



APIPP PRISM

2019 Annual Report



Adirondack Park Invasive Plant Program Partnership for Regional Invasive Species Management

Hosted by the Adirondack Chapter of The Nature Conservancy

Keene Valley, New York



**Department of
Environmental
Conservation**

2019 Annual Report Contributors

Erin Vennie-Vollrath, Aquatic Invasive Species Project Coordinator

Zachary Simek, Terrestrial Invasive Species Project Coordinator

Tammara Van Ryn, Program Manager

Funding for this project is provided from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

The Adirondack Park Invasive Plant Program (APIPP) serves as the Adirondack Partnership for Regional Invasive Species Management (PRISM), one of eight partnerships across New York State (NYS) (Map 1). APIPP is a program founded by the Adirondack Chapter of The Nature Conservancy (TNC), NYS Department of Environmental Conservation (NYS DEC), NYS Department of Transportation (NYS DOT), and NYS Adirondack Park Agency (APA). More than 30 cooperating organizations and hundreds of volunteers support APIPP in its mission.



Map 1. Jurisdictional boundaries of New York State's PRISMs.

★ APIPP PRISM 2019 HIGHLIGHTS ★

More than 30 organizations and hundreds of volunteers share their ideas, time, and resources to advance the mission of APIPP. Thank you! Together we make a significant difference addressing invasive species threats in the Adirondacks. Here are highlights from our work in 2019.

★ Staff Transitions

- APIPP bid a fond farewell to former Program Manager, Brendan Quirion, when he left at the end of the 2019 field season to pursue a graduate degree at Cornell University. Brendan joined APIPP in 2010 as the Terrestrial Project Coordinator and applied his skills to expanding our terrestrial work. In 2014, he became the Program Manager and helped expand the reach of APIPP and its partners across the Park.
- We are pleased to announce that Tammara Van Ryn has joined the APIPP team as Program Manager. Tammara brings to the position a natural resource background, deep commitment to the land, and experience building partnerships.
- APIPP was pleased to have Julie Fogden serve as our seasonal Invasive Species Management Steward. Julie brought a new level of plant identification and management skills to the position, which enabled her to successfully treat new infestations and to significantly expand APIPP's survey footprint at recreation areas throughout the PRISM. In addition, her enthusiasm for communicating the invasives message enabled her to reach new audiences.

★ Innovation

- The APIPP Terrestrial Project completed its second year of unmanned aerial vehicle-assisted (drone) surveys for wetland invasives which has the potential to greatly expand our detection efforts in difficult-to-access locations.
- Working under a Google Data Solutions for Change grant awarded to The Nature Conservancy, the Terrestrial Project developed a cutting-edge machine learning model to identify *Phragmites* infestations from drone imagery. Exciting news, the initial model had a 93.3% accuracy rate.
- The APIPP Aquatic Project partnered with APA and Adirondack Lakes Alliance to expand the use of a new mobile monitoring tool—the Lake Management Tracker. This new tool allows lake associations to assess how well their aquatic invasive plant management efforts are working. Six lakes participated in the project in 2019.

★ Aquatic Invasives Detection

- Eighty-four volunteers and four early detection team members surveyed 95 Adirondack waterways for aquatic invasive species.
- Two new lakes were found to have invasive plants, Rockwood Lake and Utowana Lake.
- No new infestations of small-bodied aquatic invasives were discovered.
- Three new sites on Lake George were found to have Asian clam infestations.

★ Terrestrial Invasives Detection

- APIPP's terrestrial early detection and response team, staff, partners and volunteers surveyed 39 DEC campgrounds, 139 recreational access points (such as trailheads and boat launches), and sections of 46 Forest Preserve units and 45 road corridors.
- Just over 750 new terrestrial infestations were found (there are now a total of 5,493 mapped infestations of APIPP's twenty-four target species), including five new infestations of two watched species—mile-a-minute and Japanese angelica tree.
- One new infestation of emerald ash borer was documented by partners in the town of Bombay.
- Prophylactic treatment was performed on 87 trees surrounding the 2017 detection of hemlock woolly adelgid (HWA) on Prospect Mountain in Lake George. There were no new infestations of HWA detected in the PRISM.

★ Invasive Species Management

- Thanks to the work of APIPP partners, many waterbodies are being managed to reduce the impact of the following aquatic invasive plants.
 - Eurasian watermilfoil: 17 lakes
 - Variable-leaf watermilfoil: 5 lakes
 - Water chestnut: 3 lakes
 - Zebra mussels: 1 lake
- APIPP's Terrestrial Project managed 773 infestations of 26 species, totaling just over 38 acres, *and* documented the absence of invasives at 1,150 historically managed infestations!

★ Prevention, Outreach and Education

- APIPP staff and volunteers spread the word about invasive species every day. In 2019 we gave formal presentations to 37 groups, reaching nearly 1,500 people. In addition, our website had more than 15,000 unique visitors.
- APIPP collaborated with Paul Smith's College Adirondack Watershed Institute, which staffed boat launch stewards at priority sites and boat inspection stations.
- APIPP collaborated with NYS DOT and partners on the first-of-its-kind boat wash station on the Northway (I-87). This free inspection and boat-washing facility helps keep nuisance aquatic plants and animals from threatening our waters and economy.

