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VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY

Chesapeake Bay Preservation Act

Riparian Buffers & Water Quality

Friends of the Appomattox River
November 30, 2022

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Topics for Today

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Chesapeake Bay Preservation Act

"Balanced economic development and water quality protection are not mutually exclusive."

- State mandated, but locally implemented
- Comprehensive, enforceable nonpoint source pollution prevention program
- Uses local land use tools already in place to limit and place performance criteria on sensitive environmental features in our landscape
- Avoids or reduces water quality impacts that could result in mitigation for lost or damaged resources
- Preserves existing vegetation, including mature trees, and limits land disturbance and impervious surfaces
- Advances coastal resiliency
- Can reduce the cost of development and stormwater compliance

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What is Nonpoint Source Pollution?

Rainwater that becomes contaminated as it moves over and through the ground, picking up pollutants from many different sources.

- Sediments from poorly managed construction sites
- Unstable stream banks eroded by excessive (and continuous) stormwater runoff
- Fertilizers and pesticides from residential landscapes
- Oil, grease, and toxic fluids from roads, parking lots, leaking underground storage tanks, and improper disposal of used motor oil
- Bacteria and nutrients from pet waste and faulty septic systems





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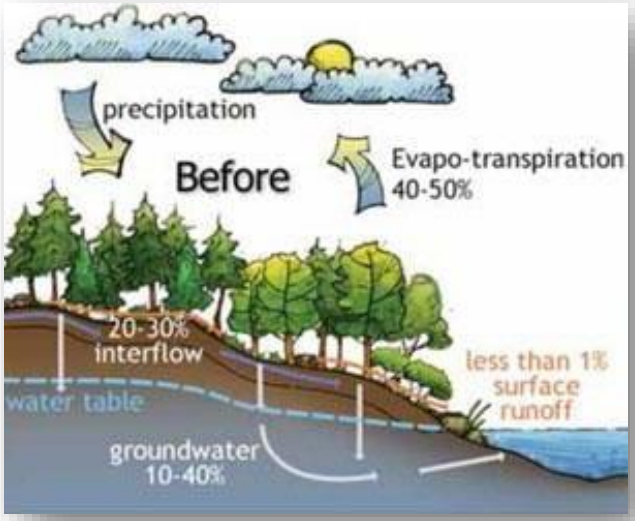
Before Development

Prior to development

- Rainfall is stored in the tree canopy, taken up by the roots of vegetation, and slowed down to enable infiltration into the soil.
- Nonpoint source pollutants are filtered out of stormwater runoff before it reaches local waterways.



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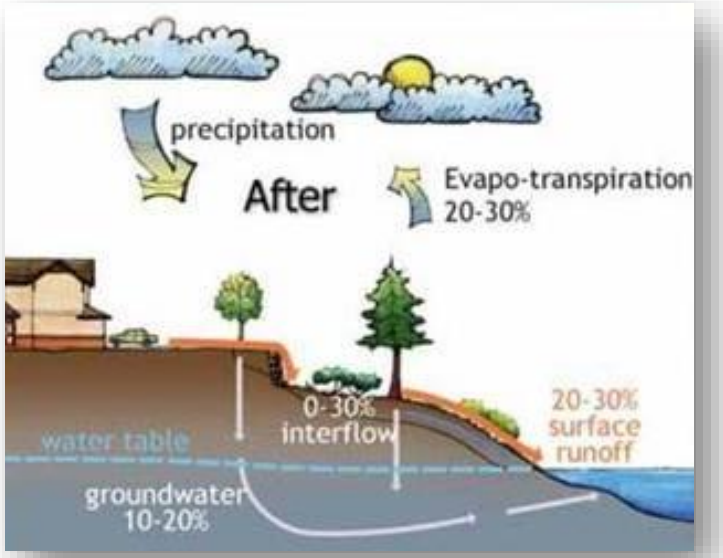
After Development

- Impervious surfaces replace indigenous vegetation
- The capacity and ability of soils to absorb rainfall decreases
- The volume and velocity of stormwater runoff increases
- Less water infiltration = **MORE** NONPOINT SOURCE POLLUTION reaching our waterways
  - Sediment
  - Nutrients (e.g., nitrogen & phosphorus
  - Toxic substances
  - Pathogens



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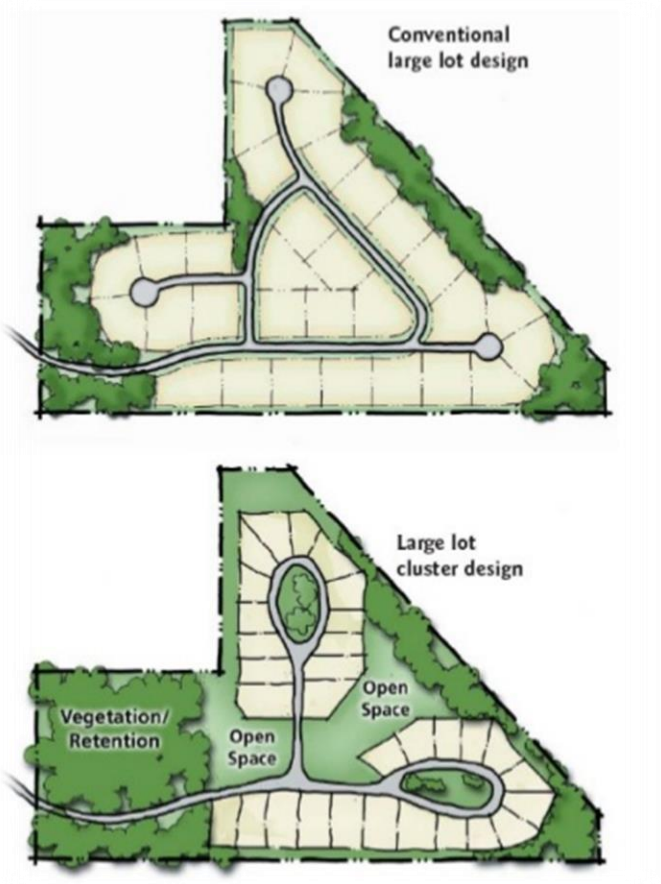
How does the Bay Act Protect Water Quality?

- Within locally designated Chesapeake Bay Preservation Areas (CBPAs) the Bay Act limits activities and is most restrictive within those areas closest to the most environmentally sensitive areas.
- During the planning and pre-development phases of a project, land disturbance and impervious surfaces are minimized, and existing vegetation is preserved.
- These efforts promote the infiltration of stormwater into the ground, consistent with the proposed use or development, in order to limit the amount of nonpoint source pollutants that make it to local waterways.



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Local Program Requirements

Identify and map Chesapeake Bay Preservation Areas (CBPAs)

- Resource Protection Areas (RPAs)
- Resource Management Areas (RMAs)
- Intensely Developed Areas (IDAs)

Incorporate performance criteria – water quality protection measures – into plans, ordinances, and policies

- Comprehensive Plan
- Zoning Ordinance
- Subdivision Ordinance
- Plan of development review process

Local Bay Act Program Website

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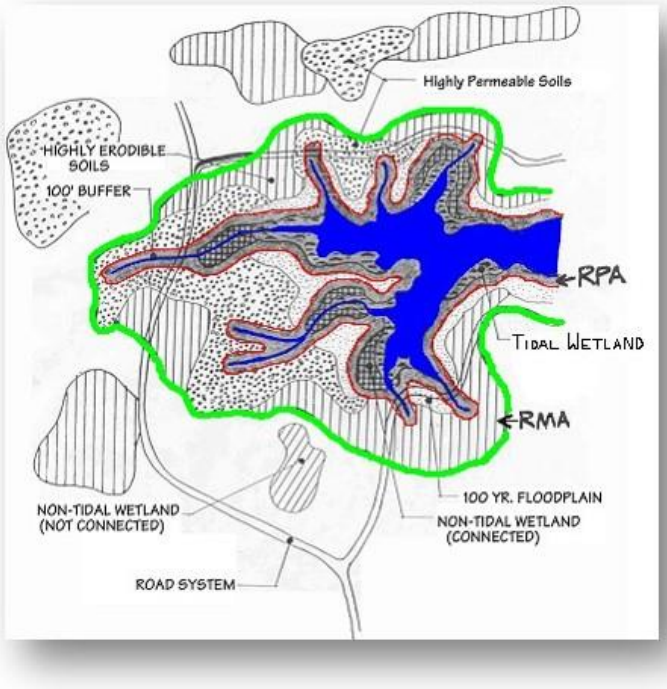
Chesapeake Bay Preservation Areas

Resource Protection Areas (RPA)

- Tidal wetlands and shores
- Nontidal wetlands connected by surface flow and contiguous to water bodies with perennial flow
- 100’ vegetated buffer adjacent to above features and along both sides of any water body with perennial flow
- Limited activities permitted, strict performance criteria for development



Resource Management Areas (RMA)

- Includes land types that have a potential for causing water quality degradation or for diminishing the functional value of the RPA
- Contiguous to the inland boundary of the RPA
- Permits all uses and activities permitted by zoning
- Land categories to be considered for inclusion in RMA: floodplains, highly erodible and permeable soils, steep slopes, nontidal wetlands not included as RPA

Intensely Developed Areas (IDA)

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General Performance Criteria

Applied to all land development within CBPAs

- Minimize land disturbance
- Preserve indigenous vegetation
- Minimize impervious surfaces
- E&S and stormwater management requirements apply for land disturbance >2,500 SF
- Plan of development review process required >2,500 SF
- Septic system requirements
- Agricultural conservation assessments
- Silvicultural exemption with streamside BMPs
- Evidence of wetlands permits required prior to clearing

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RPA Development Criteria

- Activities within the RPA are limited and require local government approval.
- Must comply with the general performance criteria.
- A site-specific determination of the RPA based on current site conditions must be conducted by the applicant.
- The applicant must submit a WQIA, including mitigation, for land disturbance in the RPA.
- The 100-foot buffer must be retained and reestablished where it does not exist.

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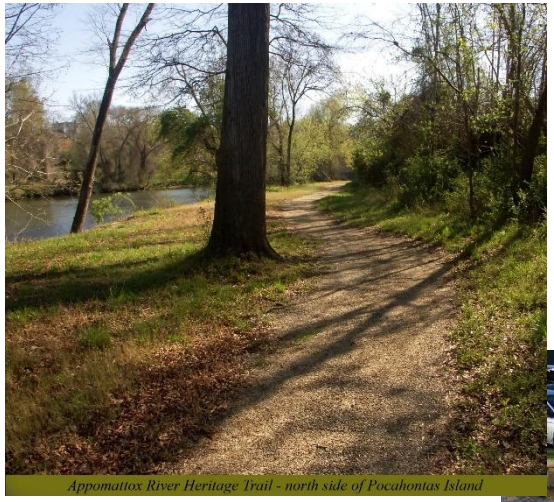
Limited Activities within the RPA


Appomattox River Heritage Trail - north side of Pocahontas Island

- Permitted or “by-right” uses
- Exempt uses
- Permitted buffer modifications
- Permitted buffer encroachments

- All activities and uses within the RPA require local approval
- Approvals either administrative (staff) or by exception (public hearing)
- All approvals have conditions and require mitigation

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Permitted Uses within RPA

- New or expanded water dependent uses (but not non-water dependent components – pools, clubhouses, parking)
- Redevelopment of existing structures (no increase in impervious cover and no further encroachment into RPA)
- New primary structure + utilities on a pre-Bay Act lot
- Private roads and driveways
- Regional flood control and stormwater facilities

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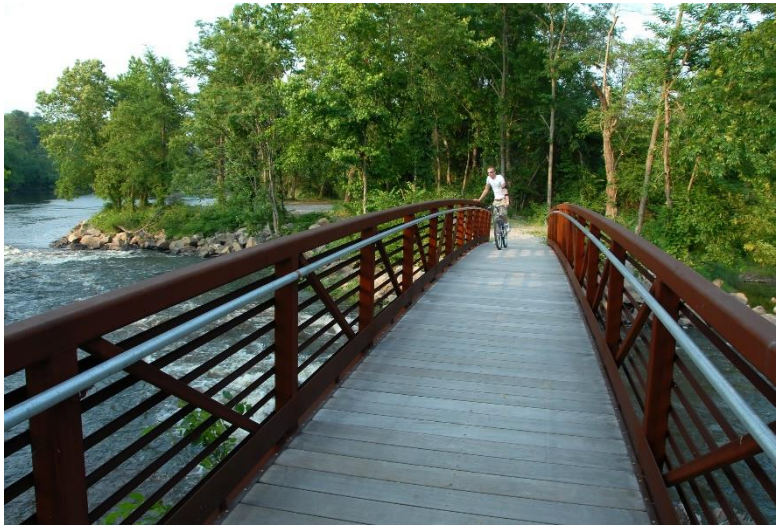
Exempt Uses within RPA

- Passive recreation facilities - boardwalks and access paths
- Historic preservation and archaeological activities
- Water wells
- Railroads
- Public roads
- Public utilities



RPA Buffer Encroachments

(structures)

Administrative Waivers:

- New development of principal structure and utilities on pre-Bay Act lots (recorded before 10/1/89*).
- Expansion of non-conforming (pre-Bay Act) structures.
- WQIA required.
- Administrative approval by local staff, no public hearing requirement.
- Approval requires reasonable conditions, including mitigation.
- Approval for expansion of non-conforming structures contingent on meeting required findings.

Formal Exceptions:

- Encroachments for any use not otherwise permitted (by-right, exempt).
- Accessory structures & uses: detached decks or garages, pools, gazebos, patios, sheds, etc.
- Encroachment into the seaward 50’ of the buffer.
- WQIA + mitigation for area of land disturbance required.
- May be granted following public notice and public hearing.
- Must meet the required findings and be approved with reasonable conditions, including mitigation.

* Lots recorded after October 1, 1989 are required to include sufficient buildable area outside RPA.

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Permitted Buffer Modifications

(no structures, generally)

Administrative approval

- Sight lines and vistas
- Access paths
- General woodlot management
- Shoreline erosion control projects

** Requires WQIA and mitigation for area of land disturbance in the RPA.

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Why a Riparian Buffer?

“To minimize the adverse effects of human activities on state waters and aquatic resources.”

- Reduce runoff
- Prevent erosion
- Filter nonpoint source pollution
- Protect sensitive environmental features

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Key Riparian Buffer Functions

- Trap and store sediment
- Nutrient uptake by plants
- Conversion of toxins – pesticides & pathogens
- Prevent erosion - maintain banks and shorelines
- Infiltration for groundwater recharge and flood mitigation
- Shade streams to reduce temperatures
- Maintain habitat and biodiversity

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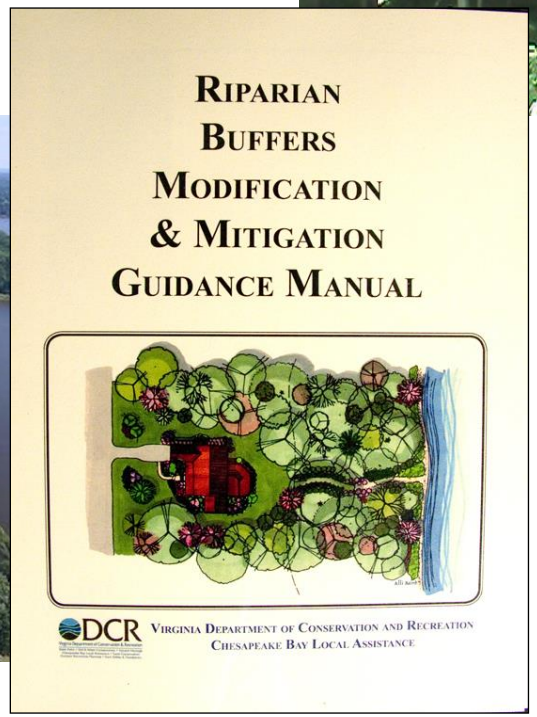
Buffer Components

- A typical forest is composed of canopy trees, understory trees, saplings and shrubs, and groundcover (both herbaceous and duff)
- 3-Trophic layers discussed in the *Riparian Buffer Modification & Mitigation Manual*



Buffer Manual link:
https://www.deq.virginia.gov/water/chesapeake-bay/chesapeake-bay-preservation-act/local-program-regulations-guidance

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Buffer Values

Canopy trees:

- Intercept rain before it reaches the ground, decreasing erosive impact and runoff
- Cool the air and ground water that provides the majority of stream base flow

Understory trees, saplings and shrubs:

- Provide additional canopy and a network of fine intertwined roots that uptake nutrients before they reach surface waters.
- Cool the air and ground water that provides the majority of stream base flow

Groundcover:

- Provides additional protection from erosion, removing sediment from water that filters through.
- Decaying organic duff provides carbon for denitrification, aids water absorption and sediment retention.




Benefits of One Tree

Rain interception:

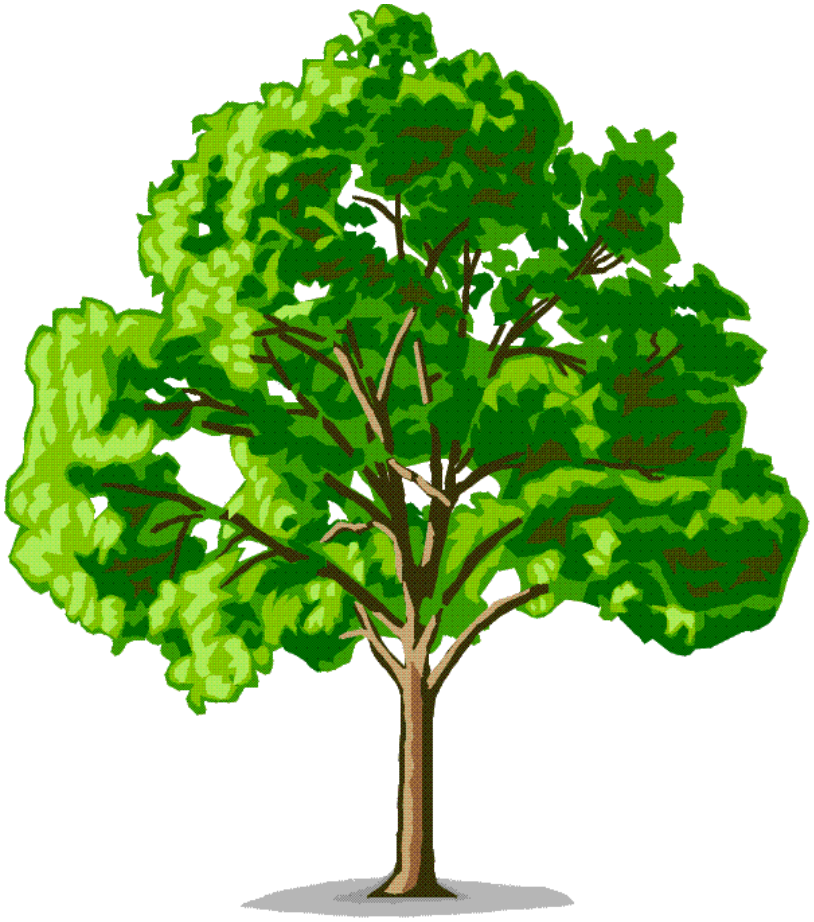
760 gallons/year

Evapotranspiration:

100 gallons/year

Nutrient uptake:

0.05 lbs/year*



** Urban Watershed Forestry Manual Part 2: Conserving and Planting Trees at Development Sites*. Center for Watershed Protection. May 2006

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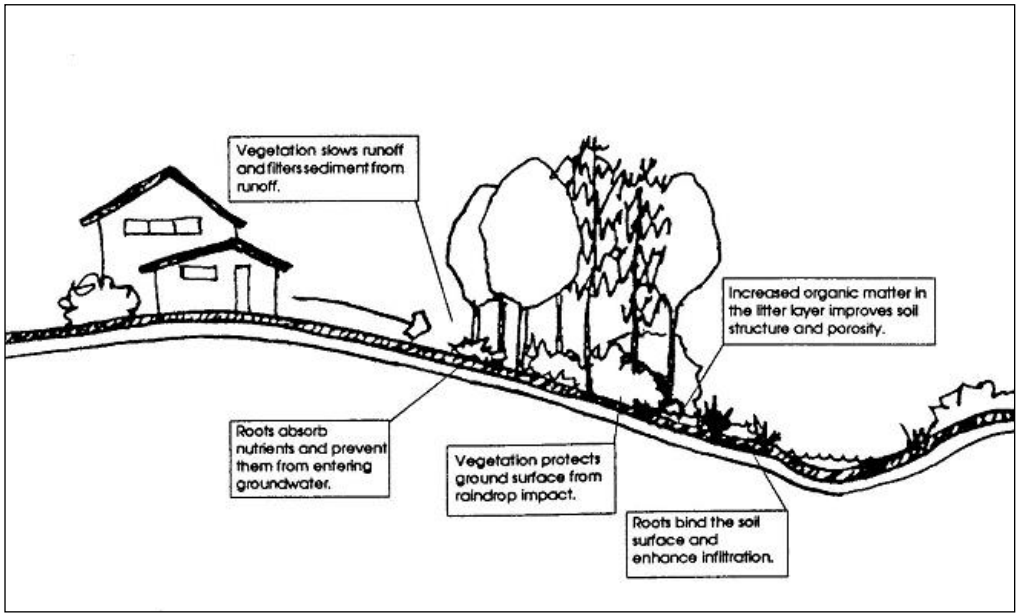
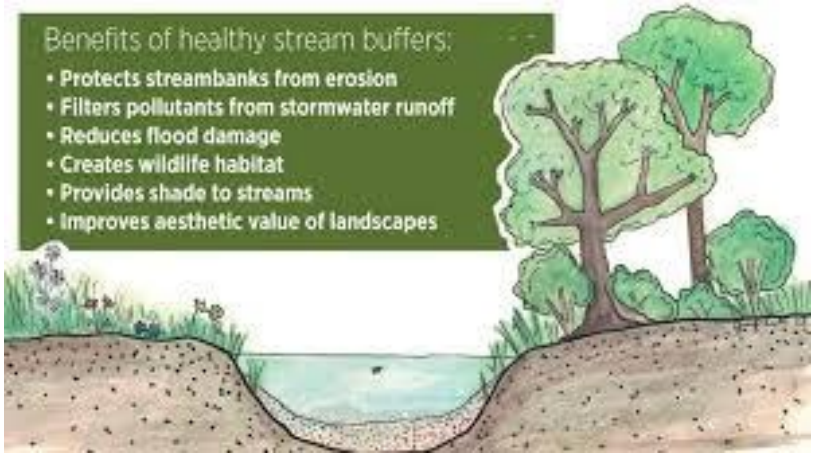
What is a Buffer expected to do?

According to 9 VAC 25-830-140 3, "the 100-foot buffer area shall be deemed to achieve a 75% reduction of sediments and a 40% reduction of nutrients."



- In general, the remaining vegetation + vegetative mitigation should meet the regulatory standard.



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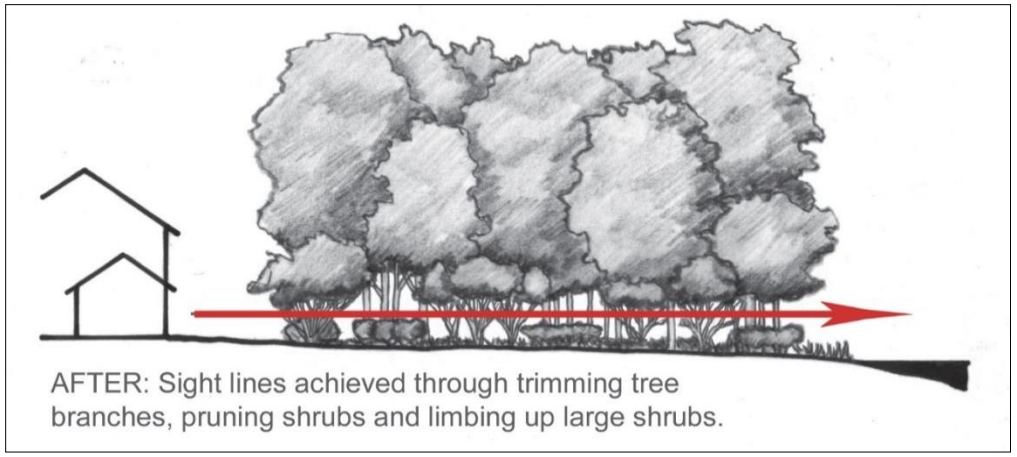
Sightlines & Vistas

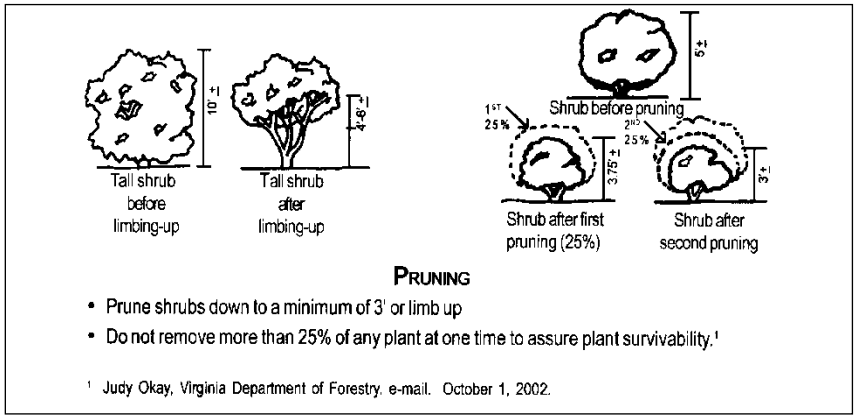
"Trees may be pruned or removed as necessary to provide for sight lines and vistas, provided that where removed, they shall be replaced with other vegetation that is equally effective in retarding runoff, preventing erosion, and filtering nonpoint source pollution ..." 9 VAC 25-830-140 5 a (1)



AFTER: Sight lines achieved through trimming tree branches, pruning shrubs and limbing up large shrubs.

- When creating vistas, the majority of the plant material should remain.

- Pruning tree limbs up and trimming shrubs down should provide sufficient views through the woods.



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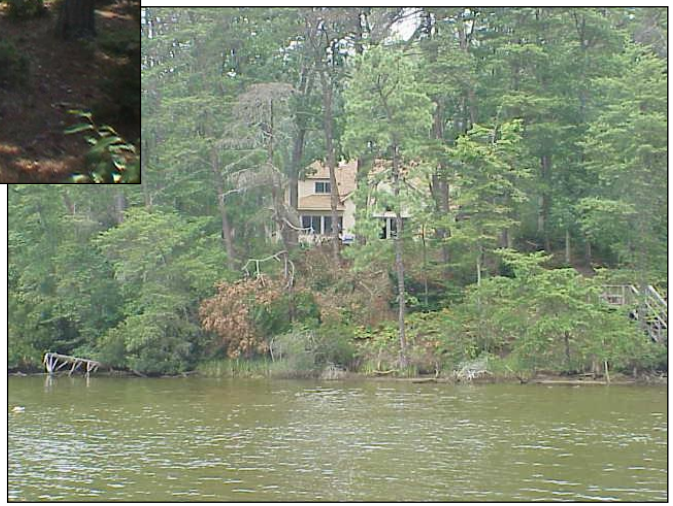
Sightlines & Vistas



- Judicious removal of a tree or two, limbing up canopy and understory trees, and thinning of saplings is allowed to create a vista, provided the understory and ground cover remain intact.

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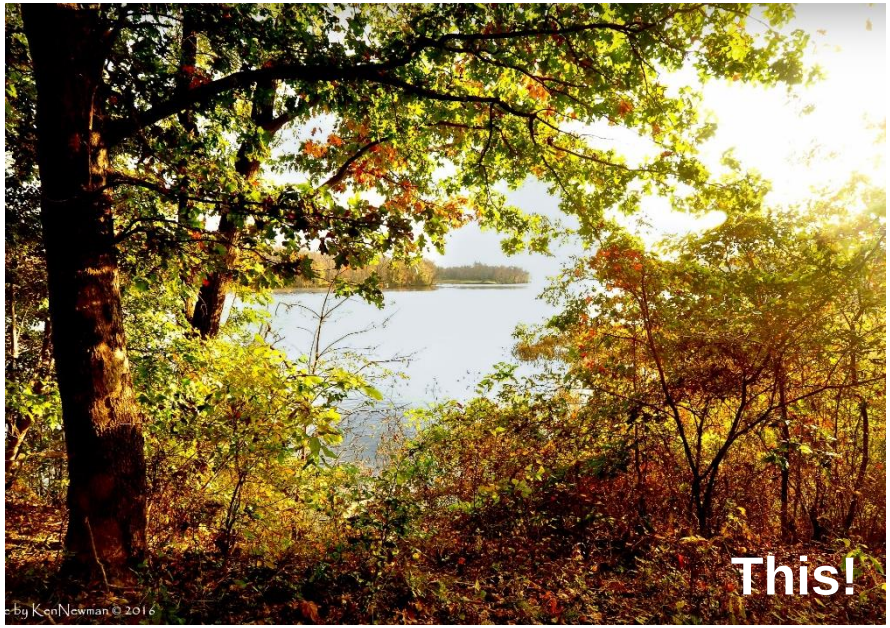
Sightlines & Vistas



- “Mature trees shall be preserved and trimmed or pruned in lieu of removal as site conditions permit and any removal should be limited to the fewest number of trees feasible.
- When trees are removed to provide for sight lines and vistas, they shall be replaced with trees as appropriate to site conditions and in such a manner as to maximize the buffer function and to protect the quality of state waters.
- Inclusion of native species in tree replanting is preferred.”

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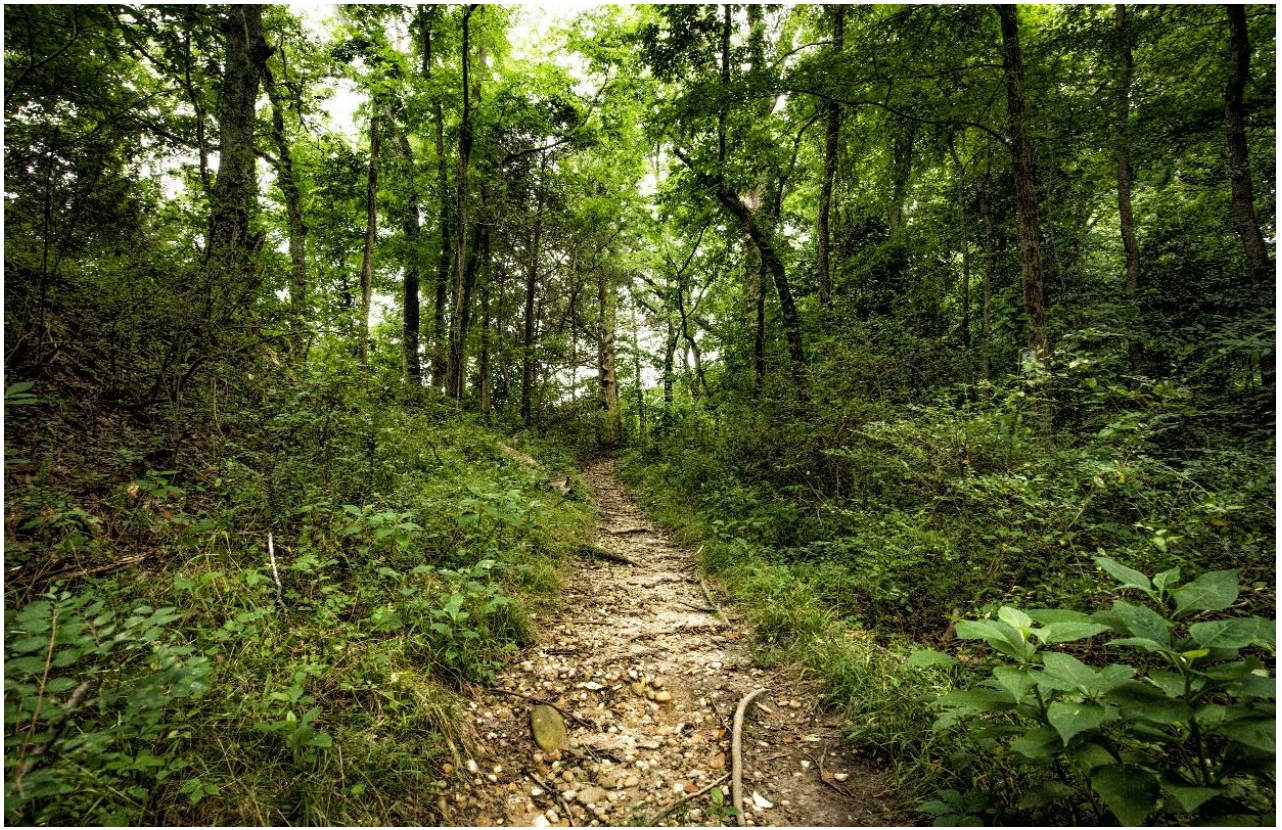
Access Paths

"Any path shall be constructed and surfaced so as to effectively control erosion." 9 VAC 25-830-140 5 a (2)



- Fit the path to the land, curve around trees and shrubs, and use natural paving materials like mulch.

Access Paths

- Two sections of the same path, one with turf grass, one with mulch.

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General Woodlot Management

"Dead, diseased, or dying trees or shrubbery and noxious weeds may be removed and thinning of trees may be allowed pursuant to sound horticultural practice ..." 9 VAC 25-830-140 5 a (3)

- A natural forest stand has 25% trees, 25% understory & large shrubs and 50% shrubs and saplings

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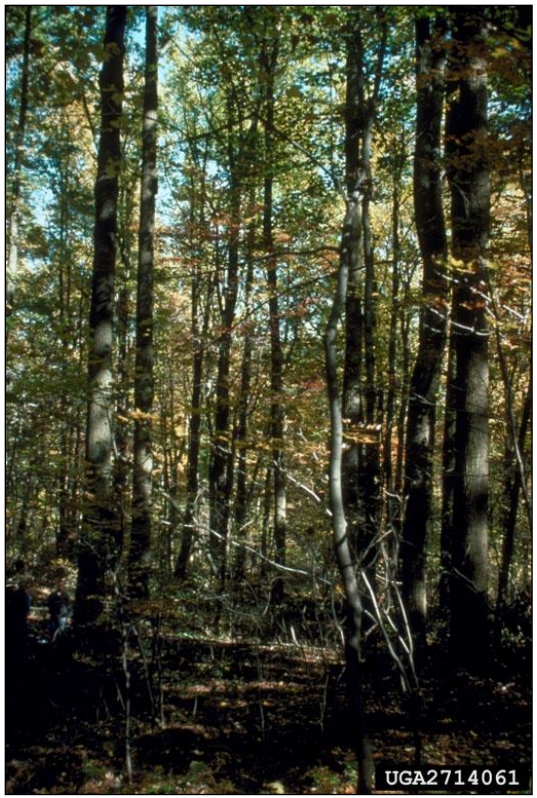
General Woodlot Management



- This unmanaged stand of woods would benefit from the judicious thinning of a few trees and saplings, “in accordance with sound horticultural practice”.

- After management there are still understory trees and saplings and the forest floor is intact. Natural regeneration of shrubs and understory trees should be allowed to occur.

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General Woodlot Management

- Invasives can destroy a buffer and sometimes management may require removal and replacement.

- Poison ivy is not considered an invasive although control may be necessary.

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Shoreline Erosion Control

- Trees and woody vegetation may be removed, necessary control techniques employed, and appropriate vegetation established to protect or stabilize the shoreline.
- “In accordance with the best available technical advice,” permits and conditions.
- Virginia law now requires the use of nature-based adaptation measures, including living shorelines according to the VMRC Tidal Wetland Guidelines, so that hardened shorelines are only allowed when such solutions are not possible given shoreline conditions, as approved by VMRC.
- Any land disturbance in the 100-foot RPA buffer requires vegetative mitigation.

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Shoreline Erosion Control

"For shoreline erosion control projects, trees and woody vegetation may be removed, necessary control techniques employed, and appropriate vegetation established to protect or stabilize the shoreline in accordance with the best available technical advice and applicable permit conditions or requirements."

9 VAC 25-830-140 5 a (4)

- The erosive effects of Hurricane Isabel on grassed, bulk-headed shoreline are visible to the right, in contrast to the intact woody buffer on the left.

- "Mature trees shall be removed only as necessary for the installation and maintenance of the project, consistent with the best available technical advice project plans, and applicable permit conditions or requirements.
- Trees shall be utilized in the project when vegetation is being established as appropriate to the site conditions and project specifications.
- Inclusion of native species in tree planting is preferred."

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Mitigation for Land Disturbance in RPA Buffer

Restoration/Establishment Table A

RIPARIAN BUFFERS MODIFICATION & MITIGATION GUIDANCE MANUAL

DCR VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION
CHESAPEAKE BAY LOCAL ASSISTANCE

A. 1/4 acre or less of buffer
(Up to 10,890 square feet or less of buffer area.)

For every 400 square-foot unit (20'x20') or fraction thereof, plant:

one (1) canopy tree @ 1Y2" - 2" caliper or large evergreen @ 6' *two (2)* understory trees @ 3/4" – 1 Y2" caliper or evergreen @ 4' or *one* (1) understory tree and *two* (2) large shrubs @ 3'-4' *three (3)* small shrubs or woody groundcover @ 15" – 18"

Example:
A 100-foot wide lot x 100-foot wide buffer is 10,000 square feet. Divide by 400 square feet (20'x20' unit) to get:
25 units

Units	x plant/unit	Number of plants
25 units x	1 canopy tree	25 canopy trees
	2 understory trees	50 understory trees
	3 small shrubs	75 small shrubs
		150 plants

- Area of LD w/i RPA / 400 sf = 1 planting unit
- For each planting unit plant 1 canopy, 2 understory, 3 small shrubs

Restoration/Establishment Table B

Greater than 1/4 acre of buffer
More than 10,890 square feet

A. Plant at the same rate as for 1/4 acre or less.

B. The waterside 50% of the buffer (from the waterline inland for the first 50 feet): For every 400 square-foot unit (20'x20') or fraction thereof plant:

one (1) canopy tree @ 1'A" - 2" caliper or large evergreen @ 6'
two (2) understory trees @ 3/4" – 1 'A" caliper or evergreen @ 4'
or *one* (1) understory tree and *two* (2) large shrubs @ 3'-4' *three (3)* small shrubs or woody groundcover @ 15" – 18"
AND

The landward 50% of buffer (from 50 feet inland to 100 feet inland):
either plant
Bare root seedlings or whips at 1,210 stems per acre[1], approximately 6'x6' on center (Minimum survival required after two growing seasons: 600 plants)
or
Container grown seedling tubes at 700 per acre approximately 8'x 8' on center (Minimum survival required after two growing seasons: 490 plants)

C. If the applicant is willing to enter into a five year maintenance and performance guarantee: 100% of buffer planted with:
Bare root seedlings or whips at 1,210 per acre, approximately 6'x 6' on center (Minimum survival required after two growing seasons: 600 plants)
or
Container grown seedling tubes at 700 per acre approximately 8'x 8' on center (Minimum survival required after two growing seasons: 490 plants)

1 acre or more of buffer

With an evaluation from an arborist or forester or other professional, natural regeneration may be an acceptable method of buffer establishment, however, a forestry management plan must be in place prior to any vegetation being removed. A minimum of 35 feet next to the water must be left in forest and protected prior to any vegetation being removed. If over 20 percent of the vegetation must be removed for the health of the woodlot, within the 35 feet closest to the shore-line, vegetation must be reestablished by seedling plantings at the rates above.

[1] Palone, Roxanne S., and Al Todd, *Chesapeake Bay riparian handbook: A guide for establishing and maintaining riparian forest buffers.* May 1977. p. 7-20.

Vegetation Replacement Rates

VEGETATION REMOVED	PREFERRED REPLACEMENT VEGETATION	ACCEPTABLE ALTERNATIVE VEGETATION
1 tree or sap ling /2"-2 1/2" caliper	1 tree @ equal caliper or greater	**Or** 2 large shrubs @ 3'-4' **Or** 10 small shrubs or woody groundcover *@ 1 5 "- 1 8 "
1 tree >2 1/2" cal p er	1 tree @ 1 1/2 " - 2" caliper,or 1 evergreen tree @ 6 ' min. ht., p er every 4" caliper of tree removed (ex: a 1 2" cal. tree would require 3 trees to replac e it)	**Or** 75% trees @ 1 1/2" - 2" and 25% large shrubs @ 3 '-4' per every 4" caliper oftree removed. (ex: a 1 6 " cal. tree removed would require 3 trees and 1 large shrub) **Or** 10 small shrubs or woody groundcover @ 1 5 "- 1 8 " per 4"caliper of tree removed (ex: a 8 " caliper tree removed requires 20 small shrubs)
lage shrub	1 largeshrub @ 3 '-4 '	**Or** 5 small shrubs or woody groundcover @ 1 5 "- 1 8 "

* Woody groundcover is considered to be a woody, spre ading shrub that remains close to the ground, to 1 8 " high, such as a shore juniper, *Juniperus conferta*. Vines may not be considered "woody groundcover" for the purpose of vegetation replacement.

Riparian Buffers Modification & Mitigation Manual, Appendix D

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2020 Statutory Amendments

Mature Trees

- Virginia Code § 62.1-44.15:72 required DEQ to develop criteria enabling local governments to encourage and promote the "preservation of mature trees or planting of trees as a water quality protection tool and as a means of providing other natural resource benefits" through their Bay Act program:
  - Providing definitions for mature trees, canopy and understory trees
  - Requiring protection during development
  - Encouraging preservation and trimming/limbing up
  - Removal limited to fewest trees feasible and consistent with the best available technical advice
  - Requiring replacement for removal with trees in a number and location appropriate to site conditions and maximizing the buffer function of protecting water quality.
  - Inclusion of native species in tree replanting is preferred.
- Effective: 9/29/2021, local ordinance adoption by 9/29/24

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2020 Regulatory Amendment:

Coastal Resiliency

- Virginia Code § 62.1-44.15:72 required the State Water Control Board (Board) to develop criteria enabling local governments to encourage and promote "coastal resilience and adaptation to sea-level rise and climate change" through their Bay Act programs by requiring a resiliency assessment be conducted to understand the impacts of climate change and sea level rise on any proposed land development within RPAs, based on a potential impact range of Localities *"shall assess the impacts of climate change and sea level rise on proposed land development in the RPA…"*
  - Incorporated into the plan of development or project review process
  - Based upon RPA as delineated at time of proposed development
  - Based upon a period of 30 years, or lifespan of the project
  - Use a model or forecast developed by or on behalf of Commonwealth
  - Assess potential impacts on buffer function in light of proposed project
  - Identify conditions, alterations or adaptation measures to address potential impacts
- Effective: 9/29/2021, requires local ordinance adoption by 9/29/24

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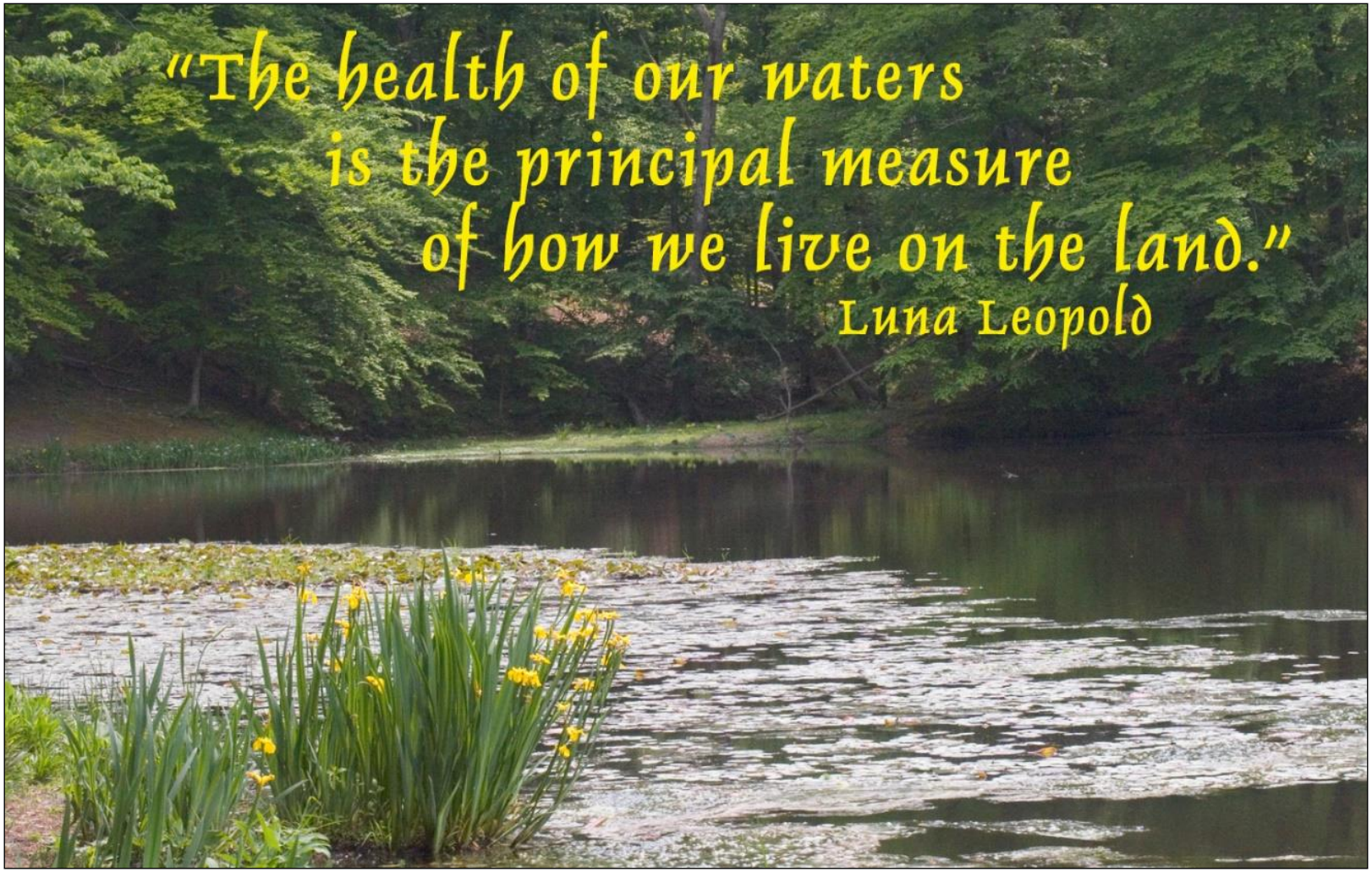
Questions & Discussion



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