Marine Alternative Shoreline Training

Needs Assessment Report

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Training Project (MAST)
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ACRONYMS AND ABBREVIATIONS

BCIT.....British Columbia Institute of Technology

CTP .....Coastal Training Program

DAHP.....Washington Department of Archeology and Historic Preservation

DNR .....Washington Department of Natural Resources

ECY.....Washington Department of Ecology

FEMA.....Federal Emergency Management Agency

HPA.....Hydraulic Project Approval (Washington Department of Fish and Wildlife)

MAST.....Marine Alternative Shoreline Training

MSDG.....Marine Shoreline Design Guidelines

SMP.....Shoreline Master Program

SLR.....Sea Level Rise

WDFW.....Washington Department of Fish and Wildlife

WSG.....Washington Sea Grant

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EXECUTIVE SUMMARY

Shoreline development along the 2,500 miles of Puget Sound often requires erosion control measures to stabilize or protect upland structures. However, not all of these measures protect the environment. In addition, there is limited training on how to identify, design, permit and apply the right technique for the right location using the most environmentally sound solution. Planners, consultants and contractors throughout the Puget Sound region need consistent, ongoing training courses to advise them on various aspects of marine alternative shoreline techniques. Currently, the trainings offered are few and not well coordinated, and there has been limited analysis of what should be taught. This report presents a catalogue of training courses, along with recommendations for best practices for adult learning, to address the need for quality and consistent training on soft shoreline techniques. The training recommendations contained in this report are based on a market analysis of other training providers and courses, survey data collected by the Washington Department of Ecology's Coastal Training Program, phone interviews of contractors, and research about adult learning principles.

During the market analysis, we examined programs in the Pacific Northwest and across the country that offer training related to alternative shoreline techniques. This analysis helped identify important topics, types of formats, credentials for instructors, and best practices for offering trainings to professionals.

A survey conducted in 2019 by the Coastal Training Program, our partner, offered insight into key topics to include in a training program on alternative shoreline techniques. An advisory committee of professionals with expertise in this area was formed to review and comment on these survey results, as well as to evaluate topics used for a four-part webinar on the Marine Shoreline Design Guidelines—a webinar developed by the Washington Department of Fish and Wildlife in 2020, in collaboration with WA Sea Grant and the Washington Department of Ecology.

From the market analysis and surveys, recommendations for a series of six training courses emerged:

1. General concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. How to address site assessments for design/construction
4. Demonstration of need and risk assessment and alternatives analysis
5. Techniques for erosion control, including construction materials and maintenance and incentive programs
6. Sea level rise issues

These proposed training courses were further vetted through an interest survey conducted by the Coastal Training Program in January 2021. Results showed that planners and consultants were generally interested in pursuing trainings related to these six topics, with highest interest in an "overview of local, state and federal permit requirements," and "general concepts related to shorelines and stabilization."

As a way to gauge the interest of marine contractors in these shoreline training courses, personal interviews were conducted. From the interviews, we learned that contractors would be interested in attending trainings, particularly ones offered in a hybrid format, including in-person or online instruction, combined with instruction in the field. Feedback from planners and consultants also indicated the most interest in a hybrid format.

Based on the market analysis and the results of the survey analysis, we recommend development of the six courses listed above. Washington's Coastal Training Program—an existing science-based training program focused on coastal issues—emerged as the most effective and efficient provider of these trainings. Another recommendation is that courses be offered in a hybrid combination of in-person or online courses with field training components. In addition, we suggest that the Coastal Training Program expands its capabilities to include self-paced online learning—a training approach worth considering.

Study results indicate that all courses should adhere to best practices for adult learning. These best practices help to ensure that adults remain engaged in a way that allows them to fully participate and retain the information being taught. Some of the key principles include:

- Activate existing knowledge before getting into details.
- Demonstrate new knowledge.
- Have participants apply knowledge to real-world problems.
- Provide opportunities for participants to share their knowledge.
- Let participants practice and apply new techniques.
- Give course participants opportunities to reflect, defend and share.

The recommendations in this report provide a structure for a comprehensive training program for planners, consultants and contractors in the Puget Sound region to enhance their understanding of our shorelines, alternative erosion control measures, and how to determine the right solution for different locations.

1

INTRODUCTION AND BACKGROUND

A. ISSUE AND PURPOSE

Learning how to care for our marine shorelines is at the heart of the Marine Alternative Shoreline Training Project (MAST). The Puget Sound region is home to more than 4.2 million people who use the 2,500 miles of marine shorelines for transportation, industry, homes, recreation and the exploration of nature. For centuries, these shorelines have provided food sources and cultural connections for the Indigenous people of the region.

Over time, as these shorelines have eroded or been developed, techniques used for stabilization have included construction of seawalls and other forms of hard armor. Evidence shows, however, that hard armor negatively impacts coastal processes and ecosystems. Throughout the region, there are growing efforts to protect and conserve unarmored shorelines, remove armor, and offer soft shore techniques as alternatives to hard armor. Throughout this report the term "soft shore" is used. The concept of soft shore protection is defined in the Marine Shoreline Design Guidelines (MSDG) as shore protection design which entails the use of indigenous materials such as gravel, sand, logs, and root masses in designs that have some degree of flexibility, mimicking natural processes. These techniques, where properly applied and installed, are intended to provide protection to the property owners while improving the ecological health of the marine shoreline. The Marine Shoreline Design Guidelines were developed to provide a comprehensive framework for site assessment and alternatives analysis to: 1) determine the need for shore protection and 2) identify the technique that best suites the conditions at a given site. What is lacking is adequate training about how to determine what techniques to use and how to apply them in a wide range of conditions.

The purpose of this MAST project was to assess the training needs of planners, consultants and contractors on a wide range of issues that will better inform them about these alternative techniques. Where might they apply these techniques? What are the best practices for design? This report provides a roadmap for developing curricula that provides pertinent information to local government planners reviewing projects, consultants designing projects and working with homeowners, and contractors designing or executing the design.

Currently, there are a number of different efforts throughout the region that provide training for different audiences. These trainings have included individual courses targeting contractors and real estate agents, a one-day course on coastal processes and shoreline stabilization techniques, and a one-day course on the use of the Marine Shoreline Design Guidelines. (The one-day classes are offered through Washington's Coastal Training Program.) However, there has never been a thorough analysis of what information is needed for the three different audiences: local planners, consultants and contractors. Each group needs slightly different information to support successful implementation of marine alternative shorelines.

In an effort to better understand what types of courses may be useful for each professional group, we examined what is currently being offered in this region, compared this with training programs across the country, evaluated the level of interest for training on different topics in Washington, and developed a set of recommendations for future trainings. We did this through a market analysis of other training opportunities, interviews with contractors, and surveys of planners and consultants conducted by other groups in the region on similar topics.

This MAST project places a priority on training design that supports the experience of adult learners. Adult learning is a field of study that demonstrates how specific educational approaches can aid adults in accessing prior knowledge and synthesizing new knowledge. These approaches are expanded upon in the Adult Learning Principles section of this report.

B. AUDIENCES

This MAST assessment identifies and focuses on the needs of three distinct groups: planners, consultants and contractors. While many training programs can be designed to address a high-level overview that addresses some of the training needs of all three groups, we attempt to clearly articulate the differences in the groups and identify the specific training needs for each. For the purposes of this study, we provide the following definitions of our three target audiences for training.

Planners: Individuals employed in a government position—either local or state—working on shoreline-related issues. The planning function of their jobs may be related to shoreline permit review and approval, project review,

long-range natural resource or land-use planning, or other activities related to the review and assessment of shoreline projects.

Consultants: Individuals working for private companies or for themselves whose work relates to shoreline issues. Typical categories of consulting that are connected to issues of soft shore work include: coastal hazards specialist, coastal engineer, engineering geologist, geologist, planning and permitting specialist, environmental science, habitat and restoration specialist, and marine ecologist.

Contractors: Two categories of marine contractors are considered for the purposes of this study: 1) contractors who design and build projects and therefore have similar interests and learning needs as consultants who are designing soft shore projects and 2) contractors responsible only for construction of designs prepared by an engineer or other designer. This group of contractors has less need for details about design implications and a greater need to understand construction methods.

As we conducted our outreach and evaluation for the most relevant training designs and topics, we clearly delineated the needs of these three groups. References will be found throughout this assessment to how the trainings and topics can best be tailored to the interests of each group.

C. ADVISORY GROUP

In order to provide oversight for this study, we established an advisory committee: A group of 27 professionals were invited to participate on the advisory committee in one of four categories:

1. Project managers of current "Shore Friendly" programs and subject matter experts. These Shore Friendly programs receive funding and support through the Washington Department of Fish and Wildlife to encourage forgoing or removing shoreline armor and to incentivize landowners and communities to inspire behavior change.
2. Shoreline planners working for cities or counties.
3. Marine contractors who both design and construct shoreline structures or have experience with soft shore projects.
4. Consultants from a wide range of disciplines, including coastal engineering, geology, environmental permitting, geotechnical engineering, landscape architecture, and ecological restoration.

MAST Training Advisory Committee Members

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At the first meeting of the advisory committee on July 1, 2020, participants reviewed an initial set of proposed training topics relevant to the three target audiences. The meeting was attended by 19 of the 27 committee members, and they provided insights on the proposed topics. Their input helped organize and sort topics into relevancy for each audience and also identified additional topics that should be added to training programs. The following course topics were evaluated and tested by the advisory committee as potential trainings:

1. General concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. How to address site assessments for design/construction
4. Demonstration of need and risk assessment
5. Incentive programs for shoreline homeowners
6. Techniques for erosion control including construction materials and maintenance
7. Sea level rise issues

Advisory committee members provided details on specific content to include in each of these course topics that are relevant to the three audience types. See Appendix A.

The second advisory committee meeting was held on March 23, 2021. The primary purpose of this meeting was to present to the committee the findings from the market analysis and the various surveys and interviews. Committee members heard key recommendations for developing pilot courses, and they were asked for feedback, input, and their level of interest in participating in curriculum development and as instructors. The notes from the advisory committee meetings are included in Appendix B.

2

INCORPORATING ADULT LEARNING PRINCIPLES IN CURRICULUM DESIGN

What do course designers need to think about when designing curricula for adult audiences? What specific educational approaches would be useful to those who work with projects involving marine soft shore design, as well as those who review soft shore projects? This section provides recommendations for designing classes for adult learners that are supported by adult learning theories and principles.

A. BEST PRACTICES FOR TEACHING ADULTS

The term "andragogy"—the art and science of teaching adults—was coined by Dr. Malcolm Knowles in the 1970s. Dr. Knowles observed that adult learners and children had different learning characteristics. He believed that by addressing these characteristics, the adult learning experience would be greatly enhanced. Since then, other scholars have expanded on his work and developed learning principles than can be used as guiding lights in curriculum design.

In their book, *Adult Learning: Linking Theory to Practice* (2014), scholars Sharon Merriam and Laura Bierema reference Dr. Knowles and the assumptions he makes about adult learners. To paraphrase:

- Adult learners are ***self-directed*** and ***motivated to learn.***
- They want to know ***why*** specific things are being taught.
- They are ***problem-centered learners*** seeking solutions.
- They bring with them a rich reservoir of ***experience***.
- They require content that is ***timely and relevant*** (p. 47).

The authors proceed to outline best practices for teaching adults, which are summarized by Robin Smith in her book, Conquering the Content (2008), and listed below. (Note: Techniques that could be used in the shoreline trainings have been included after each best practice.)

1. ***Activate*** existing knowledge before getting into details. *(ask questions, refer to their work, tap into common experiences)*
2. ***Demonstrate*** new knowledge. *(model the skill, use videos)*
3. Have students ***apply*** knowledge to real-world problems. *(written or field exercises, small group activities)*
4. Give them opportunities to ***share*** their knowledge. *(paired or small group exercises, large group sharing)*
5. Let them ***practice and apply***. *(written exercises, small group exercises in classroom or field)*
6. Give them opportunities to ***reflect, defend, and share.*** *(small group exercises, large group sharing)*

Establishing Inclusion

Adult learning scholars maintain that one of the first conditions for helping students feel engaged and motivated is "establishing inclusion" (Ginsberg and Wlodkowski, 2009, p. 39). Methods that help students feel included and connected with each other include personal introductions, being asked by the instructor to share their experiences, and working with their peers in small groups. These activities help to start a bonding process that can help students reach out to each other in the future.

Correct Sequencing

Correct sequencing of the course content gives the students confidence that the class is well organized and a good use of their time. As part of sequencing, "chunking" is one technique where content is divided into short segments of passive learning, followed by an opportunity for active learning (Smith, 2009, p. 66). These segments can then be grouped into modules as a way to structure the course.

Dominant Learning Styles

Most adults have a preferred way to learn, which is considered their dominant learning style. It is good practice to offer a combination of teaching techniques that will appeal to those with different learning styles. Daffron and North (2011) characterize the different styles this way:

> **Visual learners** favor learning aids such as videos, whiteboards, flipcharts, graphs, and handouts. They like to take notes, which helps them assimilate the information.
>
> **Auditory learners** tend to engage the instructor and fellow students in discussions and debates. They learn best through lectures, discussions, talking and listening. Written information is not as helpful as the spoken word. Activities such as role-playing and practice sessions with partners are effective ways for them to learn.
>
> **Tactile/kinesthetic learners** do best with activities that allow them to move, do, and touch. They need to be active and have frequent breaks. They truly enjoy hands-on activities and remember what was done, rather than what was said (p. 60).

How We Process Information

Smith (2014) points out that there are also global and sequential processors. Global processors are skilled at viewing information at the "big picture" level and need to understand the global perspective before absorbing the details. Sequential processors need to go step-wise through the information prior to understanding the big picture (p. 110). Smith cites a study that shows how science courses are often taught sequentially, and an overwhelming number of those who change their majors are global learners (p. 111). An important design consideration in our project's training plan is that the big picture needs to be clearly established at the beginning of any course before diving into the sequential information. Brain science supports this approach, too, as shown in John Medina's book, Brain Rules (2008), in which he says that if we start with the general idea first, there will be a 40% increase in understanding (p. 90).

Addressing the "Why"

Sometimes there can be a sense of frustration and lack of understanding by students about "why" certain designs are approved and others are not. Or why certain regulations or permits are required. It is critical that the instructors take time to explain reasoning and logic without making the students wrong. By doing this, receptivity will be raised, and the risk of students rejecting the information will be lowered (Merriam, Caffarella, and Baumgartner 2007, p. 165).

Gauging Prior Experience and Knowledge

Many of the professionals who will be attending these shoreline trainings will have prior experience and knowledge in the field. It is helpful for the instructor to have a basic idea of the students' level of knowledge so that they can better plan and provide learning experiences based on this knowledge. Several assumptions can be made simply by looking at the class roster to review job titles and agencies. Other techniques may include polling the students beforehand or at the beginning of class, asking students to help create a "challenges" list, or going around the room (virtual or in person) at the start of class and asking students to mention some specific issues they are having or to state what they would particularly like to take away from the class.

How to Make the Information Stick

For these soft shore trainings, it's important for the course designers to activate existing knowledge that ties in with the student's experiences before sharing new information. This approach helps the students synthesize the new information much more easily. This idea is supported by Zahorik (1995) who emphasized the importance of a constructivist teaching approach. In this approach, students initially focus on what they currently know and then fit the new information into their current knowledge structure (p. 14). In an academic study of four different groups of professionals, Daley (2001) showed that "when professionals learned something new, it didn't mean anything to them until the learning was put into a context within their work environment." Daley's research also showed that each sector had expertise in their own specific work context. If this context was not included in the learning scheme of the class, there was a significant loss of information for the professional.

How Different Sectors Can Learn from Each Other

As Daffron and North (2011) make clear, the thoughts and experiences of "other experts" are valuable resources in the transfer of learning (p. 96). One of the strengths of the Coastal Training Program is that students are provided with exposure to different approaches and perspectives simply by being in a physical or virtual room with 30–40 of their peers. They have an opportunity to learn from each other and expand their thinking in a more well-rounded way when making decisions that impact our shorelines. Of the different training programs that were studied as part of the market analysis, a common theme of the in-person training was the value of professionals attending from different sectors. Having a diverse representation in the class brought an awareness to both students and instructors of perspectives and challenges faced in different arenas.

B. THREE RELEVANT LEARNING THEORIES THAT COULD BE APPLIED TO THIS PROJECT

While there are several other learning theories that expand upon Dr. Knowles work, three theories seem especially relevant for consideration in this project:

1. Self-Directed Learning – This theory, also known as SDL, incorporates concepts of how adults self-manage. The premise is that adult learners will take the initiative to understand what they need to learn. They'll find the resources they need and follow through with a learning plan, evaluating their own results. They will seek out teachers and classes that can help them, and they like being in control of their own learning journey. This type of learning is best-suited for self-motivated learners, as well as those who do well with technology-based learn-ing. This format is made much more useful by having a

trainer to guide, mentor and facilitate. It works best with topics that have concrete answers, rather than grey areas. For instance, it could be effective for learning the "basics" about shoreline ecology and erosion issues.

Pros: Students can go at their own pace at the most convenient time for them. This would be particularly valuable for those (such as independent contractors) for whom it would be difficult to take time during their workday to attend a training. Participants can also review the material as many times as they need in order to grasp the content and also choose a location where they can concentrate (Smith, 2014, p.8).

Cons: This format can be difficult for learners who lack discipline or who are less experienced with or educated about the particular topic.

2. Experiential Learning – This theory focuses on hands-on learning and uses experiences to demonstrate concepts. The premise is that adult learners will actively participate in the learning process, reflect upon their experience afterwards to firm up their knowledge, consider successes and failures, and apply improvements as they move forward. This type of learning works well with learners who are eager to learn and with tasks that require systematic thinking or mechanical skills.

Pros: Good facilitators can encourage reflection and conceptualization after the experience. They can also prompt learners to contemplate how to use this new knowledge in their everyday roles. This would be a valuable way for consultants, planners and contractors to "get their hands in the dirt" and apply some of what they learned in the classroom.

Cons: Critics of experiential learning believe that there is too much emphasis placed on the development of individual knowledge at the expense of the larger context of group learning. There is also a concern that an instructor has to spend more time with each student and that confusion often emerges if there is more than one answer. An antidote to this would be to balance hands-on learning with information from virtual or classroom learning (Valamis, 2020).

3. Cognitivism – This theory states that the learner acquires knowledge by combining both old and new information and putting them together in a holistic fashion. By doing this, they are able to organize the new information according to their existing knowledge and be better able to recall it later.

Pros: This is a very effective approach for learners who need to apply what they learn to their own work (Daley, 2001). It is critical that the instructor teaches new information in a way that is meaningful to the learner and shows how it relates to the learner's existing knowledge.

Cons: It is easy to overburden learners so that they go into cognitive overload with too much information without enough time to process it (Valamis, 2020).

All three of these learning theories could be incorporated into the training design of the shoreline classes. Some trainings could include elements where students go through the material at their own pace; others could include experiential elements where students can be more hands-on with the content, while others could offer opportunities for students to actively apply the content to their own work.

In summary, it is critical to apply adult learning principles and techniques when designing shoreline courses for planners, consultants and marine contractors. These professionals require certain elements in a training to find it worthwhile. The training needs to offer solutions to real-world problems, provide opportunities for the participants to share their knowledge and experience with each other, and offer hands-on opportunities to practice and apply the information being learned. Other best practices include: establishing inclusion, effectively sequencing the content, explaining the reasons behind certain rules and regulations, and addressing different learning styles. If we incorporate these approaches and best practices into trainings, participants are much more likely to understand, retain and apply what they've learned.

3

MARKET ANALYSIS

This section is an overview of the market analysis. The full market analysis can be found in Appendix C.

A. INTRODUCTION

Who else in the country is offering trainings on alternative shoreline techniques? How can those trainings inform our work here in Washington state?

Answering these questions was the main objective of the market analysis conducted as a part of this MAST project. We learned that many trainings are delivered as webinars, others are self-guided, and some are held in person. A few providers focus on more advanced programs where practitioners receive a certificate for completing a training and passing a test. The people who pass are then listed on a state agency or program website, which is perceived as a welcome credential by the individuals, potential clients, and agency staff who review permits.

B. METHODS

Our research methods included internet research of 14 training providers and personal interviews with seven of them. Search engines were used to find agencies associated with soft shore projects that offered some form of training. These trainings were referred to in different ways, such as soft armoring, nature-based shoreline stabilization, and Green Shores. Webinars, self-guided classes, and videos of in-person trainings were reviewed. Personal interviews lasted approximately one hour, with the intent of gathering information about class length, format, frequency in offering, primary topics and the intended audiences. Questions were also asked about successes, challenges and future plans.

C. TRAINING PROVIDERS

Training providers included coastal training programs that are affiliated with the National Estuarine Research Reserve System; state agencies; conservation commissions; nonprofits; coastal federations; Sea Grants; federal agencies; and academic institutions. These providers offered training classes in person, online, via webinar, and asynchronously through self-guided courses on their websites.

The Washington State Coastal Training Program, affiliated with the Washington Department of Ecology and Padilla Bay National Estuarine Research Reserve, offers a catalogue of courses geared toward shoreline planners and consultants. Using a "community college-like" model, the program offers courses at regular intervals to address the training needs of their target audience.

D. AUDIENCES

The primary audiences targeted by these trainings are public and private biologists, engineers, planners, landscape architects, marine contractors, restoration specialists, and local and regional government staff. The majority of trainings welcome a mix of professionals, as the training coordinators feel there is value in cross-sector information sharing. Some of the trainings, however, are targeted specifically for marine contractors who often operate small businesses and have limited time for training.

E. TOPICS

General trends in topics included:

- Costs and benefits of different stabilization techniques
- Improving coastal resilience
- Conducting site assessments
- Navigating the permitting process
- Understanding physical processes and shoreline ecosystems
- Learning from case studies

The overarching objectives of the trainings appeared to focus on deepening the environmental knowledge of the participants, making a case for using soft shore techniques when appropriate, and helping people understand the nuts and bolts of moving from the idea phase to the completion phase.

F. INSTRUCTORS AND CREDENTIALS

Training instructors included agency officials; consultants; vendors; academics; lawyers; habitat, coastal, and environmental engineers; restoration ecologists; and other types of environmental professionals. They all had ties to alternative shoreline projects and brought their own unique perspectives to the training.

G. ASSESSMENT OF BEST PRACTICES

Several best practices emerged from the market analysis, which course designers will want to consider as they develop the pilot courses for this grant. Here are highlights from each type of training:

In-Person Trainings. Best practices include:

- Providing learning outcomes for the training so that attendees are clear on the focus.
- Having a mix of participants in the training with different backgrounds so that they can share their expertise with each other (e.g., shoreline engineers, marine contractors, landscape architects, and state permit and habitat staff).
- Having a variety of instructors offer their unique perspectives on different aspects of shoreline protection and regulations.
- Sharing case studies and discussing successes and lessons learned.
- Having slides with large, clear photographs and minimal text.
- Showing before-and-after photographs of a site.
- Providing opportunities to work on real sites with real data from habitat maps, geo-spatial data, and sea level rise maps.
- Offering in-class exercises that help students think through a project from beginning to end.
- Giving participants the opportunity to speak directly with site designers and shoreline homeowners who have implemented projects.

Webinars. Best practices include:

- Adding a slide of the topics and speakers at the beginning so that people know what's coming.
- Reviewing key points from previous webinars, if applicable.
- Including photographs of presenters and panelists to make things more personal.
- Reviewing the tools that will be used, such as the chat and raised-hand functions.
- Designing slides with large images and minimal text (one concept per slide).
- Including short videos that show project site or construction techniques.
- Telling stories about the creation and implementation of projects.
- Using animation to direct the viewers' attention to different parts of a map, photograph, graphic, etc.
- Acknowledging the audience during the presentation.
- Reviewing the benefits of soft shore solutions to homeowners.
- Keeping the presentation practical with clear suggestions that can be applied.

Self-Guided. Best practices include:

- Having a script that follows the slides.
- Using large photographs and just a few points of text on each slide.
- Adding short videos for demonstration.
- Summarizing the main points at the end of each module.
- Adding links to resources, documents and permit programs around the country.
- Having a question-and-answer module with frequently asked questions.

H. FOUR DIFFERENT FORMAT EXAMPLES

While several training formats and approaches were used by the programs noted in this market analysis, four examples seem especially relevant for how we might approach training classes here in Washington state:

In-Person and Field-Based: 3-day class

Michigan Certified Natural Shoreline Professional Training

This training was created by the Michigan Shoreline Partnership (Partnership) for contractors and landscape professionals. The purpose is to provide these professionals with the information and skills needed to design and implement healthy erosion control to protect Michigan's inland lakes. The class consists of two days in the classroom and one day in the field (later in the season), where they participate in an actual project. Classes are typically held in early March (the slowest time for contractors) at Michigan State University (where the classroom is provided for free); the field day is held in the summer when conditions are better.

Class attendees are required to read the guidance manual before class, and then the instructors update any critical information in person. Classroom topics include: problems associated with shoreline development, characteristics and benefits of the natural shorelines, methods for erosion control, designing a natural shoreline landscape, case studies, and permitting.

In the classroom, students engage in small group exercises where they carry a project through all of the steps, from assessment to design to permitting. There are opportunities for discussion between diverse participants, which helps people understand different perspectives. After completing the classroom portion, students are required to pass a 100-question, multiple choice, certification exam.

For the field portion, students travel to a site that has been permitted for a five-year project. Because there are up to 40 people in the class, the organizers have struggled with having enough for each participant to do. The field portion of the class is more instructional than hands-on and involves very basic installation—native plants and coir log installation. The organizers feel that 10 to 20 participants would be ideal.

Once "certified" for completing the training successfully, participants are added to a list on the Partnership's website. State agencies cannot recommend a specific contractor, but can refer people to the Listing (*Michigan Certified Shoreline Professionals*) which is arranged by the county.This has proven to be a good incentive for contractors. There is a disclaimer on the website that removes all liability from the Partnership. The list only confirms that professionals have completed the training and exam.

Online, Synchronous: 4-Part Webinar Series

Using Marine Shoreline Design Guidelines to Improve Shoreline Stabilization Permitting

This was a 4-part webinar series developed by staff from Washington Sea Grant, WDFW, and Ecology. The purpose was to familiarize shoreline planners with Marine Shoreline Design Guidelines. The sessions were about 90 minutes long, and people attended virtually at the same time. Webinars were individually titled:

Webinar 1 – Background and Introduction

Webinar 2 – Site Assessments and Demonstration of Need/ Risk Assessment

Webinar 3 – Shoreline Stabilization Techniques and Design Checklists

Webinar 4 – Sea Level Rise and Shoreline Stabilization

There was a moderator for each session who let people know which tools they'd be using and where to download the materials. The moderator also reviewed the key points from the previous webinars and set the stage for the current webinar by explaining the greater context. The attendees were actively engaged with questions to be answered in the chat, live polls, videos, and the opportunity to interpret a photograph. They were methodically guided through a checklist that would be used for a marine shoreline site visit. The moderator collected questions from the chat and passed them on to the speakers. There was time for questions at the end, and a survey link was put in the chat box. After class, the PowerPoint presentations and notes were made available, including links to referenced materials. The series was ultimately posted on the Shoreline and Coastal Planners Group website so that anyone can access it asynchronously.

Online, Asynchronous: Seven Hour Class That People Have Three Weeks to Complete

Green Shores – Level 1

The Stewardship Centre for British Columbia has partnered with the British Columbia Institute of Technology (BCIT) to deliver this class. It is geared toward those who have a general interest in shoreline ecosystem protection, such as landowners, elected and municipal officials, and conservation organizations. Topics include shoreline ecology and governance, followed by an introduction to the Green Shores credit and rating system. Students register through the BCIT website and have three weeks to complete the class.

In partnership with BCIT, the class was converted from an in-person class to an online class. The course is set up as six modules which include text to read, videos to watch, and a quiz at the end of each one. The student has one try on the quiz and can then see the results. There are also thought-provoking questions, which the student answers on the message board. After answering, the student could see a compilation of answers by other students. There are also opportunities to click on drop-down arrows to learn more about a particular topic, as well as links to complementary websites. Icons are used throughout the modules, which assist the student in identifying the type of information that is available. For instance, a "key" is found beside key points, a "paper clip" is beside additional resource, a "briefcase" is beside a case study, and a "mouse" instructs the student to click on instructions. Checkmarks appear by the steps that have been completed.

The final module consists of a comprehensive assignment: Students take a tour of three shoreline properties using virtual reality and viewing drone footage. The virtual reality allows them to explore and inspect a 360-degree view of the shorelines. The first two sites are examples, and the third site is where they apply their knowledge. For this third site, students have to develop and draw a design using Green Shore principles and then identify Green Shore credits that could be applied to the site. After finishing, the students upload their assignment and receive feedback from a professor at BCIT. This is the only time when students are graded. This online version is an

especially useful way for practitioners to cover the basics before continuing on to Level 2, which is offered in person. (Note: Level 1 is also offered in person through other venues.) According to staff at the Stewardship Centre, one of the biggest challenges is making updates to the curriculum since all revisions need to be coordinated with BCIT.

Hybrid: 1-Day Online (Synchronous) Class and 1-Day Field-Based (Asynchronous) Class

Green Shores – Level 2

While none of the trainings in the market analysis report were originally designed as hybrids, the pandemic was a catalyst for temporary adaptation. For instance, the Stewardship Centre created a hybrid out of their Level 2 Green Shores class. This class is geared toward practitioners, such as biologists, engineers, planners, and landscape architects, and has an in-depth focus on how the credit and rating systems can be used for shoreline management projects. In this class, the instructors taught a live online class, and then students went out on their own to do the field portion. Students were given some activities to do, as well as quizzes. Since this course is designed for practitioners, the ideal format is in person—to which they will return after COVID-19 restrictions are lifted. This course is offered through the University of Victoria and British Columbia Institute of Technology.

These four examples provide useful considerations for developing pilot courses for this project—particularly, the self-guided, online/asynchronous approach; the synchronous/online approach; and the in-person/field trip approach. No matter the format, this market analysis demonstrates that best practices should be followed to achieve quality programming.

4

SURVEYS AND INTERVIEWS

Analysis of two existing surveys and individual interviews provided information to better understand training needs and specific topics for the intended audiences of planners, consultants and contractors.

Survey 1: In 2019, the Washington Coastal Training Program conducted a survey prior to offering a course on the Marine Shoreline Design Guidelines (2019 MSDG Survey). This survey, completed by 295 individuals, was used to determine the level of knowledge and interest in specific topics to be offered during a one-day workshop. An evaluation of the 2019 MSDG Survey results provided insight into potential core training topics, which are the subject of this MAST Needs Assessment with respect to planners and consultants.

Survey 2: In February 2021, the Coastal Training Program and Washington Sea Grant (WSG) conducted a survey (February 2021 Survey) that was sent to more than 2,000 individuals to determine levels of interest in courses related to soft shore alternatives; 419 individual responses were returned. Review and analysis of the survey results provided insight about courses of interest to planners and consultants.