★ New Contract with NYS DEC

- APIPP worked closely with NYS DEC to secure a new contract to support APIPP's work through 2024. The funding provided through the Environmental Protection Fund will enable APIPP to expand its education, information management, volunteer network, and invasive species detection and response programs.

This is just a sampling of the great work the APIPP partners did in 2019 to protect the Adirondack region from the economic and ecologic impact of invasive species. Read on to find out all the details. Thank you APIPP Partners!

Sincerely, *The APIPP Team*

Table of Contents

APIPP Prism 2019 Annual Report	2
<i>Program Mission, Projects, Staff and Goals</i>	2
<i>Target Species – Existing Threats</i>	3
<i>Watched Species – Potential Threats</i>	8
<i>Regional Invasive Species Distribution</i>	11
<i>Surveillance</i>	13
<i>Management</i>	17
<i>Species Distribution & Management Trends</i>	20
Water chestnut.....	20
Common reed grass (common reed)	22
Garlic mustard.....	33
Giant hogweed	34
Knotweed species	35
Mile-a-minute	36
Purple loosestrife	36
Scotch broom.....	37
Swallow-wort species.....	37
Tree-of-heaven.....	38
Yellow iris.....	39
<i>Innovation</i>	41
<i>Seasonal Employment</i>	43
<i>Prevention and Awareness Building</i>	44
<i>Regional Planning and Coordination</i>	45
<i>Equipment and Materials</i>	47
<i>Obstacles and Solutions</i>	48
<i>Reference: Priority Setting Structure</i>	49
<i>Reference: State Regulations</i>	50
APIPP Partners	52
Reference Materials	53
<i>Appendix 1: iMapInvasives Summary Report</i>	54

APIPP PRISM 2019 Annual Report

Program Mission, Projects, Staff and Goals

The threats posed by invasive species are an issue front and center of concern in the Adirondack region. Action is underway at local, regional, and statewide scales, contributing to a comprehensive approach to address their negative impacts on ecosystems, economies, and society. APIPP joins forces with partner organizations, communities, and volunteers to put strategic and innovative solutions into place.

Mission

APIPP's **mission** is to...

***Protect the Adirondack Region
from the Negative Impacts of Invasive Species***

Project and Staff

The program coordinates two regional **projects**; an *Aquatic Invasive Species (AIS) Project* (Aquatic Project) and a *Terrestrial Invasive Species Project* (Terrestrial Project). **Staff** members in 2019 included Brendan Quirion (through August), Program Manager; Erin Vennie-Vollrath, AIS Project Coordinator; Zachary Simek, Terrestrial Invasive Species Project Coordinator; and, Julie Fogden, 2019's Invasive Species Management Steward.

Five-year Strategic Plan Goals

- *Coordination*
- *Pathway Analysis*
- *Spread Prevention & Vector Management*
- *Enforcement & Legislation*
- *Education & Outreach*
- *Early Detection, Rapid Response, & Monitoring*
- *Control & Management*
- *Information Management*
- *Restoration*
- *Research*
- *Climate Change Adaptation*
- *Resource Development & Funding*

AQUATIC & TERRESTRIAL INVASIVE SPECIES PROJECT REPORTS

Target Species – Existing Threats

This section describes existing, high-priority species threats affecting the Adirondack PRISM.

Aquatic Invasive Plants

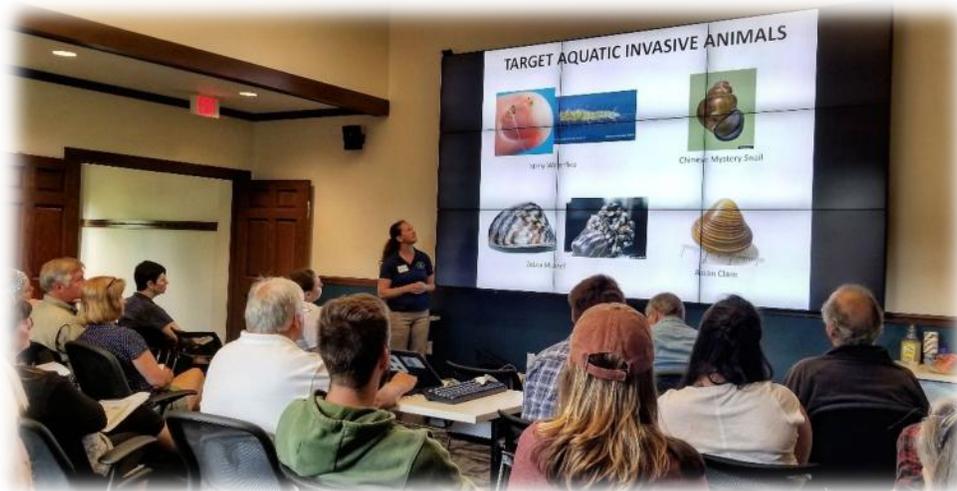
The Aquatic Project surveys for six target aquatic invasive plants known to be present in the PRISM based on their high or very high PRISM invasiveness rankings: Eurasian watermilfoil (*Myriophyllum spicatum*), variable-leaf watermilfoil (*Myriophyllum heterophyllum*), water chestnut (*Trapa natans*), curly-leaf pondweed (*Potamogeton crispus*), fanwort (*Cabomba caroliniana*), and European frog-bit (*Hydrocharis morsus-ranae*). As of 2019, 102 Adirondack lakes are known to be invaded by one or more of these target aquatic invasive plants (Map 2).

