SPECIAL PROJECT WEBINAR SERIES

Zoom Webinar

2.8.22

1PM-2PM EST

Black River Trail Feasibility Study

Presented by:

SLELO PRISM

Brittney Rogers & Robert Smith

INVASIVE SPECIES MANAGEMENT

SAINT LAWRENCE EASTERN LAKE ONTARIO

SLELO PRISM

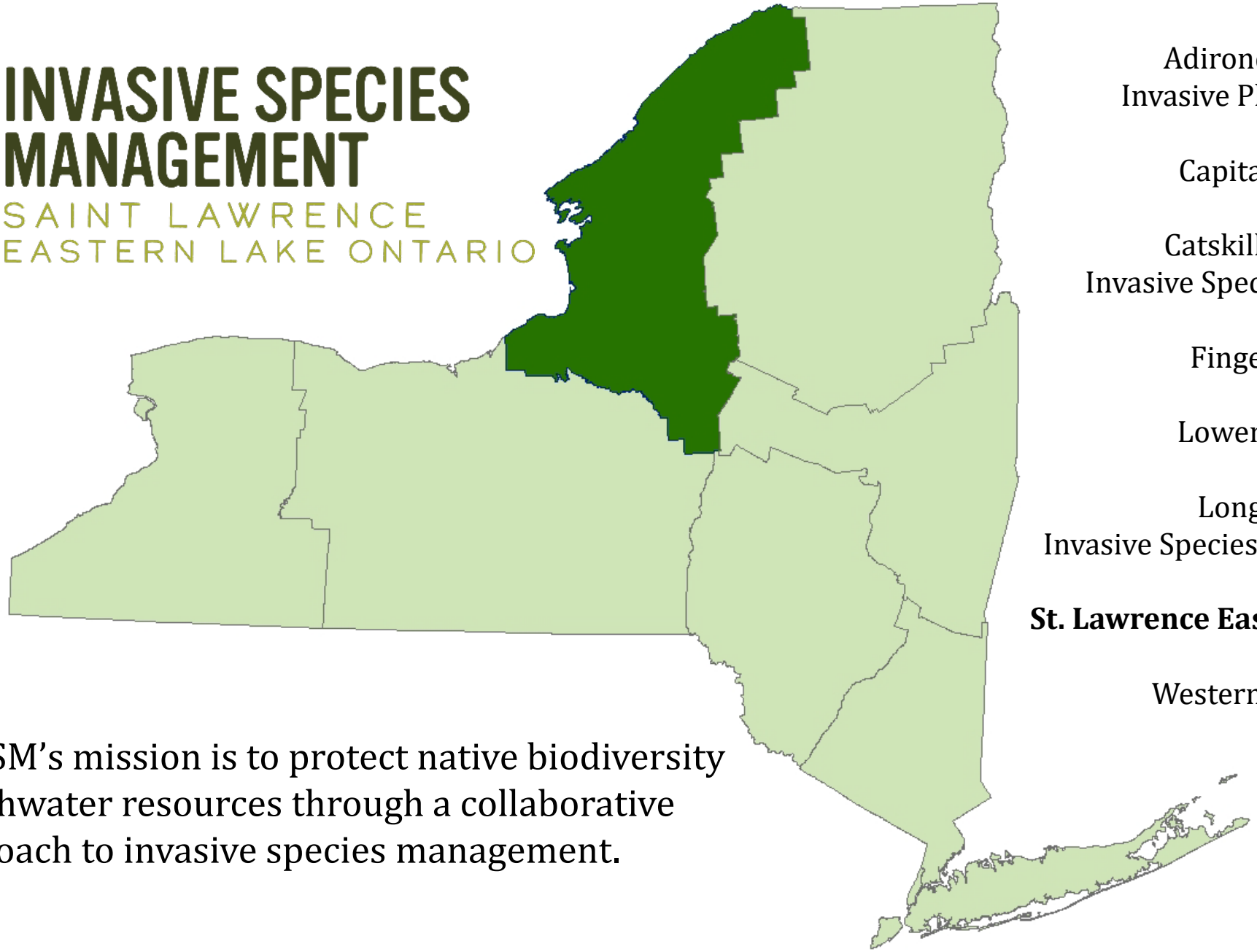
Black River Trail Feasibility Study

for Invasive Species Suppression and Ecological Restoration

2020-2021

INVASIVE SPECIES MANAGEMENT

SAINT LAWRENCE
EASTERN LAKE ONTARIO



Adirondack Park
Invasive Plant Program

Capital Region

Catskill Regional
Invasive Species Partnership

Finger Lakes

Lower Hudson

Long Island
Invasive Species Management Area

St. Lawrence Eastern Lake Ontario

Western New York

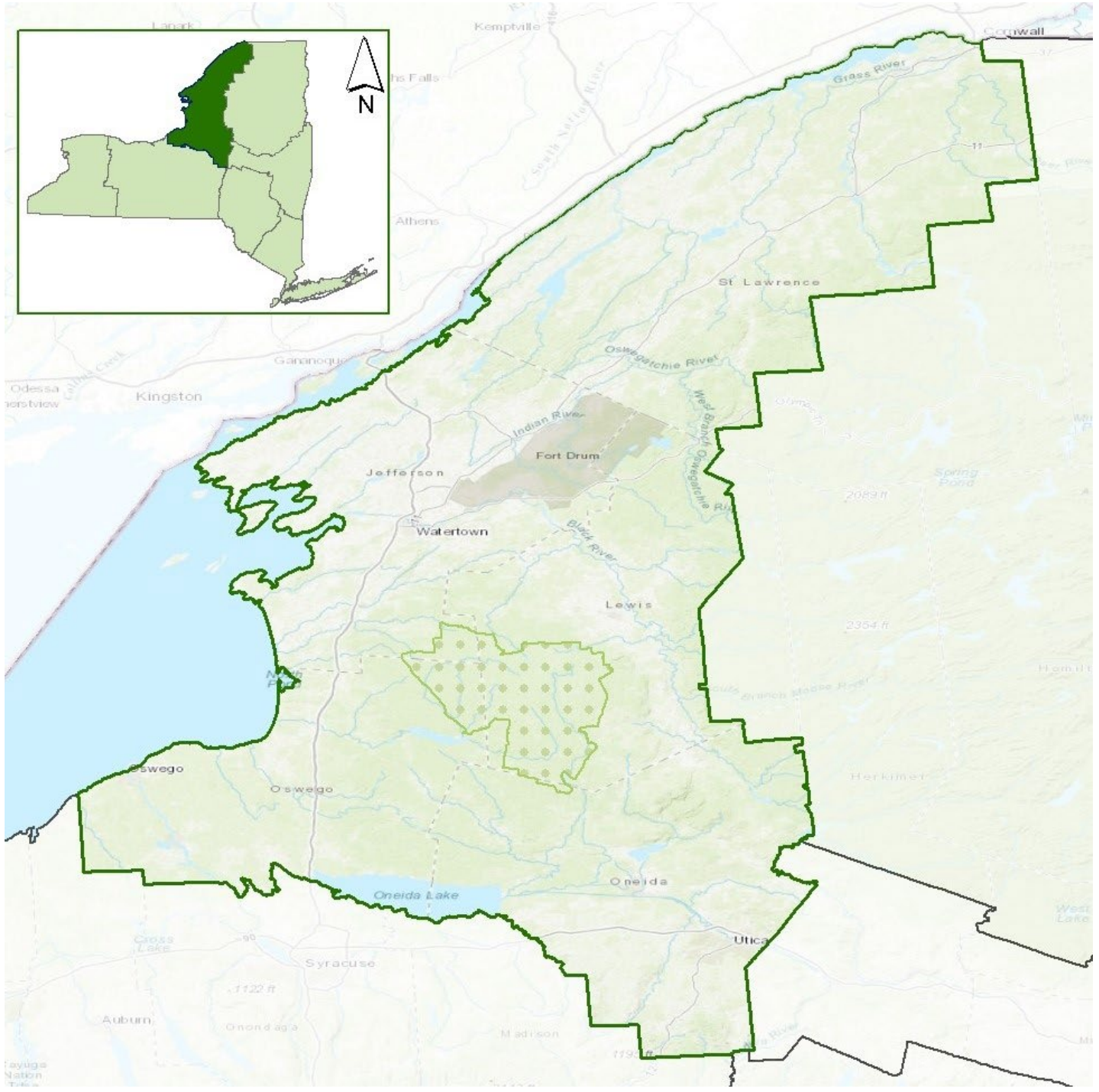
SLELO PRISM's mission is to protect native biodiversity and freshwater resources through a collaborative approach to invasive species management.

Core Programming

Prevention
Early Detection
Rapid Response
Management and Control
Ecological Restoration
Education and Outreach

Special Initiatives

AIS Macrophyte Nutrient Analysis
Aquatic Restoration Initiative
Black River Trail Study
Environmental DNA Monitoring
Pollinator Pathway
Spotted Lanternfly Spotters
Tug Hill Forest Restoration
Urban Forest Sustainability Initiative
Watercraft Inspection Steward Program



		Difficulty of Eradication/Cost of Control Abundance (In PRISM plus Buffer)				
