1% overall). Altogether, 1.5% of respondents surveyed have removed all or a portion of their armor.

Respondents with armored properties were introduced to the concept of removing all or a portion of hard armor and either letting the beach naturalize or replacing it with engineered soft shore protections. Respondents with hard armor on their shoreline were asked if they had ever considered taking any of these steps on their own property. Table 15 shows that the majority of respondents had not considered removing armor from their property (84%) and that the most prevalent consideration was having all or some of the armor replaced by soft shore protection (11%) as opposed to letting the beach naturalize.

Table 15. Have you ever considered having any of these done to the property?

	<u>n</u>	<u>%</u>
Having all hard armor removed and letting the beach naturalize	18	4
Having a portion of the hard armor removed and letting the beach naturalize	25	5
Having all or some of the hard armor replaced with engineered soft shore protection	52	11
None of these	399	84

n=474; Multiple responses permitted- percentages total more than 100%

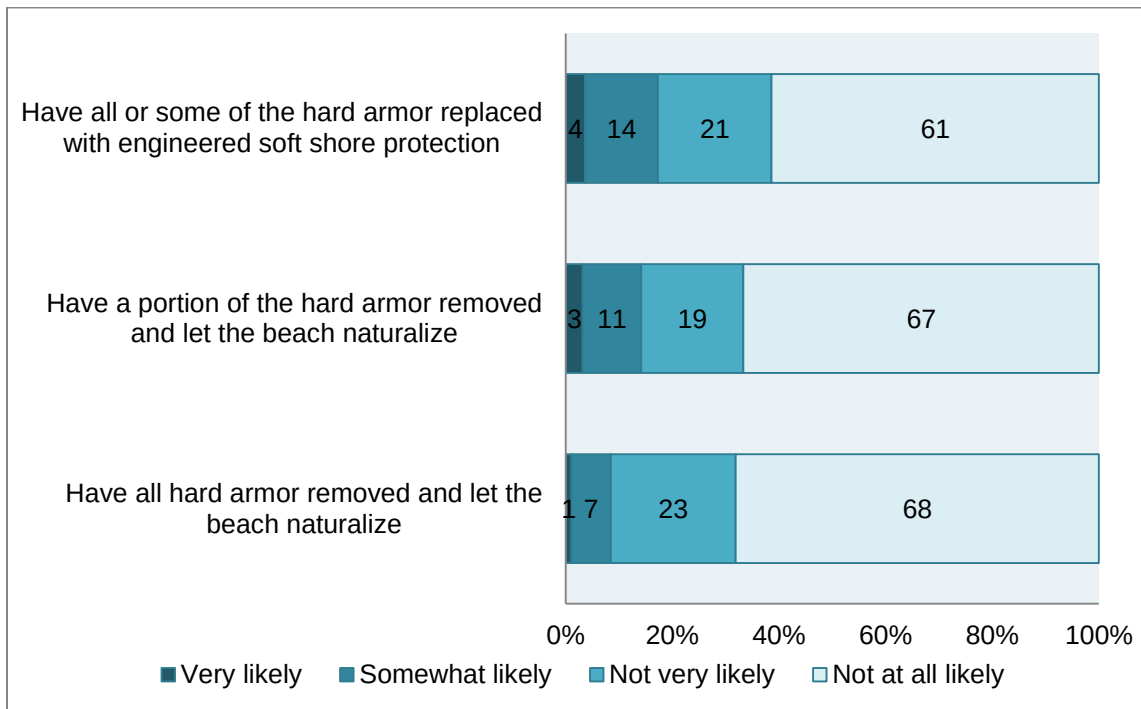
Analysis found that age was related to whether respondents had considered having all or some of the armor replaced with engineered soft shore protection. Over one quarter (27%) of respondents under the age of 55 said they had considered this option, compared to 12% of those between the ages of 55 and 64 and 8% of those 65 and older. Men were also more likely to say they had considered this (13%) compared to women (6%).

Analysis found that respondents under age 65 were also more likely to have considered removing all armor and letting the beach naturalize (6% vs 2% of those aged 65 and older).

Respondents age 65 and older were the most likely age group to say they had considered none of these options (88% vs. 69% of those under age 55). Ninety-one percent of women said this (compared to 82% of men).

Respondents were asked how likely they would be to actually have all or some of the hard armor removed and either let it naturalize or replace it with soft shore protection. Figure 10 shows that 18% of respondents said they were *somewhat* or *very likely* to have all or some of the hard armor replaced with engineered soft shore protection. This is slightly higher than the proportion who are *somewhat* or *very likely* to have a portion of the armor removed and let the beach naturalize (14%).