- [Eurasian watermilfoil \(PRISM Invasiveness Ranking = Very High\)](#) is a submerged perennial that grows quickly, forming dense mats that can degrade native habitat and impede recreational use. It is known to be present in 61 lakes in the PRISM. There were no new reports of this plant in 2019.
- [Variable-leaf watermilfoil \(PRISM Invasiveness Ranking = Very High\)](#) is a submerged perennial that grows quickly, forming dense mats that can degrade native habitat and impede recreational use. It is known to be present in 49 lakes in the PRISM. It was newly reported in two lakes in 2019: Rockwood Lake (Fulton County) and Utowana Lake (Hamilton County).
- [European frog-bit \(PRISM Invasiveness Ranking = Very High\)](#) is a free-floating annual that forms dense mats that can limit light penetration and impede recreational use. It is known to be present in seven water bodies in the PRISM. It was newly reported in one lake in 2019: Lake Alice (Clinton County).
- [Water chestnut \(PRISM Invasiveness Ranking = Very High\)](#) is a floating annual which forms dense mats that cover large expanses of water and can impact water quality, native species and impede recreational use. It is known to be present in five water bodies in the PRISM: Lake Champlain, Lake George, Hadlock Pond, Loon Lake, and Lake Alice. There were no new reports of this plant in 2019.
- [Curly-leaf pondweed \(PRISM Invasiveness Ranking = High\)](#) is a submerged perennial that begins growing early in the year and can outcompete native species. It is known to be present in 17 lakes in the PRISM. There were no new reports of this plant in 2019.
- [Fanwort \(PRISM Invasiveness Ranking = High\)](#) is a submerged aquatic plant that forms dense beds that can crowd out native plant species. It is known to be present in four private lakes in the PRISM: Efner Lake, Horseshoe Pond, Jenny Lake, and Mill Pond. There were no new reports of this plant in 2019.

Small-bodied Aquatic Invasive Animals

The Aquatic Project surveys for five target small-bodied aquatic invasive animals known to be present in the PRISM based on their high or very high NYS invasiveness rankings: spiny waterflea (*Bythotrephes longimanus*), fishhook waterflea (*Cercopais pengoi*), Asian clam (*Corbicula fluminea*), zebra mussels (*Dreissena polymorpha*), and Chinese mystery snail (*Cipangopaludina chinensis*). As of 2019, 18 Adirondack lakes are known to be invaded by one or more of these target small-bodied aquatic invasive animals (Map 2).

- [Fishhook waterflea \(NYS Threat Ranking Assessment Score = Very High\)](#) is an invasive zooplankton that can alter the composition, structure, and function of the ecosystem by outcompeting native zooplankton and juvenile fish. They were first documented in Lake Champlain in 2018. There were no new reports of this species in 2019.
- [Zebra mussel \(NYS Threat Ranking Assessment Score = Very High\)](#) is a filter-feeding freshwater mollusk that displaces native species, attaches to and covers surfaces, and has sharp shells that are a nuisance to lake users. The majority of waterbodies in the region currently do not have sufficient calcium levels to support large populations of zebra mussels. They are only known to be present in two lakes in the PRISM, Lake Champlain and Lake George. There were no new reports of this species in 2019.
- [Chinese mystery snail \(NYS Threat Ranking Assessment Score = Very High\)](#) is a large snail that quickly reproduces and has the potential to decrease native snail populations and change water chemistry. They are known to be present in ten lakes in the PRISM. There were no new reports of this species in 2019.
- [Spiny waterflea \(NYS Threat Ranking Assessment Score = Very High\)](#) is a macro-zooplankton that can reproduce rapidly through asexual reproduction and compete directly with juvenile fish and native zooplankton for food. Its long spines also easily attach to fishing lines creating a nuisance for anglers. They are known to be present in nine lakes in the PRISM. There were no new reports of this species in 2019.
- [Asian clam \(NYS Threat Ranking Assessment Score = High\)](#) is a filter-feeding freshwater mollusk that displaces native species, alters the food chain, and may cause algae blooms. It is also a bio-fouler, clogging industrial and commercial water systems. They are known to be present in one lake in the PRISM; Lake George. There were no new reports of this species in 2019.



Small-bodied Aquatic Invasive Animal Identification Training – Darrin Fresh Water Institute, Bolton Landing.

