Shoreline Technical Assistance for Homeowners in the Puget Sound Region

Potential service delivery models and lessons learned from existing programs

Prepared for Puget Sound Partnership Ecosystem Coordination Board Regulatory Subcommittee by Nicole Faghin and Skadi von Reis Crooks, Washington Sea Grant, University of Washington, February 2015.

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Executive Summary

Issues

The Puget Sound Partnership ("the Partnership"), in its 2020 Recovery Target for Puget Sound, recognized that one strategy for protecting and restoring habitat along Puget Sound is to remove or reduce construction of armoring and encourage design of soft-shore alternatives on residential properties. However, the typical shoreline homeowner may not have access to information about alternative approaches for addressing specific conditions on his or her property.

Washington Sea Grant (WSG), with guidance from the Partnership, conducted research to determine the components necessary for providing technical assistance to shoreline homeowners. This report describes the results of the research and provides a framework for determining what would be included in a comprehensive regional technical assistance program. This program framework can be used by the Partnership, state agencies, or nonprofits in the Puget Sound region to evaluate how to build such a program.

Approach

The research was based on interviews conducted with 18 individuals; 12 of these individuals are engaged in some aspect of shoreline technical assistance in the Puget Sound region. Two of the interviewees work with programs in Maryland and were included because of the relevance of those programs to providing technical assistance to shoreline homeowners. WSG developed the interview sample using a chain referral method starting with recommendations from the Partnership and WSG staff. Each interviewee was asked to suggest additional interviewees.

The interviews posed a series of questions related to areas of service, key people in the process, required knowledge and expertise, and funding requirements. These questions were designed to solicit information about the structure and function of technical assistance programs. Five programs were evaluated in greater depth because of the comprehensive nature of services provided. Interviews for these programs became the primary basis for the findings. Write-ups from these five interviews are included in the appendices to the report.

Nine key topics emerged addressing various aspects of shoreline technical assistance programs. In addition, four major elements of technical assistance programs emerged. These elements were used to develop five program models.

The Partnership provided staff support for this research, including input on the scope of work, reviews of the research, and report content. The Partnership convened an advisory committee that included representatives from San Juan County, Kitsap County, Clallam County, City of Seattle, Water Resource Inventory Area 8, the King Conservation District and the Puget Sound Partnership. The committee reviewed and commented on drafts of the report throughout the process and provided recommendations.

Structure of Report

This report is intended to provide the framework for a service delivery model for technical assistance to shoreline homeowners. Section I provides background information regarding the Partnership's interest in reducing shoreline armoring, examination of the processes undertaken by shoreline homeowners to control erosion on their properties, and the role of the advisory committee.

Section II describes the research methods used in the study. These include the way in which individuals were selected for interviews, the types of questions asked, and the method of analyzing the information.

Section III includes a synthesis of the information gathered from the interviews sorted into key topic areas: (1) stakeholders, (2) the role of jurisdictions, (3) technical knowledge requirements, (4) potential points of contact with homeowners, (5) program costs and funding, (6) monitoring, (7) interaction with contractors, (8) training needs, and (9) program facilities and capabilities. These topic areas provide background information used to identify the primary elements to be included in a comprehensive technical assistance program.

Section IV presents a framework for a regional technical assistance program based on the interviews and assessment of the elements identified in Section III. Using this framework, we proposed five model programs, which differ based upon the entity responsible for program oversight.

Section V summarizes the information gathered about existing programs. At this point in the process, the advisory committee recommended a more limited approach of focusing on specific gaps in existing programs. A recommendation for next steps towards developing of a comprehensive technical assistance program is included.

Key Findings

Interviews with individuals from 14 different programs, primarily within the Puget Sound region, provided important information for developing a comprehensive technical assistance program. Our key findings include:

- A number of parties need to be engaged in providing technical assistance to shoreline homeowners. At a minimum, a program will need to consider the roles of homeowners, an oversight entity, a program manager, funding entities, and technical experts. Technical expertise will be needed in coastal or geotechnical engineering, vegetation management, permitting, and setbacks from shoreline bluffs.
- Multiple opportunities to engage with shoreline homeowners and provide education and technical assistance exist. When designing a program, it will be important to consider how and when homeowners interact with local government, realtors, and contractors.
- Funding sources for existing technical assistance programs are typically based upon grants of limited duration. Finding consistent funding sources for programs and resulting projects has been a challenge for the programs reviewed in the Puget Sound region. This will be an issue going forward.
- The framework developed and based on the interviews includes an oversight entity to administer the program and its funding, and a program manager responsible for implementing it. The minimum elements of a technical assistance program are:
    - a method to prioritize sites to address high-priority habitat and narrow the scope of projects,
    - educational outreach to homeowners about shorelines and impacts associated with armoring and bulkheads, and availability of technical assistance,
    - site visits to evaluate the needs of individual sites and opportunities for alternatives to armoring, and
    - a funding mechanism to support the program and the cost for project design and construction.

A program based on this framework could be developed for the Puget Sound region in a number of different ways. Five models for such a program are provided in the report. The programs are distinguished by the type of oversight agency: conservation district, state agency, nonprofit, county, or a hybrid of state agency and nonprofit. Each of these models identifies an oversight administrator, a program manager, and methods for prioritizing sites, providing outreach, and conducting site visits for homeowners. Two levels of site visits are identified: a first visit to assess the site's general condition and, if needed, a second to prepare a feasibility study. Each model includes suggestions for funding the program.

The advisory committee reviewed the five models. Although committee members supported the establishment of a comprehensive service model, they decided to recommend a more limited initial approach as the best use of limited funding. The gap identified by the advisory committee was the lack of adequate services to provide expert technical assistance to homeowners. Greater access to qualified professionals, such as licensed engineers capable of providing feasibility reports, would be needed to address this gap, but existing programs have limited funding and staff resources to provide this service. Developing a program to provide these expert services on a regional basis could address the concerns of the advisory committee. The advisory committee also believed that we could subsequently expand and modify the program based on what we learned from our initial efforts.

Summary and Recommendations

Many different programs provide some aspect of technical assistance to shoreline homeowners in the Puget Sound region. It is important not to replicate these services and to coordinate as closely as possible. Many jurisdictions indicated that they did not have access to service providers or the resources to assist individual homeowners who were considering alternatives to hard armoring. The Partnership Leadership Council and the advisory committee recommended that any new technical assistance program be built upon the existing programs.

Establishing a regional program would require the following steps:

1. identifying the highest priority areas for shoreline restoration,
2. identifying where the need for services is greatest in terms of both landowner interest and constraints in the availability of resources such as technical providers and funding, and
3. determining whether to establish a comprehensive pilot program or a larger number of subregional programs providing limited services initially.

The study was unable to fully examine potential sources of sustainable funding. This would be a high priority as the region proceeds to implement a shoreline assistance program.

The effort to develop a technical assistance program, whether comprehensive or more limited, should address the issues of consistency, continuity, and coordination. Steps that should be taken as part of this effort include (1) developing a comprehensive list of existing programs and beginning a process to identify a consistent method for program delivery, (2) assessing what additional services are needed and in which regions efforts should be focused, and (3) evaluating options for long-term funding.

The information collected for this report provides a framework for developing a technical program for shoreline homeowners. Implementation of a comprehensive program or a more limited delivery of expert technical assistance will require further research and collaboration.

Section I: Background and Report Structure

Relationship to Puget Sound Partnership Action Agenda

One of the three strategic initiatives in the 2012/2013 Puget Sound Partnership (the "Partnership") Action Agenda is the protection and restoration of habitat. One of the strategies proposed in the Action Agenda for meeting this goal included promoting changes to shoreline armoring: *Remove armoring and use soft armoring replacement or landward setbacks when armoring fails, needs repair, is non protective, and during redevelopment.*[1] The 2020 Recovery Target for shoreline armoring includes the following:

- A net decrease in the overall amount of armoring constructed along Puget Sound
- Ensuring jurisdictions require the use of "soft-shore" techniques for bulkhead replacement and new construction, when possible, at the state and local levels
- Locating structures so that armoring is not required or can be removed
- Focusing efforts on feeder bluffs

Puget Sound Partnership Leadership Council Direction

On July 10, 2013, the Partnership Leadership Council heard presentations from local jurisdictions, state agencies, and nonprofits on challenges for meeting the region's objectives to reduce shoreline armoring. Presenters discussed the need for assistance to landowners who were contemplating changes to their property and to jurisdictions that might not have the technical information necessary to challenge customers who proposed to install new or replacement hard armoring.

As a result of the presentations, the Partnership Leadership Council recommended convening a group of interested partners to evaluate the feasibility of providing "regional roving technical assistance teams" to landowners who are willing to adopt alternatives to armoring.[2] The council asked whether the regional response team model could also provide technical services to jurisdictions. The intent was to examine a more cost-effective approach to providing these types of services as an alternative to funding technical assistance capability at each jurisdiction and to determine what types of services would be necessary and feasible.

In response to this request, Partnership staff entered into a contract with Washington Sea Grant (WSG) to research service delivery models for providing technical assistance to homeowners and to prepare a report and document results. WSG evaluated existing programs in the Puget Sound region and Maryland in an attempt to identify key elements of such programs.

Purpose

The purpose of this report is to provide a framework for a comprehensive regional technical assistance service delivery model for shoreline homeowners along Puget Sound. The service delivery model (i.e., a method for providing technical assistance) would be available to shoreline homeowners who are considering either bulkhead removal or soft shoreline alternatives to control erosion and protect or restore nearshore and estuary systems.

Role of Advisory Committee

The Partnership staff acted as the primary point of contact for the research conducted by WSG. In addition, the Partnership convened an advisory committee of interested parties, including those jurisdictions that had participated in the July 2013 Leadership Council meeting, to review the initial research design, recommend additional research questions and persons to be interviewed, evaluate potential models, identify gaps in service, and provide insight into how to best assist shoreline homeowners. These included representatives from San Juan County, Kitsap County, Clallam County, the City of Seattle, Water Resource Inventory Area (WRIA) 8, the King Conservation District, and the Puget Sound Partnership.

[1] Puget Sound Partnership (2012), Highlights of the 2012/2013 Action Agenda for Puget Sound, available online: *http://www.psp.wa.gov/downloads/AA2011/083012_final/Action%20Agenda%20Book%201_Aug%2029%202012.pdf*.

[2] PSP Leadership Council Meeting Notes, July 10–11, 2013, available online: *http://www.mypugetsound.net/index.php?option=com_docman&task=doc_view&gid=2214&Itemid=238* (last visited July 14, 2014).

The advisory committee convened on December 17, 2013. It received an initial outline of programs to be researched and questions to be asked. Afterward, it made the following recommendations:

1. Provide technical assistance to planners at hearings on disputed permits and when they review permit applications and exemptions.
2. Try to incorporate the technical assistance team into existing programs.
3. Interview more conservation districts.
4. Look for programs that are financially self-sustaining.

WSG made several changes in the research as a result of recommendations from the advisory committee:

- WSG staff interviewed a local planner to understand the issue of technical assistance for planners (see Appendix A for interview). The advisory committee decided that while such assistance is important, this research should continue to focus on shoreline homeowners rather than planners.
- WSG focused on fitting service delivery models into existing programs instead of proposing new programs.
- WSG interviewed staff members from three conservation districts. These interviews, especially those with King County Conservation District representatives, helped inform one of the five models presented in this report.
- WSG investigated how technical assistance might be funded. Each proposed model presented in section IV of this report includes a funding section, and we briefly address training for geotechnical contractors.

The advisory committee met a second time on April 7, 2014, to review additional sections of this report in progress and discuss potential program models. In a third meeting held on April 22, 2014, the committee discussed a gap in the services currently provided within the Puget Sound region. It noted that homeowners and programs assisting homeowners typically lack funding for detailed site assessment by a licensed coastal engineer or vegetation management specialist.

The advisory committee recommended that this report acknowledge the gap in services currently provided. It proposed that, rather than proceeding with a comprehensive technical assistance program, this report should focus on identifying how to provide shoreline homeowners with free, site-specific expert technical assistance, most importantly from licensed coastal engineers familiar with soft-shore alternatives to armoring. Also, other expertise was recommended for vegetation management and setback engineering. Once the initial reduced scope of services has been successfully implemented, the program could be expanded.

Report Structure

Section II, Research Methods, describes the research methodology referenced in preparing this report. It includes a description of what programs were identified for research and how they were selected. It also includes an overview of the topics discussed during each of the interviews and the methodology used to analyze the data from the interviews.

In Section III, Key Topics and Components, the information gained from the interviews is summarized under a series of topic headings. These have been identified as key issues and components to consider when developing a shoreline technical assistance program. Key takeaways are included for each topic. The section concludes by identifying the range of services that should be provided in a typical shoreline technical assistance program.

Section IV, Key Findings and Models for Regional Technical Assistance Programs, synthesizes the information about key topics and outlines a framework for designing model programs for technical assistance to shoreline homeowners. This section includes five model programs of comprehensive technical assistance based upon this framework. These models differ based on the type of entity providing oversight. Following the five model descriptions is a discussion of the advisory committee's suggestions for a limited approach to providing services as an initial step toward a regional program.

Section V, Summary and Recommendations, describes the elements of a comprehensive technical assistance program. It also identifies issues associated with coordinating and harmonizing new programs with existing programs. In addition, ideas are proposed for further investigating existing programs to determine the need for services, a comprehensive list of existing programs, and a method for consistent funding.

Appendices A through E include a summary of an interview with a local planner concerning technical assistance needs in one jurisdiction, the research questions, a list of the 18 interviewees, summaries of five key interviews, and a sample geotechnical feasibility report.

Section II: Research Methods

This study's primary objective was to outline a technical assistance service delivery model to assist shoreline homeowners. It set out to examine what was available in the region, identify key components of a comprehensive program, and determine how to deliver those services on a regional basis, drawing upon existing programs.

WSG staff conducted interviews with representatives of programs in the Puget Sound region and sought to review comparable programs in other regions. WSG then used information from the interviews to identify key elements of a comprehensive technical assistance program.

In designing this research, we were interested in learning about the structure and function of programs for shoreline homeowners from individuals actively involved in such programs. We developed a set of questions (Appendix B) that sought information about four main elements of service: key people in the process, knowledge and expertise, steps in the process, and necessary resources. These questions were developed in conjunction with the Partnership with input from members of the advisory committee. The questions asked included the following:

- Could you describe your program, including goal and region?
- What stakeholders, agencies or partners are involved, and how do they fit into your program?
- Who is involved in providing the program and what technical expertise do they have?

Interview Sample

We developed our interview sample using a "snowball," or chain-referral strategy. We first selected prospects to interview from existing regional, local, and state assistance programs within and outside Washington. Partnership and WSG staff identified initial interviewees based upon knowledge of existing programs. The advisory committee suggested additional candidates. Then WSG staff invited these initial interviewees to recommend other important contacts relevant to the research. Thirty-two potential interviewees were contacted by email or by phone. Twenty-eight responded, and 18 were interviewed (Appendix C) and recorded. The other 10 contacts gave valuable information regarding context and referred other contacts.

Of the 18 people interviewed, 14 were involved in providing some aspect of technical assistance to shoreline homeowners. Five of their programs were selected for in-depth interviews and analyses because of their comprehensive nature; summaries of these interviews are provided in Appendix D. These interviews provided the primary source of information contained in the key topics and program elements found in Section III. These programs included the following:

- Maryland Department of Natural Resources Shoreline Conservation Service
- Chesapeake Bay Trust and the South River Federation
- South Puget Sound Salmon Enhancement Group
- Kitsap County Department of Community Development
- Puget Sound Conservation Districts

Additional interviews with the following organizations also contributed to our research:

- Friends of the San Juans
- North Olympic Salmon Coalition
- Washington Sea Grant
- Northwest Straits Foundation
- City of Kirkland
- Pierce County Conservation District
- Snohomish County Conservation District
- Snohomish County Marine Resources Committee

We interviewed members of the two Maryland programs after conducting a nationwide search for comparable state programs.

Analysis Approach

Ten major topic areas emerged from the interviews:

- Stakeholders involved in providing technical assistance to shoreline homeowners
- Role of jurisdictions
- Technical knowledge of providers
- Potential points of contact with homeowners
- Program costs
- Program and project funding
- Program monitoring
- Interaction with contractors
- Training needs
- Program facilities

We described how these topics relate to the development of a technical assistance program and provide a summary of information gained from the interviews (Section III). These topics formed the basis for developing five separate model programs (Section IV).

Section III: Key Topics and Components for Technical Service Delivery Programs

Interviewees were asked about a range of issues associated with providing technical assistance to shoreline homeowners. This section summarizes key findings for each of the topics defined at the end of Section II. The findings informed the framework development for a technical assistance service delivery model.

Key Topics

The following topics provide detailed descriptions of elements necessary to create a service delivery model for providing technical assistance to shoreline homeowners.

Stakeholders

The interviews served to identify a wide range of parties involved in providing technical assistance to, and receiving technical assistance for, shoreline property owners. In addition to the homeowners themselves, involved parties include program and project managers and regulators, as well as other professionals who provide support within or independently of government organizations.

The people and entities involved in a technical assistance program fall into ten major roles.

Homeowners

The most important stakeholders are the people who own homes along freshwater and saltwater shorelines. Insights into the issues faced by homeowners and opportunities for interaction are described in the "Social Marketing Strategies" reports developed under the Marine and Nearshore Grant Program.[3]

[3] Colehour + Cohen, Applied Research Northwest, Social Marketing Services, Futurewise and Coastal Geologic Services, A Social Marketing Strategy to Reduce Armoring Behavior on Puget Sound, available online: *http://wdfw.wa.gov/grants/ps_marine_nearshore/results_products.html* (last visited July 10, 2014).

Government Regulators

This group is responsible for regulating the shoreline. In Washington this group might include:

- Washington Department of Natural Resources (WDNR)
- Washington Department of Fish and Wildlife (WDFW)
- U.S. Army Corps of Engineers (USCOE)
- Washington Department of Ecology (WDOE)
- Local tribes
- Local county and city permitting agencies

Oversight Agency or Administrator

The oversight agency is primarily responsible for administering the technical assistance program. It is the fiscal agent and may also be responsible for program management. While not all interviewed programs used this term, WSG staff included oversight agencies as playing a key role in the models. Examples of oversight agencies include the following:

- State agencies
- Conservation commission
- Nonprofit organizations
- A nonprofit trust created by state legislation
- A federal agency

Program Manager

The program manager implements the technical assistance program and is also typically responsible for outreach and providing technical assistance to the homeowner. The program manager may or may not be responsible for funding projects. Examples of program managers include the following:

- Conservation districts
- Nonprofit organizations
- Divisions with a state agency
- Counties
- City planning offices with consultant assistance

Program Funders

Not all programs interviewed have provided funding. However, if funding was involved in the assistance to a homeowner, this aspect was identified as an essential element. A further discussion of funding options is included in "Program Costs and Funding" (p. 11). Sources of funding might include:

- Federal agencies including the U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (USEPA), and National Oceanic and Atmospheric Administration (NOAA)
- State agencies such as the Partnership, WDFW, WDNR, WDOE
- County departments
- Nonprofit organizations offering grants
- Conservation districts (e.g., public or private grants, assessments, partnerships, or contributions)
- Homeowners

Project Funders

Once a program begins to work with a homeowner on a bulkhead removal or on an alternative design, this site-specific project requires funding. Entities that help with project funding for homeowners in Washington may include:

- State agencies (e.g., PSP, WDFW, WDNR, WDOE, Washington State Conservation Commission (WSCC)
- Federal agencies (e.g., USFWS, EPA, NOAA)
- Conservation districts (e.g., public or private grants, assessments, partnerships or contribution)
- Homeowners

Outreach Assistance Providers

These groups have been or could be involved in outreach to homeowners on soft-shore methods discussed in the interviews. Such groups might include:

- Marine resource committees
- Conservation districts
- Washington State University extension offices
- WSG
- Nonprofit organizations
- Local governments
- Local or state agencies

Preliminary Technical Assistance Providers

This refers to providers of site-specific preliminary assistance. This would include site assessment for soft-shore alternatives not requiring a licensed engineer. Such assistance excludes the actual design and implementation by certified geotechnical engineers. Providers can include:

- Nonprofit organizations
- Marine contractors trained in soft-shore methods
- Geotechnical consultants contracted by local government
- Conservation districts
- State agencies
- WSG
- City planning offices assisted by consultants

Technical Experts

Technical experts are required to varying degrees depending on the project, including:

- Coastal engineering geologists (either private contractors or program staff)
- Vegetation management specialists (conservation district or county staff, nonprofits, private contractors)
- Construction and implementation experts (private contractors)
- Permitting specialists at city and county planning departments, state agencies, and conservation districts, nonprofits, and private contractors (usually the same entity as the program manager)

Contractor

The contractor is a specialist in bulkheads or soft-shore methods who designs and builds the structure.

