Planting and Re-Naturalizing Areas

Encouraging Mixed Hardwood Forests

Description: There are several types of natural plant communities that grow along Vermont lakeshores. The Hardwood Forest Community typically has five tiers or layers of vegetation: canopy, understory, shrub, ground cover, and duff layer. Natural plant communities protect a lake from bank erosion, stormwater runoff, and habitat degradation, while maintaining healthy lake conditions.

Lake friendly living means using lakeshore Best Management Practices

BMP

Planting and Re-Naturalizing Areas: Acceptable best management practice for re-vegetating areas under the Shoreland Protection Act (Chapter 49A of Title 10, § 1441 *et seq.*).

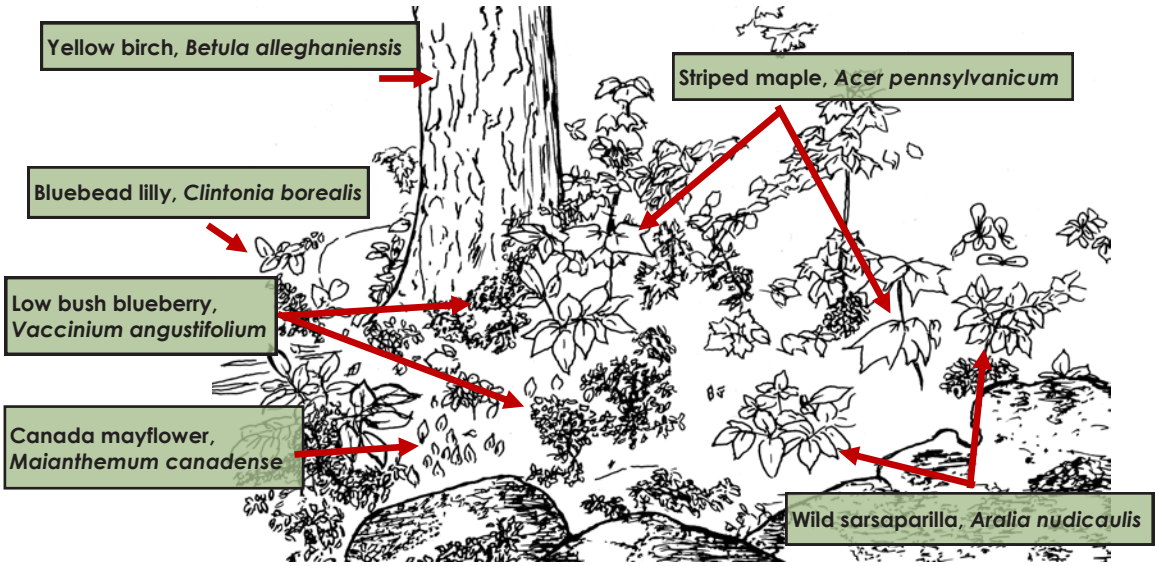
LAKE BENEFITS

Natural plant communities growing along a lakeshore provide a lake with its first line of defense against natural and human disturbances in the watershed. These communities are vital for wildlife and aquatic habitat, protect water quality and benefit the property by stabilizing the shore and preventing erosion, maintaining greater privacy, and enhancing scenic beauty.

MATERIALS

- Native Plant List
- Shovel

A natural woodland community growing along a Vermont lakeshore



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Lakeshore Natural Communities

Natural or wild communities are made of plants and animals growing and living together in landscapes characterized by specific soils, water and climate conditions. **Native shoreland vegetation is essential for protecting water quality and wildlife habitat.** Vermont has over 800 lakes with several natural lakeshore communities, ranging from cobble and sandy beaches to wetlands to northern hardwood forests.

The Problem

About 45 percent of Vermont lakeshores have been developed in ways that have cleared the shores of their natural communities.

