Managing Shore Zones for Ecological Benefits

HANDBOOK

HUDSON RIVER SUSTAINABLE SHORELINES

Managing Shore Zones for Ecological Benefits

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We gratefully acknowledge the support of the National Estuarine Research Reserve System Science Collaborative, a partnership of the National Oceanic and Atmospheric Administration and the University of New Hampshire.

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Cover photo: Heather Parsons

Contents

Why manage shore zones?

Shore zones are ecologically valuable and attractive to people, but have been badly damaged by many human activities. They need careful management if they are to provide their greatest benefits to nature and to people.

The purpose of this handbook is to offer suggestions for practical ways that landowners and land managers can protect shore zones and increase the benefits that they provide. Although targeted at the Hudson River, many of these suggestions will be helpful for managing shore zones along lakes, rivers, and estuaries elsewhere.

The shore zone: where the water meets the land

The shore zone is the area along the margin of bodies of water such as lakes, rivers, estuaries, and the ocean. It includes the shallow water offshore and the land next to the water, as well as the shoreline itself.

Many kinds of plants, animals, and fish live in shore zones, or migrate through them. Healthy shore zones can protect the water by capturing pollution running off from the land, protect the adjacent land by absorbing energy from waves and currents, and protect the land downstream from floods. People like to live in or visit shore zones to swim, fish, hike, watch birds, boat, or just relax and enjoy their beauty. People also use shore zones for transportation (roads, railroads, ports), waste disposal, resource extraction (water withdrawal, mining, commercial fishing), and other industrial uses. These many uses are not always compatible with one another, again pointing out why shore zones should be managed carefully to meet the many needs of people and nature.

web resources:

Hudson River Sustainable Shorelines
Information about ecology and engineering of shore zones, local demonstration sites, free publications, downloads, and useful links.

www.hrnerr.org/hudson-river-sustainable-shorelines
www.dec.ny.gov/lands/81956.html

Shoreline structures can last for decades, so should be carefully planned to get them right. This shore zone will provide low ecological benefits for many years.

THINK BEFORE YOU ACT

Many actions used to manage shore zones are expensive and can have long-term or even irreversible consequences. Decisions about how to use shore zones often have long-term effects – if you decide to build a park or a parking lot, you're not likely to abandon it after just a year or two.

The design life of many structures used for shoreline defense (such as bulkheads and revetments) is decades. If you make a mistake in planning, you could be living with it for a long time! Therefore it makes sense to plan carefully, and consider multiple options before beginning a project. Make sure you're making the best choices for the people and wild species that share the shore zone and that you are spending your money wisely.

Rising sea levels will flood areas along the Hudson and other coastal waters that are now usually dry.

Plan for changing water levels

Water levels along shorelines are changing rapidly all around the world. If you don't plan for future water levels, your project may end up under water (or high and dry), destroying its effectiveness and wasting your money. Before you begin to build, learn how water levels are likely to change at your site (a good resource for the Hudson is Scenic Hudson's sea level rise mapper), and plan accordingly.

web resources:

Sea Level Rise Mapper
www.scenichudson.org/slr/mapper

NYS Sea Level Rise Task Force Report
www.dec.ny.gov/docs/administration_pdf/slrtffinalrep.pdf

Responding to Climate Change in New York
www.nyserda.ny.gov/climaid

Different kinds of shoreline treatments should be used in different settings.

Match the solution to the problem

Each site has its own characteristics, limitations, and intended uses. You wouldn't tell all your friends to buy the same pair of pants, regardless of their size or what they're going to use the pants for (gardening vs. attending dinner at the White House), so don't try to use the same shoreline treatments on every site! Think carefully ahead of time about the setting and uses of the site, and make sure that the solution you choose actually fits the problem you're trying to solve.

Learn the legal landscape

Many activities in the shore zone, including many that are recommended in this handbook, require permits from federal, state, or local authorities. Learning what is legal, regulated, or forbidden well before you build or even file a formal application for a project can prevent disappointment, delay, and even fines.