Other groups who have played important roles in the process include:

Neighborhoods: The neighborhood is considered a stakeholder because (1) neighbors are concerned about the impact on their property from adjacent properties, (2) designing neighborhood-scale soft-shore restoration projects is a cost effective use of resources, and (3) more soft-shore options are available when the project is larger in scale (e.g., beach nourishment).[4] Four interviewees identified the role of neighborhood action as an element for achieving restoration objectives.

[4] Washington Department of Fish and Wildlife (2014) Marine Shoreline Design Guidelines, available online: *http://wdfw.wa.gov/publications/01583/ wdfw01583.pdf.*

Real estate agents: Realtors are often the first point of contact with a new homeowner, making their role extremely important in characterizing local shoreline management practices and options. For example, one interviewee noted that real estate agents continue to advertise bulkheads as an asset.

Local integrating organizations (LIOs): One interviewee noted it would be necessary for any program to get buy-in from the regional LIO.

***Citizen groups*:** Citizen groups can be involved in a variety of ways, typically galvanizing neighborhoods or providing monitoring groups such as Beachwatchers. For example, Beachwatchers has been involved in designing a monitoring program with the help of WSG to monitor pre- and post-construction effects in a Kitsap County program. Citizen groups can also organize within a neighborhood concerned about erosion and share resources.

Existing providers: The addition of existing providers as a key stakeholder calls out the importance of acknowledging the programs and efforts already in place around Puget Sound, of which at least 10 provide some degree of technical assistance. These existing providers should be kept in mind when considering a regional program model.

TAKEAWAYS: Stakeholders

Stakeholders to consider when providing technical assistance:

- Homeowners
- Government regulators
- Oversight agency
- Program manager
- Funding entities
- Outreach assistance
- Initial technical assistance
- Technical experts and engineers
- Contractors
- Neighborhoods
- Real estate agents
- Local integrating organizations
- Citizen groups
- Existing providers of technical assistance

Role of Jurisdiction

In Washington State, local jurisdictions are responsible for issuing permits associated with development along the shoreline.[5] Some jurisdictions require a permit to construct a bulkhead or install armoring to protect property from erosion. In that case, the jurisdiction plays an active role with the homeowner. In other jurisdictions, a property owner may be exempt from the permit process because the bulkhead is considered repair work.[6] Alternatively, the homeowner may be exempt where it is demonstrated the bulkhead is necessary to prevent loss or damage from erosion.[7] In cases where no permit is required, the role of the jurisdiction may not be as clear.

While the primary role of a jurisdiction is to issue permits, it also has a role providing technical assistance. Interviewees commented on the important role jurisdictions play when homeowners approach the local government for a bulkhead permit. This is an opportunity to redirect the individual to a program that would provide education and technical assistance for alternatives to bulkhead construction.

Many of the comments from the interviewees focused on issues and concerns associated with the permit process. However, this research does not focus on the regulatory context of providing technical assistance and, therefore, it does not address opportunities and constraints associated with the existing permit process.

Technical Knowledge Required

Most interviews indicated the need for specialized technical knowledge about shorelines and shoreline processes. They noted that most shoreline homeowners do not have the technical knowledge or expertise to determine if erosion control measures may be required for their shoreline, and what alternatives to armoring may be feasible for a given site.

Interviewees identified three main categories of expertise required to help homeowners:

Licensed coastal engineering geologist or geotechnical engineer: This is a specialist with knowledge of coastal processes, hydrology, erosion control, ecology and habitat restoration, and risk assessment and management. The expert needs to have strong skills in the characterization of geologic conditions and processes as well as knowledge of how specific development activity affects those processes.

[5] RCW 90.58.140

[6] RCW 90.58.030(3)(e)(vi)

[7] WAC 173-27-040(2)(c)

Vegetation management specialist: This type of expert has knowledge of how vegetation impacts erosion and native plants.

Permitting expert: A permitting expert navigates the complex regulatory environment surrounding shorelines. All programs interviewed assisted with the permitting process to some degree. Types of assistance included bringing regulators to the site prior to application and assistance filing the permits. In some programs, knowledge of easements was also necessary. Many programs have a program manager to provide homeowners a consistent point of contact with regulatory agencies over multi-year project timespans.

In addition, the advisory committee recommended acknowledging the need for experts to determine how to set back buildings from bluffs and the shoreline.

The interviews indicated that programs provide two different levels of technical knowledge: some programs provide staff with general shoreline technical knowledge acquired through experience, while other programs include staff with professional certifications or degrees.

The steep learning curve for program providers during initial permitting of soft-shore projects was mentioned frequently as a challenge. Interviewees identified solutions for technical assistance at various jurisdictional levels. For example, one interviewee suggested organizing watershed-level technical assistance to deal with challenging permits (e.g., U.S. Army Corps of Engineers). Another interviewee suggested organizing technical assistance at the county level, and a third suggested organizing it through LIOs.

Local jurisdictions also need technical expertise. While it is not part of this research, technical expertise is noted as a related requirement (Appendix C). In one interview, San Juan County planning staff noted specific points in the permitting process when independent geologic expertise would be helpful to a planner or hearing examiner:[8]

- When an applicant first begins to consider whether they need a shoreline stabilization structure, and when they are deciding what type of alternative to use.
- After an application is submitted and the planner is unsure of the appropriateness of the design. If impartial geologic review of an application is necessary, the tasks associated with this review would likely be to (1) conduct a site visit, (2) review the report submitted by the applicant, (3) provide a written recommendation to the staff and/or hearing examiner, (4) attend and testify at the public hearing (if there is one), and (5) attend and testify at the appeal hearing should the project be appealed.

Interviewees suggested that planners could receive training to address this problem. However, while additional training might help planners identify important issues, technical experts are still needed to review and comment on geotechnical reports and to testify at public hearings. Providing training to planners would not be sufficient to give hearing examiners and appeal boards confidence in their recommendations.

TAKEAWAYS: Technical Knowledge

- Four main types of technical knowledge are needed:
  1. Coastal geologic engineering
  2. Vegetation management
  3. Permitting
  4. Setback issues
- Permitting expertise has a steep learning curve for those providing assistance because of the complexity and variation across jurisdictions. The method in which the sub-regions are divided can further help or hinder those providing permitting assistance.

Potential Points of Contact with Homeowner

A number of potential intervention points present themselves when a homeowner goes through the process to build a new bulkhead or repair an existing one. WSG staff identified six typical steps (Figure 1). These are each explained in the following section of this report.

The technical assistance service delivery models we developed focus on early intervention; that is, during the first two steps in the process, which present opportunities to provide education, outreach, and technical advice to homeowners about alternatives to armoring their property.

Interviewees identified a number of opportunities to engage with and educate homeowners and provide technical assistance for alternatives to bulkheads or armoring. Considering the points of contact for these interactions also helps highlight who, other than the homeowner, could be educated about alternative erosion control measures.

[8] Appendix A: Technical Assistance Needed for Planners and Hearing Examiners

1. ***Homeowner → Contractor***

   The homeowners call a contractor, based on their own research or recommendations from a neighbor or other source. Unless a contractor understands design of soft-shore alternatives, the usual result is construction or replacement of a bulkhead or armoring. Educating contractors about soft-shore design and technical assistance programs could help promote non-armoring solutions.

2. ***Homeowner → Program***

   Homeowners learn about an NGO/workshop/conservation district and contact the program directly for assistance or more information. This method is generally facilitated by program outreach efforts.

3. ***Homeowner → County/City***

   Homeowners are motivated to contact the permitting agency before engaging a contractor in certain circumstances, such as when they want to learn more about the process before starting design. The advantage of this method, typically by a motivated homeowner, is that it precedes investment in a bulkhead design by a contractor.

4. ***County/City → Homeowner***

   A county or city may engage in direct outreach to shoreline landowners. This can provide a way to target prioritized sites, and may lead to neighborhood-scale solutions.[9]

5. ***Program → Homeowner***

   An organization contacts a homeowner directly about a shoreline issue, such as a failing bulkhead. This method requires extensive local knowledge and provides direct communication between a program and the homeowner.

6. ***Real Estate Agent → Homeowner***

   A real estate agent may be the first point of contact for a buyer of a shoreline property, and thus have the first opportunity to educate a homeowner about technical assistance programs. None of the programs we encountered made connections with this method, though many of the interviewees recognized the potential value.

Many interviewees commented on the benefit of having a non-governmental organization or non-regulatory body contact homeowners. They noted that homeowners tended to be less trusting of government entities offering assistance.

TAKEAWAYS: Point of Contact with Homeowners

- Points of contact vary greatly depending on the program.
  - In some instances the homeowner reaches out for assistance.
  - In other cases programs or entities reach out to the homeowner and are the first point of contact.
- Homeowners tend to respond more readily to outreach from non-regulatory bodies.

Program Costs and Funding

A technical assistance program needs a source of funding to cover costs of administering a program and providing for office space, staff, and any equipment necessary to operate the program. Moreover, sources of funding are necessary for site visits, feasibility studies, and the actual design and construction of a project when the opportunity arises to remove a bulkhead or implement alternative shoreline protection measures. Some of the costs and sources of funding identified in the interviews are as follows.

Program Costs

Interviewees said it was important to provide homeowners with reduced or free assistance to encourage participation. Interviewees noted that cost should not be a barrier when considering armoring alternatives. In a 2014 report, the top barrier for shoreline homeowners to remove armoring was expense.[10] Therefore, if a technical assistance program could reduce or eliminate the costs to homeowners, there may be a greater willingness to remove armoring or consider alternative shoreline treatment.

[9] WAC 173-26-231 requires a geotechnical analysis to justify construction of bulkheads: "New or enlarged structural shoreline stabilization measures for an existing primary structure, including residences, should not be allowed unless there is conclusive evidence, documented by a geotechnical analysis, that the structure is in danger from shoreline erosion caused by tidal action, currents, or waves."

[10] Colehour+Cohen (2014) Social Marketing to Reduce Puget Sound Shoreline Armor – Evaluating Barriers & Motivators to Shoreline Armor, p. 5.

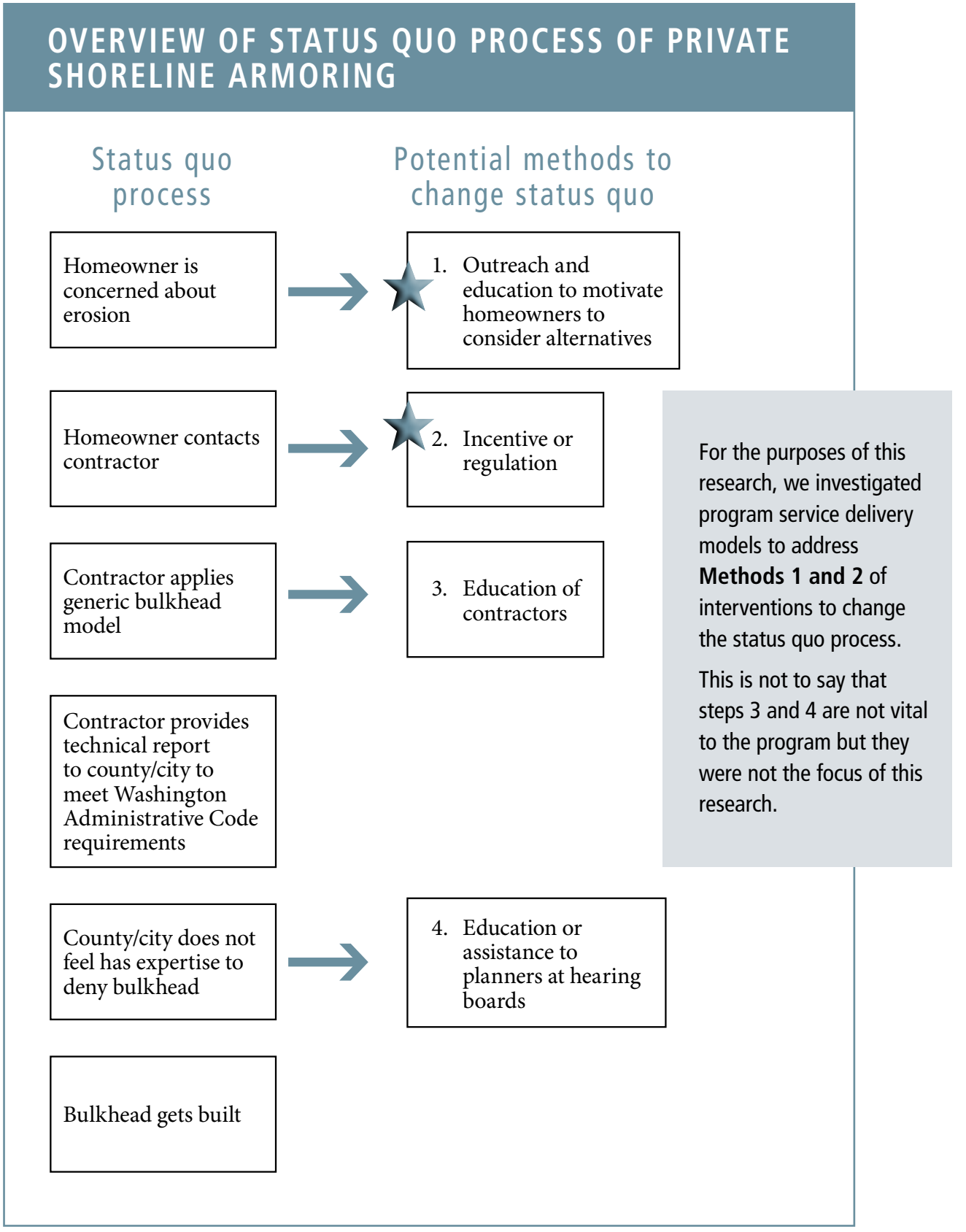

Figure 1– Opportunities to affect the way shoreline homeowners approach repair or construction of bulkheads.

The interviewees were asked about the cost to develop the technical assistance program. Key costs included:

- Staff
- Office space
- Marketing materials
- Site visits (cost for paying technical experts)
- Feasibility studies

Many of the programs evaluated in this report used staff time for a number of different functions besides technical assistance. Since a majority of the programs were not standalone comprehensive technical assistance programs, it was often difficult to separate the cost of providing technical assistance from other services provided by staff.

Interviewees yielded several insights on costs:

- A majority of the programs provide free site visits.
- Reducing the number of site visits or clustering them by geographical location is an important way to limit costs.
- For those programs providing permitting assistance, efforts to streamline the permitting processes across counties would help programs be more efficient and cost effective.

One program provided the following estimates of costs for a technical site assessment and feasibility report:[11]

- Site visit: $700 per visit
- Feasibility report by licensed geologists: $3,200 to $7,250 per site

An example of a feasibility report is found in Appendix E.

Program Funding

Interviewees provided limited information about the way programs were funded. In many cases funding for the program was tied to the funding of the individual projects. The sources of these funds were primarily from grants. The conservation district programs are provided by public and private grants, special assessments, and contributions and partnerships.[12] In Maryland the program funding is provided by the state on an annual basis through the Chesapeake Bay Trust.[13]

Project Funding

Four types of funding mechanisms to pay for alternative shoreline projection measures were identified.

Revolving Fund

The Chesapeake Bay Foundation set up a Shore Grant Program pooling several sources of funding.[14] An annual stipend is available for homeowners. This program forbids building bulkheads and only funds revetments. Costs are shared, either 25 percent grant and 75 percent homeowner or 75 percent grant and 25 percent homeowner association (HOA).

Spokane County conservation districts have another example of a revolving fund, which originated with WDOE and USEPA. The program offers low-interest loans for purchasing equipment that will aid soil conservation efforts.[15]

Grant/Homeowner

Some programs require that homeowners share the costs of design and construction. The Chesapeake Bay Trust offers varying levels of match depending on the scale of homeowner involvement.[16] If a homeowner association applies for the grant, it receives a higher match than a single homeowner. This creates an incentive for larger projects.

One Hundred Percent Homeowner-Funded

In areas where regulation is very strong, homeowners pay all costs. This occurs in Maryland, where the law prohibits bulkhead construction.

Nonprofit-Funded

In the nonprofit examples, some portion of funding comes from the nonprofit that received funds from government grants or foundations to facilitate a project.

Funding structures depend on the regulatory context and the motivation of homeowners, and there is no "one size fits all" approach. However, the majority of longstanding funding programs offer some sort of cost sharing based on a standardized ratio between fund and homeowner. Incorporating some degree of flexibility in funding packages would allow for a wider spectrum of landowners to be reached.

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11 Cost information provided by Kathlene Barnhart, Kitsap County, in personal communications.

12 Interviews with Brandy Reed, King Conservation District; Ryan Mello, Pierce Conservation District; Cindy Dittbrenner, Snohomish Conservation District, Washington, Appendix D.

13 Interview with Jana Davis, Chesapeake Bay Trust, Maryland, Appendix D.

14 Ibid.

15 Interview with Ryan Mello, Pierce County Conservation District Executive Director, January 14th 2013, Appendix D.

16 Interview with Jana Davis, Chesapeake Bay Trust, Maryland, Appendix D.

TAKEAWAYS: Costs and Funding

- Program costs include:
  - Staff
  - Office space
  - Site visits
  - Feasibility studies
- Program funding comes mostly from grants. Maryland provides state support through a nonprofit trust fund.
- Project funding types:
  - Revolving funds
  - Grant/homeowner cost-share
  - 100 percent homeowner-funded
  - Nonprofit-funded
- All but one program interviewed includes funding from public sources.
- Use of differing grant ratios can incentivize larger projects.

Monitoring

One issue raised was whether programs provided any form of follow-up monitoring to determine the effectiveness of the assistance.

Monitoring Program Delivery

None of the programs extensively monitors the delivery of the program and its ultimate outcomes, in part owing to lack of funding. One nonprofit expressed an interest in training for program tracking.

Secondary outcomes are tracked by one particular program that only focuses on education and outreach, but does not provide assistance during the implementation phase. This program found homeowner workshops were successful in improving homeowner awareness of alternatives, and a majority of homeowners said they would implement recommendations. However, the program did not track how many of the homeowners actually implemented recommendations.

Ecosystem Outcome Monitoring

Some interviewees discussed habitat monitoring as part of the conversation about program monitoring. Ecosystem outcome monitoring is rarely funded or conducted in these programs, unless it is part of a research project. Typically, monitoring is informal or anecdotal.

TAKEAWAY: Monitoring

Program delivery monitoring is rarely funded or conducted. Only one program provided feedback on increased homeowner awareness based on outreach and training aspects of the program.

Interaction with Contractors

Many of the program interviews included discussions about the role of contractors working with shoreline homeowners. The term "contractors" refers to the individual or firm that designs a bulkhead or bulkhead alternative. This may also be an individual with experience in construction of marine structures such as bulkheads. The contractors may or may not consult with a geological engineer who has a specialty in soft-shore projects.

Contractors are frequently the first point of contact with homeowners, and they may lack knowledge of or comfort with designs other than bulkheads. Existing programs have overcome this challenge by the following methods:

- **Training contractors in coastal geologic processes:** This was highly recommended by the county planners we interviewed.
- **Recommending or providing a preferred contractor list:** Several programs trained contractors in soft-shore alternatives to bulkheads or armoring.
- **Using preferred contractors at free site visits:** This creates an incentive to use preferred contractors, but requires funding.

Some programs have partnered with local contractors with expertise in soft-shore methods and coastal geologic processes who can be on call to assess project proposals and vet sites that are going to receive reductions in setback distance because they incorporate soft-shore alternatives.

