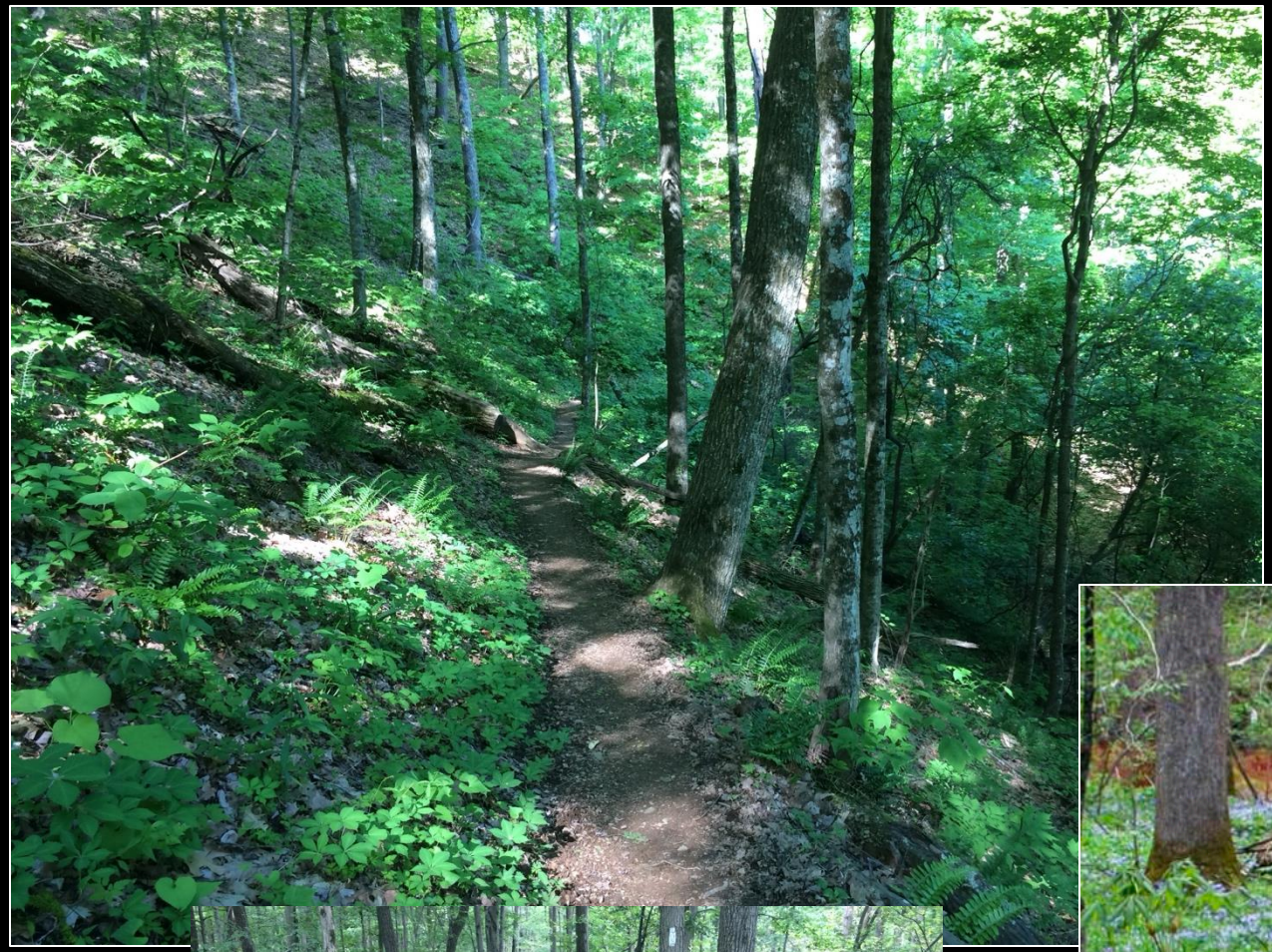
Invasives and the Trail



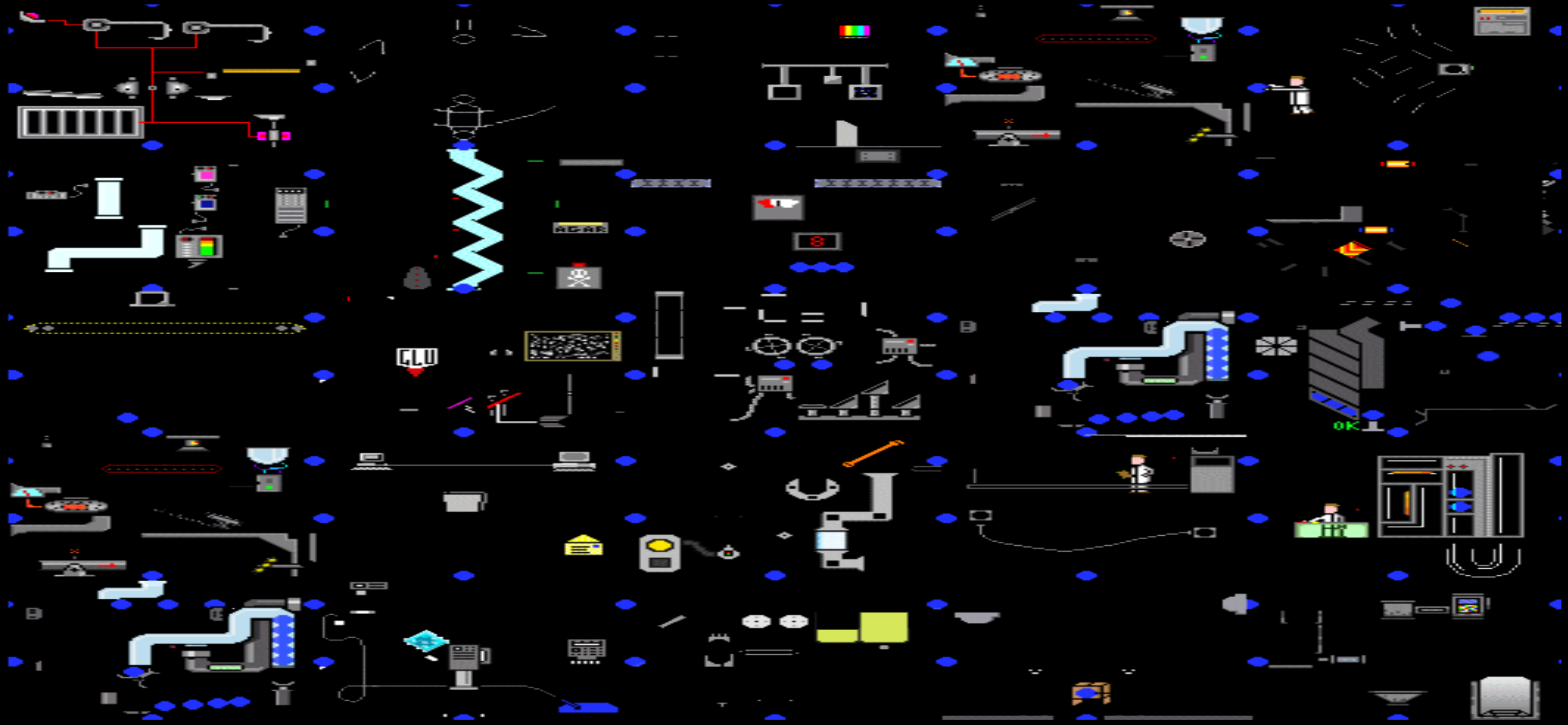
Our trails provide a path for the public to explore, study, and appreciate our natural world