		Low None in PRISM	Medium (Eradication/Full containment may be feasible)	Medium (Strategic management to contain infestations and slow spread in PRISM)	High (Established/widespread in PRISM; only strategic localized management)	N/A
Impact (current and future)	Impact Very High or High	Tier 1 *Early Detection/Prevention* Not in Prism, but within 100 mile buffer or introduction pathway exists. Highest level of early detection survey efforts.	Tier 2 *Eradication* Present in Prism, but at low abundance with suitable treatment methods available to make eradication feasible within Priority Conservation Areas (PCA's).	Tier 3 *Suppression* Too widespread for eradication from PRISM, but some areas remain unaffected. Targeted management to suppress the population within Priority Conservation Areas (PCA's).	Tier 4 *Local Control* Present and widespread throughout PRISM with no chance of eradication. Localized management applied to protect high priority resources like rare plant or recreation assets.	Tier 5 *Monitor* Species that may or may not be in PRISM but are difficult to respond to or that require more knowledge of.

Asian Jumping Worm
Asian Long Horned Beetle
Silver, Big Head, Black, and Grass Carp Species
Hydrilla
Kudzu
Mile-A-Minute Vine
Slender False Brome
Spotted lanternfly
Water Lettuce
Water Hyacinth
Water Soldier

Asian Clam
Fanwort
Giant Hogweed
Hemimysis
Hemlock Woolly Adelgid
Porcelainberry
Spiny Water Flea
Tench