If it ain't broke…

Make sure that you really have a problem before you spend money and time trying to fix it. A certain amount of flooding and erosion is natural (and even beneficial) in the shore zone, and many uses of sites in the shore zone are perfectly compatible with modest or occasional erosion and flooding. Before embarking on a project, always seriously consider the "no action" alternative.

web resources:

Basic regulatory guidelines for the Hudson River

www.hrnerr.org/hudson-river-sustainable-shorelines/regulatory-guidance

Determine whether your shoreline really is eroding

www.hrnerr.org/hudson-river-sustainable-shorelines/shorelines-engineering/shoreline-eroding

Choose treatments that provide physical and ecological diversity. Photos by HRSSP.

ENCOURAGE **PHYSICAL** AND **ECOLOGICAL** DIVERSITY

Neither nature nor people like monotony. Shore zones that contain varied contours and multiple kinds of materials will be more pleasing to people, support more kinds of plants and animals, and provide more ecological benefits than a flat, open lawn. A good general rule is to increase the physical and biological complexity of shore zones, whenever it is feasible.

A site that is graded unevenly to produce small ponds and ridges (left) is more ecologically valuable and visually interesting than one that is graded evenly (right).

Don't grade evenly: Leave swales, puddles and ridges

Although straight lines and even grades may look good on a blueprint, they don't provide good habitat for diverse communities of plants and animals. Uneven sites may also make it easier for rainwater to soak in, or pollution to be removed before it reaches the water. When designing a site plan, try to leave existing irregularities, or create new ones.

Rough, physically complicated shores (left) provide better habitat than smooth, simple shores (right).

Use rough, mixed materials for shore defenses

Rough surfaces provide more places for plants and animals to grow and hide than smooth surfaces, and a mixture of materials provides habitats for more kinds of species than a single material can.

When you can, use several kinds of materials in your shore defenses, and choose rough materials over smooth ones.

case study: Esopus Meadows


photo by Scenic Hudson

before


photo by Scenic Hudson

after

A degrading bulkhead was replaced with softer stabilizing alternatives that still provide shoreline protection. A stone toe was placed at the high tide line and soft gabions positioned above it help hold the soil in place.


photo by michiganseagrant

Make shorelines sinuous or pocketed in bird's eye view

A perfectly straight shoreline reflects waves and doesn't offer much variety of habitat or places for animals to get out of the waves and currents. A less regular shoreline can absorb more wave energy, and provide more and better habitat for plants and animals. If you're rebuilding a shoreline, consider giving it coves, pockets, or an irregular outline.

When landscaping, use a variety of plant species and types

Plants provide both physical habitat (places to hide, perch, and nest) and food for the animals of the shore zone. The more kinds of plants that you have, the more habitat you will provide to the animals that live along the shore. So try to plant herbs, shrubs, vines, evergreens, and deciduous plants, and resist the urge to plant just one kind of plant because it's cheap and easy.

Native species tend to support more kinds of insects and birds than nonnative species, so use native species if you can.

web resources:

New York State Invasive species
www.nyis.info

Native plants
www.wildflower.org
www.plantnative.org

In contrast to the shore zone on the left, which is sparsely planted with a single, non-native plant, the planting on the right includes a wide range of native plants, and is attractive to wildlife as well as people.

Include as much vegetation as possible, on both land and water side, for multiple benefits

Shore zones that are structurally complex can provide multiple benefits: habitat for animals, buffering against waves, ice, and currents, and more. Vegetation is an inexpensive, adaptable way of adding structure to a shore zone that also provides food for animals and beautifies your site.

This tidy landscape provides little habitat for shore zone plants or animals.

RESIST TIDINESS

Many people like tidy surroundings. Tidiness is fine in your home or office, but not ideal for shore zones. The trouble is that tidy sites don't provide good homes to plants and wildlife – what you might call "clutter", a bird might call "habitat". What's more, tidy shore zones can be expensive to maintain (somebody has to keep everything trimmed and picked up!).

So when you visit or manage the shore zone, try to leave your inner Martha Stewart at home, and see a tidy shore zone the way nature does – as a desert. Here are a few ways that you can keep your shore zone a little sloppy, the way that nature likes it.

Leave driftwood and wrack in place when you can

Many people try to make the shore look tidy by removing the driftwood and plant matter (wrack) that washes up on the shore. However, driftwood can provide places for birds to perch, and fish and other animals to hide. Wrack provides food and shelter for insects and other tiny animals that birds feeding along the shore can eat.