Our trails also provide a disturbance vector providing a path for the spread of invasive plants

Invasives and the trail - Outline

1. Impact of Invasives on our Native Landscapes
2. Common Invasives (grasses, vines, shrubs, trees, insects.)
3. Invasive Management (What, where, who and how)

Native ecosystems have evolved over long periods of time due to the countless interactions between living organisms and between these living organisms and their environment (soils, weather, etc)



Home › Biological Invasions › Article

Two Invasive Plants Alter Soil Microbial Community Composition in Serpentine Grasslands

Published: March 2006

THE THREAT OF INVASIVE ALIEN SPECIES TO BIOLOGICAL DIVERSITY: SETTING A FUTURE COURSE[1]

Elizabeth A. Chornesky[2] and John M. Randall[3]

1 May 2018

The Effects of Oriental Bittersweet on Native Trees in a New England Floodplain

Zackary J. Delisle, Timothy Parshall

Impact of Autumn Olive Nitrogen-Fixation on Groundwater Nitrate Concentration

Authors: Zuhdi Y. Aljobeh, Tiffany N. Kolba, Yacoub Aljobeh, and Dana Hinaman | AUTHOR AFFILIATIONS

Publication: World Environmental and Water Resources Congress 2016 • https://doi.org/10.1061/9780784479865.004

INTEGRATIVE ZOOLOGY

Climate change and invasive species: double jeopardy

Susan A. MAINKA, Geoffrey W. HOWARD

Home › Journal of Chemical Ecology › Article

Direct and Indirect Effects of Invasive Plants on Soil Chemistry and Ecosystem Function

Review Article | Published: 15 January 2010

Volume 36, pages 59–69, (2010) Cite this article

Home › Journal of Chemical Ecology › Article

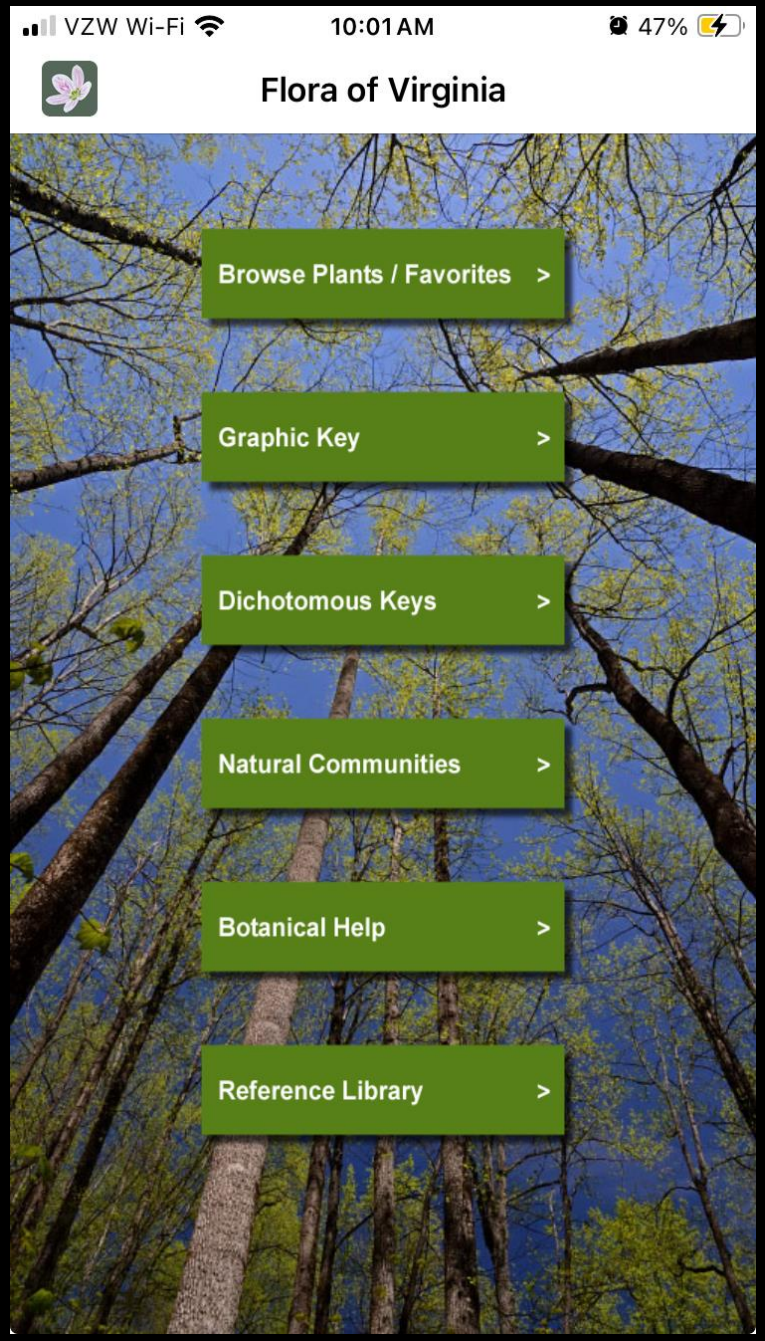
How Does Garlic Mustard Lure and Kill the West Virginia White Butterfly?

Published: 23 September 2015

Volume 41, pages 948–955, (2015) Cite this article

Impacts of Invasives on native ecosystems

- Loss of Biodiversity
- Change in soil microbial communities/function
- Changes in soil chemistry/nutrient cycling/ecosystem function and structure
- Changes in water quality