Training Needs

Although training was not explicitly covered in the interview questions, almost all interviewees discussed the importance of training and how it was essential to making a program work on a larger scale. In Maryland the agency provided extensive training to engineers, marine contractors, waterfront property owners, and local government planners. Through workshops these individuals learned about current regulations and design alternatives feasible in different locations.

Interviewees recommended that training be conducted for contractors, planners, and other stakeholders. Training in permitting may need to be region-specific because shoreline master programs and permitting in each jurisdiction vary so much. Moreover, contractors and engineers may need location-specific training based upon the local topography and shoreline processes affecting the design process.

Program Facilities and Capabilities

Interviewees were asked if any special facilities, equipment, or capabilities were required for a shoreline technical assistance program.

Other than normal office facilities, interviewees identified a need for facilities to conduct workshops or trainings. Additional capabilities include:

- GIS tools to provide mapping in order to prioritize shorelines
- CanVis,[17] the NOAA visualization tool used to demonstrate the impacts of shoreline and coastal development and sea-level rise.

TAKEAWAYS: Additional Program Elements

- Contractors are often the first point of contact with homeowners.
  - Training is needed for contractors.
  - A list of preferred contractors could assist programs and homeowners.
- Training programs need to be developed for contractors, planners, and other involved stakeholders.
- Training needs to consider variations in permitting among jurisdictions and differing shoreline characteristics.
- Additional program elements to consider include:
  - Workshop or training facilities
  - GIS mapping capabilities
  - Visualization tools such as NOAA's CanVis

[17] NOAA Digital Coast website: *http://coast.noaa.gov/digitalcoast/tools/canvis* (last visited July 10, 2014).

Service Delivery Elements Provided by Programs

A comprehensive program providing technical assistance to shoreline homeowners requires a basic framework of services. Interviews with existing programs in the Puget Sound region and Maryland provided data from which there emerged consistent elements of a service delivery program. It should be noted that no one program reviewed provided all elements of technical assistance as identified in this report. This section summarizes information about each element drawn from the interviews.

Based upon the information received from the interviews, programs that provide technical assistance to shoreline homeowners typically have four main components for service delivery:

- Regionwide prioritization of sites
- Outreach
- Site-specific technical assistance
  - Visit 1: initial site assessment
  - Visit 2: expert technical assistance
- Funding assistance

Some programs also provide permitting assistance and planner assistance.

Primary Elements of Technical Service Delivery

1. Regionwide Prioritization of Sites

There are several reasons to prioritize sites to be included in a technical assistance program. First, funding and staff resources are limited. Programs may also wish to target properties with sensitive habitat, or where removing armoring or using alternative armoring is feasible. Not all sites are suited for removal or alternatives. Therefore, programs have developed methods for prioritizing where to target their efforts to provide technical assistance to homeowners.

Three programs engage to some degree in mapping priority project sites, and two others indicated it would be an important step in a program. Some of the programs have conducted their own mapping and prioritization. One program gathers information on habitat priorities and matches them with the biophysical feasibility of a potential soft-shore project. The habitat features include feeder bluffs, herring spawning sites, forage-fish habitat, and eelgrass presence. Physical features include current shoreline modifications, wave energy, and fetch distance.

Another program lists geologic hazards and sediment type as other physical features to include. Yet another program ranks restoration sites according to the priorities of tribes or LIOs in the region. These regions or priorities, matched with local knowledge of failing bulkheads or other indicators of homeowner interest, help prioritize outreach. This mapping effort may prove very helpful to programs that are prioritizing properties regionally.

2. Outreach

All program providers interviewed identified a need to provide education and training about the impacts of armoring and alternative methods of erosion protection. The programs reached out to various parties with education and training, including homeowners, contractors who build bulkheads, planning staff who review permit applications, and real estate agents.

Outreach to these parties took various forms:

Homeowners: Seven programs had active outreach to homeowners. One was limited to areas in which restoration actions were prioritized based on LIO objectives. Two other programs were contacted or reached by interested homeowners. Outreach to homeowners included workshops, mailings, one- page fact sheets, and decision trees. Some programs noted that having demonstration sites was extremely helpful. One made a smartphone application of restoration projects so interested parties could visit sites on their own.

Contractors: One program used extensive training of contractors as a method of outreach. At least three programs in the Puget Sound region expressed a desire for more training of contractors.

Planning staff: Outreach to planning staff was done extensively in one program interviewed.

Real estate agents: There has been some initial outreach to real estate agents, who could be an element of service delivery.

3. Site-Specific Technical Assistance

In most of the programs evaluated, site-specific assistance was provided through two types of site visits:

First visit — initial site assessment: For many programs this visit does not require formal technical expertise other than general knowledge of soft-shoreline concepts. In fact, two interviewees stated it was important to not have engineers at initial site visits because they tend to design responses before evaluating the issues.

Several programs listed the importance of understanding homeowners' concerns for their property and gearing initial site assessments to those concerns.

Four programs prepared a report after the initial site visit. These reports varied widely in terms of technical information but generally included information about site characteristics, addressed homeowner concerns, and recommended management practices. Some reports even provided cost estimates. A geologic expert did not necessarily provide these reports.

Regulatory Pre-Application Meeting: Three programs highly recommended or mandated pre- application meetings. This served to bring together regulatory staff, the contractor (if already chosen), and the homeowner prior to the actual design and application for permits. This occurred before or after the initial site visit and sometimes substituted for an initial site visit if the homeowner did not want regulatory agencies on their site.

Second site visit — expert technical assistance: Many programs described a second, more in-depth site visit, which typically occurred when the homeowner was ready to proceed with a project. This visit included an assessment of the feasibility of the project from a permitting and geologic feasibility standpoint. Usually, a licensed coastal engineering geologist or equivalent wrote a formal feasibility report based on this visit. Often times, this site visit was an opportunity for the funding agency to ensure that their funds would be going to an appropriate project.

Note that some programs only identified the need for one site visit. In those cases a technical expert (e.g., coastal engineering geologist) would visit and issue some form of a feasibility report.

4. Funding Assistance

As discussed previously, the real or perceived expense of removing a bulkhead or using an alternative method to provide erosion control is a barrier to participation in a program. Therefore, technical assistance programs need to consider how to provide funding assistance to gain homeowner involvement.

All but one of the programs interviewed provided funding assistance to the homeowner for projects, including administration of a revolving loan fund, grants, or matched grants. The only program that did not provide funding provided an incentive of a reduced setback if soft-shore methods were used.

Additional Elements of Technical Service Delivery

Many of the programs identified other elements of technical service delivery that are important but did not get acknowledged as central to providing technical assistance.

Permitting Assistance

Many of the programs interviewed provided a range of additional services including preparing and filing permit applications. Four of the programs interviewed provided permitting assistance. Interviewees commented about how permitting complexity can act as a barrier to a homeowner's willingness to use a soft-shore alternative to bulkheads. Contractors typically handle permits but if permit processes are complicated or not well defined for soft-shoreline methods, contractors may opt for a bulkhead option to avoid the permitting uncertainty in some jurisdictions. Interviewees commented that providing permitting assistance and coordination with agencies helped ease homeowner frustration over lack of consistency in permitting.

Planner Assistance

Planners in local jurisdictions need specialized technical assistance when reviewing applications and enforcing regulations associated with residential bulkheads. Both the Partnership Leadership Council and the advisory committee for this report raised the issue during preparation of this report. While not identified as part of the scope of work for this research, it is important to note the need for this aspect of technical assistance. The advisory committee suggested that a shoreline technical assistance program could provide soft-shore alternatives to homeowners and technical expertise to planning departments.

TAKEAWAYS: Range of Services Provided by the Program

- The typical range of services include:
  1. Prioritization of sites
  2. Outreach to homeowners, contractors, planning staff and real estate agents
  3. Site-specific technical assistance
     - Visit 1 – initial site assessment
     - Visit 2 – expert technical assistance
  4. Funding assistance
- Additional services provided include:
  1. Permitting assistance
  2. Planning assistance
     - When an applicant comes to jurisdiction before a decision is made on type of erosion control
     - After an application is submitted, during permit review or hearing process
- Eight of the programs examined included all of these steps to some degree (except providing planner assistance).

Section IV: Key Findings and Models for Regional Technical Assistance Programs

The research scope of work called for developing a framework for a model regional technical assistance delivery program for shoreline property owners. The interviews provided insight into possible key elements of such a framework.

There are various possible structures, some within existing programs in the Puget Sound region. The models described in this section are based on information gathered in the interviews and generalized to incorporate key service delivery elements identified in Section III. While these models can be reconfigured in numerous ways, the five presented here provide an initial framework to evaluate what might be the best option for a program in the Puget Sound region.

Program Frameworks

Each model presented here includes descriptions of the oversight entity or administrator, program manager, other partners, and the key service delivery components for a comprehensive program identified in Section III, which should include at a minimum:

- Methods for prioritizing projects regionally
- Outreach techniques
- Technical assistance methods
  - Visit 1 – initial site assessment not requiring technical expertise
  - Visit 2 – expert technical assistance
- Funding for program and projects

These components, described in Section III, varied across the models. Cost, technical knowledge, facilities, and the role of jurisdiction did not vary across models and are not included in the model descriptions.

The five models are distinguished by the entities they designate as the oversight agency as defined in Section III. The five models are:

1. Conservation district
2. State agency
3. Nonprofit organization
4. County
5. Hybrid (state and nonprofit)

Information about each model, including key differences, is summarized in Table 1. Features captured include the oversight agency, the program manager, other potential partners, regional grouping potential, method for program funding, project funding, and other distinguishing features of the model. Detailed information on each model follows.

Models for Technical Assistance Programs for Shoreline Homeowners

Model 1: Conservation Districts

In this model, Washington's county conservation districts work in clusters to provide regional technical assistance to homeowners. Districts share technical staff across county lines.

Oversight Administrator

The Puget Sound Conservation District (PSCD) Caucus or Washington State Conservation Commission would oversee administration and potential funding for projects. Currently, oversight of each conservation district comes from the Conservation Commission. The commission determines how state funds are distributed to county-specific conservation districts, monitors expenditures, and works with other lead staff to coordinate activities and cross-boundary programs.

Table 1 – Overview of potential program models and variations in service delivery elements.

Abbreviations are as follows: CD, conservation district; USEPA, U.S. Environmental Protection Agency; LIO, lead integrating organization; PSCD, Puget Sound Conservation District; WRIA, Water Resource Inventory Area; WDFW, Washington Department of Fish and Wildlife; WDOE, Washington Department of Ecology

		MODEL				
		CONSERVATION DISTRICTS	STATE	NONPROFIT	COUNTY	HYBRID
ELEMENT	OVERSIGHT	PSCD Caucus or Washington Conservation Commission	Oversight by state agency (e.g. WDOE, WDFW); state agency operates no-interest revolving loan fund and program	Oversight by government granting agency like USEPA, WDOE, WDFW	Oversight by state granting agency	State trust funding agency, created by legislation and funding contributors
	PROGRAM MANAGER	Conservation district meta-groups	Division within state agency	Nonprofits act as resources and facilitators	Counties located within natural resources division or equivalent	Contractors and nonprofits working together
	OTHER PARTNERS	None applicable	Contractors and nonprofits	Geotechnical consultant if necessary for preliminary assessment	Not applicable	Not applicable
	REGIONAL GROUPING	Clustered in groups of 3 or 4; experience sharing resources across districts	Provide for entire region but coordinate with local nonprofits and contractors for outreach	Clustered by WRIA or LIO; must choose nonprofits to provide services	Geotechnical experts on staff at state and shared between counties	None; wide range of resources from nonprofits and contractors with oversight by trust
	PRIORITIZATION/ OUTREACH	Priority assessment in-house; extensive workshops and training experience	Within the agency, including training contractors and others to provide assistance	Priority assessment done by LIO/tribes/ funding agency/ nonprofits; outreach by nonprofits	Priority assessment by granting agency; outreach conducted on a county-by-county level	Priority assessment by trust; outreach by trust and local nonprofits
	TECHNICAL ASSISTANCE	Preliminary geologic assistance, permit, and habitat providers in-house; contract with professionals for design	All preliminary geologic assistance in-house; permit and habitat specialists in-house	All preliminary geologic, permitting, and habitat assistance in-house if possible; may need to contract staff to provide services	Initial assessment, permitting, and habitat in-house; use contract or grant agency staff for feasibility assessments for second site visits	By trained and certified contractors
	PROGRAM FUNDING	Within CD funding strategy or with additional grants	A portion of the loan program plus state agency	State or other grant funded with portion of each grant received for a project	State or other grants from agency or by proceeds from portion of projects conducted	Trust funds programs at nonprofits
	PROJECT FUNDING	Grant funded or using other district low-interest loan model	Low-interest loan program created by legislature	Grant funded; if coordinated on regional level, could be competitive grant process	Grant funded or provided from state revolving loan fund	Trust funds projects on cost-share basis; has technical review team to ensure quality of contractor work

The PSCD Caucus could also organize conservation district meta-groups at a more focused and relevant scale. Puget Sound conservation districts signed an interlocal agreement (ILA) in March 2013, which established the sharing of financial, technical, and staff resources between conservation districts.

Program Manager

Conservation district meta-groups (or regional subgroups of Puget Sound conservation districts) could operate through the PSCD Caucus. Conservation districts gathered into three or four subregional meta-groups would share resources for outreach and technical and implementation assistance, link homeowners to funds, and potentially provide funding. One conservation district could serve as primary program manager for the cluster. Washington conservation districts have existing agreements in place to share technical assistance engineers.

Other Partners

There are no other significant partners.

Program Delivery Providers

Prioritization/outreach

Conservation districts would contact homeowners via mailings and other outreach methods. They would provide workshops on riparian and nearshore ecology, coastal geological processes, and shoreline vegetation management. They would also be responsible for mapping priority areas with restoration potential.

Technical assistance

After outreach, interested homeowners would request site visits, which would be conducted by two to three staff members from a conservation district, including a program manager and an engineering geologist with a background in coastal geological processes. In some cases, additional habitat expertise may be needed, and a habitat specialist could be contracted, for example, through the King County Department of Natural Resources and Planning's Water and Land Resources Division. Permitting assistance would also be offered in-house; conservation districts have sometimes provided this expertise.

Program and project funding

Funding would come from the usual sources for conservation districts — a mix of public and private grants, special assessments, contributions, and partnerships.

PROS	CONS
• Established reputation in outreach, trust, and responsiveness with community • Established ILA and program collaboration between conservation districts • Experience providing habitat and permitting assistance • Nonregulatory	• Less experience with marine shorelines than with freshwater shorelines • Need to strategically pool resources and either hire or draw from existing existing staff time

Model 2: State Agency

In this model, a state agency houses technically knowledgeable staff who manage a no-interest revolving loan fund and provide initial site assessment, contractor recommendations, and technical assistance at no cost. The agency would also train shoreline professionals and conduct outreach.

Oversight Administrator

A state agency would operate a no-interest revolving loan fund and provide technical assistance to homeowners.

Program Manager

A department within a state agency would serve four main functions: training shoreline professionals, conducting outreach, providing technical assistance, and administering the revolving-loan fund.

Staffing would consist of a program manager, a biologist, two engineers and an accounts manager. The program should be housed in an agency that is non-regulatory or that has a mechanism to keep it separate from its regulatory functions. For example, a WDFW division separate from its habitat permitting staff designs and permits park and boat-ramp facilities.

Regional Grouping

This program could serve the entire region. It would entail training contractors, planners and nonprofits to provide additional outreach to homeowners.

Other Partners

Nonprofits, contractors and planners would be trained as regional technical providers.

Program Delivery Providers

Prioritization/outreach

Agency staff would conduct outreach. Alternatively, trained contractors or nonprofits might refer homeowners to the program.

Technical assistance

The agency would conduct an initial site visit to assess the problem and make appropriate recommendations. The program manager, engineers, and biologist on staff would assist with basic (not design-level) technical assistance based on their experience in shoreline projects.

The agency would give a list of preferred designers and contractors to homeowners and help each homeowner select a contractor.

The agency would train planners and marine contractors in issuing permits. It would also coordinate pre-application meetings with other agencies involved in the permit decision and assist until all local, state, and federal permits have been secured.

Program and project funding

Program funding would come from the state agency responsible for program management and from a legislatively created revolving loan fund. Project funding would come from the loan fund. Loans could be offered at varied intervals. The agency would receive a portion for administrative costs based on the total cost of the project. When homeowners receive their loans, they would need to select contractors through competitive bidding.

PROS	CONS
• Has the stability of a state-run program • Centralized program in one department can be efficient • State agencies have technical expertise on staff	• Does not reduce net cost for homeowner because it is only loan program • Homeowners may distrust government • Centralization of outreach efforts does not address regional needs • Structure does not currently exist in Washington

Model 3: Nonprofit Model

In this model, the nonprofit acts as the program manager and provides technical assistance for the homeowners. The nonprofit works with homeowners and other stakeholders to initiate, coordinate, implement, and monitor projects.

Oversight Administrator

A government granting agency provides oversight for the program and funding support to the nonprofit.

Program Manager

Nonprofits act as resources and facilitators for homeowners interested in soft-shore alternatives for erosion control. They identify projects, conduct outreach, find funding, facilitate implementation and permitting, and monitor projects.

Regional Grouping

In this model, either one or several nonprofits could be selected to administer a program. If a single nonprofit does so, it would need regional offices. Alternatively, the oversight administrator could coordinate regionally based nonprofits, which would provide the services. The clustering could be based upon the 19 Puget Sound WRIAs or Washington's nine LIO regions.

Other Partners

Nonprofits may not have the funding to keep geotechnical engineers on staff. This service may need to be provided on a contract basis.

Program Delivery Providers

Prioritization/outreach

Nonprofits undertake outreach to identify homeowners who have failing bulkheads or may be considering installing bulkheads. Assessment and prioritization of sites would be done according to nonprofit, LIO, or tribal priorities. If a nonprofit conducts the assessments, a geotechnical consultant would be needed.

Technical assistance

A nonprofit would conduct an initial site visit to evaluate site characteristics and gauge homeowner interest and willingness to explore alternatives to a bulkhead. A geotechnical consultant may be needed at the preliminary site visit. Based on the assessment results and if the owner is interested and the site is appropriate, the nonprofit would help the homeowner obtain financial assistance. The nonprofit would provide permit assistance.

If a nonprofit does not have the necessary capability on staff, it would contract a geotechnical consultant to prepare a feasibility report and design drawing. Habitat expertise would be needed in addition to the geotechnical consultation.

Program and project funding

Nonprofits would receive funding from the State or other grant source to administer programs. Funding for projects would be obtained through a competitive grant process or revolving loan fund administered by the oversight agency.

PROS	CONS
• One-point contact for homeowners • Uses established and well-connected nonprofit organizations • Nonprofits have high degree of local knowledge	• Lack of strong oversight across region • Difficult to coordinate if multiple nonprofits are engaged, each with a different mission • May not have credibility with agencies • Variation across region

Model 4: County

The model for the county-based program would not involve clustering of counties but rather sharing geotechnical experts across counties, with the experts being housed within the oversight agency that provided funding. Counties would be responsible for outreach and initial site assessments; these capabilities could be established through training.

Oversight Administrator

A state granting agency (PSP, WDOE, WDFW) would oversee funding, monitoring, and oversight of projects. At least one staff geotechnical consultant would be needed at the regional level to provide oversight.

Program Managers

Counties would establish in-house programs responsible for outreach to homeowners, conduct initial assessment of the site, facilitate permitting, and conduct monitoring. Programs could be housed in the natural resources division or equivalent of each of the 12 counties in the Puget Sound region.

Regional Grouping

Geotechnical experts would be located in the funding agency, and each of them would be assigned to a three- or four-county region. Each county would have control over all other aspects of program administration.

Other Partners

There are no other significant partners to consider.

Program Delivery Providers

Prioritization/outreach

The funding agency would be responsible for deciding on a regional prioritization assessment. Counties would apply for grants or revolving loan funds from the oversight agency for the projects. Funding for the county programs would be allocated by the state granting agency. The county program would provide outreach to homeowners. The county would sponsor workshops supported by the staff geotechnical expert from the granting agency.

