CHESAPEAKE BAY FOUNDATION

Saving a National Treasure

Living Shorelines are a creative and proven approach to protecting tidal shorelines from erosion. The technique consists of planting native wetland plants and grasses, shrubs, and trees at various points along the tidal water line. Plantings are often coordinated with carefully placed bioengineering materials, such as manmade coconut-fiber rolls and/or oyster reefs.

If you are considering installing a living shoreline on your site, it is important to note that in order for a living shoreline to prevent erosion, your site needs to fit a certain criteria. Also, one size does not fit all and a technique that works for one site may not work for another. The best thing to do is to educate yourself about the different options and to get to know the different attributes for your particular site.

This document is designed to help you understand the dynamics of your site, educate you on some of the different living shoreline parameters, and to help you answer the question "is a living shoreline right for my site?"

Before moving forward, we recommend downloading Google Earth Pro so you are able to answer some of these questions more efficiently. If you have any questions and a specific section or need further guidance, click the arrow icon for more details.

The content for this document is thanks to *VIMS Living Shoreline Design Guidelines for Shore Protection in Virginia's Estuarine Environment* and their *Site Evaluation PDF*.

Living Shoreline Site Evaluation

The Site Name: _____ Date: _____
Site Address: _____
Waterbody: _____

Click the drop down arrows next to each section for more information and step by step instructions on how to calculate using Google Earth Pro and other mapping tools.

Accessibility: ☐Easily Accessible ☐Not Easily Accessible

Notes:

This is one of the most important parameters to consider and is often left off of the initial evaluation. When we mention accessible, we are referring to how easy it is to get materials to your shoreline. For example, an "easily accessible" shoreline would be where a truck or trailer can drive right to it. A "not easily accessible" shoreline would be where some type of road would need to be built to access the shoreline or additional manpower would need to be hired to wheel barrow it down. This is often times a large part of the total cost.

Shoreline Orientation: ☐N ☐NE ☐NW ☐S ☐SE ☐SW ☐W ☐E

Notes:

The shoreline orientation is the direction the shoreline faces and is measured perpendicular to the shore. The orientation of your shoreline will be a big indicator of the amount of sun exposure your shoreline receives.

If shore orientations vary significantly along the length of the shoreline, they should be measured separately.

Steps to determine your site's shoreline orientation:

1. Navigate to Google Earth Pro on your computer (If you have not downloaded this already, we highly recommend!)
2. Once the program is open, type in the address for your site in the search button located in the upper left hand corner.

3. Once you have zoomed into your site, click the drop pin icon (in yellow) and add your site name. This will allow you to easily navigate to your site if you lose track of your spot. To move the pin point, just click on it and drag it to the correct location.
4. Once you have pinned your spot, locate the compass on the upper right hand side. This will help you determine your site orientation.

Site Length(s):

Notes:

Understanding your site length(s) is important when it comes to financial decisions and product choice.

Steps to determine your site length(s):

1. Once you have determined your orientation, navigate to the measure tool (similar to this icon : 
2. Once the ruler box opens, click path and change the measurement to feet.
3. Locate one end of your shoreline (don't start in the middle) and using your cursor, click along your shoreline at various points until you reach the other end.
4. The feet will auto populate and you can jot down this number in the provided space above.
5. Make sure you click save so your line with stay visible.

Bottom Suitability: Can you walk on it? ☐ Yes ☐ No

Notes:

A hard sandy bottom is ideal for many reasons:

1. Less material needs to be purchased if you plan to use an oyster reef sill or rock breakwater. If it is a muddy bottom, the materials will sink. This is not a deal breaker but it will increase the cost of the total project.

2. Ability to maneuver along the shoreline is more efficient. If the shoreline is a hard sandy bottom, the need to create a suitable path to bring materials down to the shoreline is not necessary. Again, this is not a deal breaker but it will increase the cost of the total project.

Erosion Source/Cause: ☐ Wave Energy ☐ Upland ☐ Both

Notes:

The erosion issue can either be from continued impact from waves or can be from upland runoff. This will be a major indicator on the methods used to control erosion.

Average Fetch(es):

Notes:

When submitting a Group 2 JPA for Living Shorelines, if the fetch is greater than 1 mile, then it will not get permitted by VMRC.

Fetch is one of the most important measurements when determining if a living shoreline is appropriate for your site. Fetch is the distance wind travels over open water. A site with a large fetch has the ability to generate a lot of wave energy. A site with a low fetch will have little to no wave energy generated by wind.

Average Fetch is calculated by determining the distance to the far shore along five transects. A transect is a straight line that traverses across the open water to the opposite shoreline.