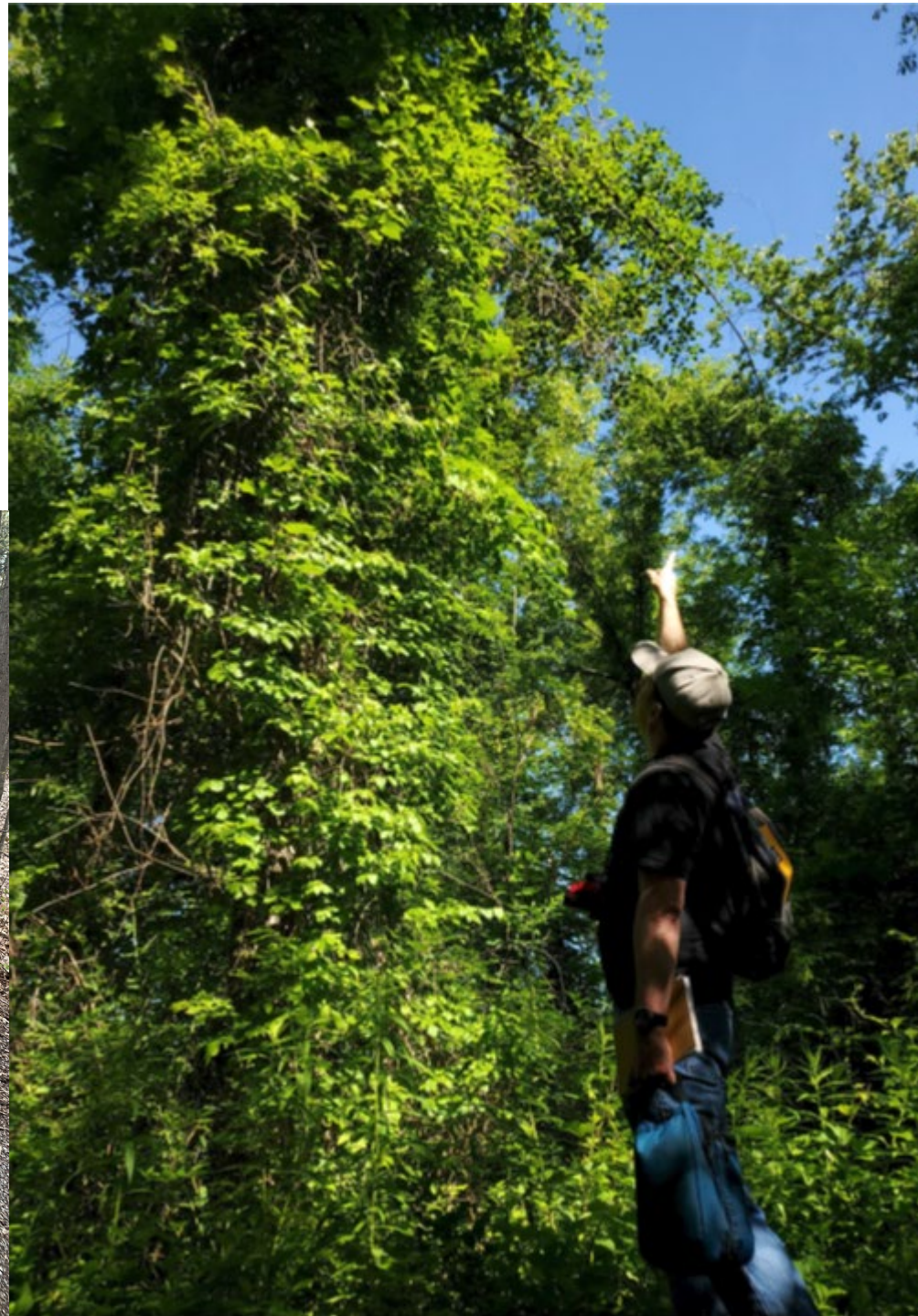
Black & Pale Swallow-wort
Japanese Knotweed
Japanese Stiltgrass
Oriental Bittersweet
Phragmites/Common Reed
Rusty Crayfish
Starry Stonewort
Tree-of-Heaven
Water Chestnut
Wild Chervil
Yellow Iris

Common Buckthorn
Curly Leaf Pondweed
Emerald Ash Borer
Eurasian Water Milfoil
European Frogbit
Feral Swine
Glossy Buckthorn
Honeysuckle Spp.
Leafy Spurge
Purple Loosestrife
Round Goby
Spotted Knapweed
Wild Parsnip
Zebra/Quagga Mussel

LEGEND:
- Insects
- Aquatic Species
- Mammals
- Woody Plants
- Graminoids
- Forbs
- Vines
- Subterranean

www.sleloinvasives.org/tiered-species-list

- **Introduction**
  - 3.5 Mile trail along Black River riparian area
  - Connection between Watertown and Fort Drum
  - 104,000 visits to the trail in 2019
  - Several known invasive plant species present but little was known about distribution