Technical assistance

Each county would be responsible for the initial site visit. Planners or other staff would need to be trained to accomplish this. A coastal geotechnical expert on the oversight administrator's staff would oversee projects and provide free, on-call technical assistance to the counties. This would include feasibility assessments after the county had already determined initial feasibility and homeowner interest. This step may be avoided through training at the county level as long as an expert in the granting agency approves the resulting projects.

Construction contracts should be awarded competitively from a list of pre-approved contractors provided to homeowners. This would ensure contractors have experience in soft-shore methods.

The geotechnical staff based in the state granting agency could also be available for other purposes, such as providing technical assistance to counties on a fee basis.

County staff must have habitat expertise or the state granting agency staff assigned to specific regions could provide this. Permitting assistance would be provided in-house within the county.

Program and project funding

The county would receive state funding to administer the program based on projects to be undertaken each year and the cost of the projects.

A monitoring system would need to be established to identify funding allocations to counties based on projects

completed. Funds could be allocated based on demand for bulkhead approvals in a given county. Alternatively, funding could be derived from any project proceeds if a revolving loan fund or fee-for-services model is employed.

Funding for projects would be provided through the oversight agency, which would determine which projects to fund based on a prioritization method shared with the counties.

PROS	CONS
• Permitting assistance provided by county staff with local knowledge • Funds prioritized by oversight agency at regional level • Uses existing county outreach resources • Centralized technical staff assigned to specific regions	• Potential mistrust of government by homeowners • Requires high level of coordination between state and county governments • Requires training county staff

Model 5: Hybrid Model

This model is based on Maryland's Chesapeake Bay Trust Fund. A nonprofit organization established by state law pools various private funding sources to provide cost-sharing grants to homeowners. Trained contractors and nonprofits provide technical assistance. Note that the interviewee who provided the information for this model worked with another state-run program that provided additional outreach and extensive contractor training.

Oversight Administrator

State law would establish a nonprofit granting organization, hereafter called "the Trust," and provide for oversight of grant funding. Because the Trust would be established under state law, it would be considered a quasi-state agency. The Trust would receive private funds to be used for shoreline projects. A benefit of the quasi-state status is that, while it can work with state agencies, the Trust would have flexibility in working with contractors and homeowners. Funding for the Trust would come from state and local funds and private donations via the sale of car license plates; donation check-offs on state income tax forms; other donations and grants; and partnerships with private foundations and local, state, and federal government agencies.

Program Managers

Program management would be shared by the Trust and trained contractors, with some additional help from nonprofits. The Trust would need to perform some program tasks, including outreach and training contractors. Trained contractors would assist homeowners applying for grants, assist with outreach, and provide preliminary site visits and permitting assistance.

Contractors would be trained and certified in soft-shore methods. This certification would allow contractors to work directly with homeowners to gain access to funding, conduct initial site assessments, and assist with permitting and project design.

Regional Grouping

Regional grouping does not apply to the hybrid model. Nonprofits and the Trust would work together and share resources.

Program Delivery Providers

Prioritization and outreach

The Trust would assess priority sites on a project-by-project basis or at a regional level, or both. A system of priorities for funding projects would be established and could be based on potential ecological benefits, appropriateness of design, demonstration potential, landowner willingness, shovel-ready status, and matched/leveraged resources.

Outreach would be conducted by nonprofits, the Trust, and the partnering state agency. Outreach would include free workshops, site visits, and brochures. There are several demonstration project sites where landowners can be taken to experience first-hand the results of the living shoreline program.

Technical assistance

State agency staff, trained contractors, or nonprofit staff would provide initial technical assistance. The homeowner would receive a preliminary assessment from a contractor or nonprofit when applying for funding through the Trust.

The permitting agency would conduct a pre-application site visit and provide the homeowner information about the permitting process and run through the challenges and timelines to be expected. All other permitting agencies would participate in this site visit.

Before an applicant applies for a grant, the Trust would conduct a pre-funding site visit with a representative of the permitting agency and the other funding partners

(e.g., NOAA, WDNR equivalent). Homeowners interested in funding would be given phone interviews to determine if site visits are appropriate. A technical review committee composed of engineers, scientists, coastal managers, and funders would review the homeowner's grant application. This committee would make recommendations to the collaborative funding partners.

Program and project funding

Program funding would come from the Trust's revolving fund. The Trust would aggregate funding for shoreline projects and other ecological and educational goals from several sources: state and federal agencies, special-interest license plates, donations from individuals, and a check-off option on state income tax forms. The Trust would send out a request for proposals annually or biennially. Only nonprofits, community associations, state and local governments, and academic institutions would be eligible to apply.

All grant monies would be part of a cost-sharing program between the granting agency and the homeowner or HOA. The cost-sharing ratio would depend on the whether the applicant is an individual homeowner or an HOA. The ratios are 25:75 grant to homeowner for single families and 75:25 grant to HOA if it is an HOA application and HOA-owned land. A nonprofit can request a 100 percent grant.

PROS	CONS
• State Trust provides matching grants and loans to assist homeowners in stable funding mechanism • Multi-agency collaboration on site visits, technical assistance, and site priorities • Maryland example shown to be successful	• Requires act of legislature to create Trust • Requires initial funding • Requires agreement between agencies and trust-building • Requires coordination between nonprofits and agency • Extensive training required of contractors

Advisory Committee Recommendations for Initial Steps

The Partnership's scope-of-work document recommended developing a framework for delivering technical assistance based upon feedback from an advisory committee. The advisory committee formed by the Partnership included representatives of several areas of the Puget Sound region. After review of the five models presented previously in this section, the advisory committee proposed a more limited approach to be forwarded to the Puget Sound Partnership Leadership Council.

The advisory committee suggested that if funding is to be directed to any aspect of a shoreline homeowner technical assistance program, it should be targeted to providing expert technical assistance to shoreline homeowners. This is identified as "Visit 2 – expert technical assistance" (p. 15) in the service delivery components for a comprehensive program. The advisory committee noted that this is the most difficult element to fund and represents a gap in existing services for shoreline homeowners.

This technical assistance program with a limited scope would require an oversight entity and a program manager. However, as compared with the five technical service delivery components identified previously (including the two separate site visits) as the framework for a comprehensive program, the only service component would be "Expert Technical Assistance." The following describes how a limited program might function based on the advisory committee's recommendation:

1. ***Initial contact:*** A local project proponent contacts the technical assistance program manager. The local project proponent then screens sites to determine which are appropriate for assistance and completes the initial site assessment. This information is given to the program manager, who then draws site-visit participants from a list of certified coastal geologists, vegetation management specialists, and specialists in setback requirements, and prepares a feasibility report.
2. ***Service filter***: The program manager asks the local project proponent about the results of the initial site assessment, site prioritization, and homeowner willingness to participate.
3. ***Service provision:*** The program manager deploys the type of expert technical assistance appropriate both to the site and to the outcomes sought by the homeowner and local project proponent.

4. ***Feasibility report:*** A licensed coastal engineering geologist assesses the site and writes a feasibility report that is given to the program manager, local project proponent, and homeowner.
5. ***Tracking:*** The program manager follows up with the local project proponent and the homeowner to determine the outcome of the assistance.

These steps could be taken if a program were to focus only on providing technical assistance; this contrasts with a comprehensive program that would include many more steps, as shown previously in the five models.

Section V: Summary and Recommendations

The Puget Sound Partnership initiated this project to determine how to create a consistent, coordinated, regionally based technical assistance program for shoreline homeowners built upon existing programs. A well-coordinated shoreline technical assistance program could help address one of the key objectives of the Partnership Action Agenda, which is to reduce hard armoring on residential properties.

Interviews were conducted with participants in 13 programs in the Puget Sound region and one program in Maryland. These interviews identified key aspects of the programs related to stakeholders, jurisdictional roles, technical knowledge requirements, documentation, points of contact, program provisions, interactions with contractors, costs, funding, facilities required, tracking systems, takeaways (successes and failures), and additional resources needed. This information clarified what should be considered in designing a comprehensive program, and informed the development of five models for providing technical assistance to shoreline homeowners.

Summary of Topics Related to a Comprehensive Technical Assistance Program

A number of parties must be engaged to provide technical assistance to shoreline homeowners. These include homeowners, government regulators, an oversight entity, a program manager, funding entities, outreach assistance, technical experts, and contractors. Technical experts should have backgrounds in coastal or geotechnical engineering and vegetation management, permitting expertise, and knowledge about how to set structures back from shoreline bluffs.

Multiple opportunities to engage with shoreline homeowners exist, and each is a chance to provide education and technical assistance. A homeowner with an erosion problem might seek assistance from a contractor, an existing technical assistance program, or a local government. Alternatively, a city county or a technical assistance program might initiate contact with the homeowner.

Funding for the technical assistance programs evaluated for this report came primarily from grants, meaning they were limited in scope and continuity. However, funding for the design of shoreline protection alternatives came from a broader range of sources, including grants, loans, and private sources.

The programs included in this research provided different types of technical assistance. From the interviews, a framework of key elements for a comprehensive program was developed:

- A program needs an *oversight agency*. This is the entity primarily responsible for funding and administering the technical assistance program.
- A program needs a *program manager*. This entity implements the program. It may or may not be the same as the oversight agency.
- A program needs, at a minimum, the following *technical service delivery elements* to be considered comprehensive:
    1. Regionwide site prioritization to identify key properties
    2. Outreach to homeowners
    3. Site-specific technical assistance (two steps):
        - Visit 1 – initial site assessment not requiring technical expertise
        - Visit 2 – expert technical assistance
    4. Funding for both the program and individual projects.

Additional components identified as important to service delivery include permitting assistance to homeowners and technical assistance to local planners reviewing permits that involve shoreline armoring.

The five proposed model programs described in Section IV include all these elements. The models differ according to the oversight agency designated: a conservation district, a state agency, a nonprofit, a county or a hybrid state/nonprofit agency. These models are provided as initial frameworks for evaluating potential programs.

Building on Existing Programs

The Partnership Leadership Council and advisory committee both recommended that a technical assistance program build upon existing programs in the region to the greatest extent possible. While many excellent programs provide some aspects of technical assistance to shoreline homeowners, this report does not identify any program providing comprehensive service. Moreover, no centralized point for learning about the various programs exists, nor is there an organized framework for the programs to use for coordinating amongst themselves.

In addition, there is a lack of consistency between existing efforts. Site assessments provided by one program might differ from those provided by another program. Information in outreach materials also varies between jurisdictions.

A further issue concerns the longevity of programs. Historically, programmatic funding for shoreline technical assistance has come from a variety of sources. Developing a comprehensive program would likely require a dedicated funding source to ensure continuity.

Proposed Next Steps

The research for this study identified components of a comprehensive technical assistance program. Five models were designed to compare and contrast potential programs.

To determine the most effective way to proceed, additional questions must be answered. One key issue to resolve is whether a program of limited scope could provide regional technical assistance, as recommended by the advisory council, or whether a more comprehensive program would be needed.

Needs Assessment

To help resolve the issue of a limited versus comprehensive program, we recommend a needs assessment be conducted to more completely define (1) the services currently provided, (2) the need for additional services as described in the models in this report, and (3) where the need is located.

Comprehensive List of Existing Programs

To document services currently provided, this report recommends developing a comprehensive list of all technical assistance programs in the region. The list would identify the types of assistance now provided and facilitate coordination among the programs. In addition, there should be an effort to standardize and coordinate the information provided to homeowners.

Funding Source Evaluation

As a final recommendation, the report suggests developing a consistent source of funding for the comprehensive program. The lack of continuous funding was identified as a drawback for many of the programs currently in operation. Funding methods developed by the State of Maryland may provide a starting point for creating a program in the Puget Sound region.

Conclusion

Shoreline homeowners will benefit from comprehensive technical assistance as they determine how best to manage their property to limit damage to the shoreline environment. Many programs are currently in place to assist homeowners and there are opportunities to improve service delivery. The recommendations in this report provide an overview of the services needed and steps that could be taken to ensure such programs will be consistent, continuous, and better coordinated in the future.

APPENDICES

Appendix A: Technical Assistance for Planners and Hearing Examiners

Based on an interview with Susan Key, Shoreline Stewardship Coordinator, San Juan County Planning Department

Planners in local jurisdictions need assistance when reviewing applications and enforcing regulations associated with residential bulkheads. Both the Leadership Council and the Shoreline Technical Assistance Advisory Committee raised this issue during preparation of this report. This report does not address technical assistance to planners and hearing examiners once a homeowner has decided to pursue a bulkhead project. However, it is possible a shoreline technical assistance program could provide both assistance with soft-shore alternatives to homeowners and technical expertise to planning departments.

The following information provided by staff of the San Juan Planning Department outlines the problems and needs faced by planning departments at the city and county levels throughout the Puget Sound region.

Problem

Planners and hearing examiners evaluate geotechnical reports provided by applicants to decide if a bulkhead is necessary and consistent with local codes. However, planners and hearing examiners lack the formal geotechnical training and certification needed to analyze, verify, and question reports provided by certain consultants on behalf of homeowner applicants.

Solution

To effectively administer the regulations adopted to protect public resources from the adverse impacts associated with bulkheads, planners and hearing examiners need input from a neutral, independent geotechnical professional not advocating for either an applicant or an appellant.

There are specific points in the permitting process when independent geotechnical expertise would be helpful to a planner or hearing examiner:

1. ***When an applicant first begins to consider a shoreline stabilization structure.*** When applicants first consider applying for shoreline stabilization permits it is important that they understand whether there is indeed erosion of their shorelines and if so, to determine whether it is due to wind and waves or to upland drainage and stability issues, and if necessary identify alternatives for addressing it.
2. ***After an application is submitted***. The planner may be uncertain whether the geotechnical evaluation provided by the applicant accurately describes the situation, viable alternatives, and compliance of the proposed project with the code requirements. If impartial geotechnical review of an application is necessary, the tasks associated with this review would likely be to (a) conduct a site visit; (b) review the report submitted by the applicant's consultant; (c) provide a written recommendation to the staff and/or hearing examiner; (d) attend and testify at the public hearing, if there is one; and (e) attend and testify at the appeal hearing if the project is appealed.

Planners could receive training to address this problem. While additional training might help planners identify situations when independent expert assistance is needed, it will not solve the problem. Educating planners will not give them the credentials needed to assure hearing examiners and appeal boards that their recommendations are correct.

How assistance could be provided

A range of methods could be used to provide assistance:

1. In-person assistance on site, as early in the process as possible
2. Review and comment on geotechnical reports and compliance with code provisions
3. Testimony at public hearings

Estimated demand and costs

The San Juan County Planning Department estimated that it would need $35,000 for geotechnical assistance in 2014. The county anticipates approximately 10 applications for bulkhead construction or repair each calendar year.

Appendix B: Interview Questions

The following questions provided the framework for 27 interviews conducted over a three-month period from November 2013 to January 2014.

Interview Questions

1. **Background**

   Describe your program briefly, including goal and region.

2. **Stakeholders, agencies involved**

   What stakeholders, agencies, or partners are involved and how do they fit into your program?

   What ratio of work does each of them do?

3. **Role of jurisdiction**

   What jurisdictions operate to guide or necessitate your program?

   Does your local SMP have regulations in it relating to soft bulkheads?

4. **Technical knowledge of providers**

   Who is involved in providing the program (all staff) and what technical expertise do they have?

   Was there training involved?

5. **Point of contact** (i.e. through planning office, nonprofit etc)

   How do homeowners get in touch with you? What motivates them to do so?

6. **Program provision**

   What type of technical assistance was provided?

   What documentation would you need to evaluate the property?

   What was the form of the information *(personal, handout, over phone)?*

7. **Interaction with contractors**

   How do you interact with contractors?

   Where there any specific contractors you know of or who did this type of work?

8. **Costs**

   What were the *hours* involved in the assistance?

   What was the cost to provide the assistance? Were there other costs than employee hours to provide the assistance?

9. **Funding**

   How did you fund the assistance?

   Have you considered or used a federal tax credit for property owners who remove bulkheads and employ soft shoreline or Living Shoreline techniques? Do you know anyone else who has done this?

10. **Facilities required (Internet, office, phone)**

    What facilities are required to do this?

11. **Tracking system**

    Do you have a tracking system in place?

12. **Success rate of program:**

    What was the result to the homeowner from providing that assistance? Did they end up achieving your goal?

    Say your program was not successful: What would have made the outreach more successful?

    If program was successful: What factors helped this to be a successful assistance?

13. **Other contacts:**

    Do you know anyone else who has programs in place to provide technical assistance to homeowners? If so, would you mind passing their contact information along?

14. **Additional feedback or unaddressed issues**

Appendix C: List of Interviewees

Kathlene Barnhart	Kitsap County, Washington
Jim Brennan	Previously at Washington Sea Grant, Washington
Jana Davis	Chesapeake Bay Trust, Maryland
Cindy Dittbrenner	Snohomish Conservation District, Washington
Robyn Du Pre	Northwest Straits Foundation, Washington
Kelsey Gianou	NOAA Coastal Fellow, Washington Department of Ecology, Washington
Shireene Hale	San Juan County, Washington
Kathleen Herrmann	Snohomish Marine Resource Committee, Washington
Ryan Mello	Pierce County Conservation District, Washington
Jamie Michel	North Olympic Salmon Coalition, Washington
Erik Michelsen	South River Federation, Maryland
Brandy Reed	King County Conservation District, Washington
Bhaskaran Subramanian, Ph.D.	Shoreline Conservation Services, Maryland Department of Natural Resources
Teresa Swan, Senior Planner	City of Kirkland, Washington
Bobbak Talebi	Washington Department of Ecology
Tina Whitman	Friends of the San Juans, Washington
Lance Winecka	Director of South Puget Sound Salmon Enhancement, Washington
Zelma Zieman	Previously at Washington State Office of Regulatory Assistance

Appendix D: Five Primary Interviews

This section contains interviews with members of five different programs in Washington and Maryland. These five programs were the primary sources of data informing the models developed by this research. This is not to say that the other interviews did not contribute to the models, merely we focused on these five to gain the most accurate representation of their service delivery.

Each of these reports has been edited and confirmed by the interviewee to assure accuracy. The programs interviewed from Maryland are the Maryland Department of Natural Resources' Shoreline Conservation Service and the Chesapeake Bay Trust. The Washington programs are the King Conservation District, the South Puget Sound Enhancement Group, and the Kitsap County Department of Community Development's Planning and Environmental Programs Division. The following key issues were discussed with each program:

- Background
- Stakeholders, agencies involved
- Role of jurisdiction
- Technical knowledge of providers
- Point of contact (how homeowners get involved)
- Program provisions (model)
- Interaction with contractors
- Costs
- Funding
- Facilities required
- Tracking system
- General takeaways

Not all interviews provided the same level of detail or description. For ease of comparison we have applied these headings for each of the five write-ups and noted where information either was unavailable or did not fit into these categories.

Interview with Bhaskaran Subramanian, Maryland Department of Natural Resources (DNR) Shoreline Conservation Service

Background

Maryland DNR's Shoreline Conservation Service (SCS) acts in four main capacities: training "living shoreline"[1] professionals (engineers, marine contractors, and local government planners), conducting outreach, providing initial and continued technical assistance for waterfront property owners, and administering a revolving loan fund. It operates in the same region as the Chesapeake Bay Trust's grant program, and the two programs complement and supplement one another in many cases.

Stakeholders, agencies involved

Maryland DNR: Oversees the program, administering all main components and coordinating between various agencies.

Maryland Department of the Environment (MDE): Provides oversight on permitting and environmental guidance.

Nonprofit organizations: Many nonprofits work within this program. Some provide initial assessments, technical assistance, and outreach. They also operate independently to facilitate the construction of soft shorelines without financial assistance. For the execution of the loan program, DNR partnered with a nonprofit for twenty years because of state procurement restrictions.

Role of jurisdiction

In Maryland, under current statutes, no permit is issued for a new bulkhead unless the property owner proves it is infeasible to have a living shoreline on the site. New laws were passed in 2008 revising the state's Shore Erosion Control Laws and Critical Area Act and enacting the Living Shorelines Protection Act. Under these new regulations, shoreline erosion control projects are considered "home improvements," and contractors

[1] Maryland successfully passed the Living Shorelines Protection Act, HB 973 in October 2008.

can lose their licenses if they violate the Critical Area Act. The Army Corps of Engineers has a programmatic agreement with the MDE that encompasses living shorelines projects. There is a project length threshold or channelward jurisdiction line for when the Army Corps will need to be involved in the project. Homeowners need both state and federal approval.

