The Limits of Restoration: Getting to Know the True Nature of Your Stream Valley and Hopefully Keeping It Intact!

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Photo by R.H. Simmons

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The presence of non-native invasive plants is largely the result of soil and habitat disturbance.

[1]Masters, J.A., A.N. Bryant, M.M. Carreiro, and S.M. Emery. 2017. Does Removal of the Invasive Shrub *Lonicera maackii* Alter Arthropod Abundance and Diversity? Natural Areas Journal 37: 228-232.

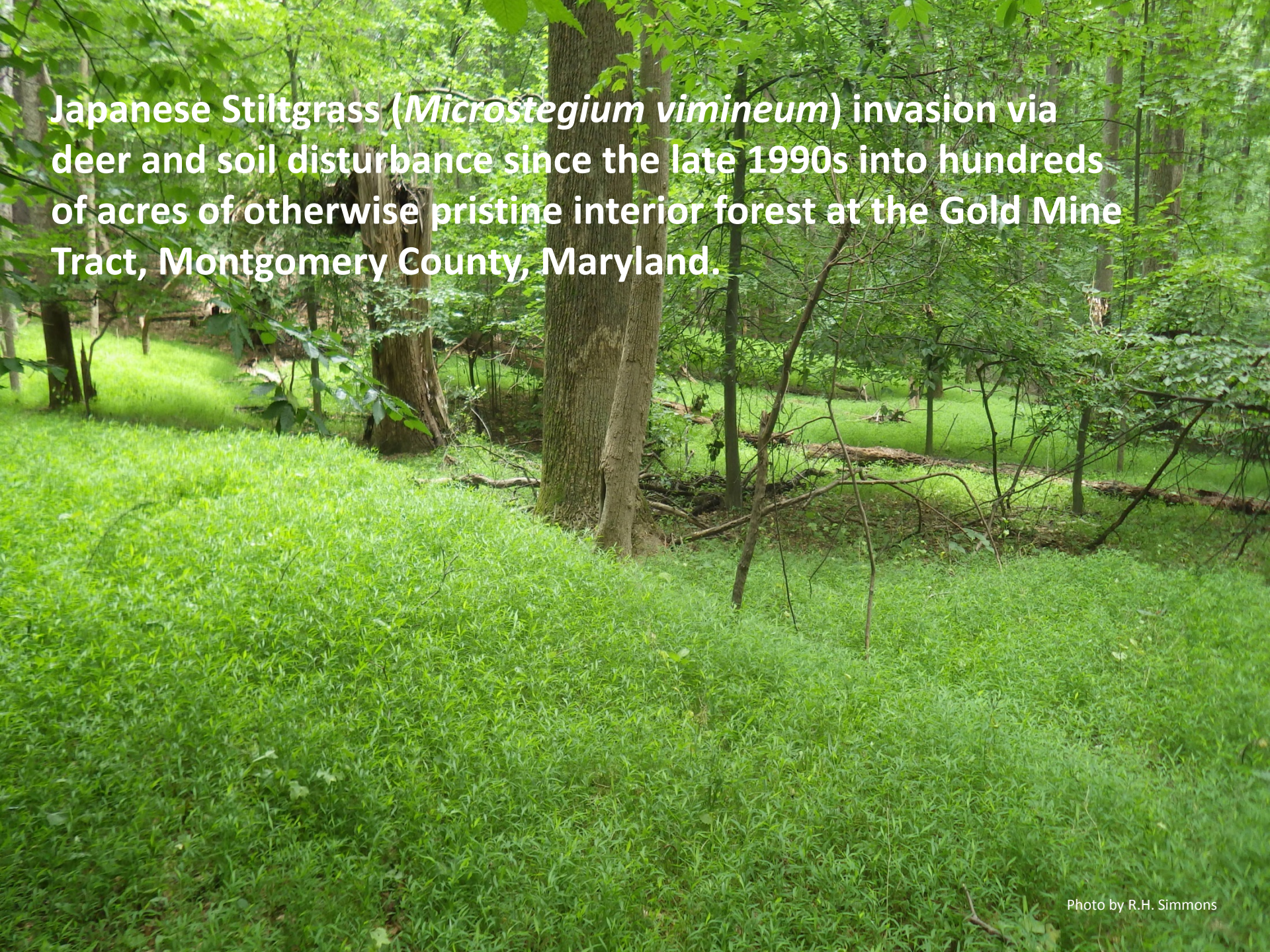
Photo by R.H. Simmons

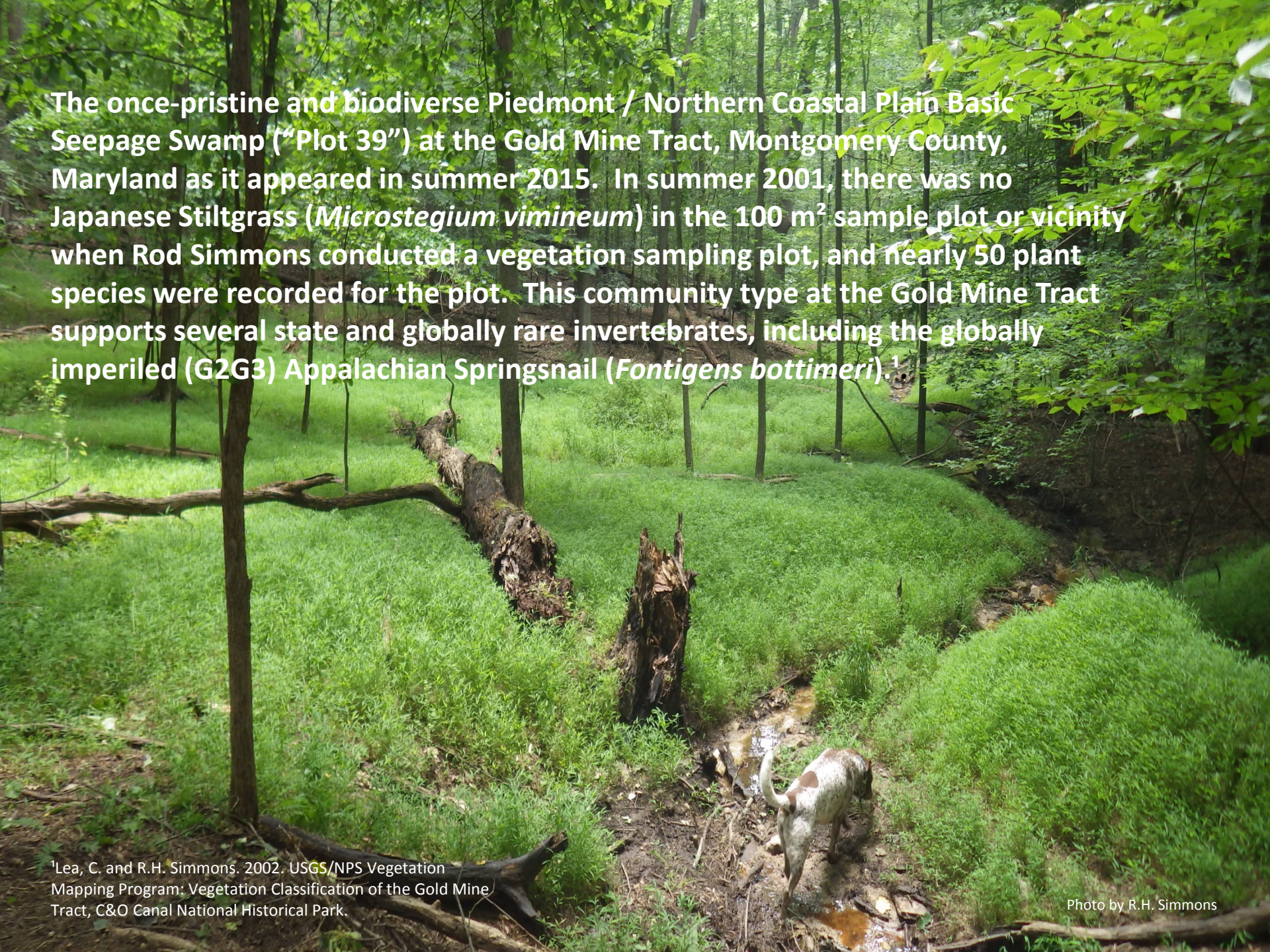
Invasive species are now a major global problem:

In the U.S. alone, "economic damages associated with alien invasive species effects and their control amount to approximately $120 billion/year."[1]

[1]Pimentel D, R. Zuniga, and D. Morrison. 2005. Update on the Environmental and Economic Costs Associated With Alien-invasive Species in the United States. Ecological Economics 52: 273–288.

Photo by J. Scott Graham


Japanese Stiltgrass (*Microstegium vimineum*) invasion via deer and soil disturbance since the late 1990s into hundreds of acres of otherwise pristine interior forest at the Gold Mine Tract, Montgomery County, Maryland.
Photo by R.H. Simmons

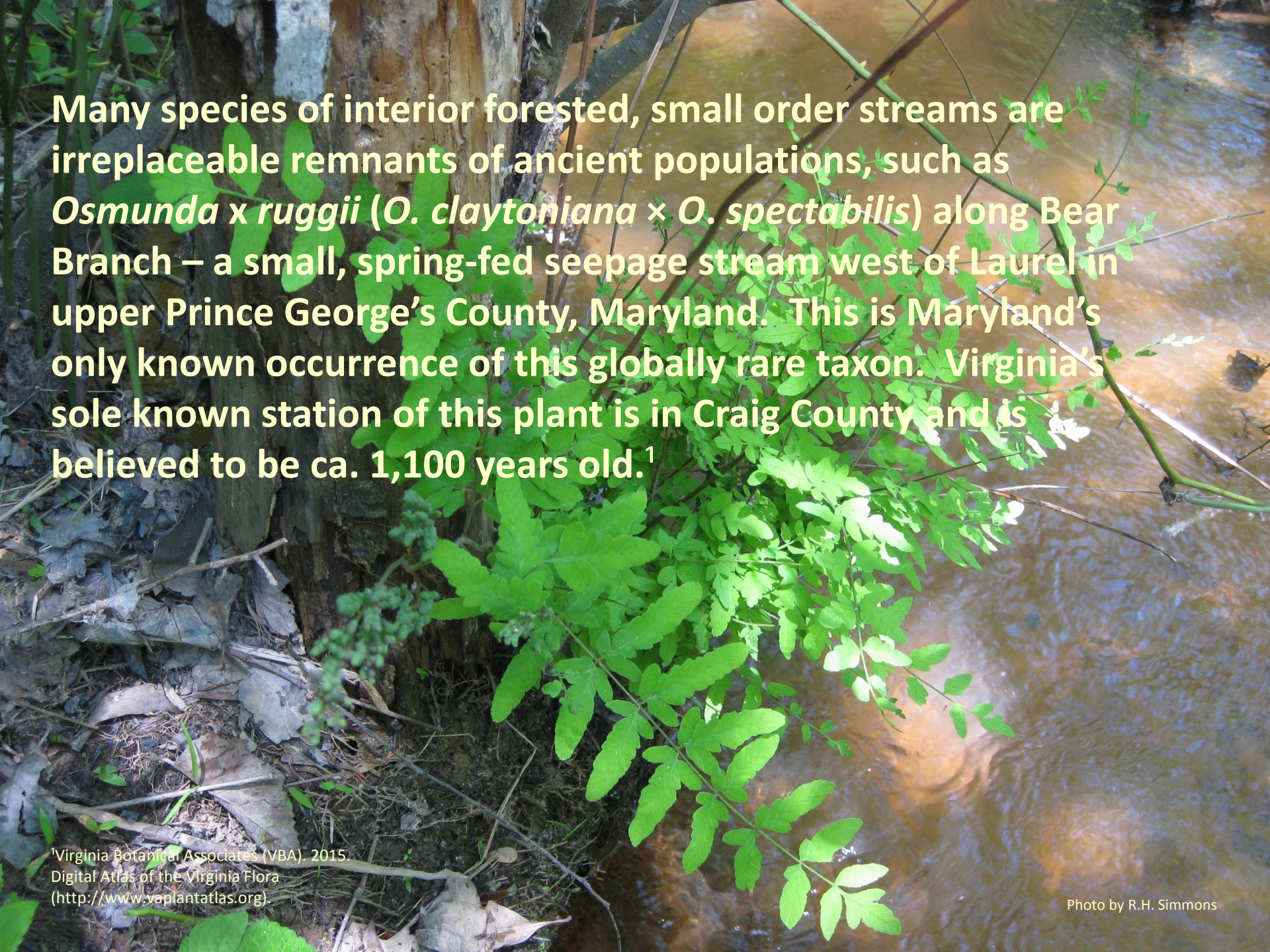


The once-pristine and biodiverse Piedmont / Northern Coastal Plain Basic Seepage Swamp ("Plot 39") at the Gold Mine Tract, Montgomery County, Maryland as it appeared in summer 2015. In summer 2001, there was no Japanese Stiltgrass (*Microstegium vimineum*) in the 100 m² sample plot or vicinity when Rod Simmons conducted a vegetation sampling plot, and nearly 50 plant species were recorded for the plot. This community type at the Gold Mine Tract supports several state and globally rare invertebrates, including the globally imperiled (G2G3) Appalachian Springsnail (*Fontigens bottimeri*).[1]

[1]Lea, C. and R.H. Simmons. 2002. USGS/NPS Vegetation Mapping Program: Vegetation Classification of the Gold Mine Tract, C&O Canal National Historical Park.