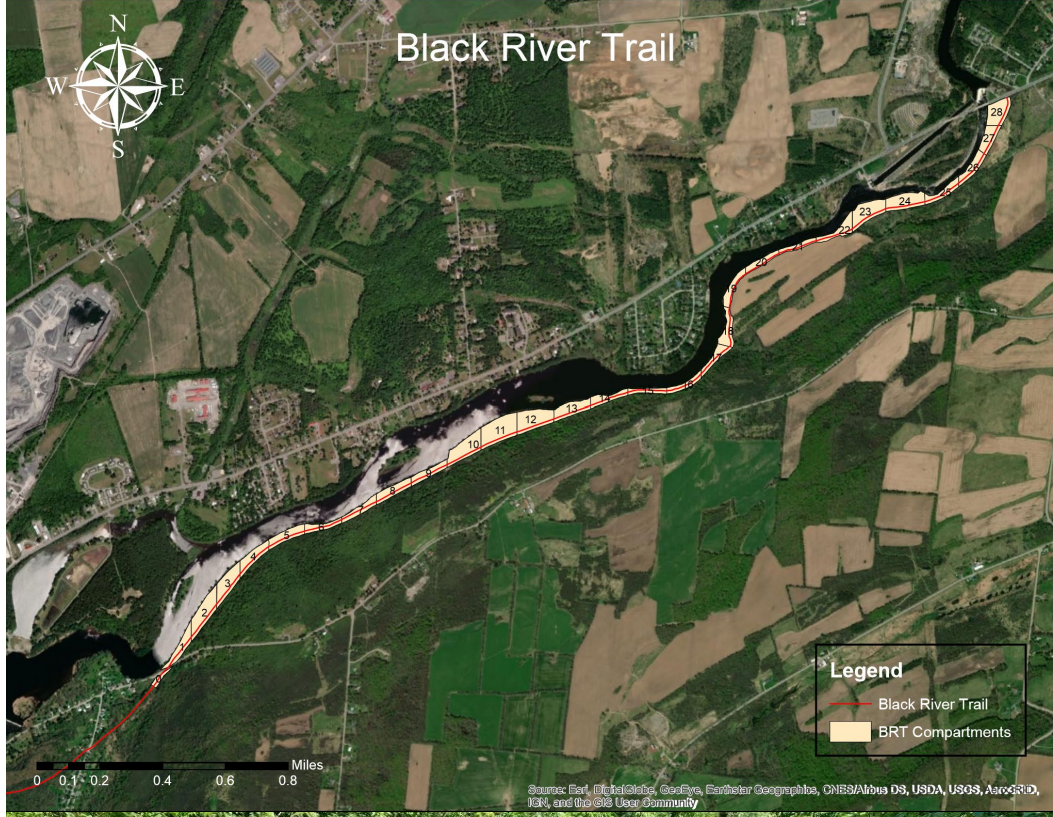


Objectives:

Study native and invasive species on trail

Determine the feasibility of invasive species management and restoration work

Provide results and recommendations from study to NYS OPRHP



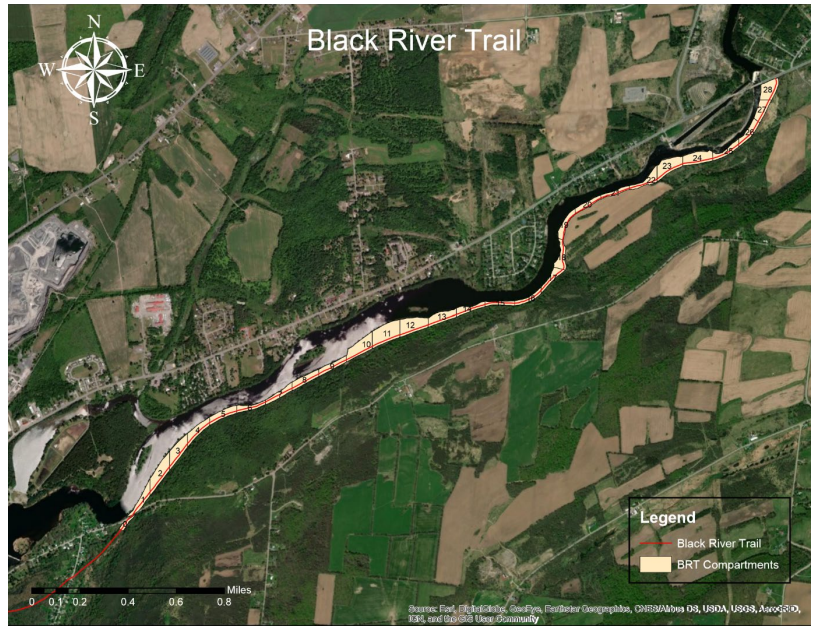
PROJECT TEAM

Brittney Rogers, SLELO PRISM
Aquatic Restoration and Resiliency Coordinator

Robert Smith, SLELO PRISM
Terrestrial Restoration and Resiliency Coordinator

Zack Simek, SLELO PRISM and APIPP
Conservation and GIS Analyst

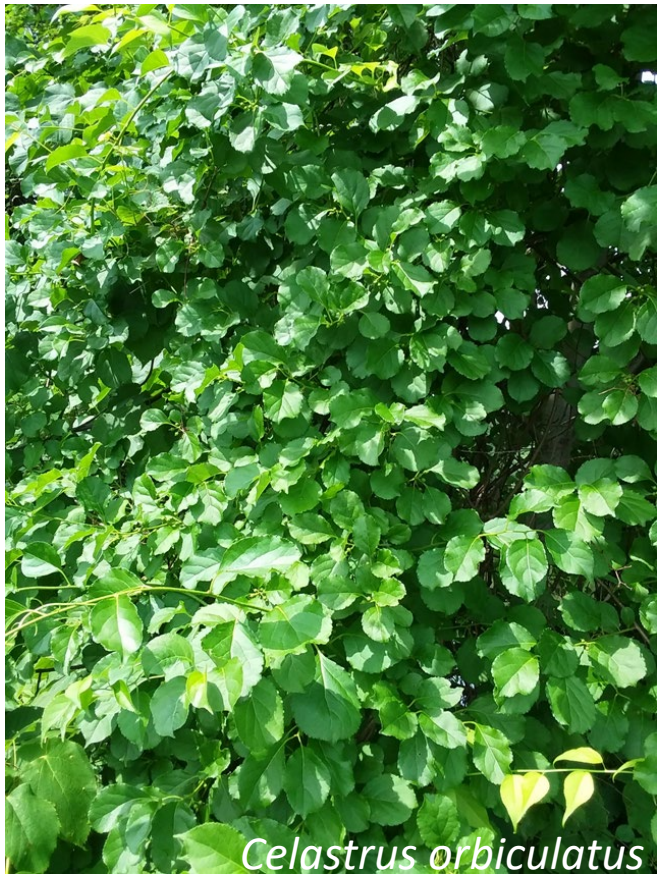
- **Data Collection**
  - Surveyed 29 compartments
    - Length: 1/8 mile
    - Width: north - trail to river, south - 100 ft from trail
  - Recorded:
    - Tree abundance and canopy cover
    - Herbaceous/understory plant abundance and cover
    - Invasive plant abundance and cover
    - Location of culverts and tributaries



- **Data Analysis**
  - Compile and compare native, non-natives, invasives, and rare plant species composition
  - Compare invasive species management methods
  - Analyze terrain


Sanguinaria canadensis


Vincetoxicum rossicum


Celastrus orbiculatus


Arisaema dracontium

- **Prioritizing Black River Trail Compartments**
  - Determine Floristic Quality Index (FQI) Score
    - Coefficient of Conservatism
    - Number of Species

$$FQI = \overline{C} * \sqrt{N}$$

Table 1. Guiding definitions for coefficients of conservatism (CoC) assigned to the vascular flora of New York and New England.

