WORKING WITH NATURE

A GUIDE TO NATIVE PLANTS FOR NEW YORK'S GREAT LAKES SHORELINES

Sea Grant
New York

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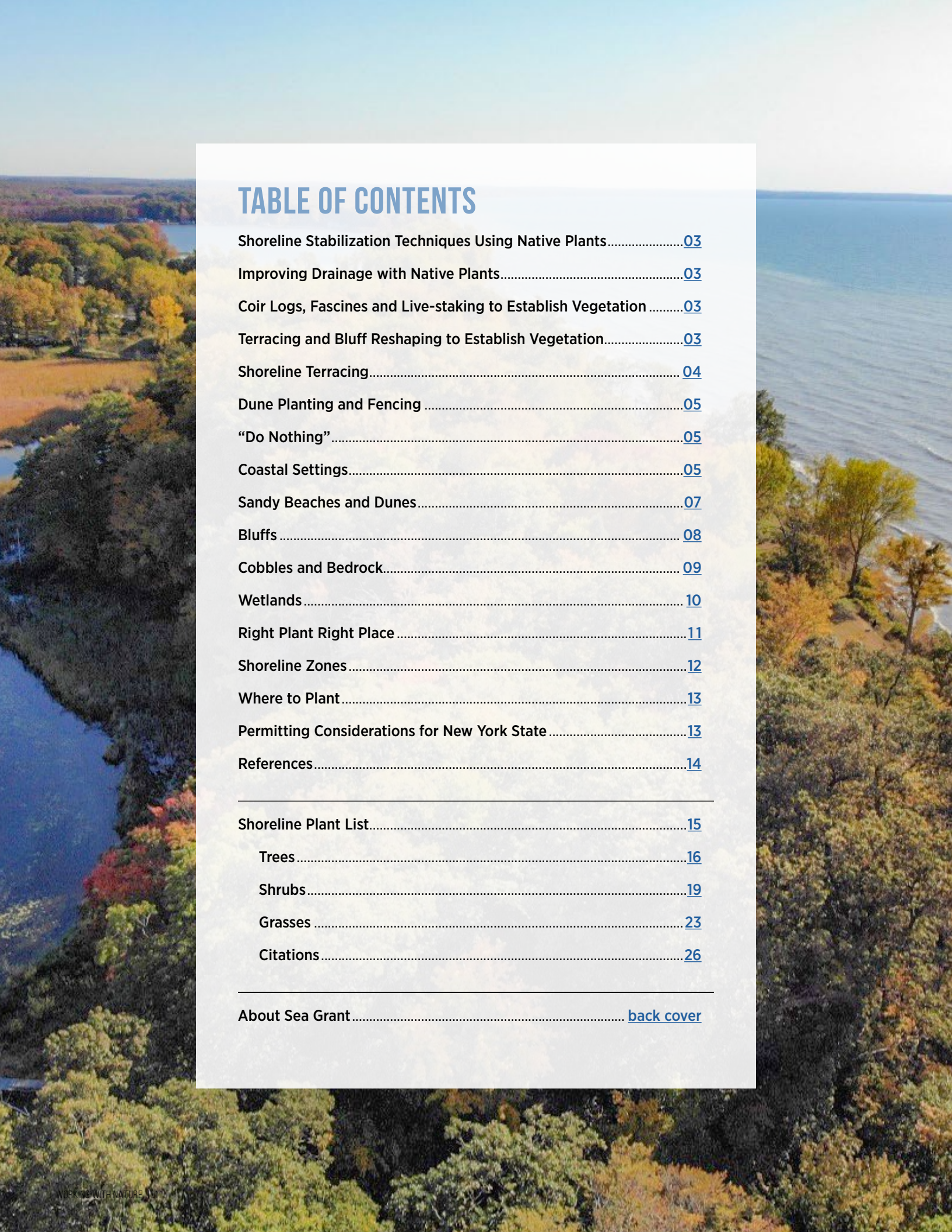

TABLE OF CONTENTS

INTRODUCTION

The hardening of New York's Great Lake shorelines by rock, concrete and steel structures has led to beaches starved of sediment, a deepened nearshore environment, and the loss of coastal habitat for native plants and wildlife. Restoring native vegetation along our shorelines is an important step in returning these shorelines to a naturally functioning state. In many cases, natural and nature-based shoreline stabilization approaches can be used in place of traditional revetments, including gray structures such as rock rip-rap, concrete seawalls or steel sheet piles.

Reestablishing natural, stable shoreline slopes and transition zones from lake to upland areas rehabilitates habitat for native birds, fish, mammals and insects while beautifying the shoreline. In many cases native plants can aid in controlling shoreline erosion and improving water quality.

SHORELINE STABILIZATION TECHNIQUES USING NATIVE PLANTS

Nature-based shoreline techniques should be considered site-specific. The slope of the shoreline and wave energy acting on the shoreline will be of greatest importance—shorelines with intense wave energy should consider more of a bioengineered approach than a low-sloping shore with lesser wave energy, where nature-based shorelines and vegetation usage may be more appropriate. Even with heavily gray or hard-structured environments, incorporating nature-based elements such as revegetation and slope adjustments can improve shoreline habitat and function. Upland areas can also benefit from the planting of native plant species, with deep-rooted trees and shrubs stabilizing soil and improving drainage of shoreline areas while absorbing stormwater.

IMPROVING DRAINAGE WITH NATIVE PLANTS

With all shoreline projects, drainage of the upland area should be considered. Water can be captured on land by utilizing rain gardens, increasing or conserving tree canopy, and by reducing mowing. Rain gardens can be especially useful in both stabilizing soils and retaining stormwater, reducing the impacts of flooding. However, rain gardens should not be used in all cases, especially near bluffs, where their concentration of stormwater can lead to further bluff instability. If used, rain gardens should be located as far from the bluff face as possible. Additionally, subsurface drainage tiles (usually corrugated plastic tubing) can be used to divert water away from bluff faces, improving their stability.

For additional options for improving drainage, please see Erosion Management for New York's Great Lakes Shorelines.

COIR LOGS, FASCINES AND LIVE-STAKING TO ESTABLISH VEGETATION

Coir logs are woven tubes of biodegradable coconut fiber that can be used in stabilizing shorelines. The logs follow the contours of the desired shoreline (parallel to a river's flow or along a lake or pond shoreline) to stabilize the soil and produce a material suitable for rooting live plants and cuttings. The coir logs are staked in place and further stabilized by using native vegetation spikes, such as willows, in addition to planting of native trees, shrubs and grasses. Fascines are similar, but may involve staking both living and/or inert bundles of sticks or cut vegetation without an outer, woven structure.

PLANTING AND DESIGN CONSIDERATIONS

Nature-based shorelines will not be applicable in all locations. Shoreline property owners must consider many factors, including the slope of the shoreline, distance from the shoreline for any permanent dwelling or infrastructure, the degree of wave action, erosion control methods on adjacent properties, and of course, cost. While nature-based shorelines provide a low up-front material and installation cost, there is more maintenance needed over time. It is also important to consider what assets are most at risk of loss due to shoreline erosion on a given property.

▲ *Wood stumps and rootwads used to stabilize a cobble beach, Wayne County, NY. Here, large woody debris is buried within the barrier bar and anchored in place. Wave energy is reduced when the waves crash into these features, knocking suspended sediments out of the water and creating a place for cobbles and gravel to build up the shoreline. Photo by Roy Widrig, New York Sea Grant.*

SHORELINE TERRACING

TERRACING AND BLUFF RESHAPING TO ESTABLISH VEGETATION

In addition to coir logs, coir mats are also available that can stabilize broad, flat areas of exposed soil, such as those soils susceptible to erosion after construction projects. Mats are especially effective when coupled with shoreline slope stabilizations, such as terracing or bluff reshaping. Roots from native vegetation entwine with the mats, creating a more stable surface less susceptible to rainfall, stormwater runoff and wave action. Terracing involves creating a stepped shape to the shoreline, where steep bluff material is removed and flattened out. Reshaped bluffs can be further stabilized by the addition of toe protection, which will require immediate re-planting of the slope with ground cover and shrubs to keep exposed soil in place.