It's certainly okay to remove trash and other unsightly or dangerous debris, but try to leave some driftwood and wrack for nature.

It is normal for driftwood and wrack to wash up on shores, where it provides food and shelter to shore zone insects, birds, and other animals.

The tidy shore zone on the left provides less cover and habitat than the shrubbier one on the right, in which beneficial native bushes have been planted.

Leave brush and shrubs in place (or even plant some!)

Tidy landscapers favor open lawns or lawns with a few tall trees. But wildlife favors shrubby areas with lots of places to hide, feed, or build a nest. If your site includes areas that don't have to be kept open, let some shrubs and brush grow, or even plant shrubs with high value to wildlife.

web resources:

Native plants
Information on using native plants for wildlife habitat and conservation landscaping.

www.nps.gov/plants/pubs/chesapeake/pdf/chesapeakenatives.pdf
www.sunywcc.edu/about/npc

Why use native plants?

Native plants are adapted to local soils and climate conditions and wildlife evolved with them using native plant communities for food, cover, and rearing young. Using native plants helps to promote diverse ecosystems.

some native alternatives to common invasive species

Ulmus americana 'American elm'
instead of: Norway maple

Viburnum cassinoide 'Wild raisin'
instead of: Burning bush

Lonicera sempervirens 'Honeysuckle'
instead of: English ivy

Viburnum lantanoides 'Hobblebush'
instead of: Forsythia

Verbena hastata 'Vervain'
instead of: Purple loosestrife

Physocarpus opulifolius 'Ninebark'
instead of: Barberry

source: www.sunywcc.edu/cms/wp-content/uploads/2012/09/Native-Alternatives-to-12-Common-Invasive-Plants.pdf

Don’t mow right down to the water’s edge

A lawn that reaches right to the water’s edge may look orderly, but provides poor ecological value, and opens up the shoreline to erosion. Except where people need access to the water, try to preserve a buffer strip of unmowed vegetation. Wider buffer strips are better, but even a 10-foot wide buffer is much better than a mowed lawn.

A lawn that is mowed to the water’s edge allows erosion and provides little habitat for birds and wildlife.

unmowed vegetation...

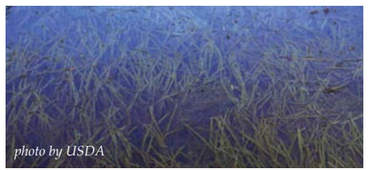
- prevents erosion
- provides habitat and food for animals in the water and on the land
- absorbs the energy of waves and currents
- prevents pollutants from running into the water

Leave dead wood in place where you can

Dead wood may look unsightly, but it provides habitat for animals. Woodpeckers, owls, and squirrels make their homes in dead trees, birds and turtles perch on snags and driftwood, and fish hide under logs. Unless it is hazardous, try to leave dead wood in place so that animals can use it.

Don't clear aquatic vegetation unless absolutely necessary

People think that "weeds" in the water look messy and impede swimming and boating. However, these "weeds" are among the most desirable habitat for fish, waterfowl, and other animals, and can help to absorb the energy of waves and currents, and thereby reduce shoreline erosion. Don't clear aquatic vegetation or cover it with sand or geotextile unless your site use demands it.



water celery

three-square

spatterdock

Many aquatic animals use aquatic vegetation for food and shelter.

DON'T SQUEEZE THE SHORE ZONE

It's pretty obvious that if you squeeze a shore zone out of existence, it can't provide any benefits to people or nature. Yet it is very common for people to narrow shore zones by adding fill to raise the elevation of the land, or dredging to make the water deeper. These practices diminish the ecological value of the shore zone. Try to keep the shore zone as wide as possible to maximize its benefits to people and nature.

This wall next to deep water eliminates valuable shallow water habitats.

If you're reworking a site, consider grading to reduce steepness

If you're reworking a site where the bank was artificially steepened in the past, take the opportunity to regrade the site to a flatter grade. This will provide multiple benefits, including increasing the area of valuable transitional habitat near the water's edge for plants and animals, making it easier for animals like turtles to move between the water and the land, and reducing wave reflection.

Because disturbance associated with construction can cause erosion and other problems, it is generally not a good idea to regrade a site unless you are already working on the site for some other reason.