Photo by R.H. Simmons

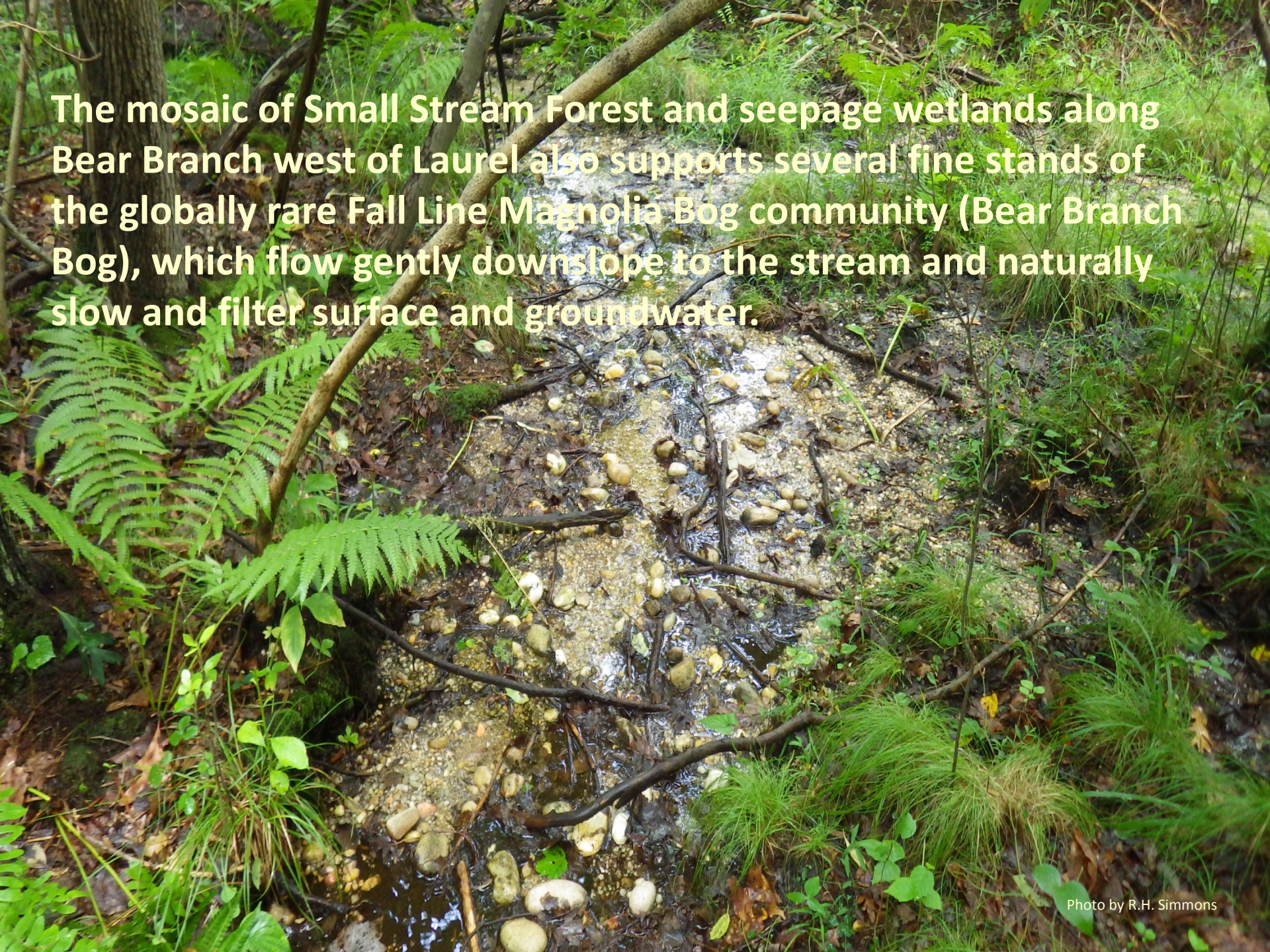

Thorough inventories of floral and faunal components, as well as geologic conditions, reveal a wealth of natural resources and native biodiversity that still persist throughout urbanized areas, such as this colony of state-rare *Dryopteris* x *boottii* that was recently "rediscovered" along an ancient seepage stream in Arlington County, Virginia.
Photo by R.H. Simmons



Many species of interior forested, small order streams are irreplaceable remnants of ancient populations, such as *Osmunda* x *ruggii* (*O. claytoniana* × *O. spectabilis*) along Bear Branch – a small, spring-fed seepage stream west of Laurel in upper Prince George's County, Maryland. This is Maryland's only known occurrence of this globally rare taxon. Virginia's sole known station of this plant is in Craig County and is believed to be ca. 1,100 years old.[1]