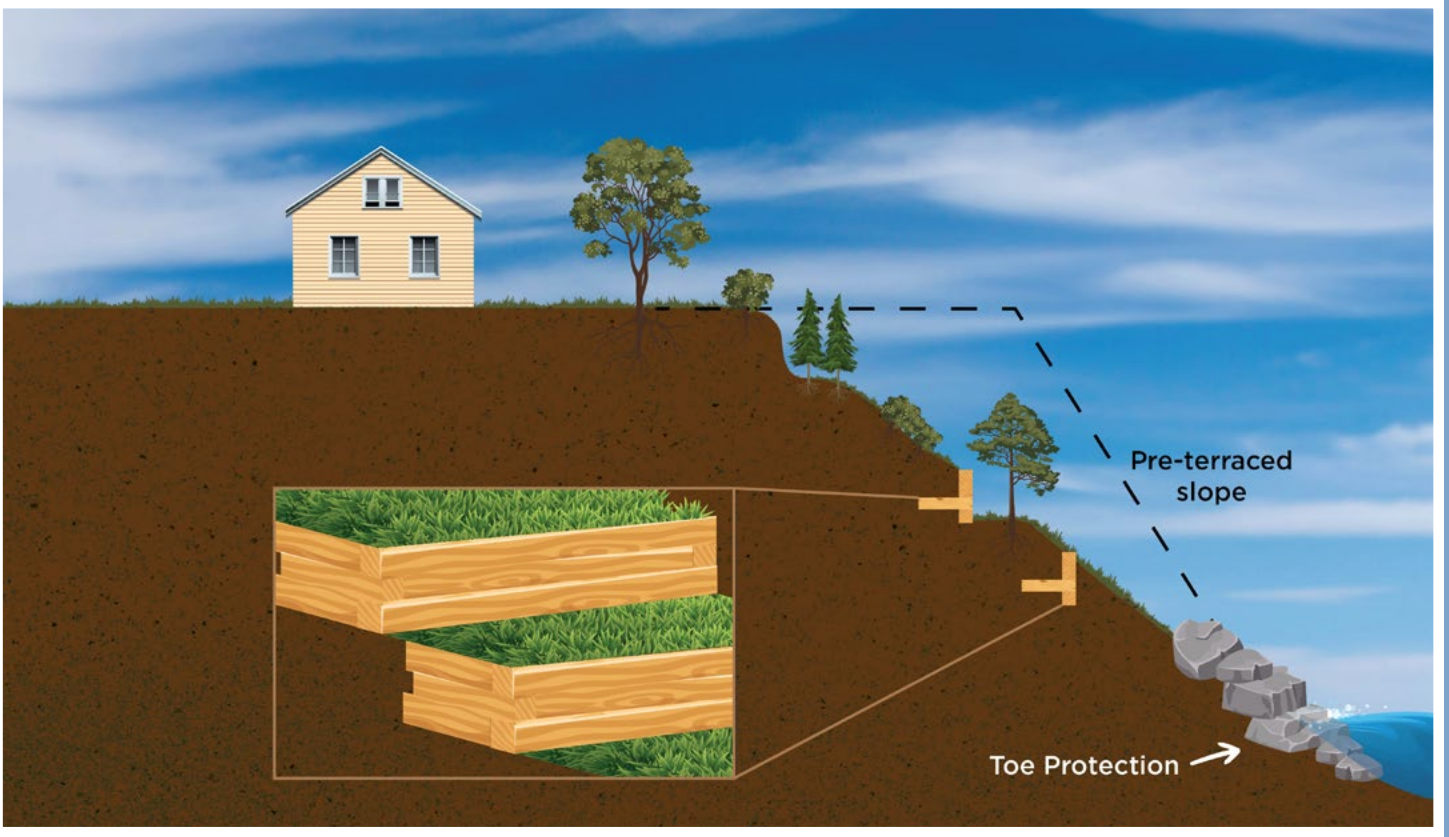

Figure 1: Regrading or terracing a slope and planting bare spots with vegetation that provides a good ground cover and binds the soil with its root system can lessen surface erosion caused by the action of rain and wind.

▲ *Sand is deposited on the leeward (downwind) side of fencing on the Lake Ontario shoreline at Sandy Pond. Sand fencing contributes to the restoration of sandy beaches by trapping sand behind the fence line and allowing native vegetation to reestablish. Photo by Roy Widrig, New York Sea Grant.*

DUNE PLANTING AND FENCING

Where appropriate, dune fencing can allow for the building of lakeshore dunes and the healthy restoration of the dune ecosystem. Fencing knocks wind-blown sand grains out of the air to encourage build-up of dunes, in time stabilizing the system or rebuilding what can be lost during storm events. Replanting dunes with native beach grass will also help the accretion of sand, contributing to the long-term health of the dune.

DO NOTHING

A "do nothing" approach maintains the shoreline as is, meaning no hard structures are put in place, and the landscape is allowed to evolve in step with shoreline erosion and accretion. This option involves no protection from the recession of the coastline, but maintains the coastal processes in the area by not disturbing the nearshore zone, and could allow for a rebound of the shoreline to natural conditions. Establishing a "no-mow zone" near the lakeshore allows native plants to regenerate where only turf grass would grow before, aiding in the retention of stormwater and restoration of the natural environment. It is important to note that without active management to maintain desired native plants, there is a potential for the introduction of nuisance and invasive species, potentially establishing a monoculture and diminishing the visual appeal and habitat value of the shoreline.

COASTAL SETTINGS

Lake Erie and Lake Ontario provide an array of geologic settings for shorelines. Lake Erie features extensive shale cliffs and beaches composed of coarse sediments created by their erosion. Lake Ontario, however, lacks prominent bedrock shores except for the northeastern shores in Jefferson and St. Lawrence County. Ontario shores are often composed of glacial sediments, loosely consolidated (and easily erodible) in the forms of bluffs, sand dunes, barrier bars and spits. Eroding drumlins (elongated, often steep-sided hills formed by glaciers) leftover from the last glaciation of the region, are truncated at the shoreline and rapidly eroded by Lake Ontario, forming high bluffs along the southeastern and southern shoreline.

Different plants will thrive in some locations and struggle in others. Plants that thrive in a marsh or wetland may not work on a cobble beach or along a coastal bluff. It is important to observe naturally occurring plants in your location that have a history of thriving locally. Consulting with experts, such as Cornell Cooperative Extension's network of Master Gardener volunteers, will help you in finding the right plant in the right place.

EROSION AND ACCRETION

Erosion and accretion are natural processes that shape the changes to New York's Great Lakes shorelines. With shoreline erosion, particles of soil, sand, gravel and rock are pulled from the shoreline by waves and returned to the littoral zone, where sediment is moved around close to and along the shoreline by wave action. Littoral drift is the process of moving this sediment along this nearshore zone, which on Lakes Erie and Ontario in New York, moves dominantly from west to east. Accretion is where this sediment builds up and becomes a coastal landform, including beaches, dunes, barrier bars and spits. Sediment in the littoral zone is key to conserving these natural shoreline features.