Leave areas near the elevation of the shoreline

Marshy or wet areas along the shore often are regarded as useless, because they're too shallow to float a boat and too wet to use for hiking and picnicking. But it is just these transitional areas that are so valuable as nursery and feeding grounds for fish, habitat for birds, and places where wave energy and pollutants can be absorbed.

Remember that although such places may look useless to a boater or ballplayer, they are ecologically valuable. Don't destroy them.

Filling the transition zone between land and water can destroy ecologically valuable habitats.

PREVENT POLLUTION

Pollution in the shore zone packs a double punch. Pollutants like pesticides, road salt, and fertilizers can harm the plants and animals in the shore zone (or the people who use the shore zone). Then, because the shore zone is so close to the water, these pollutants can wash into the water and harm fish and wildlife in the water. So there are excellent reasons to try to keep pollutants out of the shore zone.

road salt

motor oil

fertilizers

Minimize the use of harmful substances, which can easily run off into the water

Obviously, the shore zone is right next to the water, so it's very easy for any chemicals to run off into the water after a storm. Be careful about applying substances such as road salt, fertilizer, insecticides, fungicides, and herbicides in and around the shore zone – use as little as possible, and keep away from the water's edge. And always read the label before applying pesticides! Many of them are not supposed to be used in or around water at all.

avoid using...

- road salt
- fertilizer
- insecticides
- fungicides
- herbicides

Don’t store harmful substances in the shore zone

Storing harmful chemicals in the shore zone is asking for trouble. Sheds and tanks can leak or fail during a disaster or a flood, and it’s common to spill or leak a little material even during normal operations. And once these harmful substances are spilled, it’s just a short trip to the water’s edge.

A storm, flood, or a leak could release any harmful materials stored in this shed into the river.

Try not to disturb soils or sediments on the land or in the water

When you disturb soils on the land or sediments under the water, you can encourage erosion, kill and damage plants and animals, and degrade the quality of the habitat. Activities like excavation, or driving or parking heavy vehicles on soft soils, should be done sparingly in both the land and water side of the shore zone. If soils and sediments must be disturbed, use best practices such as silt fences and plantings to minimize damage and speed recovery.

Construction activities can cause erosion; management practices such as use of silt fences may lessen harmful impacts of necessary construction.

Manage surface runoff and drainage water so that you don't start erosion

Runoff, especially from impervious surfaces such as roads, roofs, and parking lots, can cause erosion, damaging your site and opening up your shoreline to further erosion from waves and currents. The soil and sediment that is washed away by this erosion often ends up in nearshore waters, where it smothers plant life and fish eggs and damages habitat quality.

web resources:

Stormwater best management practices
Ideas on how to manage runoff.

water.epa.gov/polwaste/npdes/swbmp/index.cfm
www.dec.ny.gov/chemical/8694.html


photo by Sickter6

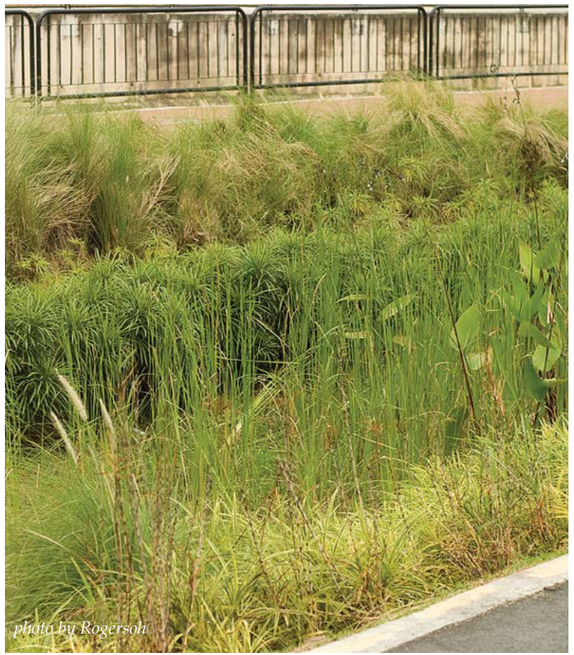


photo by Rogerson

Careless handling of runoff can lead to erosion (left), but use of devices such as rain gardens (right), which capture runoff and let it soak into the ground, can minimize such problems.