Figure 10. Likelihood of removing hard armor



n=474, respondents with armored shorelines

A larger portion of owners of properties with a home, armor and no erosion potential (segment 7) reported being *somewhat* or *very likely* to actually remove all their hard armor and let the beach naturalize than did others (13% compared to 8% overall). A much larger portion of those with homes, armor and high erosion potential (segment 9)

reported being *not at all likely* to do so (84% compared to 68% overall), though interestingly 7% also said they would be *somewhat likely* to do so.

Demographic analysis found that younger respondents were more inclined to say they were *somewhat* or *very likely* to do each of these three approaches to removing hard armor. Respondents with the highest income (\$250k+) were the least inclined to actually have all hard armor removed and let the beach naturalize (81% said *not at all likely* compared to 62% of those with income under \$250k).

Respondents who were at all likely to remove or replace hard armor (*very likely*, *somewhat likely* or *not very likely*) were asked about what would make them more likely to do this. Table 16 shows that the motivators were nearly identical across the three different scenarios (remove all, remove some, and replace all or some with soft shore alternatives). The strongest motivator was being confident that the property will be protected or enhanced (58% to 60%). Getting a tax break and getting a loan or grant also resonated with about a quarter to one-third of those respondents who are at all likely to take these steps.

Table 16. Which of the following would make you more likely to have...			
	All hard armor removed, let the beach naturalize	A portion of hard armor removed, let the beach naturalize	All or some of the hard armor replaced with soft shore protection
	<u>%</u>	<u>%</u>	<u>%</u>
Being confident that my property will be protected or enhanced by it	60	58	60
Getting a tax break or reduced fees for doing it	30	28	31
Getting a loan or grant to help pay for it	30	25	28
Streamlined permitting and processes	21	22	17
Providing healthy habitat for fish and wildlife	19	16	15
Knowing my neighbors are doing this or working together with my neighbors on this	12	13	11
Knowing more about this and how to do it	10	9	10
Gaining a beach	8	8	10
Knowing where to get expert advice about it	9	10	9
Enjoying the natural look of it	12	15	9
Having easier access to the beach	11	9	8
Seeing examples of where this has been done	9	9	4
Other	13	13	10

n=151|n=158|n=183; Multiple responses permitted- percentages total more than 100%

Only 11 owners of properties with homes, armor and high erosion potential (segment 9) also reported being at all likely to actually remove their armor and let their beach naturalize. However, almost all of these owners were motivated by being confident their property would be protected or enhanced if they did so (91% compared to 60% overall).

Respondents who were at all likely to remove or replace hard armor were also asked what makes them less likely to remove or replace hard armor. Table 17 shows that the top barrier was concern that the property would not be protected from flooding and erosion (60% to 64%). Also prominent was the barrier of cost (the expense of doing this).

Table 17. Which of the following makes you less likely to have...			
	All hard armor removed, let the beach naturalize	A portion of hard armor removed, let the beach naturalize	All or some of the hard armor replaced with soft shore protection
	%	%	%
If I were concerned that my property would not be protected from flooding and erosion	64	61	60
The expense of doing it	62	54	56
Regulatory and permitting agencies could make the process difficult	33	28	30
I don't know enough about this to do it	14	13	17
Being unable to maintain the extent of the yard or lawn by using hard armor	17	17	17
The time it takes to do it	11	11	9
I don't like the look of it/how it would change my property	4	4	5
I don't know who to talk to about how to do it	9	8	5
Other	17	15	11

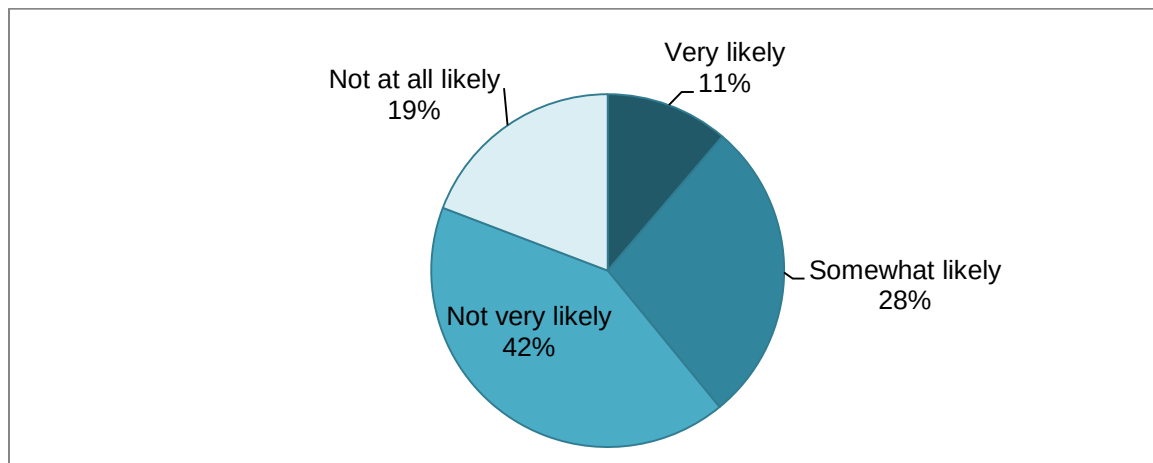
n=151|n=158|n=183; Multiple responses permitted- percentages total more than 100%

Only 45% of owners of properties with a home, armor and no erosion potential (segment 7) said they would be less likely to remove their armor and install engineered soft shore protection due to concerns that their property would not be protected by it, while this was a concern to 60% of others with armor.