The third audience for this needs assessment is marine contractors. Typically, marine contractors do not participate in trainings through the Coastal Training Program and are not on mailing lists for this program. Thus, no survey information could be found for this audience. Moreover, there is no coordinated organization that could be used to reach this group. Instead, phone interviews were conducted with marine contractors (identified by the advisory committee) to gather information about the interests and needs of this audience.

A. 2019 MSDG SURVEY

The 2019 MSDG Survey, distributed through the Coastal Training Program listserv as well as the Shoreline and Coastal Planners listserv, received 295 responses from a wide range of disciplines. The data was sorted to isolate responses from planners and consultants. The complete survey is found in Appendix D.

Of the 295 respondents, 83 worked in local, state or federal government positions and identified their jobs as planners, permit specialists or regulators. These job categories were selected as relevant to our target audience of government planners. Consultants comprised 87 of the 295 respondents. We also evaluated responses from this job category.

The 2019 MSDG Survey asked the level of interest in the following topics:

- Understanding project site
- Understanding coastal processes
- Site alternatives analysis
- Surface and groundwater management
- Vegetation management
- Soft shoreline stabilization techniques: beach nourishment
- Soft shoreline stabilization techniques: large wood
- Soft shoreline stabilization techniques: bank reslope and revegetation
- How to select an appropriate technique
- Avoidance techniques such as site layout, setbacks and relocation, drainage, and vegetation
- Monitoring plans
- Regulatory Structure for shoreline armoring
- Tools and techniques for review of soft shore design projects
- Successful and unsuccessful examples

Respondents rated each topic from 1 (not at all interested) to 5 (extremely interested). There was no limit on the number of topics each respondent could select for each level of interest. For the purposes of this report, the results for topics given either a 4 or 5 rating were consolidated and used to create the following set of graphs.

The graph in Figure 1 shows the interest in various shoreline training topics of the 83 government planners who responded to the 2019 MSDG survey.

The results from the 2019 MSDG survey indicate that the highest level of interest from planners is in the following six topics:

1. Successful and unsuccessful examples of soft shore projects
2. Avoidance techniques, such as site layout, setbacks and relocation, drainage, and vegetation
3. Soft shoreline stabilization techniques: bank reslope and vegetation

TRAINING TOPICS OF MOST INTEREST TO GOVERNMENT PLANNERS

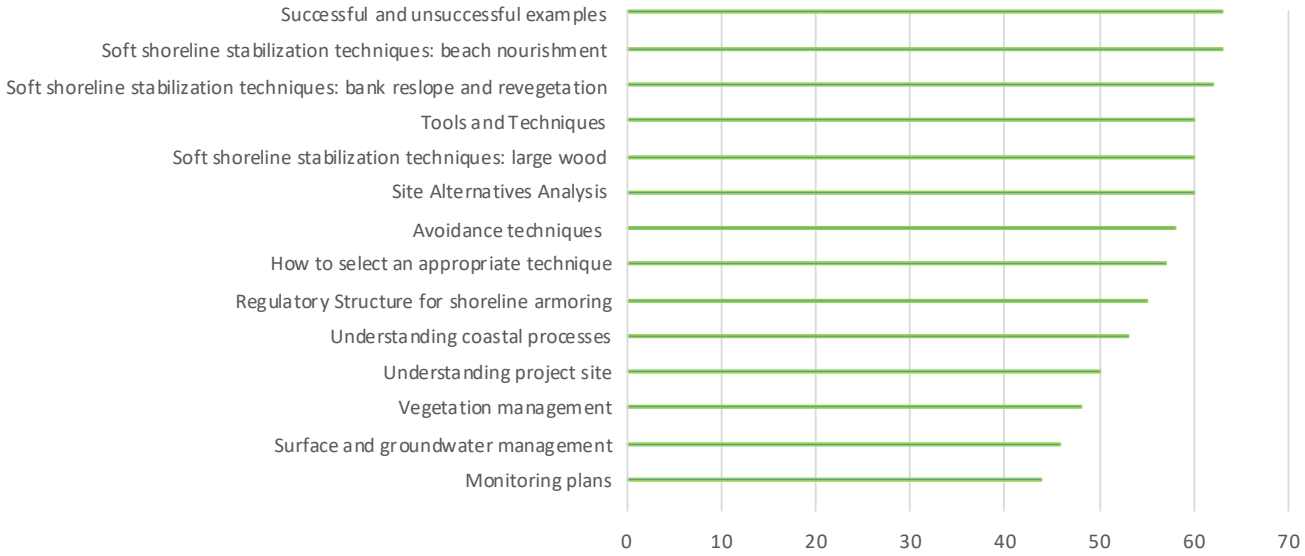


Figure 1: Training topics of most interest to government planners from 2019 MSDG Survey

4. Soft shoreline stabilization techniques: large wood
5. Soft shoreline stabilization techniques: beach nourishment
6. Tools and techniques for review of soft shore design projects

The following graph (Figure 2) depicts the interest of the 87 consultants who responded to the 2019 MSDG Survey on various shoreline training topics.

The results from the 2019 MSDG Survey indicate the highest level of interest from consultants in the following six topics:

1. Successful and unsuccessful examples of soft shore projects
2. Soft shoreline stabilization techniques: beach nourishment
3. Soft shoreline stabilization techniques: large wood
4. Soft shore: bank reslope and revegetation
5. How to select an appropriate technique
6. Avoidance techniques such as site layout, setbacks and relocation, drainage, and vegetation

TRAINING TOPICS OF MOST INTEREST TO CONSULTANTS

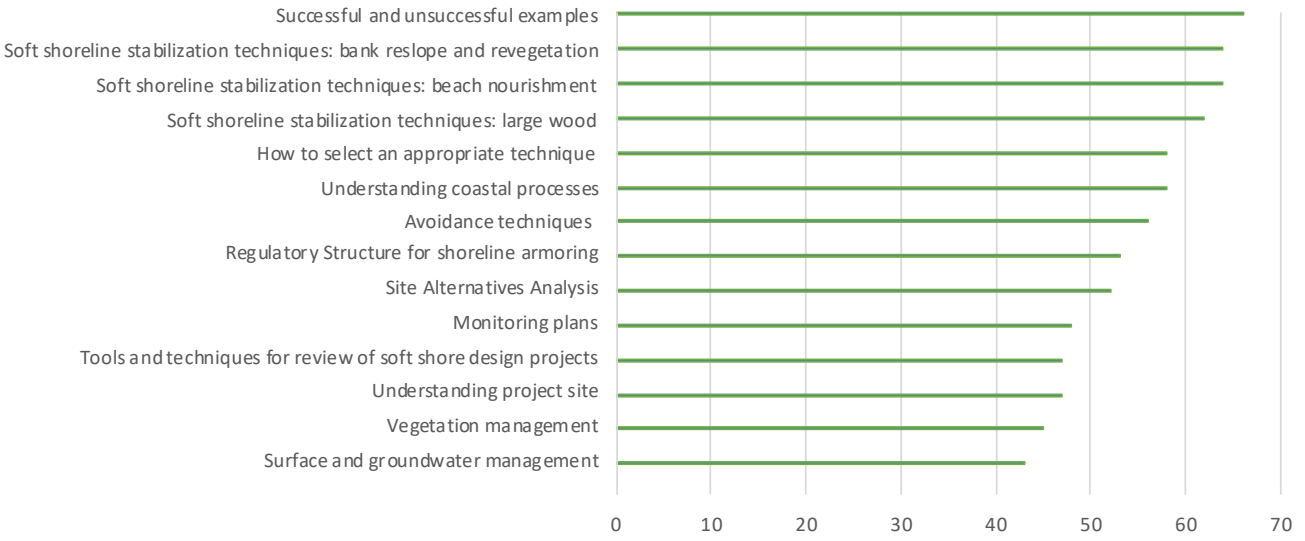


Figure 2: Training topics of most interest to consultants from 2019 MSDG Survey

Both groups gave the highest rating to the topic "successful and unsuccessful examples of soft shore projects." Planners indicated a higher level of interest in avoidance techniques than consultants. Planners also indicated a higher level of interest in monitoring plans than consultants did, while consultants indicated a higher level of interest in regulatory structure.

The information gained from this survey helped craft the topics included in a one-day course offered by the Coastal Training Program to better understand the Marine Shoreline Design Guidelines offered in June 2019. This data also informed the design of a four-part webinar offered by the Shoreline and Coastal Planners Group, "Using the Marine Shoreline Design Guidelines to Improve Shoreline Stabilization." The content of these trainings and webinars then became the basis for developing the core module topics recommended by the advisory committee to be considered as part of this study.

A comparison between the overall training topics recommended by the MAST advisory committee and the topics from the 2019 MSDG Survey is shown in Table 1; this figure also shows the overlap between the topics in the 2019 MSDG Survey and the topics proposed for the MAST trainings. Two topics ("Monitoring" and "Examples of successful and unsuccessful projects") included in the 2019 MSDG Survey are not called out specifically in the MAST proposed training topics. Likewise, the MAST proposed training topics included two items not identified in the 2019 MSDG Survey: "Sea level rise" and "Incentive programs."

Table 1: Comparison of 2019 MSDG Survey Topics with MAST proposed Training Courses

	2019 MSDG Survey Topics	MAST Proposed Training Courses
General concepts	Understanding a project	General concepts related to shorelines and stabilization
	Understanding coastal processes	
	Vegetation management	
Conducting site assessments	Site alternatives analysis	Key topics for conducting site assessments
Techniques	Surface and groundwater management	Techniques for erosion control, including construction materials, methods and maintenance
	Soft shoreline stabilization techniques: beach nourishment	
	Soft shore: large wood	
	Soft shore: bank reslope and revegetation	
	How to select an appropriate technique	
	Avoidance techniques	
Permitting	Regulatory structure for shoreline armoring	Overview of local, state and federal permit requirements
Alternatives Analysis	Tools and techniques for review of soft shore design projects	Demonstration of need and risk assessment
Other topics	Monitoring plans	
	Successful and unsuccessful examples	
		Incentive programs
		Sea level rise issues

B. RESULTS FEBRUARY 2021 SURVEY

Using the results from the 2019 MSDG survey and input from the advisory committee, the Coastal Training Program and Washington Sea Grant conducted a new survey in February 2021. This "February 2021 Survey" queried about 1) existing knowledge and 2) interest in taking courses on the following seven core topics areas:

1. General concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. How to address site assessments for design/construction
4. Demonstration of need and risk assessment
5. Incentive programs
6. Techniques for erosion control including construction materials and maintenance
7. Sea level rise issues

Detailed results from the February 2021 Survey are found in Appendix E.

Since two of the target audiences for this study were planners and consultants, the data was sorted for these two groups. For the planners, the first level of sorting extracted those respondents who identified their jobs as either planners or permit specialists. This group was then sorted further by whether they worked for a local or state government. Of the total February 2021 Survey respondents, 33 percent (139) indicated they worked for local institutions and 17 percent (74) worked for state institutions. Of the total 213 respondents working for either local or state governments, 106 identified their job as either a planner or permit specialist. For consultants, the February 2021 Survey included 31 percent (132) responses from individuals who worked for consulting firms.

Respondents provided ratings between 1 (low) and 5 (high) for each of the topics relative to 1) level of knowledge and 2) interest in taking a course. For the purposes of this report, responses of either a 4 or 5 were consolidated.

Figures 3 and 4 depict the level of current knowledge compared to the level of interest in taking a course on one of the seven identified topic areas. The consultant group indicated the highest level of interest in the following the topics: conducting site assessments, permitting, techniques for erosion control, and general shoreline concepts (Figure 3).

Planners indicated their topic of highest interest for training purposes was to learn about permitting, followed by demonstration of need, general shoreline concepts, and erosion techniques (Figure 4).

Figures 5 and 6 provide comparisons of the level of knowledge in the topics and the level of interest in taking the courses between planners and consultants.

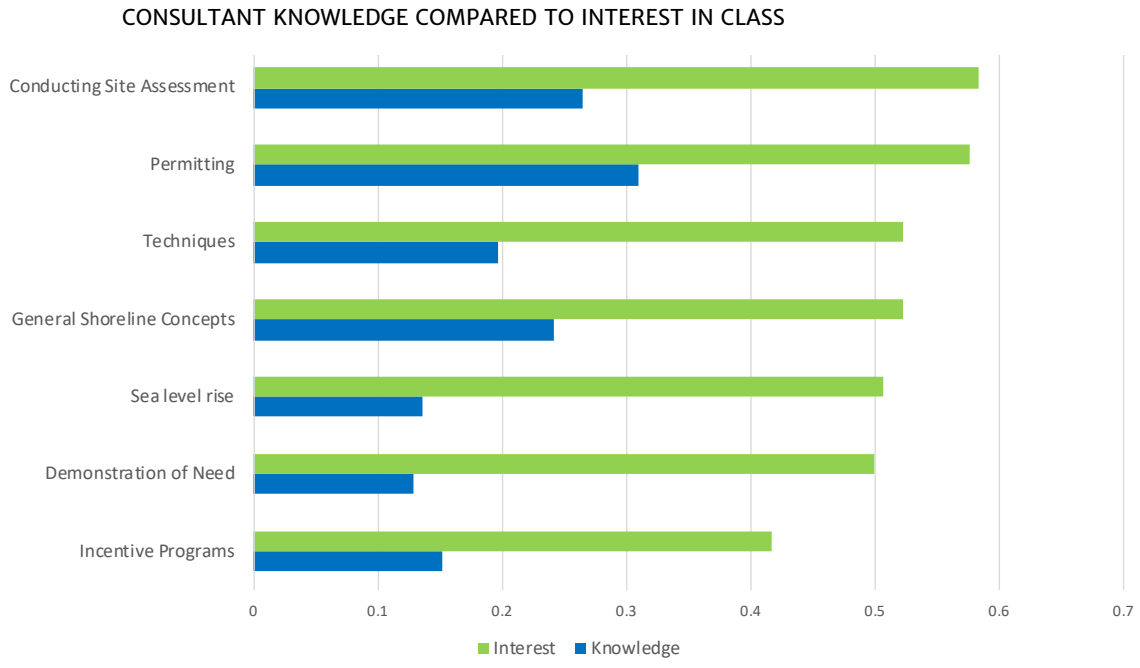


Figure 3: Consultant level of knowledge about topics related to soft shore design as compared to level of interest in taking a course.

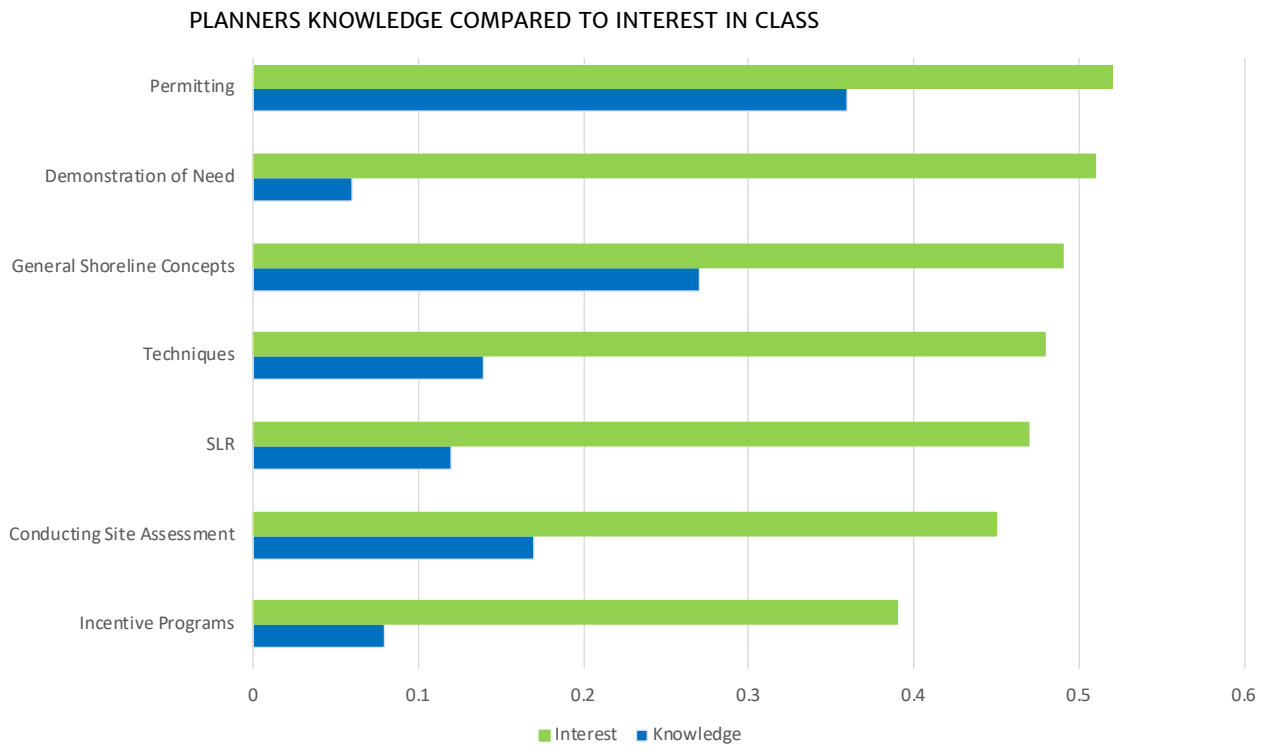
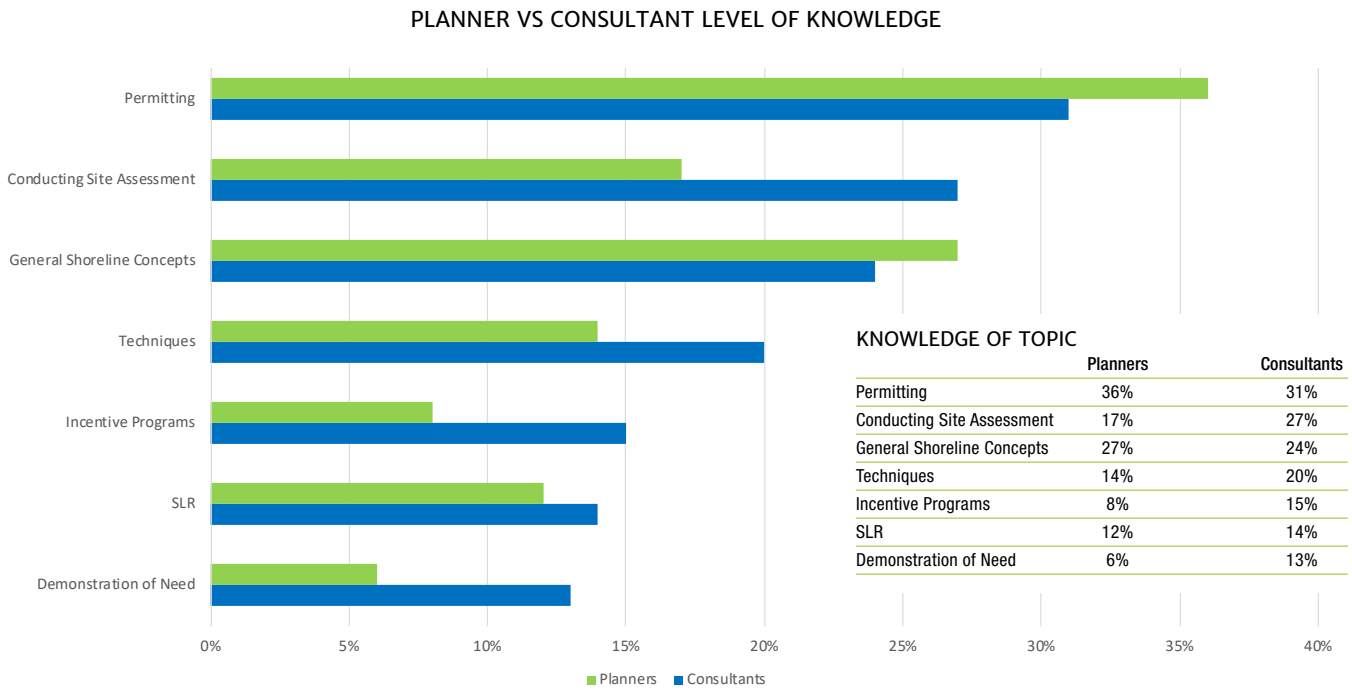


Figure 4: Planner level of knowledge about topics related to soft shore design as compared to level of interest in taking a course.

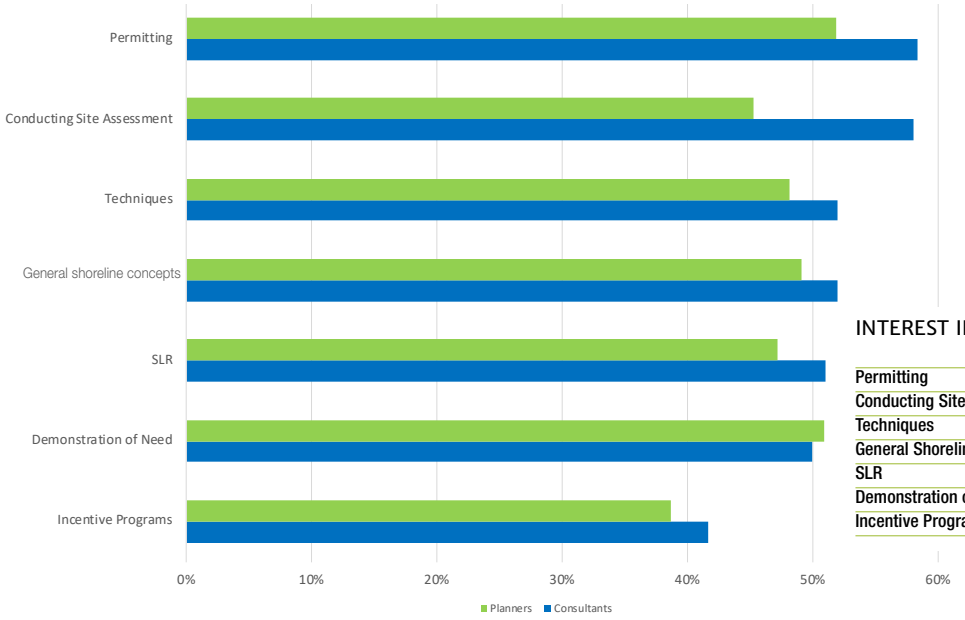


KNOWLEDGE OF TOPIC

	Planners	Consultants
Permitting	36%	31%
Conducting Site Assessment	17%	27%
General Shoreline Concepts	27%	24%
Techniques	14%	20%
Incentive Programs	8%	15%
SLR	12%	14%
Demonstration of Need	6%	13%

Figure 5: Planner compared to consultant level of knowledge in topics.

PLANNER VS CONSULTANT INTEREST IN TAKING COURSE



INTEREST IN COURSE

	Planners	Consultants
Permitting	52%	58%
Conducting Site Assessment	45%	58%
Techniques	48%	52%
General Shoreline Concepts	49%	52%
SLR	47%	51%
Demonstration of Need	51%	50%
Incentive Programs	39%	42%

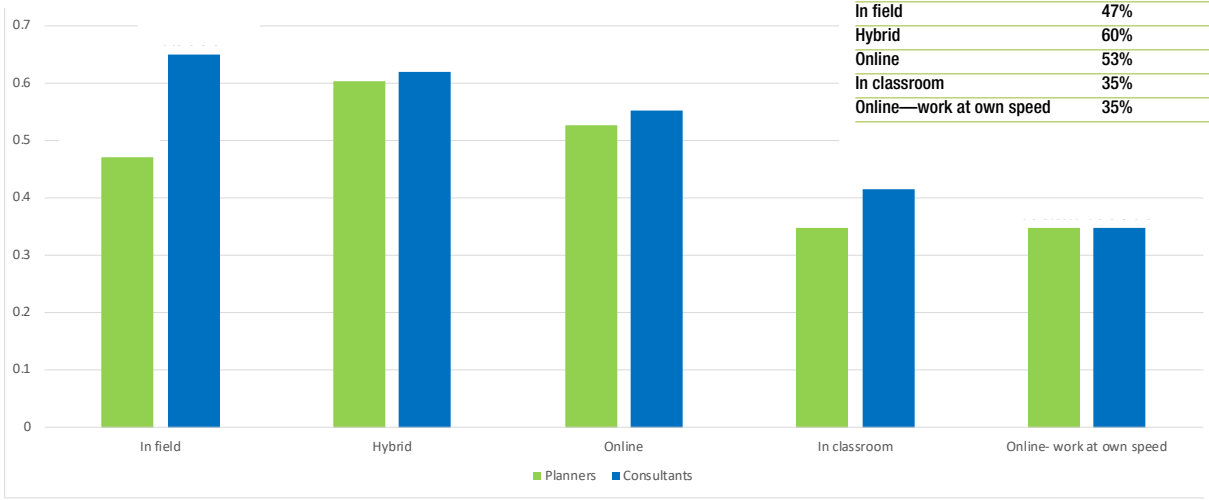
Figure 6: Planner compared to consultant interest in taking course sorted by highest level of interest.

While all audiences indicated interest in learning more about permitting, they differed in other areas of interest for trainings. For example, "Conducting site assessments" (higher for consultants and lower for planners) could be attributed to the need of consultants to understand how a site functions in order to design an erosion solution (Figures 6 and 7).

The February 2021 Survey also asked which format of courses would be of interest to the respondents. Figure 7 provides the results from this inquiry. All of the survey respondents indicated a strong interest in a hybrid form of a class, with online classes and a field component. The lower level of interest in a classroom format may be indicative of responses to the pandemic and not necessarily a preference overall for future courses.

The survey results showed that the highest level of interest is in some form of hybrid course. Consultants indicated a higher level of interest in field work compared to planners. This may relate to the difficulty for many planners to receive time off from office work to attend courses.

INTEREST IN TYPES OF COURSE FORMATS



INTEREST IN TYPES OF COURSE FORMATS

	Planners	Consultants
In field	47%	65%
Hybrid	60%	62%
Online	53%	55%
In classroom	35%	42%
Online—work at own speed	35%	35%

Figure 7: Interest in types of course formats

C. RESULTS FROM CONTRACTOR INTERVIEWS

Over the course of two months, seven phone interviews were conducted with marine contractors who work in both the north and south parts of Puget Sound, reflecting the range of coastal conditions that may be experienced in different regions. Most of those interviewed had 20 or more years of experience working in the marine environment in this region. Some worked exclusively in the marine environment, while a few of those interviewed also worked in freshwater lakes.

This section of the report includes a qualitative analysis of information gained from these phone interviews regarding the experience of marine contractors with soft shore projects, their level of knowledge about potential training topics, and their interest in taking courses in the future. The questions posed to the contractors are found in Appendix F.

The majority of those interviewed identified their work as design/build, which means they create and install the designs for the facilities. In some cases, the contractors indicated they only provided construction based on the stamped drawings of an engineer. Although many identified themselves as design/build contractors, many also commented that these days, there is a need for a stamped engineering drawing. Comments were made about concerns of liability, and therefore, their company was not willing or interested in designing a project. They need someone who can approve and stamp the drawings, which is what a geotechnical engineer will do for a project.

All of the interviewees were familiar with the idea of a soft shore alternative to hard armoring. Half of the contractors had more that 10 years experiences working on shoreline erosion projects that are alternatives to bulkheads. The other half of those interviewed had either never completed a soft shore project or had completed fewer than 10 projects.

Different answers were given to the question, "what might be the biggest concern about soft shore projects?" One individual commented that while the projects might look good on paper, they frequently don't work. Another commented that installations are done by people without experience and are therefore done incorrectly and fail. This gives the projects a bad name. Another major concern is the liability for installing a project that fails. One additional concern related to the inability to estimate costs where there are so many unknown factors and uncertainty. This has led to bids being high.

We asked all of the contractors about their interest in trainings and their specific interest in trainings related to soft shorelines and alternatives to bulkheads. In general, everyone expressed some level of interest in trainings related to soft shore projects. However, some noted they believe the geotechnical engineers are the ones who need the most training to be sure that what has been designed will last.

All of the contractors were asked about their level of knowledge and level of interest in training in seven different topics that would potentially be classes for a training program.

The following is a summary of the responses received about each of the topics.

1. General concepts related to shorelines and stabilization

There was a mix of knowledge about shorelines and stabilizations. Some contractors indicated a very high level of knowledge, while others indicated they had very little knowledge about these issues.

The majority of those interviewed indicated they would be very interested in learning more about this topic. Some noted their interest in learning about any new science. Others commented that the more knowledge they had, the easier it was to obtain permits. Others noted that more information would help inform their clients.

2. Overview of local, state and federal permit requirements

Most of the contractors said they had a general knowledge of permit requirements and would be interested in some additional training to better understand the connections between permit requirements and design.

3. How to address site assessments for design/construction

Many of the contractors indicated a fairly high level of knowledge about how to conduct site assessments. When asked about their interest in learning more about this topic the interviewees gave a range of comments. One respondent expressed interest in this topic if it is taught by someone with experience, particularly construction experience in either the north or south Sound, recognizing that there is a difference between the two areas in what is being evaluated. Others commented that this is where the contractors need to rely upon the expertise of the coastal engineers to evaluate the site for design purposes.

4. Demonstration of need and risk assessment

Similar to the topic of site assessments, contractors had mixed responses to their level of knowledge and level of interest in learning about demonstration of need and risk assessment. Many believed this is where engineers need to be providing input for the contractors and stamping the drawings. This raises issues of concern about liability for contractors, and it should not be something required or expected of them. One contractor expressed interest in learning more if it was something that would help with the permit process.

5. Incentive programs

The interviewees generally indicated they had little or no knowledge of available incentive programs for shoreline homeowners. The level of interest in learning more about incentives was mixed. Some indicated they would like to learn more so they could provide the homeowners with the information. However, the majority of those interviewed expressed a low level of interest in this topic.

6. Techniques for erosion control, including construction materials and maintenance

Contractors we interviewed generally claimed a high level of knowledge about erosion control techniques unless they had not designed any soft shore projects. Some indicated they would like to know more and see more examples that worked and examples that failed. Some indicated this is where the contractor needs to rely upon the engineer to stamp the drawings and "get the design right."

7. Sea level rise issues

The contractors had a mixed response about their need to learn about sea level rise and how it might affect their designs. The majority indicated they had little or no knowledge about sea level rise and how it might affect their designs. Some recognized this may be an issue for the future of designs. Some commented on the conflict this will create as homeowners will want higher bulkheads that will not be allowed through the permit process.

Table 2 shows the contractor level of knowledge compared to level of interest in each of the seven potential course topics. The two areas of most interest to those interviewed were topics related to "permitting" and "general concepts" about the shoreline. The lower interest in learning about techniques may well relate to comments received from contractors about relying upon engineers to design projects.

Table 2: Contractor level of knowledge compared to level of interest in course sorted by highest level of interest

	Knowledge	Interest
Permitting	38%	57%
General concepts	48%	55%
Incentive programs	33%	49%
Techniques	43%	49%
Site assessments	36%	48%
Sea level rise	26%	45%
Demonstration of need	36%	43%

All the interviewees were asked about their experiences with trainings related to soft shore issues. Many indicated they had taken some type of a course or attended a workshop on the topic. Examples included trainings offered by the Department of Fish and Wildlife, Friends of the San Juans and Kitsap Shore Friendly. Others indicated they had not attended any trainings, but were aware of materials available on the topic.