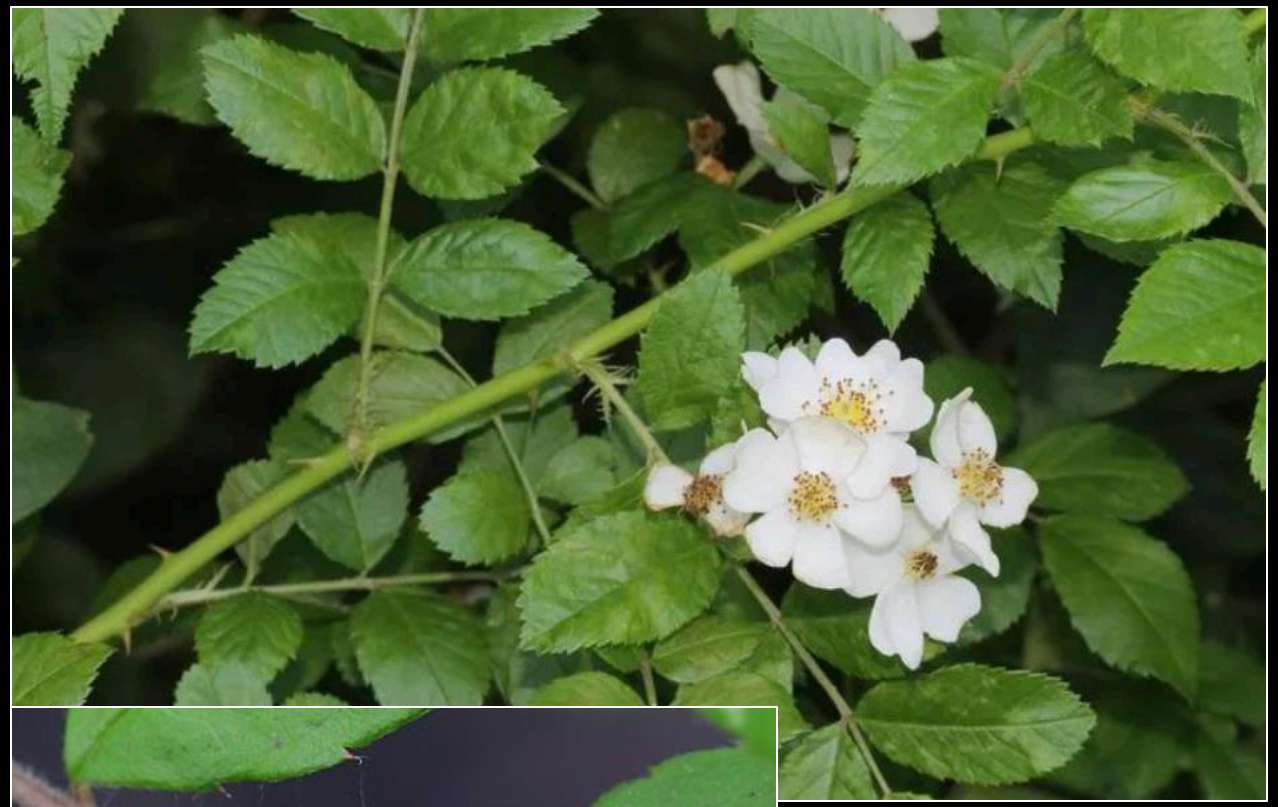


Flora of Virginia lists. . . .

3344 species of vascular plants

- 2645 are native
- 754 are non- native
- 87 are invasive

Japanese Barberry, Wavyleaf Basketgrass, Colonial Bentgrass, Oriental Bittersweet, Lesser Celandine, Marsh Dewflower, Winged Euonymus, Parrot Feather, Johnson Grass, Amur Honeysuckle, Japanese Honeysuckle, Morrow's Honeysuckle, Yellow Iris, Jetbead, Spotted Knapweed, Japanese Knotweed, Kudzu, Sericea Lespedeza, Purple Loosestrife, Garlic Mustard, European Stinging Nettle, Autumn Olive, Perilla, Porcelain-berry, Chinese Privet, Common Reed, Multiflora Rose, Long-bristled Smartweed, Japanese Stiltgrass, Tree-of-Heaven, Crown Vetch, Cinnamon Vine, Mile-a-minute, Wineberry,



Multiflora Rose
(*Rosa multiflora*)

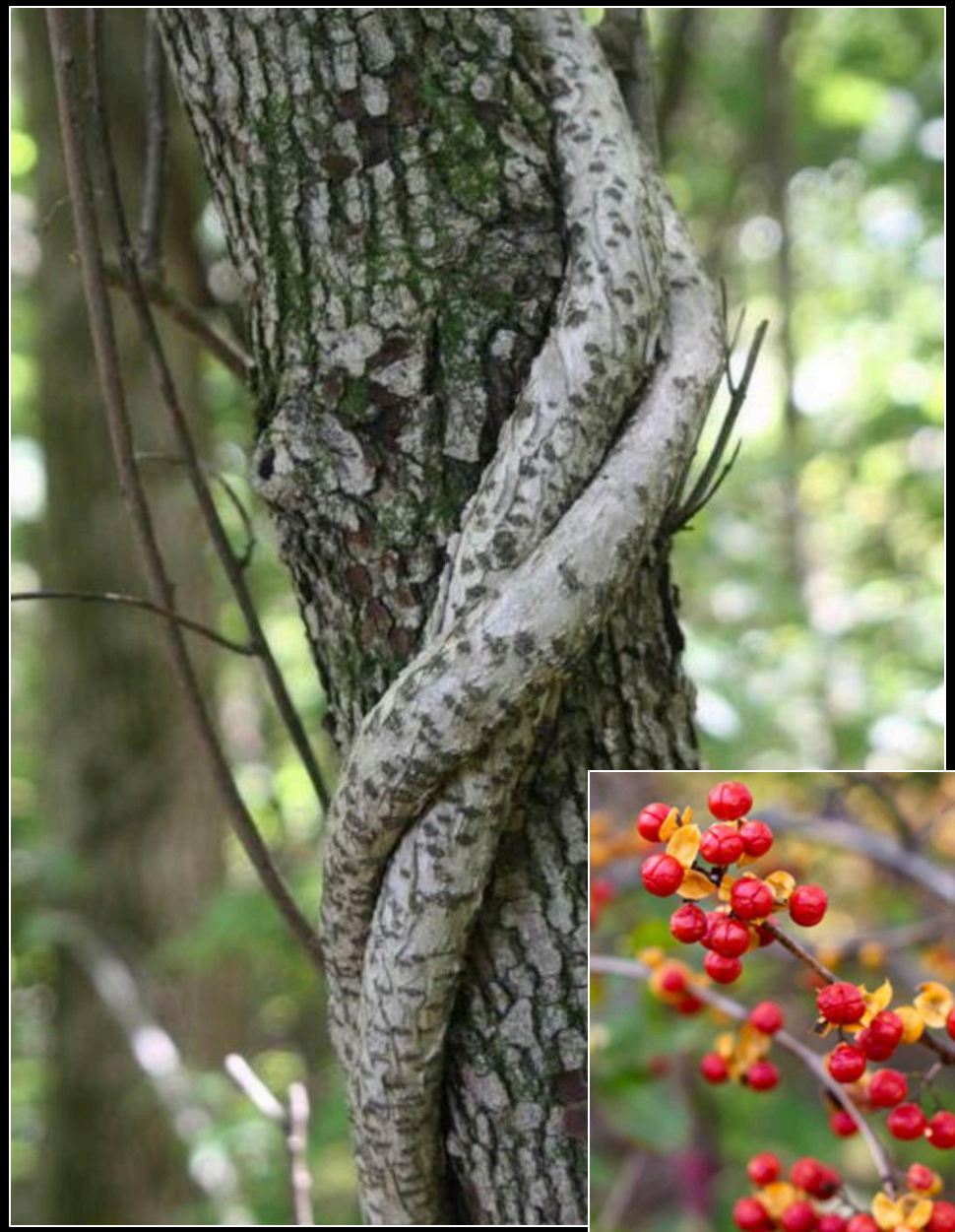
Multiflora Rose(*Rosa multiflora*)

- Introduced many times since the late 1700's as a garden plant and root stock for ornamental roses. Later used as wildlife plant for erosion control and as "living fence"
- Large plant can produce as many as 100,000's of seeds/year. Seeds can remain viable in seed bank for 10-20 years.
- Can also reproduce vegetatively by "layering" (rooting of stem tips) and re-spouting from root crown
- Rapid growth rate (1-2 ft/week) with stems reaching 10-15'.