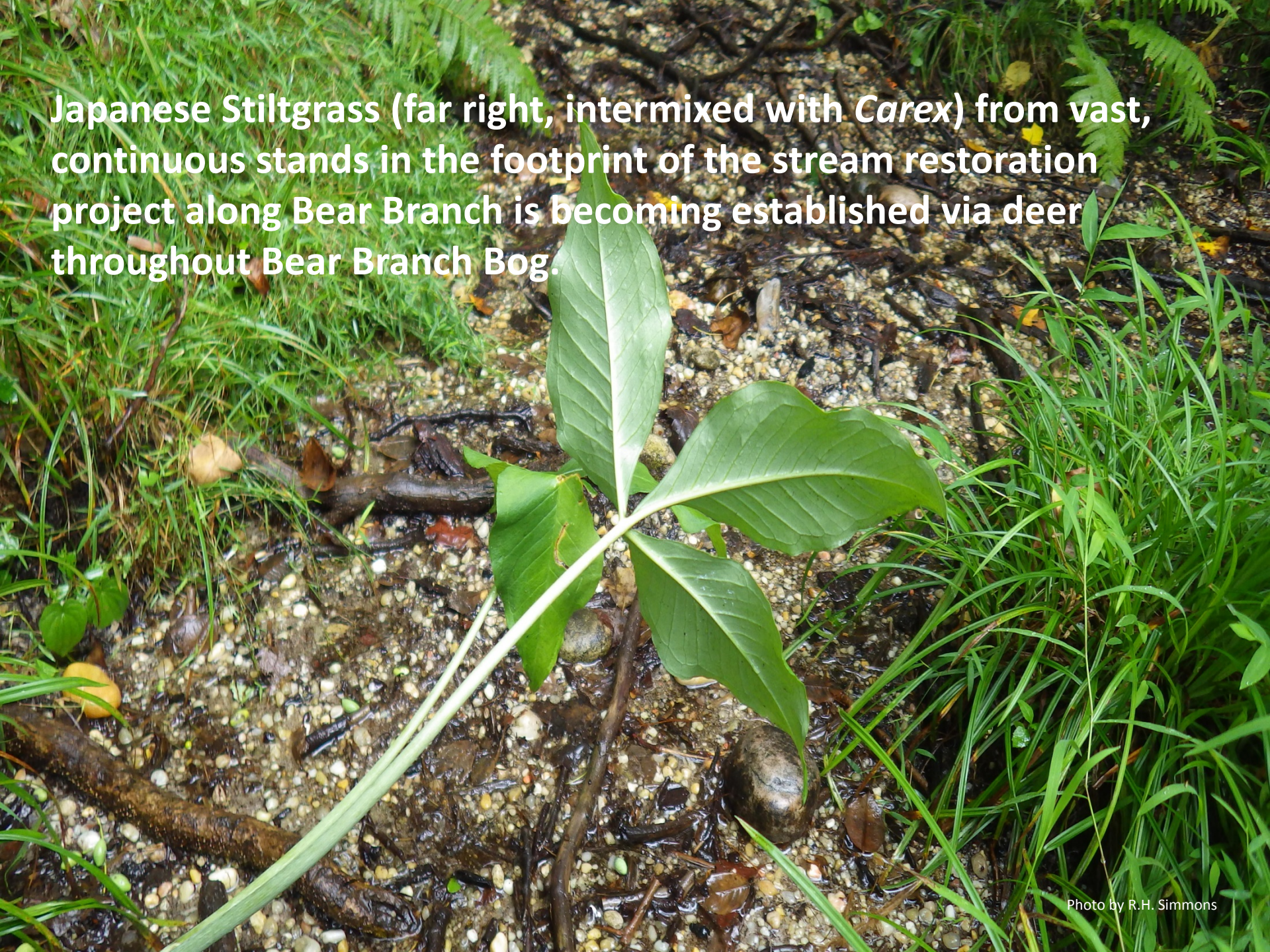
[1]Virginia Botanical Associates (VBA). 2015. Digital Atlas of the Virginia Flora (http://www.vaplantatlas.org).

Photo by R.H. Simmons


The mosaic of Small Stream Forest and seepage wetlands along Bear Branch west of Laurel also supports several fine stands of the globally rare Fall Line Magnolia Bog community (Bear Branch Bog), which flow gently downslope to the stream and naturally slow and filter surface and groundwater.
Photo by R.H. Simmons

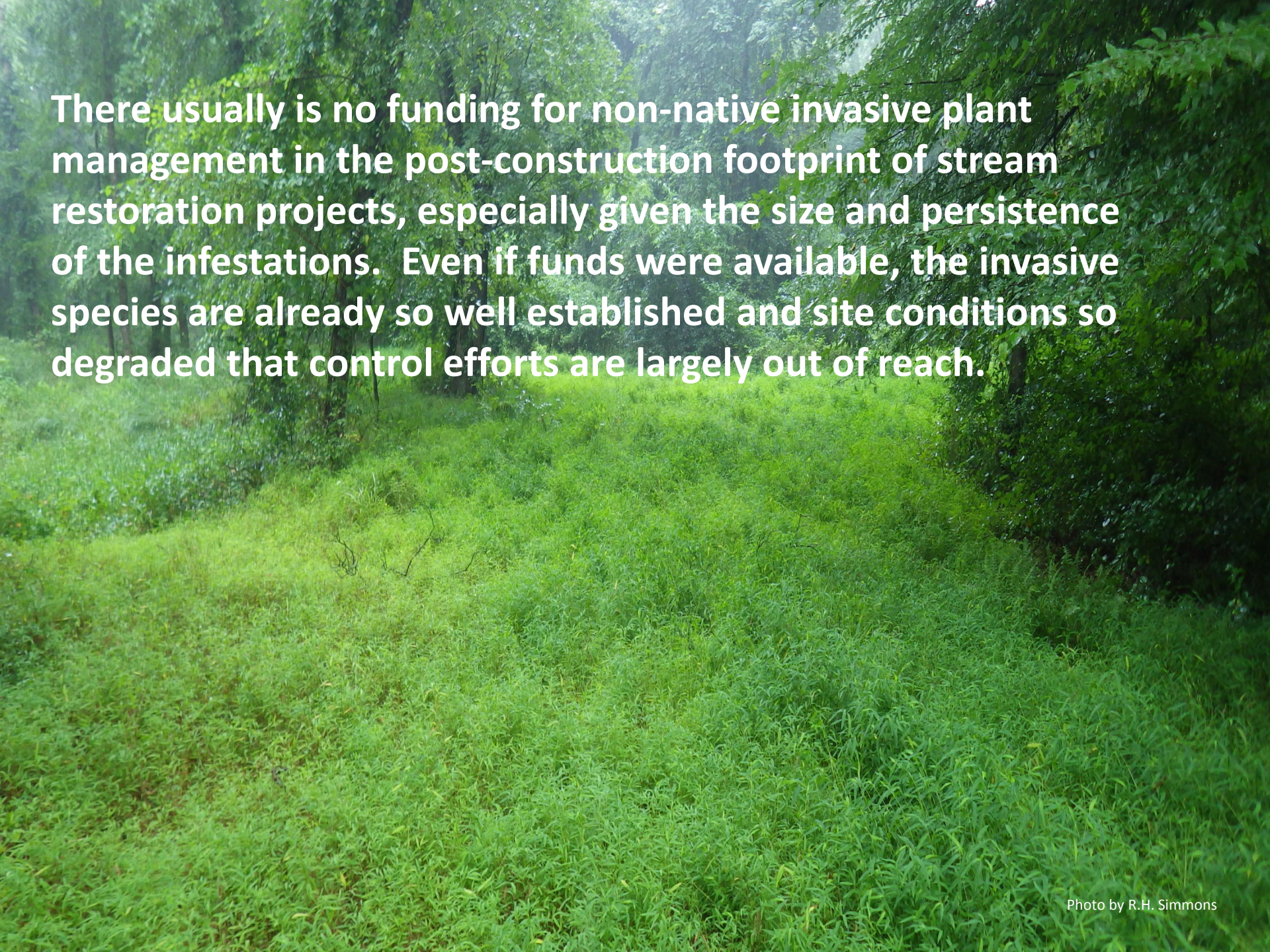
Even a sensitively executed stream restoration project like the one along Bear Branch in 2009 that avoided disturbing the *Osmunda* x *ruggii* and Bear Branch Bog nonetheless resulted in the establishment of a major Japanese Stiltgrass "highway" and weed corridor owing to unavoidable major soil disturbance and deforestation, mainly along the south side of Bear Branch. Such dispersal vectors, an unintended and unforeseen effect of such projects, permanently degrade stream valleys and associated natural communities, as well as greatly inhibit natural succession and the future sustainability of native flora and wildlife.