Technical knowledge of providers

There are four main technical experts in the program: a program manager, a biologist, and two engineers. There is also an accounts manager. In addition, the private contractors who actually execute the projects are certified as marine contractors by the MDE. DNR's Shoreline Conservation Service also keeps a list of preferred contractors who have a proven track record of successfully implementing living shoreline projects.

Was training involved?

Yes, there has been a series of training programs and workshops for waterfront property owners, living shorelines professionals (engineers, marine contractors, permit processors, local planners, etc.). These training programs have been extensive in the past and have been shown to be effective in promoting awareness of living shorelines. There has been a marked increase in the number of contractors whose business models have changed to accommodate living shorelines; many "conventional" marine contractors and engineering firms have hired wetland biologists or developed relationships with subcontractors with this expertise. The general format of all these workshops and training programs has been an introduction to living shorelines, the various techniques involved, design considerations, and one or two topics unique to the region.

Point of contact

Outreach has been a large part of this program. DNR uses brochures, fact sheets, pamphlets, technical guides, websites, site visits, and workshops. Educating homeowners and visiting sites where living shorelines have been implemented has been vital. The department has developed a DNR Mobile Restoration app (*http://www.mappler.net/mddnr/*). The department plans to use it in the future to pinpoint the location of these projects for outreach and education purposes.

Other information about DNR's living shoreline program can be found here: *http://www.dnr.maryland.gov/livingshoreline*.

Program provision

1. Homeowners contact contractors, who refer them to DNR, or they contact DNR directly.
2. DNR provides initial site visit where staff assess the problem at hand and provide appropriate recommendations. They also discuss program details and concept design with the homeowner.
3. Sometimes homeowners will go through the process without assistance from a contractor or SCS.
4. After initial assessment, the homeowner interested in getting financial assistance submits a request for state assistance to the SCS Program Manager.
5. If DNR approves the loan, the homeowner receives a notice to proceed upon submission and execution of a project agreement with the state.
6. At this point, homeowners can choose from a list of preferred engineering firms supplied by DNR or identify contractors on their own. In either case, the process *must* be competitively bid.
7. DNR'S SCS Program helps the homeowner select a responsible bidder.
8. It is highly advised to have a pre-application meeting with the permitting agencies, the homeowner, and the funding agency, in this case DNR.

   At this meeting, various items are discussed, including design options, costs, funding, concept plans, impacts to critical natural resources, and permits and approvals needed. The vetting of the concept plans by the MDE seems to give more confidence to local planners and the pre-app meeting allows local planners more time to get started on reviewing the site.
9. At this point the homeowner will submit to MDE a joint state/federal permit application with pre-final plan. As a part of the process, a buffer management plan and a planting plan are also submitted along with the permit application.
10. When a new and innovative design is proposed, a pre-application meeting helps get all the agencies on the same page, or at least sets the stage for getting consensus and eventual approval.
11. The local planners use training, regulations, and past experience to review and approve projects. The planners typically do some research before the site visit.
12. The plan is considered final when MDE and the Corps approve it.

What documentation would you need to evaluate the property?

A field inspection form is used for the initial assessment, describing the location, what was discussed (technical/financial aid), length of shoreline, construction type, any findings/recommendations, field estimates, homeowner response, riparian buffer conditions, drainage, bank area, beach area, and offshore area, including a small sketch with photo marks and other comments.[2]

What was the form of the information (personal, handout, over phone)?

There are generally site visits involved so information like handouts is usually given directly and personally. Online resources are available at their website: *http://www.dnr.state.md.us/ccs/livingshorelines/ftassistance.asp*.

Interaction with contractors

Different organizations offer training of contractors and other living shoreline professionals. The new Maryland Shorelines Law places the onus on the applicant or applicant's contractor to prove that a living shoreline wouldn't work on the property. This challenged the status quo among contractors at the time, so the training and open dialogues that followed were to help contractors feel more comfortable with the concept of living shorelines. The contractors look for examples where living shoreline projects have worked. They need strong examples and case studies to convince themselves to change their *modus operandi*.

There is a list of recommended engineers and contractors, but homeowners are not required to use them. DNR's SCS developed the list after due diligence that included requiring a very detailed application form, inspecting past projects, and checking references. The list does not favor one contractor over another, but it is dynamic and is modified to reflect contractors' performance.

Funding

How did you fund the assistance?

This program was set up with approximately $1 million from the state legislature. It has provided zero-interest loans to waterfront property owners for more than 30 years. Each year the program's funds are replenished by annual payments on those loans, resulting in a pool of approximately $600,000 in the revolving loan fund. This changes from year to year depending on pay off from previous loans or new property owners in the program. These funds are then allocated to newer living shoreline projects that keep the revolving loan fund operational.

Loans are offered for 5-, 10-, 15-, and 25-year periods. Stability of having the loan program within the state agency is important because it is a loan fund and if there is foreclosure or failed repayment the state has lien on it. Some of the larger loans do require an initial contribution from the homeowner and DNR's SCS retains a percentage (determined by a sliding scale based on the total cost of the project) for administrative costs. The matrix of financial assistance can be found at *http://www.dnr.state.md.us/ccs/pdfs/ls/dnr/scm/LS_FAMFY13.pdf*

When homeowners receive loans, they must obtain competitive bids from contractors.

Facilities required (Internet, office, phone)

Normal office requirements apply. The Coastal Atlas is utilized to look at historical shoreline erosion rates prior to site visits.

Tracking system

No formal monitoring protocol was discussed. Generally they are able to follow up and view projects but the sheer number of projects prevents monitoring all of them. DNR used a formal monitoring protocol to assess the success of past living-shorelines projects in 2006.

Interview with Jana Davis, Chesapeake Bay Trust, Maryland

Background

The Living Shorelines Initiative Grant Program gives grants to homeowners and public entities for shoreline restoration projects. Through the program the Chesapeake Bay Trust and its funding partners (NOAA, Maryland Departments of the Environment and Natural Resources) have been able to provide potential applicants information on living shorelines and site visits.

Stakeholders, agencies involved

Chesapeake Bay Trust (CBT) is the nonprofit, quasi-state entity that provides oversight of the grants distributed by this program. Its status as a quasi-state agency enables it to work closely with DNR/MDE but allows them to work more flexibly with grantees and they, in turn, with contractors and landowners. CBT was created by the legislature although its funding sources are private and its employees are not state employees. This nonprofit

[2] *http://www.dnr.state.md.us/ccs/pdfs/ls/dnr/scm/FieldInspectionForms.pdf*

grant agency works in conjunction with other state and local permitting agencies to ensure funds are used for the benefit of the Chesapeake Estuary. CBT provides technical assistance, information on living shorelines, site visits, and, most importantly, grant funds to applicants.

Maryland's Department of Natural Resources (DNR) and ***Department of the Environment (MDE)*** and ***U.S. NOAA*** are partners in providing the grants. DNR does outreach as well through a separate program.

MDE is the state permitting agency. It has also done some contractor training. As the regulatory authority, MDE is an important partner in that permitting assistance/ advice can be provided along with the funding decision site visits.

Landowners generally match the grants, though matches are not required for public-property projects. Private-property projects have varying levels of match requirements (e.g. 25 percent for homeowners or community association projects, and 75 percent for individual property owners, who must apply through a not-for-profit applicant)

Contractors in many cases have been trained to understand the restoration methods used in this region. This training has been offered by MDNR and others. Contractors are often the first contact a landowner has: The landowner has an erosion issue, and the first thing he, she, or it does is contact a marine contractor. Many marine contractors in the Maryland area who offer living shorelines know about the funding offered by CBT partnership and encourage their clients to consider applying. Landowners then contact CBT, who helps them consider a not-for-profit lead applicant.

Homeowner associations (HOAs) often participate in operations at this scale and serve as leads on grant applications.

Nonprofits are among the contacts for homeowners who are looking for assistance with their shorelines. They act like consultants, bringing in clients and providing quick initial site visits to inform homeowners as to what they can and can't do and about opportunities in the program.

Role of jurisdiction

Under current statutes bulkheads are no longer permitted in Maryland without waivers. The default course is to use a revetment or soft shoreline. New laws passed in 2008 revised the Critical Area laws and enacted the Living Shorelines Protection Act. Under these new regulations shoreline erosion-control projects are considered "home improvements;" contractors may lose their licenses if they violate the critical area laws, and living shorelines are the preferred method of reducing erosion where conditions allow. The regulations describe the conditions that are appropriate for living shoreline projects. Exceptions are granted under a waiver process whereby the homeowner must demonstrate that a living shoreline is not feasible. A homeowner can obtain an exception to replace a bulkhead as long as it is still 85 percent functional.

Technical knowledge of providers and types of assistance

Technical assistance to a landowner generally occurs through one of two pathways: (1) initiated by a landowner with an erosion issue, or (2) initiated by a non-owner – a contractor or nonprofit – with ideas about what a landowner should or could do on his/her/its site.

1) Landowner-driven initial contact assistance

Landowners with erosion issues who opt or need to be proactive about solutions will generally contact either a natural resource agency, a local nonprofit organization already known to them, or, more commonly, a marine contractor directly. Such homeowners usually receive some sort of preliminary assessment by that entity. Because of the extensive training of contractors and outreach, there is growing and widespread understanding of the program and of living shorelines in general. If the homeowner has reached out to a natural-resource agency or local nonprofit, generally these entities know about the Living Shoreline Protection Act, the drive to use a living shoreline approach rather than armor, and CBT's Living Shoreline funding initiative. In those cases, where appropriate, the homeowner is directed to consider a living shoreline and to seek funding from CBT to support the project. If the homeowner's first contact is a marine contractor, there is a chance the contractor will neither a) suggest a living shoreline approach, nor b) therefore suggest the grant program to support one. Because so many homeowners get their information directly from contractors, the shoreline community feels educating and training marine contractors is important. As a result of the Living Shoreline Protection Act passed in 2008 and the recent regulations to promulgate it, more contractors are becoming exposed to living shorelines through the permit process.

(2) Third-party driven initial contact

Often nonprofit organizations or resource agencies with a goal to improve shoreline conditions in local watersheds will approach landowners with ideas about shoreline projects. In such cases, Staff at the nonprofit or natural resource agency may prioritize

certain land types, approach landowners, provide technical assistance at site visits where they examine surrounding areas, hardening shorelines on adjacent properties, energy levels, and other features. [3]

With either contact type, either initiated by the landowner with an erosion issue or project in mind or initiated by a third party, the group may contact CBT to discuss a potential grant to support the project. At that point, several technical assistance avenues are suggested by CBT.

(2) Pre-application visit

The Maryland Department of the Environment (MDE) will generally do a pre-application site visit with permitting agencies that will cover the general permitting process and information needs and give homeowners a run-through of the challenges and timelines they should expect. The MDE, local jurisdiction, Army Corps, NOAA, and FWS all have regulatory authority or review as part of this process and are invited to participate in this visit. All funding applicants are strongly encouraged to take advantage of this "pre-app" opportunity.

(3) Prefunding site visit

CBT also offers, and prefers to do, site visits with all applicants prior to application to the grant program. At this site visit many topics are discussed depending on how advanced the landowners' ideas are, generally including discussion on three fronts: engineering and design, habitat, and permitting:

Engineering and design: If a landowner is at the early stages of project development, CBT engineering staff can provide "first blush" technical assistance. From that point a homeowner must figure out what he/she wants to do.

Habitat: There are biologists housed in CBT, and one of the factors considered in idea development is to maximize habitat potential of the ultimate project.

Permitting assistance: MDE participates in the grant-program site visits, and although these visits don't qualify as official "permit pre-application" meetings, MDE staff can assist with a general discussion of the permit process.

[3] Interview with Erik Michelsen, Executive Director of the South River Federation, Maryland.

Training

DNR educates planners about living shorelines, shoreline types, and what is feasible in different locations. Planners must understand that flexibility at these early stages is very important. There is no cut-and-dry checklist for these restoration projects, and innovation requires flexibility. Training planners continues to be essential to the entire program.

Point of contact (how homeowners get involved)

Contact is usually made first with marine contractors. If the site is feasible for living shoreline, they can refer homeowners to one of the nonprofit organizations that have the ability to submit grant applications. A homeowner may also go to a nonprofit directly, without first contacting a contractor, but this is less common.

Regulatory restrictions lead many homeowners to just install living shorelines, which cost about as much as other options.

Program provision

1. ***Outreach:*** Several nonprofits and counties and the state DNR conduct outreach to educate landowners and contractors about living shoreline practices. So does the CBT, but mainly as a means to solicit projects in order to accomplish the funding initiative's goals.

   This outreach has included free workshops, site visits, and brochures. There are several demonstration projects where homeowners can see first-hand the results of the living shoreline program. Owners can also learn about their shoreline types and erosion from a shoreline atlas: www.dnr.state.md.us/ccp/coastalatlas/shorelines.asp.

2. ***Assistance #1:*** Before a grant application is submitted, a contractor or one of the many nonprofits that can help determine if a site is appropriate will usually conduct some sort of initial assessment.

3. CBT sends out a Living Shoreline Grant Program request for proposals (RFP) yearly. Only nonprofits, community associations, state and local governments, and academic institutions are eligible to apply for grants. About half the applications come from local governments and half from nonprofits. The RFP includes extensive information on what criteria the program considers. Applicants can review this. They can ask for a second site visit prior to applying, which CBT is not mandated to perform but which it always agrees to do.

4. ***Assistance #2:*** CBT recommends that at this point homeowners begin seeking permits from MDE, NOAA, the Army Corps, FWS, and local jurisdictions. This is intended to reduce the pressure on MDE to approve permits so funds can be released to homeowners who've obtained grant funding first. A pre-application site visit is then conducted by MDE separate from the CBT site visit.
    a. This pre-application site visit is highly recommended by MDE because it has proven to reduce the amount of time for review of a project. You can fill out a pre-application form on their website easily. At the pre-application site visit MDE is able to:
        i. Give an estimate of fees, processing time, and costs
        ii. Help homeowners identify information needed and potential problems with their applications
        iii. Review procedures and give guidance on the project.
    b. Many shore erosion control practices are jointly authorized under the Army Corps through a joint federal-state programmatic permit, provided they meet certain conditions are authorized by MDE in accordance with State Water Quality Certification and State Coastal Zone Consistency.[4]
    c. Only one combined federal and state permit application form is needed.[5]
5. A nonprofit, contractor, or homeowner expresses interest in the CBT grant program. A questionnaire is used prior to a preliminary site visit to determine if the visit is appropriate.
    a. This screening call covers basic questions such as ownership, upland areas, existing shoreline description, project length, community buy-in, and technical contacts to date.
6. ***Assistance #3:*** A site visit is conducted before the homeowner applies for the grant. Although this is not mandatory, it is highly recommended and regularly performed. CBT brings members of MDE, DNR, and NOAA to the site visit. The benefit is that all funding agencies are able to provide comment prior to the grant package being assembled. It is also smart to get all funding partners on the same page and talk through the site characteristics.
    a. It is very important to have a strong group of people working together before the site visit, for several reasons: (1) They educate each other about the needs and desires of the different agencies. (2) This allows them to fill in for each other when not all are present. (3) It makes life much easier for the homeowner.
7. When the applicant submits a formal grant application, a technical review committee reviews it. This team is composed of eight to 12 members including engineers, scientists, coastal managers, and funders. The committee makes recommendations to the funding partner's board.
8. There is high demand for the program, and only about half the projects proposed are funded each year. Prioritization is based on potential ecological benefit, how appropriate the design is, demonstration potential, landowner willingness, shovel-ready status, and matched and leveraged resources. The highest scored projects are
    a. In areas without shellfish or submerged aquatic vegetation resources that could be negatively impacted by a shoreline project
    b. In areas where armor exists and removal is proposed
    c. In areas of erosion, particularly where erosion threatens infrastructure
    d. Where wetland loss has occurred.
9. Funds are released when permits are approved and other project contingencies are met.
10. A series of post-award meetings, including a pre-construction meeting once a firm is selected, helps everyone get on the same page. This meeting approves a plan for access and construction hours. The CBT conducts inspections during construction.

Monitoring

In this model there is no formal monitoring except when scientific research is conducted for a special project. The program receives news about the project indirectly, through word of mouth or frequent contact with the community. NOAA has figured out what it wants to look at from an engineering perspective but conducts no formal monitoring on the sites.

[4] *http://www.mde.state.md.us/programs/Water/WetlandsandWaterways/PermitsandApplications/Documents/www.mde.state.md.us/assets/document/wetlandswaterways/Shoreerostext.pdf*

[5] *http://www.mde.state.md.us/programs/Water/WetlandsandWaterways/PermitsandApplications/Documents/www.mde.state.md.us/assets/document/wetlandswaterways/JPA_SF_Bundle.pdf*

Interaction with contractors

Covered in previous sections.

Costs

From the CBT perspective a single site would mean half an hour phone call and anywhere from 5-10 meetings of an hour or two to get to breaking ground on a project.

Funding

The nonprofit granting agency CBT aggregates funding from several sources for shoreline restoration, and other ecological and educational goals. This granting agency has thirteen employees. It receives and administers $5-9 million per year and reinvests that money in projects.

Note that its activities extend far beyond this program and include other restoration-type activities, such as buffer planting, fish-passage projects, and wetland creation. These funds are sourced from DNR, MDE, NOAA, special interest license plates, donations from individuals, and a checkoff option on the state income tax form.

Grant money can be applied to either the design or the design and implementation parts of the project. All grant monies are part of a cost-sharing program. The cost shares required are 75 percent from individual homeowners and 25 percent from homeowner associations seeking funding for land they own. A nonprofit such as a museum can seek a 100 percent grant.

Facilities required (Internet, office, phone)

Nothing of note.

Interview with Kathlene Barnhart, Planning and Environmental Programs, Kitsap County Department of Community Development, Washington

Background

Kitsap County received an EPA grant which funded this collaborative effort between the county and willing shoreline landowners. The project also included the funding of a bulkhead removal on public land. The overall goal was to design and implement shoreline restoration projects to reconnect upland sediments to the nearshore habitat. There is no existing in-house program that will provide this service after the grant money runs out. Following the initial site visits, only three sites were selected for geotechnical feasibility reports. One has been constructed, one is about to go to bid for construction, and a third will undergo riparian restoration for bank stabilization in hopes of enabling bulkhead removal in the future.

Stakeholders, agencies involved

The Kitsap Department of Community Development received and administered the grant and facilitated the process from outreach to implementation. It also performed a bulkhead removal in a public park to use as a demonstration project.

A geotechnical consultant was hired to help identify sediment sources, create maps, and write feasibility reports for identified projects in priority sediment-source areas.

The requirements for the consultant specified in the RFP were:

- Demonstrated expertise in coastal and shoreline processes
- Demonstrated expertise in geotechnical assessments
- Demonstrated expertise in the geotechnical feasibility of armoring removal and restoration
- Demonstrated ability to meet deadlines and deliverable timelines

Homeowners learned about program and registered via an online survey to find out more about bulkhead removal and replacement. In general they seemed to have high levels of education, have science backgrounds, and/or be involved in other programs such as Washington State University Beach Watchers.[6] Many of them are also newer homeowners who are planning to rebuild or make other changes in their bulkheads.

EPA: Provided grant to Kitsap County.

Point of contact

Homeowners learned about the program through outreach, public meetings, and postcards. Beach Watchers also put a link to the homeowner survey in its newsletter, so it was more widely distributed. At one workshop a site visit with a licensed geologist was given as a door prize. This was very well received.

6 *http://www.kitsapgov.com/press/2012/NR12-59.htm*

After learning of the program, homeowners participated in an online survey online. The survey requested contact information. Homeowners in priority locations already mapped by the county who showed interest via the landowner survey were then contacted by phone or email.

County staff conducted broad outreach but in retrospect wish they had had time and resources to focus additional outreach on particular areas. They would have picked a few priority areas and concentrated outreach on homeowner associations and civic groups there. This would have allowed them to garner support from a group of neighbors and undertake a single, larger-scale project.