REDUCE DAMAGES FROM **WAVES**, **WAKES**, AND **CURRENTS**

Waves, wakes from recreational boats and commercial ships, and currents can erode shorelines, and damage or kill plants and animals living in the shore zone. Because these forces often arise outside the shore zone, it can be challenging for you to manage them. Nevertheless, here are a few things that you might do to reduce damage from waves, wakes, and currents.


photo by VViki media

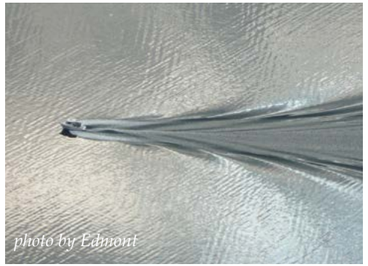


photo by Edmont


photo by NOAA

Post and enforce no-wake zones

If your site is frequently used by recreational boaters, boat wakes may damage shore defenses, cause bank erosion, and disturb or kill plants and animals along the shore. Post signs to remind boaters that the speed limit for boats within 100 feet of the shore in New York State is generally 5 mph.

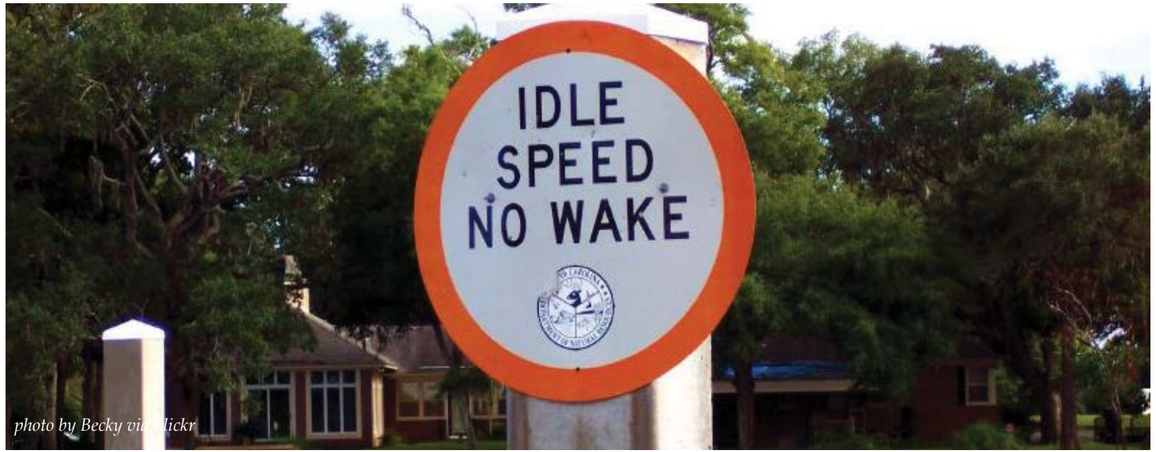


photo by Becky via flickr

Avoid using shore defenses that reflect wave energy

Shore defenses that are hard, smooth, or vertical reflect wave energy back into the water instead of absorbing it. This can cause erosion offshore or up- and downriver of the defenses, damage or kill plants, fish, and other animals that live along the shore, and cause problems for recreational boaters and swimmers. If you can, design shore defenses to absorb rather than reflect wave energy by making them sloping instead of vertical, and soft and rough instead of hard and smooth.

Vertical walls reflect wave energy and cause nearshore erosion.

Consider using rock sills to protect soft shorelines

A rock sill just offshore can absorb energy from waves, wakes, currents, and ice, and protect soft shorelines. It also can itself provide physically complex habitat.

Caution: rock sills are not permitted in some jurisdictions where underwater fill is prohibited. Check with your regulatory agency.

A rock sill with wetland protects a shoreline from erosion and provides good habitat.

A well-vegetated shoreline may protect the area behind it from waves and currents during floods

During high water, waves, wakes, currents, and ice reach areas that are normally dry, and which may be especially vulnerable to erosion. Structures such as fences and buildings may likewise be subject to damage.