Photo by R.H. Simmons



Japanese Stiltgrass (far right, intermixed with *Carex*) from vast, continuous stands in the footprint of the stream restoration project along Bear Branch is becoming established via deer throughout Bear Branch Bog.

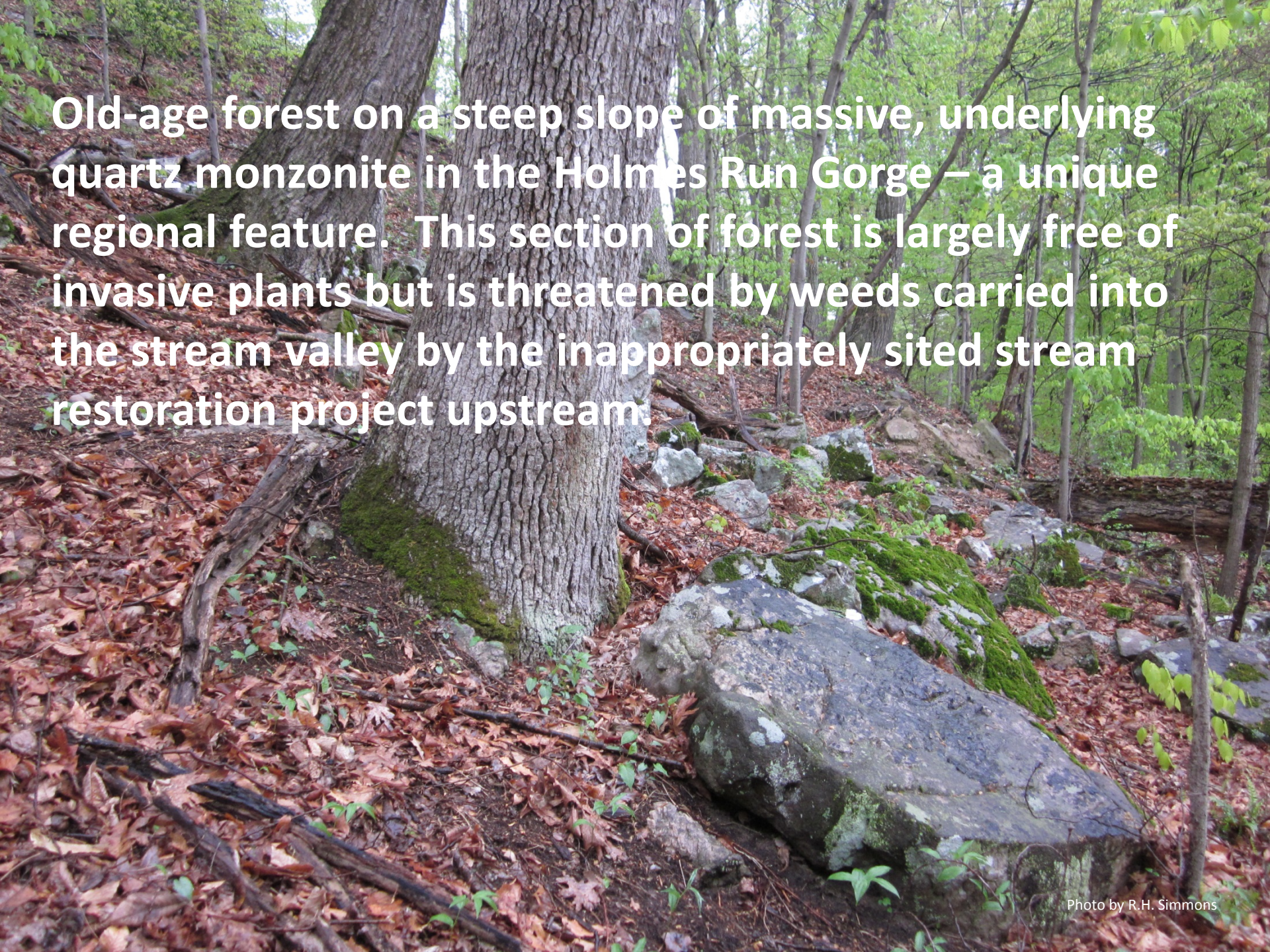
Photo by R.H. Simmons


There usually is no funding for non-native invasive plant management in the post-construction footprint of stream restoration projects, especially given the size and persistence of the infestations. Even if funds were available, the invasive species are already so well established and site conditions so degraded that control efforts are largely out of reach.
Photo by R.H. Simmons


A nearly complete destruction of an old-age, interior forest and “V-shaped”, bedrock seepage stream in the Holmes Run Gorge of Fairfax County, Virginia as it appeared in April 2017. It is hard to imagine such destructive practices being carried out today, let alone their gaining approval.
Photo by R.H. Simmons


The same largely deforested and disturbed stream valley in July 2017 completely overrun with Japanese Stiltgrass, Wineberry, Oriental Bittersweet, and other pervasive, difficult to control weeds.
Photo by R.H. Simmons