INSTALL ENGINEERED SOFT SHORE PROTECTION

Fifty-nine percent (59%) of respondents with unarmored properties said that they had heard of soft-shore protection alternatives. When asked whether they had considered having this type of protection installed, 41% said that they had. In addition, 39% said that they were *very* or *somewhat* likely to actually have engineered soft shore protection installed (see Figure 11).

Figure 11. Likelihood of actually having engineered soft shore protection installed on unarmored property



n=151

Table 18 shows that the top motivator for installing soft shore protection was being confident it would protect or enhance the property (60%). Getting a tax break or reduced fees was also attractive (46%) and almost a third indicated that they were motivated by streamlined permitting (30%).

Table 18. Which of the following would make you more likely to install engineered soft shore protection?		
	<u>n</u>	<u>%</u>
Being confident that my property will be protected or enhanced by it	123	60
Getting a tax break or reduced fees for doing it	95	46
Streamlined permitting and processes for doing it	61	30
Providing healthy habitat for fish and wildlife	44	21
Getting a loan or grant to help pay for it	41	20
Knowing where to get expert advice about it	35	17
Enjoying the natural look of it	32	16
Knowing my neighbors are doing this or working together with my neighbors on this	32	16
Knowing more about this and how to do it	26	13
Having easier access to the beach	19	9
Seeing examples of where this has been done	12	6
Other	15	7

n=205; Multiple responses permitted- percentages total more than 100%

Owners from segments with a home but no erosion potential (segment 3) were especially interested in getting a loan or grant to help pay for it (28% compared to 14% of those with erosion potential). Those with a home and some erosion potential (segment 4) were more likely to choose “being confident my property will be protected or enhanced by it” (66% versus 53% of those with no erosion potential). This segment was also much more likely to say that “knowing my neighbors are doing this or working together with my neighbors” was a motivator (21% versus 7% of those with no erosion potential).

Respondents who showed any interest in installing soft shore protection on their unarmored shorelines were asked what makes them less likely to do so. Key barriers, shown in Table 19, were difficulties with regulations and permitting (57%) and expense (55%). Some concern about the efficacy of the approach was also highlighted (41%).

Table 19. Which of the following makes you less likely to install engineered soft shore protection?		
	<u>n</u>	<u>%</u>
Regulatory and permitting agencies could make the process difficult	116	57
The expense of doing it	113	55

If I were concerned that my property would not be protected from floods or erosion	84	41
I don't know enough about this to do it	47	23
Other	25	12
The time it takes to do it	20	10
I don't know who to talk to about how to do it	17	8
I don't like the look of it/how it would change my property	5	2
Being unable to extend the yard or lawn by using hard armor	0	0

n=205; Multiple responses permitted- percentages total more than 100%

OBTAIN EXPERT ADVICE

Respondents were asked whether they had sought expert advice regarding their shoreline. Table 20 shows the various sources of advice and the proportion who have used each type. One-fifth (20%) of respondents said that they have consulted with a private consultant like a geologist, shoreline engineer or landscape architect. A slightly smaller proportion (16%) said that they have obtained advice from a city or county planner or permitting official.

Table 20. Have you ever obtained information or expert advice regarding your shoreline, bluff or hard armor from any of the following?		
	n	%
Private consultant (geologist, shoreline engineer, landscape designer/architect)	238	20
County or city planner or permitting official	186	16
Longtime local resident, friend or family member (non-professional source)	155	13
Contractor	139	12
Biologist or planner from state agency (from Fish and Wildlife, Dept. of Ecology)	71	6
Conservation district	56	5
Academic professional	44	4
WSU extension	37	3
Another nonprofit organization	26	2
SeaGrant	7	1
Other government or professional	59	5
None	678	58