Terrestrial Invasive Plants

The Terrestrial Project surveys for twenty-four target terrestrial invasive plants known to be present in the PRISM based on their high or very high PRISM invasiveness rankings: knotweed species (*Reynoutria spp.*), autumn olive (*Elaeagnus umbellata*), common reed grass (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), Japanese barberry (*Berberis thunbergii*), black swallow-wort (*Cynanchum louiseae*), multiflora rose (*Rosa multiflora*), pale swallow-wort (*Cynanchum rossicum*), oriental bittersweet (*Celastrus orbiculatus*), bush honeysuckles (*Lonicera spp.*), garlic mustard (*Alliaria petiolata*), Norway maple (*Acer platanoides*), winged burning bush (*Euonymus alatus*), common buckthorn (*Rhamnus cathartica*), scotch broom (*Cytisus scoparius*), cup plant (*Silphium perfoliatum*), reed canary grass (*Phalaris arundinacea*), tree-of-heaven (*Ailanthus altissima*), yellow iris (*Iris pseudacorus*), glossy buckthorn (*Frangula alnus*), lesser celandine (*Ficaria verna*) and giant hogweed (*Heracleum mantegazzianum*). As of 2019, there are 5,489 mapped infestations of these plants in the PRISM (Map 3).

- [Knotweed species \(PRISM Invasiveness Ranking = Very High\)](#) are large bamboo-like perennials that grow vigorously and quickly out-compete native species for space and resources. These plants readily invade riparian areas, cultivated lands, yards, and roadsides. There are currently 1,321 documented infestations of these plants within the PRISM. One-hundred ninety-nine new infestations of this plant were documented in 2019.
- [Autumn olive \(PRISM Invasiveness Ranking = Very High\)](#) is a large, spiny, deciduous shrub that can reach 20 feet in height and produces bright red berries that are readily consumed by birds and other animals, allowing it to spread long distances. It can form a dense layer of understory vegetation that crowds out native plants and impedes tree seedling recruitment. It readily invades areas of disturbance such as roadsides, grasslands, fields, and forest edges/openings. There are currently 39 documented infestations of this plant within the PRISM. Eighteen new infestations of this plant were documented in 2019.
- [Common reed grass \(PRISM Invasiveness Ranking = Very High\)](#) is a large perennial grass that aggressively invades wetlands, outcompetes native vegetation and forms dense thickets that have little value to wildlife. It readily invades wetlands, cultivated areas, and drainage ditches. There are currently 1,679 documented infestations of this plant within the PRISM. One-hundred thirty-seven new infestations of this plant were documented in 2019.
- [Purple loosestrife \(PRISM Invasiveness Ranking = Very High\)](#) is an herbaceous perennial that invades wetlands, produces millions of seeds each year, and outcompetes surrounding native plants. It readily invades wetlands, cultivated areas, and drainage ditches. There are currently 667 documented infestations of this plant within the PRISM. Eighty-two new infestations of this plant were documented in 2019.
- [Japanese barberry \(PRISM Invasiveness Ranking = Very High\)](#) is a spiny herbaceous shrub that is commonly planted as an ornamental and escapes into natural areas via bird dispersed seeds. It can dominate the forest understory, especially in areas with high deer densities, outcompetes native plants, and improves tick habitat. It readily invades forest understories, riparian corridors, roadsides, and grasslands. There are currently 59 documented infestations of this plant within the PRISM. Fourteen new infestations of this plant were documented in 2019.
- [Black swallow-wort \(PRISM Invasiveness Ranking = Very High\)](#) is a perennial herbaceous vine that forms dense mats that can smother native vegetation. It readily invades riparian areas,

grasslands and fields, forest edges and understories, and roadsides. There are currently 54 documented infestations of this plant within the PRISM. Nine new infestations of this plant were documented in 2019.

- [Multiflora rose \(PRISM Invasiveness Ranking = High\)](#) is a spiny, perennial shrub that can reach 15 feet in height. Infestations can become dense and shade out native plants. It readily invades roadsides, riparian corridors, grasslands, forest edges and canopy openings. There are currently 18 documented infestations of this plant within the PRISM. Six new infestations of this plant were documented in 2019.
- [Pale swallow-wort \(PRISM Invasiveness Ranking = High\)](#) is a perennial herbaceous vine that forms dense mats which smother native vegetation. It readily invades forested wetlands and riparian areas, cultivated lands, grasslands and fields, forest edges and understories, and roadsides. There are currently two documented infestations of this plant within the PRISM. One new infestation of this plant was documented in 2019.
- [Oriental bittersweet \(PRISM Invasiveness Ranking = Very High\)](#) is a perennial woody vine that can form dense mats which shade out low growing vegetation and climb into the forest canopy, girdling trees and blocking sunlight. It readily invades forested wetlands and riparian areas, cultivated lands, grasslands and fields, forests, and roadsides. There are currently 84 documented infestations of this plant within the PRISM. Twenty-eight new infestations of this plant were documented in 2019.
- [Lesser celandine \(PRISM Invasiveness Ranking = High\)](#) is a low growing flowering perennial that forms dense monocultures that crowd out native vegetation. It readily invades wetlands and open riparian corridors. There are currently ten documented infestations of this plant within the PRISM. Six new infestations of this plant were documented in 2019.
- [Bush honeysuckle species \(PRISM Invasiveness Ranking = Very High\)](#) are deciduous shrubs that can reach 20 feet in height and invade forest edges and openings. Infestations can become dense, shading out native plants and promoting tick habitat. These plants readily invade roadsides, grasslands, forest edges, and canopy openings. There are currently 181 documented infestations of these plants within the PRISM. Seventy-eight new infestations of these plants were documented in 2019.
- [Garlic mustard \(PRISM Invasiveness Ranking = Very High\)](#) is an herbaceous biennial that outcompetes native understory plants through allelopathy. It readily invades areas of disturbance such as campgrounds, trailheads, and roadsides and slowly expands into the surrounding forest understory. There are currently 893 documented infestations of this plant within the PRISM. Thirty-three new infestations of this plant were documented in 2019.
- [Norway maple \(PRISM Invasiveness Ranking = Very High\)](#) is a deciduous tree that averages 50 feet in height and establishes in forests via wind dispersed seed. Infestations can become dense and shade out native plants. It readily invades forests, riparian corridors, roadsides, and forested wetlands. There are currently 11 documented infestations of this plant within the PRISM. Two new infestations of this plant were documented in 2019.
- [Winged burning bush \(PRISM Invasiveness Ranking = Very High\)](#) is a deciduous shrub that can reach 20 feet in height and escapes into natural areas via bird dispersed seeds. Infestations can become dense and outcompete native plants. It readily invades roadsides, riparian corridors, and forest understories. There are currently 19 documented infestations of this plant within the PRISM. Nine new infestations of this plant were documented in 2019.