▲ *Drumlins along the southern shore of Lake Ontario form steep, unconsolidated bluffs that erode rapidly in times of high water and intense wave action. Lack of shoreline ice during the winter exacerbates this process, first starting at the toe of the bluff and causing slumping further up, causing large chunks of bluff to erode at a time. Bluffs can be difficult to manage for erosion, but a combination of slope reduction (terracing), toe protection and revegetation can improve the stability of these features. Photo by Roy Widrig, New York Sea Grant.*

SANDY BEACHES AND DUNES

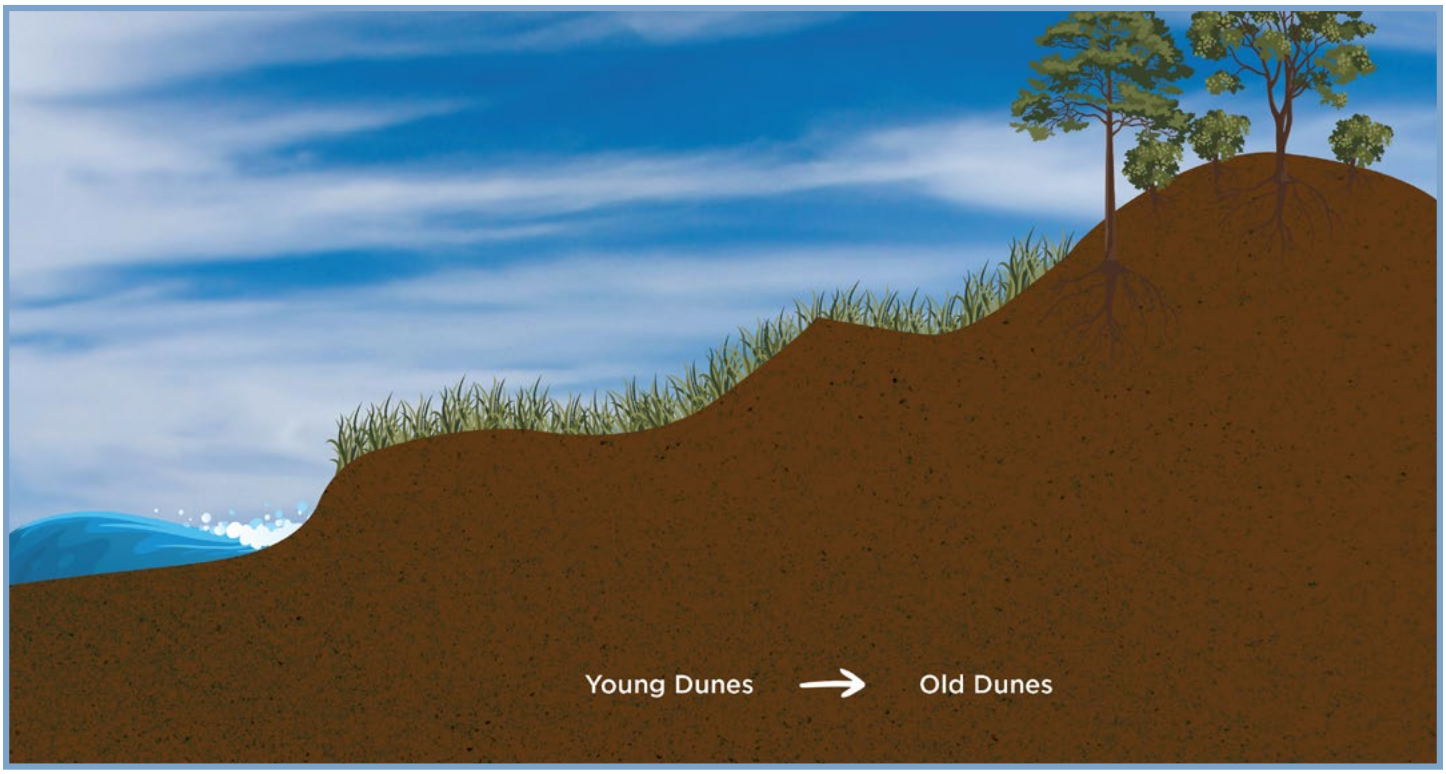

Figure 2: Sandy beaches and dunes are dynamic environments, going through changes in vegetation on various scales, including seasonal variability. Beach grasses colonize areas of blowing sand early in their development and thrive when the dynamic conditions continue. As dunes become more stable, wild dune grapes *(V. riparia)*, sand cherry, and dune willow will stabilize the dune further, before shrubs such as red osier dogwood move in. Eventually, willows and cottonwoods develop significant root systems.

▼ *Dune grasses thrive in environments of blowing sand. Roots for Champlain beachgrass (dune grass native to Lake Ontario's eastern shoreline) will radiate out from the main plant (rhizomes or runners) and send roots down deep within the dune. As the sand buries the grass, the plant aggressively grows towards the surface, sending new sets of runners to further stabilize the new layer of sand atop the dune. Photo by Roy Widrig, New York Sea Grant.*

BLUFFS

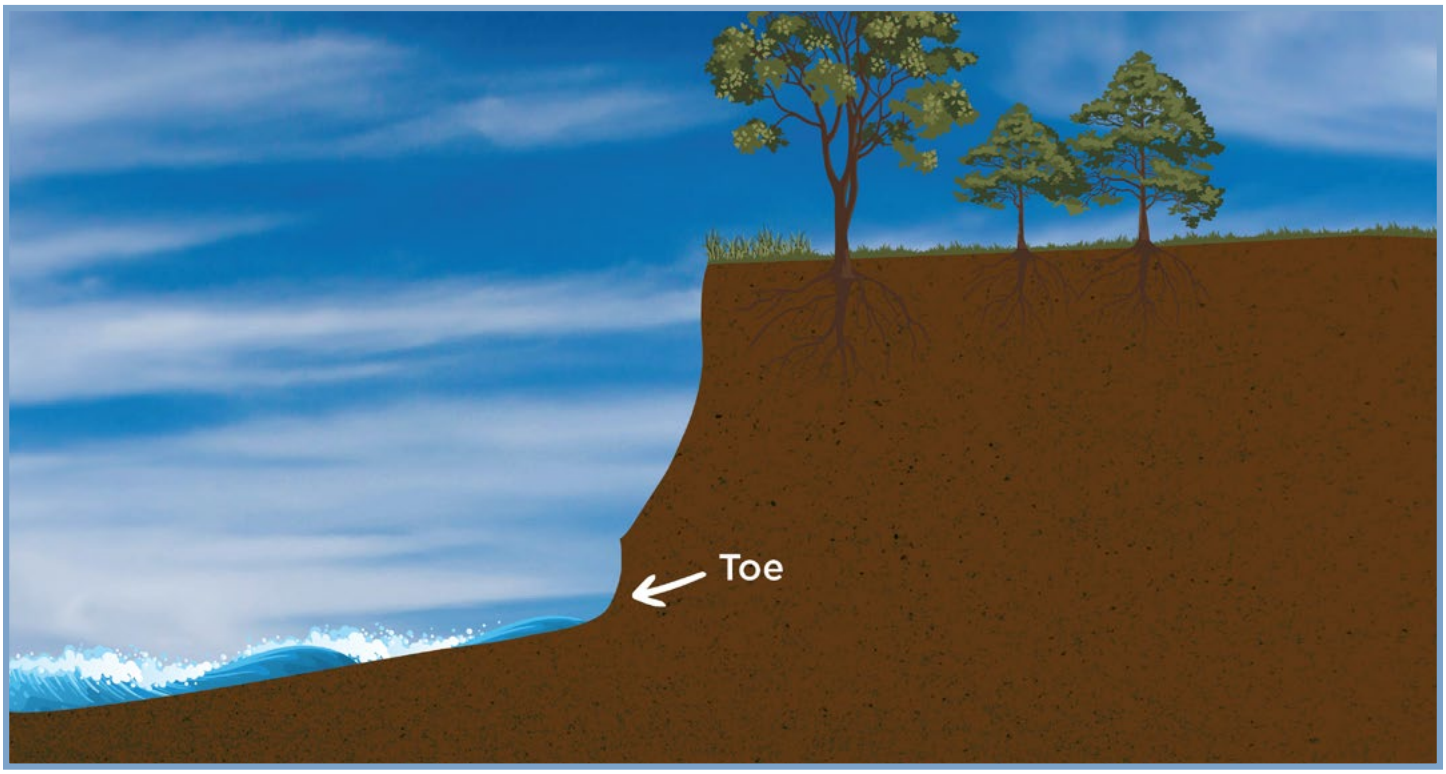

Figure 3: Bluff shorelines can be difficult to stabilize, considering the slope of the shoreline, movement of groundwater within the bluff, and the mass-movement (slumping) type of erosion consistent with waves on bluffs. In many cases, bluff stabilization is not possible without the use of terracing, toe protection, or other hard shoreline erosion management options. Toe protection refers to a line of hard material along the base of the bluff, such as rock rip-rap integrated with native vegetation for increased protection against erosion.