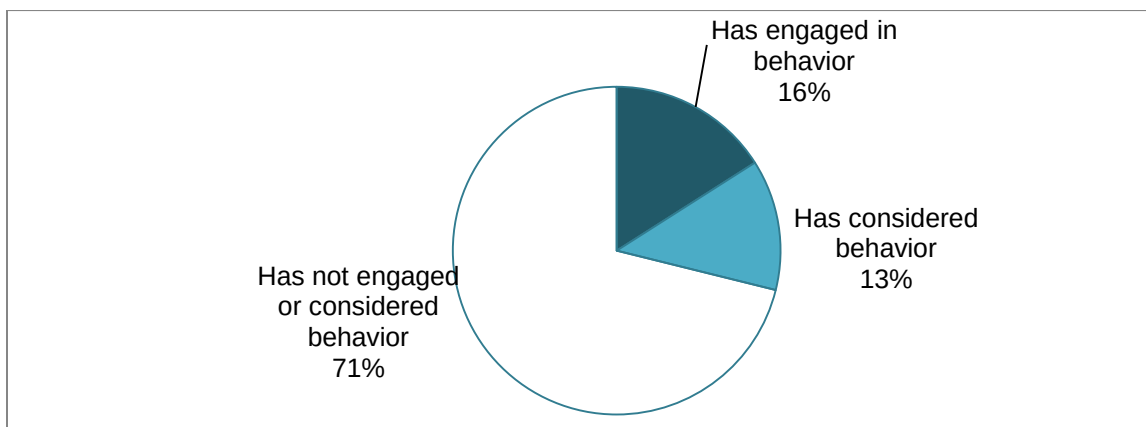
n=1164; Multiple responses permitted- percentages total more than 100%

Analysis found that respondents under age 55 were more likely to have consulted with a city or county planner or permitting official (25% vs 15% of those over age 55). Also, those with armor (segments 5 thru 9) were much more likely to have talked with a contractor (~19%) than those with no armor (~7%). Those with no armor (segments 1 & 2) were unlikely to have talked to anyone about their shoreline (78% versus 58% overall).

Respondents with a home, armor and high erosion potential (segment 9) were much more likely to have consulted with a county or city planner or permitting official (37% versus 16% of these respondents overall). These were also much more likely to have talked to a private consultant (44% versus 20% overall), and somewhat more likely to have talked to longtime local residents, friends or family members (25% versus 13% overall).

Respondents who had not obtained advice from a city or county planner or permitting official were asked whether they had ever considered this. Figure 12 shows that 13% said that they have considered this, though the majority (71%) had not.

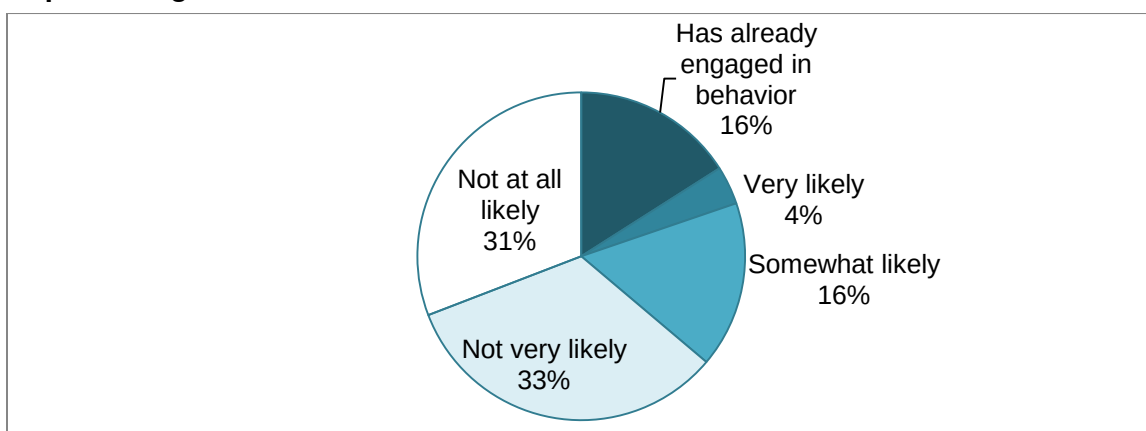
Figure 12. Prevalence and consideration of seeking expert advice from a county or city planner or permitting official



n=1,164

Respondents were asked how likely they would be to actually seek expert advice from a county or city planner or permitting official. Twenty percent (20%) said that they were *somewhat* or *very likely* to do this (see Figure 13).

Figure 13. Likelihood of actually seek expert advice from a county or city planner or permitting official



n=1,164

Likelihood to consult with a planner or permitting official increased with the presence of a home, armor and erosion potential. For example, 67% of those in segment 9 (home, armor and high erosion potential) and 77% of those in segment 4 (home, no armor and some erosion potential) were *very*, *somewhat* or *not very likely* to consult with a planner

or permitting official. This is significantly higher than 56% of those with no home and no armor (segments 1 & 2).

Demographic analysis found that respondents under age 65 who have not sought expert advice from a planner or permitting official were more likely to have considered doing this when compared to those 65 and older; they were also more likely to say they were *somewhat* or *very likely* to do this in the future.