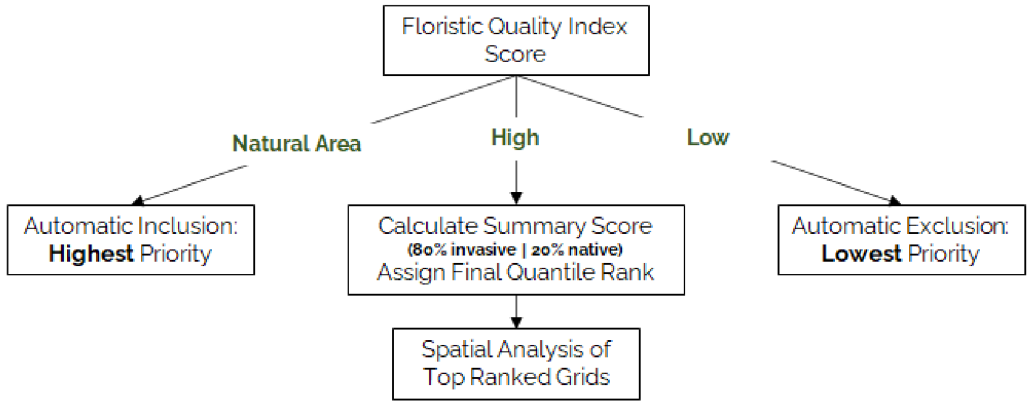
CoC	Criteria
0	Non-native with wide range of ecological tolerances. Often these are opportunistic of intact undisturbed habitats.
1 to 2	Native invasive or widespread native that is not typical of (or only marginally typical of) a particular plant community; tolerant of anthropogenic disturbance.
3 to 5	Native with an intermediate range of ecological tolerances and may typify a stable native community, but may also persist under some anthropogenic disturbance.
6 to 8	Native with a narrow range of ecological tolerances and typically associated with a stable community.
9 to 10	Native with a narrow range of ecological tolerances, high fidelity to particular habitat conditions, and sensitive to anthropogenic disturbance.

- **Prioritizing Black River Trail Compartments**
  - Categorize Compartments

FQI Quality Categories

Floristic Quality Index (FQI)	Description of Quality
1-19	Low
20-35	High
Over 35	Natural Area (Exceptional)

Prioritize by FQI Quality Categories



- **Prioritizing Black River Trail Compartments**
  - Determine Summary Score for High FQI Category Segments
    - 20% Native Species Score + 80% Invasive Species Score

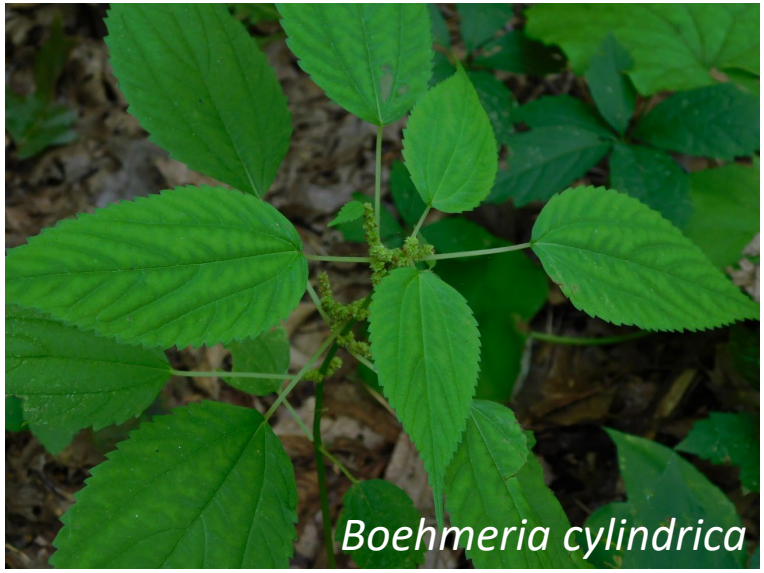
Native Species Score = FQI Quantile + EV Quantile

Compartment	FQI Score	FQI Category	FQI Quantile (Assigned)
13	41	Natural	1
14	38	Natural	1
15	36	Natural	1
18	35	High	2
9	32	High	3
17	31	High	4
16	31	High	4
19	31	High	4
12	30	High	5
2	30	High	5
20	30	High	5
11	29	High	6
8	29	High	6
6	29	High	6
7	28	High	7

Compartment	FQI Score	FQI Category	FQI Quantile (Assigned)
10	28	High	7
21	28	High	7
22	26	High	8
24	25	High	9
4	25	High	9
23	25	High	9
0	23	High	10
5	23	High	10
3	23	High	10
1	22	High	11
25	22	High	11
26	22	High	11
28	18	Low	999
27	17	Low	999

Compartment	EV Richness	EV Quantile
0	2	5
1	0	7
2	4	3
3	2	5
4	4	3
5	1	6
6	4	3
7	4	3
8	1	6
9	1	6
10	2	5
11	3	4
12	7	2
13	8	1
14	7	2

Compartment	EV Richness	EV Quantile
15	4	3
16	2	5
17	3	4
18	2	5
19	3	4
20	2	5
21	2	5
22	0	7
23	0	7
24	3	4
25	0	7
26	1	6
27	0	7
28	0	7