Water-loving species like dogwoods and shrub willows can contribute to shoreline stabilization, but any vegetation planted on bluffs should be tolerant to living on steep, rapidly-draining slopes composed of gravels, sand and clay. Additionally, very large trees (oak, sycamore, tulip poplar) should be avoided on bluffs as their mass may lead to further bluff instabilities.

▼ *Southern Lake Ontario features many tall, steep bluffs, some of which are the most highly-erodible shorelines in the Great Lakes region. Drainage improvements, reestablishment of native vegetation, developing no-mow zones and terracing can help manage the impacts of erosion on these unstable features. Photo by Roy Widrig, New York Sea Grant.*

COBBLES AND BEDROCK

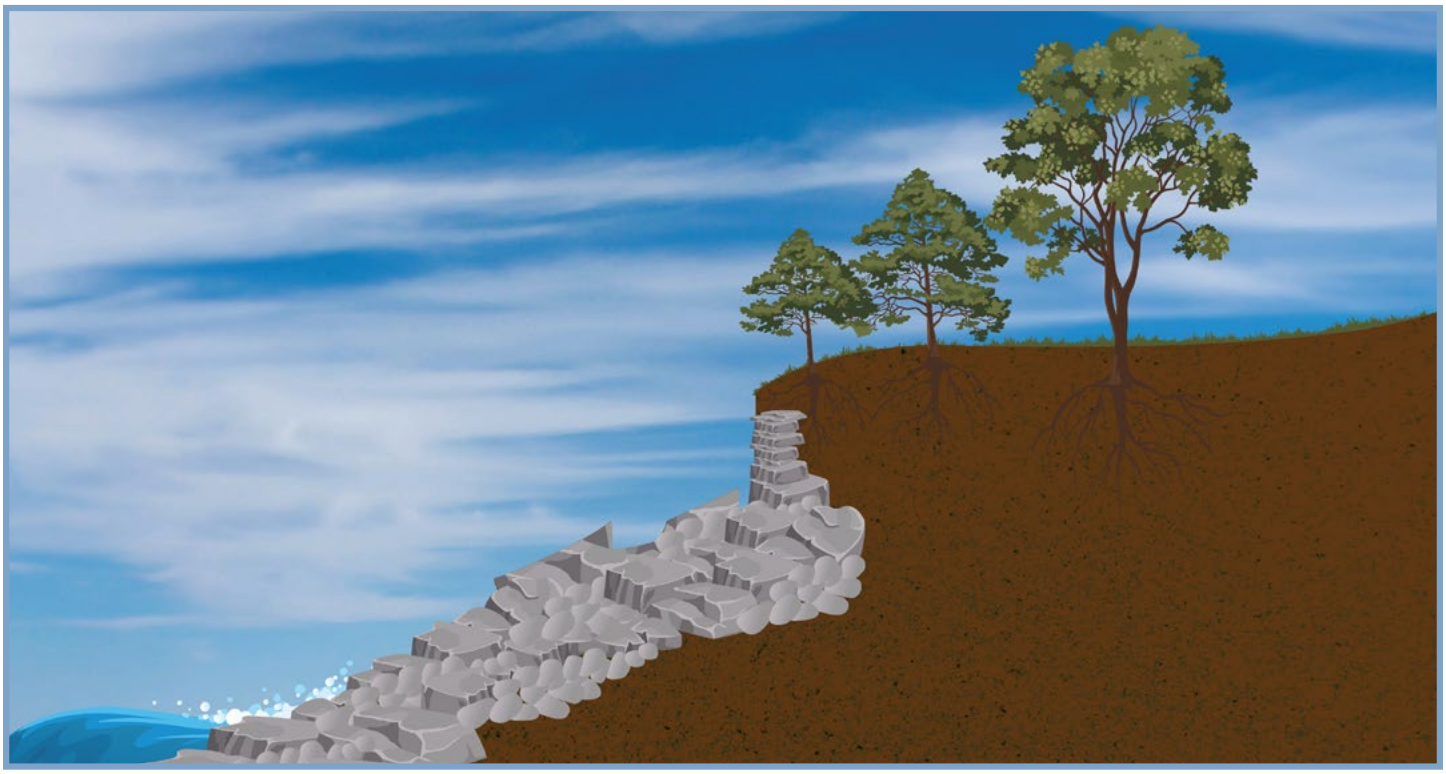

Figure 4: Cobble and bedrock shorelines can be difficult to work with because it is difficult for plant roots to get established. These shorelines can be stabilized with live staking of native species, such as willow, birch and cedar, as well as shrubs like red osier dogwood and ninebark. With successful establishment of trees such as willows, extensive root mats may form, which can aid in keeping finer sediments such as coarse sand and gravel in place along the shoreline.

▼ *Bedrock shores present a unique challenge to residential property owners and land managers. Native plants selected for these shorelines should be able to survive in harsh environments of heavy wind and winter ice, and be able to root effectively in very shallow soils, like the red cedars pictured below in Henderson, NY. Photo by Roy Widrig, New York Sea Grant.*

WETLANDS

Figure 5: Always be aware of wetland regulations in your area before modifying any wetland landscape. In many cases, coastal wetlands are protected by law. Unregulated wet areas or wetland buffer areas can be strengthened against erosion by the planting of shrubs like red osier dogwood, bearberry or ninebark, or with trees such as black willow and American sycamore. Maintaining native, submerged and emergent vegetation also aids in reducing wave energy and conserving habitat and water quality.

NATIVE WILLOWS FOR EROSION CONTROL

Many varieties of willow trees (*Salix sp.*) are often used for erosion control on shorelines. Willows are water-loving trees and grow quickly, creating dense mats of roots. There are a number of willows native to the Great Lakes region, as well as cultivars (a plant variety produced by selective breeding for purposeful traits) bred specifically for erosion control.

- Coyote or Sandbar Willow (*Salix exigua*) is native to New York and southern Canada, growing shrub like, up to 23'.
- 'Streamco' Willow (*Salix purpurea*), a cultivar bred specifically for erosion control. Grows up to 16' in very dense stands, acting like a hedgerow or fence, and is wildlife browse-resistant.
- Black Willow (*Salix nigra*, see image on page 11) is one of the most common willows in the wild, growing up to 80' along stream sides, floodplains and lakeshores.

Willows will grow on a wide variety of Great Lakes shorelines and thrive in most conditions. The trees are winter-hardy, flood-resistant, and stand up well to the severities of living on the shoreline, including shoreline ice and damage from debris thrown by crashing waves. Willows are affordable and can be purchased in large quantities, or cut from growing trees and live-staked into the soil for rapidly rooting erosion control, often with coir mats and fascines (bundles of cut wood used to stabilize wet soil.) Due to their nature of developing intense root mats, willows should not be sited near septic tanks.

▲ *Black willow and native cattails growing alongside a small pond in Van Buren, NY. This photo shows the usage of small-scale rock rip-rap (acting as toe protection), native trees and emergent aquatic vegetation working together to stabilize a shoreline. Photo by Roy Widrig, NY Sea Grant.*

RIGHT PLANT RIGHT PLACE

Before developing a planting strategy, the dynamics of each individual shoreline should be taken into consideration. The slope of the shoreline, type of soils and the wetness of an area should factor into which plants to choose. In some cases, the best bet may be to stabilize with the planting of trees in some locations; shrubs, ground covers, grasses and native perennials in others. Many situations will require a combination of all of these, as well as improvements to the drainage of the area, soil stabilizers such as coir mats and hydroseeding, slope improvements, and possibly the introduction of fill material.

Wildlife is also a consideration when planting native vegetation. While native plants often aid in biodiversity, some grasses, shrubs and trees (like oaks or maples) are susceptible to deer and rabbit browsing. Flowering plants will also attract pollinators, including bees. Be sure to check local regulations when selecting plants from nurseries or garden shops, as non-native and invasive species should be avoided.