- [Common buckthorn \(PRISM Invasiveness Ranking = Very High\)](#) is a deciduous shrub or small tree that can exceed 20 feet in height. It produces small glossy, black berries that are dispersed long distances by birds. Infestations can become dense and shade out native plants. It readily invades areas of disturbance such as roadsides, grasslands, forest edges and canopy openings. There are currently 28 documented infestations of this plant within the PRISM; however, this species is likely underrepresented in APIPP's database. Eighteen new infestations of this plant were documented in 2019.
- [Scotch broom \(PRISM Invasiveness Ranking = High\)](#) is a perennial shrub that invades fields, forest edges, roadsides, and canopy openings. It can form dense stands that crowd out native species and degrade wildlife habitat. There is currently only one documented infestation of this plant within the PRISM. There were no new infestations of this plant documented in 2019.
- [Cup plant \(PRISM Invasiveness Ranking = High\)](#) is an herbaceous perennial in the sunflower family that produces copious amounts of seed allowing it to form dense monocultures and outcompete native plants. It readily invades riparian corridors, wet meadows, open forested wetlands, and drainage ditches. There are currently 49 documented infestations of this plant within the PRISM. Five new infestations of this plant were documented in 2019.
- [Reed canary grass \(PRISM Invasiveness Ranking = High\)](#) is a perennial grass that grows up to 5 feet tall. It spreads through abundant seed production and vegetative expansion via rhizomes. It readily invades moist sites where it crowds out native vegetation. There are currently 109 documented infestations of reed canary grass within the PRISM. One-hundred three new infestations of this plant were documented in 2019.
- [Tree-of-heaven \(PRISM Invasiveness Ranking = High\)](#) is a deciduous tree that can reach 80 feet in height, forming thick stands that crowd out native plant species. There are currently two documented infestations of tree-of-heaven in the PRISM. There were no new infestations of this plant documented in 2019.
- [Yellow iris \(PRISM Invasiveness Ranking = High\)](#) is an invasive ornamental perennial that can form dense monocultures which crowd out native plants. It readily invades riparian corridors, the shores of lakes and ponds, wetlands, and drainage ditches. There are currently 212 documented infestations of this plant within the PRISM. Twenty-two new infestations of this plant were documented in 2019.
- [Glossy buckthorn \(PRISM Invasiveness Ranking = High\)](#) is a deciduous shrub or small tree that can exceed 20 feet in height. Much like common buckthorn, it produces small glossy, black berries that are dispersed long distances by birds. Dense infestations shade out native plants and can impact forest regeneration. It readily invades areas of disturbance such as roadsides, grasslands, forest edges and canopy openings. Six infestations of this plant were documented in 2019.
- [Giant hogweed \(PRISM Invasiveness Ranking = High\)](#) is a large herbaceous biennial that can reach 15 feet in height and contains phytotoxic sap that can cause severe skin burns upon contact. It readily invades drainage ditches, grasslands/fields, and yards. There are currently 16 documented infestations of this plant within the PRISM. There were no new infestations of this plant documented in 2019.
- [Japanese angelica tree \(PRISM Invasiveness Ranking = Very High\)](#) is a fast-growing deciduous tree that can exceed 40-feet in height. It spreads easily from ornamental plantings via animal dispersed seed, forming dense monocultures that exclude native vegetation. The first infestation of this species within the PRISM was documented in 2019.

- [Mile-a-minute \(PRISM Invasiveness Ranking = Very High\)](#) is an herbaceous vine that, as its name suggests, grows at astonishing rates - 6 inches per day under ideal conditions. It forms dense mats that cover and shade out lower growing vegetation. The first four infestations of this species within the PRISM were documented in 2019.