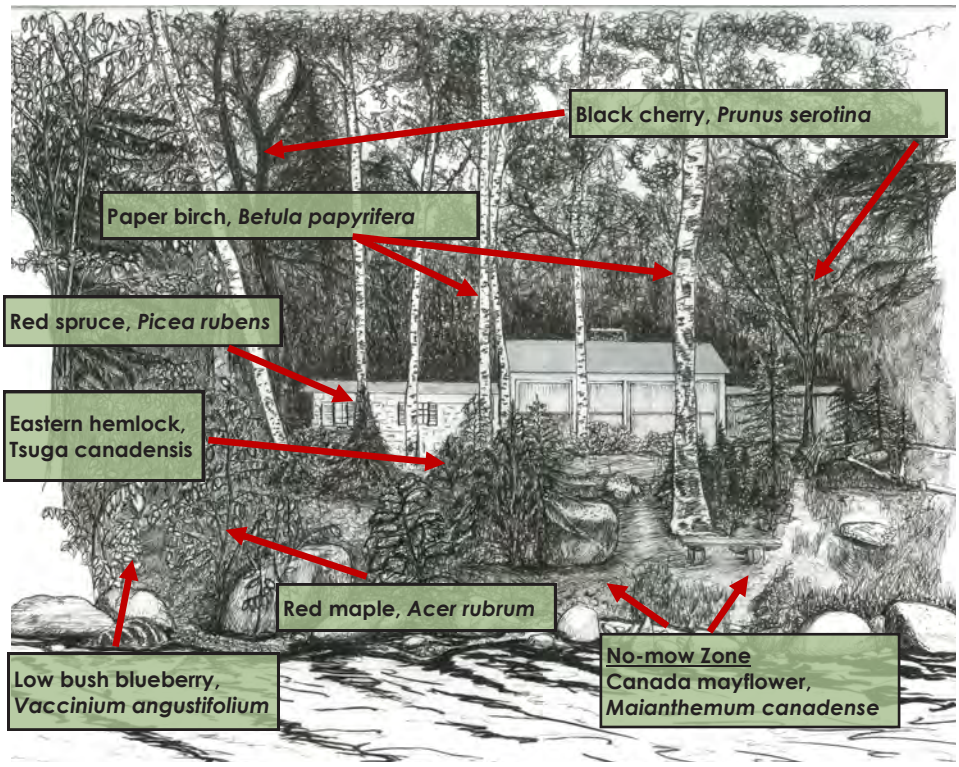
The Solution

You. Re-vegetating and restoring lakeshore natural communities depends almost entirely on the voluntary actions of property owners.

Gardeners. The future of Vermont's biodiversity and native plants and animals is mostly under the control of homeowners and their gardening and landscaping practices. Gardeners can safeguard Vermont lake ecosystems by choosing to reduce lawns and promote native plant growth.

Go Native. Native species fuel the food web and are essential to healthy lake ecosystems. For example 60 percent of protein for fresh water fish comes from insects that have fallen into the water from their native plant host.

A natural hardwood community surrounds this lakeshore home, which shows a good example of how to live in harmony with the lake.



This property meets the Shoreland Protection Act's Vegetation Protection Standards, which require a certain number of trees, shrubs, perennials and an undisturbed duff layer (the sponging ground cover of decomposing leaves, needles, and sticks) to grow along the shore. The homeowner has complete autonomy over what species to encourage growing and which ones to thin out while meeting the minimal requirements of the Vegetation Protection Standards. The no-mow zone access area is filled with wildflowers.

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How To Re-Establish Native Species On A Lakeshore

Plants growing along undeveloped shorelands represent the naturally occurring species for that area and the species that grow best together, making up a natural plant community. Look to those species when making your selection of plants to use for re-naturalizing your shoreland site. If you need help identifying plants, visit the site Go Botany at the New England Wildflower Society for some easy tools to use. You can also contact the Lake Wise Program, or a County Forester for help.

Buying Native Plants

Native plants are available at many Vermont nurseries. If you have made a list of species from what you have observed growing around your lake, taking this list to a local nursery will help ensure that you buy the right plants for your site conditions. Potted plants can be planted anytime during the growing season.

Harvesting Native Plants

Early spring, when plants are still dormant, or fall after the growing season, are the optimum times to dig up and transplant from the wild. In some situations, allowing natural succession to take hold will also re-naturalize your shore. Refer to the Establishing No-Mow Zones for more information on this option, or Live Staking for stabilizing a steep slope with vegetative cuttings.