When asked about types of training formats they would be interested in, many of the contractors said they prefer a combination of classroom and field-based trainings; the next level of interest was for a hybrid type of a course that would include online classes with an instructor plus a field training component. in addition, contractors preferred a full-day course rather than part of a day (see Table 3).

Table 3: Contractor Interest in Type of Training

Classroom	57%
In field	57%
Hybrid Format	29%
Online	14%
Own pace online	0%

One important consideration is to be sure that all trainings are accessible both for online and with field components. If courses are taught online, the issue of location is less important. However, for in-person and field-based work, offering trainings in different parts of the region would mean better attendance.

One interviewee stated that if the trainings are well designed, it would not matter where they were offered. This same individual stressed that trainings should include instruction by contractors with actual experience. They had attended trainings in the past where the instructor had little or no actual field experience. Another interviewee stressed the importance of using case studies, both of successful and failed soft shore projects, for field training.

D. SUMMARY

The 2019 MSDG Survey, along with the input from the MAST advisory committee, provided the basis for establishing core topics to be included in a comprehensive training program. These topics were then tested by the February 2021 Survey and interviews with contractors. As a result, we narrowed down a proposed list of core topics to be included in a curriculum to six topics. The seventh topic," incentive programs for shoreline homeowners," was combined with "techniques for erosion control." The survey results provide an initial insight into the level of interest in providing these courses. Planners expressed the greatest interest in learning more about permitting and demonstration of need, while consultants showed the greatest interest in permitting and conducting site assessments. Contractors expressed the greatest interest in permitting and learning about general concepts of shorelines. The preferred format for providing courses was a hybrid format or one that might combine online or classroom learning with a field component.

5

CERTIFICATION

One final issue explored through both the market analysis and the interviews with contractors identified the concept of certification. Typically offered by professional organizations and nonprofits, certification entails taking a course and passing an exam at the end. Successful passage of the final exam results in "certification." Certification is used to help standardize practices within a certain field. It also is used for marketing purposes to demonstrate a level of knowledge of a certain skill. Examples of these types of certifications for contractors include certification for professionals specializing in concrete design and construction: American Concrete Institute (ACI), Certified Construction Manager (CCM), or Project Management Institute (PMI). Within the field of marine construction in Washington state there currently exists no specified certification program, particularly as related to shoreline work, such as bulkheads or soft shore alternatives.

A different type of certification might be applicable for the training proposed by this MAST study. In examples found in other jurisdictions, certification was awarded upon successful completion of a course on alternative shoreline development. After completing the training and passing an exam, professionals would be added to an official "list," maintained by a government entity or nonprofit. The trainings used for this type of shoreline certification typically involve two days in the classroom, followed by an exam, and one day in the field working on a soft shore project. After attendees have taken the class, passed the exam, and completed the fieldwork, they are added to a public list maintained by the training provider. This list is typically posted on the provider's website. The training providers are very clear that the certification list is only to show those who have completed the training. It is not a recommendation or endorsement.

An example of this in Washington state is the Wetlands Rating Course, where, upon completion of the course, a contractor or consultant is listed on a website maintained by the Washington Department of Ecology. The list is compiled for others to find consultants who have completed the training.

From the interviews with contractors, we found some interest in developing a certification program to signify a level of knowledge related to soft shore design and construction. For the purposes of this study, no similar questions were posed to consultants or planners. It was suggested that, after completing a course on soft shores, a contractor's business might be listed by WDFW or other local agencies as having "completed the course." There would not be a certification indicating any ability to do the work, rather a "certification of completion of a course." This suggestion was met with mixed results. Some indicated they would be interested in receiving certification for completing the class and that it would add value to their business. Others indicated there would be little or no value to their business from such a certification.

This is a topic deserving further investigation and analysis. Certification may provide a way to encourage greater participation by contractors in training programs. A proposed program might require applicants to complete a certain set of the six courses identified in this report and a qualifying final exam. Upon successful completion of the exam, the contractor (or consultant) would become certified for the purposes of having their name listed on a website with other certified professionals. In addition, the contractor or consultant will be eligible to use a designated logo on their business cards or website.

6

RECOMMENDATIONS FOR COURSE CATALOGUE, PROVIDERS AND INSTRUCTORS

The market analysis and surveys provided the basis for development of a course catalogue about alternative marine shoreline techniques for three audience types: planners, consultants and contractors. The survey results and interviews provided invaluable information about the level of current knowledge and the level of interest by each group in different course topics. We also gained insight about the ways to reach out to the different groups and the level of interest in different types of trainings. The market analysis gave insight into the types of formats for courses and the strengths and weaknesses of each. After analyzing the information from the market analysis, surveys and interviews, and with valuable insight from the advisory committee, we are able to propose a course catalogue for trainings. In addition, we recommend that the trainings be designed for a mixed group of participants from the three different audiences described in this report: planners, consultants, and contractors.

A. PROPOSED COURSE CATALOGUE

The six courses described below are the key components for a comprehensive training program on alternative marine shoreline techniques. These courses are based upon review of existing classes offered through the Coastal Training Program and other similar classes offered throughout the United States and Canada. The advisory committee provided invaluable input and insight into the level of detail and content to be offered. Each course is described below. It should be noted that incentive programs, identified in the earlier list of topics, can be addressed as part of Course 5 on techniques for erosion control.

The six proposed courses for future trainings are:

Course 1 - General concepts related to shorelines and stabilization

Course 2 - Overview of local, state and federal permit requirements

Course 3 - How to address site assessments for design/construction

Course 4 - Demonstration of need and risk assessment and alternatives analysis

Course 5 - Techniques for erosion control including construction materials and maintenance and incentive programs for shoreline homeowners

Course 6 - Sea level rise issues

For some of the courses, extra modules or field components should be added that are directed towards contractors. Learning objectives for each of the six courses are listed below. These learning objectives can be used as a way to measure success of the trainings. We also include recommendations on the methodology for providing the course either in person or online.

COURSE 1 – General concepts related to shorelines and stabilization

This course includes familiarization with general topics related to coastal processes, shoreline vegetation, marine habitat, weather impacts, and climate change. These concepts provide an overview of shoreline and coastal processes that form the basis for understanding all other aspects of shoreline stabilization and the alternatives to armoring. The level of detail for this course does not need to be in depth. Participants need enough information to understand the basics and how to read reports. For purposes of design engineers, a higher level of training, such as college courses in coastal engineering may be required.

Learning objective: Participants will identify key aspects of shoreline and coastal processes relevant to sites within Puget Sound.

Recommended course methodology: This course is suited for either synchronous or asynchronous online learning, with a field component to demonstrate concepts.

COURSE 2 – Overview of local, state and federal permit requirements

This course addresses local, state and federal permitting associated with the implementation of shoreline projects designed to either restore shorelines to natural conditions or implement projects considered "soft" alternatives to bulkheads or armoring. The module will describe details of the different types of permits, the different levels of government, and how each of the permits relate to one another. Permits reviewed in this section include: local government shoreline master program permits, Washington Department of Fish and Wildlife Hydraulic Project Approval, US Army Corp of Engineer permits, FEMA and floodplain permits, and Endangered Species Act review by National Marine Fisheries Service, and US Fish and Wildlife Service. Additional permit related issues include Department of Natural Resources (DNR) leases and cultural resources reviews and coordination with the Department of Archeology and Historic Preservation (DAHP). The role of tribes in the permit process is also included in this module.

Learning Outcome: Participants will know which permits are required for different activities in the marine shoreline. They will be able to identify whom to contact, what steps are involved in the permit process, what to include in a permit package, and how the different permits relate to one another.

Recommended course methodology: This course is suited for synchronous online learning or in-person classroom.

COURSE 3 – How to address site assessments for design/construction

This course explores how to conduct a site assessment for a shoreline stabilization project. This includes identifying issues that need to be addressed, where to find resources for each of the issues, and how to prepare and read reports pertaining to various aspects of the site.

Learning Outcome: Participants will use checklists to identify key aspects of a site, collect information and present that information as the applicant, or review the information as the permit reviewer.

Recommended Course Methodology: This course is suited for synchronous online learning or in-person classroom, with a field component to demonstrate concepts.

COURSE 4 – Demonstration of Need and Risk Assessment and Alternatives Analysis

This course examines how to determine which type of erosion protection and shoreline treatment is applicable for a given site, as no one design is applicable everywhere. This section builds upon the information identified and included in the Site Assessment module. This course will also address the concept of "demonstration of need," as required in shoreline master programs.

WAC 173-26- 201(2)(e)(i). The risk assessment tool (as revised), provided in the Marine Shoreline Design Guidelines (MSDG), will be the basis for determining need.

Learning Outcome: Participants will use tools to assist in the assessment of a site and to determine the most appropriate technique for erosion control.

Recommended Course Methodology: This course is suited for synchronous online learning or in-person classroom.

COURSE 5 – Techniques for Erosion Control: Construction Materials, Maintenance, and Incentive Programs

This course will explore the range of erosion control measures and restoration techniques applicable to Washington state shorelines as described in the MSDG and developed for the Puget Sound region. Descriptions of each of the techniques and where they are appropriate to use will be discussed. The course will also cover the effects of these techniques, provide design examples, and present successful and unsuccessful examples. Included are: construction materials, methods and maintenance, and an overview of various incentive programs available throughout Washington state. The purpose of this course is to familiarize attendees with various technical assistance or financial support options.

Learning Outcome: Participants will identify the most appropriate technique for a given site, the general design standards for the technique, and how to find more detailed information about site design based upon the Marine Shoreline Design Guidelines.

Recommended Course Methodology: This course is suited for synchronous online learning or in-person classroom with a field component to demonstrate concepts.

COURSE 6 – Sea Level Rise Issues

This course will provide an overview of sea level rise and coastal hazards that impact location and design of alternatives to bulkheads or armor. There will be descriptions of how to integrate sea level rise and storm surge into the siting, design and construction of projects. The course should be designed with a required Part 1, an initial overview of the issues, and an optional Part 2, which would focus on a more in-depth analysis of design options and implications to address sea level rise and storm surge.

Learning Outcome for Part 1 (required): Participants will identify how erosion control measures in Puget Sound are impacted by sea level rise and coastal hazards.

Learning Outcome for Part 2 (optional); Participants will incorporate sea level rise and storm surge analysis into project design.

Recommended Course Methodology: This course is suited for synchronous or asynchronous online learning or in-person classrooms.

B. RECOMMENDED COURSE PROVIDER

In the research conducted for this study, we reviewed different providers offering courses throughout the United States and in British Columbia. One important finding was the need for a consistent and centralized method for delivering content. Examples of organizations capable of offering consistent courses demonstrated the ability to offer multiple courses, market broadly, facilitate development of new courses, and accommodate multiple course formats. In Washington state, Ecology's Coastal Training Program, located at the Padilla Bay Research Reserve in Mt. Vernon, offers the most appropriate approach. The Coastal Training Program offers a catalogue of courses geared toward shoreline planners and consultants. Using a "community college-like" model, the program offers courses at regular intervals that are similar to the courses described in the course catalogue section of this report (pages 35–39). With a mailing list of over 4,000 professionals, the Coastal Training Program has access to many of the audiences identified in this report.

However, there are two caveats:

1. The Coastal Training Program does not currently offer asynchronous courses, although it does offer online classes. It would need to explore options for developing and offering courses using a learning management system (LMS) that is approved by the Washington State Department of Ecology. As noted in this report, there is a high degree of interest by our audiences in a hybrid format, and we recommend creating one of our pilot courses in an asynchronous format, which would need to be developed using an LMS.
2. The Coastal Training Program currently has limited access to contractors, as their mailing list primarily consists of professionals in the planning and consulting fields. In our research, we found no specific training format typically used by marine contractors. Therefore, offering these courses through the Coastal Training Program will require specialized and focused outreach and marketing.

C. INSTRUCTORS

We recommend that courses described in this report be developed and taught by instructors from a range of backgrounds. Depending upon the topic, instructors should include government employees, consultants and contractors with experience in the field. In our research and interviews, we heard about the importance of using contractors with experience to train other contractors. Similarly, we heard about the need for permitting courses to be offered by planners or consultants with experience both in applying for permits and reviewing permit applications.

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PROPOSED PILOT COURSES

In accordance with our proposed deliverables for this grant, we recommend development of two pilot courses based upon 1) the greatest level of interest (determined from the February 2021 survey and contractor interviews), and 2) exploring new approaches to learning, such as use of Learning Management Systems as described in Appendix J to this report.

The two pilot courses we recommend are: "General Concepts Related to Shorelines and Stabilization" and "Overview of Local, State and Federal Permit Requirements."

Here are general proposals for how these two pilot courses will be developed:

Pilot 1: General Concepts Related to Shorelines and Stabilization

Format: 2-day course, hybrid (online asynchronous and in field)

Content: Outline for course will be based on recommendations from the advisory committee found in Appendix G.

Length: Day 1, approximately 3 hours; Day 2, approximately 3-5 hours (potentially including field component)

Pilot 2: Overview of local, state and federal permit requirements

Format: Online or in-person synchronous

Content: Outline for course will be based on recommendations from the advisory committee found in Appendix H.

Length: Approximately 5-6 hours

A consolidated list of detailed content for all courses can be found in Appendix I. This includes input from the advisory committee about overall issues related to content of each course and specific issues to be considered that will be of importance to each of the three audiences: planners, consultants and contractors.

Here is a list of additional issues that need to be addressed in order to develop these pilot courses:

Create course blueprints:
For each course, a "blueprint" needs to be developed that divides the course into modules. For each module, there needs to be a clear statement of purpose and content, along with identification of supporting training materials.

Pay experts for course development and instruction:
Courses should be developed with input from experts who represent each of the three audience groups. Funding needs to be made available to compensate these experts. In the past, the CTP budget has established a line item to address this issue. If that funding is no longer available, other means will need to be explored to ensure funding will be available.

Convert the curriculum into synchronous and asynchronous components:
Curriculum design is very different if courses are offered synchronously or asynchronously. Each aspect of the curriculum will need to be evaluated to ensure that participants will be engaged and can learn from the lesson. Moreover, the curriculum for in-person learning will need to be modified for an online (Zoom-style) course.

Create quizzes for anchoring information:
Creating quizzes will be particularly important for the asynchronous courses to help "cement" concepts. It is highly recommended that training courses include some form of quiz to help emphasize and reinforce what is being learned.

Create course materials for download:
Making materials available for download will be particularly important for online courses, whether synchronous or asynchronous. In many cases, materials handed out at in-person courses can be easily transferred to a downloadable format. Other documents may need to be edited for online use.

Use existing videos and developing new ones for course instruction:
Especially for asynchronous courses, videos are an important component of instruction. Time will need to be spent in development of these videos. There may be existing videos created through the Department of Fish and Wildlife that could be considered for modules for some of these courses.

Create or access drone footage as a teaching tool:
In addition to video footage, use of drone footage of beaches is an important learning tool for courses where there is no field component. Access to the technology needed to create drone footage is something that should be considered in development of many of these courses.

Support the Coastal Training Program in securing a Learning Management System (LMS)
In order to offer asynchronous courses, the course provider will need to explore what is the most appropriate Learning Management System to use. (See Appendix J for more information about Learning Management Systems.) This report recommends supporting the CTP as the provider for these trainings, and CTP is currently examining options for an LMS. This should be supported in the effort to provide quality training opportunities as identified in this report.

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CONCLUSION

As more and more soft shore stabilization projects are initiated in the Puget Sound region, there is an increasing need to provide training and support. This report offers a detailed examination of which issues should be included and how to design courses on soft shore stabilization and associated topics for the three audiences: planners, consultants and contractors. Planners need training on how to review proposals for soft shore projects; consultants need better advice on how to design and maintain these types of projects; and contractors need better information about how to install these projects. All three groups need to know how to advise clients about alternatives when requests are made for hard armoring or bulkheads. While there are some trainings offered in the area, they are not well-coordinated and no comprehensive study has examined what issues should be addressed in trainings, how the courses should be offered, and the level of interest in different topics.

Through the use of survey analysis and individual phone interviews, we identified a core list of courses to be offered to create a complete training. Our market analysis of similar courses offered in other states and British Columbia confirmed the proposed outline of courses:

1. General concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. How to address site assessments for design/construction
4. Demonstration of need and risk assessment and alternatives analysis
5. Techniques for erosion control including construction materials and maintenance and incentive programs
6. Sea level rise issues

The market analysis provided insight on training providers, audiences, instructors, and best practices. An analysis of adult learning principles provides important key features to consider when developing trainings. For instance, a training needs to offer solutions to real-world problems in a way that helps participants retain what they learn in class. It needs to provide opportunities for the participants to share their knowledge and experience with each other.

There needs to be opportunities to practice and apply the information. Other best practices include: establishing inclusion, effectively sequencing the content, explaining the reasons behind certain rules and regulations, and addressing different learning styles. By incorporating these approaches and best practices, participants are much more likely to understand, retain and apply what they've learned.

We recommend offering these trainings through the Coastal Training Program, located at the Padilla Bay National Estuarine Research Reserve in Mt. Vernon, WA. The Coastal Training Program has most of the necessary existing infrastructure to offer these courses to most of the targeted audiences. Additional effort will be necessary to attract contractors, who typically are not on mailing lists for CTP classes. Some courses can be offered online, asynchronously (no live instruction), while others will benefit from being offered either online synchronously or in person along with a field component. One issue that needs to be addressed is the ability of CTP to offer courses using online Learning Management Systems. In order to offer the broadest array of formats for courses, new technology needs to be developed.

We also recommend investigating ways to offer certification upon completion of all six courses.

There are a number of ways this might be pursued. As a starting point, we suggest investigating the option of creating a list of firms and individuals who have completed these trainings. This list could be posted on the Washington Department of Fish and Wildlife website. In addition, we suggest exploring a graphic logo that can be added to websites or business cards to indicate completion of the courses.

The recommendations in this report offer a comprehensive approach to developing training courses for marine alternative shoreline stabilization techniques. By following the proposed approaches and the best practices for adult learning, this region will be a model of success for other training programs around the nation.

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APPENDIX A

TRAINING TOPICS DESCRIPTIONS

The following is a description of seven proposed course units of training related to shoreline stabilization techniques for Washington State. Each course is generally described. This is followed by differences that may be required to modify the training for planners, contractors or consultants.

1. General Concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. Key topics for conducting site assessments
4. Demonstration of Need and Risk Assessment
5. Incentive Programs
6. Techniques for Erosion Control including materials, methods and maintenance
7. Sea Level Rise Issues

1. General Shoreline and Coastal Concepts

This training module includes familiarization with general topics related to coastal processes, shoreline vegetation, marine habitat, weather impacts, and climate change. The level of detail about each topic will be modified based upon whether the course is offered for planners, contractors or consultants. These basic concepts provide an overview of shoreline and coastal processes that form the basis for understanding all other aspects of shoreline stabilization and the alternatives to armoring.

Planners: Planners do not need in depth knowledge about how coastal and shoreline processes work. They need enough information to understand basics to be able to read reports.

Contractors: Contractors only need a high level of understanding about how coastal and shoreline processes work unless they are design/build contractors in which case they need the same level of understanding as consultants. Contractors need information about impacts of machinery on shorelines.

Consultants: Consultants need a solid understanding of the background of coastal processes in order to properly design projects.

2. Overview of local, state and federal permit requirements

This training module addresses local, state and federal permitting associated with the implementation of shoreline projects designed to either restore shorelines to natural conditions or implement projects considered “soft” alternatives to bulkheads or armoring. The module will describe details of the different types of permits and the different levels of government and how each of the permits relate to one another. Permits reviewed in this

section include local government shoreline master program permits, Washington Department of Fish and Wildlife Hydraulic Project Approval, US Army Corp of Engineer permits, FEMA and floodplain permits, and Endangered Species Act review by National Marine Fisheries Services and US Fish and Wildlife Service. The role of tribes in the permit process is also included in this module.

Planners: Planners need to understand how the different permits interact. Planners also need training on how to use the pre-application process.

Contractors: Contractors need only a high level of understanding about permits if only responsible for construction. Otherwise, contractors who are design/build specialists need the same level of detail as consultants.

Consultants: Consultants need to understand what permits are required sufficient to be able to apply for the different permits and also to be able to explain the process to homeowners.

3. Conducting site assessments

This training module explores how to conduct a site assessment for a shoreline stabilization project. This includes identifying issues that need to be included, where to find resources for each of the issues, and how to prepare and read reports addressing various aspects of the site.

Planners: Planners need to be provided with a site assessment by the contractor or consultant and need to understand what to look for in that site assessment which may include a checklist. They also need to understand how to read reports, particularly those prepared by geotechnical engineers.

Contractors: Contractors need to understand the basics of what should be included in a site assessment, although they do not usually conduct them unless design/build. The importance for contractors is the focus on how to minimize impacts (see general concepts section above).

Consultants: Consultants need clear advice about what information should be provided in a site assessment.

4. Demonstration of Need and Risk Assessment and Alternatives Analysis

This module examines how to determine what type of shoreline treatment is applicable for a given site. Recognizing no one design will be applicable everywhere, this section will examine the factors to be considered when evaluating what type of erosion protection or shoreline treatment will be the most applicable. This section builds upon the information identified and included in the Site Assessment module. This section will also address the concept of

"demonstration of need" as required in shoreline master programs. WAC 173-26-201(2)(e)(i). The risk assessment tool (as revised) provided for in the Marine Shoreline Design Guidelines (MSDG) will be the basis for determining need.

Planners: Planners need to understand how to determine what type of treatment is appropriate for a given location. This is based upon the language in a local SMP consistent with state law.

Contractors: Contractors need a high level of understanding about demonstration of need and risk assessment. The most important aspect is that a contractor needs to understand when it is time to bring in professionals to assist in determining the right technique for a site.

Consultants: Consultants need some form of a tool such as the risk assessment tool in the MSDG to better determine what technique is most appropriate for a given location. It is important to develop such a tool and use this module to train consultants on the use and application.

5. Techniques for Erosion Control

This module will explore the range of erosion control measures as well as restoration techniques applicable to Washington State shorelines with an emphasis on Puget Sound coastlines. These are the techniques described in the MSDG. This section will describe each of the techniques, examine where it is appropriate to use each one, what are the effects of the technique, provide design examples and discuss successful as well as unsuccessful examples. This module will also include Construction Materials, Methods and Maintenance.

Planners: Planners need a high level of understanding about each of these techniques.

Contractors: Contractors need to understand each of the techniques and where they are applicable if design/build (see consultants below). If the contractor is only following plans provided by the consultant, the level of understanding about each technique is relatively high.

Consultants: Consultants need detailed understanding of each of the techniques, where applicable, how it relates to the site (risk assessment process), the effects, design standards, material sizing, cost comparisons, and maintenance techniques.

6. Sea Level Rise Issues

This module will provide an overview of sea level rise and coastal hazards that will impact location and design of alternatives to bulkheads or armor. Included in this section will be descriptions of how to integrate sea level rise and storm surge into the siting, design and construction of projects.

Planners: Planners need a high level of understanding of this issue in order to understand viability of proposed projects.

Contractors: Contractors need a high level of understanding of this issue.

Consultants: Consultants need an in-depth understanding of this issue sufficient to be able to site, design and construct projects that will withstand impacts of sea level rise and storm surge over multiple decades.

7. Incentive Programs

This module will provide an overview of various incentive programs available throughout Washington State. The purpose of this module is to familiarize trainees with various options that may provide technical assistance or financial support.

Planners: Planners need this information to provide applicants with information about various options available to them.

Contractors: Contractors need this information to learn about technical and financial support for their clients.

Consultants: Consultants need this information to learn about technical and financial support for their clients.

APPENDIX B

Notes from meetings #1 and #2 from Advisory Committee

Washington Marine Alternative Shoreline Trainings (MAST)

REPORT FROM MAST ADVISORY COMMITTEE MEETING #1

Meeting date: July 1, 2020

Meeting Coordinators: Nicole Faghin, Washington Sea Grant, Cathy Angell, Cathy Angell Communications

The purpose of the Marine Alternative Shoreline Training (MAST) project is to develop an understanding of the needs for three different audiences for training related to review of and design of alternatives to bulkheads and armoring to protect or restore shorelines impacted by erosion. The training needs are directed at shoreline planners, marine contractors and a variety of consultants working on these types of projects. As part of the MAST project, we created an **Advisory Committee**, experts in a variety of relevant areas, to provide insight and direction on our effort. The proposed outcome for this project is a training guide that will identify on what types of issues these various groups need training, and how the training should be delivered.

The Advisory Committee held its first **virtual meeting on July 1, 2020**. The committee is composed of 27 people (see attached roster) of whom 25 participated in the meeting. They represent the three target groups for the study; planners, contractors and consultants. We provided three goals for this first meeting:

- Objective #1: Review and refine the topic list of issues to be included in a training program
- Objective #2: Brainstorm additional topics.
- Objective #3: Identify recipients of a needs assessment and how to best get input.

In advance of the meeting we created a draft list of topics that might be included in trainings for each of the three target audiences.

Three facilitators provided support for the meeting held on the ZOOM platform. The group met as a whole for an initial welcome and overview of the project. Participants then broke into separate “breakout rooms” with facilitators to provide detailed feedback on the proposed list of topics to be included in trainings for each of the three audiences. The breakout rooms consisted of participants either representing or with expertise in the areas relevant to that particular audience. In order to ensure feedback relevant to each of the audience types, we used these content-specific breakout sessions to gather key insights.

In general, all the breakout groups agreed on the importance of the overall topics. These are as follows:

1. General Concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. Key topics for conducting site assessments
4. Demonstration of Need and Risk Assessment
5. Techniques for Erosion Control

The group recommended addition of one additional topic on "Incentive Programs." For each of the overarching topics the groups suggested clarifications and additional subtopics.

One of the **key themes** from each of the breakout sessions concerned clarity about the purpose of these trainings and the importance of targeting trainings for the different audiences. The group suggested a need to develop different levels of trainings for each audience type. And they emphasized the different focus for each group that will affect the level of detail provided in a training. For example, planners need to understand about local, state and federal permit processes and how they interact. However, contractors (not design/build) may not need to know much detail about permitting. Likewise, planners need to understand what types of issues are associated with conducting site assessments but the consultants will require a much higher level of knowledge about how to conduct different aspects of the site assessment and how to provide the information in a report that will be used by planners to evaluate a proposal.

Some of the issues discussed by the **planners** group addressed the importance of the planner role understanding issues in order to provide advice to homeowners seeking permits. Also, planners need to understand how to review project proposals and reports such as the geotechnical reports.

Contractors have differing needs based on the type of work performed. Three different groups were identified; those who conduct design/build projects, those who are builders only installing someone else's design, and landscape companies. The training needs for each of these groups may be slightly different. One recommendation suggested including design/build contractors in with consultants as they would require similar levels of knowledge where they are designing structures and then installing them. Contractors need a strong emphasis on best management construction practices in the shoreline for erosion and sediment control. As noted, contractors may not see a need to learn about permitting requirements although if there are permit conditions for them to follow, they need to understand these. When providing training about different erosion control measures, contractors will need to understand why each of these techniques are designed in a certain way and learn what is appropriate for different types of sites.

The **consultant** group represented the broadest range of disciplines; permitting specialists, biologists, geologists, coastal engineers and more. This audience needs to know about all of the various topics so they can advise homeowners in how to proceed with a project.

The Advisory Committee also provided input on other aspects of training. They provided suggestions about locations for trainings, existing types of trainings that could offer these courses, ideas about certification programs and tying the training to those, and suggestions about who we should include in our outreach to get further input about the needs for this type of training.

Attachments:
Agenda
Advisory Committee Roster of Attendees

AGENDA – Advisory Group Meeting, July 1, 2020
Marine Alternative Shoreline Training

Time	Topic	Lead
9:55-10:00	**Please sign in a few minutes ahead of time to make sure you're ready to start.** **Question in chat – Please list your AFFILIATION and ONE SILVER LINING that you have experienced during this time?**	
10:00 – 10:20	**Welcome/ Introduction** ● Three groups represented- Shoreline Planners, Contractors, Consultants ● Update your name with planner, contractor or consultant so that it's clear who's who Meeting Goal: To kick-off our group and gather content for the Needs Assessment. Objective #1: Review and refine the topic list. Objective #2: Brainstorm additional topics. Objective #3: Identify recipients of NA and how to best get input. ● Process for Meeting (review)	**Nicole- WA Sea Grant** **Cathy-Cathy Angell Communications**
10:20 – 11:05	**BREAKOUT ROOMS: Review Topics for Draft Needs Assessment** Guidelines for breakout room: ● Raise your virtual hand if you'd like to comment. Wait to be called upon by the facilitator. ● Facilitator will record ideas on the white board. Pre-assigned Break-out Rooms: ● Planners- Sydney facilitates ● Consultants- Nicole facilitates ● Contractors- DG facilitates Session Objective #1: Go through topics for the draft NA one by one and supply additional detail. Session Objective #2: Offer additional topic ideas.	**Sydney Fishman- Dept of Ecology** **Nicole Faghin- WA Sea Grant** **DG Blair, Stewardship Centre for BC**
11:05-11:15	**Return to Meeting for wrap-up of that part.** Discussion	**Nicole**
11:15-11:25	**Break**	

AGENDA – Advisory Group Meeting, July 1, 2020
Marine Alternative Shoreline Training

11:25 – 12:15	**BREAKOUT ROOMS: Brainstorm other issues** ● Where are the **best locations**? Are there existing training programs we can work with? ● Are there **certification-type programs** we can partner with? (e.g. AICP, etc.) ● Are there **related training programs**? ● Who should **receive** the NA?	**Sydney** **Nicole** **DG**
12:15 -12:30	**Wrap up and Next steps**	**Nicole**

Advisory Group for the Marine Alternative Shoreline Training (MAST) Project

July 1, 2020
x indicates attendance
LEAD:

x	Nicole Faghin	Washington Sea Grant	faghin@uw.edu
x	Cathy Angell	Angell Communications	hello@cathyangell.com

	Name	Organization	Email	Role
	Breakout Group 1: Planners			
x	Sydney Fishman	ECY	syfi461@ecy.wa.gov	FACILITATOR
x	Christina Kereki*	Kitsap SF	CKereki@co.kitsap.wa.us	SF Lead
x	Kathlene Barnhart	Kitsap County	KBarnhar@co.kitsap.wa.us	Planning
x	Dave Risvold	Pierce County	dave.risvold@piercecountywa.gov	Planning
x	Patty Charnas	Jefferson County	PCharnas@co.jefferson.wa.us	Planning
x	Colin Maycock	San Juan County	ColinM@sanjuanco.com	Planning
x	Annie Hiller	City of Bainbridge	ahillier@bainbridgewa.gov	Planning
x	Tina Whitman*	Friends of San Juan	tina@sanjuans.org	SF Lead
x	Jenna Jewett	WDFW	Jenna.Jewett@dfw.wa.gov	Advisor
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x	Karin Strelioff*	Thurston Conservation District	karin@thurstoncd.com	SF Lead
x	Jenny Rosten	Sealevel	Jenny@sealevelbb.com	Contractor
	Corey Morss	WDFW	Corey.Morss@dfw.wa.gov	SF Lead
x	Steve Zuvela	Waterfront Construction Inc	Steve@waterfrontconstruction.com	Contractor
	Jennifer Griffiths	WDFW	jennifer.griffiths@dfw.wa.gov	Advisor
x	Ben Alexander	Sound Native Plants Inc.	ben@soundnativeplants.com	Vegetation
	Matt Kukuk	Saratoga Environmental	saratogaenvironmental@whidbey.com	Consultant contractor
	Breakout Group 3: Consultants			
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x	Brandy Reed*	King SF	brandy.reed@kingcd.org	SF Lead
x	Anna Toledo*	Island County SF	A.toledo@islandcountywa.gov	SF Lead
x	Jessica Cote	go blue coast engineering	jessica@gobluecoast.com	Coastal Eng
x	Andrea McLennan	Herrera	AMacLennan@herrerainc.com	geomorphology
x	Dan Nickel	Watershed	DNickel@watershedco.com	Env Science
	Brad Thiele	NW environmental	brad@northwest-environmental.com	Planning
	Jim Johannessen	CGS	jim@coastalgeo.com	Geologist
x	Wendy Gerstel	Qwg	mudpeople@earthlink.net	Geologist
	Matthew von der Ahe	Aspect Consulting	mvonderahe@aspectconsulting.com	Engineering Geologist

* Shore Friendly Program Lead

WASHINGTON MARINE ALTERNATIVE SHORELINE TRAININGS (MAST)

REPORT FROM MAST ADVISORY COMMITTEE MEETING #2

Meeting Date: March 23, 2021

Meeting Coordinators: Nicole Faghin, Washington Sea Grant; Cathy Angell, Cathy Angell Communications

The MAST Advisory Committee met for the second time on March 23, 2021. Eighteen members of the committee joined the meeting representing the three target communities: planners, contractors and consultants. In addition, program leads from the Shore Friendly programs also attended. The roster of attendees is attached. We provided two objectives for this meeting:

- Objective #1: Bring participants up to date
- Objective #2: Request input on Pilot Course Creation

Market Analysis

Cathy Angell provided an overview of the Market Analysis conducted last fall and completed in January 2021. The final report of this analysis had been previously sent to advisory members. The analysis was conducted via internet research and personal interviews. The main objective of was to explore different types of trainings that focus on softshore stabilization (aka, living shorelines, soft armoring, nature-based shoreline stabilization, Green Shores) and to see how these trainings could inform our work here in Washington State. Many trainings were delivered as webinars, others were self-guided, and some were in-person. A few providers have focused on more advanced programs where practitioners receive a certificate for completing a training and passing a test. The people who pass are listed on a state agency or program website, which is perceived as a welcome credential by the individuals, potential clients, and agency staff who review permits.