Program provision

The following was a general flow sequence for the program:

1. The county, via a consultant, mapped feeder bluffs and other ecosystem services to identify priority shorelines.
2. It notified homeowners of the project via a pamphlet, presentations, and postcards and, more broadly, through the Beach Watchers newsletter.
3. A survey was sent out to homeowners along those priority shorelines to gauge interest in restoration.
4. The county contacted homeowners who expressed interest via phone and email.
5. Any homeowner still interested in participating received a site visit by a county planner and engineer to determine initial feasibility.
6. Geotechnical feasibility analysis was conducted at promising sites. If the feasibility analysis recommended moving forward, the county hired a firm to design the project.
7. The county, a design consultant team, and a WDFW habitat biologist would conduct a second site visit with the homeowner.
8. County staff obtained all the necessary permits in the homeowner's name, just as a private consultant would.
9. Beach Watchers developed and instituted a monitoring plan.

What documentation did you need to evaluate the property?

A geotechnical consultant produced a feasibility report. This was done in part because the county was unsure of how to analyze these sites and in part because of liability issues. The feasibility report also served to enhance the homeowner's confidence in the project and communicate the site's features to the homeowner. Having an independent consultant who had scientific credibility, provided the feasibility reports, and worked with the homeowner lessened skepticism about a county-sponsored project.

These reports were designed to be more detailed than other geotechnical reports provided in the past. They covered site conditions, general geology, beach and coastal conditions, slope stability, upland and bank conditions that could lead to slides or bank failure, upland site maintenance suggestions, vegetation, and drainage, and qualitatively assessed the change in risks due to bulkhead removal.

Interaction with design/implementation contractors aand geotechnical consultants

Separate RFPs were sent out for the geotechnical feasibility report and the contracted designs. Finding a contractor for the design was not difficult. It was challenging to find consultants who would depart from the bulkhead status quo. Many were not familiar with feasibility assessments that go above and beyond the standard "geotechnical report" required for bulkhead installation. The risk consultants take on when they recommend removing a bulkhead is significant. Although consultants were willing to do the job, some did not provide sufficiently definitive answers to move forward with removal. Geotechnical consultants could use training to become comfortable recommending softer erosion-control techniques and bulkhead removal.

Costs

Actions the county took which incurred costs: priority sediment source analysis, shoreline" reach " (segments) and site visits, designing brochures and publications, designing survey, feasibility reports, permitting (covered by the county), and construction. They also used the bulkhead removal at Anna Smith Park, which was financed by this grant and organized by the county, as a demonstration site for private landowners.

What were the hours involved in providing assistance?

Estimated 16 hours a week on average over the past year, not including consultant time.

Funding

EPA grant with a 33 percent match by the county.

Facilities required (Internet, office, phone)

All county activities were conducted internally, and the only additional facility required was a larger meeting space for one of the workshops. The mapping was done by the consultant to ensure accuracy and to not add to the workloads of highly capable but busy Geographic Information Service (GIS) staff.

Tracking system

Eight sites were identified through the prioritization and survey process. Each received a preliminary site visit, which was documented and well described. For those sites selected for restoration, local Beach Watchers volunteers will assist in monitoring pre- and post-construction. The organization already has a monitoring protocol for shorelines, adopted in the "Island County/ WSU Beach Watchers Beach Monitoring Procedures." They will conduct a series of transects perpendicular to the shoreline. They are monitoring slope and sediment size and using quadrats to look at changes in biota. Photo points are also established and GPS will be used to mark large woody debris and terrestrial vegetation changes.

Other Takeaways

Partnering with Washington Sea Grant and WSU Extension would also help improve the approach to homeowners.

With the right training, i.e. the ability to recognize when softer alternatives are appropriate, the staff could potentially do initial feasibility assessments internally, at the county level. The Washington Department of Fish and Wildlife's Marine Shoreline Design Guidelines and associated training will help with this.

A traveling geotechnical consultant on call to assist with detailed feasibility review and, potentially, design would be very helpful to county and homeowners.

Some kind of reimbursement system might be devised to help local jurisdictions cover the cost of permitting. This would make the permitting, including assistance throughout the process, free to the homeowner.

Permitting assistance at the local level is very important because whoever is applying for the permits must understand the local permitting process.

The permitting process is often identified as the top reason people do not consider restoration. Being able to offer the service of completing all necessary permits may be even more of an incentive than paying for the actual restoration.

Interviews with Brandy Reed, King Conservation District; Ryan Mello, Pierce Conservation District; Cindy Dittbrenner, Snohomish Conservation District, Washington

Stakeholders, agencies involved

The Washington State Conservation Commission (WSCC) oversees the county conservation districts. Its 10-member board is composed of four representatives from the conservation districts and four from state agencies, plus two gubernatorial appointees. The WSCC's role is to coordinate programs across district boundaries, facilitate and guide the activities and programs of individual districts, and resolve any conflicts that arise. It also determines how state funds are distributed to the conservation districts, monitors expenditures, and works with other lead conservation district staff to coordinate activities.

In March 2013, 12 conservation districts signed an interlocal agreement to share financial, technical, and staff resources. This agreement formalizes their commitment to maintain a Puget Sound Conservation District Caucus. This caucus covers Clallam, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston, and Whatcom Counties.

Role of jurisdiction

One important question is whether shoreline technical assistance falls within the strategic plans of the individual conservation districts. Although shoreline management is not explicitly included in the WSCC's strategic plan, the plan's goals, including "improving the quality of Washington's environment," and the conservation districts' enabling legislation, RCW Chapter 89.08, are broad enough to allow district resources to be directed to shoreline management.[7]

Technical knowledge of providers

There are a number of examples of conservation districts on Puget Sound providing technical, engineering, project permitting, and shoreline vegetation assistance along marine and freshwater systems.

The Puget Sound conservation districts have identified freshwater and marine shoreline management as a

[7] *http://scc.wa.gov/wp-content/uploads/2012/04/09-15-WSCC-Strategic-Plan.pdf*

priority programmatic area of focus. Some conservation districts have the capacity to assist in

1. ***Coastal geotechnical services:*** Some conservation districts have this type of expertise on staff. King Conservation had in-house geotechnical expertise but now contracts the service.
2. ***Habitat expertise*** already exists in conservation districts and can be coordinated and shared among groups.
3. ***Permitting:*** Conservation districts provide permitting assistance for projects.

Point of contact (how homeowners get involved)

Conservation districts have extensive experience in conducting outreach across the region. They are non-regulatory, relationship-driven agencies. Each district uniquely reflects its community, but they share a common characteristic: landowners generally trust conservation districts.

The districts have high capacity for conducting workshops, mailings, and other outreach. They have largely established the most important components of outreach, trust, and community relationships.

Program service model flowchart

Note: This program flowchart is based on an interview on marine shoreline technical assistance. However, King and other Puget Sound conservation districts also have freshwater enhancement programs that have been effective in implementing projects in creeks and streams. Ms. Reed noted the similarity between these programs but also noted potential variation in landowner attitudes and other features not captured in this overview.

Outreach

One conservation district has provided this type of technical assistance using mailings and outreach to contact homeowners. Fifteen well-attended workshops took place, at which homeowners received an educational program on marine riparian and nearshore ecology, coastal geological processes, and shoreline vegetation management.

The program covered best management practices near shorelines and the inherent risks of Puget Sound nearshore environments. Homeowners learned about the next steps, site visits and implementation. These workshops were very successful in raising interest. However, obtaining funding for subsequent site visits, resource protection, and enhancement project implementation was challenging.

Initial strategic prioritization of sites and homeowner education

This same program is now using a strategic approach to identify areas where bluff or beach retreat rates would likely support bulkhead removal. This is determined by analyzing where erosion-resistant glacial sediments within the tide line combine with sheltered or semi-sheltered exposures.

Shoreline landowners will have access to this information in the event they wish to consider removing all or portions of bulkheads. These detailed "area of interest" reports utilize existing mapping along with field examination and sampling of beach sediments and/or upslope soils and subsoils. Basic soil sediment classification and sediment strength testing may be performed to provide information on depositional conditions as well as the nature of landslide hazards. USDA Natural Resources Conservation Service (NRCS) standards and practices are utilized, especially in specific recommendations such as the NRCS practice standard *Land Reclamation, Landslide Treatment (Code 453)*. See *http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_025715.pdf*.

The area-of-interest reports, along with GIS information on shoreline parcels and past shoreline education and participation, will enhance the conservation district's ability to support landowners' interest in healthy shoreline management and restoration.

Site visits

After the outreach, homeowners who are interested request site visits. Two to three staff members took part in these visits:

- An in-house technician/program manager
- An in-house engineering geologist with a background in coastal geological processes.
- In some cases additional habitat expertise was needed, and a habitat specialist was contracted through the King County Department of Natural Resources and Parks.

These visits always start with the homeowners' priorities and concerns. Conservation districts in general view resource management through dual lenses: landowners' priorities and concerns and environmentally sensitive land use. In the case of the program surveyed, this approach was used to address core resource-management priorities, including: building setbacks from beaches and bluff faces and related geotechnical issues; the protection and enhancement of the ecological functions and values of marine riparian,

beach, and nearshore environments; the protection and enhancement of water quality and other water resources; and stormwater runoff management.

A site assessment report is provided to homeowners which includes management recommendations related to the core resource-management priorities. From here homeowners choose what to do.

At this juncture the on-the-ground program model largely ceased to operate, due to lack of funding, but further steps were elucidated through interviews and by considering other existing models within conservation districts.

Implementation (if available)

At this point there are two routes the program can take.

1. A conservation district can provide funding through cost sharing, grants, or a revolving loan fund, or
2. A conservation district can refer the homeowner to a third-party funding agent.

Conservation districts have experience developing funding packages and may also mimic revolving loan funds and provide low-interest loans.

Either the conservation district or a private contractor could do the actual design. The ability of a CD to do a design would not limit homeowner choice but rather provide back-up in case no willing contractors were available.

Note: A coastal geotechnical expert would be on staff for feasibility assessments and outreach but might not always be needed for implementation. They would also be required to assess the appropriateness of the designs especially if funding was being given.

Monitoring

A hypothetical monitoring program was briefly touched on. Conservation districts have programs in place to monitor the effectiveness of freshwater-enhancement projects.

Interaction with contractors

Not covered.

Costs

Not covered.

Funding

The conservation districts' funding model is multifaceted. It includes state and federal sources, private grants, private contracts, and in some cases local special assessments or rates and charges. King Conservation District, the primary conservation district interviewed for this report providing technical assistance to marine shoreline homeowners works with them to develop funding packages for project implementation. These packages include government matching funds.

However, within conservation districts there are other funding examples for other programs. The Spokane County Conservation District has a unique low-interest loan program to purchase equipment to encourage best agricultural practices.

Facilities required (Internet, office, phone)

None specifically identified.

Interview with Lance Winecka, South Puget Sound Salmon Enhancement Group, Washington

Background

We have conducted about 10 projects in WRIA 10-15 in South Puget Sound. The South Puget Sound Enhancement Group (SPSSEG) works in an area containing five counties, five lead entities, and four tribes. Projects have included bulkhead removal and soft armoring. SPSSEG is a non-governmental, non-regulatory nonprofit organization, one of 14 regional fisheries enhancement groups in Washington. It acts as a resource and facilitator for property owners interested in soft-shore projects and works with a variety of stakeholders to initiate, coordinate, implement, and monitor projects. SPSSEG facilitates geotechnical assistance and outreach. It also helps direct projects to the most suitable areas with predetermined scientific mapping. It answers homeowner questions over the phone on more general topics but can provide only limited assistance due to time constraints.

Stakeholders, agencies involved

All participation is voluntary. The major stakeholders include:

- Funding sources (Washington Departments of Fish and Wildlife, Ecology, and Natural Resources; the Puget Sound Partnership).
- Geotechnical consultants
- Homeowners
- Public entities
- SPSSEG, which coordinates and facilitates, identifies projects, writes grants, and leverages other funding.

Role of jurisdiction

SPSSEG's projects operate in five counties with a wide range of local shoreline master programs. Ease of implementation varies across counties. In some, the permit process is difficult, and SPSSEG has had to apply for building permits to take down bulkheads. Other counties grant exemptions for bulkhead removal.

Technical knowledge of providers

SPSSEG provides most of the assistance required, together with a geotechnical consultant hired for each project. The geotechnical consultant is an expert in geomorphology or civil engineering who can provide drawing concepts of the site design as well as a stamp of approval. This review is extremely important to reduce risk.

Point of contact

Generally homeowners get in touch with SPSSEG. SPSSEG relies on local knowledge of bulkheads that are failing or is contacted by homeowners who know about its work. It finds projects opportunistically and then matches these opportunities with LIO priorities, rather than conducting extensive outreach.

Program Provision

1. SPSSEG works with lead entities and tribes to target and prioritize bulkhead removals using scientific analysis and three-year work plans. Five years ago it worked with anyone who expressed interest. Due to funding constraints it must now prioritize projects.
2. Initial contact will be on a site where a bulkhead may be failing. This way the project proposal will offer financial assistance to a homeowner who would otherwise have to take some other action.
3. Sometimes a grant will be obtained to conduct outreach or identify specific sites.
4. Within these prioritized areas SPSSEG will often identify bulkheads that are dilapidated, or homeowners will contact them after hearing about them from regional biologists or through other channels.

   SPSSEG conducts an initial visit to gauge site characteristics and homeowner willingness to participate. The three-year work plans of the various lead entities often determine if the site is appropriate. The idea of incorporating a checklist at the initial site visit was posited as a way to weed out infeasible projects.
5. SPSSEG evaluates the lead entities' priorities for action and three-year work plans, homeowner willingness, the appropriateness of the site, and many project-dependent factors before moving forward.
6. A geotechnical report by a consultant provides advice and, if appropriate, site design. This report includes a risk analysis.
7. SPSSEG obtains a matching grant(s).
8. It provides permitting assistance throughout the process.
9. It hires a contractor to do the work.
10. It conducts post-construction monitoring.

What was the form of the information – in person, via handouts, over the phone?

It is difficult to learn about a site over the phone. A site visit is usually required.

Interaction with Contractors

We recommend choosing a contractor in accordance with the size of the site.

Costs

These depend on landowner and funding situation. If a project is already funded it moves much more quickly. Landowners without funding have taken years to implement projects. It takes SPSSEG about 10 hours to provide initial site assessment. This includes communicating with the landowner and providing follow-up.

Funding

This may come from the Washington Departments of Fish and Wildlife, Ecology, and Natural Resources; the Puget Sound Partnership, and the Puget Sound Restoration Fund; Local jurisdictions such as the City of Olympia provide matching funds on public property. One landowner committed a small amount.

Facilities required (Internet, office, phone)

SPSSEG does not normally use phones to conduct outreach. The organization does not engage in "cold calling."

Tracking system

Monitoring has been really difficult due to lack of funding. SPSSEG takes photo points, measures veneer depth, and tries to visit once a year. Monitoring really depends on the outcome of a project. SPSSEG has expressed a desire to have a more complete monitoring protocol.

Appendix E: Sample Feasibility Report

Geotechnical Assessment and Bulkhead Removal Feasibility Study for the Munter/Elmer Property, President Point, Kitsap County, Washington.

Prepared by Qwg Applied Geology, July 26, 2013.

Geotechnical Assessment and Bulkhead Removal Feasibility Study for the Munter/Elmer Property, President Point, Kitsap County, Washington

(Deliverable under Contract KC 105-13)

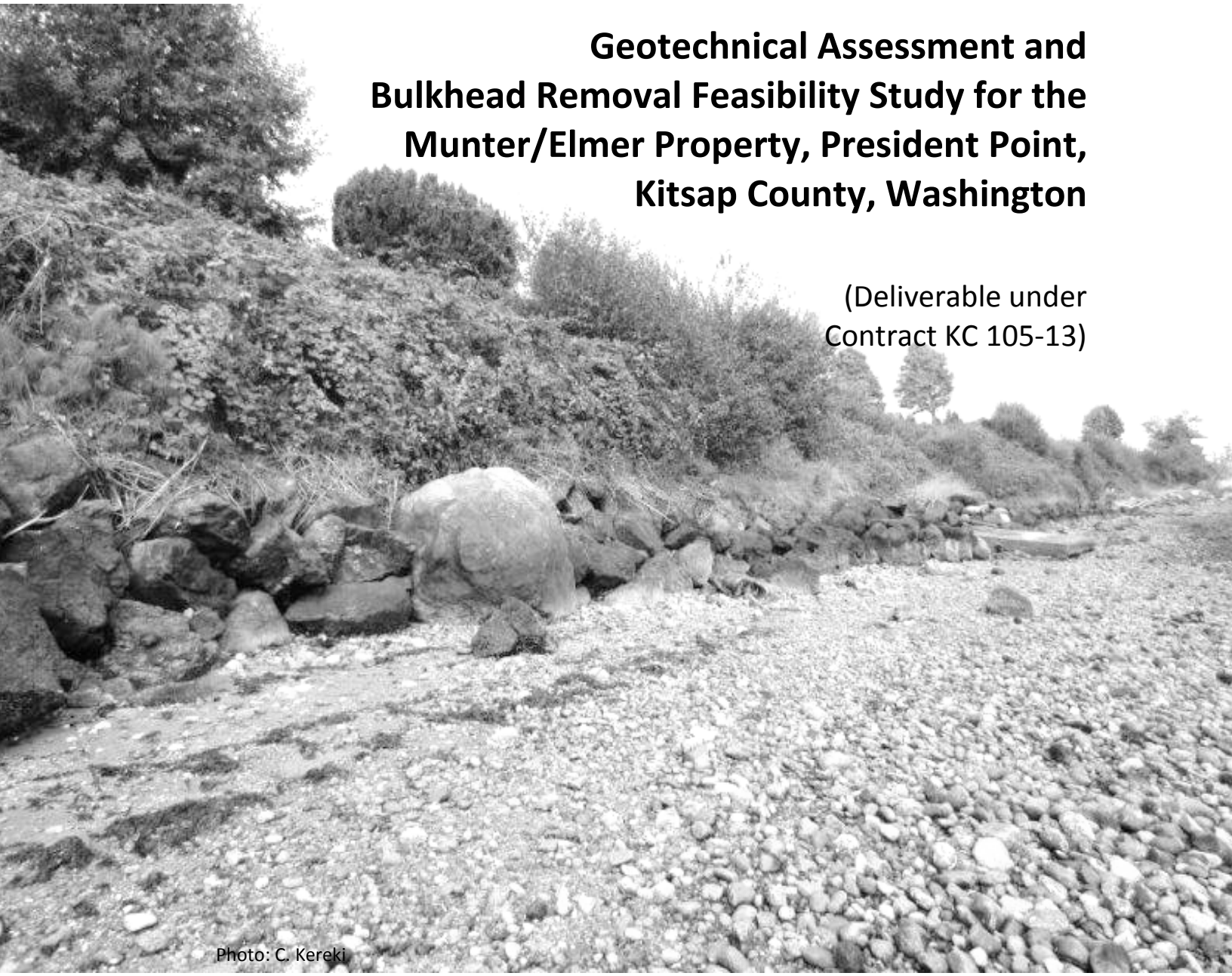

Photo: C. Kereki,

FINAL REPORT
July 26, 2013

Qwg Applied Geology
1802 Pine Ave. NE
Olympia, WA 98506

1.0 Project Scope and Purpose

This report provides the findings of a geotechnical assessment of the feasibility of removing a bulkhead along the shore of the private property owned by Teri Munter and Ben Elmer. The assessment is based on a combination of observations made at the site on May 28, 2013 and review of remote resources as described below. The geotechnical assessment characterizes the geology, hydrology, erosion, and slope stability at and adjacent to the site, and qualitatively evaluates the potential risk to existing structures and landforms in the context of the bulkhead removal being considered. The assessment also touches on the potential benefits to natural shore processes and habitat, and develops conceptual design ideas for the site. Potential supplementary benefits of site treatment to neighboring properties are also described.