Planting and Caring for Native Vegetation

Delineate the total area to re-naturalize because once planted, other than initial watering, the site should be left alone. *Managing vegetation under the Shoreland Protection Act can be found in the Vegetation Protection Standards.*

- To convert a lawn to a natural area, till it up first, especially before planting herbaceous perennials and wildflowers. An important part of re-naturalizing areas is to allow time for succession (progressive change that leads to natural plant communities). For example, woodland shrubs and wildflowers will need tree canopy (a few years of tree growth) in order to survive, so to restore a natural woodland community, start your planting knowing that it will take a few years and a few different species before maturing into an enchanting hardwood forest.

Planting

- Dig a hole twice as wide as the root ball, and partially fill the hole with existing soil.
- After filling in the hole, berm up the soil to create a mini well around the tree. This ensures water to percolate into the hole, soaking the roots.
- Water at planting time. ***Continue to water often so that the soil remains moist for six to eight weeks.***
- Do not mow in an area you are re-naturalizing because it's important to allow a duff layer to form to provide a future nursery for forest seedlings.

Sources of native plants can be found at many nurseries, like like Gardener's Supply in Williston; The Intervale Conservation Nursery in Burlington; The Vermont Wetland Plant Company in Shoreham; The Vermont Association of Conservation Districts; and the Vermont Wildflower Farm in Charlotte.

Visit **Native Plant Suppliers,** and **Vermont Native Plants** for listings on these topics. Other resources for planting with native species are available on the Lake Wise web site.

A Guide to Natural Communities of Vermont by Elizabeth Thompson and Eric Sorenson covers the native plants found in wetland, woodland and wildland sites in Vermont while explaining the importance of biodiversity and functioning ecosystems.

Doug Tallamy's guide, Bringing Nature Home, is an excellent resource on sustaining wildlife with native plants. Doug's research and lecture series on native plants "WOWs" everyone. Excellent!

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Selecting Species to Plant Together

Succession is a natural process of inevitable change within in a plant community. As a landscape fills in with more plants, the sun loving ones get shaded out and give way to those that require shade. However, seeds on the ground are easily brought to life with a change in sunlight, like from a broken branch, which fuels succession. Planting younger trees and shrubs (less than five inch stem circumference) have a better chance of survival, but knowing some may not make it, plant densely: Trees and shrubs six feet apart from one another, while herbaceous plants should be one foot apart from each other, in between the trees and shrubs. *Managing vegetation under the Shoreland Protection Act can be found in the Vegetation Protection Standards guidance.*

Example Groupings of Native Plants

Well Drained Soils

Tall Trees
Sugar maple
Black cherry
American beech
Red oak
Paper birch

Shrubs
Highbush cranberry
Serviceberry
Highbush blueberry
Hobble bush*
Alternative leaf dogwood

Perennials
Sarsaparilla
New England aster
Blue flag iris
Bunchberry*
Canadian mayflower*

Wet or Moist Soils

Tall Trees
Red maple
Green ash
Hemlock
Cedar

Shrubs
Nannyberry
Winterberry
Highbush cranberry
Witch Hazel
Silky dogwood
Redosier dogwood
Elderberry
Sweetgale

Perennials
Cardinal flower
Blue flag iris
Cinnamon fern

Shallow, Rocky Soils

Tall Trees
Red spruce
White pine
Black cherry
Balsam fir

Shrubs
Witch hazel
Serviceberry
Lowbush blueberries

Perennials
New England aster
Sarsaparilla

Tolerant of Many Soils

Tall Trees
Yellow birch
Red maple
Sugar maple
Eastern red cedar

Shrubs
Silky dogwood
Highbush cranberry
Nannyberry
Winterberry
Stripped maple*
Mountain maple*

Perennials
Partridgeberry*
Canadian mayflower*
New England aster
Sarsaparilla

Blue flag iris (sunny spots)

** these plants require shade*

For planting plans, check out the Federation of Vermont Lakes and Ponds planting guide, A Guide to Healthy Lakes Using Lakeshore Landscaping: design templates and easy-to-use planting plans

Keep it Vermont Native!