Training providers included Coastal Training Programs who are affiliated with the National Estuarine Research Reserve System; State Agencies, Conservation Commissions; Non-profits; Coastal Federations; Sea Grants; Federal agencies; and Academic Institutions. The primary audiences targeted by these trainings included public and private biologists, engineers, planners, landscape architects, marine contractors, restoration specialists, local and regional government staff. The majority of trainings welcomed a mix of professionals, as the training coordinators feel there is value in cross-sector information sharing. However, some of the trainings are targeted specifically for marine contractors who are often small businesses with limited time for training.

General trends in topics included:

- Costs and benefits of different stabilization techniques;
- Improving coastal resilience
- Conducting site assessments;
- Navigating the permitting process;
- Understanding physical processes and shoreline ecosystems;

- Learning from case studies.

The overarching objectives of the training appeared to focus on deepening the environmental knowledge of the participants, making a case for using softshore techniques when appropriate, and helping people understand the nuts and bolts of moving from the idea phase to the completion phase.

Training instructors included agency officials, consultants, vendors, academics, lawyers, habitat, coastal, and environmental engineers, restoration ecologists, and other types of environmental professionals. They all had a tie to living shorelines or soft-shore armoring and brought their own unique perspectives to the training.

One of the most valuable outcomes of the Market Analysis was an overview of best practices when offering webinars, online training, and in-person classes. These best practices came from Cathy's observations and knowledge of adult learning and slide design principles.

Surveys and Interviews

Nicole Faghin provided an update on interviews and survey analysis conducted over the last few months. This included analysis of a survey conducted in 2019 in advance of offering a course on the Marine Shoreline Design Guidelines (MSDG) through the Coastal Training Program (CTP), phone interviews conducted in January and February 2021 of shoreline contractors and analysis of a survey conducted by the CTP on level of knowledge and level of interest in taking courses on seven identified topic areas to be considered for future trainings. A detailed analysis of the findings will be included in the Needs Assessment. This is a brief overview of the findings provided to the Advisory Committee.

The 2019 Survey used the CTP mailing list and received 295 responses, 83 from local, state or federal government positions and self-identified as planners, permit specialists or regulators, and 87 identified themselves as consultants. When asked about interest in different topics related to the MSDG we found the following results. Planners indicated they were most interested in examples of successful and unsuccessful shoreline projects, avoidance techniques and soft shore techniques. Consultants indicated they were most interested in successful and unsuccessful shoreline projects, soft shore techniques, and how to select the appropriate techniques. See Figures 1 and 2.

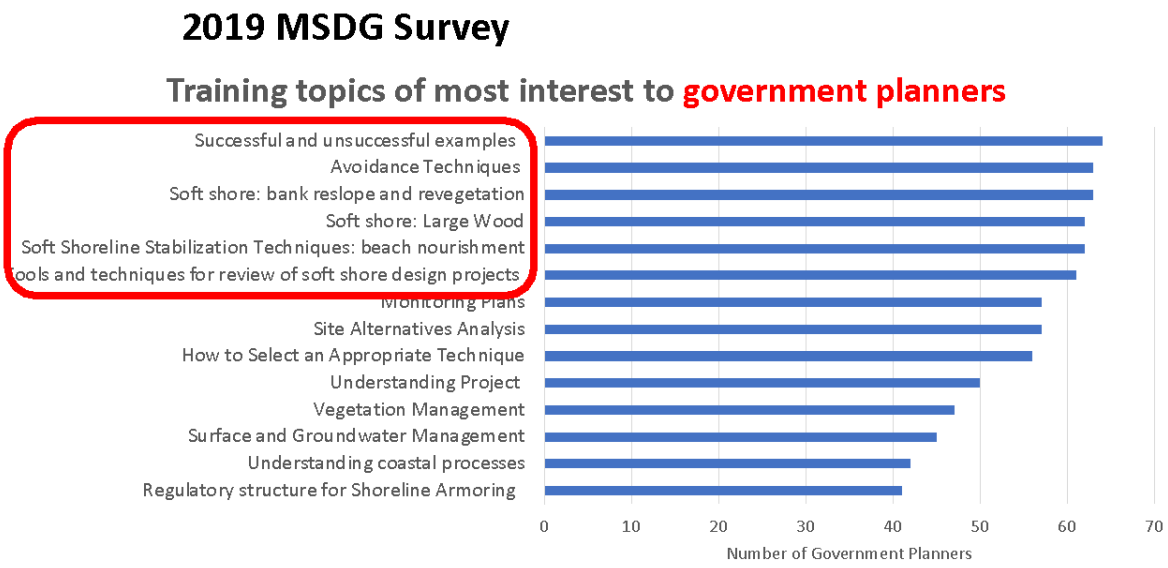

Figure 1: 2019 MSDG Survey indicating training topics of most interest to government planners

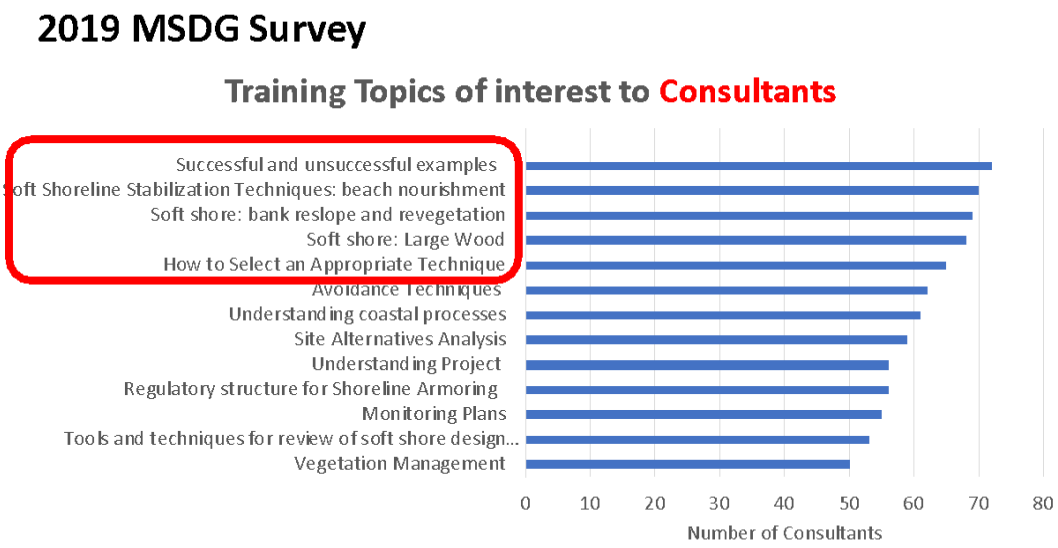

Figure 2: 2019 MSDG Survey indicating training topics of most interest to consultants

These survey results were initially used in the development of a one-day course offered by the CTP in June 2019. They were used further in the development of a four-part webinar series offered in the winter of 2020 titled “Using Marine Shoreline Design Guidelines to improve shoreline stabilization permits.” The CTP course and the webinar series provided the initial outline and framework for proposed training modules to be

developed as part of this Needs Assessment Project. The proposed modules for future training are:

1. General Concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. How to address site assessments for design/construction
4. Demonstration of Need and Risk Assessment
5. Incentive Programs
6. Techniques for Erosion Control including construction materials and maintenance
7. Sea Level Rise Issues

We compared the topics proposed for the 2019 CTP course and the MSDG webinar with this proposed list and found an overlap in the topics which led us believe the seven modules cover the correct issues.

CTP conducted a new survey in February 2021 to determine level of knowledge and level of interest in these seven training modules. We analyzed the results of that survey and found the following: Planners indicated their highest level of interest in taking classes on permitting associated with soft shore projects and learning about demonstration of need while consultants indicated their highest level of interest in taking courses on permitting and how to conduct site assessments (see Figure 3).

Comparison of Topics of Interest to Planners vs Consultants

Topic	Consultants	Planners
Permitting	58%	52%
Conducting Site Assessment	58%	45%
Techniques	52%	48%
General Knowledge	52%	49%
SLR	51%	47%
Demonstration of Need	50%	51%
Incentive Programs	42%	39%

Figure 3: Planner compared to consultant interest in taking specific courses on soft shoreline issues based on 2021 CTP survey.

The CTP survey also asked about what format of training interested people the most. The results indicated the highest level of interest in combining some form of class and field exercises. See Figure 4.

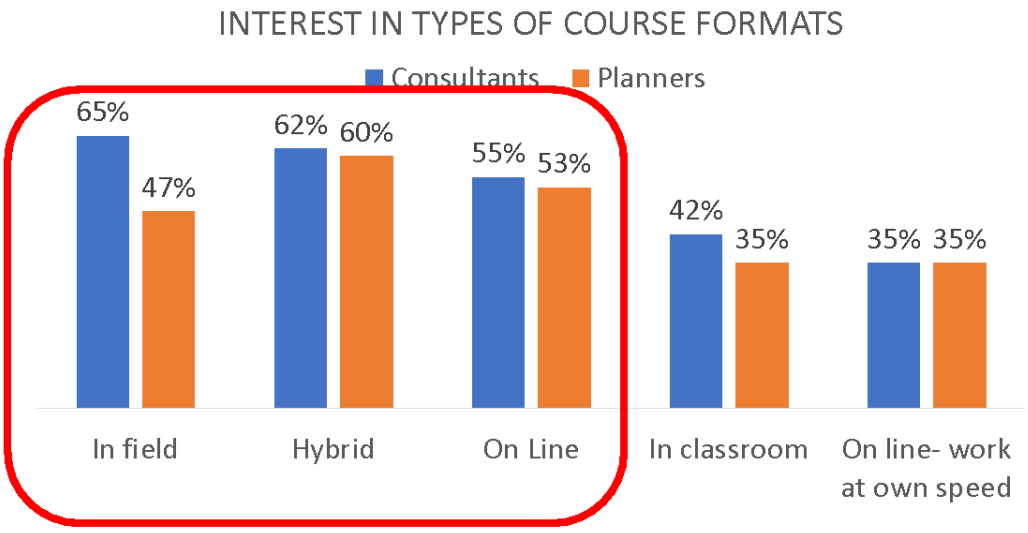

Figure 4: Interest of planners and consultants in different formats for training courses.

We also conducted seven interviews with contractors currently engaged in marine shoreline work including installing bulkheads, bulkhead removal, and soft shore design. In these interviews we asked about interest in taking courses on different topics. The two top issues of interest were permitting and learning more about general shoreline concepts. See Figure 5.

CONTRACTOR INTERVEWS

TOPIC	Interest
Permitting	57%
General Concepts	55%
Incentive Programs	49%
Techniques	49%
Site Assessments	48%
Sea level Rise	45%
Demonstration of Need	43%

Figure 5. Contractor interest in training modules based upon phone interviews in winter 2021.

During the interviews with contractors, we learned about other issues. They expressed concern about liability associated with designing soft shore projects that might fail. They also indicated they would be interested trainings where the instructors is a contractor with experience designing soft shore projects. When asked if they were interested in some form of certification that they had completed the training, many indicated this would be of interest as a marketing tool. And in general, most of the contractors interviewed indicated an interest in taking more trainings to learn more.

Initial Recommendations

We offered some initial recommendations to the Advisory Committee. Further details will be included in our Needs Assessment. Based upon our Market Analysis and results of the Survey and Interview Analysis we have recommendations for courses to be offered as part of a series of Marine Alternative Shoreline Trainings. As part of this project we are obligated to provide two pilot courses. We recommend we use the following two topics for our initial courses based on the feedback from planners, consultants and contractors from the surveys and interviews:

- Overview of local, state and federal permit requirements for marine soft shoreline projects
- General Concepts for marine shorelines

Our recommendations include the following details:

PLATFORM: Offer through the Coastal Training Program, Explore On-Line learning format
INSTRUCTORS: Limit number of instructors and use contractors and people with experience in these areas
CONTENT: Build upon webinars and MSDG training modules already completed
CERTIFICATION: Coordinate with WDFW and others
FUNDING: Needed for future course development

We asked the Advisory Committee to offer input and ideas about potential instructors. Are they interested in being an instructor? Are they interested in helping us create curriculum for these pilot courses?

Next Steps

We will finalize the Draft Needs Assessment in the next few weeks and circulate this to the Advisory Committee for review and input. Then we will begin to develop the curriculum for the two pilot courses with a target of next fall or winter as the timeframe to offer the courses.

APPENDIX C

FINAL REPORT: MARKET ANALYSIS OF SHORELINE TRAINING PROGRAMS

This market analysis was completed as part of the MAST (Marine Alternative Shoreline Training) Project, funded by the National Estuaries Program and Washington State Department of Fish and Wildlife.

What types of softshore training classes and webinars are being offered around the country and to whom? What topics are covered? Who are the experts? What best practices are used for design and delivery? This informal market analysis validates the training classes currently offered in Washington State and offers fresh perspectives on additional topics and approaches.

Cathy Angell, M.Ed.
Cathy Angell Communications
January 2021

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Summary

This summary represents the results of an informal market analysis that was conducted via internet research and personal interviews. While it represents a large sampling of training providers and trainings, it does not purport to be 100% comprehensive. The main objective of the market analysis was to explore different types of trainings that focus on Softshore Techniques (aka, Living Shorelines, Soft armoring, Nature-based Shoreline Stabilization, Green Shores) and to see how these trainings could inform our work here in Washington State. Many trainings are delivered as webinars, others are self-guided, and some are in-person. A few providers offer (or are developing) more advanced programs where practitioners receive a certificate for completing a training and passing a test. The people who pass will then be listed publicly on a state agency or program website.

Research Methods

Research methods included internet research and personal phone interviews. Data gathered was entered into an excel spreadsheet for later analysis and summarization. Internet Research involved using search engines to find agencies who were associated with Living Shoreline/Softshore Projects. Webinars, self-guided classes, and videos of live trainings were reviewed. Personal interviews consisted of phone calls with training providers with the intent of gathering information about class length, format, frequency in offering, primary topics and intended audiences. Most calls lasted approximately one hour.

Training Providers and Trainings (listed alphabetically)

Training providers included Coastal Training Programs who are affiliated with the National Estuarine Research Reserve System, State Agencies, Conservation Commissions, Non-profits, Coastal Federations, Sea Grants, Federal agencies, and Academic Institutions. These providers offered training classes in-person, online, via webinar, and asynchronously through self-guided classes on their websites. Some in-person trainings were only offered once or a couple of times; others are offered periodically or on a more regular basis. The self-guided trainings and webinars are available 24/7. Three programs identified by (*) below offer opportunities for certifying the practitioners and contractors who have completed their trainings. The trainings typically involve two days in the classroom - followed by an exam - and one day in the field working on a softshore project. The training providers maintain a public list of the people who have passed the exam and completed the fieldwork. This list is typically posted on the provider's website. The training providers are very clear that the certification list is *only* to show those who have completed the training. It is not a recommendation or endorsement.

1. **Coastal Training Program - Hudson River National Estuarine Research Reserve, New York**
   https://www.hrnerr.org/estuary-training/trainingtopic
   In-person: Applying the Findings of the Hudson River Sustainable Shorelines Project, 2006 & 2014 (1 day)
   Webinar: Softening Our Shorelines: A Report of the National Wildlife Federation and the Coastal States Organization (90 min)

2. ***Coastal Training Program - Old Woman Creek National Estuarine Research Reserve, Ohio**
   In-person: Nature-based Shoreline Stabilization Certification Program *(currently being developed as a pilot in partnership with the Ohio Department of Natural Resources).* (2 days classroom, 1 day in field)

3. **Coastal Training Program – Padilla Bay National Estuarine Research Reserve, Washington**

   In-person: Using the Marine Shoreline Design Guidelines for Marine Shoreline Stabilization (1 day)

4. **Coastal Training Program - Weeks Bay National Estuarine Research Reserve, Alabama**

   In-person: has offered a variety of 1-day classes which consist of a classroom and field component, addressing permitting, techniques, cost-benefit analyses, and site visits.
   One-on-One: has found it most effective to meet individually with marine contractors and to give them a copy of "Living Shorelines: A Technical Guide for Contractors in Alabama and Mississippi."

5. **Delaware Living Shoreline Committee (Dept of Natural Resources)**

   https://www.youtube.com/watch?v=AwlzxkNgLd0&list=PLLEyNDtosoJ6IGfLue_JKLXPY-TW6IsfI&index=1

   Multi-part Webinar: Delaware Introduction to Living Shoreline Design, 4 Parts (2 hours each)

6. **EPA Watershed Academy**

   Webcast: Living Shorelines: Types, Tools, and Techniques, May 2014 (2 hours)

7. **Florida Fish and Wildlife Conservation Commission**

   http://www.tbrpc.org/wp-content/uploads/2019/11/Manual_Final_Oct2019.pdf

   In-person (posted online as pdf): Living Shorelines Training for Marine Contractors, October 2019 (12 hours)

8. **Living Shorelines Academy** (Collaboration between Restore America's Estuaries and the North Carolina Coastal Federation)

   https://www.livingshorelinesacademy.org/

   Self-guided (on website): Living Shorelines, Living Coasts (Parts 1 and 2)

   Part 1: Shoreline Erosion and Living Shoreline Methods: An Introductory Course for Property Owners and Others Seeking to Learn about Living Shorelines

   Part 2: Living Shoreline Project Planning and Implementation: An Introductory Course for Marine Professionals

   Online modules with a script and photographs. Links to resources. Quiz at end.

   Webinars from Restore America's Estuaries (RAE) Community of Practice events:

   Development of an Ephemeral Hardscape for Living Shorelines, May 15, 2019 (56 min)

   1. Engaging Veterans in Living Shoreline Programs, April 10, 2019 (42 min)
   2. Legal and Policy Tools to Mitigate the Impacts of Coastal Squeeze, February 20, 2019 (40 min)
   3. Efficacy of Living Shoreline Approaches under Extreme Weather Events, November 28, 2018 (57 min)
   4. Perspectives from the Pacific Northwest, October 17, 2018 (52 min)
   5. Derelict Wharf Removal and Living Shorelines: Re-envisioning San Francisco Bay's Urban Edge, September 20, 2017 (30 min)
   6. Living Shorelines as Adaptable Erosion Control, April 26, 2017 (58 min)
   7.

9. ***Michigan Natural Shorelines Partnership Program**
   https://www.mishorelinepartnership.org/contractor-training.html
   In-person: "Michigan Certified Natural Shoreline Professional Training" (2 days in classroom; 1 day in field)

10. **New York Sea Grant** (with New York State Dept of Environmental Conservations, Great Lakes Watershed Program, WI Sea Grant)
    https://seagrant.sunysb.edu/articles/t/nature-based-shoreline-practices-workshop-great-lakes-coastal-processes-and-erosion-press-release
    In-Person (video-taped and posted online): "Nature-Based Shoreline Practices: Can They Improve Coastal Resilience in New York's Great Lakes Region?" Dec 2016 (1 day)

11. **Office for Coastal Management: Digital Coast**
    https://coast.noaa.gov/digitalcoast/training/green.html
    Online and In-person: Nature-Based Solutions for Coastal Hazards (1 day)
    Part 1: The Basics (self-guided module pre-class, 45 min)
    Part 2: Developing a Green-Infrastructure Strategy (1 day in person)

12. ***Stewardship Centre of British Columbia – Green Shores Program**
    https://stewardshipcentrebc.ca/green-shores-home/
    In-person: "Green Shores Level 1" (1 day)
    In-person: "Green Shores Level 2" (2 days)
    Online, asynchronous: "Green Shores Level 3"

13. **Virginia Institute of Marine Science – Center for Coastal Resources Management**
    http://ccrm.vims.edu/education/ls_design_class/index.html
    Self-guided (on website): "Living Shoreline Design: a class for marine contractors"
    Module 1: Ecosystem Services
    Module 2: Site Sustainability
    Module 3: Design Criteria
    (Flash plugin required)
    In-person: "Living Shoreline Professionals Advanced Training," August 24 & 31, 2017

14. **Washington Sea Grant** (with Department of Ecology and Washington State Department of Fish and Wildlife)
    www.coastalplanners.org/four-part-webinar-series
    Webinar Series: "Using Marine Shoreline Design Guidelines to Improve Shoreline Stabilization Permitting"
    #1: Background and Introduction (1 hr 28 min)
    #2: Site Assessments and Demonstration of Need/Risk Assessment (1 hr 28 min)
    #3: Shoreline Stabilization Techniques and Design Checklists (1 hr 7 min)
    #4: Sea Level Rise and Shoreline Stabilization (1 hr 26 min)

Primary Audiences

The primary audiences targeted by these trainings included public and private biologists, engineers, planners, landscape architects, marine contractors, restoration specialists, local and regional government staff. The majority of trainings welcome a mix of professionals, as the training coordinators feel there is value in cross-sector

information sharing. However, some of the trainings are targeted specifically for marine contractors who are often small businesses with limited time for training. Solutions include offering asynchronous classes that contractors can take on their own time, printed guides, and one-on-one meetings. As mentioned above, some providers offer a "certificate" for contractors or practitioners who take a 3-day training class and pass a test. This training certification is a welcome incentive for contractors. Although not an official endorsement, the public list gives them credibility with potential clients and agency staff who review the permits. (For more information, see Stewardship Centre of BC; Coastal Training Program - Old Woman Creek National Estuarine Research Reserve; and Michigan Shoreline Partnership above.)

General Topics Addressed in Trainings

There was a lot of overlap in the topics offered through the different in-person and online classes and webinars. This report has attempted to break them into seven categories including General Shoreline Concepts, Site Assessments, Design Considerations, Permit and Planning, Resilience, Incentives, and Resources.

*Not applicable to WA

General Shoreline Concepts

- Biological processes - forage fish
- Coastal resilience - engineering with nature
- Conventional methods - impacts from creosote structures/pilings
- Creating habitat for wildlife
- Erosion - causes, impacts of climate change
- *Oysters - safe zones/reef fitness
- *Oysters - water quality and habitat
- *Oysters and eelgrass - providing structure
- Physical processes - sediment transport, wave and wind energy, flooding, coastal processes, shore types
- Restoration - habitat, key drivers
- Sediment transport
- Shoreline ecosystems - values and threats, wetland degradation, ecosystem services, economics
- Social-ecological systems in coastal shorelines

Site Assessments

- Characterizing shoreline habits
- Conducting a site assessment
- Site assessment and selection - key criteria, suitability, surveys

Design Considerations

- Case studies, techniques, types and examples, materials, trends, lessons learned
- Considerations (need, cost, size limitations, permitting issues, diversity of sites);
- Design criteria and considerations, checklists, assessments
- Database of completed living shoreline projects
- Erosion - options for protecting developed shorelines
- Marine Shoreline Design Guidelines - some examples from manual
- Marine Shoreline Design Guidelines- how to use, tools (checklist, SMP Guidelines…)
- Monitoring, maintenance, and troubleshooting
- Sequence of events in constructing
- Financial considerations, cost analysis

Permit and Planning

- Knowledge gaps that might impact planning
- Legal feasibility of project
- Permitting process in marine environment- federal and state regulations, repairs and replacements, cultural resources, floodplain management
- Policy and science decisions - roles and players involved
- Regional - guidance docs, plans, reports, before you build

Resilience

- Coastal resilience challenges (e.g., hurricanes causing erosion)
- Restoration: beaches after hurricanes (or comparable coastal storms)
- Sea level rise - considerations with local examples of flooding, science

Incentives

- Business considerations and incentives for marine contractors and other professionals
- Benefits and costs of different stabilization options
- Blue Carbon strategies, carbon offset
- Veterans - how they have helped - their process

Resources

- Property owners - types of information they can provide marine contractors, maintenance information
- Questions - frequently asked (research, process…)

- Resources and tools available to local governments, homeowners, contractors
- Systems approach to promoting coastal processes and nature-based shoreline management

Potential New Topics for Washington State

One of the benefits of this market analysis was to discover other topics that could potentially be of interest to stakeholders in Washington State. The following topics were of interest to the project leads for further evaluation:

Design Considerations

- Comparisons between conventional and living shorelines (advantages and disadvantages)
- Equipment needed for doing the work
- Relative costs of different approaches (cost-benefit analysis)
- Materials and their uses
- Maintenance (evaluating and maintaining project success; maintenance as a business opportunity – ongoing need to maintain site)
- Planting implementation
- Sequence of events in constructing living shorelines

Resources

- Client concerns and questions and how to respond
- Common concerns and q/a for discussion between professionals and landowners
- Additional information and training resources for softshore techniques

Incentives

- Business considerations and incentives for marine contractors and other professionals
- Types of information that property owners can provide marine contractors

Instructor Credentials

Training instructors ranged from agency officials to consultants and vendors. This is a list of positions that were listed in the different trainings. Those with similar positions are grouped together. Recorded webinars or self-guided trainings often just listed the agency and not the job title.

Academic

Academic Instructor

Practitioner

Landscape Architect
Habitat Engineer
Coastal Management Specialist

Program Manager

Coastal Resilience Director
Coast and Water Program Director
Living Shorelines Program Manager
National Estuarine Research Reserve Manager
Science Director

Topic Specialist

Coastal Hazards Specialist
Coastal Engineer
Engineering Geologist
Geologist
Environmental Lawyer
Environmental Protection Specialist
Environmental Consultant
Resilience Specialist
Shoreline Armoring Planning Associate
Environmental Specialist
Habitat Restoration, Fisheries Biologist
Habitat Specialist
Restoration Ecologist
Research Scientist
Oyster Specialist

Assessment of Best Practices and Challenges

The following is a collective assessment of best practices and challenges that emerged from this market analysis. They do not necessarily apply to each training.

In-Person trainings

While these trainings could not be observed, there were best practices and challenges that emerged from reviewing agendas and interviewing several training coordinators.

Best practices included:

1. Providing *learning outcomes* for the training so that attendees were clear on the focus
2. Having a *mix of people* in the training with different backgrounds so that they could share their expertise with each other (e.g., shoreline engineers, marine contractors, landscape architects, and state permit and habitat staff)
3. Having a *variety of instructors* offer their unique perspectives on different aspects of shoreline protection and regulations;
4. Sharing *case studies* and discussing successes and lessons learned
5. Having *slides with large, clear photographs and minimal text*
6. Showing *before and after* photographs of a site

7. Having the opportunity to *work on real sites* with real data from habitat maps, geo-spatial data, and sea level rise maps
8. Offering *in-class exercises* that helped students think through a project from beginning to end
9. Focusing on *high priority topics*, including: conducting a site assessment; conducting a risk assessment
10. Techniques for shoreline stabilization; and assessing designs using checklists
11. Reviewing the *types of sites* that are *not* conducive to soft armoring projects
12. Giving participants the opportunity to *speak directly with site designers* and *shoreline homeowners* who have implemented projects
13. *Offering perks*, such as certification for taking the training and getting put on a publicly posted list

Challenges included:

1. Finding field sites that could accommodate groups and offer near access to restrooms and parking
2. Losing participants at the end of the day who had to drive far between field sites
3. Attracting small mom and pop businesses who didn't have the time for a full or multi-day training
4. Having slides that were ineffective due to multiple images, lots of bullet points, and graphs that were too small or hard to understand

Webinars

There are many webinars available that have been hosted by different agencies around the country. Most were held live and then posted on YouTube.

Best practices included:

1. *Making things more personal* with a photo or video of the moderator and each of the presenters or panelists (as opposed to just looking at a slide with the title or text)
2. Adding a *slide of the topics and speakers* at beginning so that people know what's coming
3. Reviewing *key points* from previous webinars, if applicable
4. *Reviewing the tools* that will be used, such as the chat and hand-raise functions
5. Designing slides with *large images and minimal text* (one concept per slide)
6. Incorporating *short videos* that show *proof of the effectiveness* of softshore solutions (example – a reef deflecting strong waves)
7. Including *short videos* that show *project site or construction techniques*
8. *Telling stories* about the creation and implementation of projects
9. *Comparing the effectiveness* of different products and techniques (circles filled in to show more or less effective, like Consumer Reports)

10. Using *animation* to direct the viewer's eyes to different parts of a map, photograph, graphic, etc.
11. *Acknowledging the audience* during presentation
12. Reviewing the *benefits of softshore solutions* to homeowners
13. Offering *continuing education credits* that attendees can apply to their professional certifications
14. Keeping the presentation *practical* with clear suggestions that people can apply
15. Showing a *photograph of a project* to the attendees before showing graphs and data about it

Challenges included:

5. Having slides that were ineffective due to multiple images, lots of bullet points, and graphs or tables that were too small or hard to understand
6. Using acronyms that may not have been familiar to the audience
7. Not making a personal connection to the audience or inviting them to interact with the content
8. Staying on a slide for too long
9. Not showing the name, title, or affiliation of panelists

Self-Guided

A few of the trainings were actually designed with asynchronous modules (as opposed to the training materials that were posted online) so that people could go through the course at their own pace.