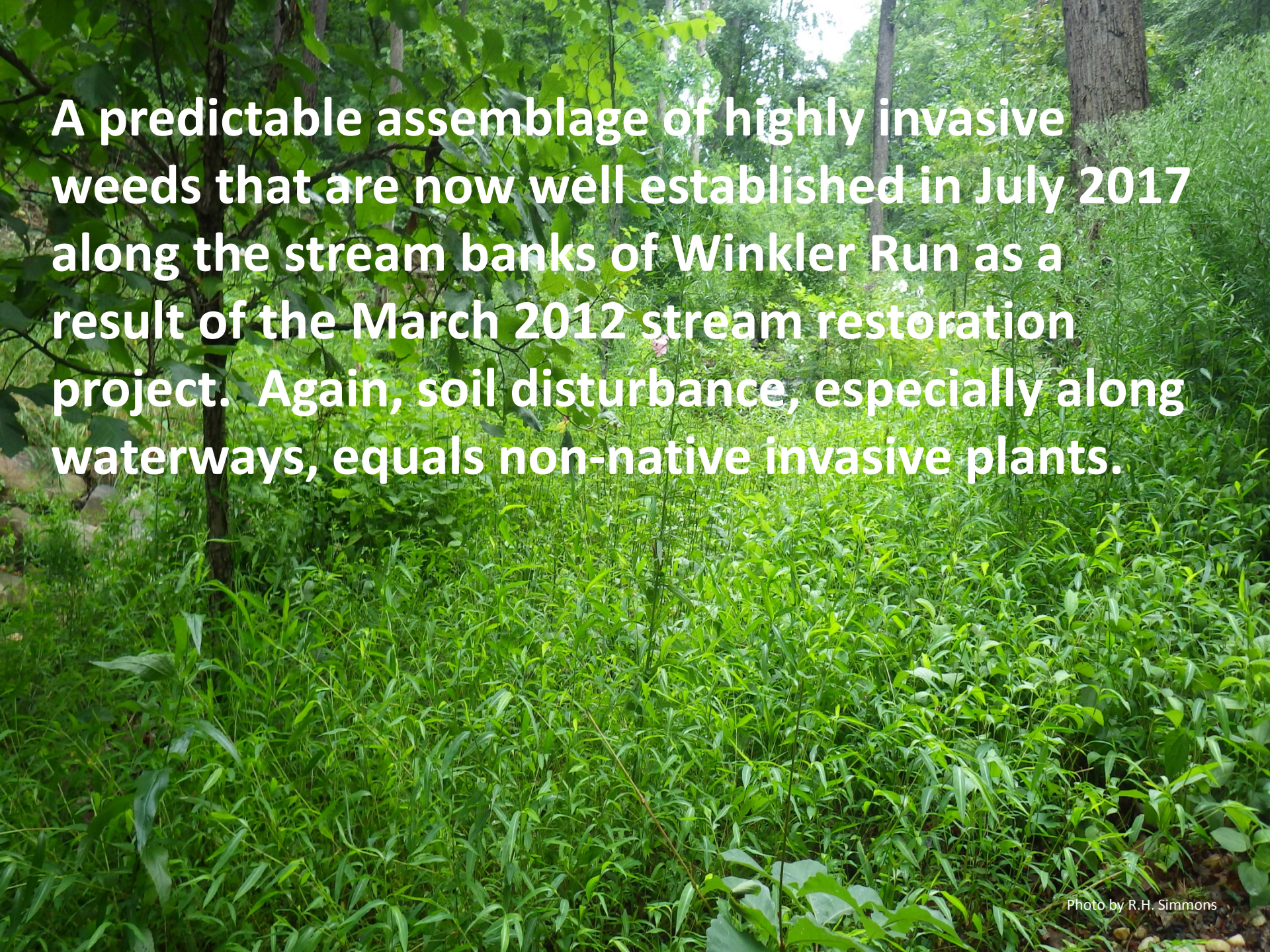

The outflow of this newly created weed corridor is now a major dispersal vector for non-native invasive plants into the still largely undisturbed old-age forest communities of the Holmes Run Gorge.
Photo by R.H. Simmons

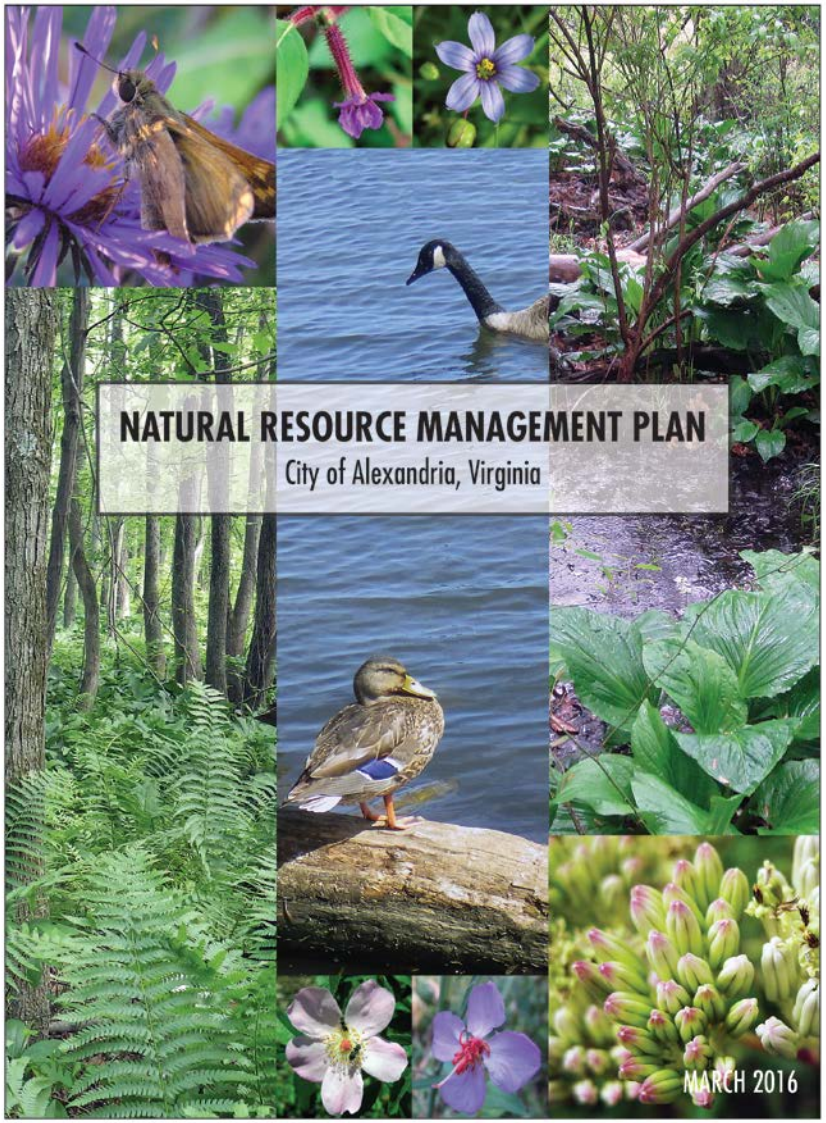

Old-age forest on a steep slope of massive, underlying quartz monzonite in the Holmes Run Gorge – a unique regional feature. This section of forest is largely free of invasive plants but is threatened by weeds carried into the stream valley by the inappropriately sited stream restoration project upstream.
Photo by R.H. Simmons