Many trees, shrubs and herbaceous plants used in landscaping are non-native species. Non-native species provide little to no food or habitat for wildlife. A number of these plants have escaped from cultivations and threaten native species and diversity. In particular, *avoid rugosa rose species, honeysuckles, purple loosestrife, and periwinkle groundcover.* For a listing of species to avoid and for information on how to manage already established invasive species, visit the Vermont Landowner's Guide Invasive Terrestrial Plant Management at the Vermont Nature Conservancy's web site. No permit from the Shoreland Permit Program is needed to be able to remove a plant listed on the noxious and nuisance plant list. For controlling aquatic invasive species, visit the Aquatic Nuisance Control Permit Program. The Vermont Department of Forest, Parks, and Recreation has the latest on Forest Health, including invasive pests to be on the watch for. And, Lake Wise has a fact sheet on Managing Invasive Species.

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Native Plant Lists

For a complete native plant list: Lady Bird Johnson Wildflower Center

Trees	Soil Condition	Growth Habits Slow growth 1ft/year Fast growth 1-2ft/yr Rapid growth >2ft/yr
Red maple, *Acer rubrum*	Wet to dry	Bright red fall foliage, fast growing up to 90ft
Sugar maple, *Acer saccharum*	Well drained	Colorful fall foliage, sweet sap, fast growth rate up to 100ft
American beech, *Fagus grandifolia*	Well drained, moist	Very slow growing– a 10' beech tree could be 50 years old
Eastern hemlock, Tsuga canadensis	wet	Slow growing, especially when young
Black cherry, *Prunus serotine*	Well drained	Fast growth, shade intolerant, birds love it.
Green ash, *Fraxinus pennsylvanica*	Moist, tolerant of some flooding	Rapid growth to 75ft, attractive branching
White pine, *Pinus strobus*	Moderately well -drained	Long-lived evergreen, grows fast to 100ft
American basswood, Tilia americana	Well drained, moist	Fast growing hardwood, 75'-130' and can live about 200 years
Red oak, *Quercus rubra*	Drier soils	Slow growth to 75ft, grand tree of reddish-brown bark, favorite for wildlife
Paper birch, *Betula papyrifera*	Well-drained soil, tolerant of other soils	White attractive bark, small cones feed birds in winter, grows fast to 75ft
Yellow birch, *Betula alleghaniensis*	Well-drained soil, tolerant of other soils	Beautiful gold bark and wintergreen flavored stems, grows fast to 75ft
Red spruce, Picea rubens	Shallow soils	Fast growing evergreen, shade tolerant
Northern white cedar, *Thuja occidentalis*	Moist, intolerant of acidic soils	Evergreen, slow growth rate up to 45ft
Easter red cedar, *Juniperus virginiana*	Tolerant of wide soil types	Rapid growth rate to 25ft, Best in full sun, great for wildlife
Balsam fir, *Abies balsamea*	Tolerant of shallow soils	Fast growth up o 50 ft, fragrant, excellent small animal habitat
Alternative leaf dogwood, *Cornus alternifoliia*	Best in well drained, acidic soils	Grows fast to 20ft, white flowers, purple berries, shady border plant

Shrubs	Soil Condition	Growth Habits Slow growth 1'/year Fast growth 1-2'/yr Rapid growth >2'/yr
Striped maple, *Acer pensylvanicum*	Adaptable to shady areas	Fast growing understory shrub with beautiful emerald striped bark
Mountain maple, *Acer spicatum*	Very adaptable as understory shrub	Fast growing understory shrub up to 20 t with multiple trunks. Beautiful yellow foliage in fall
American hazelnut, *Corylus americana*	Drier soils	Adapted to shade but does well on an edge or more open situations, grows slowly to 8-12 ft
Witch hazel, *Hamamelis virginiana*	Moist	Shade tolerant, grows slowly to 16ft. Delicate clusters of yellow flowers in the fall after leaves fall off
Winterberry, *Ilex verticillata*	Wet to moist	Full or partial sun, Bright red berries persist into winter, grows slowly to 8ft
High or low blueberry, *Vaccinium corymbosum* and *angustifolium*	Acid, wet soils to drier conditions	Sun or shade, colorful red fall foliage, and edible berries
Nannyberry, *Viburnum lentago*	Drier soils but tolerant of wet soils	Sun or shade, rapid growth up to 20ft. Birds eat berries throughout winter
Serviceberry, *Amelanchier canadensis*	Prefers dry, but tolerates wet	Lovely early spring flowers and fruits (a favorite of birds), colorful foliage, slow growing
Hobble bush, *Viburnum alnifolium*	Shade in moist, rich soils	Fast growing, understory plant, lovely spring flowers and purple fall foliage
Highbush Cranberry, *Viburnum trilobum*	Wet to moist	Fast growing. Not a true cranberry, but fruit look and taste like it. Terrific for song birds, aesthetics. Likes sun, some shade okay
Silky dogwood, *Cornus amomum*	Wet to dry	Fast growth to 10 ft, prefers sun, but shade tolerant,
Red-osier dogwood, *Cornus sericea*	Moist to wet	Grows fast to 10ft, prefers sun, but shade tolerant, bright red stems all year long
Elderberry, *Sambucus sp.*	Moist to wet	Grows fast to 13ft. Berries make wine, jam, & bird food
Sweetgale *Myrica gale*	Moist to wet	Fragrant green leaves, grows 4ft by 2ft round. Thrives along wet shorelines. Birds love it