All respondents were asked what would make them more likely to get expert advice in the future from any professional, including private consultants and non-profits about issues regarding the shoreline and hard armor. Respondents indicated they would be most motivated by substantial changes in erosion of the shore or bluff (44%), followed by storms, waves or tides changing the shore dramatically (40%). Forty-percent (40%) also said that they would be more likely to get advice if it made them confident that the property would be protected or enhanced.

Table 21. Which of the following would make you more likely to get expert advice in the future from any professional (planners and permitting officials as well as private consultants or non-profits) about issues regarding your shoreline, bluff or hard armor?

	n	%
If there were substantial changes in erosion of the shore or bluff	516	44
If storms, waves or tides changed the shore or bluff dramatically	466	40
Being confident that my property will be protected or enhanced by it	461	40
Free advice from an expert (one who will not try to sell you additional services)	383	33
Streamlined permitting and processes for doing it	224	19
Getting access to loans and grants or reduced fees for doing it	201	17
Knowing who to talk to	129	11
Other	128	11

n=1163; Multiple responses permitted- percentages total more than 100%

Storms, waves or tides changing property dramatically were particularly motivating to owners with a home, no armor and some erosion potential (segment 4). Just over half (51%) of those respondents selected it as one of their top three motivators compared to 40% of landowners overall. Landowners in segment 9 (home, armor and high erosion potential) were least motivated by this (28%).

Similarly, those in segment 4 were most likely to say that “substantial changes in erosion of the shore or bluff” would motivate them (54% compared to 44% of respondents

overall). Owners of armored properties were least motivated by this (segments 5-9) though many still selected it (38%).

Segment 9 owners were motivated by being confident that their property would be protected or enhanced by it (65% compared to 40% overall). Those without a home or armor were much less motivated by this (segments 1 & 2, 24%)

All respondents were also asked what would make them less likely to get expert advice in the future from any professional, including private consultants and non-profits about issues regarding the shoreline and hard armor. Respondents identified the top barrier as the expense associated with it (51%). Over one-quarter (29%) said that they don't see any value in doing this.

Table 22. Which of the following would make you less likely to get expert advice in the future from any professional (planners and permitting officials as well as private consultants or non-profits) about issues regarding your shoreline, bluff or hard armor?

	<u>n</u>	<u>%</u>
The expense of doing it	594	51
I don't see any value in doing it	337	29
I don't know who to talk to about how to do it	218	19
The time it takes to do it	185	16
Other	220	19

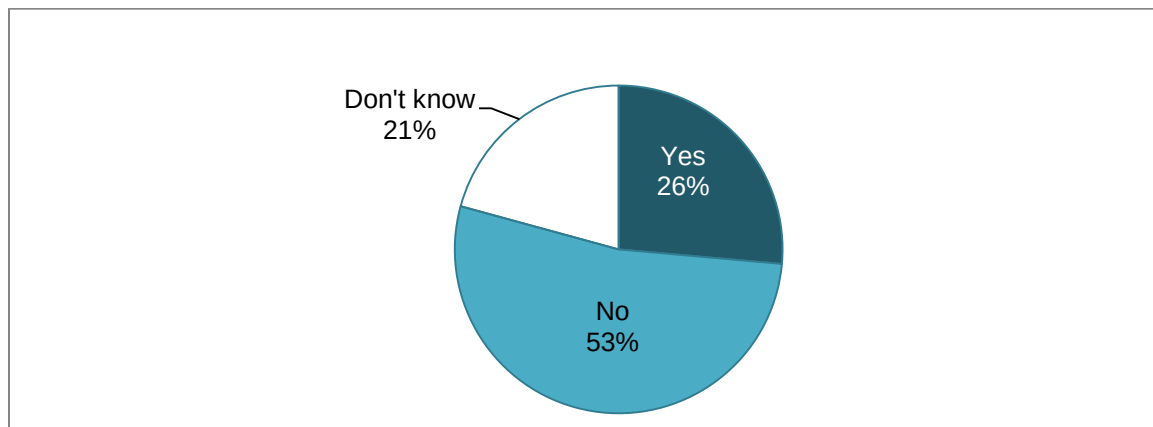
n=1163; Multiple responses permitted- percentages total more than 100%

Segment 3 (home, no armor and no erosion potential) was less likely to cite expense (43% compared to 51% overall). Most concerned by expense were those with a home, armor and no erosion potential (segment 7).

BUILD FURTHER FROM THE SHORELINE

Respondents without homes on the property were asked whether they plan to add buildings to the property in the next five to ten years. One quarter (26%) said that they do plan to build. Those with armor (segments 5 & 6) were more likely than those with no armor (segments 1 & 2) to plan to do so, though this should be considered with care since only eight respondents fell into the armored/no home segment.