Best Practices included:

1. Having a *script* that followed the slides
2. Using *large photographs* and just a *few points of text* on each slide
3. Adding *short videos* for demonstration
4. Showing *cost examples* to help property owners plan
5. *Summarizing the main points* at the end of each module
6. Adding *links to resources*, documents, and permit programs around the country
7. Having a *question-and-answer module* with frequently asked questions

Challenges included:

1. Having some photographs that were low resolution or too small to be effective
2. Not offering the bigger context in the first module. People need to know right up front why the content is relevant to them.
3. Including cut and pastes of tables from technical documents that were hard to read or low resolution
4. Having the language in third person, rather than first person (important to speak directly to the student)

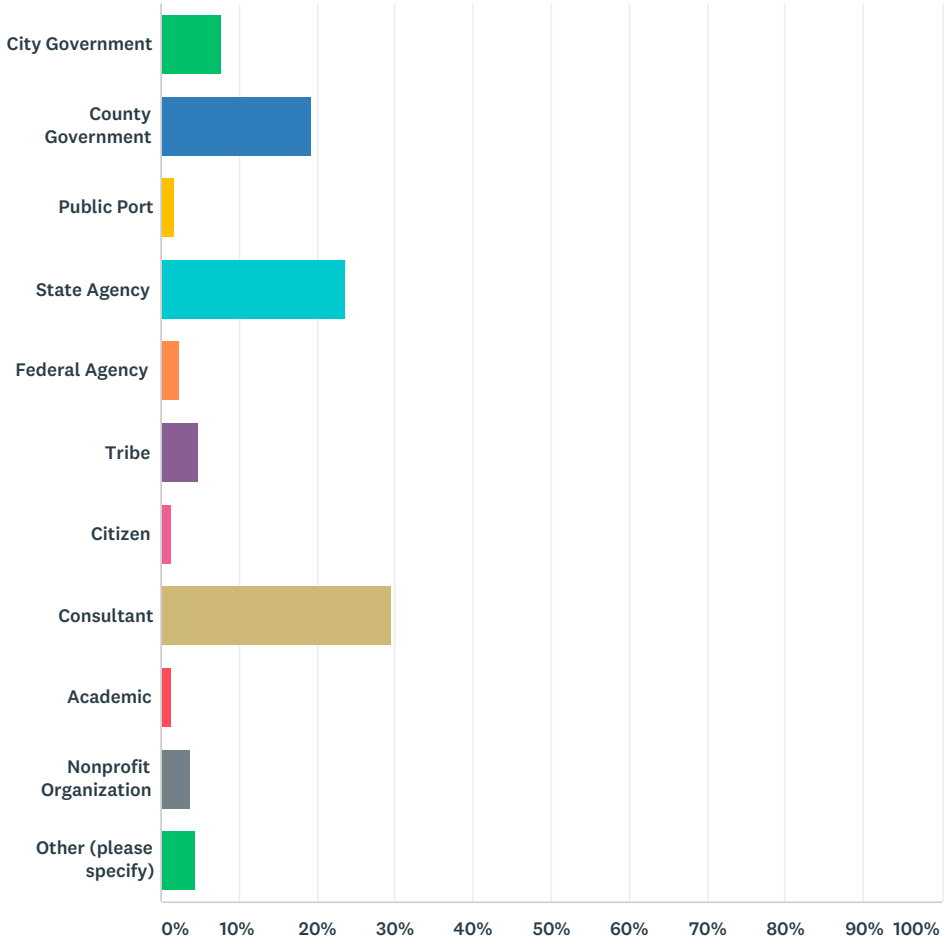
Conclusion

This market analysis, conducted as part of the shoreline training needs assessment, demonstrates a wide range of existing trainings across the country. These trainings target contractors, consultants and planners and provide insight into how courses could be structured, what platforms can be used, and the types of professionals who could provide instruction. Moreover, these examples provide ideas for best practices that can be applied to the training recommendations that emerge from this study for in-person trainings, webinars and self-guided trainings. Going forward these insights will be invaluable to the creation of a Washington State Marine Shoreline Training Program.

Survey: Marine Shoreline Design Guidelines class (Jan. 2019)

Q1 What best describes your job affiliation?

Answered: 295 Skipped: 0



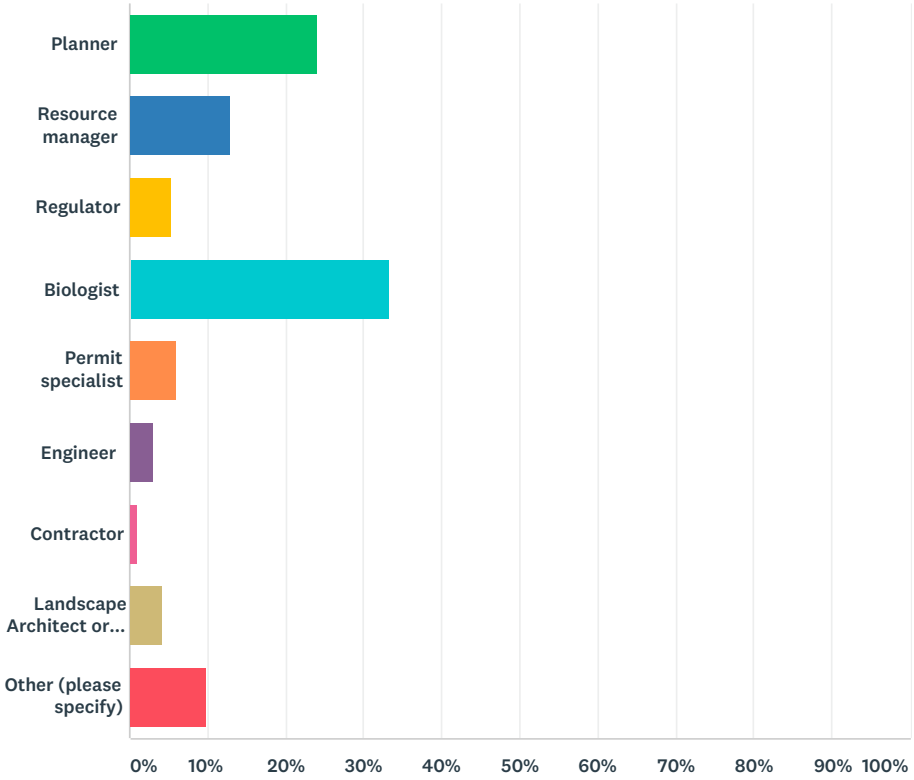
ANSWER CHOICES	RESPONSES	
City Government	7.80%	23
County Government	19.32%	57
Public Port	1.69%	5
State Agency	23.73%	70
Federal Agency	2.37%	7
Tribe	4.75%	14
Citizen	1.36%	4
Consultant	29.49%	87
Academic	1.36%	4
Nonprofit Organization	3.73%	11

Other (please specify)	4.41%	13
TOTAL		295

#	OTHER (PLEASE SPECIFY)	DATE
1	political subdivision of WA state	1/17/2019 12:26 PM
2	Conservation District	1/17/2019 6:43 AM
3	Just retired last year, but still interested in keeping informed on issues I worked on when I was employed.	1/16/2019 7:24 PM
4	Retired (Citizen)	1/16/2019 6:10 PM
5	conservation district	1/16/2019 1:12 PM
6	Conservation District	1/16/2019 1:10 PM
7	Conservation District	1/16/2019 12:58 PM
8	Non profit that receives most of our funding from state and federal gov	1/16/2019 12:25 PM
9	Shellfish Grower	1/16/2019 11:51 AM
10	Private with state, county and federal contracts	1/16/2019 11:48 AM
11	conservation district	1/16/2019 11:45 AM
12	Private utility	1/16/2019 11:41 AM
13	Tri-county Municipality	1/16/2019 11:41 AM

Q2 What best describes your job description?

Answered: 294 Skipped: 1



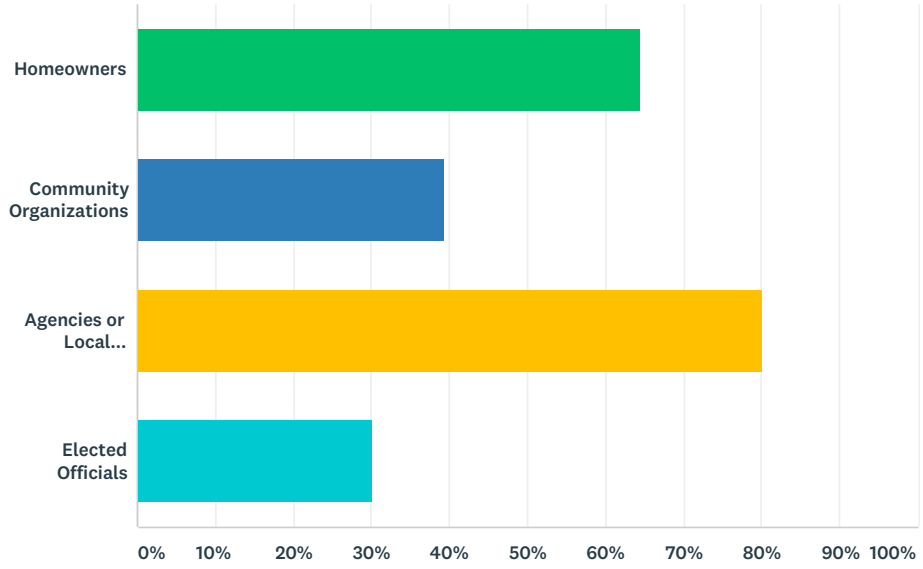
ANSWER CHOICES	RESPONSES	
Planner	24.15%	71
Resource manager	12.93%	38
Regulator	5.44%	16
Biologist	33.33%	98
Permit specialist	6.12%	18
Engineer	3.06%	9
Contractor	1.02%	3
Landscape Architect or Designer	4.08%	12
Other (please specify)	9.86%	29
TOTAL		294

#	OTHER (PLEASE SPECIFY)	DATE
1	Cultural Resource Management	1/18/2019 12:12 PM
2	Capital Project Manager	1/18/2019 10:57 AM
3	Engineering Geologist	1/17/2019 7:28 PM
4	Wetland scientist	1/17/2019 5:31 PM
5	NWS Commission Director	1/17/2019 10:20 AM
6	Communicator	1/17/2019 9:46 AM
7	shoreline land owner	1/17/2019 9:24 AM

8	Ecological design / Restoration	1/16/2019 10:14 PM
9	Retired fisheries biologist, and resource manager	1/16/2019 8:37 PM
10	Capital project selection & funder	1/16/2019 8:17 PM
11	In my career, I was a biologist and permit specialist.	1/16/2019 6:10 PM
12	Educator	1/16/2019 4:00 PM
13	program logistics	1/16/2019 3:10 PM
14	Business development and communications	1/16/2019 2:32 PM
15	Wetland Scientist	1/16/2019 1:35 PM
16	Program Director	1/16/2019 1:10 PM
17	Restoration Ecologist	1/16/2019 1:04 PM
18	public outreach specialist	1/16/2019 12:57 PM
19	Geotech	1/16/2019 12:52 PM
20	soil and wetland scientist	1/16/2019 12:39 PM
21	Obtains environmental permits for city transportation projects	1/16/2019 12:28 PM
22	Land owner	1/16/2019 12:22 PM
23	shoreline project development, practitioner	1/16/2019 12:16 PM
24	Building & Planning Administrative Assistant	1/16/2019 12:02 PM
25	Operations, Production, and Regularory Compliance Supervisor	1/16/2019 11:51 AM
26	policy analyst	1/16/2019 11:47 AM
27	Regulatory Specialist	1/16/2019 11:46 AM
28	environmental outreach	1/16/2019 11:45 AM
29	Communications and community engagement	1/16/2019 11:42 AM

Q3 Who is your audience when you are addressing issues related to shoreline armoring? (choose all that apply)

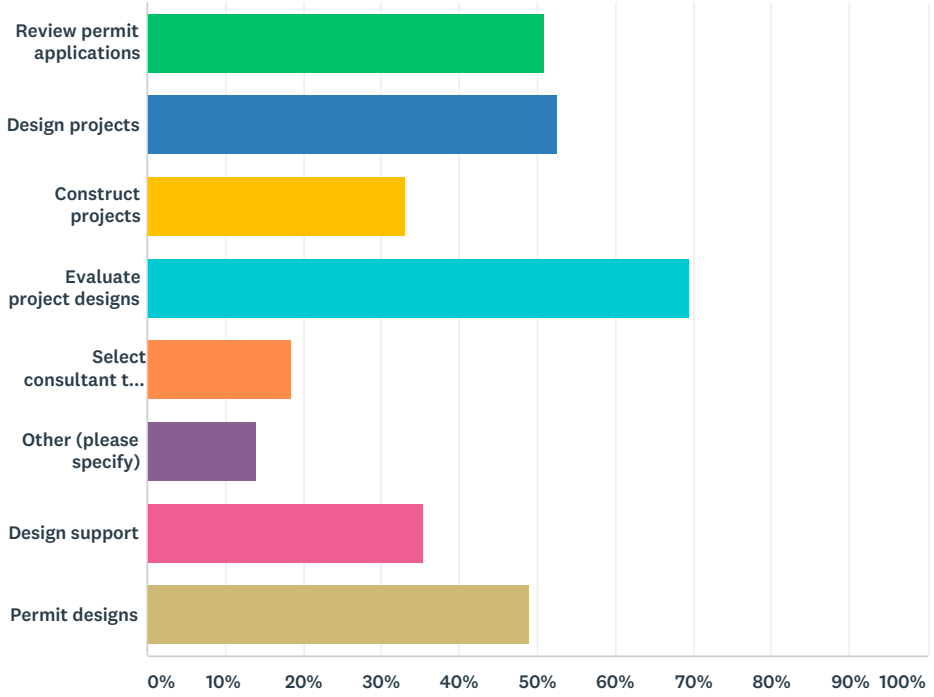
Answered: 292 Skipped: 3



ANSWER CHOICES	RESPONSES	
Homeowners	64.38%	188
Community Organizations	39.38%	115
Agencies or Local Government	80.14%	234
Elected Officials	30.14%	88
Total Respondents: 292		

Q4 What are your goals in learning more about the Marine Shoreline Design Guidelines (mark all that apply)

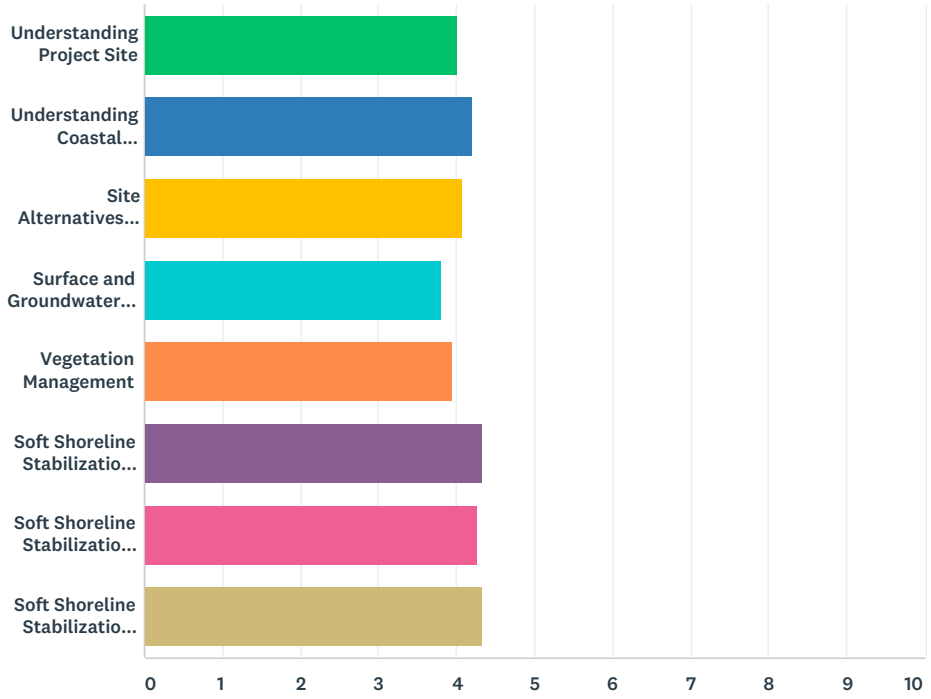
Answered: 272 Skipped: 23



ANSWER CHOICES	RESPONSES	
Review permit applications	50.74%	138
Design projects	52.57%	143
Construct projects	33.09%	90
Evaluate project designs	69.49%	189
Select consultant to assist in design of project	18.38%	50
Other (please specify)	13.97%	38
Design support	35.29%	96
Permit designs	48.90%	133
Total Respondents: 272		

Q5 Please indicate your level of interest in the following topics.

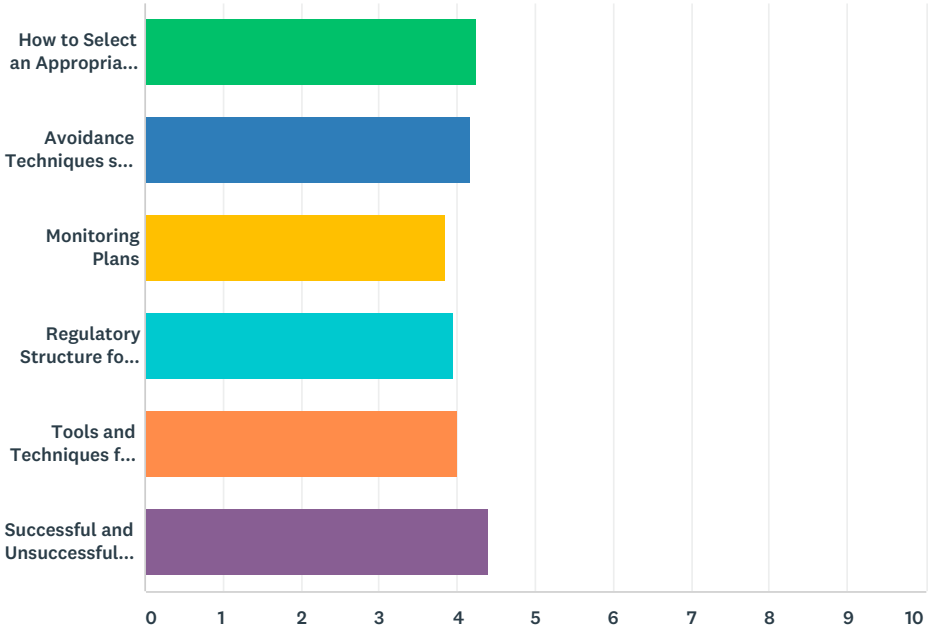
Answered: 267 Skipped: 28



	1-NOT AT ALL INTERESTED	2-	3- INTERESTED	4-	5- EXTREMELY INTERESTED	TOTAL	WEIGHTED AVERAGE
Understanding Project Site	0.38% 1	4.20% 11	27.48% 72	30.15% 79	37.79% 99	262	4.01
Understanding Coastal Processes	0.75% 2	3.40% 9	20.75% 55	24.15% 64	50.94% 135	265	4.21
Site Alternatives Analysis	0.00% 0	6.08% 16	21.29% 56	30.80% 81	41.83% 110	263	4.08
Surface and Groundwater Management	0.77% 2	11.97% 31	28.57% 74	24.32% 63	34.36% 89	259	3.80
Vegetation Management	0.00% 0	6.11% 16	31.30% 82	24.05% 63	38.55% 101	262	3.95
Soft Shoreline Stabilization Techniques: Beach Nourishment	1.14% 3	3.79% 10	11.36% 30	28.03% 74	55.68% 147	264	4.33
Soft Shoreline Stabilization Techniques: Large Wood	1.89% 5	3.77% 10	12.45% 33	29.06% 77	52.83% 140	265	4.27
Soft Shoreline Stabilization Techniques: Bank Reslope and Revegetation	1.50% 4	3.38% 9	12.03% 32	26.69% 71	56.39% 150	266	4.33

Q6 (continued)

Answered: 267 Skipped: 28



	1-NOT AT ALL INTERESTED	2-	3- INTERESTED	4-	5- EXTREMELY INTERESTED	TOTAL	WEIGHTED AVERAGE
How to Select an Appropriate Technique	0.38% 1	3.40% 9	17.74% 47	27.92% 74	50.57% 134	265	4.25
Avoidance Techniques such as Site Layout, Setbacks and Relocation, Drainage, Vegetation	0.00% 0	5.66% 15	16.98% 45	32.45% 86	44.91% 119	265	4.17
Monitoring Plans	0.76% 2	9.47% 25	26.14% 69	32.58% 86	31.06% 82	264	3.84
Regulatory Structure for Shoreline Armoring	0.76% 2	7.95% 21	24.62% 65	29.17% 77	37.50% 99	264	3.95
Tools and Techniques for Review of Soft Shore Design Projects	2.65% 7	7.20% 19	18.56% 49	30.30% 80	41.29% 109	264	4.00
Successful and Unsuccessful Examples (potentially in the field)	0.37% 1	2.25% 6	12.73% 34	26.22% 70	58.43% 156	267	4.40

Q7 Are there other topics that would support you in understanding how to design, evaluate and review applications for soft shoreline projects?

Answered: 105 Skipped: 190

#	RESPONSES	DATE
1	permitting process	1/25/2019 2:27 PM
2	Knowing the permitting requirements and regulatory boundaries between USACE, NOAA, USFW, Floodplains	1/25/2019 7:41 AM
3	Information on appropriate setbacks for structures along different types of shorelines primarily feeder bluffs would be useful.	1/22/2019 2:32 PM

4	No	1/20/2019 9:38 PM
5	n/a	1/18/2019 3:46 PM
6	A quick first perusal of this document is a great primmer.	1/18/2019 1:27 PM
7	Cultural resource stewardship	1/18/2019 12:21 PM
8	Long term maintenance.	1/18/2019 12:18 PM
9	Guidelines for redesigning shoreline armoring projects i.e. shorelines currently or historically poorly armored (hard) with plans to restore habitat or redo shoreline armor with less impact to habitat.	1/18/2019 8:39 AM
10	Scientific evaluation of habitat impacts of soft-shore projects.	1/17/2019 7:31 PM
11	A	1/17/2019 3:59 PM
12	International design methodologies vs our local design methodologies (pros and cons)	1/17/2019 3:23 PM
13	when hard armoring is suitable	1/17/2019 10:44 AM
14	Reviewing applications	1/17/2019 10:27 AM
15	resources available	1/17/2019 10:25 AM
16	I'm new to all of this, so any information would be appreciated.	1/17/2019 10:24 AM
17	I've already taken this class. It's good. I would recommend it to others. (I have recommended it to our local planning department).	1/17/2019 9:32 AM
18	Safety	1/17/2019 9:28 AM
19	Engineering/Design interface with biological processes	1/17/2019 9:19 AM
20	how to incentivize	1/17/2019 9:11 AM
21	N/a	1/17/2019 9:04 AM
22	No. As a state agency, I primarily work to share this guideline to ensure this excellent material is reviewed early, understood and best applied.	1/17/2019 8:26 AM
23	N/A	1/17/2019 8:17 AM
24	I think the topics in the survey covered it well	1/17/2019 8:10 AM
25	No, I'm just a concerned citizen interesting in understanding what is happening in my part of the world. Thanks.	1/17/2019 7:56 AM
26	Not that I can think of	1/17/2019 7:30 AM
27	integrating cost/benefit in selecting alternatives and accounting for short term and long terms (like construction and monitoring/maintenance)	1/17/2019 7:30 AM
28	No	1/17/2019 7:10 AM
29	How we can integrate adaptive management into permitting/construction- it seems it would be helpful on some sites to be able to build, go through a winter,and observe, then adjust as needed and the permitting/funding structure makes this a challenge, even if it might be one of the best ways to proceed.	1/17/2019 6:47 AM
30	Relationship with the biological components of the shoreline transition	1/16/2019 10:17 PM
31	It would be most useful to have a consensus understanding of what the objectives of shoreline management issues in terms of benefits expected from these actions	1/16/2019 8:42 PM
32	Clear regulatory and federal guidelines and checklists.	1/16/2019 8:19 PM
33	No	1/16/2019 7:26 PM
34	We would be most interested in getting support to design soft armoring options to make available to citizens. Support and training to determine if anything at all is needed and if so, what design would be best for the site. Scientific support for regulations that implement the use of those designs (especially over hard structures). I think that's what is being asked by you but we need the process in place so that any planner can implement an appropriate review of a site.	1/16/2019 4:18 PM
35	no	1/16/2019 4:00 PM

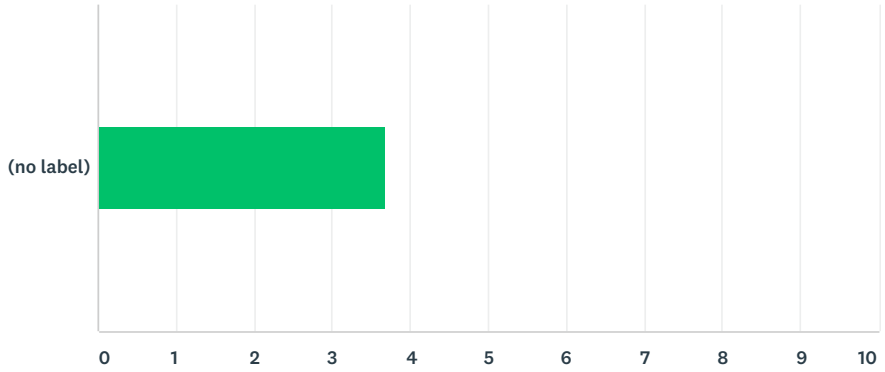
36	If project abuts or impacts State-owned aquatic land, how to work with DNR for authorization	1/16/2019 3:36 PM
37	archeological review	1/16/2019 3:05 PM
38	Nope, what a great course topic!	1/16/2019 2:32 PM
39	How to incorporate projections of SLR	1/16/2019 2:29 PM
40	Impact on adjacent properties, successful examples where projects have been pursued at a scale that encompasses multiple properties or at the drift cell scale.	1/16/2019 2:25 PM
41	IDK	1/16/2019 2:21 PM
42	None I can think of.	1/16/2019 2:14 PM
43	probably, but don't know what they are	1/16/2019 2:13 PM
44	How to mitigate for illegal shoreline armoring as enforcement case.	1/16/2019 2:13 PM
45	unsure	1/16/2019 2:08 PM
46	not that I can think of...	1/16/2019 2:06 PM
47	Writing regulation for SMP updates to provide good guidance for community and consultants to prepare good applications.	1/16/2019 2:00 PM
48	Bulkhead removal - removing old structures, restoring nearshore processes, evaluating when soft shoreline replacement may be necessary because the area can't be left completely unprotected.	1/16/2019 1:48 PM
49	Not at this time	1/16/2019 1:25 PM
50	Overview of all the permitting needs and differences between jurisdictions such as WDFW, DNR and Corp	1/16/2019 1:22 PM
51	Lessons learned from actual construction projects -like bring in a contractor who has to build something and see what they have to say about doing a project.	1/16/2019 1:21 PM
52	Regulatory context of scale of remaining impact even if soft shoreline techniques are used. i.e. does a soft shore technique necessarily mean the remaining impacts are acceptable? No action is still best for well functioning sites?	1/16/2019 1:21 PM
53	Alternatives for shoreline armoring where soft techniques are not feasible. Techniques using original footprint without encroachment into the waterbody. Addressing where thresholds are possible for use of soft (slope minimums, available space, regulatory restrictions) vs traditional hard armoring and where both may be appropriate. This class needs to make sense for the real world application where not everything can be soft, so helping in feasibility discussions would be great.	1/16/2019 1:17 PM
54	hydrology of coastlines	1/16/2019 1:17 PM
55	An overview of all applicable permitting requirements.	1/16/2019 1:16 PM
56	Important to know how to demonstrate and evaluate the "demonstration of need" requirement in the Shoreline Master Programs.	1/16/2019 1:13 PM
57	Working with, marketing to, convincing landowners. Funding sources.	1/16/2019 1:13 PM
58	How to factor in King tides, low pressure systems, sea level rise into design	1/16/2019 12:56 PM
59	n/a	1/16/2019 12:55 PM
60	Working with private property owners	1/16/2019 12:48 PM
61	none known	1/16/2019 12:47 PM
62	You covered them.	1/16/2019 12:46 PM
63	Understanding what permits are required for shoreline permitting.	1/16/2019 12:44 PM
64	Annual or daily changes in current power and flow direction along shorelines; hydraulics	1/16/2019 12:42 PM
65	no	1/16/2019 12:39 PM
66	Habitat impacts of different designs, ongoing maintenance issues of different designs.	1/16/2019 12:39 PM
67	environmentally friendly alternatives	1/16/2019 12:35 PM

68	Climate change considerations	1/16/2019 12:32 PM
69	Any topics that would support obtaining permits for soft shoreline projects	1/16/2019 12:30 PM
70	Cost comparisons between armouring (discouraged) and soft shores (encouraged), both for construction and lifetime of works (maintenance, expected replacement of works-lifetime differences). I get a lot of engineers and construction operators saying "Soft shores don't work, we had this project that completely failed ..." etc. A review of soft techniques that DIDN'T work would also be helpful (ie WHY didn't it work: faulty design, faulty construction, inappropriate method for shoreline type/location, faulty maintenance, added load upslope not initially designed for, extreme weather????)	1/16/2019 12:30 PM
71	We consultants need predictability in terms of acceptable designs, and timing (quickly) for permit review/approval. Also, provide a reliable timeline with respect to Tribal input. Tribes often create unacceptable delays. They should be required, as are the Federal, State, and local agencies, to respond with their comments within a required period of time.	1/16/2019 12:29 PM
72	Reviewing geotech reports that state hard structure is the only alternative. How can biologist, regulators, and county push back against these often generic reports?	1/16/2019 12:25 PM
73	Long range aspects. Creating plans and how the applications may related to state regulations.	1/16/2019 12:20 PM
74	how to translate and share this info with property owners, consultants/agents and local planners/mgrs	1/16/2019 12:18 PM
75	no	1/16/2019 12:07 PM
76	Anything related to the permitting process. I would like to have the knowledge in case the topic ever comes up with a customer	1/16/2019 12:05 PM
77	How to include adaptive management into the design and post implimentation	1/16/2019 12:01 PM
78	Sea level rise and storm surge considerations	1/16/2019 12:01 PM
79	Probably, but not familiar enough to know.	1/16/2019 12:00 PM
80	I'm looking for support on designing shoreline projects and permit application requirements. Areas of interest are freshwater lakes, Rivers and WA and OR coasts along Clatsop, Pacific, and Grays Harbor.	1/16/2019 11:58 AM
81	Sea level rise	1/16/2019 11:58 AM
82	Shoreline Code application	1/16/2019 11:58 AM
83	Hydrodynamic and hydrogeologic processes; tying in site development and restoration/mitigation	1/16/2019 11:57 AM
84	How each of the options for soft shoreline projects correlate with the mitigation sequencing.	1/16/2019 11:55 AM
85	I thought your list was pretty comprehensive	1/16/2019 11:54 AM
86	Material suppliers input (e.g. CalPortland beach nourishment, Cedar Grove soils, etc.) and general contractor input	1/16/2019 11:53 AM
87	No	1/16/2019 11:53 AM
88	Cross-jurisdiction coordination	1/16/2019 11:51 AM
89	Integration of habitat features into soft engineering designs for native aquatic & beach/shoreline species	1/16/2019 11:51 AM
90	no	1/16/2019 11:51 AM
91	Navigating the multitudes of classifications and categories and understanding what designates them as such-SIMPLY	1/16/2019 11:50 AM
92	Tying this guidance back into SMP guidance most jurisdictions have about how to create a regulatory process that allows you to say to say when hard armor is not necessary, and being able to push back on consultants when they say otherwise	1/16/2019 11:50 AM
93	focus on Pacific coast shoreforms -- I am consistently having to adapt guidance documents for outreach in SW WA, which often means that these topics do not get covered to the extent that they could, missing opportunities.	1/16/2019 11:49 AM
94	Deep water deflection / wave abatement	1/16/2019 11:48 AM

95	Best ways to communicate about MSDG to a variety of audiences (homeowners, contractors, local permit reviewers)	1/16/2019 11:48 AM
96	no	1/16/2019 11:48 AM
97	How to communicate soft shore techniques to skeptical engineers.	1/16/2019 11:47 AM
98	Estuarine focus, fish passage	1/16/2019 11:46 AM
99	I don't know. I am new and don't know what I don't know... :)	1/16/2019 11:46 AM
100	n/a	1/16/2019 11:46 AM
101	current trends in mitigation approvals based on design	1/16/2019 11:44 AM
102	How sea level rise and storm surge will impact all shoreline projects and what is ecological responsibility within this lens.	1/16/2019 11:44 AM
103	not sure	1/16/2019 11:43 AM
104	As an experienced biologist involved in permitting, design, monitoring, and effectiveness evaluations, I'm more interested in the policy and management aspects of funding and implementing more of these projects to improve our overall coastline. I work with community, state, and federal agencies on these issues.	1/16/2019 11:38 AM
105	I think a basic overview of the guidelines and recommended best practices, with good/bad examples, would be appreciated and very helpful in implementation.	1/16/2019 11:35 AM

Q8 What is the likelihood of your attending a training on use of the Marine Shoreline Design Guidelines?