Tree of Heaven
(*Ailanthus altissima*)

Tree-of-Heaven (*Ailanthus altissima*)

- Introduced in 1794 in Philadelphia, PA as an exotic, ornamental fast growing shade tree
- Reproduces by seed (>1,000,000 seeds /annually) and by root sprouting.
- Cutting trunk will stimulate increased root and stump sprouting.
- Primary host for the invasive Spotted Lanternfly



Oriental Bittersweet
(*Celastrus orbiculatus*)

Oriental Bittersweet (*Celastrus orbiculatus*)

- Introduced into the United States as an ornamental in 1860/70's
- Reproduces by seed and root sprouting (aggressive sprouter)
- Seeds have high rate of germination, low light requirements
- Annual growth rate 1 – 12 ft/year

Wavyleaf Basketgrass (*Oplismenus undulatifolius*)

- First discovered in the US in 1996 in Patapsco Valley State Park, MD
- Found in 2006 in Shenandoah National Park

- Able to reproduce both vegetatively (stolons) and by seeds
- Seeds are VERY sticky (up to 6000 seeds/sq meter) and VERY small
- Adaptive to low light, high leaf litter environments, can invade mature forest

- First discovered in the US in 1996 in Patapsco Valley State Park, MD
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- Able to reproduce both vegetatively (stolons) and by seeds
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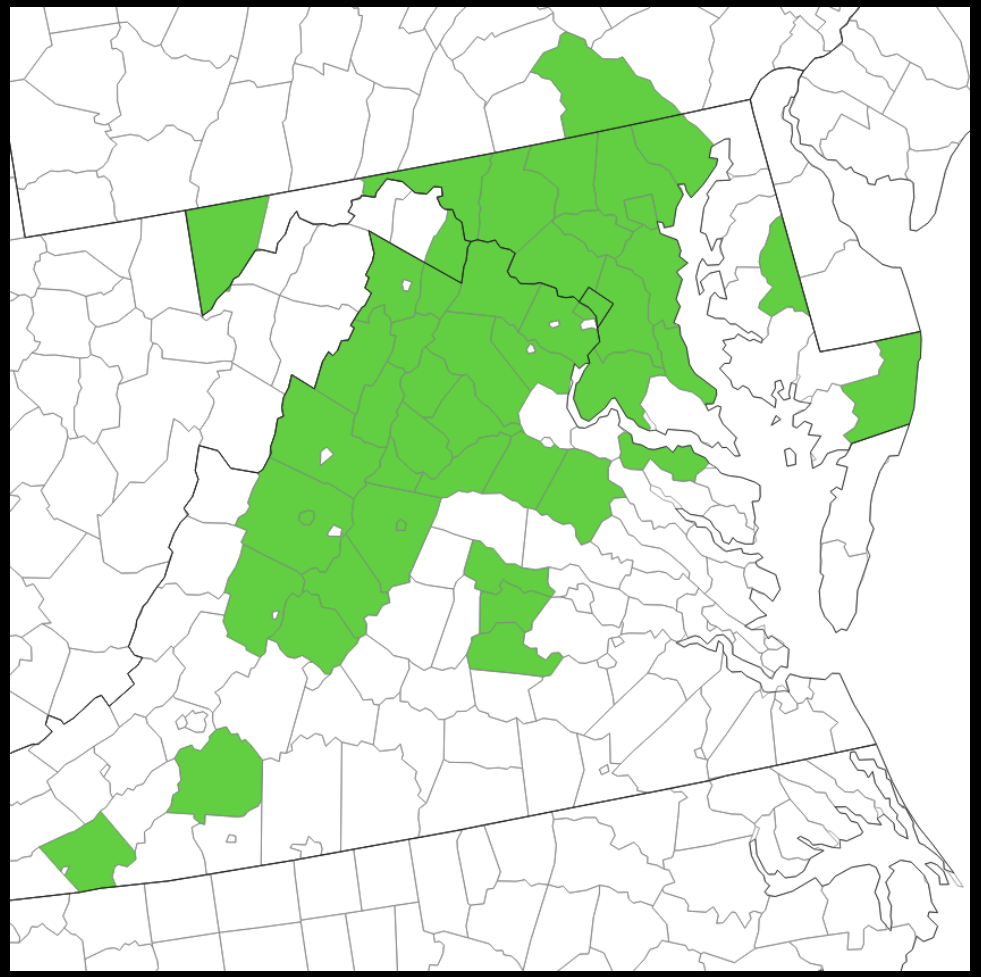
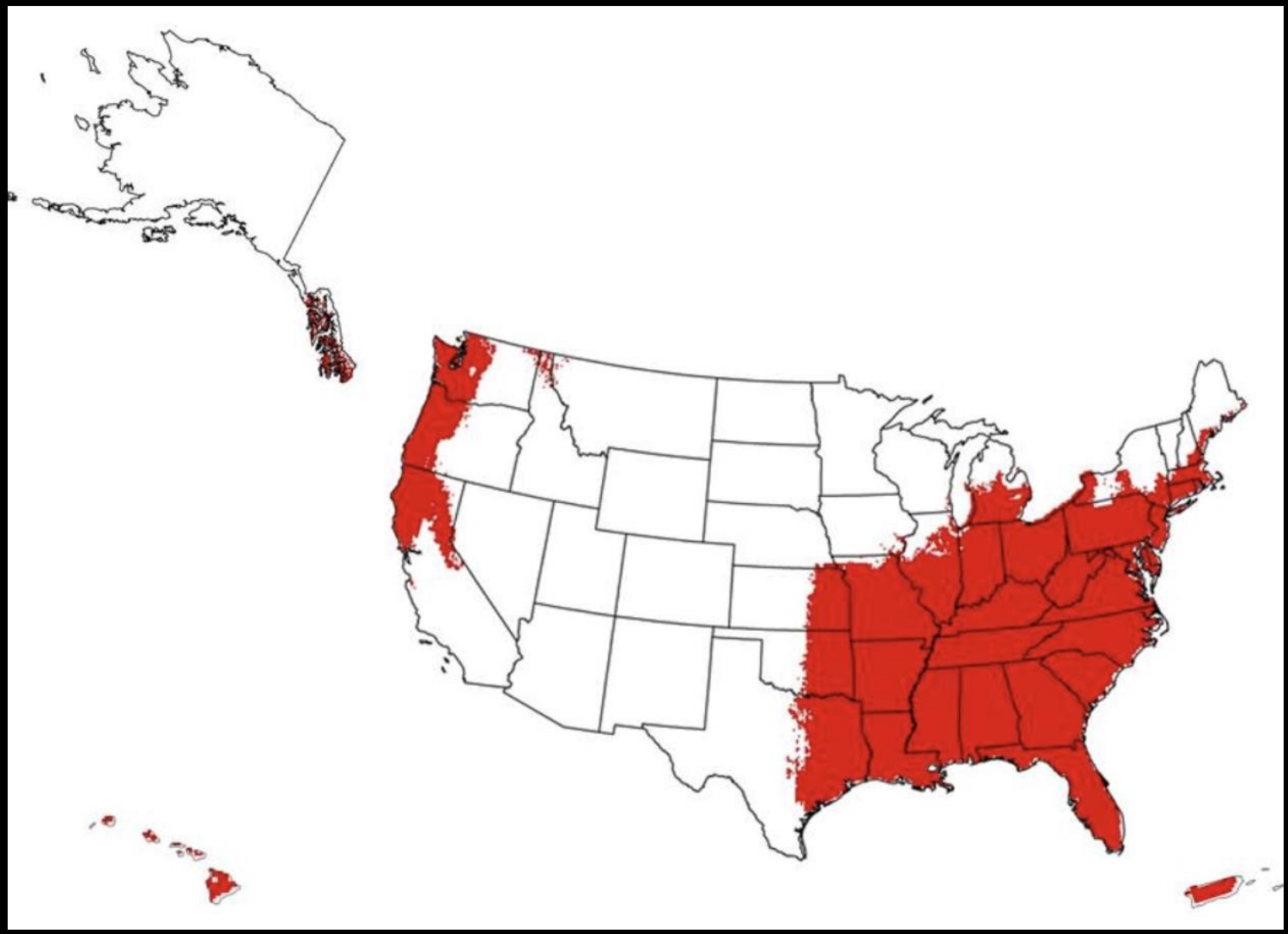
Wavyleaf Distribution