Terrestrial Invasive Animals

The Terrestrial Project surveys for three target terrestrial invasive animals known to be present in the PRISM, based on their high or very high NYS invasiveness rankings: emerald ash borer (*Agrilus planipennis*), hemlock woolly adelgid (*Adelges tsugae*) and sirex woodwasp (*Sirex noctilio*). As of 2019, there are two mapped infestations of these animals in the PRISM (Map 3).

- [Emerald ash borer \(NYS Threat Ranking Assessment Score = Very High\)](#) is a small emerald green beetle that is extremely destructive to ash trees in the *Fraxinus* genus. Extensive larval feeding activity cuts off nutrients and water flow throughout the tree, causing mortality. Emerald ash borer was confirmed in the PRISM for the first time in 2017 in northern Franklin County. One new infestation of this species was documented in 2019 in the Town of Bombay.
- [Hemlock woolly adelgid \(NYS Threat Ranking Assessment Score = High\)](#) is a small insect that inserts its piercing-sucking mouthpiece into the twig tissue near the base of hemlock needles. The hemlock tree responds by walling off the wound. When this compartmentalization action is repeated on a large scale in response to heavy adelgid infestation, nutrient and water flow is cut off within the tree, resulting in rapid mortality. The first infestation of hemlock woolly adelgid in the Adirondack PRISM was confirmed on Prospect Mountain near Lake George in 2017. There were no new infestations of this species documented in 2019.
- [Sirex wood wasp \(NYS Threat Ranking Assessment Score = High\)](#) is a pest of a wide variety of pine species and causes damage by laying its eggs underneath the bark of the host tree. Upon oviposition, the insect may also deposit a fungus that serves as a food source for its larvae but is toxic to the host tree. Comprehensive surveys for sirex woodwasp have not been completed, but the insect is presumed to be widespread in the PRISM.

Watched Species – Potential Threats

This section describes high-priority species threats approaching the Adirondack PRISM.

Aquatic Invasive Plants

The Aquatic Project remains vigilant for one aquatic invasive plant that is present in NYS but has not yet been documented in the PRISM, and it has a very high PRISM invasiveness ranking: hydrilla (*Hydrilla verticillata*).

- [Hydrilla \(PRISM Invasiveness Ranking = Very High\)](#) is a submerged aquatic plant that can quickly form an impenetrable mat that completely clogs waterways and restricts water flow, posing significant threats to aquatic ecosystems and recreational resources. Hydrilla was first discovered in 2008 in a small pond in Orange County and has since been discovered in Broome, Cayuga, Erie, Kings, Monroe, Nassau, Niagara, Suffolk, Tioga, Tompkins, and Westchester Counties.

Small-bodied Aquatic Invasive Animals

The Aquatic Project remains vigilant for two small-bodied aquatic invasive animals that are present in NYS but have not yet been documented in the PRISM, and have high or very high NYS invasiveness rankings: rusty crayfish (*Orconectes rusticus*) and quagga mussel (*Dreissena rostriformis bugensis*).

- [Quagga mussel \(NYS Threat Ranking Assessment Score = Very High\)](#) is an invasive freshwater mussel that is an extremely efficient filter feeder, outcompeting native species for food. It also clogs water intake pipes and underwater screens. Quagga mussels were first reported in the Great Lakes in 1989 and have since been documented in multiple waterways including the Erie Canal, the St. Lawrence River, the Hudson River, Oneida Lake, and eight of the Finger Lakes.
- [Rusty crayfish \(NYS Threat Ranking Assessment Score = High\)](#) is an invasive crayfish that displaces native crustaceans and reduces native aquatic plant abundance and diversity. It is widespread throughout much of southern and central New York State.



AIS Early Detection Team Survey – East Caroga Lake, Fulton County.

Terrestrial Invasive Plants

The Terrestrial Project remains vigilant for four terrestrial invasive plants that are present in NYS but have not yet been documented in the PRISM, and have high or very high PRISM invasiveness rankings: slender falsebrome (*Brachypodium sylvaticum*), wineberry (*Rubus phoenicolasius*), Japanese stiltgrass (*Microstegium vimineum*), and porcelain berry (*Ampelopsis brevipedunculata*).

- [Slender false brome \(PRISM Invasiveness Ranking = Very High\)](#) is a perennial bunchgrass that grows up to 2.5 feet tall in dense clumps that outcompete native vegetation. Plants produce an ample quantity of seed that can be spread long distances by animals and humans. It is currently known to occur in several central and western NYS counties, with additional isolated infestations in Dutchess County.
- [Wineberry \(PRISM Invasiveness Ranking = Very High\)](#) is a spiny shrub in the raspberry family that quickly grows into dense thickets that exclude native vegetation. It is widespread in southern NYS, with isolated infestations in Niagara, Wayne, Tompkins, Schoharie, Albany and Saratoga Counties.