SHORELINE ZONES

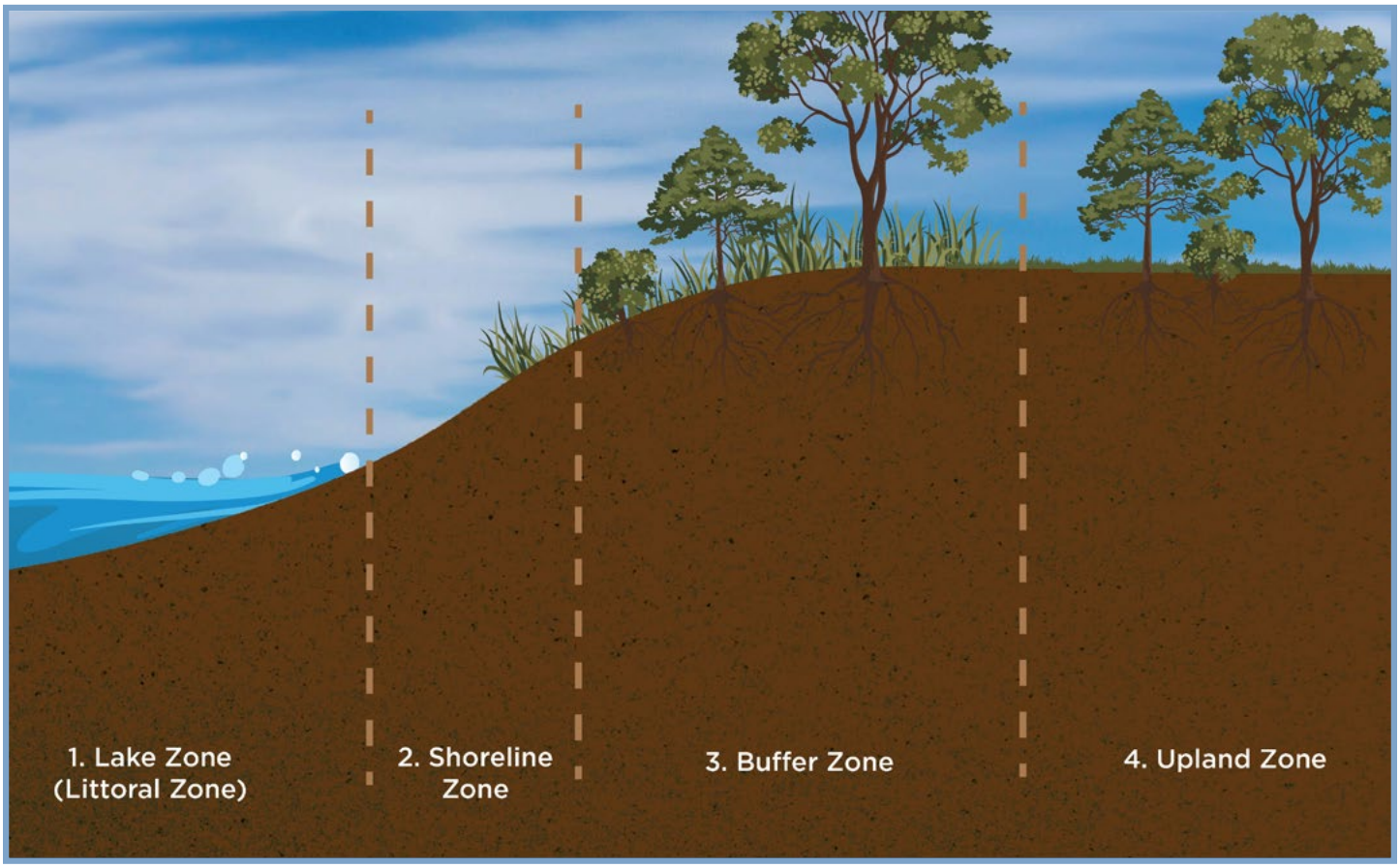

Figure 6:

Lake Zone (Littoral Zone)

The lake zone, commonly referred to as the nearshore, is the shallowest part of the lake and immediately adjacent to the shoreline. The lake zone varies in depth due to lake levels and wave action, but it is shallow enough to allow light and support plant life, if the wave action is gentle enough for aquatic plant growth. The lake zone is where sediment transport takes place, and it is extremely important to keep this zone as natural as possible in order to maintain this process, which helps build beaches and reduce erosion downdrift. If native aquatic plants are present, they should not be removed.

Shoreline Zone

The shoreline zone marks the transition between water and land. Depending on the lake level, nearshore slope and slope of the buffer zone, the shoreline zone may be narrow or broad, extending from the top of the bank to the land-water transition. In some cases, the shoreline zone could be a steep bluff, jagged and rocky shoreline or a flat, expansive beach. Maintaining a natural slope and vegetation in this zone is ideal. Hard erosion protection methods like seawalls or other revetments should be avoided to maintain shoreline habitat, coastal processes and proper drainage.

Buffer Zone

From the top of the bank and into the properties upland zone is the buffer zone, a critical area of between 30-50 feet of land without structures or a water-to-land transition. The buffer zone is ideal for planting native trees and shrubs, as the stability of this zone can provide a longer lifespan for natural materials. In bluff zones, avoid planting trees and shrubs too close to the edge, so as not to add additional weight to the bluff. Reducing the slope in the buffer zone can also reduce erosion rates, especially when coupled with revegetation.

Upland Zone

The upland zone of a coastal property includes the area between the buffer zone and the area where most structures, including houses, garages, sheds, etc. are located. This area should be naturally vegetated, with best management practices in place for reducing runoff, including limiting impervious surfaces (such as paved driveways, patios, etc.) This will capture and allow infiltration of stormwater to be directed away from the shoreline.

WHERE TO PLANT

Timing of planting in coastal areas is key to the survival of the plant and the success of any nature-based shoreline implementation. The ideal planting time along Great Lakes shorelines is spring, before water levels drop in the summer and the risk of intense, storm-based erosion is lessened. Make sure not to plant when lake levels are near their highest points for the year, before heavy forecasted rains, prior to or during extensive droughts, or below mean lake level. Additionally, fall is also a good time to plant, as lake levels are generally lower and the plants and soil will be less disturbed by movement in the dormant season.

PERMITTING CONSIDERATIONS FOR NEW YORK STATE

The New York State Department of Environmental Conservation (DEC) permits are often required for coastal projects. In addition to DEC permits, permits from other regulatory entities may be required for your project; these may include, but are not limited to, your local municipality, NYS Office of General Services and United States Army Corps of Engineers. If you have questions about which permits are required or what to include in a permit application to DEC, please call your DEC Regional Office. Contact information for DEC Regional Permits Offices can be found at dec.ny.gov/permits/89368.html.

DEC's Coastal Erosion Hazard Area (CEHA) program regulates land use, development and other activities in coastal areas subject to coastal flooding and erosion to minimize or prevent damage or destruction to man-made property, natural protective features, and other natural resources. To determine if your project is located within a DEC identified CEHA, check the official CEHA maps available at on.ny.gov/2aVYuOA. Some municipalities maintain jurisdiction over CEHA areas, and can be found here: dec.ny.gov/lands/86552.html.

Specific functions and protective values of different types of natural protective features may vary. Certain types of natural protective features are intrinsically better suited for certain types of uses, activities, or development than others. The standards and development restrictions as per 6 NYCRR Part 505: Coastal Erosion Management Regulations that apply to regulated activities within specific types of natural protective feature areas are based on:

(1) The protective functions that specific types of natural protective features provide; and

(2) The interaction between specific types of natural protective features and physical coastal processes.

Some commonly practiced shoreline modifications and erosion control methods can actually increase the rate of erosion as well, resulting in costly structural damage as well as property loss. Others may aid in the destruction of the shoreline's natural environment. The DEC guide (dec.ny.gov/permits/67096.html) addresses the problems with some of these common practices and offers alternative methods. The DEC encourages the use of "soft" or natural shoreline protection methods over "hard" or structural methods. These methods are much easier on the environment; imitate natural systems, can interact naturally within the ecosystem, as well as save residents a significant amount of money in construction cost, but do require maintenance and upkeep. Please be aware that permits are necessary for the installation of most of these methods, whether located in a CEHA area or not.