Boehmeria cylindrica


Menispermum canadense

- **Prioritizing Black River Trail Compartments**
  - Determine Summary Score for High FQI Category Segments
    - 20% Native Species Score + 80% Invasive Species Score

$$Invasive\ Species\ Score = (Tier\ Quantile)(0.8) + (NonTier\ Quantile)(0.2)$$

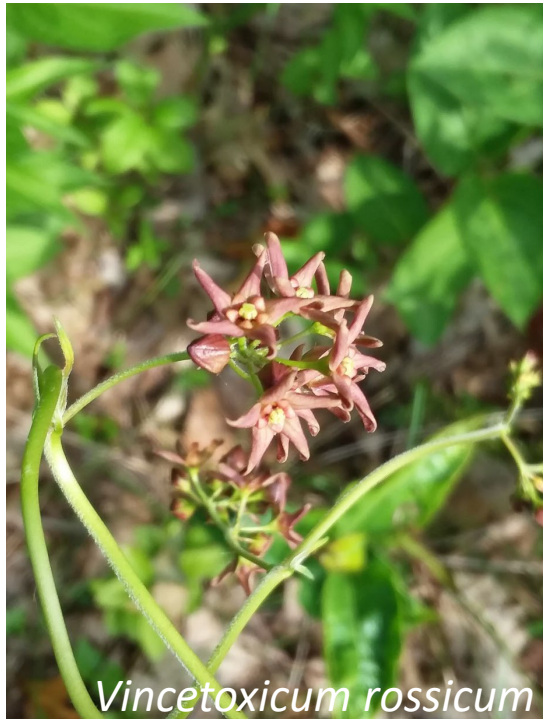
Compartment	Abundance Nominated Tier (acres)	Abundance Tier Quantile
0	0.147	29
1	0.648	9
2	1.353	3
3	1.326	4
4	1.794	2
5	0.525	12
6	0.768	7
7	0.228	23
8	0.504	13
9	0.48	15
10	0.615	10
11	1.848	1
12	0.396	17
13	0.18	27
14	0.171	28

Compartment	Abundance Nominated Tier (acres)	Abundance Tier Quantile
15	0.195	25
16	0.225	24
17	0.456	16
18	0.66	8
19	0.324	21
20	0.192	26
21	0.234	22
22	0.552	11
23	0.48	14
24	1.11	5
25	0.36	18
26	0.33	20
27	0.345	19
28	0.864	6

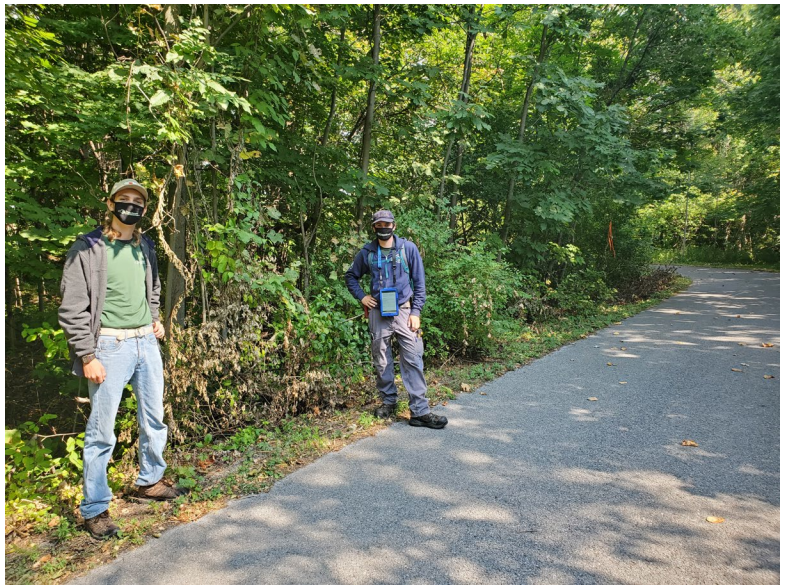
Compartment	Abundance Non-Tier (acres)	Abundance Non-Tier Quantile
0	0.08	26
1	0.29	13
2	0.49	5
3	0.2	20
4	0.31	12
5	0.38	8
6	0.14	23
7	0.06	29
8	0.22	18
9	0.18	22
10	0.49	6
11	0.5	4
12	0.4	7
13	0.36	9
14	0.11	25

Compartment	Abundance Non-Tier (acres)	Abundance Non-Tier Quantile
15	0.2	21
16	0.27	15
17	0.34	10
18	0.07	27
19	0.22	17
20	0.24	16
21	0.12	24
22	0.28	14
23	0.72	1
24	0.67	2
25	0.06	28
26	0.33	11
27	0.21	19
28	0.58	3


Iris pseudacorus


Vincetoxicum rossicum

Spatial Analysis



- **Prioritizing Black River Trail Compartments**
  - Final Black River Prioritization Scores

Compartment	FQI Category	Summary Score	Final Ranking Quantile
13	Natural	1	1
14	Natural	1	1
15	Natural	1	1
11	High	3	2
2	High	4	3
4	High	6	4
24	High	6	4
3	High	9	5
6	High	10	6
10	High	10	6
1	High	11	7
18	High	11	7
5	High	12	8
22	High	12	8
23	High	12	8

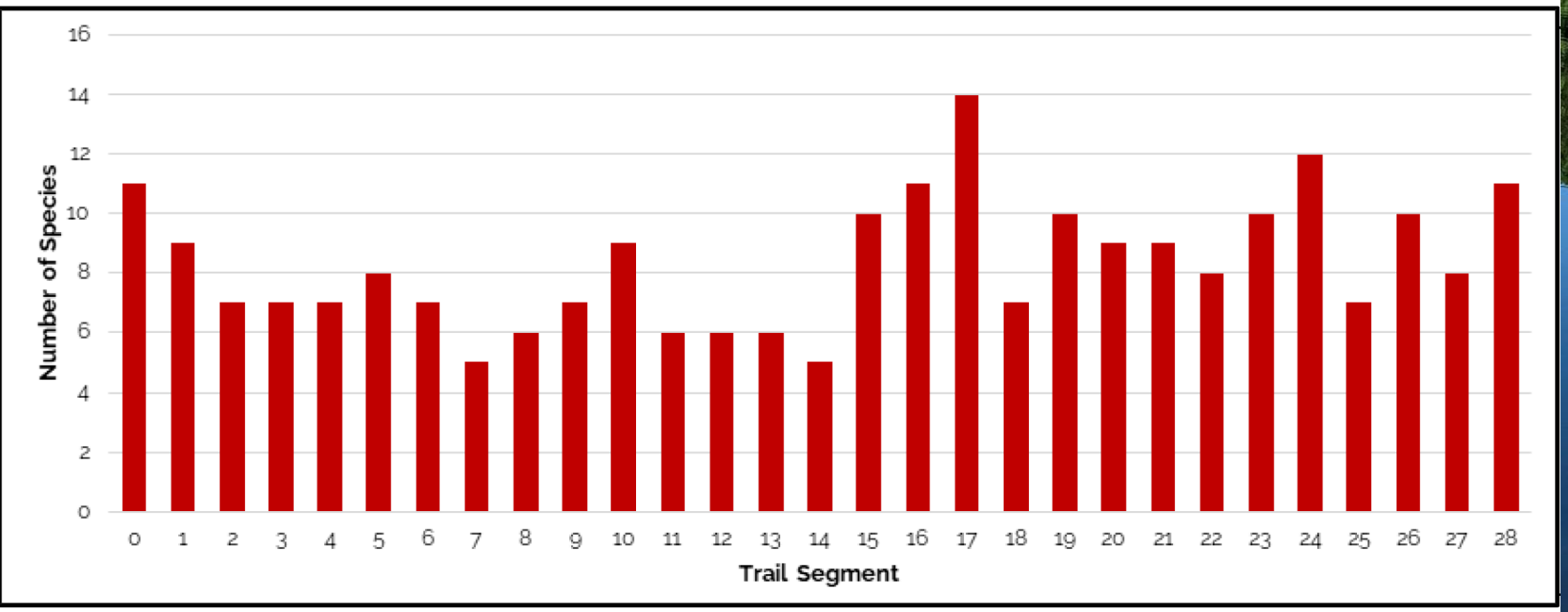
Compartment	FQI Category	Summary Score	Final Ranking Quantile
12	High	13	9
17	High	13	9
8	High	14	10
9	High	15	11
19	High	18	12
26	High	18	12
16	High	20	13
21	High	20	13
25	High	20	13
7	High	21	14
20	High	21	14
0	High	26	15
27	Low	999	999
28	Low	999	999


Actaea pachypoda


Pilea pumila

Results

- Nearly 300 field hours studying the flora of the trail
  - ~ 10 hours per compartment
- Identified over 270 plants species (31 trees – 243 herb)
  - Including 18 exploitatively vulnerable species
- Prioritized compartments for removal efforts
  - Including logistical information for each compartment
- Cost estimate for invasive species management and restoration



P 2							P 3			P 1						P 3			P 4						P 5			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

Compartment 18

Segment 18 is approximately 2.2 acres and is the tenth trail section after leaving the northern parking area/access. A total of 86 species were documented. Seven (8%) were invasive, including six nominated tiered species. The native species assemblage included 20 tree and 59 herbaceous species (Tables XX). Compartment 18 had an FQI score of 35 (high) and mean C value of 3.95. Two exploitatively vulnerable species were found.

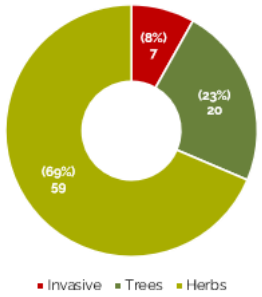


Figure. Classification of species documented in segment 0.

Non-Invasive Species

79

Invasive Species

7

Mapped Features:

- Culverts – 2
- Tributaries – 2
- Other Human Features – 6

Nominated Tier Invasive Species:

Tier 3

- Oriental Bittersweet
- Swallowwort (species unknown)

Tier 4

- Common Buckthorn
- Honeysuckle (species unknown)
- Leafy Spurge, Wolf's Milk
- Spotted Starthistle, Spotted Knapweed

Invasive Species	Abundance	Cover (%)
Common Buckthorn	Dense plants/clumps	<5
Crabapple (species unknown)	No Data	<5
Honeysuckle (species unknown)	Dense plants/clumps	<5
Leafy Spurge, Wolf's Milk	No Data	<5
Oriental Bittersweet	Linearly scattered	15
Spotted Starthistle, Spotted Knapweed	Sparse (Scattered plants/clumps)	<5
Swallowwort (species unknown)	Sparse (Scattered plants/clumps)	<5

Tree Species	Herbaceous Species		
American basswood	alternate-leaved dogwood	common horsetail / field horsetail	orchard grass
American beech	American common/ground juniper	common milkweed	ostrich fern
big-toothed aspen	American red raspberry	common ragweed	poison ivy spp.
bitternut hickory	big bluestem	common Timothy	prickly gooseberry
box elder	black medic	common yellow wood sorrel	red clover
butternut	black raspberry	deer-tongue rosette grass	river grape
eastern hemlock	bladder campion	eastern enchanter's nightshade	sessile-leaved bellwort/wild oats
gray birch	bladdernut	Eurasian live forever	staghorn sumac
hop hornbeam	blue cohosh, late blue cohosh	false Solomon's seal	strawberry spp.
northern red oak	blue-stemmed/wreath goldenrod	fowl blue grass	sweet-scented bedstraw
northern white cedar	boneset	fringed loosestrife	tall anemone/thimbleweed
Red maple, common	bulblet fern	green foxtail	tall goldenrod
red pine	bush honeysuckle	groundnut	tall meadow rue
Scotch pine	calico aster	heart-leaved aster	virgin's bower
sugar maple	Canada goldenrod	herb Robert	Virginia creeper
trembling aspen	Canada wild rye	hog peanut	white rattlesnake root
white ash	chicory	maple-leaved viburnum	wild basil
White Oak	common black-eyed Susan	New England aster	wild carrot
white pine	common carrion flower	northern tickle grass	yellow foxtail
wild black cherry	common dandelion	orange-fruited horse gentian	

Recommendations

- Development of “Friends of the Black River Trail” group
- Interpretive panels to inform of flora and fauna along the trail
- Use Manual/Mechanical Methods for Removal
- Restore with native plant species found during survey


Apios americana


Arisaema triphyllum


Trillium erectum


Iris prismatica

Management/Removal Methods

- **Strategy**
  - Minimize Chemical Use
  - Long-Term Monitoring and Management

- **Recommendations**
  - Combination of digging and hand pulls for non-woody invasive plant species and seedlings of woody invasive species
  - Hand tools such as an “uprooter” or “root talon” for invasive shrub removal
  - Spade cut method and smothering for Phragmites
  - Cut-stem chemical treatment with secured covers over treated surface for woody invasive vine (oriental bittersweet)
  - Formation of volunteer group to perform annual hand pulls of invasive species


Celastrus orbiculatus


Vincetoxicum rossicum


Phragmites australis

Ecological Restoration

Goal:

- To recreate, initiate, or accelerate the recovery of an ecosystem that has been disturbed, followed by continued monitoring and maintenance

Conditions to consider include:

- Existing species
- Sunlight levels
- Soil type
- Water availability
- Erosion potential
- Soil compaction
- Soil contamination

Small scale projects with large scale results:

- 3.5 mile section of riparian trail
- Black River watershed
- Great Lakes Basin
- Algonquin to Adirondacks link

THE RESTORATIVE

CONTINUUM

Improving biodiversity, ecological health, and ecosystem services

REDUCING SOCIETAL IMPACTS

IMPROVING ECOSYSTEM MANAGEMENT

REPAIRING ECOSYSTEM FUNCTION

INITIATING NATIVE RECOVERY

PARTIALLY RECOVERING NATIVE ECOSYSTEMS

FULLY RECOVERING NATIVE ECOSYSTEMS

REDUCED IMPACTS

REMEDIATION

REHABILITATION

ECOLOGICAL RESTORATION

SER SOCIETY FOR ECOLOGICAL RESTORATION

Recommended Native Plant Species for Restoration at the Black River Trail

- Based on native species found at this site (over 200 natives)
  - Trees, shrubs, herbs, and graminoids selected by wetland indicator and shade tolerance
  - Most common species


Eutrochium maculatum


Ageratina altissima


Chelone glabra


Lycopus uniflorus

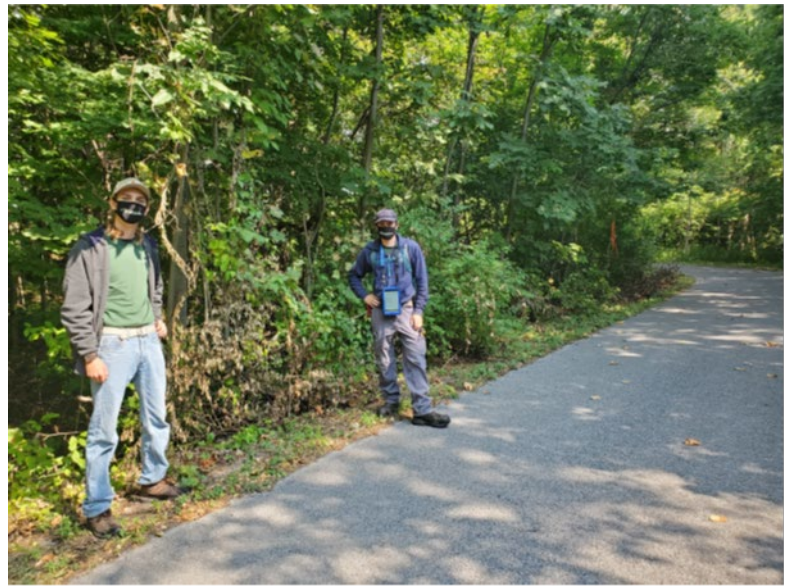
Wetland Areas	
Common Name	Scientific Name
northern bugleweed	Lycopus uniflorus
white turtlehead	Chelone glabra
maple-leaved viburnum	Viburnum acerifolium
false nettle	Boehmeria cylindrica
nodding beggar ticks	Bidens cernua
sweet-scented bedstraw	Galium triflorum
sensitive fern	Onoclea sensibilis
tall meadow rue	Thalictrum pubescens
boneset	Eupatorium perfoliatum
Canada anemone	Anemone canadensis

Upland Areas	
Common Name	Scientific Name
common milkweed	Asclepias syriaca
Virginia creeper	Parthenocissus quinquefolia
tall goldenrod	Solidago altissima
herb Robert	Geranium robertianum
blue-stemmed goldenrod	Solidago caesia
false Solomon's seal	Maianthemum racemosum
eastern enchanter's nightshade	Circaea canadensis
common white snakeroot	Ageratina altissima
common yellow wood sorrel	Oxalis stricta
prickly gooseberry	Ribes cynosbati

All Areas	
Common Name	Scientific Name
spotted Joe Pye weed	Eutrochium maculatum
calico aster	Symphyotrichum lateriflorum
hog peanut	Amphicarpaea bracteata
Indian hemp	Apocynum cannabinum
Jack-in-the-pulpit	Arisaema triphyllum

Top Herbs by Wetland Indicator

- **Next Steps**
    - Collaboration with OPRHP
    - Use of Methods for Other Projects



Thanks to NYS OPRHP Seasonal Techs for assisting with part of the field surveys!

QUESTIONS?

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