- [Japanese stiltgrass \(PRISM Invasiveness Ranking = Very High\)](#) is a low growing annual grass that readily invades areas of disturbance such as trailheads, recreation areas, and roadsides. The invasiveness of Japanese stiltgrass is exacerbated in areas with high deer densities where it grows in very dense mats that crowd and shade out native vegetation. Japanese stiltgrass is currently widespread throughout most of southern NYS. It is widespread across much of southern, central and western NYS. Several infestations are located in close proximity to the Adirondack PRISM boundary in Saratoga County.
- [Porcelain berry \(PRISM Invasiveness Ranking = High\)](#) is a climbing woody vine that forms dense mats that climb into the forest canopy, shading out native vegetation. It is widespread throughout most of southern NYS, with isolated infestations in Schuyler, Cayuga, Tompkins, St. Lawrence, Rensselaer and Saratoga Counties.



Porcelain berry has not yet been detected with the APIPP PRISM; however, it was mapped and treated nearby in the SLELO PRISM in 2019. It is a top early detection priority.

Terrestrial Invasive Animals

The Terrestrial Project remains vigilant for two terrestrial invasive animals that are present in NYS but have not yet been documented in the PRISM; these have high or very high NYS invasiveness rankings: Eurasian Boar (*Sus scrofa*) and Asian long-horned beetle (*Anoplophora glabripennis*).

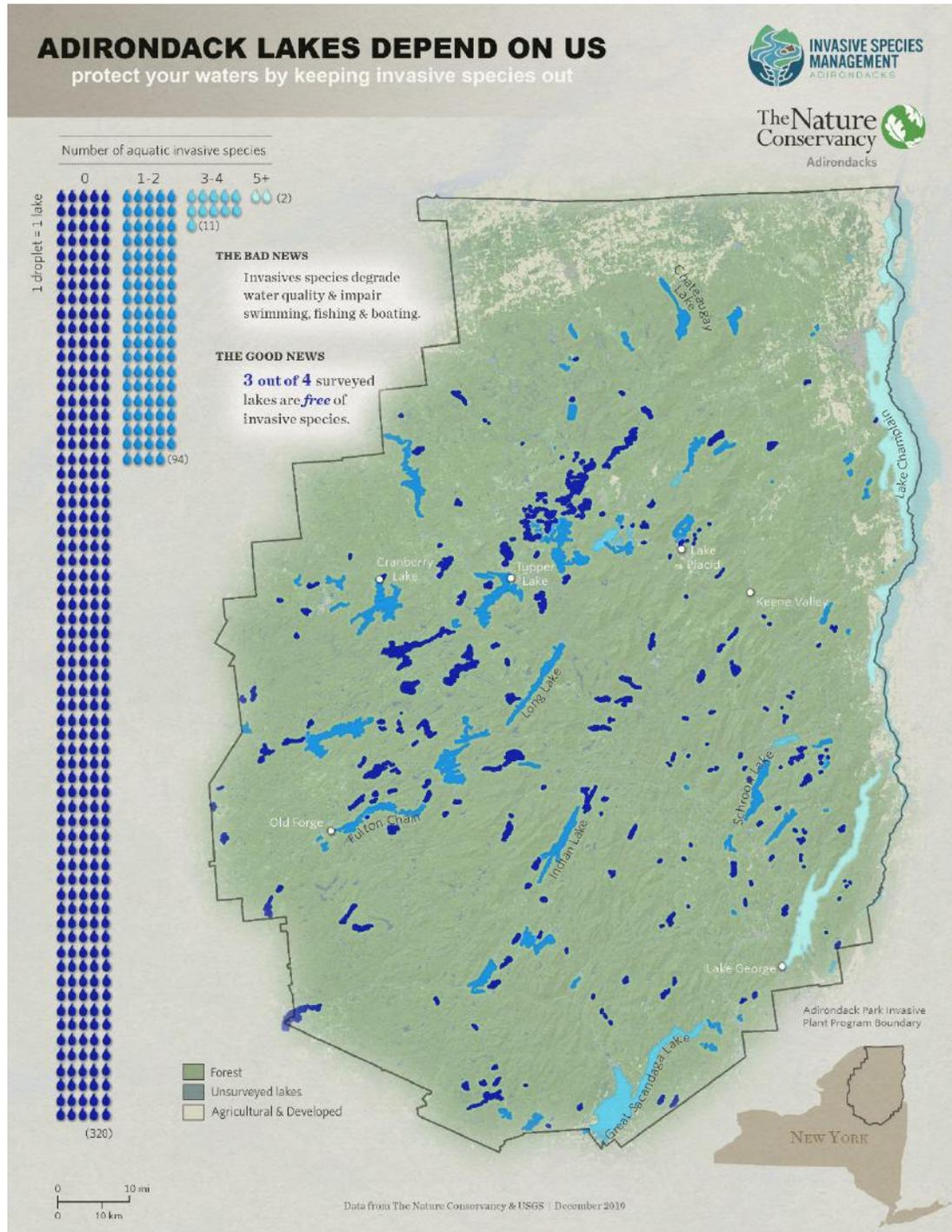
- [Eurasian boar \(NYS Threat Ranking Assessment Score = Very High\)](#) is an aggressive wild pig species that can be extremely destructive to fields and agricultural areas. Eurasian boar compete with native wildlife for food and habitat and are known to carry numerous diseases. They were previously known to occur in six counties across NYS, including an infestation within the PRISM in Clinton County. All historic infestations within the PRISM have been deemed locally eradicated.
- [Asian long-horned beetle \(NYS Threat Ranking Assessment Score = High\)](#) is a large beetle that attacks a wide suite of hardwood trees. Adult beetles lay their eggs underneath the bark and when the larvae hatch, they feed on the cambium and heartwood, girdling and killing the tree. Asian long-horned beetle is [present in NYS](#) on Long Island.