Figure 14. Do you expect to add any buildings to the property in the next five to ten years

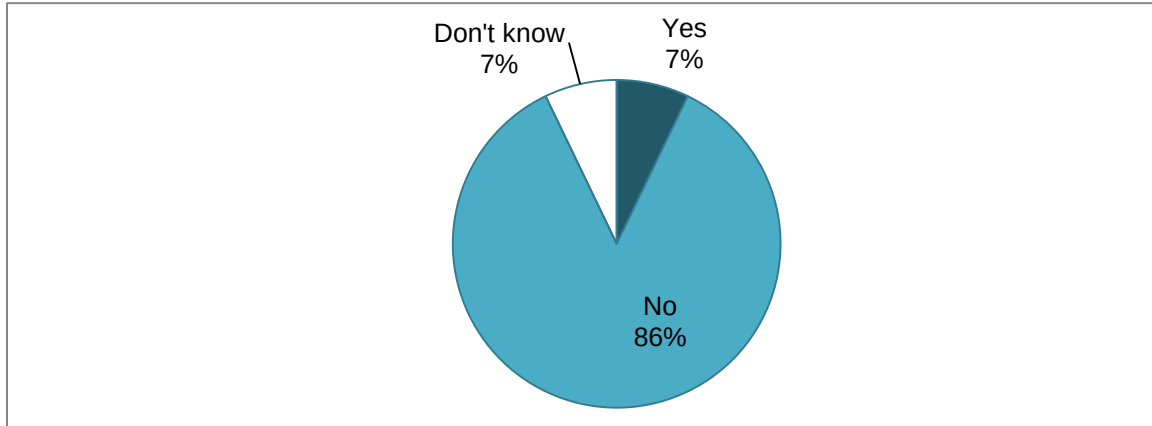


n=53

Respondents under the age of 65 were more likely to say they plan to add buildings to their property (39% vs 15% of those 65 and older).

Respondents who said they plan to build in the next five to ten years were asked whether they had considered building further from the shoreline than required by regulations; seven percent said that they had considered this (see Figure 14).

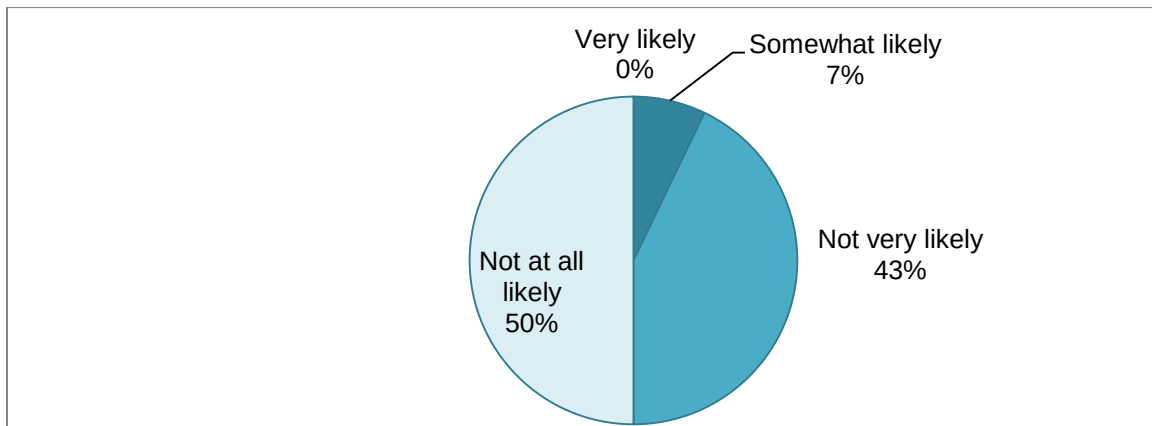
Figure 14. Have you ever considered building further from the shoreline than is required by current regulations?



n=14

These respondents were also asked how likely they would be to build further from the shoreline than is required by current regulations. Figure 15 shows that half said this was *not at all likely* and another 43% said it was *not very likely*.

Figure 15. How likely are you to actually build further from the shoreline than is required by current regulations?



n=14

A very small group of respondents (n=7) were asked about their motivators and barriers around building further from the shoreline than required by current regulations. As a group, their top motivator was knowing that their home would be better protected from

floods and erosion. The biggest barrier they cited was that the property isn't big enough to allow for building further from the shore.