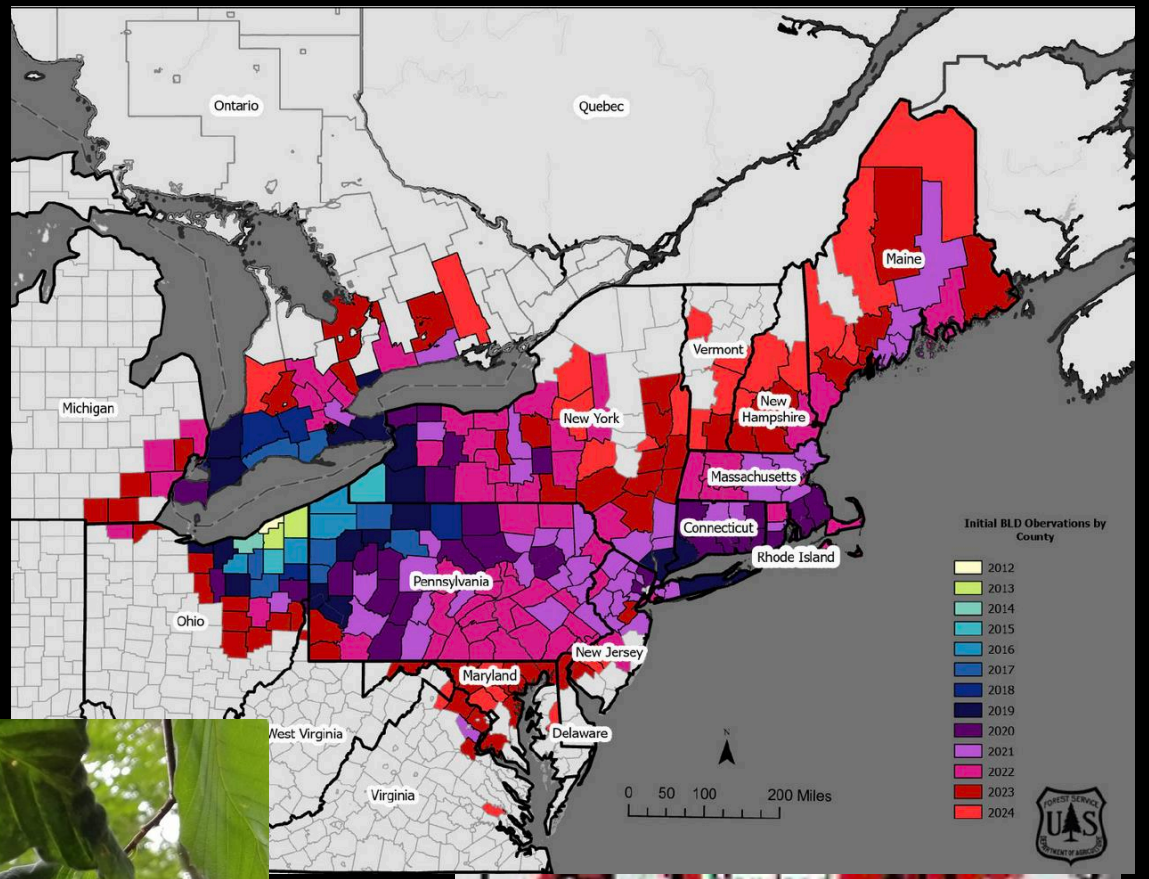
Current



Potential Distribution

Beech Leaf Disease

First discovered in Ohio in 2012
Caused by a microscopic nematode (*Litylenchus crenatae mccannii*)
First confirmed in Virginia (Prince William County) in 2021
Symptoms include dark bands between leaf veins, thickened deformed leaves, thin canopy.