An unnecessary and poorly sited stream restoration project along Winkler Run at the Winkler Botanical Preserve in the City of Alexandria, Virginia in March 2012 that completely removed hundreds of linear feet of diverse forest, geologic features, and the stream itself, as well as the "landscape memory" of the stream valley. This particular project, which used so-called natural techniques to reconstruct the stream, would be considered high-end by most engineers and design and build companies.

Photo by R.H. Simmons

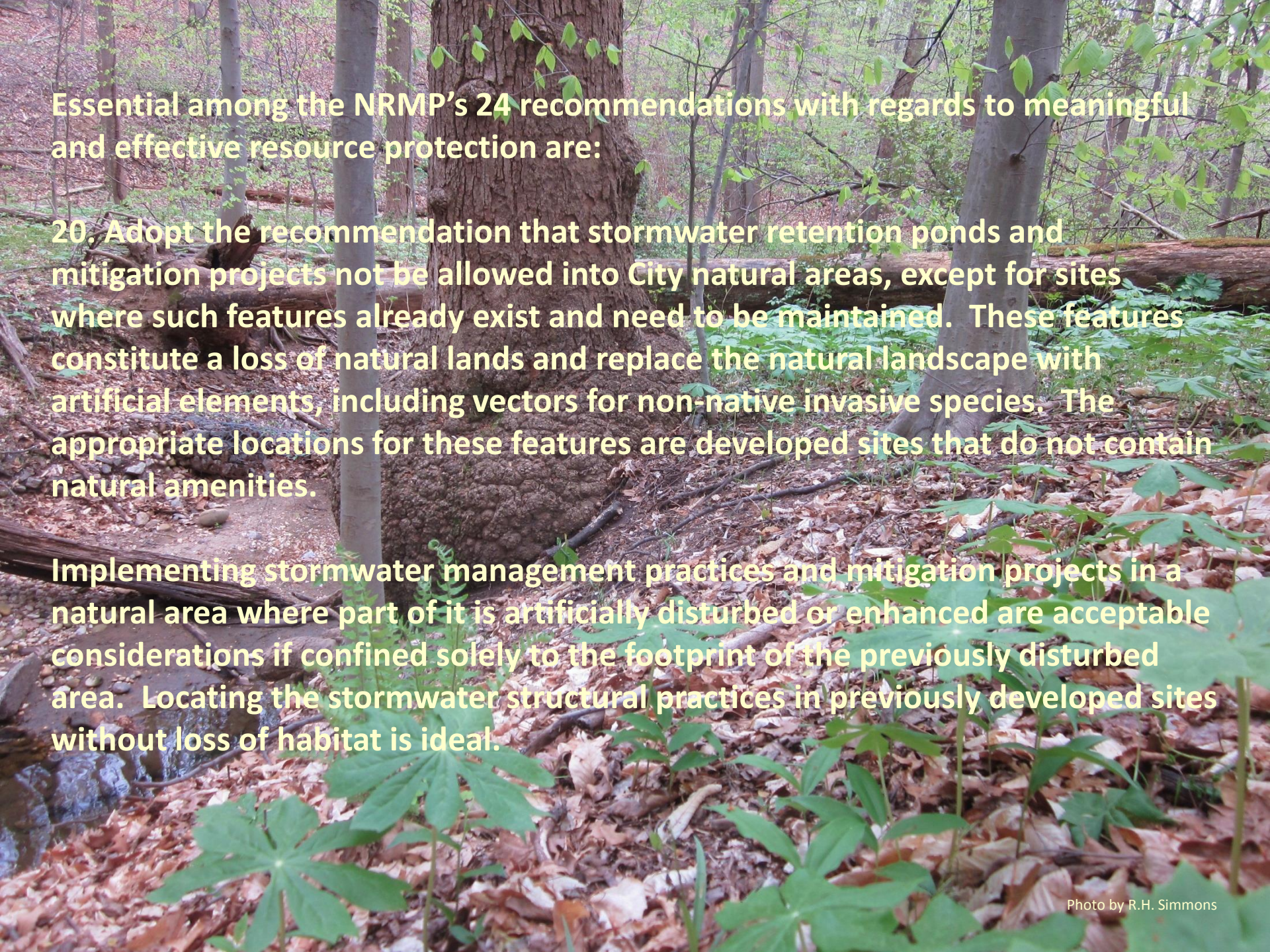

An example of the pristine, diverse, and irreplaceable forest community along the stream banks of Winkler Run that was destroyed during the March 2012 stream restoration project.
Photo by R.H. Simmons


A predictable assemblage of highly invasive weeds that are now well established in July 2017 along the stream banks of Winkler Run as a result of the March 2012 stream restoration project. Again, soil disturbance, especially along waterways, equals non-native invasive plants.
Photo by R.H. Simmons



Natural resources are irreplaceable features of the indigenous landscape that include topography (land shape), geology, soils, surface and ground water, natural communities, plants, and animals.

The policy goals of No Net Loss of City-owned natural lands and a Do No Harm approach to land management are the two overarching policy recommendations of the plan's 24 recommendations.