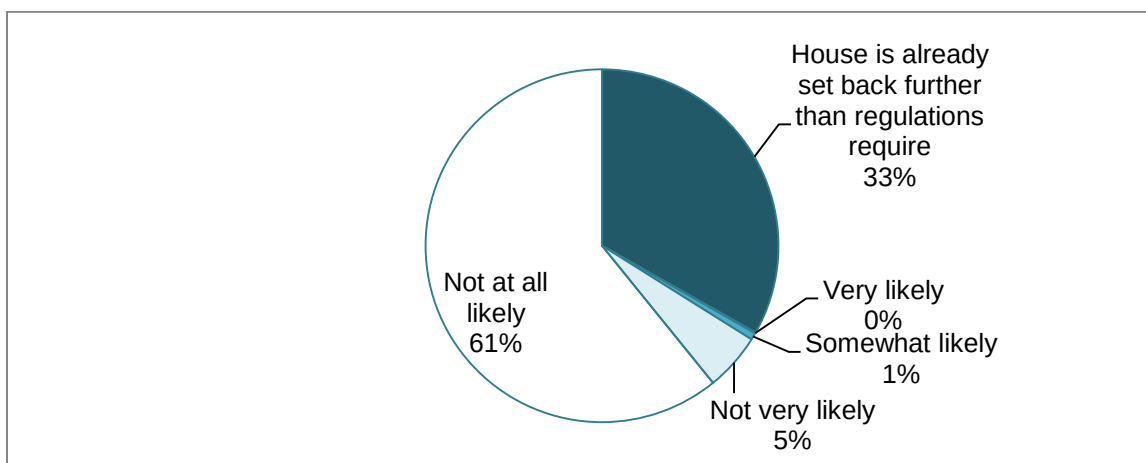
MOVE HOME FURTHER FROM SHORELINE

Respondents with a home on the property were asked if their house is set back further from the shoreline than current regulations require. One-third (33%) said this was true for their property. These were more likely to be segments without armor (3 & 4), suggesting some interplay – that either building the home closer to the shore prompts the installation of armor, or that the presence of armor leads people to build closer to the shore. Analysis found that men were more likely than women to say that their house is set back.

The remaining respondents were asked how likely they would be to consider and actually move their home further from the shoreline. Respondents with armor were instructed to respond with the assumption that it meant they could have the potential to remove hard armor and restore all or some of the natural shoreline. Respondents without armor were instructed to respond with the assumption that they could keep their shoreline as it currently is.

Figure 16 shows that one percent of respondents would be *somewhat* or *very likely* to actually move their home further from the shoreline. Those most amenable to the idea of considering this were those without armor but some erosion potential and those with armor and no erosion potential.

Figure 16. Likelihood of considering and actually moving the home further from the shoreline



n=1,104

Respondents whose homes are not already back further than required and are at all likely to actually move their home (*very likely*, *somewhat likely* or *not very likely*) were asked about what would make them more likely to move their house further from the

shoreline. Table 23 shows that the strongest motivators included experiencing a major erosion or flood event (33%) and being confident that the property will be protected or enhanced by this step (31%).

Table 23. Which of the following would make you more likely to move the house further from the shoreline?		
	<u>n</u>	<u>%</u>
Experiencing a major erosion or flood event	21	33
Being confident that my property will be protected or enhanced by it	20	31
Knowing it's possible to move my house without damaging it	17	27
Getting a tax break or reduced fees for doing it	13	20
Knowing the house would be better protected from floods or erosion	13	20
Knowing more about the cost	11	17
If it would help provide healthy habitat for fish and wildlife	8	13
(If currently no hard armor) If it were less expensive than installing and maintaining a bulkhead to protect my house	7	11
Knowing where to get expert advice on how to do it	6	9
Streamlined permitting and processes for doing it	5	8
Being able to have a bigger yard and/or a natural beach	2	3
Other, please describe:	13	20

n=64; Multiple responses permitted- percentages total more than 100%

These same respondents were asked about what would make them less likely to move their house further from the shoreline. Table 24 shows that half of these respondents don't think this is necessary (48%) and one-third (34%) said that their property isn't big enough to allow for moving the house further from the shore. Another quarter (27%) indicated that they would have concerns about it damaging their house.

Table 24. Which of the following makes you less likely to move the house further from the shoreline?		
	<u>n</u>	<u>%</u>
I don't think it's necessary	31	48
My property isn't big enough to allow for moving further from the shore	22	34
If I thought it would damage my house	17	27
I don't know enough about the cost of doing it	14	22
I don't know enough about this to do it	7	11
I don't plan to live here long enough to make it worthwhile	6	9
I don't know who to talk to about how to do it	3	5
I don't want the building to be set back that far from the shoreline	3	5
I don't like the look of it	0	0
Other	10	16

n=64; Multiple responses permitted- percentages total more than 100%

SUMMARY

Shoreline landowners in Puget Sound are key stakeholders in the process of helping restore habitat around the Sound. This survey showed that many are already engaged in many of the desirable behaviors and that more are likely to become engaged. Some are one-time behaviors, such as building a new home further from the shoreline than regulations require. Others require ongoing attention, such as maintaining native vegetation.

Table 25 shows the relative frequency with which respondents said they had already engaged in the behaviors. Those that require no action (*not* removing native plants and *not* armoring the shore) were most commonly found. Least common was removing armor. Reducing surface water drainage has been done by less than half of the respondents with high or moderate bluffs and homes on their property, but nearly the same portion (35%) reported having no drainage problems. It is likely that these property owners are unaware of drainage issues that are impacting their bluff or shoreline. Raising awareness for those owners would be a recommended first step for the campaign.