The intended audience for this report is Kitsap County and the property owners, although others who get involved with the project if it moves forward may also find it useful. The content is intended to highlight the risks and benefits of any restoration action so that any project decisions (even as basic as go/no-go) will be well informed. An overall goal for this effort from the County's perspective is to encourage voluntary participation by the landowner in achieving shoreline restoration. From the homeowner's perspective, project goals have a more personal emphasis relevant to the site itself, focusing on reduced maintenance levels that incorporate natural aesthetics. These goals are outlined in more detail later in the report.

Meeting restoration goals would improve natural shoreline habitat conditions and reestablish natural processes at the project site. Consequently, restoration may cause increased rates of erosion and sediment transport (key shoreline processes), likely accompanied by a component of bluff retreat. Such conditions could be addressed through recognition and acceptance of these processes, or, if they become a concern, mitigation using alternatives to hard armoring can be implemented. Alternatives to hard armor mimic natural features and aesthetics, commonly incorporating vegetation and large wood (logs or stumps.) As this document is not intended to offer design ideas, any discussion of alternatives will be conceptual only.

This geotechnical assessment does not include the results of subsurface exploration beyond that readily observable in the exposed bluff face or from remotely-accessed or other available data. In other words, no drilling was done for this study. Furthermore, neither the assessment nor this report includes geotechnical design, quantitative slope stability analysis, or instrumented surveying beyond the use of a hand-held GPS unit to locate features discussed in the text.

2.0 Project Site Location

The property being evaluated is located at 22768 Jefferson Point Rd NE, in Kingston, WA; within T.26N., R.2E., Sec. 1 (Fig. 1). It faces Puget Sound to the east along the north-south-oriented shoreline south of the town of Kingston and north of President Point. The site is accessed easiest from Highway 104 via Hansville Rd., W. Kingston Rd., S. Kingston Rd., to Jefferson Point Rd. It was selected for consideration as a bulkhead removal/restoration project during a previous study funded by Kitsap County (Gerstel, et al., 2012).

The property is a rectangle about 540 ft. long by 170 ft. wide, oriented lengthwise nearly east-west and extending from its waterfront towards the two privately-owned properties abutting the western boundary. To the north and south are other residences, each accessed by private driveways from Jefferson Point Rd.

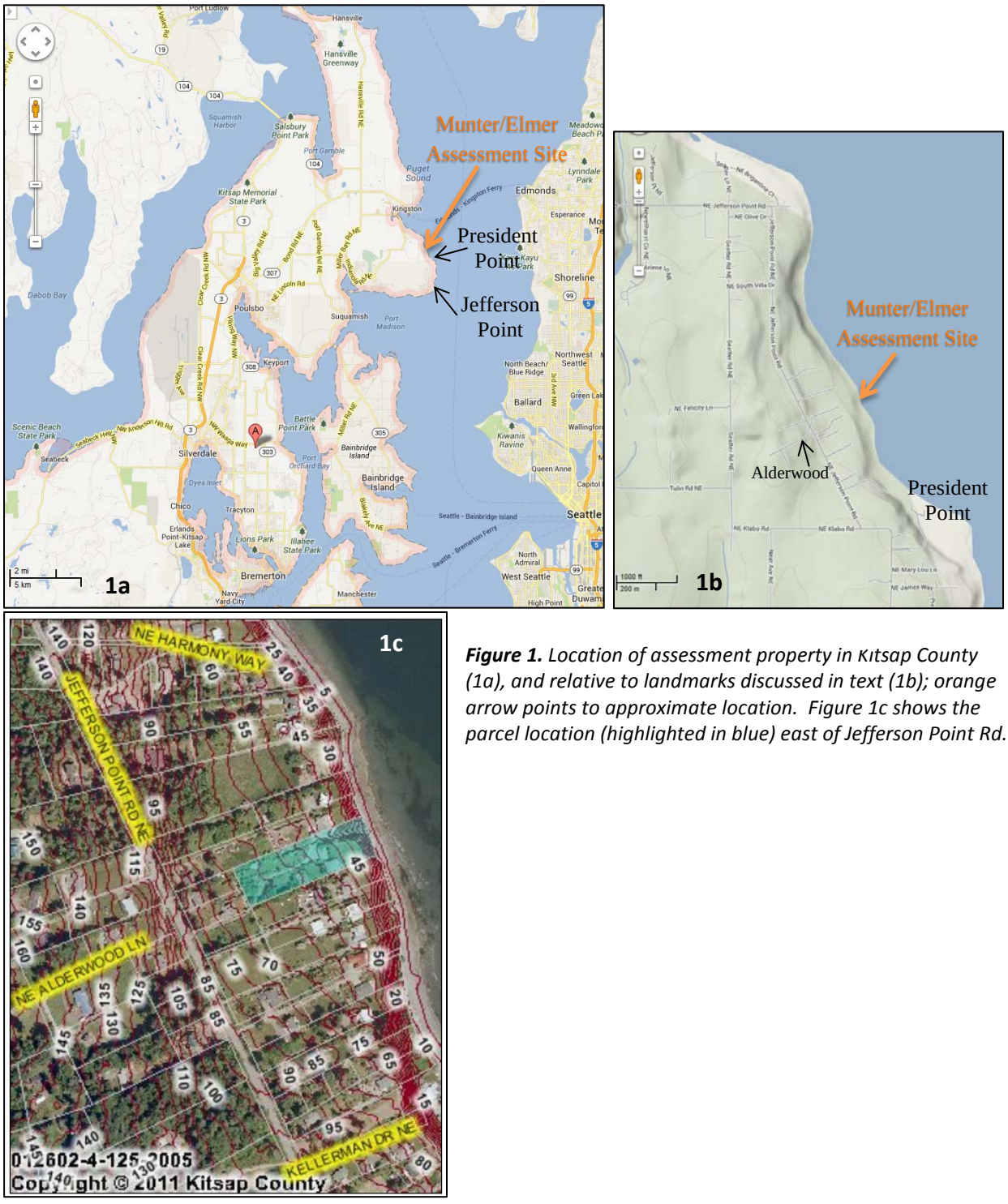

Figure 1. *Location of assessment property in Kitsap County (1a), and relative to landmarks discussed in text (1b); orange arrow points to approximate location. Figure 1c shows the parcel location (highlighted in blue) east of Jefferson Point Rd.*

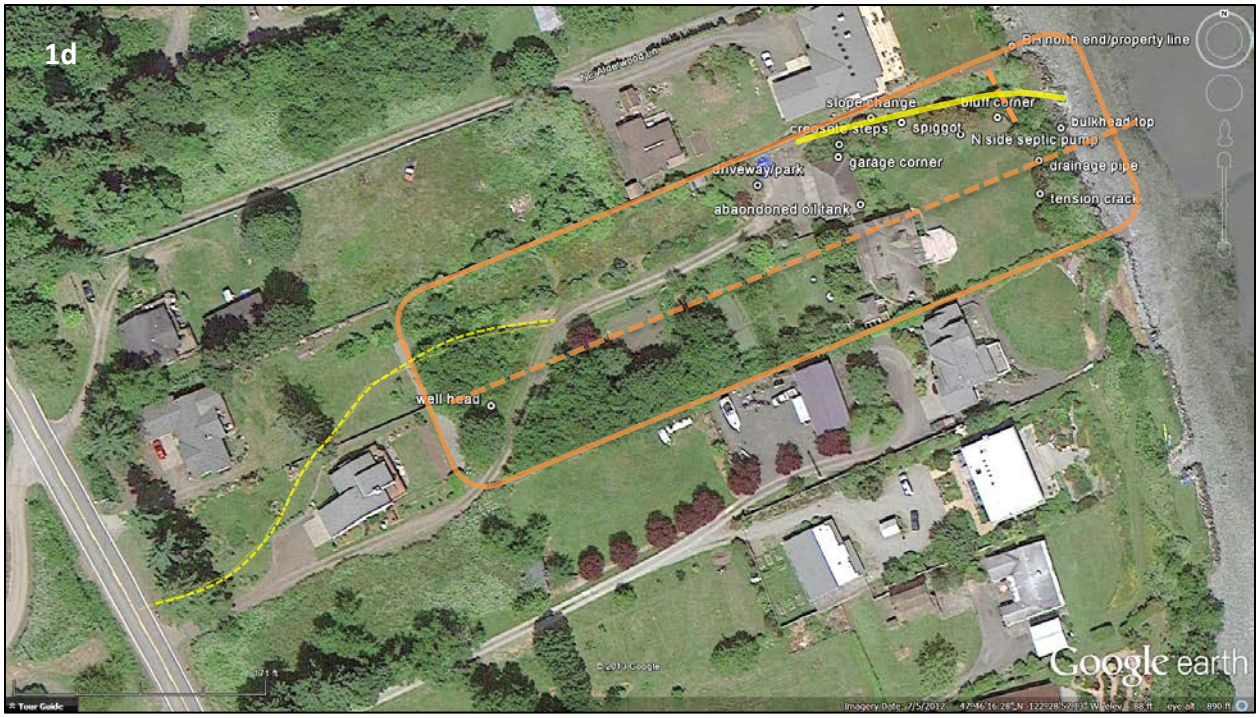

Figure 1. (Continued.) *Figure 1d is a map view of the assessment property (within orange rectangle) with field-collected GPS points identifying specific features or locations referenced in the text. Dashed orange lines represent location of geologic cross-section (shore-perpendicular) and beach access through-cut profile (shore-parallel) shown in Figure 8; solid yellow line identifies the beach access road with bluff through-cut; dashed yellow line identifies original property driveway access visible in older air photos.*

The site has an interesting history that could be acknowledged in any restoration design ideas. The roadway along the northern length of the property boundary and cut into the bluff to access the beach was used by heavy military equipment during WW II to service a Degaussing Station. [Note: degaussing of ships was done to neutralize the magnetic field created by the combination of different metals used in construction.]

3.0 Site Characterization

3.1 Remote review

Prior to making a field visit, a remote review was conducted of relevant on-line information and electronically transmitted reports and photographs obtained from Kitsap County. On-line data included high-resolution topographic images (LiDAR, from Puget Sound LiDAR Consortium), geologic mapping (Deeter, 1978), water-well logs, oblique and ortho-aerial shoreline photographs (spanning 1990-2012), and Coastal Atlas data (Washington Dept. of Ecology).

The LiDAR (Light Detection and Ranging) images (Fig. 2) reveal the north-south fabric of the regional surface morphology left by the last glaciation of Puget Sound. This alignment of landforms, together with the geology discussed below, controls surface and groundwater flow. The upland area on which a majority of the property sits, is relatively flat, although it clearly receives surface run-off from the slight rise to the west. Also apparent in the LiDAR images is a pronounced incision leading eastward from the uplands to the shoreline. This is a paved beach

access/boat launch road that was used during WW II and is discussed in more detail later in this report. Another smaller incision lies just to the north. No obvious landsliding is visible in the LiDAR images at or immediately adjacent to the property being evaluated.

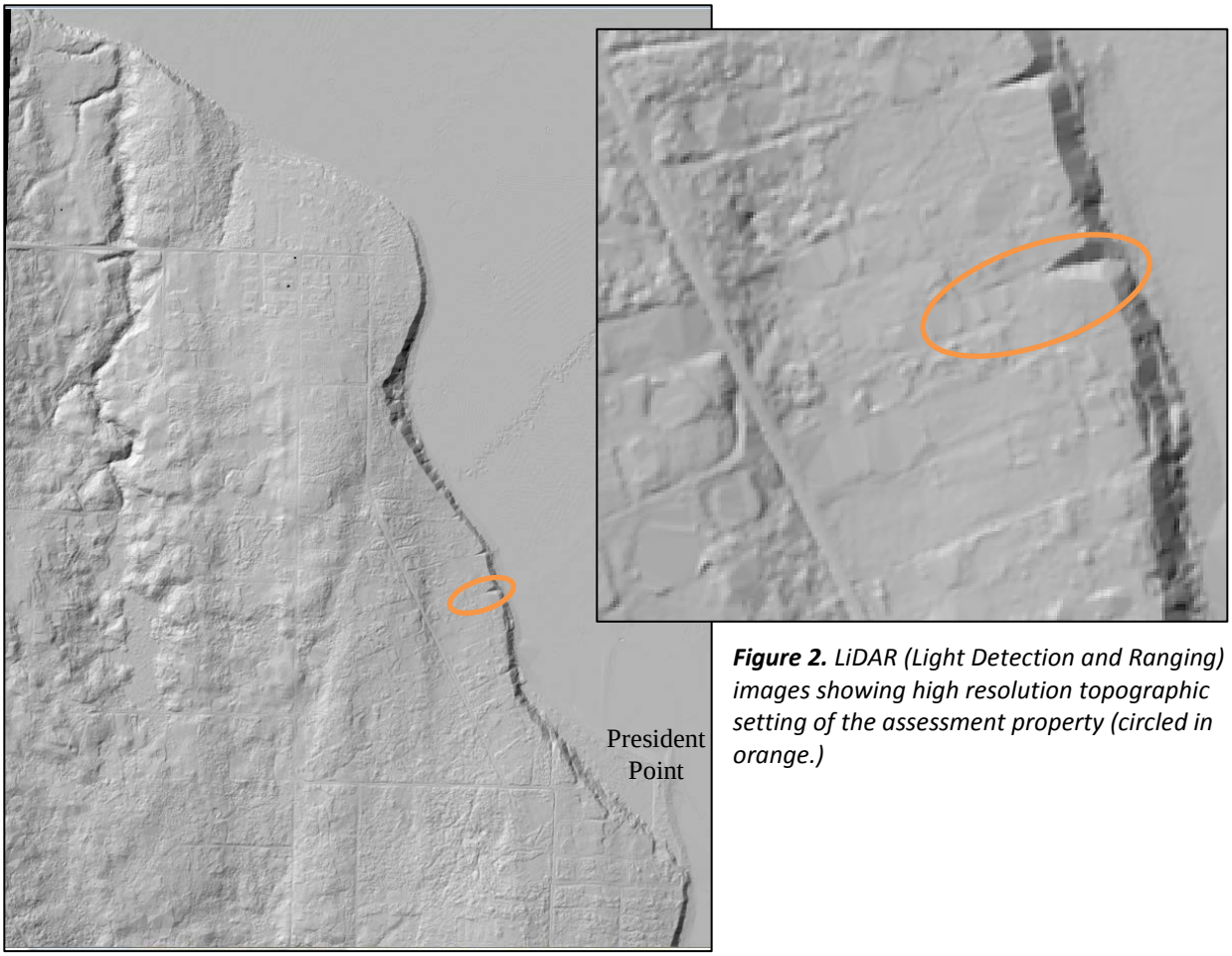

Figure 2. *LiDAR (Light Detection and Ranging) images showing high resolution topographic setting of the assessment property (circled in orange.)*

3.2 Geomorphic and Geologic Setting

The following descriptions and interpretation are based on the remote review combined with site observations. The assessed property is characterized by a relatively flat upland that slopes gently (<5%) from its western property boundary eastward to the house and garage, steepening slightly to 8-10% eastward from there, and dropping off abruptly at the bluff crest to near vertical, and in some places overhanging. Along the northern edge of the planar upland and along the crest of the bluff is a buffer of mostly ornamental evergreen shrubs and some native trees. The near-vertical bank below the crest is about 6-8 ft. high, with a buttress of talus at the base that slopes to the top of the bulkhead. The talus results from sloughing of the upper bank sediments, depositing on top of the bulkhead rocks in places.

The abandoned paved roadway is cut through the bluff along the north side of the property and grades east down the beach from the uplands. The roadway and both cutslopes lie fully within the Munter/Elmer property boundaries. Where the road descends from the upland it has a

grade of about 10-12% for about 50 ft.; at about 65 ft. from the beach it transitions to an 18-20% grade. The asphalt pavement, cracked and vegetated, terminates at a 2-3 ft. thick, 10 ft. long concrete slab that extends onto the beach (Fig. 3).

Along the steeper portion of the roadway where the incision into the bluff is deepest, the cut slopes along both sides are held up by timber pile walls consisting of creosote-treated piles with lagging (Fig. 4). Some sections of the walls appear to have rotted over time and been retrofitted and reinforced with rebar. Slumping and seepage is evident, and the perpetually wet conditions make for a slippery and hazardous descent to the beach.

Figure 3. *Looking north with the 2-3 ft. thick concrete slab boat ramp at the east end of the beach access roadway paralleling the north side of the assessment property.*

Figure 4. *Deteriorating timber pile wall along the lower part of the beach access roadway. Note creosote pile.*

The full sequence of bluff sediments is not exposed anywhere along the assessed reach; however, upper bluff sediments are visible along much of the length of the property, and lower bluff sediments are exposed along the property adjacent to the north – at the north end of the bulkhead being considered for removal.

Upper bluff sediments, mapped by Deeter (1978) as Vashon glacial till (Fig. 5), are dense gray with a fine-grained matrix of silt and clay supporting clasts (stone inclusions) of pea gravel to cobble size. An occasional boulder of up to 2 ft. in diameter, typical of glacial till deposits, was also observed in the bluff exposure (Fig. 6). The till appears to be about 15-20 ft. thick at the site.

Lower bluff sediments, exposed in the adjacent property to the north, are similarly dense as the till described above, having been overridden by the Vashon glacier, but show greater variation in overall grainsize ranging from slightly coarse and more clast-rich to uniform fine-grained sand, silt and organic deposits (Fig. 7). This older unit was interpreted by Deeter (1978) to be of non-glacial origin. Its thickness exceeds 20 ft., the maximum thickness exposed at the north end of the bulkhead, and likely reaches depths below sea level.

Geologic Map

Glacial Sediments

Qa	Quaternary alluvium, dune sand, loess, and artificial fill
Qb/Qc	Quaternary alluvial fans, beach deposits, undifferentiated sedimentary deposits, lacustrine deposits, landslides, peat, terraced deposits, and talus
Qgt/Qgu	Qgt - Pleistocene continental glacial till Qgu - Undifferentiated glacial and non-glacial deposits

Landslides

Deep-seated; Deep-seated composite; Deep-seated earthflow; Deep-seated rotational; Deep-seated translational

Figure 5. *Geologic map of the assessment property (indicated by orange arrow) and surrounding area (from Washington Geologic Information Portal).*

Figure 6. Exposure of till near top of bluff at assessment site. Note large boulder and spalling of fine-grained silt and clay matrix due to repeated wetting/drying of the bluff face.

Figure 7. Exposure directly north of the assessment property where the bulkhead has cause end-effect erosion. Lower bluff sediments are mapped as undifferentiated non-glacial silt, sand, and gravel. Bluff height at this location is about 25-30 ft.

Figure 8 is a representative slope profile and geologic cross section through the assessment property from west to east. It is a composite of features north and south of the line shown on Figure 1d to represent critical site conditions and infrastructure. Subsurface geology and groundwater conditions are interpreted from visible geologic exposure, water well data, and historic site information.

3.3 Surface- and Groundwater Conditions

The low permeability of the sediments described above result in several distinct surface and groundwater conditions important to site modification planning. Till, which is fairly impervious, generally acts as an aquitard (limiting the ability of water to infiltrate), so surface water commonly perches on top, resulting in shallow groundwater and boggy areas. This is evident in the western upland portion of the property where water was ponded around the water well behind the driveway berm at the time of the site visit in May (Fig. 8). According to the landowner, the area remains wet throughout much of the year.

Stormwater run-off generated west and upslope of Jefferson Point Rd. along NE Alderwood Lane (Fig. 1) has also been a source of surface water, flowing from there across Jefferson Pt. Rd. and onto the subject property. The general eastward sloping topography, likely roughly parallel to the subsurface sedimentary layering, or stratigraphy, directs both surface (run-off and perched or unconfined aquifer) and subsurface (in this case confined aquifer) flow eastward.

Where the till thins, is laterally discontinuous, or fractured, water can infiltrate to the surface of the underlying non-glacial sediments. The dense, fine-grained nature of these lower sediments forces water to flow along the contact between them and the overlying till. That, together with the gentle eastward dip of the land and possibly also the sedimentary layers, results in the springs and seeps observed discharging along the shoreline just north of the property, and along the cut-slopes of the abandoned roadway. The discharge occurs at the contact between the two geologic units described above, where excavation for the road intercepted groundwater flowing along that contact.

According to the landowner, water, likely from surface runoff and the intercepted groundwater, flows along the old roadway surface throughout most of the year, supporting algae, horsetails, and other hydrophilic (water-loving) plant growth.