A well-vegetated shore zone can absorb the energy from waves and currents, and keep ice and floating debris from encroaching on your site, thereby protecting these vulnerable areas and structure from erosion and damage.


photo by NOAA


photo by DEC

Vegetation in the shore zone can protect the land from damage from ice, currents, waves, and wakes.


photo by Jon Miller

Regularly inspect and maintain structures and vegetation

Regular wear and tear, storms, and vandalism can damage shorelines, shore defenses, and vegetation, making them unable to perform their intended functions and leaving them open to further damage or even failure.

Regular inspection (especially after storms), maintenance, and repair can keep your shore zone structures performing like they're supposed to, and prevent costly repairs or replacement of badly damaged or failed structures.

TREAD LIGHTLY

Humans love shore zones so much that heavy or uncontrolled human activity sometimes seriously damages shore zones by causing erosion, or killing or disturbing plants and animals. If we want to avoid loving shore zones to death, we may need to guide or control recreational activities in the shore zone.


photo by Juan Alberto Puentes Puertas


photo by Shinya Suzuki


photo by Diane Cordell

Use paths, plantings, and signs to direct visitors away from sensitive areas

Heavy activity from human visitors can trample plants, disturb animals, and erode or compact soils. Your site may contain sensitive areas (for instance, areas with soft or erodible soils, rare plants, or nesting birds) that would benefit from reduced human activity. You can direct people away from these sensitive areas by using signs, routing paths away from these areas, or placing plantings or fences to discourage human access.


photo by Dave Strayer

Paths and plantings can guide visitors away from sensitive areas.

Direct traffic away from erodible sites along the shore

Too much traffic from people, bicycles, or cars will kill plants, damage structures, and lead to shoreline erosion, especially on steep shorelines or soft soils. Once such erosion gets started, it can be hard to stop. You can prevent this by using plantings, paths, signs, or fences to direct people away from sensitive sites, concentrating shoreline access on places that are less prone to erosion, or using structures such as boardwalks or armoring to protect sensitive sites where access must be allowed.

Using signs, barriers, and a new path to direct people away from an eroding shoreline.

Boardwalks can allow access to areas with wet or erodible soils, while keeping visitors out of sensitive areas.

Use boardwalks to prevent trampling of sensitive areas

Some parts of the shore zone can be damaged even by light foot traffic. Boardwalks can be useful in preventing damage to soft, wet soils or plants, and have other important benefits – they help you control your visitors and keep them from walking through sensitive areas. Plus, they help your visitors keep their feet dry!

Be sure to allow enough space under the boardwalk so that it doesn't block animal movement.

Keep livestock out of the shore zone

If you think that hikers can damage shore zones, you should see what a herd of cattle can do!

Livestock can trample plants, erode soils and shores, and (putting it delicately) contribute nutrient pollution to the shore zone.

You can keep livestock out of the shore zone by using fencing and by providing an alternative source of water for them to drink.

Livestock can cause shoreline erosion.

Limit the number of shoreline access points

If you let people have access to the entire shoreline, then none will be left for the plants and animals that make the shore zone their home. Try to share the shore zone by channeling people to carefully selected spots to meet their needs, and leave the rest for nature. You can do this by offering amenities such as swimming beaches, picnic tables, benches, and fishing piers at the chosen access points, or by using paths, signs, and vegetation management (planting and mowing) to direct your visitors.

The shore zone on the left is completely mowed for hundreds of feet, offering little or no habitat for plants and wildlife. The shore on the right is carefully managed to allow views and access to the shore for people, but leaves much of the shore for nature.

Don’t run trails directly up and down slopes

Trails running straight down a slope tend to erode badly, unless they are built and maintained carefully. Try not to run paths up and down steep slopes, or if you have to, use devices like waterbars, check dams, or rolling grade dips to prevent erosion.

web resources:

Trail Construction and Maintenance Notebook — Information on how to build and maintain good trails.
www.fs.fed.us/t-d/pubs/htmlpubs/htm07232806/toc.htm

This steep shoreline path is eroding, damaging vegetation and carrying sediments into the water.

DON’T MAKE DEAD ENDS

Shore zones are highways for many animals such as migrating birds and fish. Even non-migratory animals move through shore zones to find places to feed, shelter, or breed, or move to new habitats. These movements can be along the shore or across the shore zone (i.e., from the water to the land, or vice versa). Many times, humans inadvertently block these movements, and make life difficult or impossible for shore zone animals. Try to make it easy for animals to move through shore zones.