▲ *Cottonwood (tall, deeply grooved bark) and Willows (broad, widely branching) in late winter, stabilizing the inside of a barrier beach, Fair Haven, NY. Cottonwoods establish on bare soil early, while willows create broad, widely-expanding root systems which stabilize shorelines. These water-loving trees often remain after high water, taking abuse from waves that other trees do not tolerate. Photo by Roy Widrig, New York Sea Grant.*

REFERENCES

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United States Department of Agriculture, Natural Resource Conservation Service, PLANTS Database. Plants.usda.gov

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To learn more about coastal processes and shoreline resilience in the Great Lakes, please visit New York Sea Grant's website nyseagrant.org/glcoastal.

nyseagrant.org

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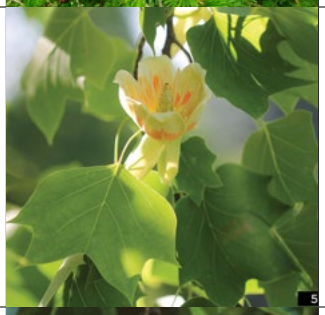
SHORELINE PLANT LIST

TREES

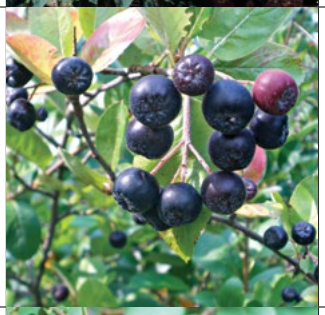
Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
Eastern Cottonwood *(Populus deltoides)*		80-100′	The quick-growing eastern cottonwood shows off green-gray bark when young and becomes deeply furrowed with age. The dark green, triangular leaves are large (3-5″) and marginally toothed. Tolerant of most soils, but clay should be avoided. Resistant to flood damage and high water.	Most Great Lakes Shorelines, colonizes dunes and sandy shorelines.
Basswood *(Tilia americana)*		70-80′	The large, deciduous basswood has gray, furrowed bark with flat ridges. Slightly leathery, heart-shaped alternate leaves provide shade while the tree enriches the soil in which it grows.	Moderately moist soils, low slope. River banks and coves.
Willows *(Salix sp.)*		30-60′	The soil-binding willows, growing quickly to impressive height and girth, provide habitat to many species and are easily established from cuttings. The leaves are slender, long and alternate on the branch.	Stream banks, sandy or gravelly shorelines. Alternatively, Sand-dune willow (*Salix cordata*) can be used in dune environments.
American Sycamore *(Platanus occidentalis)*		100-130′	Sycamores are some of the largest North American trees, towering over 100′ with striking, patchwork bark of brown, yellow and white. The leaves are large (5-10″) wide and roughly star-shaped.	Riparian and wetland areas, low-sloped and waterlogged areas.
Red Maple *(Acer rubrum)*		60-80′	Medium-sized red maples have a tall, straight trunk and an elliptical crown. Three-lobed leaves start red but turn green once grown, again turning deep red in fall.	Dense, moist forests, broad range of habitats.

Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
Sugar Maple *(Acer saccarum)*		70-100′	New York's State Tree can grow quite large and feature a dense, elliptic crown, with smooth gray bark while young turning brown and platy with age. The distinct, five-lobed leaf has prominent tips, is dull to dark green in summer before becoming brilliant shades or red, orange and gold in the autumn.	Moist forests, landscape and shade trees.
Paper Birch *(Betula papyrifera)*		40-70′	Paper birch, white birch or canoe birch is known for its striking, bright-white trunks, growing in groups of one to several. The white, papery bark peels and sheds over time. Leaves 2-5″ long with a double-toothed margin and slight tips. Autumn foliage is bright yellow.	Young forests, rocky slopes and gravelly, river/ lake shorelines. Paper birch can pioneer disturbed shoreline soils.
River Birch *(Betula nigra)*		40-80′	River birch are medium-sized trees with up to several trunks, forming a broad, rounded crown. The bark is papery and brown-to-salmon colored and horizontally peeling. Leaves up to 3″, elliptic with a pointed tip and coarsely-toothed margins.	Floodplains, stream banks, swamps, lakeshores.
Tamarack *(Larex larcinia)*		40-80′	Tamarack or eastern larch grows up to 80′ with a straight trunk and sparse crown. Tamarack is a deciduous tree with needles (<1 ¼″ long) growing in clusters and small (3/4″) cones. Tolerant to colder climates and harsh shorelines.	Swamps, upland slopes and lakeshores, especially with shallow soils close to bedrock.
Tulip Poplar *(Liriodendron tulipifera)*		70-120′	Tulip poplar, yellow poplar or tulip tree is a species in the magnolia family common in New York, with a prominent, straight, deeply furrowed and very tall trunk with very large (3-7″) leaves with four broad lobes. Big, showy yellow-white-green flowers emerge in Spring, followed by a cone-shaped cluster of samaras (seed pods) in summer.	Moist forests, upland zones near the shoreline.
Cucumber-tree Magnolia *(Magnolia acuminata)*		50-80′	North America's northernmost magnolia, the cucumber-tree, is a medium-to-large, straight growing tree with buttressed base and gray-to-brown, furrowed bark. The name comes from the immature summer fruits which resemble cucumbers. Leaves simple, elliptic, yellowish green and slightly crinkled along the margin.	Moist forests, upland zones near the shoreline.

Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
Black Gum *(Nyssa sylvatica)*		50-80′	Black tupelo or black gum is a medium-sized tree growing with a tall, straight trunk and medium, dense crown. The leaves are simple, slightly elliptic with a slight tip and shiny green. Purple-black drooping fruit clusters (3/8-5/8″) emerge in autumn along with bright red and gold foliage.	Swamp margins, moist forests.
Bigtooth Aspen *(Populus grandidentata)*		30-60′	Medium-sized tree with straight trunk and rounded crown, featuring toothed leaves up to 4″ and round with a slight tip. Early colonizer of land disturbed by fire, construction, erosion.	Sandy areas, moist disturbed areas.
Northern Red Oak *(Quercus rubra)*		60-90′	Red oaks grow throughout the eastern US and Canada, with tall trunks and crowns of various shapes. The leaves are green in summer and brown in fall, symmetrically lobed and upwards of 9″ in length. Acorns are ovoid with shallow brown cup.	All habitats, especially moist woodlands.
Swamp White Oak *(Quercus bicolor)*		50-70′	Swamp oak grow from a single stem and narrow crown, with easily identified, 4-7″ round-lobed leaves that are dark green above and silvery on the underside. Acorns grow in groups of two, green turning brown in autumn with a scaled cup rim.	Thrive in wet areas, including swamps and lakeshores, especially habitats with clayey soils.
Eastern Hophornbeam *(Ostrya virginiana)*		30-50′	Sometimes multi-stemmed, bark is light brown and covered with loose, rectangular, flaky scales. The leaves are 2-5″ long and elliptic, rounded at the base and pointed at the tip and double-toothed along the margin. Hophornbeam is slow-growing and easily identified with hop-like fruit clusters.	Limestone woods, gravelly soils, shade-tolerant to understory, uplands preferred.
Eastern Red Cedar *(Juniperus virginiana)*		30-60′	Evergreen tree with fluted trunk and red to gray, peeling bark. Known as the “common juniper” of the east, is an early colonizer with both needle-like as well as scaly leaves, often on the same plant and producing small, rounded, berry-like blue cones.	Rocky shorelines, limestone soils, dunes, open areas, shallow soils near bedrock.