Answered: 265 Skipped: 30



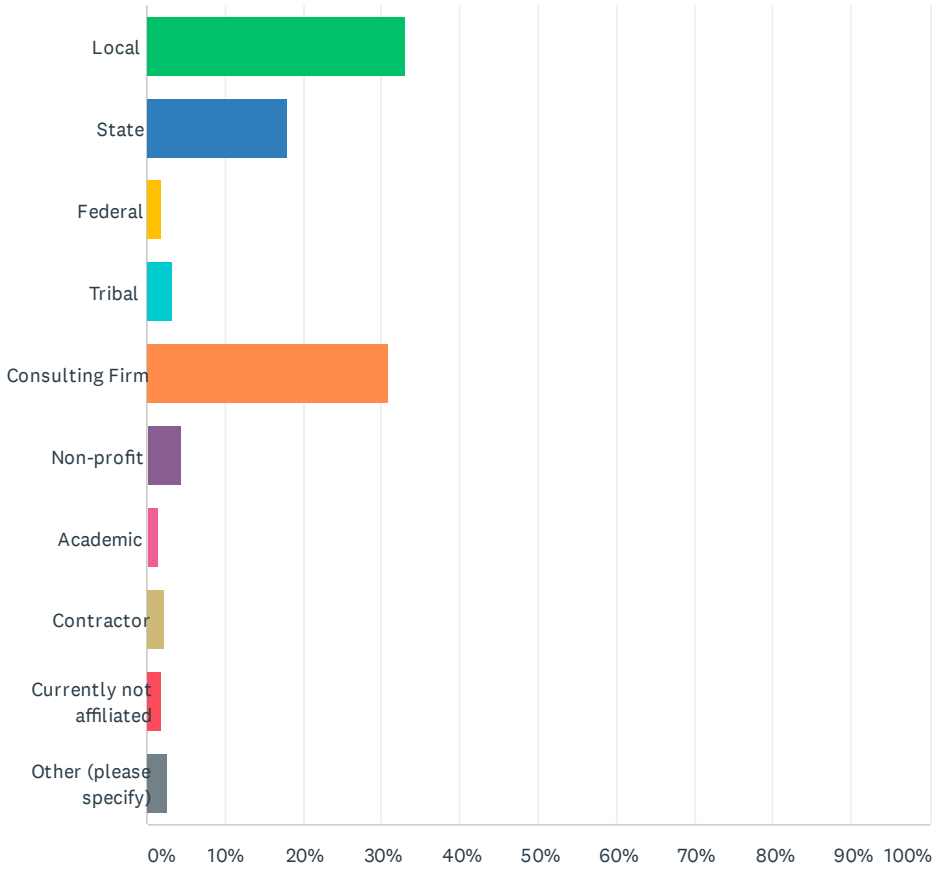
	1-NOT AT ALL LIKELY	2-	3-LIKELY	4-	5-EXTREMELY LIKELY	TOTAL	WEIGHTED AVERAGE
(no label)	1.51% 4	12.08% 32	32.83% 87	22.64% 60	30.94% 82	265	3.69

APPENDIX E

Survey 2021: Training Needs Assessment for Planners, Consultants and Contractors

Q1 What type of institution are you associated with?

Answered: 427 Skipped: 0

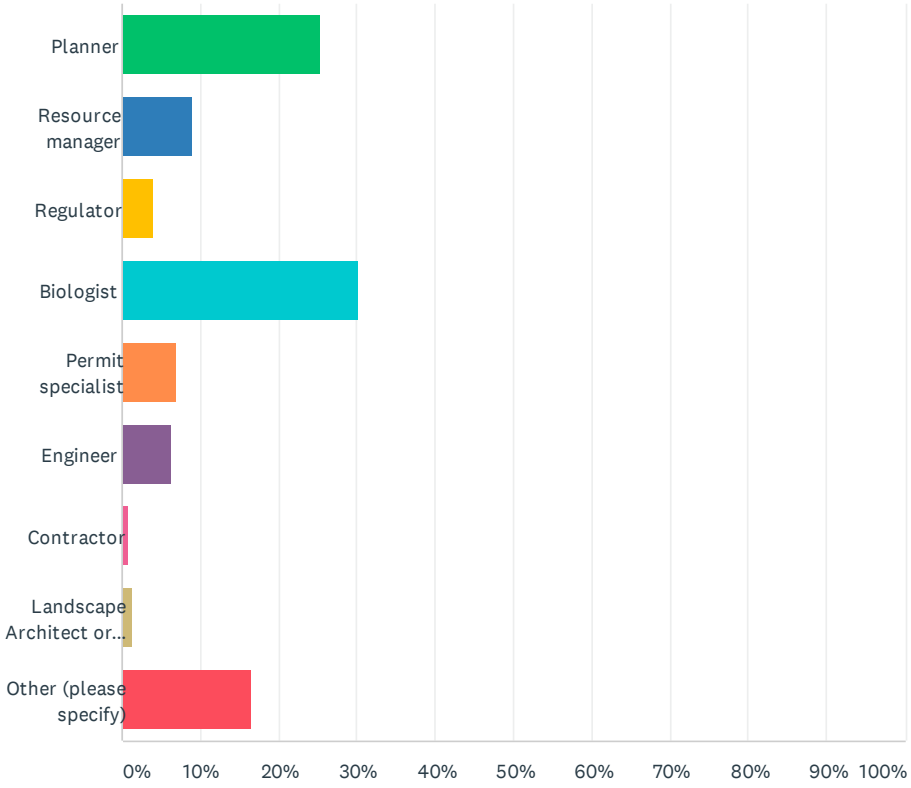


ANSWER CHOICES	RESPONSES	
Local	33.02%	141
State	18.03%	77
Federal	1.87%	8
Tribal	3.28%	14
Consulting Firm	30.91%	132
Non-profit	4.45%	19
Academic	1.41%	6
Contractor	2.34%	10
Currently not affiliated	1.87%	8
Other (please specify)	2.81%	12
TOTAL		427

#	OTHER (PLEASE SPECIFY)	DATE
1	Private Utility	2/17/2021 11:12 AM
2	Avista Corp - Energy company	2/17/2021 8:51 AM
3	Quasi-municipal public utility district	2/17/2021 8:20 AM
4	CD	2/12/2021 3:12 PM
5	Conservation district	2/10/2021 11:52 AM
6	Port	2/10/2021 10:51 AM
7	council of governments	2/10/2021 10:39 AM
8	conservation district	2/10/2021 10:36 AM
9	Land Surveying Firm	2/10/2021 7:46 AM
10	citizen stewardship	2/10/2021 7:43 AM
11	Utility Company	2/10/2021 7:35 AM
12	independant geologist	2/9/2021 6:33 PM

Q2 What best describes your job description?

Answered: 426 Skipped: 1



ANSWER CHOICES	RESPONSES	
Planner	25.35%	108
Resource manager	8.92%	38
Regulator	3.99%	17
Biologist	30.05%	128
Permit specialist	6.81%	29
Engineer	6.34%	27
Contractor	0.94%	4
Landscape Architect or Designer	1.17%	5
Other (please specify)	16.43%	70
TOTAL		426

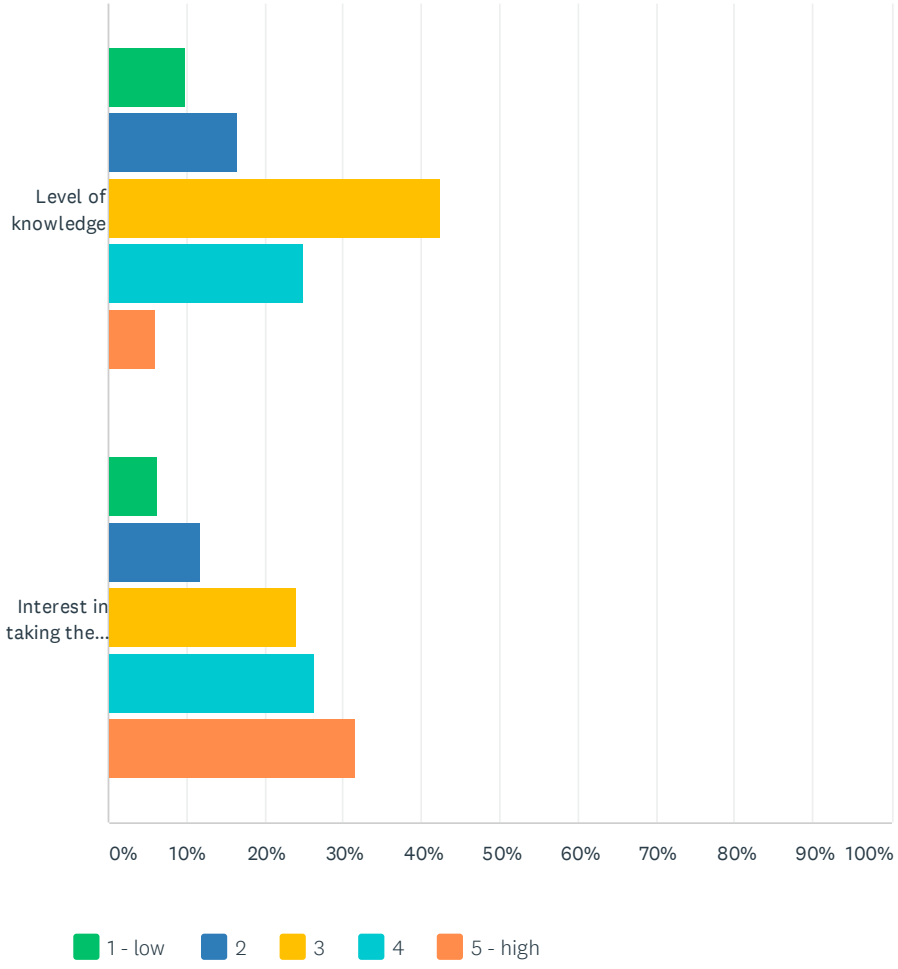
#	OTHER (PLEASE SPECIFY)	DATE
1	coordinator	2/24/2021 10:28 AM
2	Climatologist	2/19/2021 5:57 AM

3	Work specifically on the intersection of protecting nearshore habitat via the full application of regualtory tools and the use of best available science	2/18/2021 10:53 AM
4	Parks specialist	2/17/2021 3:08 PM
5	educator	2/17/2021 2:56 PM
6	Interpretive Specialist	2/17/2021 1:41 PM
7	four of the above not just one	2/17/2021 1:37 PM
8	academic technician	2/17/2021 11:53 AM
9	Retired	2/17/2021 10:37 AM
10	elected official	2/17/2021 10:18 AM
11	Engagement and Education manager	2/17/2021 10:06 AM
12	Program Manager	2/17/2021 9:37 AM
13	Program manager	2/17/2021 9:18 AM
14	Professor	2/17/2021 9:02 AM
15	Professor	2/17/2021 8:52 AM
16	Planner & Ecologist	2/17/2021 8:41 AM
17	communications	2/17/2021 8:23 AM
18	emergency management	2/17/2021 8:22 AM
19	Environmental Coordinator	2/17/2021 8:21 AM
20	Technology Analyst (GIS)	2/17/2021 8:17 AM
21	Environmental Specialist	2/17/2021 8:16 AM
22	Scientist and Land Use Planner	2/17/2021 8:15 AM
23	Inspector	2/17/2021 8:09 AM
24	Biologist and Permit Specialist	2/16/2021 5:50 PM
25	Ecologist	2/16/2021 5:03 PM
26	Geologist/GIS Analyst	2/16/2021 2:26 PM
27	Earth scientist	2/16/2021 2:25 PM
28	I work in cultural resources and recently competed a masters in biology. I am interested in community-based biocultural conservation.	2/12/2021 11:16 AM
29	Educator	2/11/2021 2:07 PM
30	Marketing	2/11/2021 10:29 AM
31	Environmental Scientist / Permit Specialist	2/11/2021 10:12 AM
32	Archaeologist	2/11/2021 9:21 AM
33	Land Surveyor	2/11/2021 7:49 AM
34	Wetland Specialist, Field Surveyor, CFM	2/11/2021 7:11 AM
35	instructor - researcher	2/10/2021 5:55 PM
36	Tech editor	2/10/2021 5:34 PM
37	Parks lead	2/10/2021 2:34 PM
38	Research assistant	2/10/2021 1:12 PM
39	Admin	2/10/2021 12:45 PM

40	Restoration ecologist/project manager	2/10/2021 12:36 PM
41	Community Development Director/Building Inspector	2/10/2021 11:48 AM
42	Extension agent	2/10/2021 11:37 AM
43	Project Manager	2/10/2021 10:44 AM
44	Communications/Outreach/Stakeholder Engagement	2/10/2021 9:34 AM
45	both biologist/scientist and permit document writer	2/10/2021 9:33 AM
46	Water quality scientist	2/10/2021 9:28 AM
47	data science and communication	2/10/2021 9:12 AM
48	Post-Graduate Fellow	2/10/2021 9:12 AM
49	Researcher	2/10/2021 9:06 AM
50	Volunteer	2/10/2021 9:00 AM
51	GIS and field staff	2/10/2021 8:56 AM
52	Manager	2/10/2021 8:42 AM
53	Natural Resources Department	2/10/2021 8:26 AM
54	Environmental Compliance Specialist	2/10/2021 8:21 AM
55	fisheries technician	2/10/2021 8:14 AM
56	Shore Friendly practitioner	2/10/2021 8:11 AM
57	Cultural Resorce Consultant	2/10/2021 8:03 AM
58	GIS Manager	2/10/2021 8:01 AM
59	Stormwater	2/10/2021 7:55 AM
60	Organizational development and training	2/10/2021 7:53 AM
61	Land Surveying Technician	2/10/2021 7:46 AM
62	volunteer coordinator/outreach	2/10/2021 7:43 AM
63	Principal Scientist	2/10/2021 7:43 AM
64	planning and permitting section manager	2/10/2021 7:35 AM
65	geologist	2/9/2021 6:33 PM
66	Project Manager	2/9/2021 5:09 PM
67	Volunteer	2/9/2021 5:01 PM
68	Project manager	2/9/2021 5:01 PM
69	geomorphologist	2/9/2021 5:01 PM
70	Trainer	2/4/2021 10:19 AM

Q3 Training Module: General Concepts Related to Shorelines and StabilizationThis training module includes familiarization with general topics related to coastal processes, shoreline vegetation, marine habitat, weather impacts, and climate change. The level of detail about each topic will be modified based upon whether the course is offered for planners, contractors or consultants. These basic concepts provide an overview of shoreline and coastal processes that form the basis for understanding all other aspects of shoreline stabilization and the alternatives to armoring.

Answered: 365 Skipped: 62

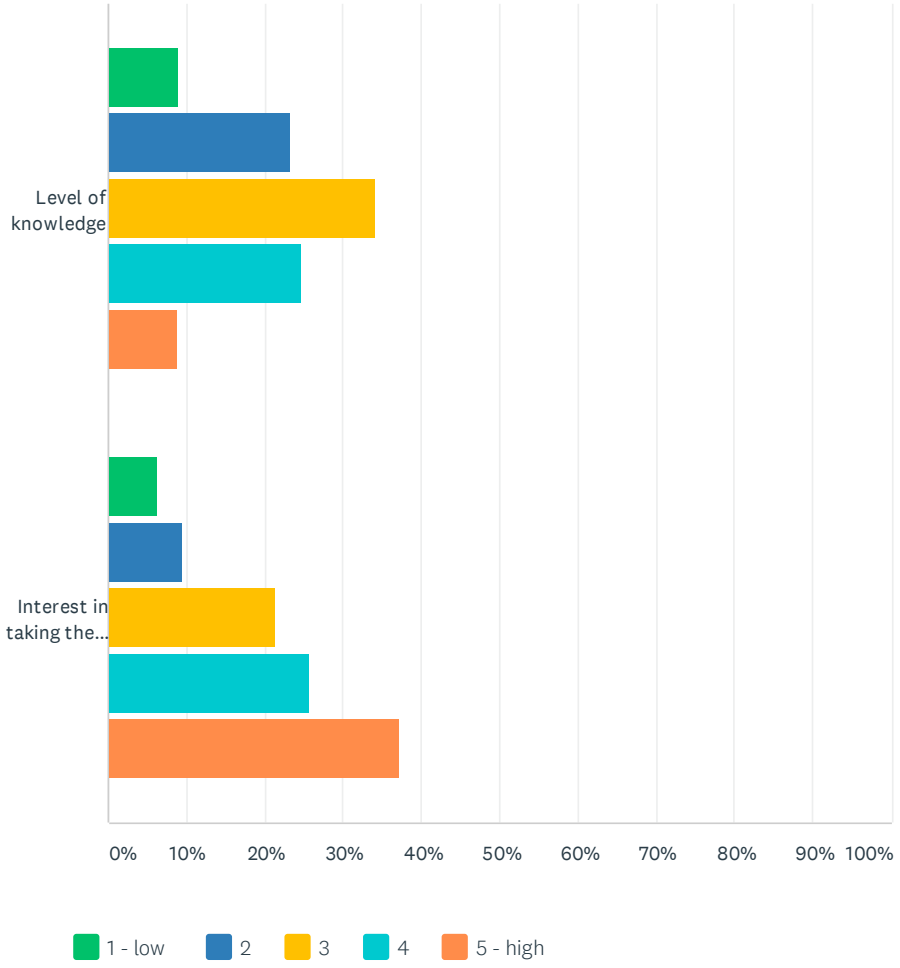


	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Level of knowledge	9.88% 34	16.57% 57	42.44% 146	25.00% 86	6.10% 21	344	3.01
Interest in taking the course	6.37% 23	11.63% 42	24.10% 87	26.32% 95	31.58% 114	361	3.65

Q4 Training Module: Overview of Local, State and Federal Permit RequirementsThis training module addresses local, state and federal permitting associated with the implementation of shoreline projects designed to either restore shorelines to natural conditions or implement projects considered “soft” alternatives to bulkheads or armoring. The module will describe details of the different types of permits and the different levels of government and how each of the permits relate to one another. Permits reviewed in this section include local government shoreline master program permits, Washington Department of Fish and Wildlife Hydraulic Project Approval, US Army Corp of Engineer permits, FEMA and floodplain permits, and Endangered Species Act review by National Marine Fisheries Services and US Fish and Wildlife Service. The role of tribes in the permit process is also included in this module.

Answered: 367 Skipped: 60

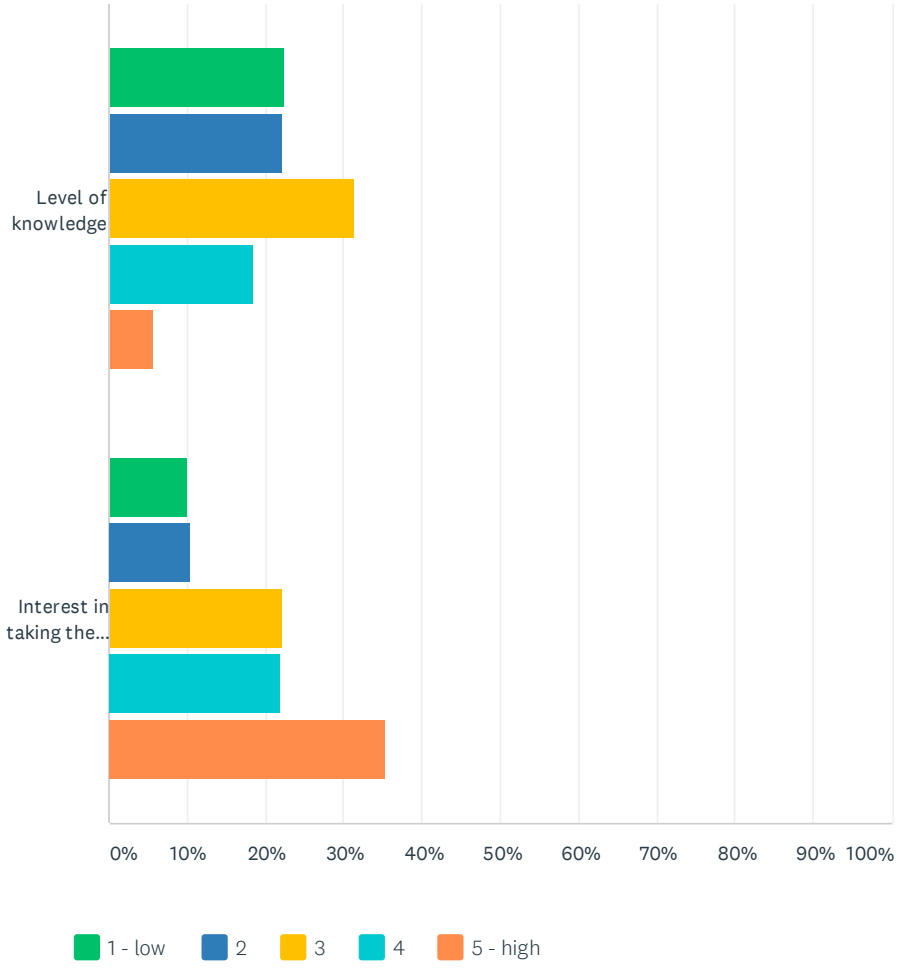
Training Needs Assessment for Planners, Consultants and Contractors



	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Level of knowledge	9.09% 32	23.30% 82	34.09% 120	24.72% 87	8.81% 31	352	3.01
Interest in taking the course	6.30% 23	9.32% 34	21.37% 78	25.75% 94	37.26% 136	365	3.78

Q5 Training Module: Conducting Site AssessmentsThis training module explores how to conduct a site assessment for a shoreline stabilization project. This includes identifying issues that need to be included, where to find resources for each of the issues, and how to prepare and read reports addressing various aspects of the site.

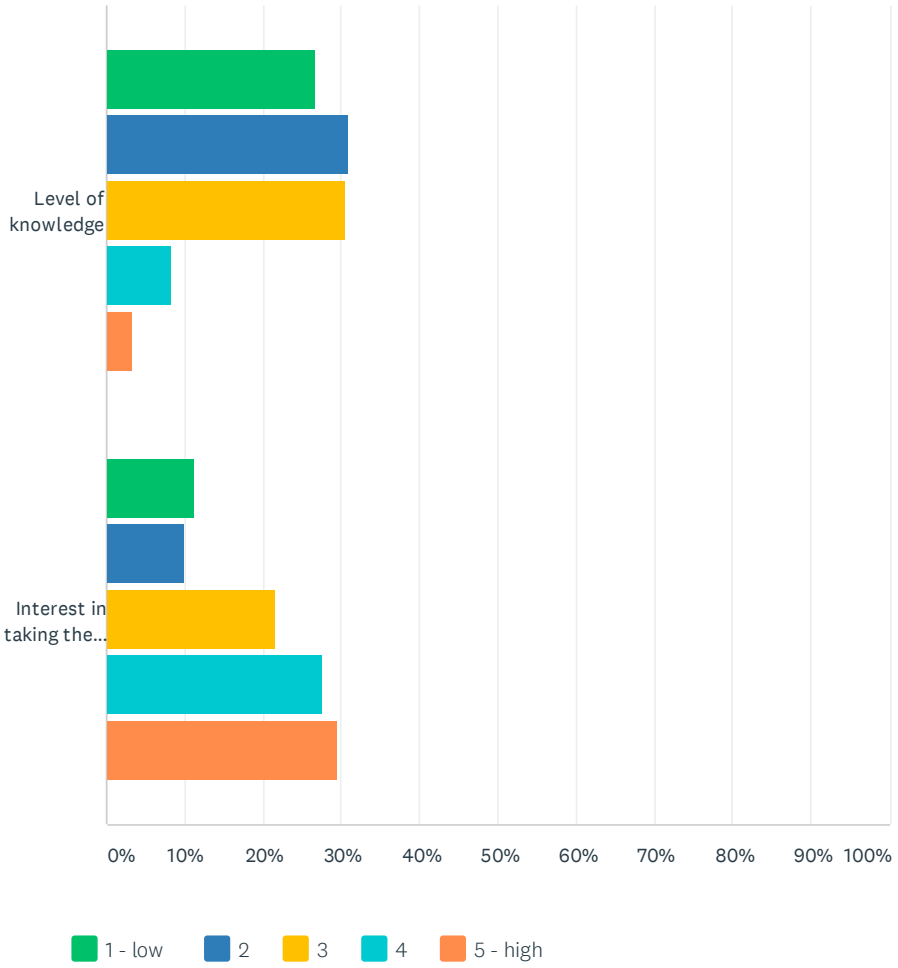
Answered: 364 Skipped: 63



	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Level of knowledge	22.41% 78	22.13% 77	31.32% 109	18.39% 64	5.75% 20	348	2.63
Interest in taking the course	9.97% 36	10.53% 38	22.16% 80	21.88% 79	35.46% 128	361	3.62

Q6 Training Module: Demonstration of Need and Risk AssessmentThis module examines how to determine what type of shoreline treatment is applicable for a given site. Recognizing no one design will be applicable everywhere, this section will examine the factors to be considered when evaluating what type of erosion protection or shoreline treatment will be the most applicable. This section builds upon the information identified and included in the Site Assessment module. This section will also address the concept of "demonstration of need" as required in shoreline master programs. WAC 173-26-201(2)(e)(i). The risk assessment tool (as revised) provided for in the Marine Shoreline Design Guidelines (MSDG) will be the basis for determining need.

Answered: 364 Skipped: 63

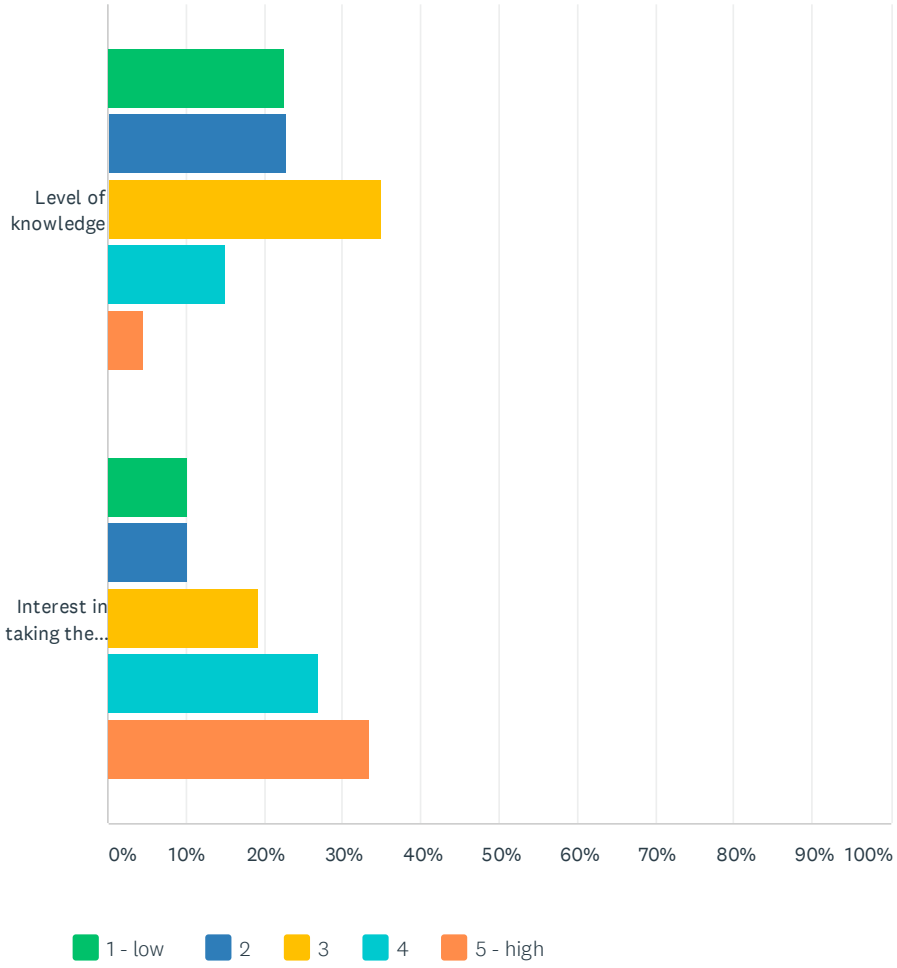


Training Needs Assessment for Planners, Consultants and Contractors

	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Level of knowledge	26.72% 93	31.03% 108	30.46% 106	8.33% 29	3.45% 12	348	2.31
Interest in taking the course	11.33% 41	9.94% 36	21.55% 78	27.62% 100	29.56% 107	362	3.54

Q7 Training Module: Techniques for Erosion Control Including Materials, Methods and MaintenanceThis module will explore the range of erosion control measures as well as restoration techniques applicable to Washington State shorelines with an emphasis on Puget Sound coastlines. These are the techniques described in the MSDG. This section will describe each of the techniques, examine where it is appropriate to use each one, what are the effects of the technique, provide design examples and discuss successful as well as unsuccessful examples. This module will also include Construction Materials, Methods and Maintenance.