Don’t make barriers

Many animals need to move through the shore zone to find places to feed, nest, or rest. It doesn’t take a very big barrier to block a little animal like a turtle or a salamander that is trying to make its way through the shore zone. Where you can, avoid building steep, smooth barriers like walls, vertical edges to sidewalks, and curbs.


photo by Dave Strayer


photo by Michelle Arseneault

Walls and curbs can block animals from moving freely through shore zones.

Avoid building continuous smooth, steep walls

It’s hard for animals to get over steep, smooth walls. If you have to build a wall, whether it’s a bulkhead or a curb, try to make it easier for an animal to get over it by reducing its steepness and height, roughening its surface to provide toeholds, or providing cuts or ramps at intervals

Minimize gaps in the band of vegetation along the shore

Many animals move along the shoreline, and take cover or feed in the plants that live along the water. It’s easiest for them if they don’t have to cross large, open areas, which can expose them to predators or harsh conditions, and discourage them from using the shore zone at all.

don’t make dead ends

DON'T MAKE IT SO HARD!

Traditionally, people have hardened shorelines (bulkheads, seawalls, armored revetments) to protect waterfront property. These hardened shorelines can be effective in protecting property, but they often have harmful ecological effects. They can also cause engineering problems by encouraging scour at the base and ends of the hardened structure, and thereby damaging adjoining properties. Depending on the setting and the uses of the site, softer treatments may provide adequate engineering protection at a competitive price, and offer much better ecological value than hardened shores.

web resources:

A Comparative Cost Analysis of Ten Shore Protection Approaches at Three Sites Under Two Sea Level Rise Scenarios
A cost comparison of some hard and soft alternatives

www.hrnerr.org/doc/?doc=240186100

Use sloped shore defenses instead of vertical walls, if possible

Vertical walls provide poor habitat for plants, fish, and other animals, discourage human access to the water, and reflect waves. They often cause scour at the bottom and ends of the wall, and so may cause problems for neighbors. Unless you really don't have the space or have a use that demands a vertical wall, try to use sloped shore treatments like revetments, wetlands, sills, or beaches instead of walls.

A vertical wall (left) offers poorer habitat than a riprapped revetment (center) or sill and wetland (right), and also reflects waves.

Use natural materials for shore protection where possible

If you bring in material for shoreline protection, try to use natural materials. Natural materials (locally sourced stone, native plants) are more likely to be visually appealing and useful to shore zone animals than exotic materials or non-native plants.

See Hudson shorelines in action!

The Hudson River Sustainable Shorelines Project demonstration site network (www.hrnerr.org/hudson-river-sustainable-shorelines/demonstration-site-network) lets you see a variety of innovative shoreline treatments in the real world.

photo by michiganseagrant

photo by optimusprime2111 via Flickr

Natural or local materials are most likely to be appealing and useful to shore zone plants and animals.

Choose the softest treatment that will get the job done

Some shorelines really do need to be protected with very hard shore defenses, if the site is subject to very strong waves and currents or ice, and is protecting valuable and vulnerable infrastructure (e.g., a sewage treatment plant). Before you choose a very hard treatment, though, consider the waves, wakes, currents, and ice to which the site is exposed, and the intended uses of the site. Is the shore pounded by huge waves or just little ripples? Is a little erosion or flooding tolerable (e.g., for a nature preserve or park)? Then choose a treatment that will meet your needs while providing as much ecological value as possible.

Use permeable paving and other structures to reduce runoff

Water running off of large areas of impermeable surface (parking lots, pavement, roofs) in the shore zone can cause erosion and flooding. One way to reduce the amount of runoff water is to use permeable paving materials for walks and parking lots. Vegetated swales and rain gardens may also be useful in absorbing water that is running off of impermeable surfaces.

web resources:

Geospatial Data and Tools
Information on physical forces along Hudson River shorelines.

www.hrnerr.org/geospatial

Permeable paving used in a parking lot.

This shore zone is protected by lines of riprap and vegetation rather than an obtrusive wall.

Building too close to the shore often removes stabilizing vegetated buffers and leaves properties vulnerable to erosion and flooding damage.