Additional evidence of the local high water table has appeared in the basement of the site residence and in digging holes for tree planting just west of the house. The need for drainage management was also recognized in the development of the two adjacent properties to the west, where curtain drains were installed.

At least one pipe is known to convey water from gutters and possibly other collection points around the house to the edge of the bluff (Fig. 1). The condition of the pipe over the bluff and to the slope toe was not easily observed and therefore not determined. A piece of broken pipe lies on top of the bulkhead in line with the upland pipe and appears to have been carried downslope with one of the small toppling events described in the next section.

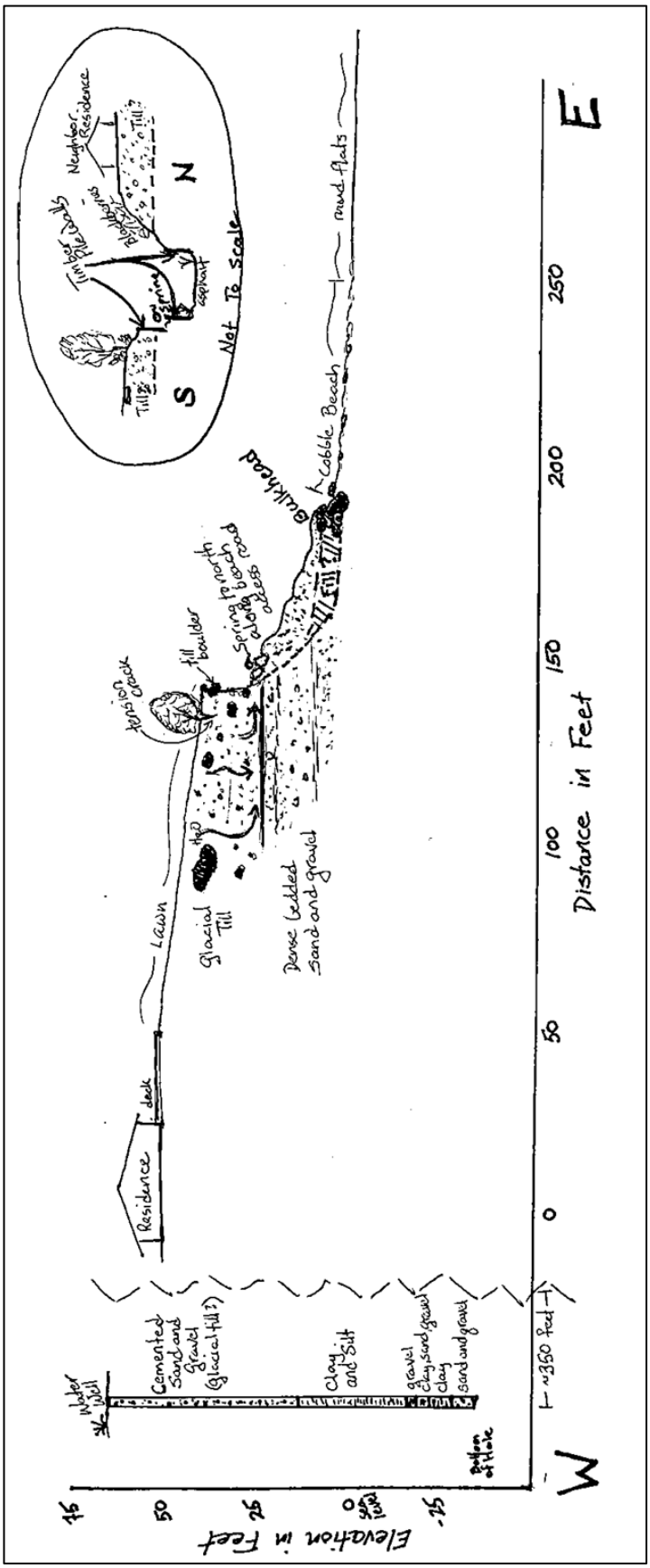

Figure 8. *Geologic cross section showing the position of the residence relative to edge of the bluff and the bulkhead being considered for removal. Subsurface conditions are interpreted from visible geologic exposure, water well data, and groundwater seepage. Inset is a shore-parallel cross section of the beach access roadway cut through the bluff along the north side of the property.*

3.4 Slope Stability

The Washington Dept. of Ecology Coastal Atlas maps, compiled in the late 1970s to early 1980s, show the assessment site and immediately adjacent areas as stable (Fig. 9). A narrow zone of intermediate stability is mapped about a mile to the south along bluffs lying inland of the accretion shoreform known as President Point. More recently, an active deep-seated landslide has been mapped less than a mile to the north (WA Dept. of Natural Resources.)

Figure 9. *Dept. of Ecology Coastal Atlas maps showing littoral drift direction, slope stability, eel grass beds, and historic shore features. Assessment property is indicated by orange arrow.*

At the assessment site, the near-vertical upper portion of the bank is prone to calving or sloughing, called “toppling failure” or “block topple”. The fallen blocks of till collect as talus at the toe of the steep bluff face and begin to break into pieces. Because of the fine-grained composition of the till matrix, the unconsolidated sediment holds water for long periods of time and therefore continues to creep downslope as an earthflow. This is evident in places where the sediment has oozed over the top of bulkhead. The vegetation of alder, grasses, horsetails, and blackberries also speaks to the persistent moisture in those residual sediments.

The dense nature of the substrate supports the supposition that the upper bluff will continue to retreat by the same small toppling failures, preserving the near-vertical nature of the bluff face as it does so. The triggers for this type of bluff retreat are attributed primarily to repeated wetting and drying (expansion and contraction) of the sediment exposed at the face, accompanied by root wedging and other biologic activity (Fig. 6). A tension crack a few feet

back from the bluff edge (Fig. 1) is evidence that the process is active and has little to do with erosion that might occur by coastal processes if the bulkhead were not there. Precluding any large seismic events, this process of bluff retreat is likely to persist at current rates, losing a few inches to a few feet at a time rather than occurring as large catastrophic slope failures.

The property directly north of the assessment site has no bulkhead. Erosion is occurring there for several feet north of the end of the Munter/Elmer bulkhead (Fig. 7). This is known as end-effect erosion and is caused by waves refracting and focusing energy around the end of the bulkhead.

3.5 Shoreline Conditions and Coastal Processes

A review of Washington Dept. of Ecology's on-line Coastal Atlas shows that the shore reach within which the assessment site lies is dominated by northward transport of sediment (long-shore or littoral drift) (Fig. 9), suggesting that wind-generated waves originate primarily from the south. The primary sediment source for the drift cell is the reach of high bluffs and predominantly shallow landslides at Jefferson Point (Gerstel, et al., 2012; Fig. 10). A cell is a portion of the coast, or a reach, acting as an individual segment within which littoral (beach) sediment transport is bounded or contained. Smaller bluffs, some characterized by deep-seated landsliding, occur between Jefferson Point and President Point. It appears that most of the sediment from these sources is deposited at one of two accretion (depositional) areas; President Point, which lies about a half mile to the south of the assessment site, and another accretion area further south within the drift cell.

A smaller accretion area, visible in Figure 9 (under the orange arrow) off-shore of the site, appears to be supporting eel grass beds. No herring or surf smelt are documented within the drift cell, and only small areas of sand lance are documented to south (Pentilla, 2007).

Figure 11 is an aerial view of a portion of the drift cell within which the assessed site is located. Although the prevailing long-shore drift, or sediment transport direction, is northward, this black and white photo clearly shows that sediment moves southward during times when waves are generated by north winds.

The large fetch (distance over which a wind acts to produce waves) to the north has the capacity to generate relatively high-energy waves. Because of its shore orientation, the assessed site reach is relatively protected from prevailing southwest winds; however, the consistent occurrence of south-wind-generated waves is apparently sufficient to dominate

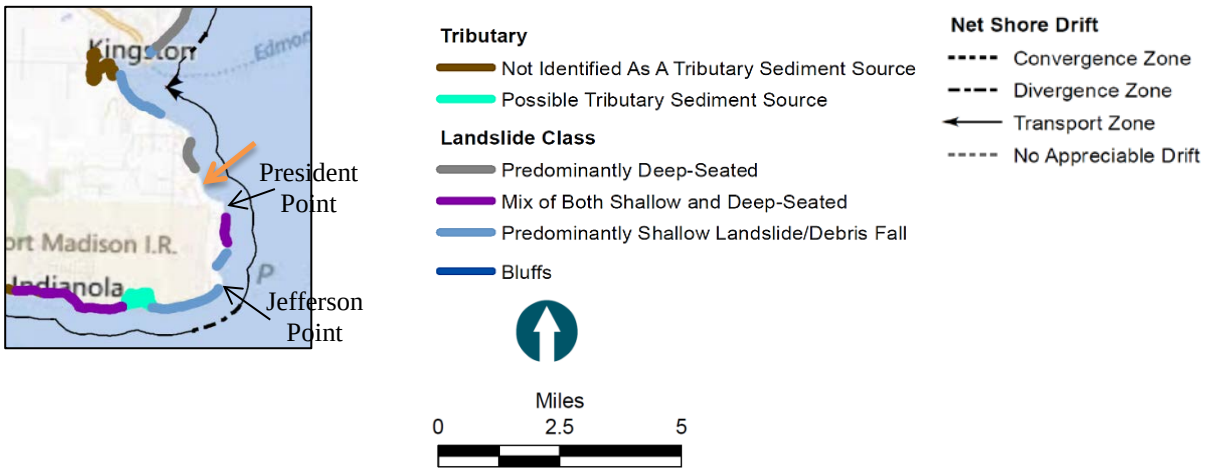

Figure 10. *Sediment input source mapping by Gerstel, et al. (2012) showing the Dyes Inlet area. Orange arrow points to the assessment site. Primary sediment-input sources for the drift cell are between President Point and Jefferson Point.*

Figure 11. *This 1978 Aerial view of a portion of the drift cell within which the assessed site is located shows that although the prevailing long-shore drift is northward, sediment moves southward when waves are generated by north winds. Orange circle indicates assessment property; white arrows indicate southward sediment transport.*

sediment movement processes. A closer look at the accretion shoreforms north and south of the assessed site suggests that smaller-scale depositional features such as bars and spits form alternately in both directions at different times. Long-shore drift may therefore be more variable than the mapping would suggest, and may operate as a complex of smaller cells rather than one long cell extending from Jefferson Point to Kingston as mapped. Any sediment analysis for the site then, should also consider potential contribution of sediment from the deep-seated landsliding mapped to the north (Fig. 10).

Large wood appears to be recruiting naturally along the entire length of the accretion shoreforms. A backshore exists along these same reaches. The backshore is the beach area above ordinary high tide only exposed to waves under extreme tidal events and storm surge. It can serve as a buffer to erosion during normal storm events and high tides.

Water-ward of the assessment site is an accretion form only visible at lower tides. Although there is no obvious reason for sediment to accumulate at this location except a slight convexity in the shoreline, it may result from a combination of processes and conditions thought to include periodic convergent drift, relatively erosion-resistant geologic deposits in the bluff that thin or change in nature north and south, or armoring of the beach surface by cobble lag weathered from the till. The geologic mapping might bear out the latter two hypotheses as it shows the capping layer of till extending to the shoreline along this reach and not to the north and south (Fig. 5). As a point of interest, the remnants of a ship visible in more complete form in a 1963 air photo can still be seen at the north end of this accretion form.

4.0 The Bulkhead

The shore reach of the assessment site is armored by a basalt rock bulkhead, the structure being considered for removal in this feasibility assessment (Fig. 12 and cover photo). The bulkhead is made up of 2-4 ft.-diameter quarried basalt boulders loosely piled, for a cumulative height of about 5 ft. The bulkhead extends for about 118 ft. from the south end of the property, where it adjoins the neighbor's bulkhead of similar rock, north to the concrete boat ramp (which interrupts the armoring for about 14 ft.), and another 35 ft. north to the end of the property. The northern end of the bulkhead is constructed with a corner, creating a leg perpendicular to the shoreline of about 14 ft. A 5-6 ft. diameter boulder, possibly a glacial erratic deposited there naturally, sits near the southern end of the bulkhead and is incorporated into it. The neighbor's bulkhead to the south is constructed similarly to project about 7 or 8 ft. seaward of the one along the assessment site. The total length of the bulkhead being considered for removal is about 167 ft., with the additional footage of the 14 ft. concrete boat ramp. This involves the entire 170 ft. shoreline length of the property.

Figure 12. *Dept. of Ecology oblique shoreline photo showing bulkhead, degaussing station beach access roadway, and concrete boat ramp being considered for removal and restoration – all delineated within orange line.*

5.0 Goals and Project Objectives

As a collaborative project between Kitsap County and the homeowner, any shoreline restoration or bulkhead removal should consider the combined goals and project objectives of the collaborators. In conversation with Ms. Munter and Mr. Elmer, the following were identified as their objectives for any modification of existing infrastructure and current site conditions:

1. Reduce the amount of grass.
2. Increase native plantings (already being done in the upland area).
3. Preserve the natural slope configuration as much as possible (homeowner accepts current slope retreat processes described above).
4. Create walkable access to the beach that might include steps.
5. Provide for continued beach access by deer, raccoon, otter, coyote and other resident wildlife.
6. Current vegetation along the bluff edge and boat ramp access does not necessarily need to be preserved if long-term vegetation improvements are made.

The County's overall goal for bulkhead removal and shoreline restoration action is to encourage increased voluntary participation by landowners to improve natural shoreline habitat

conditions and processes. This effort applies the findings of the sediment input study (Gerstel, et al., 2012), and combines it with the results of a public outreach survey seeking willing public participation to restore areas determined to have high long-term potential habitat benefits.

6.0 Risks and Benefits of Armoring Removal

Under the current conditions and processes affecting the site and described in section 3.0 of this report, the risks to on-site structures from slope instability resulting from bulkhead removal is likely to be negligible. The dense, erosion-resistant sediment, position of the shoreline north and south of the assessment property (particularly along nearby un-armored reaches), and set-back of the residential home and garage from the current edge of the bluff crest (approximately 115 and 138 ft., respectively), all speak to the feasibility of considering restoration actions at this site.

Ideally, armoring along properties in the vicinity to the north and south would be removed to eliminate the potential for end-effect erosion – erosion occurring to the natural shoreline as a result of adjacent armoring – anywhere along this stretch of coastline. As that is unlikely, the southeast corner of the Munter/Elmer property could experience some increased erosion if the bulkhead is removed. However, mitigation of that concern could be achieved by softening the area where the neighboring bulkhead to the south ends, and vegetating the sloughed sediments to stabilize the talus. Softening the end of the neighbor's bulkhead might be done by installing large wood (logs or stumps) or individually-placed rocks in the transition area, thereby reducing the angle at which the refracted waves hit the shoreline. Removal of the bulkhead (including the concrete boat ramp) along the Munter/Elmer property would likely reduce the erosion occurring at the southern end of the neighboring property to the north.

Continued retreat of the bluff under current or modified slope gradients will eventually compromise the existing vegetation along the eastern upland perimeter. Removal of the retaining walls along the beach access roadway would result in the same occurring along the northern upland slope breaks, particularly along the higher parts of the through-cut. In both areas planting successional vegetation 'lines of defense' landward would provide beneficial root strength to the soil and sediment. Resloping of the bluff or cutslope crest could also be considered.

Of necessary consideration is the septic pump located in the northeast portion of the lawn area (Fig. 1d). The extent of any resloping of the south-side cutslope of the beach access would be limited in this area.

The benefits of reducing lawn area, planting additional native vegetation, and removing the paved surface of the beach access roadway would be to reduce or slow water infiltration and runoff from irrigation and impervious surfaces. It would also encourage the evapotranspirative properties of plants that contribute to slope stability, and create a healthy marine riparian zone to improve nearshore habitat (Brennan, 2007; Brennan and Culverwell, 2004). Seeps and springs are still likely from off-site upslope contributions of surface and groundwater.

An equally important goal for restoration is the removal of toxic materials currently leaching into the marine environment; specifically, the asphalt and creosote-treated timber pile retaining walls used in the construction and maintenance of the beach access roadway.

7.0 Conceptual Ideas for Site Restoration

Benefits of removing the bulkhead at this site need to be weighed against the risks outlined in the previous section and how those risks might be mitigated. Reducing the gradient (resloping) and vegetating the cutslopes of the roadway would eliminate the need for any retaining structures and allow for the creation of an aesthetic, safe, and wildlife-friendly beach access. The through-cut of the roadway could be sloped to look more natural (Fig. 8 (inset)), incorporating a water feature (landscaped surface flow path rather than buried piping) and site-appropriate native vegetation to collect and direct seepage safely and aesthetically. Removal of retaining walls along the north side of the cutslope will need more careful consideration as the adjacent residence is close to the current slope break. Without appropriate slope stabilization, this slope is likely to experience some instability and resultant retreat.

Vegetation along the east-facing bluff could be planted to help stabilize both the bluff crest and the talus along the toe. Both areas will likely require on-going maintenance to remove and then prevent the reappearance of invasive species such as blackberries. Site-appropriate native vegetation for the talus could include salt-tolerant, water-loving plants such as willow and alder, as well as numerous other plants. Along the crest of the bluff and eastward on the uplands, site-appropriate native plants might include fir, cedar, vine maple, snowberry, red flowering current, and many more. Planting plans can be developed by experienced landscape specialists knowledgeable of the local area to eliminate the need for watering (once established) and improve stability of the bluff edge, while maintaining views and appealing to the property owners' aesthetics.

Removal of the bulkhead, asphalt, and concrete boat ramp could be done relatively easily and cost-effectively via land access for heavy equipment. Little would need to be done with the bluff slope behind it beyond vegetating with native riparian plants and allowing for short-term increased erosion until plants are established. If continued block topples from the bluff crest become a concern, minimal resloping would mitigate this, as would additional native plants. Any upland drainage conveyance systems would need to be incorporated into the design.

Removal of the bulkhead might result in end-effect erosion at the south end of the property, caused by the neighboring bulkhead to the south. This area could be monitored after bulkhead removal and managed adaptively to address erosion issues. Softening the transition between the neighbor's bulkhead and the unarmored Munter/Elmer property could be done at some later date as necessary. Softening might include placing individual rocks, logs, or stumps, and resloping and vegetating that corner of the property. The logistics of making long-term modifications to the site, particularly access for heavy equipment, should be considered in any restoration design.

8.0 Summary

Findings from the site assessment and review of documents and maps indicate that this site could provide an exciting opportunity for the homeowner and the county to collaboratively explore options that would meet the goals and objectives of both parties. As with any site, there are challenges to overcome regarding removal and disposal of materials used for armoring and slope stabilization, as well as addressing the potential for coastal erosion and cutslope stability likely to be raised by adjacent property owners. The medium to high wave energy environment, variable drift direction, and dispersed sediment input sources also contribute to restoration design challenges, as do the potential for seismic events and sea level rise. However, none of these should be insurmountable with creativity, knowledge of the site, and the incorporation of lessons learned from other restoration sites.

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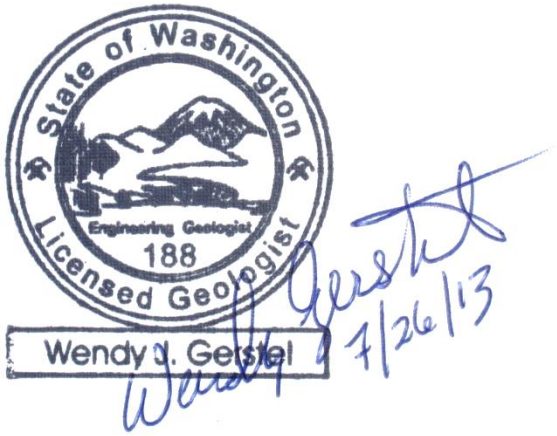

Wendy Gerstel, L.E.G., Owner/principal
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Disclaimer

The findings presented herein reflect interpretations of field observations made May 28, 2013, in combination with review of existing geologic maps, air photos, and other available resources, and are based on conditions observed during the period of investigation. No drilling or other subsurface explorations were made for this investigation. The contractor assumes no responsibility for the implementation of decisions made based on these interpretations. No expressed or implied warranties are made regarding use of this information. This product is for use by the client only.