Answered: 366 Skipped: 61

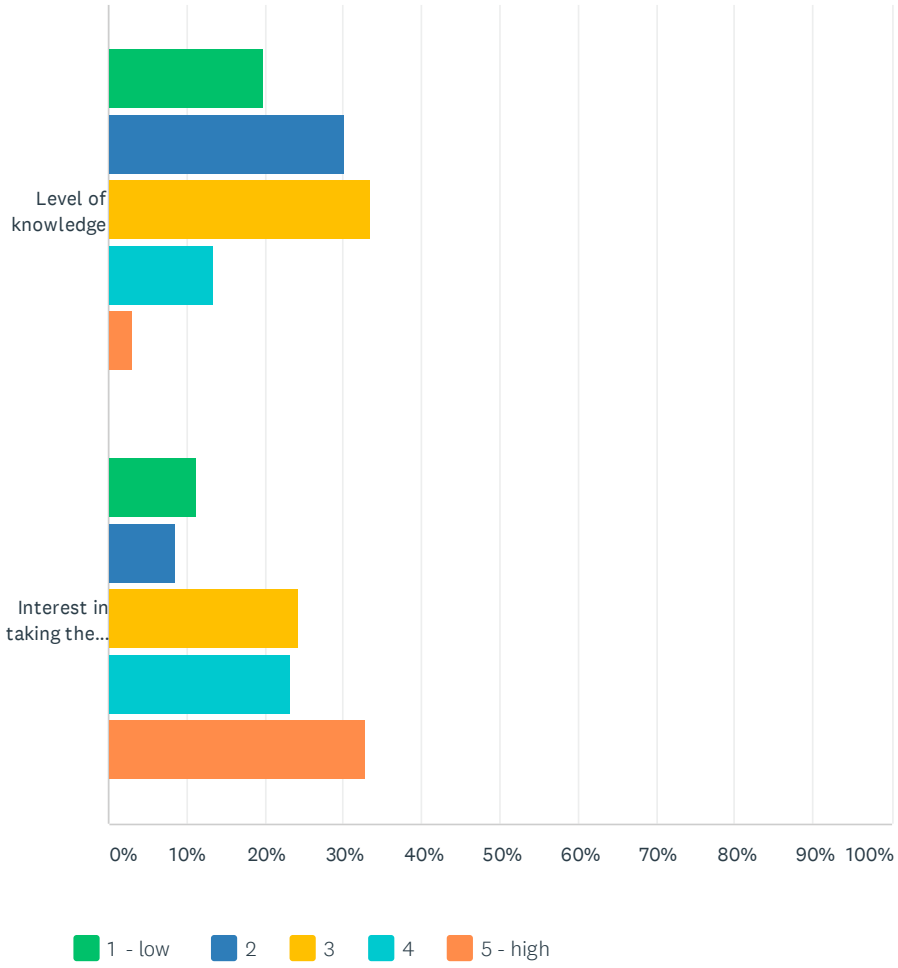


Training Needs Assessment for Planners, Consultants and Contractors

	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Level of knowledge	22.57% 79	22.86% 80	34.86% 122	15.14% 53	4.57% 16	350	2.56
Interest in taking the course	10.16% 37	10.16% 37	19.23% 70	26.92% 98	33.52% 122	364	3.63

Q8 Training Module: Sea Level Rise IssuesThis module will provide an overview of sea level rise and coastal hazards that will impact location and design of alternatives to bulkheads or armor. Included in this section will be descriptions of how to integrate sea level rise and storm surge into the siting, design and construction of projects.

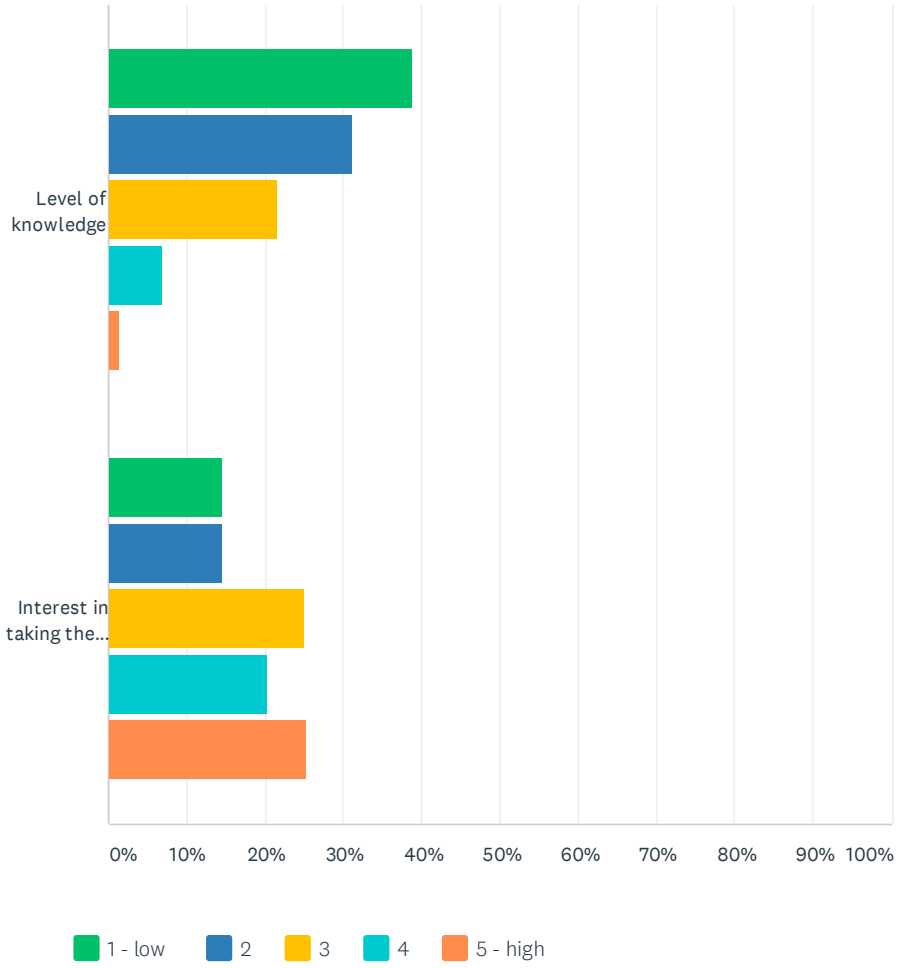
Answered: 365 Skipped: 62



	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Level of knowledge	19.77% 69	30.09% 105	33.52% 117	13.47% 47	3.15% 11	349	2.50
Interest in taking the course	11.29% 41	8.54% 31	24.24% 88	23.14% 84	32.78% 119	363	3.58

Q9 Training Module: Incentive ProgramsThis module will provide an overview of various incentive programs available throughout Washington State related to soft shore alternatives to bulkheads. The purpose of this module is to familiarize trainees with various options that may provide technical assistance or financial support.

Answered: 365 Skipped: 62



	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Level of knowledge	38.97% 136	31.23% 109	21.49% 75	6.88% 24	1.43% 5	349	2.01
Interest in taking the course	14.60% 53	14.60% 53	25.07% 91	20.39% 74	25.34% 92	363	3.27

Q10 Additional topics of interest related to soft shorelines and design?

Answered: 121 Skipped: 306

#	RESPONSES	DATE
1	Shoreline mapping and analysis	3/6/2021 10:50 PM
2	not at this time	2/25/2021 9:55 AM
3	Community involvement and buy in	2/19/2021 3:28 PM
4	shoreline stewardship: techniques to facilitate landowner and neighbor accountability, communicating difficult topics: telling landowners why they can't have their bulkhead. workshop on the feasibility of buyout programs for shoreline restoration or grant programs for relocation.	2/19/2021 11:17 AM
5	I am signed up for the 4-part SEPA training series. I have a number of interests that go beyond basic requirements and am focused on nonproject actions. What is of most interest is learning from Ecology what they see as best practices, including specific examples from other jurisdictions, in a variety of areas. These include the following: *synchronizing SEPA and GMA review, including early SEPA as Comprehensive Plans are updated *good examples of reliance on past documents and environmental reviews *good nonproject checklists that clearly explain and identify potential significant adverse impacts *good examples of SEPA addendums for nonproject actions *good examples of jurisdictions revising SEPA documents when Council amendments are significant departures from what was covered in the initial SEPA review *good examples of Threshold Determinations that establish a basis for the determination *good processes and protocols for responding to changes and amendments to a proposal during different steps in the process *documentation in the legislative process for how SEPA was considered such as in the Findings section of an ordinance	2/18/2021 1:56 PM
6	none	2/18/2021 7:15 AM
7	selection of vegetation types for soft shorelines in urban areas	2/17/2021 4:03 PM
8	Nothing to add.	2/17/2021 1:39 PM
9	I'm more interested in biological aspects of shorelines.	2/17/2021 1:15 PM
10	Include impacts of fill on burial of existing habitat and permitting ramifications.	2/17/2021 12:56 PM
11	infraestructura verde como sistemas de protección costera, conservación de areas naturales protegidas en la zona costera	2/17/2021 11:57 AM
12	incorporating native plant materials into design and implementation early in the process	2/17/2021 11:40 AM
13	Pre and post project monitoring	2/17/2021 11:22 AM
14	Designing nearshore stormwater facilities	2/17/2021 10:56 AM
15	Appropriate methods to identify OHWM to sufficiently meet the needs of state and federal reviewing agency expectations.	2/17/2021 9:35 AM
16	None	2/17/2021 9:32 AM
17	Non-marine shorelines	2/17/2021 9:29 AM
18	Property owner engagement techniques Plant/soft armor selection methods Beach nourishment techniques	2/17/2021 9:22 AM
19	no	2/17/2021 9:08 AM
20	Related to the federal, state, and local permitting requirements question, specific training on determining the High Tide Line would be helpful.	2/17/2021 9:07 AM
21	Can’t think of any more off hand.	2/17/2021 9:01 AM

22	none	2/17/2021 8:59 AM
23	Drawbacks of hardened shorelines relative to bio-engineered or "softer" approaches	2/17/2021 8:58 AM
24	bluff stabilization	2/17/2021 8:54 AM
25	N/A	2/17/2021 8:51 AM
26	-	2/17/2021 8:49 AM
27	none	2/17/2021 8:46 AM
28	n/a	2/17/2021 8:44 AM
29	Imapacts and mitigation/adaptation for coincidence of high tide and rain event stormwater flooding.	2/17/2021 8:34 AM
30	I would be interested in learning more about the science of soft shorelines and design (particularly through an ecological lens).	2/17/2021 8:32 AM
31	none	2/17/2021 8:28 AM
32	None	2/17/2021 8:22 AM
33	Public partnership opportunities, education and resources	2/17/2021 8:19 AM
34	n/a	2/17/2021 8:14 AM
35	N/A	2/17/2021 7:53 AM
36	forage fish nutrient enhancement - methods, means and requirements for various shoreline treatments Permitting of forage fish nutrient enhancement; shoreline armoring as it relates to environmental cleanup sites	2/16/2021 5:55 PM
37	how to incentivize	2/16/2021 4:01 PM
38	The public outreach component -demonstrate effective methods to generate interest and buy-in from shoreline landowners to change out their armoring for soft methods. It seems like there's a lot of good information available, but limited interest in voluntary projects.	2/16/2021 3:48 PM
39	Property ownership issues and liability concerns	2/16/2021 3:46 PM
40	NA	2/16/2021 3:42 PM
41	New NMFS/NOAA bulkhead regulations	2/16/2021 2:04 PM
42	None come to mind. You covered them all.	2/12/2021 12:55 PM
43	Cultural Resources	2/12/2021 11:20 AM
44	Fetch	2/12/2021 11:05 AM
45	None	2/11/2021 12:11 PM
46	none. Not very involved with this topic	2/11/2021 11:28 AM
47	Noxious weed/invasive species control in shoreline environments	2/11/2021 10:36 AM
48	working within the Special Flood Hazard Area, Riparian Habitat Zone	2/11/2021 7:14 AM
49	no	2/11/2021 6:21 AM
50	No	2/10/2021 9:06 PM
51	Application and best materials	2/10/2021 6:28 PM
52	None	2/10/2021 5:25 PM
53	none	2/10/2021 4:48 PM
54	Renewal/re-fresher for Forage Fish Surveyor certification. Finding it hard to get the mandated practice in. Would be good to do an outdoor session.	2/10/2021 4:27 PM
55	Nutrient infiltration and effects on Fish life helping to protect more suitable habitats for Fish	2/10/2021 4:25 PM

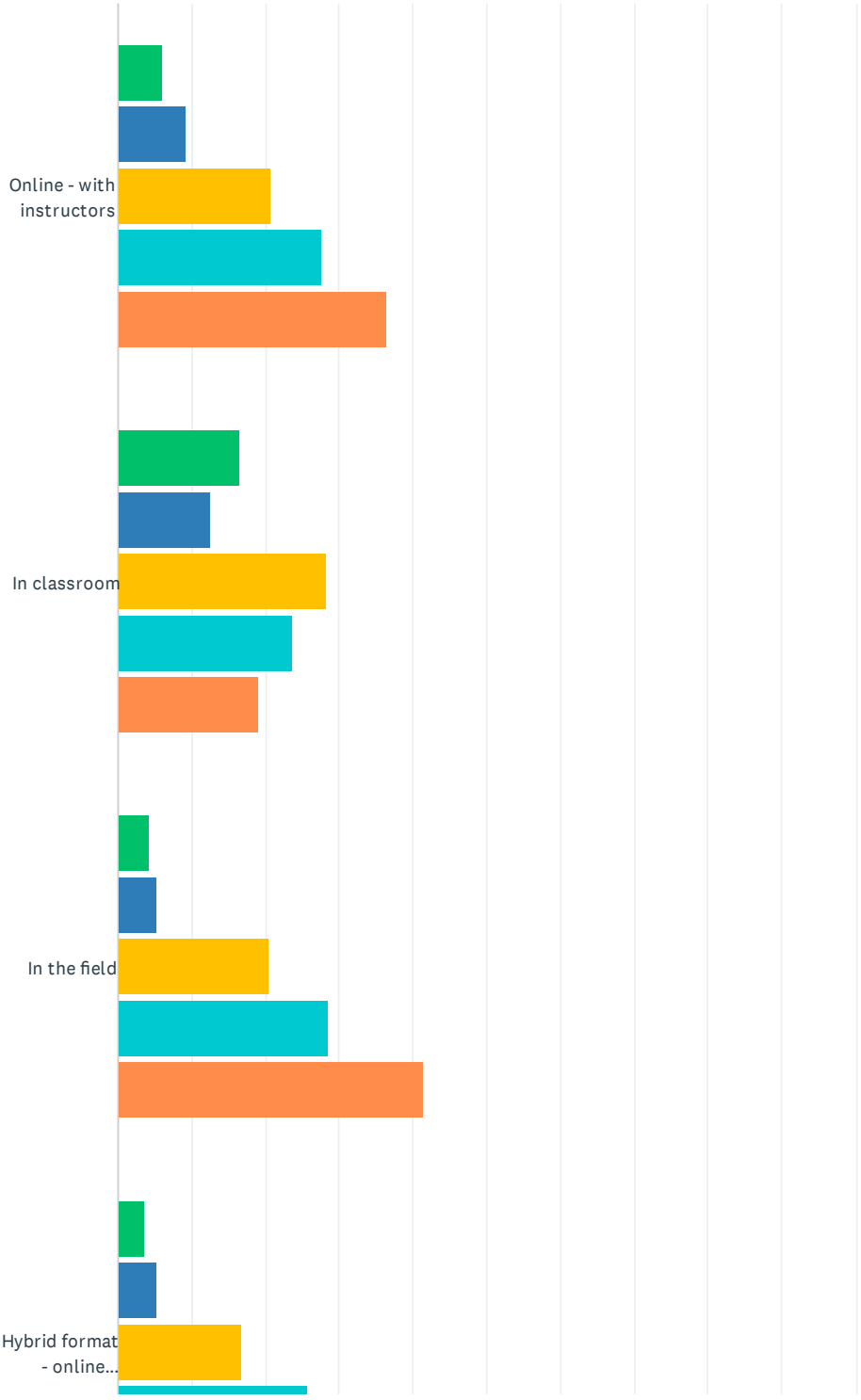
56	Protection of public infrastructure from sea level rise.	2/10/2021 4:20 PM
57	mitigation options, emergency project prevention	2/10/2021 3:28 PM
58	Ecological benefits of soft shorelines vs. bulkheads or other "hard" shoreline armoring.	2/10/2021 3:17 PM
59	How to effectively communicate restoration value to landowners (beyond monetary	2/10/2021 2:44 PM
60	Maintaining features that already exist on the shoreline	2/10/2021 2:38 PM
61	Basics of coastal geologic processes and assessment. This may be covered in the first(?) course, yet too many people do not understand basic concepts on natural shoreline processes.	2/10/2021 1:37 PM
62	Any form of techniques for shoreline restoration and assessments.	2/10/2021 12:58 PM
63	design of bio-geotechnical stabilization measures	2/10/2021 12:58 PM
64	None	2/10/2021 12:47 PM
65	Off site mitigation options for property owners	2/10/2021 12:19 PM
66	Designing collaborative processes for greater project success (engagement from initial idea through long-term commitment). Role of maintenance & monitoring on long-term success and sustainability of vegetative coastal restoration.	2/10/2021 11:42 AM
67	Relationship to shorelines beyond Puget Sound-- Pacific Coast and lower Columbia River environments	2/10/2021 11:40 AM
68	Vegetation selection and availability	2/10/2021 10:55 AM
69	Permitting pitfalls	2/10/2021 10:53 AM
70	I'd be interested in learning more about how to design for intense storm surge (beyond sea level rise). I'd also be interested in learning more from coastal geomorphologist/engineer and what tools they use from a design standpoint so that we as planners/permitters have a better understanding of their methodology.	2/10/2021 10:45 AM
71	training for helping with SMP updates would be great	2/10/2021 10:41 AM
72	owner incentives	2/10/2021 10:37 AM
73	I would like to see a freshwater-specific shoreline stabilization offering	2/10/2021 10:21 AM
74	Lessons learned for projects and info on techniques such as accurate elevation mapping	2/10/2021 9:57 AM
75	Offshore artificial reefs to mitigate wave energy, alternative designs and applicability of regulation to inland freshwater environments (Larger lakes with significant fetch).	2/10/2021 9:54 AM
76	review of bioengineered techniques success years after implementation, especially in stream and lake environments	2/10/2021 9:47 AM
77	Any training specific to soft shorelines and design on rivers. Many rivers (and lakes) are also "shorelines" under the SMA.	2/10/2021 9:39 AM
78	Soft armoring on streambanks, freshwater. Not just marine	2/10/2021 9:26 AM
79	Coastal water acidification	2/10/2021 9:10 AM
80	Ocean pollution from industrial and human wastes - CSO, effluents, illegal dumping, etc.	2/10/2021 9:05 AM
81	Plant selection, irrigation and maintenance of plants, and how to manage invasive plants.	2/10/2021 8:56 AM
82	Please continue to offer wetland delineation and plant ID classes, especially the graminoid class.	2/10/2021 8:51 AM
83	I really enjoy the material that the coastal training program puts together each year. I think courses are very detailed and have some good information. I do feel a little detached being in Eastern Washington and is why I rated some of my interest low on some courses. We don't have coast lines but we do have large rivers that have a lot of failing banks and would love to have more work, trainings, information on funding sources, for work in these systems. Just wanted to put in a plug for the Eastern most extents of the state.	2/10/2021 8:49 AM
84	Case studies/project examples specifically related to how they were permitted, by whom, and	2/10/2021 8:44 AM

	lessons learned/things to avoid.	
85	Mitigation	2/10/2021 8:42 AM
86	Promotion of these alternatives for landowners who reflexively wish to install bulkheads.	2/10/2021 8:35 AM
87	Benefits/impacts to local sea life and salmonids, particularly Chinook.	2/10/2021 8:30 AM
88	N/A	2/10/2021 8:29 AM
89	n/a	2/10/2021 8:28 AM
90	Site specific risk assessment methods	2/10/2021 8:22 AM
91	Soft shorelines and commercial waterfront access (ports, shipyards, ferry terminals, etc.)	2/10/2021 8:21 AM
92	Flood hazard permitting for coastal environments.	2/10/2021 8:19 AM
93	na	2/10/2021 8:18 AM
94	I love green infrastructure :) living shorelines are the best!	2/10/2021 8:12 AM
95	Available resources, groups, partnerships to assist and collaborate individual stakeholders	2/10/2021 8:12 AM
96	Please provide more classes for designing and mitigation techniques.	2/10/2021 8:09 AM
97	How it impacts cultural resources.	2/10/2021 8:05 AM
98	Partnerships & collaborations	2/10/2021 8:03 AM
99	Interested in inland mainstem river shorelines, not marine	2/10/2021 8:01 AM
100	None I can think of.	2/10/2021 7:59 AM
101	good coverage	2/10/2021 7:56 AM
102	none	2/10/2021 7:54 AM
103	eelgrass delineation and use of the new HEA tool	2/10/2021 7:53 AM
104	Delineation of all levels of Water (Ordinary High, Mean Low etc.), and delineation of Wetlands associated with Ordinary High and Mean Low.	2/10/2021 7:50 AM
105	Discussion of permitting timelines... particularly local and federal.	2/10/2021 7:49 AM
106	How to permit soft-shore at sites when no form of armoring is allowed unless there is an 'imminent threat' to a structure, because at that point hard armoring is likely the only option. Perhaps thresholds for allowing soft-shore protection should be lower than hard armoring? I would like to see this issue be part of any training on risk assessment, design and permitting of armoring and also as part of the discussion on sea level rise.	2/10/2021 7:48 AM
107	Outreach to landowners and also to general public to help support continued regulatory improvement and consistency	2/10/2021 7:47 AM
108	SEPA	2/10/2021 7:44 AM
109	General shoreline permitting, regulations, processing permits	2/10/2021 7:44 AM
110	Determining full bank width and ordinary high water mark.	2/10/2021 7:44 AM
111	None	2/10/2021 7:42 AM
112	Intersection of Shorelines regulation and the NFIP	2/10/2021 7:36 AM
113	Need to address potential impacts to cultural resources such as pre-contact archaeological sites.	2/10/2021 7:32 AM
114	One of the big unknowns in shorelines and design is the amount of time it will take to get permits, specifically getting through review with NMFS with the pending Salish Sea Nearshore Programmatic and the use of the new calculator in determining if "conservations actions" are needed for shoreline projects in Puget Sound. The ramifications of additional mitigation needed for shoreline projects is critical to understand.	2/10/2021 7:30 AM
115	None I can think of	2/10/2021 7:28 AM

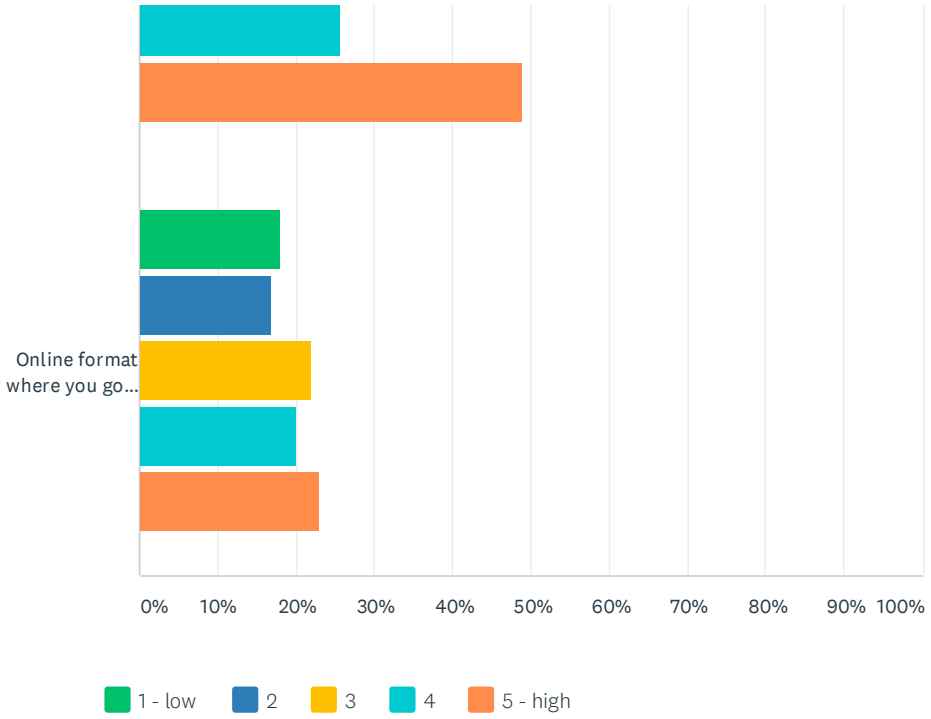
116	Emphasis on Living Shorelines including use of hybrid approaches being used in the EU and east coast such as constructed floating wetlands.	2/10/2021 7:09 AM
117	I would suggest you may not want to split us into 3 groups, but bring everyone together. Several topic areas I know a fair amount about, but would be very interested in attending a contractor training just to see how you approach it differently and to hear what they are thinking	2/10/2021 7:08 AM
118	overview of investment risk related to owning developed shoreline; what is outlook for 10 years, 20 years, 40 years?	2/9/2021 7:38 PM
119	What are the options for collaboration between agencies, tribes, NGOs, non-profits, government, etc etc. And how can these best be activated.	2/9/2021 6:40 PM
120	Case studies of soft shorelines, or hybrid designs, that have been used in urban areas.	2/9/2021 5:02 PM
121	test	2/3/2021 11:06 AM

Q11 Determine your interest in taking courses in the different format options (1 (low interest) - 5 (high interested)).

Answered: 353 Skipped: 74



Training Needs Assessment for Planners, Consultants and Contractors



	1 - LOW	2	3	4	5 - HIGH	TOTAL	WEIGHTED AVERAGE
Online - with instructors	5.98% 21	9.12% 32	20.80% 73	27.64% 97	36.47% 128	351	3.79
In classroom	16.62% 57	12.54% 43	28.28% 97	23.62% 81	18.95% 65	343	3.16
In the field	4.12% 14	5.29% 18	20.59% 70	28.53% 97	41.47% 141	340	3.98
Hybrid format - online classes plus outdoor field training	3.46% 12	5.19% 18	16.71% 58	25.65% 89	48.99% 170	347	4.12
Online format where you go at your own pace	18.05% 63	16.91% 59	22.06% 77	20.06% 70	22.92% 80	349	3.13

APPENDIX F

Contractor Interview Questions

November 30, 2020
REV: December 7, 2020

PART 1: What is your experience working on marine shoreline stabilization and erosion projects in Puget Sound? (alternatives to bulkheads, soft shore projects, armor removal projects)?

Primarily, forestry and tree trimming and eco restoration.
Mostly, terrestrial systems
4 projects under belt
2 trainings by friends of san juans

1. **Number of years working as a marine contractor?**

    a. 0 - 5
    b. 5 - 10
    c. 10 - 20
    d. + 20

Not really a marine contractor

2. **Where do you do your work?**
    a. Marine Shorelines
    b. Freshwater lakes/Streams
    c. Both

3. **What type of services do you provide?**
    a. Construction only
    b. Design Build
    c. both

4. **Are you familiar with the term Soft Shore projects? If so, what does it mean to you?**

5. **Number of years working on shoreline erosion projects that are alternatives to bulkheads?**
    a. 0 - 5
    b. 5 - 10
    c. 10 - 20
    d. + 20

6. **How many projects have you completed?**

7. **If none, do you have interest in doing these types of projects in the future?**

8. **What is your interest in trainings about marine shoreline related issues?**

9. **Based on the following topics, address questions below:**
TOPICS:

1. General Concepts related to shorelines and stabilization
2. How to address site assessments for design/construction
3. Demonstration of Need and Risk Assessment
4. Incentive Programs
5. Techniques for Erosion Control including construction materials and maintenance
6. Sea Level Rise Issues

a. what is your current level of knowledge about topics 1-8 (Intro, mid, adv)
b. what is your level of interest (on a scale of 1 – 5) in receiving training on topics 1 – 8
c. What are your top 3 priority topics?

10. **If you have experience, what is your biggest concern about these projects?**

11. **Have you ever received any training on issues related to shorelines in Puget Sound?**

12. **If so, what type of training? Provided by whom?**

a. online - with instructors
b. in classroom
c. in the field
d. hybrid format - online classes plus outdoor field training
e. online format where you go at your own pace

13. **What would be your preferred location for training?**
South sound

14. **What would be your preferred amount of time for trainings?**
    ½ day
    Full day
    Multiple days

15. **Would you be willing to do some pre-homework before the class in order to shorten the amount of time that you're actively engaged in training?**

16. **Do you currently have any type of certification for your work?**
    If so, what type?

17. **Would you be interested in receiving certification as a qualified "green shores" contractor?**

APPENDIX G

General Concepts Related to Shorelines and Stabilization

Details to be included in courses:

- Coastal Processes (Note: Need to clarify how this is not redundant with items below)
- Shoreforms: Differences and how they function
- Coastal geology
    a. Expand to include process
    b. Include human and natural causes
    c. Consider mass wasting
- Coastal Biology
    a. Focus on nearshore
- Cultural/historical resources
    a. Focus on knowing what resources are available and how to use them
- Weather
    a. Wind
- TIdes
- Fluvial Actions
- Beach alignment
- Beach forming process
    a. What causes erosion and how it influences design decisions (Note: this may be tied to site development below
    b. What is distinction between erosion and mass wasting, episodic events
    c. Anthropogenic impacts related to how it causes erosion;
- Anthropogenic impacts
- What causes erosion
- Marine Habitat and effect of stabilization on that habitat
    a. Focus on fish window timing related to construction for contractors
- Shoreline Vegetation
    - What causes instability and what is improving it
    - Role of vegetation as Infrastructure.
- Trees
- Impacts of Hard Armor
- Implications of Climate Change and Sea Level Rise
- Clarifications on Hard Armor v. Soft Armor v. Restoration v. passive techniques v. living shorelines – need for some definitions of each of these
- Mitigation – how it relates to design and habitat
- Upland Hydrology of the site

a. how will this impact erosion and decisions

- Add complicating factors:
  a. Adjacent properties
  b. Boat waves
  c. Inputs of fresh waters
  d. Contaminated sediments
  e. Ownership and Use Issues
  f. Tidelands ownership
- Consider Toxic sites and how to include information about this issue

a.

KEY ISSUES FOR PLANNERS

- For Planners do not need in depth understanding of all of these. Only need to understand the basics and relationship to regulations.
- What do planners need to know in order to be able to read reports from experts? What information should they look for?
- How to look at erosion data rates, know which questions to ask to get more data. What data sources, what should be in the analysis. Allows for better conversations with consultants
- Need consistent methodology for review of Determination of Need in reports prepared by contractors and consultants.
- Knowledge of marine habitat should focus on what information is necessary for planners to understand no net loss reports
- Planners need to develop a fluency about what is the difference between hard and soft alternatives and the grey areas in between. This will allow for better evaluation of projects.
- Recognize and be aware of the differences between jurisdictions and definitions used by each for hard and soft solutions.
- Planners may also need training about how to discuss liability and certainty issue.