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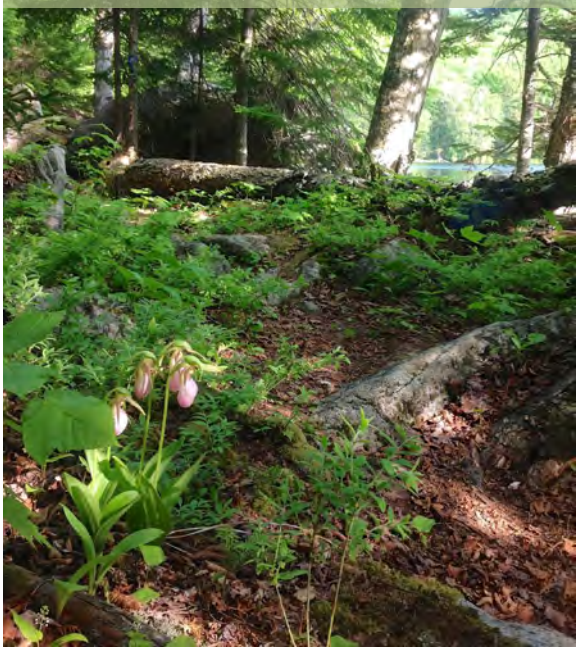
Groundcovers/ Perennials	Soil Condition	Growth Habits
Cinnamon fern, *Osmunda cinnamomea*	Wet soils, mostly shady	Vase-shaped clumps, attractive fertile fronds, grows to 2-4 ft
Interupted fern, *Osmunda claytonia*	Wet to somewhat dry soils, mostly shady	Vase-shaped clumps, grows 2-3 ft
New England aster, *Aster novae-angliae*	Fertile soil, adequate moisture, full sun	Attractive dark purple late summer flowers, will spread by rhizomes, grows to 4ft
Jack in the Pulpit, *Arisaema triphyllum*	Moist, wet, but tolerant of drier spots	Easy to grow, needs shade, will grow fastest in moist soils.
Blue flag iris, *Iris veriscolor*	Wet soil, full sun	Spreads well, grows 1-3 ft, **avoid the invasive yellow iris**
Partridgeberry, *Mitchella repens*	Shady, acid soils	Dark green attractive leaves, red berries, trailing plant, 1-2 inches
Cardinal flower, *Lobelia cardinalis*	Wet to moist soils, sun and shade	Brilliant, red flowers loved by hummingbirds, grows 2-4 ft
Wild sarsaparilla, *Aralia nudicaulis*	Adaptable	Grows in colonies, wispy look, good for wildlife, takes sun
Purple trillium, *Trillium erectum* White trillium, *Trillium grandiflorum*	Adaptable, but sensitive to being disturbed	12-14 inches tall, lovely colors, ants disperse seeds by transporting them to feed on the fleshy seed cover.
Pink lady slipper, *Cypripedium acaule*	Moist, very acidic soils, commonly associated with white pine overstory	Slow to flower (6 years), a treasure to see and have
Bunchberry, *Cornus canadensis*	Cool and shady, adequate moisture, acid soil	Spreading groundcover of attractive leaves, white flowers, red berries, grows 6 inches
Canadian mayflower, *Maianthemum canadense*	Adaptable, widely distributed, understory wildflower	Grows 2-6 inches tall.
Blue bead lily, *Clintona borealis*	Cool and shady, adequate moisture, acid soil	Grows 6-8 inches tall with yellow flower and blue bead fruit. Gorgeous.

Impressive wildflowers, including the elusive pink lady slipper, *Cypripedium acaule*, decorate this lakeshore.



Path among bunchberry wildflowers

Partridgeberry

Bunchberry

Wildflowers

Most wildflowers of the Hardwood Forest are herbaceous perennials. They store food in their roots, tubers, or bulbs when the sunlight reaches the forest floor before trees leaf out in early spring or in the fall after leaves drops. Some wildflowers like wild leeks, Dutchman's breeches and trout lily photosynthesize only in the early spring, going mostly dormant the rest of the summer. Partridgeberry and wintergreen can grow with evergreens, for example, in hemlock forests where there is almost continual darkness on the forest floor, because they photosynthesize at low rates but for the length of the growing season.

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Wildlife

When one tugs at a single thing in nature...he finds it attached to the rest of the world."

~John Muir

Conservationist and National Park Founder

The monarch butterfly, *Danaus plexippus*, depends soley on milkweed, *Asclepias syriaca,* to lay its egg and feed as a larva. Milkweed is essential to the survival of the monarch.

The luna moth, *actias luna,* evolved with the shagbark hickory, *Carya ovata*, and larva depend on the leaves. Caterpillars, like the luna moth larva, provide the greatest protein source for broods of all birds.

Gardners can help protect biodiversity,

Eastern red cedar, *Juniperus virginiana,* provides the only food source for the larval stage of the Olive hairstrike butterfly, *Callophrys gryneaus.* Cedar waxwings are named after this plant because of their feeding habits on the berries. The Olive hairstrike larva also provide essential protein to cedar wax wings and other birds when they rear their broods.

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Native Plant Facts

Stormwater Benefits

- ♦ Hemlock and northern white cedar can live over 800 years.
- ♦ White and red pines may live 100 to 150 years; maples and oaks more than 150; and aspen and birch 50 to 70.
- ♦ A mature maple tree can uptake and transpire 17 to 37 gallons per summer day, while a large oak tree can uptake and transpire 79 gallons in a day.
- ♦ Plants build topsoil and duff (decomposing leaves and twigs), creating the forest nursery for all seedlings.
- ♦The forest floor (duff) acts as an enormous sponge, typically absorbing up to 18 inches of precipitation before gradually releasing it to groundwater or surface channel flows.
- ♦ The uptake of soil water by tree roots increases soil water storage potential, effectively lengthening the amount of time before rainfall becomes runoff.

Personal Benefits

- ♦ One large tree can supply oxygen for two people.
- ♦ Trees provide natural shading in the summer, reducing air conditioning needs, and insulation and windblock during the winter, lowering energy bills.
- ♦ There are measureable medical benefits for those who spend more than 15 minutes a day in naturally vegetated areas (not lawned areas).

Essential for Wildlife

- ♦ 60% of protein for fresh water fish species comes from terrestrial insects that fall from plants into the water.
- ♦ 90% of insects that eat plants are specialized to feed on one or only a few types of native plants.
- ♦ 96% of birds (seed and grass eaters included) rear their young on insect protein! For example, each pair of nesting chickadees needs to find 6000 caterpillar larva over a three week time period to feed their young.
- ♦ Black cherry, *Prunus serotina*, hosts more than 450 species of butterfly and moth insects that birds depend on to feed their brood and provides fruit for more than 40 species of birds and many mammals, making it the most important native tree for wildlife survival in Vermont.

Lawns

- ♦ In the USA, there is 45.6 million acres of lawn, which is continuing to increase annually at a fast rate.
- ♦ If 20 million acres of the lawn (about half the existing lawn) in the USA were replanted with native species (an area greater than the combined acreage of the National Parks: *Adirondacks; Yellowstone; Yosemite; Grand Tetons; Canyonlands; Mount Rainer; North Cascades; Badlands; Olympic; Sequoia; Grand Canyon; Denali; and Great Smoky Mountains*), then the isolated existing natural areas would be connected through biological corridors and essentially safeguard our country's water, land, plants, animals and citizens.