BE CAREFUL ABOUT BUILDING IN THE SHORE ZONE

Putting buildings or other structures in the shore zone can cause ecological damage, in several ways. The presence of the building, and activities around it, can destroy habitat or reduce its value to wildlife. Construction of the building can cause erosion and other damage. Depending on the purpose of the building, it may bring pollution or the risk of spills into the shore zone. In addition, putting buildings in the shore zone often is subject to regulations, and ultimately may expose the buildings to damage from flooding or erosion. As a result, if you have the choice, it is often better to keep buildings and other structures out of the shore zone.

Keep non-water-dependent uses/structures out of the shore zone

Some buildings and structures have to be in the shore zone. But other structures (retail stores, parking lots, etc.) could be built anywhere. Placing these non-water-dependent structures in the shore zone needlessly exposes them to damage from erosion and flooding, consumes valuable shore zone space that could be used by nature of water-dependent uses, increases traffic in the shore zone, and often increases the risk of spills or pollution.


photo by Dave Strayer


photo by Dave Strayer

A kayak-rental shed (left) may be a more appropriate use of the shore zone than a parking lot.

Avoid new construction in the shore zone

Construction often compacts soils or opens them up to erosion, disturbs or kills plants and wildlife, and carries with it the risk of spills of fuel and other materials. It's often better to keep new construction out of the shore zone. If it is allowed, be sure to use best management practices and regular inspections to control its negative impacts.


photo by U.S. Fish and Wildlife Service

Construction activities can kill plants and animals and cause erosion in the shore zone.

Avoid using bright lights in the shore zone

Bright lights can upset the behavior and reproduction of shore zone animals, sometimes even causing mass deaths of birds, insects, and other animals. Emerging aquatic insects may be attracted to lights, not only disorienting the insects, but also resulting in large accumulations of dead insects, which can be a nuisance.

Where you can, keep artificial lights out of the shore zone. If you need lights, limit the time the lights are on, don't make them any brighter than necessary, and consider choosing types of lights that minimize their impacts on animals.

Migratory birds, like vireos, can become disoriented from bright lights.

Cleaning up emerging aquatic insects (mayflies) attracted by lights near the shore.

Glossary of some shore zone terms

Bulkhead — Vertical walls that prevent the loss of soil and erosion of the shore, typically made of rock, steel, concrete, or wood.

Impervious surface — A surface that does not readily allow water to soak in; examples include most roads and roofs.

Permeable — Readily allowing water to soak in.

Revetment — Large sloping structures that armor the bank to protect it against erosion, typically made of large rocks or concrete armor units.

Riprap — Large stone used to build revetments or armor shorelines to prevent erosion.

Seawall — A structure built parallel to the shoreline, usually on open coasts, to dissipate wave energy or hold back floodwaters.

Shoreline — The line that separates the land from the water. In New York State, the shoreline is defined to be the mean high water line.

Shore zone — The area along the margin of bodies of water such as lakes, rivers, estuaries, and the ocean, including the shallow water offshore and the land next to the water, as well as the shoreline itself.

Sill — Low-profile, continuous structures, typically made of stone, built parallel to the shore, and designed to break waves.

Swale — A low-lying area or shallow ditch, often containing plants, and often used to capture runoff and allow it to soak into the ground.

Wrack — Dead plants or other floating material that is cast up on the shore by waves and currents, often in a distinct line.

More shoreline terminology: www.hrnerr.org/doc/?doc=240189624

Sustainable Shorelines Project

The Hudson River Sustainable Shorelines Project is a multi-year effort led by the New York State Department of Environmental Conservation Hudson River National Estuarine Research Reserve in cooperation with the Greenway Conservancy for the Hudson River Valley. Partners in the project include Cary Institute of Ecosystem Studies, NYSDEC Hudson River Estuary Program, and Stevens Institute of Technology. The Consensus Building Institute facilitates the project.

The project is supported by the National Estuarine Research Reserve System Science Collaborative, a partnership of the National Oceanic and Atmospheric Administration and the University of New Hampshire. The Science Collaborative puts Reserve-based science to work for coastal communities coping with the impacts of land use change, pollution, and habitat degradation in the context of a changing climate.