KEY ISSUES FOR CONTRACTORS

- Contractors need a solid understanding about drainage and vegetation management on the shoreline along with the risks of various conventional property management techniques as compared to landowner demands
- When providing introduction to issues about weather consider the following issues:
  - Need for better definition (apply to all):
  - effects coastal processes for design and construction/monitoring;
  - preparedness for **erosion control**;
  - time of year of the project work;
  - understand the constraints of weather;

- be thoughtful about **equipment impacts**;
- seasonality is critical;
- working in dry vs wet environments but integrate into other topics.

- Contractors need better training and information about construction; what are the beach impacts from machinery, what are low impact options for shorelines, what are impacts of vibrations on banks as destabilizing force, how to change oil in less risky fashion, and how to put down pressure diffusion padding.
- Contractors need information about drainage techniques in the shoreline.
- **Add** erosion and sediment control practices for shoreline work and intertidal work.
- Cultural and Historical Values:
  - This issue is less important to contractors regarding substance. However, it is very important related to potential risks of finding cultural resources on the site and what actions need to be taken.
  - Focus needs to be on permitting related issues
  - What happens when there is a discovery?
  - How to coordinate with tribes during construction for purposes of monitoring work

KEY ISSUES FOR CONSULTANTS

- Coastal Processes – make sure there is a connection between physical and ecological patterns
- Coastal geology
  - Expand to include process
  - Include human and natural causes
  - Consider mass wasting
- Coastal Biology
  - Focus on nearshore
- Cultural Resources
  - Focus on knowing what resources are available and how to use them
- Add complicating factors:
  - Adjacent properties
  - Boat waves
  - Inputs of fresh waters
  - Contaminated sediments
  - Ownership and Use Issues
  - Tidelands ownership
- Consider Toxic sites and how to include information about this issue

APPENDIX H

Overview of local, state and federal permit requirements

Details to be included in content of course:

Local Government

- Shoreline Master Program
- Critical Areas Ordinance
- Grading and development type permits
- Floodplain Permitting
- Stormwater permitting
- Building permits
- Relationship to Tribes
- SEPA (State Environmental Policy Act)
- Demonstration of need and relationship to Shoreline Permitting

State Government

- Hydraulic Project Approval (Department of Fish and Wildlife)
- Water Quality (Department of Ecology)
- Construction General Permit (Department of Ecology)
- Department of Archaeology and Historic/Cultural Resources Permits (DAHP)
- Aquatic Lands Permission – actions on state owned lands (Department of Natural Resources)
- SEPA in some cases

Federal Government

- US Army Corps of Engineers
    - USACE regulating High Tide Line
    - Section 404 permits
    - Section 106 and tribal consultation
    - Mitigation Requirements
- US Fish and Wildlife Service
    - Endangered Species Act Consultation
    - Floodplain Issues
- National Marine Fisheries Service
    - Endangered Species Act Consultation
    - Floodplain Issues

Incentive Programs

- Shore Friendly
- Others

KEY ISSUES FOR PLANNERS

- Key issues for planners is the understanding the interaction and relationship between the different types of permits.
- Local planners need better understanding of role of tribes and the tribal consultation process.
- Planners need more information and training about how to use the pre-application process as a way to inform property owners about alternatives to bulkheads.

KEY ISSUES FOR CONTRACTORS

- Note that most contractors may not perceive a need to understand permitting requirements.
- Problem: making sure conditions are understood and followed by the contractors.
- Written in ways that regulators understand, but contractors may not see the reason.
- Explain the primary rules and what the intention is.
- If a homeowner is working directly, they rely on the contractor for understanding the regulations.
- Who is the expert on site for single landowners?
- Homeowner (or holder of the permit) is the one legally required to follow the permits.

KEY ISSUES FOR CONSULTANTS

- For consultants it is necessary to consider how all the different permits work together.
- Tribal coordination is a very important issue
- Demonstration of Need is really a permit related issue and should be considered as part of this section rather than as a separate topic.

APPENDIX I

Consolidated list of details for courses

Marine Alternative Shoreline Training (MAST) Advisory Committee Input

Planners
Contractors
Consultants

Marine Alternative Shoreline Training (MAST) Advisory Committee Input

Topics for Training Needs Assessment: CONSULTANTS

This document summarizes issues discussed July 1, 2020 during the MAST Advisory Committee meeting in the breakout session for CONSULTANTS. The initial portion identifies overall issues that emerged from the three different breakout groups for planners, contractors and consultants. These same themes showed up in all three groups. This is followed by comments relevant to consultants and a modified list of topics for trainings based upon the conversation in the breakout session.

Overall structure for training topics:

The following 6 categories are the initial ones recommended for individual training programs. These categories could possibly be broken down into smaller training units.

1. General Concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. Key topics for conducting site assessments
4. Demonstration of Need and Risk Assessment
5. Incentive Programs
6. Techniques for Erosion Control

Overall issues related to content:

- Who is audience for assessment?
- Who is the audience for the training programs? What level of knowledge is assumed?
- What is the role of each different group (planners, contractors, and consultants) in the process of working on soft shore alternatives?
- Is there a need to develop different levels of training for each group?
- When talking about consultants, it would be useful to clarify and identify all the different types of consultants who may be involved with these types of projects.
- Clarify PURPOSE for the training (some suggestions and should clarify and create more for a final report)
    - Advising homeowners on how to make choices and move through design and permitting process
    - How to advise on water management concerns / priorities on coastal bluffs
    - advise on marine riparian forest restoration (geology, erosion, specialized restoration techniques)
- Create separate assessment for each - planners, contractors, consultants

- Clarify Definitions
    - One issue noted is the disparity in definitions between jurisdictions. This may complicate trying to come up with common definitions of terms in the training efforts
    - Consider collapsing the General Concepts area to be more concise and focus on how it relates to issues of impacts and mitigation.
- Third party review of geotechnical reports has been cited as a major issue for planners
- It is important to include in any training the question of why a project is being pursued and what stage of planning is involved.
- Risk Assessment Tool: need to revise to be more useful
    - Risk Assessment Tool
        - Not enough specificity...**needs revision**
        - Conservative for armor removal (pushes towards can't remove hard armor)
        - Doesn't work on parcel level (AM)
        - Improve for shoretypes/presence of structures
- The site assessment training needs to help all parties determine where to go to get information such as on-line mapping, etc.
- ADD: Section on Incentive Programs
    - Not only consultants need to know about all the existing Incentive Programs. This is a topic that should be included for all groups receiving training. This includes programs like Shore Friendly.

Issues specific to Consultants

- Consultants need to know to advise homeowners relevant to marine nearshore management in a way that makes it possible for homeowners to move forward through the planning / permitting / implementation process.
- Specific to geologist: The role of the geologist should be to provide the geologic/hydrologic setting within which project design can develop, providing a glimpse into how physical processes will impact restoration actions and project success in the short and long term.

General Concepts

- Coastal Processes – make sure there is a connection between physical and ecological patterns
- Coastal geology
    - Expand to include process
    - Include human and natural causes
    - Consider mass wasting
- Coastal Biology
    - Focus on nearshore
- Cultural Resources
    - Focus on knowing what resources are available and how to use them
- Add complicating factors:
    - Adjacent properties
    - Boat waves
    - Inputs of fresh waters
    - Contaminated sediments

    - Ownership and Use Issues
    - Tidelands ownership
- Consider Toxic sites and how to include information about this issue

Permitting

- For consultants it is necessary to consider how all the different permits work together.
- Tribal coordination is a very important issue
- Demonstration of Need is really a permit related issue and should be considered as part of this section rather than as a separate topic.

Site Assessments

- Need to provide clear advice about what information is necessary to make action determinations.
- Be sure to include thorough information about site characterization especially low bank and higher.
- Include thorough information about adjacent topography such as hills, backshore, glacial fluting, etc. that contributes to surface water and groundwater on site.

Demonstration of Need

- Tool as currently designed does not work on a parcel level and does not provide enough specificity to help consultants.
- As currently designed, the Needs Assessment tool tends to push the decision away from armor removal!
- It would be good to have some type of tool for conducting an assessment, although the current tool needs revisions.
- Caution should be made in the use of tools to "find answers" and should be used instead to determine pros and cons of different options.

General Concepts for Trainings

Consolidate some of these with sub bullets

- Coastal Processes
- Coastal geology
- Coastal Biology
- Cultural/historical Values
- Weather
- Fluvial Actions
- Beach alignment
- Beach forming process
- Toxic Sites
- Anthropogenic impacts
- What causes erosion
- Marine Habitat
- Shoreline Vegetation

- Trees
- Impacts of Hard Armor
- Implications of Climate Change/Sea Level Rise
- Clarifications on Hard Armor v. Soft Armor v. Restoration v. passive techniques v. living shorelines
- *Complicating factors;*
    - Adjacent properties
    - Boat waves
    - Inputs of fresh waters
    - Contaminated sediments
    - Ownership and Use Issues
    - Tidelands ownership

Permitting

Local Government

- Shoreline Master Program
- Critical Areas Ordinance
- Grading and development type permits
- Floodplain Permitting
- Building permits
- Stormwater permitting
- Relationship to Tribes
- SEPA (State Environmental Policy Act)
- Demonstration of need and relationship to Shoreline Permitting

State Government

- Hydraulic Project Approval (Department of Fish and Wildlife)
- Water Quality (Department of Ecology)
- Construction General Permit (Department of Ecology)
- Department of Archaeology and Historic/Cultural Resources Permits (DAHP)
- Aquatic Lands Permission – actions on state owned lands (Department of Natural Resources)
- SEPA in some cases

Federal Government

- US Army Corps of Engineers
    - USACE regulating High Tide Line
    - Section 404 permits
    - Section 106 and tribal consultation
    - Mitigation Requirements
- US Fish and Wildlife Service

    - Endangered Species Act Consultation
    - Floodplain Issues
- National Marine Fisheries Service
    - Endangered Species Act Consultation
    - Floodplain Issues

Incentive Programs

- Shore Friendly
- Others

Site Assessments

- Soils
- Layers
- Groundwater and surface water run off
- Shoretype
- Fetch
- Longshore Drift
- Landslide activity and types
- Beach texture and large wood
- Backshore features and cross sections
- Surrounding drainage and drainage control
- Site vegetation
- Cultural resources
- Target species
- Effects of actions on adjacent sites
- Proximity to aquaculture
- Water depths
    - Locating OHWM, MHHW, HTL
- Rates of erosion
    - Causes and rates of Erosion – causes, e.g. beach erosion vs flood control vs slope stabilization
- Wind info – only needed by engineer designer
    - Wind roses, wind speeds, gust v. sustained
    - Elevations
- Wave info - only needed by engineer designer
    - Hindcasting, forecasting, wave energy, wave prediction
    - Wave mechanics and shore-wave interaction
- Use of Checklists
- Use of Decision Trees

Demonstration of Need or Needs Assessment and Cumulative Risk Assessment (NOTE: This topic may actually need to be considered under the Permitting section as it relates to the SMP)

- Local Government Planning related issues (SMP)
    - Risk Assessment Tool
- Department of Ecology Demonstration of Need

Techniques for Erosion Control

Passive

- Surface and groundwater management
- Veg management
- Relocation (managed retreat)

Soft Techniques

- Beach nourishment
- Reslope /revegetation
- Large wood
- Drift Sills

Restoration

- Bulkhead removal
- Bulkhead/seawall setback
- Debris removal and beach cleanup
- Beach Nourishment (similar/same technique, different goals)
- Cross shore structure removal (groin, drift sill…)

Experimental/Uncommon Techniques

- Lag Boulder intermittent breakwater
- Breakwater
- Living shorelines type nearshore shoal
- Dynamic Revetment
- Living Dike (Canadian concept)

Marine Alternative Shoreline Training (MAST) Advisory Committee Input

Topics for Training Needs Assessment:
CONTRACTORS

This document summarizes issues discussed July 1, 2020 during the MAST Advisory Committee meeting in the breakout session for CONTRACTORS. The initial portion identifies overall issues that emerged from the three different breakout groups for planners, contractors and consultants. These same themes showed up in all three groups. This is followed by comments relevant to contractors and a modified list of topics for trainings based upon the conversation in the breakout session.

Overall structure for training topics:

The following 6 categories are the initial ones recommended for individual training programs. These categories could possibly be broken down into smaller training units.

1. General Concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. Key topics for conducting site assessments
4. Demonstration of Need and Risk Assessment
5. Incentive Programs
6. Techniques for Erosion Control

Overall issues related to content:

- Who is audience for assessment?
- Who is the audience for the training programs? What level of knowledge is assumed?
- What is the role of each different group (planners, contractors, and consultants) in the process of working on soft shore alternatives?
- Is there a need to develop different levels of training for each group?
- When talking about consultants, it would be useful to clarify and identify all the different types of consultants who may be involved with these types of projects.
- Clarify PURPOSE for the training (some suggestions and should clarify and create more for a final report)
    - Advising homeowners on how to make choices and move through design and permitting process
    - How to advise on water management concerns / priorities on coastal bluffs
    - advise on marine riparian forest restoration (geology, erosion, specialized restoration techniques)

- Create separate assessment for each - planners, contractors, consultants
- Clarify Definitions
    - One issue noted is the disparity in definitions between jurisdictions. This may complicate trying to come up with common definitions of terms in the training efforts
    - Consider collapsing the General Concepts area to be more concise and focus on how it relates to issues of impacts and mitigation.
- Third party review of geotechnical reports has been cited as a major issue for planners
- It is important to include in any training the question of why a project is being pursued and what stage of planning is involved.
- Risk Assessment Tool: need to revise to be more useful
    - Risk Assessment Tool
        - Not enough specificity...**needs revision**
        - Conservative for armor removal (pushes towards can't remove hard armor)
        - Doesn't work on parcel level (AM)
        - Improve for shoretypes/presence of structures
- The site assessment training needs to help all parties determine where to go to get information such as on-line mapping, etc.
- ADD: Section on Incentive Programs
    - Not only consultants need to know about all the existing Incentive Programs. This is a topic that should be included for all groups receiving training. This includes programs like Shore Friendly.

Issues specific to Contractors:

Issues specific to contractors:

- Different types of contractors and therefore different levels of understanding necessary based on type of work:
    - Design/Build
    - Builder only (installing someone else's design)
    - Drainage work
    - Landscape companies.
    - See notes from K. Streiloff on training needs for each of these different groups.
- Consider including contractors who do design/build to be included with contractors for training purposes as they need to know many of the same things.
- 3 primary needs:
    - Builders/restoration practitioners; drainage management experts; vegetation experts
- Contractors need to know what to do when they encounter something that was unforeseen
- Contractors may require incentives to get them to apply best practices in the shoreline environment. This is something to consider. Fast track permitting is definitely something to promote.
- Include best management practices for working in shoreline as topic area for contractors. This should include methods for working with machinery in the nearshore and on unstable slopes. It should also cover erosion and weed control measures.

General Concepts

- Contractors need a solid understanding about drainage and vegetation management on the shoreline along with the risks of various conventional property management techniques as compared to landowner demands
- When providing introduction to issues about weather consider the following issues:
    - Need for better definition (apply to all):
    - effects coastal processes for design and construction/monitoring;
    - preparedness for **erosion control**;
    - time of year of the project work;
    - understand the constraints of weather;
    - be thoughtful about **equipment impacts**;
    - seasonality is critical;
    - working in dry vs wet environments but integrate into other topics.
- Contractors need better training and information about construction; what are the beach impacts from machinery, what are low impact options for shorelines, what are impacts of vibrations on banks as destabilizing force, how to change oil in less risky fashion, and how to put down pressure diffusion padding.
- Contractors need information about drainage techniques in the shoreline.
- **Add** erosion and sediment control practices for shoreline work and intertidal work.
- Cultural and Historical Values:
    - This issue is less important to contractors regarding substance. However, it is very important related to potential risks of finding cultural resources on the site and what actions need to be taken.
    - Focus needs to be on permitting related issues
    - What happens when there is a discovery?
    - How to coordinate with tribes during construction for purposes of monitoring work

Permitting:

- Note that most contractors may not perceive a need to understand permitting requirements.
- Problem: making sure conditions are understood and followed by the contractors.
- Written in ways that regulators understand, but contractors may not see the reason.
- Explain the primary rules and what the intention is.
- If a homeowner is working directly, they rely on the contractor for understanding the regulations.
- Who is the expert on site for single landowners?
- Homeowner (or holder of the permit) is the one legally required to follow the permits.

Site Assessments:

- Contractors need to understand each of these issues for site assesments but do not typically do the assessments. The issue for contractors is how to minimize construction impacts. Consider how to reorganize this information when doing trainings on these topics to address minimizing construction impacts.

- One additional issue that should be considered is the proximity to aquaculture. There is a potential and perceived threat to shellfish beds adjacent to a site. WDFW is implementing timing restrictions relative to shellfish spawning.
- Consider how to address upland management/beach interconnections/impacts as part of site assessments.

Demonstration of Need

- This may not be something contractors need to learn about, or if included, it is at a high level to understand issues that may require additional help from engineers.
- Build only contractor: what goes into a needs assessment would be helpful to know. Builder gives recommendation to landowner who then goes to the designer without having a needs assessment. Can cause conflict and may not be permittable.
- This should all be done before construction, but a consideration for design/build.
- Right project in the right place.
- Who makes the ultimate judgement on needs assessment? What liability is there if not allowed?

Techniques for Erosion Control

- Understand *why* each of these techniques are designed the way they are. This helps contractors to build them.
- Contractor should understand the techniques that are appropriate for the site.
- Contractor may be uncomfortable with what they are told to design based on assessments and rules.

General Concepts for Trainings

- Coastal Processes
- Coastal geology (focus on drainage):
- Coastal Biology (focus on forage fish):
- Cultural/historical Values
- Weather
- Tides: (How to build and work within the tides)
- Fluvial Actions
- Beach alignment
- Beach forming process
    - What causes erosion and how it influences design decisions (Note: this may be tied to site development below
    - What is distinction between erosion and mass wasting, episodic events
    - Anthropogenic impacts related to how it causes erosion;
- Marine Habitat
    - Focus on fish window timing related to construction
- Shoreline Vegetation
    - What causes instability and what is improving it

- Role of vegetation as Infrastructure.
- Trees
- Impacts of Hard Armor
- Implications of Climate Change/Sea Level Rise/Storm Surge
- Clarifications on Hard Armor v. Soft Armor v. Restoration v. passive techniques v. living shorelines
- Upland Hydrology of the site
  - how will this impact erosion and decisions

Permitting

Local Government

- Shoreline Master Program
- Critical Areas Ordinance
- Grading and development type permits
- Floodplain Permitting
- Stormwater permitting
- Building permits
- Relationship to Tribes
- SEPA (State Environmental Policy Act)
- Structural engineering (NRF note: Not sure this is a permitting issue. Check with Lisa and Corey)

State Government

- Hydraulic Project Approval (Department of Fish and Wildlife)
- Water Quality (Department of Ecology)
- Construction General Permit (Department of Ecology)
- Department of Archaeology and Historic/Cultural Resources Permits (DAHP)
- Aquatic Lands Permission – actions on state owned lands (Department of Natural Resources)
- SEPA when applicable

Federal Government

- US Army Corps of Engineers
  - USACE regulating High Tide Line
  - Section 404 permits
  - Section 106 and tribal consultation
- US Fish and Wildlife Service
  - Endangered Species Act Consultation
  - Floodplain Issues
- National Marine Fisheries Service
  - Endangered Species Act Consultation

- Floodplain Issues

Site Assessments

- Goal of Landowners
- Soils
- Layers
- Groundwater
- Shoretype
- Fetch
- Longshore Drift
- Landslide activity and types
- Beach texture and large wood
- Backshore features and cross sections
- Site and Surrounding drainage and drainage control
- Site vegetation
- Cultural resources
- Target species
- Effects of actions on adjacent sites
- Proximity to aquaculture
- Water depths
  - Locating OHWM, MHHW, HTL
- Rates of erosion
  - Causes and rates of Erosion – causes, e.g. beach erosion vs flood control vs slope stabilization
- Wind info – only needed by engineer designer
  - Wind roses, wind speeds, gust v. sustained
  - Elevations
- Wave info - only needed by engineer designer
  - Hindcasting, forecasting, wave energy, wave prediction
  - Wave mechanics and shore-wave interaction
- Use of Checklists
- Use of Decision Trees

Demonstration of Need or Needs Assessment and Cumulative Risk Assessment

- Local Government Planning related issues (SMP)
- MSDG related assessment (use of assessment tool)
- Department of Ecology Demonstration of Need

Techniques for Erosion Control

Passive

- Surface and groundwater management
- Veg management
- Relocation (managed retreat)

Soft Techniques

- Beach nourishment
- Reslope /revegetation
- Large wood
- Drift Sills
- Geogrids/soil lifts

Restoration

- Bulkhead removal
- Bulkhead/seawall setback
- Debris removal and beach cleanup
- Beach Nourishment (similar/same technique, different goals)
- Cross shore structure removal (groin, drift sill…)

Experimental/Uncommon Techniques

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- Breakwater
- Living shorelines type nearshore shoal
- Dynamic Revetment
- Living Dike (Canadian concept)

Marine Alternative Shoreline Training (MAST) Advisory Committee Input

Topics for Training Needs Assessment: PLANNERS

This document summarizes issues discussed July 1, 2020 during the MAST Advisory Committee meeting in the breakout session for PLANNERS. The initial portion identifies overall issues that emerged from the three different breakout groups for planners, contractors and consultants. These same themes showed up in all three groups. This is followed by comments relevant to planners and a modified list of topics for trainings based upon the conversation in the breakout session.

Overall structure for training topics:

The following 6 categories are the initial ones recommended for individual training programs. These categories could possibly be broken down into smaller training units.

1. General Concepts related to shorelines and stabilization
2. Overview of local, state and federal permit requirements
3. Key topics for conducting site assessments
4. Demonstration of Need and Risk Assessment
5. Incentive Programs
6. Techniques for Erosion Control

Overall issues related to content:

- Who is audience for assessment?
- Who is the audience for the training programs? What level of knowledge is assumed?
- What is the role of each different group (planners, contractors, and consultants) in the process of working on soft shore alternatives?
- Is there a need to develop different levels of training for each group?
- When talking about consultants, it would be useful to clarify and identify all the different types of consultants who may be involved with these types of projects.
- Clarify PURPOSE for the training (some suggestions and should clarify and create more for a final report)
    - Advising homeowners on how to make choices and move through design and permitting process
    - How to advise on water management concerns / priorities on coastal bluffs

    - advise on marine riparian forest restoration (geology, erosion, specialized restoration techniques)
- Create separate assessment for each - planners, contractors, consultants
- Clarify Definitions
    - One issue noted is the disparity in definitions between jurisdictions. This may complicate trying to come up with common definitions of terms in the training efforts
    - Consider collapsing the General Concepts area to be more concise and focus on how it relates to issues of impacts and mitigation.
- Third party review of geotechnical reports has been cited as a major issue for planners
- It is important to include in any training the question of why a project is being pursued and what stage of planning is involved.
- Risk Assessment Tool: need to revise to be more useful
    - Risk Assessment Tool
        - Not enough specificity...needs revision
        - Conservative for armor removal (pushes towards can't remove hard armor)
        - Doesn't work on parcel level (AM)
        - Improve for shoretypes/presence of structures
- The site assessment training needs to help all parties determine where to go to get information such as on-line mapping, etc.
- ADD: Section on Incentive Programs
    - Not only consultants need to know about all the existing Incentive Programs. This is a topic that should be included for all groups receiving training. This includes programs like Shore Friendly.

Issues specific to Planners

- Training needs to be easy, accessible, relevant
- Trainings need to be cost-effective
- Training development needs to be multidisciplinary, should break down silos -- in terms of topics
    - Training leaders would know the issues to cross-walk
- Training sessions should be targeted to planners, specific to the level of knowledge they need.
    - It's unhelpful to planners when they attend trainings that are too general or too targeted toward another population like contractors.
    - Chance to engage with other planners too.
    - Planners need their own space to discuss issues openly, privately
- Trainings shouldn't just be "this is the right thing to do". Needs to be "this is cost-effective and relevant to our work". Need to be conscious of realities that planners face in dealing with homeowners and contractors.
- Need to acknowledge the site-specific nature of these projects, and that solutions aren't applicable for every site. Encouraging soft shore on a certain site that's not appropriate can actually backfire if it goes wrong--soft shore can get a bad reputation.

General Concepts

- For Planners do not need in depth understanding of all of these. Only need to understand the basics and relationship to regulations.
- What do planners need to know in order to be able to read reports from experts? What information should they look for?
- How to look at erosion data rates, know which questions to ask to get more data. What data sources, what should be in the analysis. Allows for better conversations with consultants
- Need consistent methodology for review of Determination of Need in reports prepared by contractors and consultants.
- Knowledge of marine habitat should focus on what information is necessary for planners to understand no net loss reports
- Planners need to develop a fluency about what is the difference between hard and soft alternatives and the grey areas in between. This will allow for better evaluation of projects.
- Recognize and be aware of the differences between jurisdictions and definitions used by each for hard and soft solutions.
- Planners may also need training about how to discuss liability and certainty issue.

Permitting

- Key issues for planners is understanding the interaction and relationship between the different types of permits.
- Local planners need better understanding of role of tribes and the tribal consultation process.
- Planners need more information and training about how to use the pre-application process as a way to inform property owners about alternatives to bulkheads.

Site Assessment

- Planners need to know how to read and understand a site assessment
- Recognize planners do not usually conduct field assessment. How can training lend itself to “paper” understanding of site?

Demonstration of Need

- Planners need a strong understanding of demonstration of need and how that relates to cumulative risk assessments.
- It is important to note that each jurisdiction has its own DofN and CRA standards. There is no standard methodology from the state about this issue. This is something that is needed.

General Concepts for Trainings

- Coastal Processes (Note: Need to clarify how this is not redundant with items below)

- Shoreforms: Differences and how they function
- Coastal geology
- Coastal Biology
- Cultural/historical resources
- Weather
    a. Wind
- TIdes
- Fluvial Actions
- Beach alignment
- Beach forming process
- Anthropogenic impacts
- What causes erosion
- Marine Habitat and effect of stabilization on that habitat
- Shoreline Vegetation
- Trees
- Impacts of Hard Armor
- Implications of Climate Change and Sea Level Rise
- Clarifications on Hard Armor v. Soft Armor v. Restoration v. passive techniques v. living shorelines – need for some definitions of each of these
- Mitigation – how it relates to design and habitat

Permitting

Local Government

- Shoreline Master Program
- Critical Areas Ordinance
- Grading and development type permits
- Floodplain Permitting
- Stormwater permitting
- Building permits
- Relationship to Tribes
- SEPA (State Environmental Policy Act)

State Government

- Hydraulic Project Approval (Department of Fish and Wildlife)
- Water Quality (Department of Ecology)
- Construction General Permit (Department of Ecology)
- Department of Archaeology and Historic/Cultural Resources Permits (DAHP)
- Aquatic Lands Permission – actions on state owned lands (Department of Natural Resources)
- SEPA in some cases

Federal Government

- US Army Corps of Engineers
    - USACE regulating High Tide Line
    - Section 404 permits
    - Section 106 and tribal consultation
    - Mitigation Requirements
- US Fish and Wildlife Service
    - Endangered Species Act Consultation
    - Floodplain Issues
- National Marine Fisheries Service
    - Endangered Species Act Consultation
    - Floodplain Issues

Incentive Programs

- Shore Friendly
- Others

Site Assessments

Note: need more definitions for each

- Soils
- Layers
- Groundwater
- Shoretype
- Fetch
- Longshore Drift
- Landslide activity and types
- Beach texture and large wood
- Backshore features and cross sections
- Surrounding drainage and drainage control
- Site vegetation
- Cultural resources
- Target species
- Effects of actions on adjacent sites
- Proximity to aquaculture
- Water depths
    - Locating OHWM, MHHW, HTL
- Rates of erosion
    - Causes and rates of Erosion – causes, e.g. beach erosion vs flood control vs slope stabilization
- Wind info – only needed by engineer designer

- Wind roses, wind speeds, gust v. sustained
- Elevations

- Wave info - only needed by engineer designer
  - Hindcasting, forecasting, wave energy, wave prediction
  - Wave mechanics and shore-wave interaction
- Use of Checklists
- Use of Decision Trees

Demonstration of Need or Needs Assessment and Cumulative Risk Assessment

- Local Government Planning related issues (SMP)
- Pre-application meeting and its importance
- MSDG related assessment (use of assessment tool)
- Department of Ecology Demonstration of Need
- Evaluating erosion analysis under DoN -
- Cumulative Risk Assessment -

NOTE: Need better definitions for each of these. Need consistent methodology for review of Determination of Need in reports prepared by contractors and consultants.

Techniques for Erosion Control

Passive

- Surface and groundwater management
- Veg management
- Relocation (managed retreat)

Soft Techniques

- Beach nourishment
- Reslope /revegetation
- Large wood
- Drift Sills
- Geogrids/soil lifts

Restoration

- Bulkhead removal
- Bulkhead/seawall setback
- Debris removal and beach cleanup
- Beach Nourishment (similar/same technique, different goals)
- Cross shore structure removal (groin, drift sill…)

Experimental/Uncommon Techniques

- Lag Boulder intermittent breakwater
- Breakwater
- Living shorelines type nearshore shoal
- Dynamic Revetment
- Living Dike (Canadian concept)
- Hybrid use of a number of different techniques

Appendix J

LEARNING MANAGEMENT SYSTEMS FOR ONLINE LEARNING

Online classes require learning management systems upon which to build the course. Through these systems, students can access videos, track assignments, review PowerPoint presentations, and interact with instructors and peers. Currently, the Coastal Training Program is exploring possible platforms that would be approved to use by the Washington Department of Ecology or National Estuarine Research Reserve System.

There are two categories of Learning Management Systems (LMS): Cloud-Based and Open Source. A cloud-based application requires no installation, low start-up costs, and is hosted on the provider's server. Software updates are automatic, and the platform is mobile-friendly. Subscription plans offer scalability and features can be added, as needed. An open-source application requires installation and setup. One of the main advantages is that it is low-cost, with free options, making it more budget-friendly for some organizations. The system is installed on the company's server, so the user must take care of the maintenance and manage updates manually. Additional functionalities can be added `a la carte (Pappas, 2020).

The most-used LMS application world-wide is Moodle. It is available as both an open source and cloud-based platform. It is known for its modular design and open-source technology, along with high functionality. Curriculum can be built from scratch within Moodle, and the application offers the user a lot of control over their course design. It is free to download and install, and there are free and subscription-based cloud programs, as well. A Moodle community provides 24/7 free technical support (Edwiser, 2020, Sept 11). Blackboard and Canvas are two other well-known, open-source LMS applications, and there are many others emerging all the time.

Regardless of which platform is considered, some of the key features to look for include the ability to create your course within the application vs. creating all the content and videos in a separate system and then importing them into the platform; to use on mobile devices, including responsive design so that learners can participate from any location on whatever device they own; to create asynchronous content, such as videos, online readings, messaging, and question/answer forums so that students can go at their own pace; video conferencing for live trainings and face-to-face conversations; to offer message boards to help students learn from one another (Scott, 2020).