Table 25. Shoreline landowners participation in behaviors	
Maintained native vegetation (has not removed vegetation to improve the view)	89%
Shoreline is currently unarmored	58%
Planted native vegetation	51%
Reduced surface water drainage reaching bluffs	39%
Home is further from shoreline than regulations require	33%
Ever sought professional advice from a city or county planner or permitting official	16%
Removed all or a portion of existing armor	2%

Note: Respondents were not asked if they had already installed engineered soft shore protection.

Table 26 shows the likelihood of those who have not engaged in the behavior doing so. At the high end, 94% of respondents with unarmored properties said they are *very* or *somewhat likely* to leave the shore unarmored. At the low end, only 7% of those who are planning to build a house on their property said they were *very* or *somewhat likely* to build further back than current regulations require, though only 14 cases without homes already on the property were planning to build within the next five years.

Table 26. Shoreline landowners' likelihood of engaging in targeted practices (for those who are not yet doing so)

	n	Very or somewhat likely	Not very likely	Not at all likely
Leave Shore Unarmored	494	94%	5%	1%
Maintain Native Vegetation	106	90%	6%	4%
Install Soft Shore Protection on unarmored property	151	39%	42%	19%
Address Water Drainage Reaching Bluffs	169	33%	36%	31%
Plant Native Vegetation	568	25%	38%	37%
Obtain Expert Advice	978	24%	39%	37%
Replace Armor With Soft Shore Protection	474	17%	21%	61%
Remove A Portion Of Armor	474	14%	19%	67%
Remove All Hard Armor	474	8%	23%	68%
Building further from the shoreline than current regulations require	14	7%	43%	50%
Move Home Further From The Shoreline	737	1%	8%	91%

Note: these figures are based on the number of respondents who were asked the question; some numbers will differ from those presented in the body of the report.

Adding, maintaining or removing armor are among of the most impactful decisions landowners can make on helping or harming habitat and shorelines. Removing all or a portion of the armor are the lowest rated behaviors of the group, though more than 30% expressed some likelihood of doing so. Presented with relevant information to cue their motivation and proper incentives, even this difficult, expensive task may be undertaken by some. It is very promising to note that unarmored shoreline owners seem very willing to leave their property as is or use habitat-friendly engineered soft shore protection if needed.

Program outreach will need to attend carefully to the many varied characteristics of each shoreline property. Segmentation helps to identify some of the opportunities for customizing the program design. Below we present the likelihood of participating in behaviors within each of the nine segments explored in the survey analysis.

Table 27 shows the proportion of respondents who are *very* or *somewhat likely* to engage in each behavior within each segment. This allows for a relatively quick comparison of different segments. For example, segment 7 appears to be the most likely to plant native vegetation, especially compared to segments 1 & 2 (33% vs. 15%). Segment 7, which has armor and homes but no erosion potential has higher likelihood of participating in many of the behaviors than similar segments with more erosion potential. Caution is recommended when interpreting the findings from cells with fewer than 20 cases.

Table 27. Very or somewhat likely per behavior by segment							
Armor:	No Armor			Armor			
Home:	No home	Home		No home	Home		
Erosion Potential:	Any	None	Lo/Mod/High	Any	None	Lo/Mod	High
Segment #:	1 & 2	3	4	5 & 6	7	8	9
Plant Native Vegetation	15% (n=34)	23% (n=163)	30% (n=145)	17% (n=6)	33% (n=69)	21% (n=136)	33% (n=15)
Maintain Native Vegetation		95% (n=38)	94% (n=31)		69% (n=13)	95% (n=21)	67% (n=3)
Address Water Drainage Reaching Bluffs		29% (n=62)	33% (n=57)		35% (n=17)	38% (n=24)	44% (n=9)
Leave Shore Unarmored	97% (n=30)	92% (n=206)	94% (n=258)				
Remove All Hard Armor				0% (n=8)	13% (n=152)	6% (n=271)	7% (n=43)
Remove A Portion Of Armor				13% (n=8)	20% (n=152)	12% (n=271)	7% (n=43)
Replace Armor With Soft Shore Protection				13% (n=8)	24% (n=152)	15% (n=271)	7% (n=43)
Install Soft Shore Protection on unarmored property	50% (n=2)	36% (n=44)	40% (n=105)				
Obtain Expert Advice	18% (n=39)	24% (n=287)	26% (n=265)	0% (n=6)	27% (n=131)	22% (n=223)	22% (n=27)
Build further from the shoreline than current regulations require	9% (n=11)			0% (n=3)			
Move Home Further From The Shoreline		0% (n=22)	11% (n=46)		5% (n=20)	14% (n=14)	0% (n=2)

Grey cells indicate that the behavior is not applicable to the segment