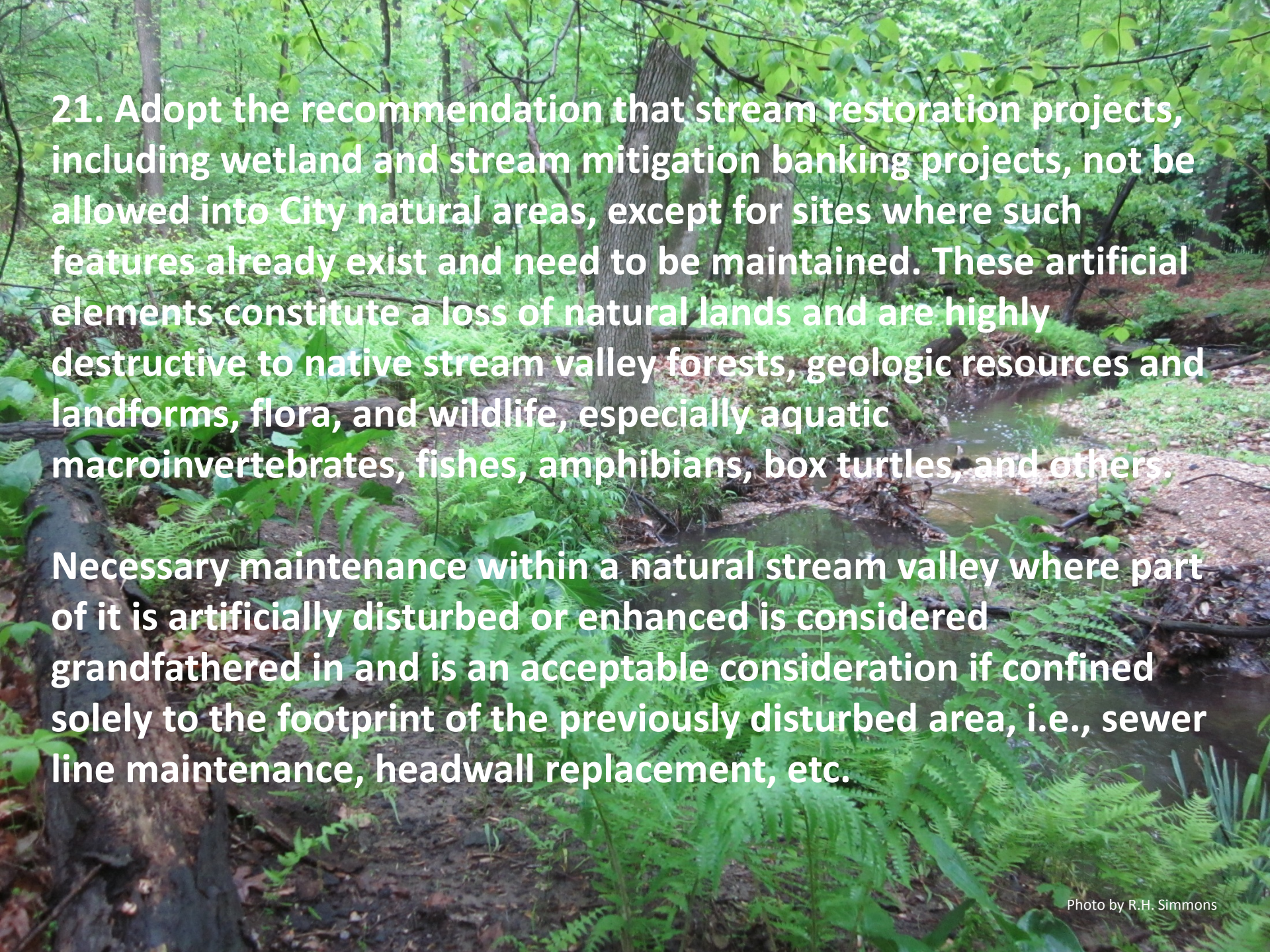


Essential among the NRMP's 24 recommendations with regards to meaningful and effective resource protection are:

20. Adopt the recommendation that stormwater retention ponds and mitigation projects not be allowed into City natural areas, except for sites where such features already exist and need to be maintained. These features constitute a loss of natural lands and replace the natural landscape with artificial elements, including vectors for non-native invasive species. The appropriate locations for these features are developed sites that do not contain natural amenities.

Implementing stormwater management practices and mitigation projects in a natural area where part of it is artificially disturbed or enhanced are acceptable considerations if confined solely to the footprint of the previously disturbed area. Locating the stormwater structural practices in previously developed sites without loss of habitat is ideal.

Photo by R.H. Simmons



21. Adopt the recommendation that stream restoration projects, including wetland and stream mitigation banking projects, not be allowed into City natural areas, except for sites where such features already exist and need to be maintained. These artificial elements constitute a loss of natural lands and are highly destructive to native stream valley forests, geologic resources and landforms, flora, and wildlife, especially aquatic macroinvertebrates, fishes, amphibians, box turtles, and others.

Necessary maintenance within a natural stream valley where part of it is artificially disturbed or enhanced is considered grandfathered in and is an acceptable consideration if confined solely to the footprint of the previously disturbed area, i.e., sewer line maintenance, headwall replacement, etc.

Photo by R.H. Simmons


It is essential that decision makers and planners fully realize the whole of existing natural features in the footprints of stream restoration projects that are *irreplaceable* and will be forever lost, well beyond simply delineating stream banks, wetlands, and the footprint of the project. For example, the Eastern Box Turtle spends much of the first ten years or so of its life along small order streams and are unable to escape the construction staging areas.
Photo by R.H. Simmons


Many species of interior forested small streams and wetlands are niche specialists in such habitats, such as Broad-leaved Sedge (*Carex platyphylla*) – a steep slope and river bluff specialist that helps stabilize naturally erodible slopes. This species was newly discovered in April 2017 in Alexandria, miles downstream from the only other known station in the Holmes Run Gorge. Interior occurrences in the D.C. region are highly rare and probably represent ancient relictual populations that have persisted for millennia.
Photo by R.H. Simmons


In most cases for small order, interior forested streams and wetlands, a hands-off, Do No Harm approach (No Build option) truly provides hope for the future preservation and sustainability of a stream valley's natural features.
Photo by R.H. Simmons

Ways to help ensure the future preservation and sustainability of forested stream valleys:

All jurisdictions share a public trust responsibility and commitment to properly steward and preserve their natural resources for present and future generations and the good of the environment.

Natural lands managers, ecologists, engineers, planners, and design and build companies likewise have a responsibility to thoroughly assess and present all irreplaceable natural resources potentially affected by a stream restoration or wetlands project as necessary environmental review prior to construction. The approach to date has traditionally been a very narrow scope solely through an engineering perspective, with little to no input from conservation biologists.


QUESTIONS?
Photo by R.H. Simmons


Thank you.
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