Identification - first step in invasive management

- Don't "control" if you are unsure of identification
- Field guides, apps (Flora of Virginia, Seek, iNaturalist, PlantNet, Picture This)
- Field trips (Weed Warriors, Nature Centers, Meetups)

EARLY DETECTION - RAPID RESPONSE *******

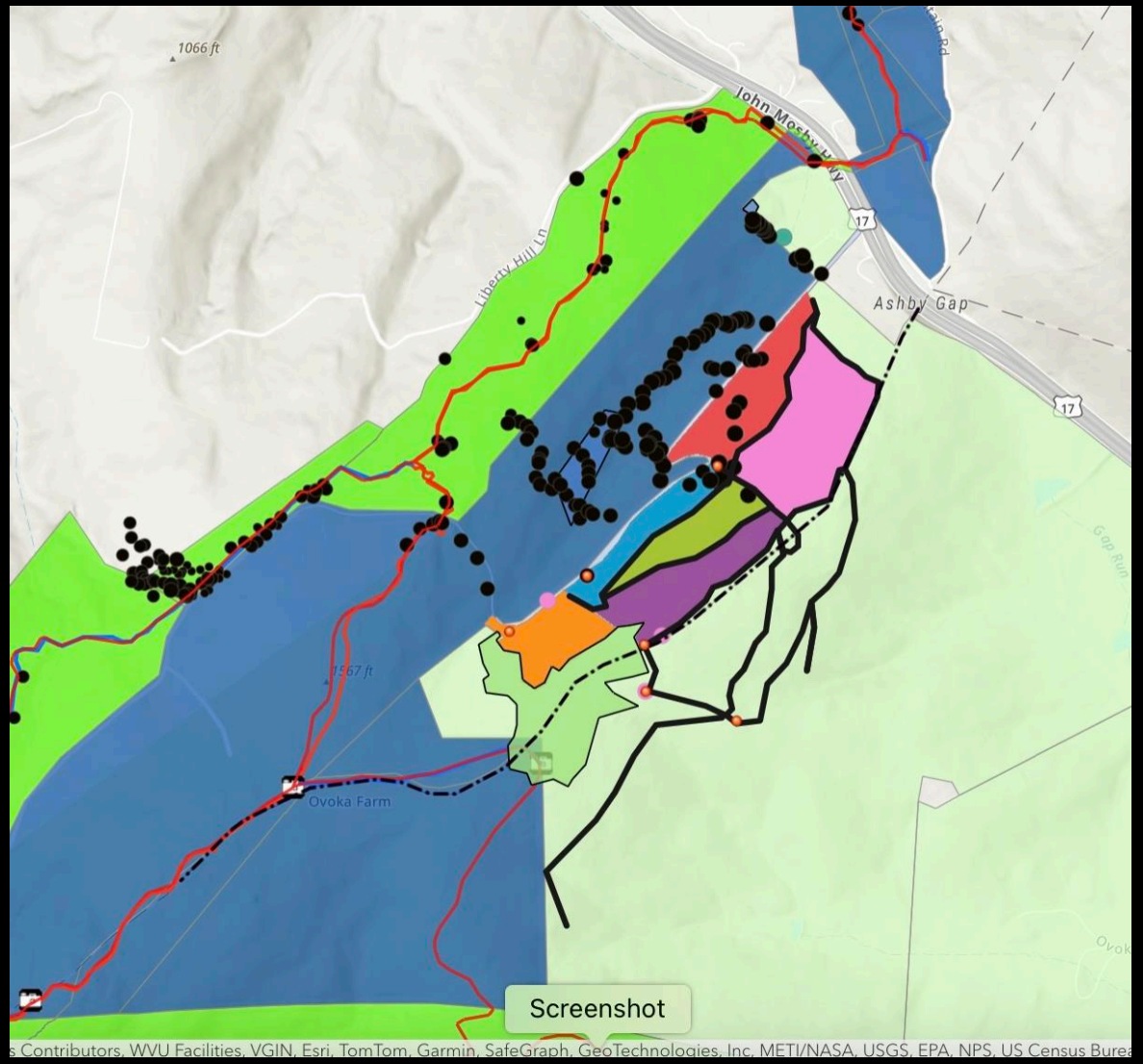
The what, where, who and how of Invasive Management

What is the problem?
What is the extent of the problem?
Where is the problem?

Mapping is often be helpful in answering these questions

Understanding the problem allows one to ask

What are our priorities?
Where are our priorities?



Potential Priority Considerations

- ❑ Areas of high ecological significance
- ❑ Species of special concern
- ❑ Cost effectiveness of removal
- ❑ Impact on environment
- ❑ Areas around trails or high visitor use areas
- ❑ Areas of high volunteer/ park neighbor interest

Who will manage invasives?

Land management staff ****

- Essential in guidance and support role
- Bring an important understanding of an organization's objectives
- Ideally present at the field level as well

Contractors

- Trained professionals
- Bring potentially higher level of equipment and expertise
- Expensive

Volunteers

- Inexpensive, enthusiastic
- Require training, equipment, supervision
- Variable work schedules

How to manage invasives?

Two basic tools exists in the Invasive Control Toolbox

1. Mechanical

- Depending on target, can be effective
- Can involve a larger and broader participation pool
- Generally, requires less equipment and training
- Less efficient and may not be as effective as . . .

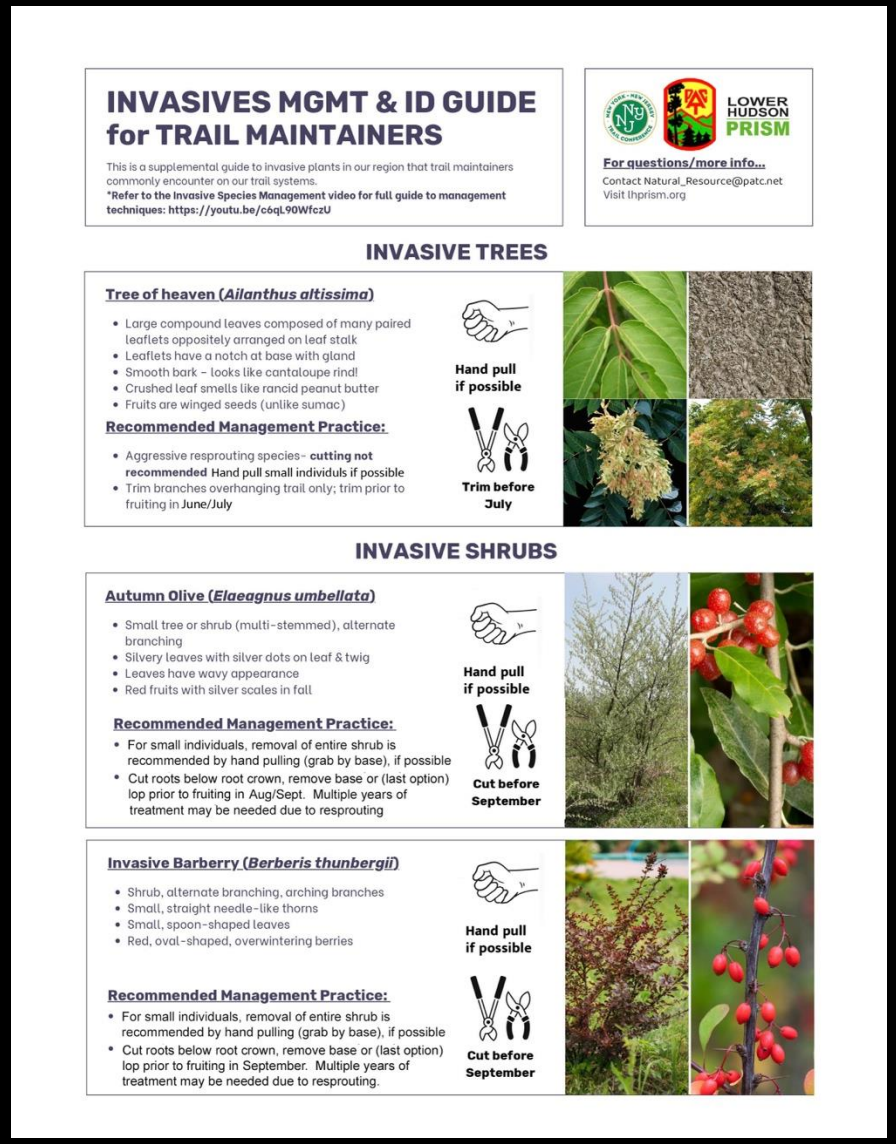
2) Chemical

- More efficient, and often more effective
- Requires specialized equipment and training

Any Integrated Pest Management plan takes a wholistic approach to the invasive problem – sometimes mechanical control, sometimes chemical control might provide the best solution.

PATC's Invasive Plant Management Team (IPMT) is able to utilize both chemical and mechanical methods to control invasive plants

PATC's Invasive Mgmt. and ID Guide for Trail Maintainers



INVASIVES MGMT & ID GUIDE for TRAIL MAINTAINERS

This is a supplemental guide to invasive plants in our region that trail maintainers commonly encounter on our trail systems.
*Refer to the Invasive Species Management video for full guide to management techniques: https://youtu.be/c6qL90WfczU

LOWER HUDSON PRISM

For questions/more info...
Contact Natural_Resource@patc.net
Visit lhprism.org

INVASIVE TREES

Tree of heaven (*Ailanthus altissima*)

- Large compound leaves composed of many paired leaflets oppositely arranged on leaf stalk
- Leaflets have a notch at base with gland
- Smooth bark – looks like cantaloupe rind!
- Crushed leaf smells like rancid peanut butter
- Fruits are winged seeds (unlike sumac)

Recommended Management Practice:

- Aggressive resprouting species- **cutting not recommended** Hand pull small individuls if possible
- Trim branches overhanging trail only; trim prior to fruiting in June/July

Hand pull if possible

Trim before July

INVASIVE SHRUBS

Autumn Olive (*Elaeagnus umbellata*)

- Small tree or shrub (multi-stemmed), alternate branching
- Silvery leaves with silver dots on leaf & twig
- Leaves have wavy appearance
- Red fruits with silver scales in fall

Recommended Management Practice:

- For small individuals, removal of entire shrub is recommended by hand pulling (grab by base), if possible
- Cut roots below root crown, remove base or (last option) lop prior to fruiting in Aug/Sept. Multiple years of treatment may be needed due to resprouting

Hand pull if possible

Cut before September

Invasive Barberry (*Berberis thunbergii*)

- Shrub, alternate branching, arching branches
- Small, straight needle-like thorns
- Small, spoon-shaped leaves
- Red, oval-shaped, overwintering berries

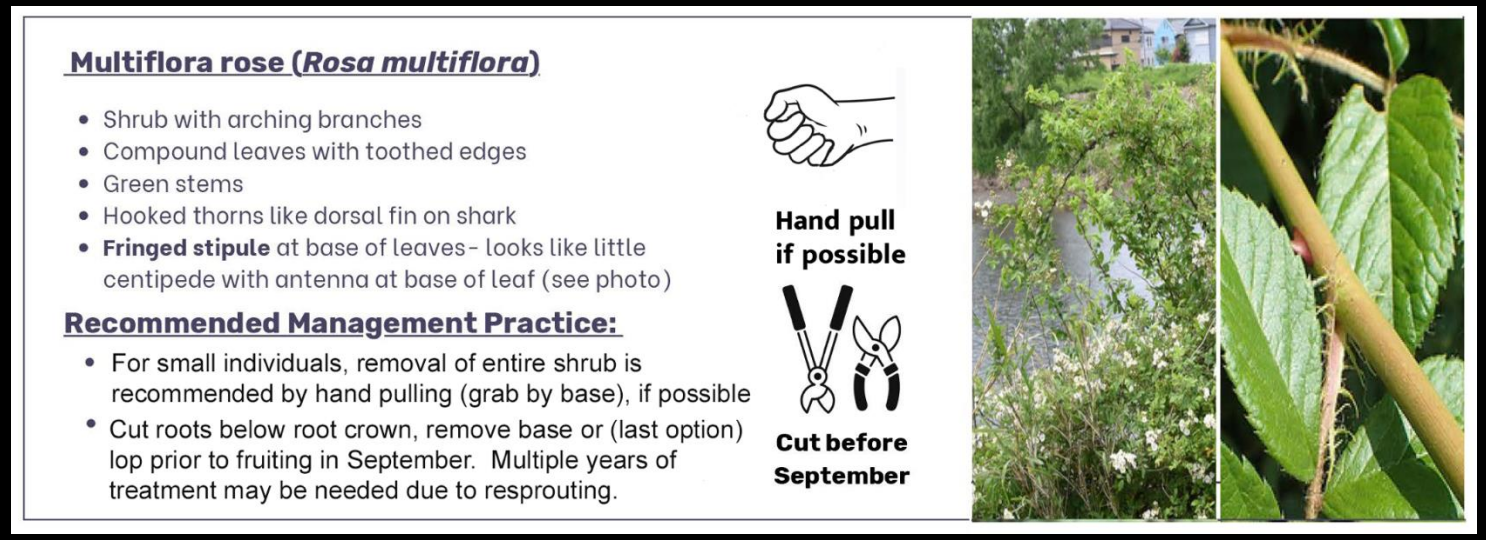
Recommended Management Practice:

- For small individuals, removal of entire shrub is recommended by hand pulling (grab by base), if possible
- Cut roots below root crown, remove base or (last option) lop prior to fruiting in September. Multiple years of treatment may be needed due to resprouting.

Hand pull if possible

Cut before September

- ✓ Developed in conjunction with some of our major land management partners.
- ✓ Lists 13 of our region's most problematic invasive plants with ID and mechanical removal tips.
- ✓ Available in electronic format to ALL via PATC website (www.patc.net)



Multiflora rose (*Rosa multiflora*)

- Shrub with arching branches
- Compound leaves with toothed edges
- Green stems
- Hooked thorns like dorsal fin on shark
- **Fringed stipule** at base of leaves- looks like little centipede with antenna at base of leaf (see photo)

Recommended Management Practice:

- For small individuals, removal of entire shrub is recommended by hand pulling (grab by base), if possible
- Cut roots below root crown, remove base or (last option) lop prior to fruiting in September. Multiple years of treatment may be needed due to resprouting.

Hand pull if possible

Cut before September

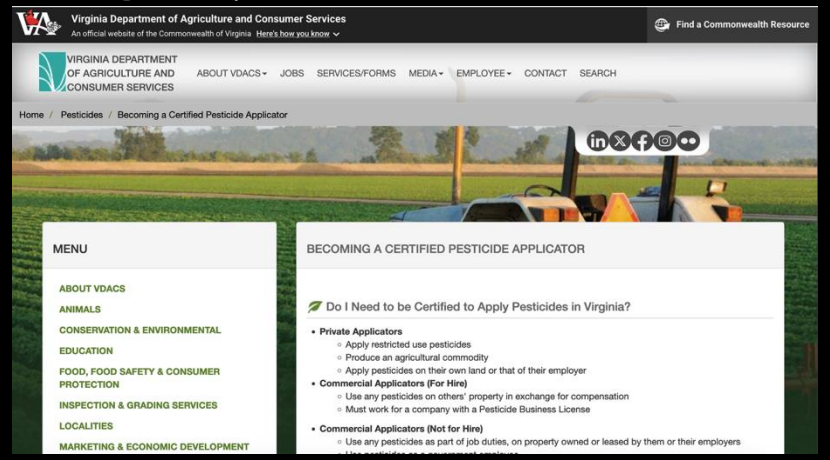
Specialized Training for Chemical Applicators

Pesticide certification in the United States is regulated by the states (in VA, the Department of Agriculture and Consumer Services - VDACS)

In Virginia there are two basic certification levels

1. **Commercial applicator** – can both apply pesticides and supervise registered technicians and non-certified forest applicators (volunteers) VOLUNTEERS MUST BE UNDER DIRECT, ON-SITE, SUPERVISION
2. **Registered Technician** – can independently apply pesticides under a commercial applicator. Commercial applicator does not have to be on-site.

In addition, VDACS requires commercial applicators and registered technicians to be "employed "by a company holding a pesticide business license or a government agency. (Yes, volunteers can qualify as "employees")



https://www.vdacs.virginia.gov/pesticide-applicator-certification.shtml

In 2024 Virginia passed new State law regarding volunteers applying pesticides on local political subdivision lands

3.2-3931. Agencies or persons exempt or partially exempt

Neither the provisions of this chapter nor the regulations adopted hereunder shall require the certification of any **unpaid volunteer who uses any nonrestricted herbicide with the express authorization of a local political subdivision** for the sole purpose of controlling invasive plants or noxious weeds, as that term is defined in § 3.2-800, on properties owned by such local political subdivision. **Such unpaid volunteer shall use such herbicide under the direct supervision of a certified commercial applicator, and such local political subdivision shall provide instruction by a certified commercial applicator to such unpaid volunteer prior to application on (i) the risks associated with the herbicide utilized, (ii) the proper use of equipment used to apply the herbicide, (iii) the proper use of personal protective equipment, (iv) other information to prevent an unreasonable adverse effect on the environment, and (v) any other information relevant to the specific herbicide utilized..**

In 2024 Virginia passed new State law regarding volunteers applying pesticides on local political subdivision lands

- Volunteers can use herbicides under direct supervision of Commercial Applicator who does not need to be on-site
- Volunteers must receive instruction by Commercial Applicator prior to application on
    1) herbicide risks
    2) proper use of equipment
    3) proper use of PPE
    4) information to prevent adverse effect on environment
    5) other information relevant to herbicide being utilized.

- New law only applies to local political subdivisions (Counties, cities, towns within Virginia)
- New law only applies to these local governments that adopt such a program

Besides state certification laws, each land management agency may have specific requirements for pesticide use.

- IPMT Spill Avoidance/Response Plan
- Job Hazard Analysis
- Pesticide Use Proposal (including environmental compliance)
- Storage and transport plans
- Treatment Maps/Pesticide Logs
- Memorandum of Understanding
- Volunteer Pesticide Agreement
- etc.

NPS Integrated Pest Management

Natural Resource Stewardship and Science
Biological Resources Division

Pesticide Use Proposal Form

Date:_01/12/2023

Park: APPA	Calendar Year: 2023	Proposal Number (if known):
Region: Mid-Atlantic	State: VIRGINIA	

IPMT SPILL AVOIDANCE

AND

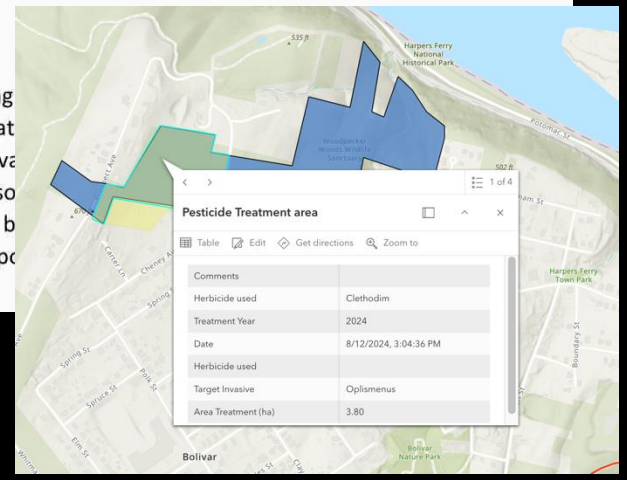
Appalachian National Scenic Trail	**1. WORK PROJECT/ACTIVITY** **Pesticide Handling and Use**	**2. LOCATION** **TRAIL WIDE**	Includes work performed on lands of National Park Service, and various states' park and lands
JOB HAZARD ANALYSIS (JHA) **References-FSH 6709.11 and -12** **OSHA** **(Instructions on Reverse)**	**3. NAME(S) OF ANALYST(S)** **Jim Von Haden, Integrated Resources Program Manager; Keith Stegall, Facility Manager**	**4. Work Supervisor** **Various**	**5. DATE PREPARED** **12/1/2020**
Required Standards and General Notes:	Pesticide applications will only be performed by or under the supervision of certified or registered applicators licensed under the procedures of a federal or state certification system. All pesticide treatment projects need approval from land managing agency before work begins. Product labels must be strictly followed. Current safety data sheets (SDS) must be kept with product and be readily available to the applicator at all		

Volunteer Pesticide Application Agreement for Potomac Appalachian Trail Club

April 29th, 2020

Background

As one of the largest Appalachian Trail (A.T.) Maintaining
(PATC) is an important Trail partner for ensuring adequat
Northern Virginia, West Virginia, Maryland and Pennsylva
management responsibilities including some natural reso
order to address existing management deficiencies and b
management partnership, PATC would like to expand upo
volunteer herbicide applications to the portfolio.



PATC IPMT Today

Multiple Commercial Applicators and Registered Technicians

Partner with various agencies/groups including:

- Shenandoah National Park
- APPA (NPS)/ATC
- VA Dept of Wildlife Resources
- VA Dept of Forestry
- WV Dept of Natural Resources
- NPS Mid-Atlantic IPMT
- NPS National Capital IPMT
- Piedmont Environmental Council
- Blue Ridge PRISM
- Clarke County, VA
- RxFire Effects, Harrisonburg, VA

"In every walk with nature, one receives far more than he seeks" John Muir

Potomac Appalachian Trail Club
Natural Resources Contact Info

Rob Lamar, PATC Natural Resource Advisor Natural_Resource@patc.net