Here is how to calculate Average Fetch:

1. Locate your measure tool on Google Earth and once the ruler box appears, click line and change measurement to miles.
2. Locate the middle of the site length line you created previously and click the line.
3. Now drag your mouse and draw a line to the opposite shore that is perpendicular to the site.
4. Record the "Ground Length."
5. Make sure you click save to ensure the main transect line remains.
6. Repeat this for the four additional transects, two on either side of the main transect.

- Note on the opposite shore, the lines need to 22.5 degrees apart. For now, just estimate that.

7. Once you have all five measurements, plug them into this equation: [(F1+F2+F3+F4+F5)/5].

Depth(s) Offshore:

Interactive Map Link

Notes:

Depth Offshore is primarily looking at the near-shore gradient. This is the slope of your shoreline and will be a large indicator if a living shoreline will work at your site. This is important to do this on site rather than on the computer but VIMS does provide a link to show the 3' and 6' contour. The distance from the shoreline to the six-foot contour reflects the extent of the near-shore shelf.

Field verify:

1. Walk out perpendicular to your shoreline.
2. Indicate the depth as you walk out.

The interactive map link above provides the contour lines -3.3 feet and -6.6 feet to help provide a rough estimate before field verifying. **Below are step-by-step instructions on how to use the online map:**

1. Click the link above and once the URL has loaded scroll until you see "Bathymetry_Line.kml."
2. Click this and you will notice a file will start to download onto your computer.
3. Once the file is completely downloaded, double click to open it. You may need to navigate to your downloaded files in your file explorer.
4. Once you double click, it should open in Google Earth Pro.
5. Once the file is completely loaded into Google Earth Pro, type in the site's address to zoom in. You will notice two lines once the map zooms in. The red is -6.6 feet and the yellow is the -3.3 feet.
6. Using the measure tool (follow the same steps for calculating fetch), draw a 30-feet line perpendicular to your shoreline. Do this along several parts of your shoreline.

Nearshore Morphology(s): ☐ Bars ☐ Tidal Flats

Notes:

A site's nearshore morphology(s) evaluates the occurrence or lack of offshore tidal flats and sandbars.

Extensive tidal flats and/or sand bars will act to reduce wave action against the shoreline. Sand flats can indicate that a hard bottom will hold a structure with minimal settling.

Due to the change of shoreline year to year, Google Earth is not a completely reliable source. It is best to evaluate the near-shore morphology on site during low tide. You can still use Google Earth to get an idea before visiting the site.

Existing Upland Vegetation(s): ☐ Spartina Alterniflora ☐ Phragmites ☐ Large Trees ☐ Salt Bush

Notes:

Understanding what is already growing at your site will give an idea of what should be planted in the future.

This to make note of when evaluating:

- Elevation where the Spartina Alternaflora is growing. Spartina Alternaflora likes to get its feet wet two times a day at high tide. This elevation will also need to be how much back will need to laid down.
- Phragmities are an invasive species and will take over a shoreline. It is very hard to get rid of phragmities and if you have this
- If large trees are shading your shoreline, they may need to be limbed up to allow for full sun exposure.

Sun Exposure: ☐ Full Day ☐ Half Day ☐ None

Notes:

This is a very important parameter for planting. The more sun exposure the better!

There are various ways to see sun exposure. The best would be just to field verify. Some things to look for when doing the site visit:

1. Where are the plants currently growing?
2. Are trees blocking the sun? If so, some limbs may need to be cut down.

Oysters: ☐ Oysters Present ☐ Oysters Not Present

Interactive Map Link Oysters

Notes:

On site evaluation:

A good indicator if oysters can grow on your site is if you see oyster already living on the shoreline.

Evaluate on the computer "Interactive Map Link Oysters":

Site suitability for installing an oyster reef is determined by the bottom type (needs to be firm enough to walk on), the salinity level (needs to be above 8 ppt), the Mean Low Water Line (needs to be below this line), and the fetch (needs to be low to medium). The "Interactive Map Link Oysters" will help answer some of these questions. Please note that this map is designed for educational use only.

Tide Range(s): MLW =_____ft. and MHW = _____ft.

Interactive Map Link

Notes:

A site's tide range is an important parameter for determining the size and crest height of project structures. Mean Low Water and Mean High Water will need to be indicated on the permit drawings. Often times, this parameter is best done on site but the "interactive map link" will allow you to get an idea before doing a site visit. See how to below.

On site:

1. Schedule the site visit at low tide.
2. Find the tide line on a fixed structure and measure the height from MLW line to MHW line.

On computer:

The “Interactive Map Link” will navigate you to the Oyster map you viewed above. Use the Mean Low Water layer to determine your tide range.

1. Type in your address in the search window on the left side.
2. A blue or blue green color should appear next to your site. Click that color and a pop-up will appear.
3. This will provide the tide range for your site.

Summary: