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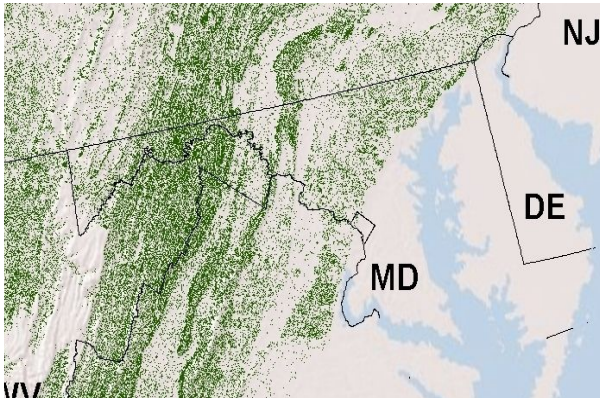
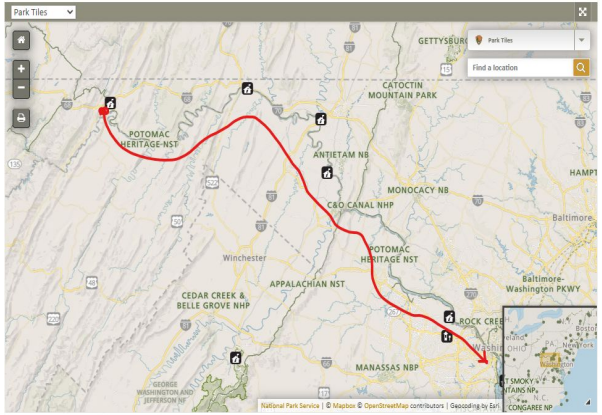
Provide recommendations for the removal of targeted invasive species and reintroduction of native plants to facilitate restoration along the C&O Canal

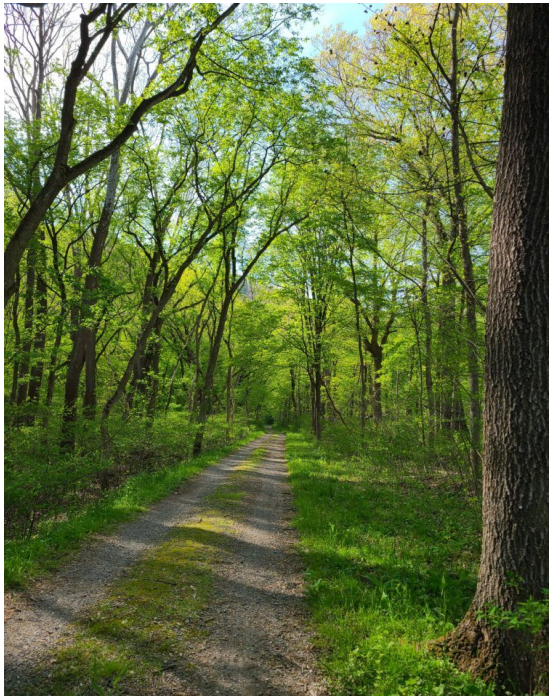
Northeastern Interior Dry-Mesic Oak Forest

C & O Canal





- Most abundant habitat in the Ridge and Valley region of Maryland
- Oak-dominated closed canopy
- Hickories in mature stands
- Also red-maple, black & yellow birch
- And susceptible to numerous invasive species



Most impactful invasives

- Tree-of-heaven (*Ailanthus altissima)*
- Japanese knotweed (*Fallopia japonica*)
- Wineberry (*Rubus phoenicolasius*)
- Multiflora rose (*Rosa multiflora)*
- Japanese honeysuckle (*Lonicera japonica)*
- Autumn Olive (*Elaeagnus umbellata*)
- *Japanese Barberry (Berberis thunbergii)*

Japanese knotweed

Tree-of-heaven

Spotted Lanternfly

Management challenges

- Complex ecological interactions between different invasive species
- Contrasting priorities across management agencies (Cottet et. al)
- Highly invasive species likely to return
- Management focuses on single invasive species removal
- Little information about restoration
    - what to plant
    - community management

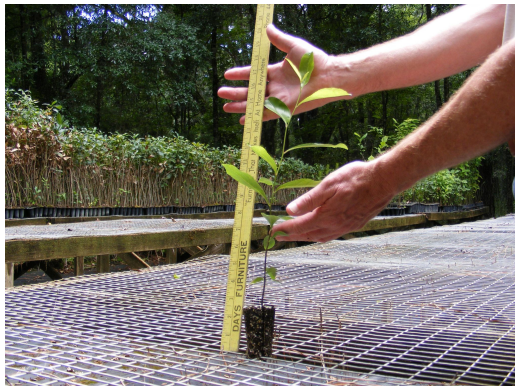
Invasive species management solutions

- Tree-of-heaven - emerging biocontrol (Ding et al. 2006)
- Japanese knotweed
  - Existing biocontrol
  - Emerging physiochemical control (Jones et al. 2018)

Management solutions

Prioritizing restoration as a method of invasive species control

- Native leaf litter mediates the impact of invasive leaf litter decomposition on biogeochemical processes (Swan et al. 2008)
- Revegetation with native plants can suppress reinvastion (Schuster et al. 2018)
- Successful native tree seedling restoration despite dense invasive species (Link III et al. 2019)



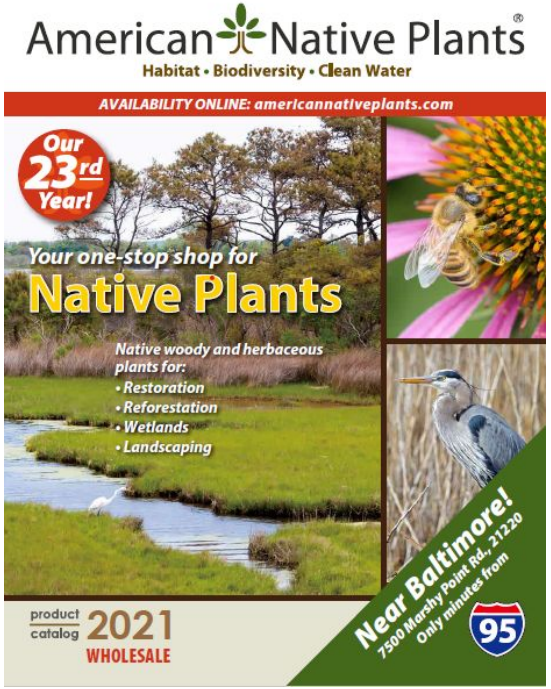
Black Cherry - *Prunus serotina*

Maple leaf viburnum - *Viburnum acerfolium*

Management solutions - Restoration
Northeastern Interior Dry-Mesic Oak Forest

Common native species

- *Viburnum acerfolium* - mapleleaf viburnum
- *Hamamelis virginiana* - American witch-hazel
- *Kalmia latifolia* - mountain-laurel
- *Vaccinium pallidum* - hillside blueberry
- *Gaylussaccia baccata* - black huckleberry
- *Cornus florida* - flowering dogwood
- *Amelanchier arborea* - common serviceberry
- *Celtis occidentalis* - common hackberry
- *Lindera benzoin* - northern spicebush



Management solutions

Restoration Planting Community Prediction Tool: West Virginia

Region: West Virginia | View site: | show all

Step 1: Site Variables

Start new site data | Site name (optional): North Branch | delete this site

Entire site values for these variables (required = bold)

Desired Physiognomy (optional)		
UTM X	694491.2524730111	364705 to 785324
UTM Y	4384464.49462711	4129612.4 to 4489154.3
Bailey Section	Northern Ridge and Valley	
River Basin	Potomac River Drains	
Elevation (meters)	177.35	76 to 1474
Cowardin System	Upland	
Landform	Cove/ravine/gorge	
Topo Position	Plain/bottom	
Slope (degrees)	12	0 to 78
Aspect (Beers)	.84	0 to 1
Soil Drainage		
Hydro Regime		
NRCS Hydro (hydgrpdcd)	A	
NRCS Capability (niccdad)	2	
Ecological System	Northeastern Interior Dry-Mesic Oak Forest	
Geologic Unit	Qal: Quaternary alluvium	
Rock Type	Alluvium	
Field Soil pH		3 to 8.1
Soil Lab Organic Matter		0.2 to 89.8
soil Lab pH		3 to 8.1
Soil Lab Al (ppm)		2 to 2085
Soil Lab Ca (ppm)		1 to 27135
Soil Lab Cu (ppm)		0.2 to 32.1
Soil Lab Fe (ppm)		13 to 1163

Similarity key: 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

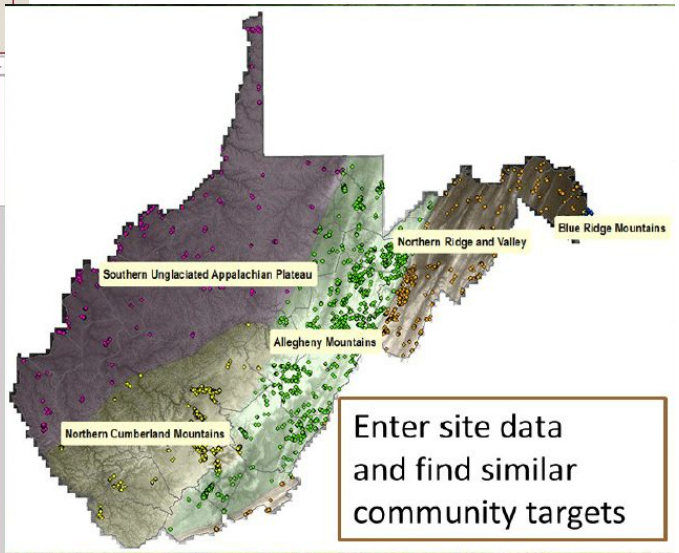
Step 2: Find target communities

Find most similar communities

Most similar communities:

Target	Similarity	Confidence	Select
3896	0.676	medium	☑
4643	0.619	medium	☐
6217	0.603	medium	☐
6445	0.596	high	☐
8412	0.592	medium	☐
8517	0.588	medium	☐
6548	0.576	medium	☐
4073	0.568	high	☐
8514	0.548	very high	☐
2026	0.542	very high	☐
4793	0.537	very high	☐
1016	0.536	high	☐
6288	0.533	very high	☐
6057	0.532	high	☐
8525	0.526	high	☐
6565	0.524	high	☐
7334	0.522	high	☐
6497	0.521	high	☐
1010	0.517	medium	☐
2432	0.513	very high	☐
6466	0.512	very high	☐
8523	0.511	high	☐
3683	0.511	medium	☐

^ double-click target to show similarity by variable acco
(1=same and green, 0=completely different and red)



https://dep.wv.gov/WWE/getinvolved/Pages/Restoration-Planting-Tool.aspx

Included in the brief

- Most impactful invasives for Northeastern Interior Dry-Mesic Oak Forests
- Links to species specific invasive management strategies
- Novel invasive species management strategies
- List of native species and their local availability for restoration planting
- Recommendation to use West Virginia's Restoration Planting Community Prediction Tool