SHRUBS

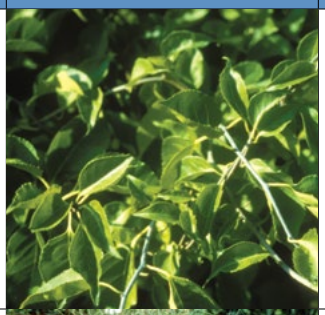
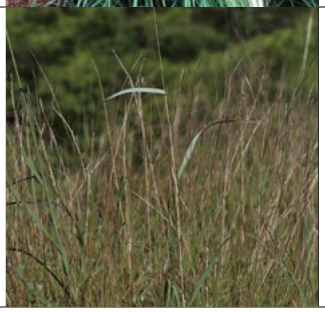
Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
Sand cherry *(Prunus pumila)*		40″	Sand cherry is a small shrub, usually under 40″ height and prefers sandy, gravelly or rocky beaches. The red-brown branches sprawl across the ground with smooth, egg-shaped leaves; producing white flowers in spring and large, dark purple fruits in late summer. Sand cherry aids in dune stability and provides a food source for wildlife.	Sandy beaches, dunes, gravel beaches, rocky areas.
Red Osier Dogwood *(Cornus sericea)*		10′	The bright, red-stemmed dogwood can grow upwards of 10′ from the center, with 2-4″ elongated leaves round at the bottom and coming to a point. Red osier dogwoods produce small, white flowers and act as binders of new or shallow soil, creating a refuge for newly-establishing plants.	Wetlands, wet or damp soils along all Great Lakes shorelines.
Silky Dogwood *(Cornus amomum)*		10′	Similar to red osier dogwood, silky dogwood has mottled, red-brown bark and produces clusters of dark blue berries in summer.	Wetlands, damp soils, suitable to most Great Lakes shorelines.
Bearberry *(Arctostaphylos uva-ursi)*		20″	Bearberry is a small, sprawling evergreen shrub forming mats up to 39″ wide, with small, pinkish-white and bell-shaped flowers with red/purple fruit, growing along the ground. Grows well on limestone beaches.	Sand dunes, sand and gravel beaches.
Ninebark *(Physocarpus opulifolius)*		10′	Often an ornamental plant, ninebark is a branching shrub with peeling bark, green to purple leaves and clusters of white flowers in June. Grows up to 10’ throughout the Great Lakes region and will spread towards water during low lake levels.	Alkaline, gravelly or sandy shores, rock outcrops.

Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
Bayberry *(Morella pensylvanica)*		15′	Northern bayberry is an aromatic shrub, producing many stems and spreading 10′ wide and 15′ high, with dark green, glossy leaves, alternately arranged and semi-evergreen.	Dune colonizer creates dense thickets which help other plants establish and stabilize sandy areas.
Bottlebrush Buckeye *(Aesculus parviflora)*		12′	Buckeye is a deciduous shrub spreading up to 12′ with large, palmate and compound leaves of five lobes, and large, tall white flowers in summer before foliage turns bright yellow in fall.	Stream banks, moist slopes, sandy soils, swamps.
Black Chokeberry *(Aronia melanocarpa)*		6′	Aronia, commonly known as Chokeberry, is a deciduous shrub reaching 6′. Medium-green leaves are finely toothed and opposite on the branch. In late summer fruits form, green turning deep purple-black as they ripen.	Low but well-drained sites, bluffs and cliffs.
Common Chokecherry *(Prunus virginiana)*		Up to 20-30′	Thicket-forming perennial shrub, often used in mass plantings for erosion control. Rarely beyond 20’ tall, with dark green, glossy leaves and drooping clusters of berries that range in colors from black to dark purple to dark red. **Toxic**.	Wide range of soil types, textures and slopes.
Winterberry *(Ilex verticillata)*		10-15′	Winterberry is a deciduous shrub, but can rarely reach tree size of 25′. Leaves are thick, 2-4″ and dull green, with pointed tips and light teeth. Striking, bright-red ¼″ fruits emerge in autumn and persist through winter.	Wet woodlands and swamps.
Staghorn Sumac *(Rhus typhina)*		15-30′	Found in open and edge habitats, staghorn sumac is a small tree or large shrub, featuring long, compound pinnate leaves, easily identified by its brown, velvety branches. Red fruits emerge in late summer and are also velvety in 4-8″ long clusters.	Generally dry soils, can quickly take over areas with strong rhizomes spreading from early colonies.

Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
Swamp Rose *(Rosa pallustris)*		7′	Swamp rose is perennial shrub with short thorns, growing off 2-3′ branches. Leaves are alternate and pinnate, divided into seven leaflets. Pink flowers about 2″ wide occur throughout summer, with red, ¾″ fruits (rose hips) through autumn.	Stream banks, swamps, marshes.
Viburnum species *(Viburnum sp.)*		30′	Various Viburnum species can be found in the region, including *V. lentago*, commonly known as Nannyberry. Usually grown in multi-branching shrubs in swamps, streams and forest edge habitats, with shiny green leaves, dark gray or brown bark that is furrowed, and producing dark blue-to-black fruits in dropping clusters, less than ½″ wide berries.	Swamps, stream edges, moist edge habitats.
American Holly *(Ilex opaca)*		15-30′	Smooth gray-brown bark may grow to tree size, has attractive, leathery evergreen foliage and bright red berries which provide food for whitetail deer and many birds.	In poor coastal soils, remains shrub-like; thrives in well-drained, sandy soils
Buttonbush *(Cephalanthus occidentalis)*		20′	Often used for erosion control along shorelines, Buttonbush forms dense stands of large shrubs, featuring whorled, opposite lance-shaped leaves with white, pincushion-like flowers blooming from June to September.	Wetlands, floodplains, marshes, wet ditches.
Coastal Sweetpepperbush *(Clethra alnifolia)*		5-10′	This deciduous shrub features striped gray bark with alternate, finely-toothed leaves. Dense, 3-6″ long terminal spike flowers are fragrant into late summer.	Poorly drained soils, bogs, swamps, rocky shorelines, stream sides.

GRASSES, GROUND COVERS, VINES AND PERENNIALS

Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
Champlain Beachgrass *(Ammophila champlainensis)*		20-40″	American Beach-Grass, or Marram Grass, is a local version of American Beachgrass *(Ammophila brevigulata)*. This is a native, smooth grass, growing up to 40″, known for acting as a binder and stabilizing sandy shorelines and sand dunes. Beach-grass spreads through rhizomes in the sand where many other native plants cannot establish.	Dunes.
Broad-leaf cat-tail *(Typha latifola)*		10′	Native cattails produce spikes up to 10′ in suitable wetlands with a dense, sausage-shaped female seed heads. These plants reproduce and spread quickly, often creating acres of monoculture. Rhizomes are browsed by geese and muskrats, and the foliage can serve as nesting areas for red-winged blackbirds.	Wetlands, can be submerged.
Bulrush *(Scripus validus)*		5-10′	Bulrush is a common sedge found in the Great Lakes region, especially in coastal wetlands. Growing in clonal groups, bulrush can reach up to 10′ in some places, but is more commonly less than 5′. Seeds of this plant can be eaten by an array of waterfowl, including blue-winged teals, canvasbacks, mallards, pintails and northern shovelers.	Wetlands, can be submerged.
Little Bluestem *(Schizachyrium scoparium)*		50″	Little Bluestem, sometimes referred to as wiregrass, in a thin and wispy grass, growing up to 50″ tall and growing isolated or in large clumps. This grass, common in remnant prairies, grows throughout the Great Lakes shorelines and can colonize and stabilize sand dunes.	Wetlands, dunes.
Riverbank Grape *(Vitis riparia)*		Vine up to 75′	The frost grape or riverbank grape vine will climb fences, trees and shrubs but provides cover and food for many wildlife, producing sweet-tart fruit in summer to harvest after a frost. Old bark is brown and shedding, new bark bright green with large, 4-8″ leaves.	All environments where the vine can climb.

Common Name *(Latin name)*		Size	Description	Ideal Shoreline Type
American Bittersweet *(Celastrus scandens)*		Up to 20′	American bittersweet grows by climbing other plants, reaching heights of 20′ and producing berry-like fruit on vines with dark green, oval-shaped leaves. Aids in habitat construction, wildlife forage, and erosion control.	Prefers neutral soils and a range of slopes.
Switchgrass *(Panicum virgatum)*		3-5′	Native grass often used in erosion control, forming sod and growing perennially ~3-5′ tall, stem has a light reddish tint.	Sandy to clay loam soils.
Canada Wildrye *(Elymus canadensis)*		2-5′	Cool season, clumping perennial, often used as an ornamental grass and for erosion control. Displays large, pointed, blue-green leaves, arching flower stems above the leaves with heavy green flowers.	Loamy and sandy soils, moist but well-drained.

FORESTRY IMAGES CITATIONS FOR GREAT LAKES SHORELINE PLANTS

American basswood: *Tilia americana* — Chris Evans, University of Illinois — Bugwood.org

American bittersweet: *Celastrus scandens* — Richard Webb — Bugwood.org

American holly: *Ilex opaca* — John Ruter, University of Georgia — Bugwood.org

American sycamore: *Platanus occidentalis* — T. Davis Sydnor, The Ohio State University — Bugwood.org

Bayberry: *Morella pensylvanica* — Dow Gardens — Bugwood.org

Bearberry: *Arctostaphylos uva-ursi* — Rob Routledge, Sault College — Bugwood.org

Bigtooth aspen: *Populus granidentata* — Paul Wray, Iowa State University — Bugwood.org

Black chokeberry: *Aronia melanocarpa* — Ansel Oommen — Bugwood.org

Blackgum: *Nyssa sylvatica* — John Ruter, University of Georgia — Bugwood.org

Bottlebrush buckeye: *Aesculus parviflora* — John Ruter, University of Georgia — Bugwood.org

Bulrush: *Scripus sp. - Graves Lovell* — Alabama Department of Conservation and Natural Resources — Bugwood.org

Buttonbush: *Cephalanthus occidentalis* — Chris Evans, University of Illinois — Bugwood.org

Canada wildrye: *Elymus Canadensis* — Rob Rutledge, Sault College — Bugwood.org

Coastal sweetpepperbush: *Clethra alnifolia* — John Ruter, University of Georgia — Bugwood.org

Common chokecherry: *Prunus virginiana* — Paul Wray, Iowa State University — Bugwood.org

Common winterberry: *Ilex verticillata* — Chris Evans, University of Illinois — Bugwood.org

Cucumber-tree: *Magnolia acuminate* — T. Davis Syndor, The Ohio State University — Bugwood.org

Hophornbeam: *Ostrya virginiana* — Paul Wray, Iowa State University — Bugwood.org

Little bluestem: *Schizachyrium scoparium* — Howard F. Schwartz, Colorado State University — Bugwood.org

Northern red oak: *Quercus rubra* — Becca MacDonald, Sault College — Bugwood.org

Northern white cedar: *huja occidentalis* — Paul Wray, Iowa State University — Bugwood.org

Red maple: *Acer rubrum* — Robert L. Anderson, USDA Forest Service — Bugwood.org

River birch: *Betula nigra* — John Ruter, University of Georgia — Bugwood.org

Riverbank grape: *Vitis riparia* — David Cappaert — Bugwood.org

Silky dogwood: *Cornus amomum* — John Ruter, University of Georgia — Bugwood.org

Swamp rose: *Rosa palustris* — James R. Holland — Bugwood.org

Switchgrass: *Panicum virgatum* — John Ruter, University of Georgia — Bugwood.org

Tulip polar/yellow poplar: *Liriodendron tulipifera* — Rob Routledge, Sault College — Bugwood.org

Photos by Roy Widrig:

- Broad-leaf Cattail
- Champlain Beachgrass
- Eastern Cottonwood
- Paper Birch
- Quaking Aspen
- Red Osier Dogwood
- Staghorn Sumac
- Sugar Maple
- Swamp White Oak
- Willows

NOTES

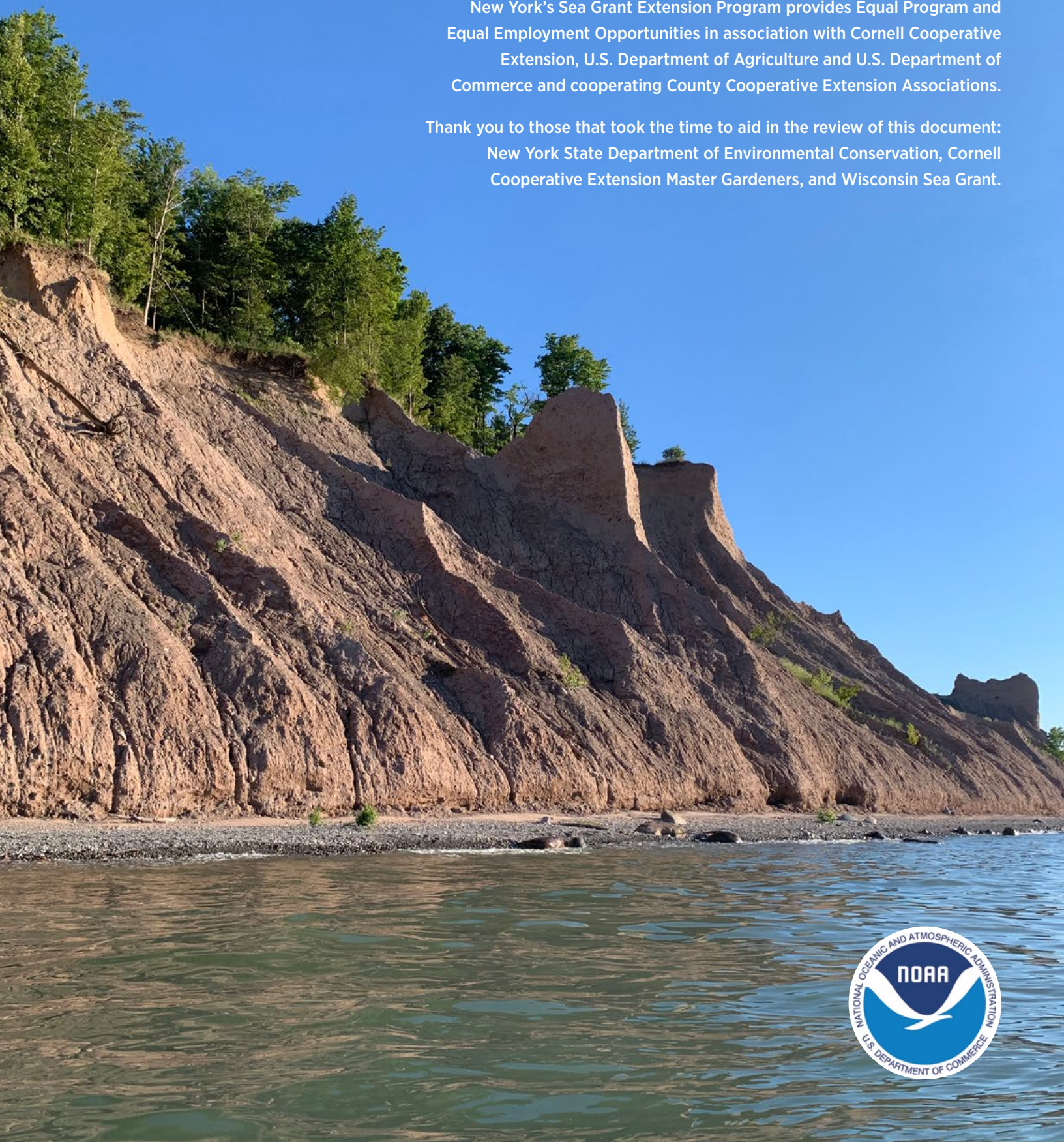
NOTES

Sea Grant
New York

New York Sea Grant is part of a nationwide network of 34 university-based programs working with coastal communities through the National Oceanic Atmospheric Administration (NOAA). Sea Grant research and outreach programs promote better understanding, conservation, and use of America's coastal resources. Sea Grant is funded in New York through SUNY and Cornell University and federally through NOAA.

New York's Sea Grant Extension Program provides Equal Program and Equal Employment Opportunities in association with Cornell Cooperative Extension, U.S. Department of Agriculture and U.S. Department of Commerce and cooperating County Cooperative Extension Associations.

Thank you to those that took the time to aid in the review of this document: New York State Department of Environmental Conservation, Cornell Cooperative Extension Master Gardeners, and Wisconsin Sea Grant.



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