Regional Invasive Species Distribution

This section describes the known distribution of target invasive species in the PRISM.

Aquatic Invasive Species (AIS)

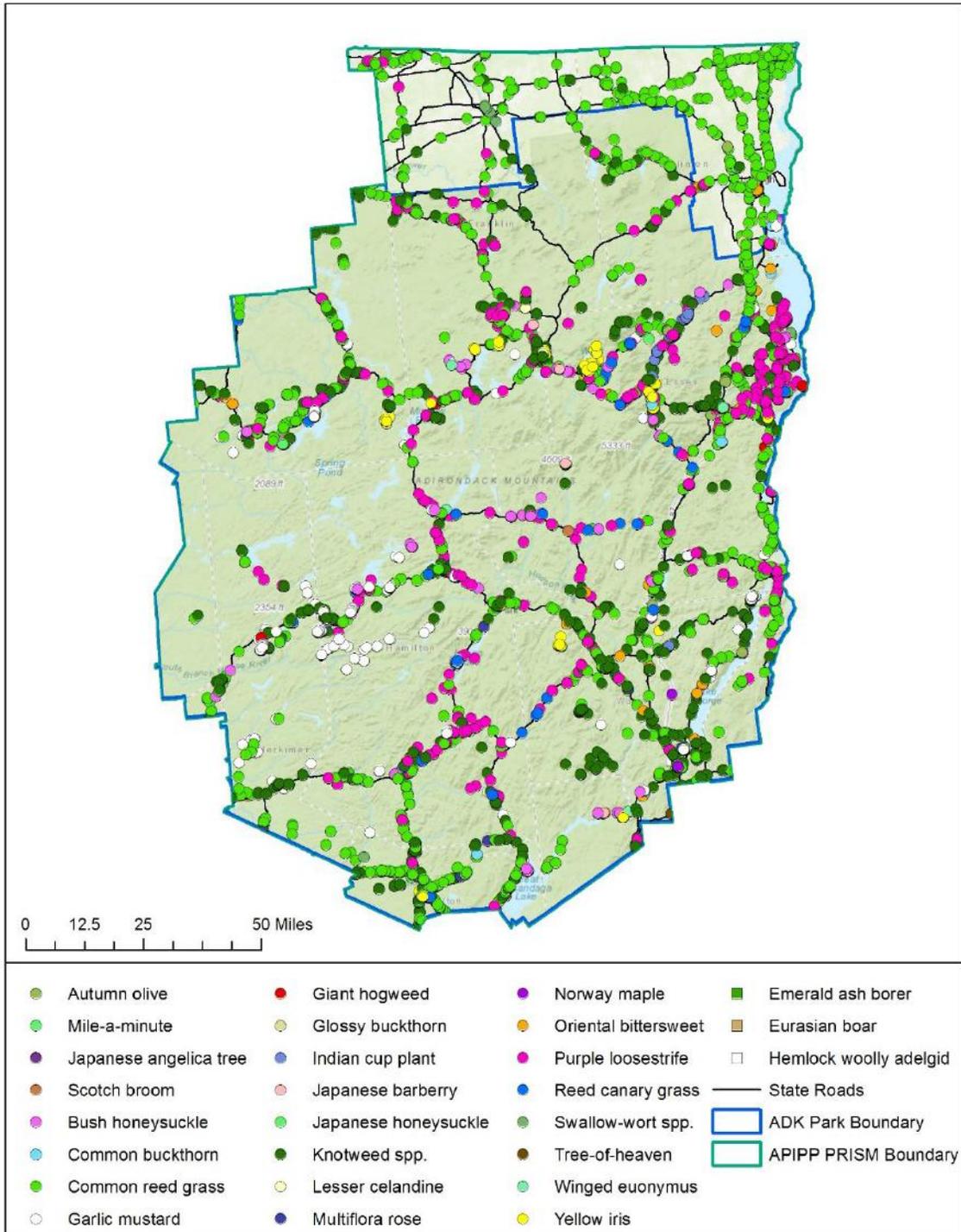
- In 18 seasons, more than 853 APIPP volunteers and response team members surveyed 427 distinct Adirondack waterways, finding 107 to contain one or more target AIS with 320 free of AIS (Map 2).



Map 2. Distribution and number of AIS in the Adirondack PRISM.

Terrestrial Invasive Species

- A total of 5,493 target terrestrial invasive species infestations have been mapped spatially as of 2019 (Map 3).



Map 3. Distribution of target terrestrial invasive species in the Adirondack PRISM.

To view additional invasive species distribution information for the Adirondack PRISM, please visit www.nyimainvasives.org.

Surveillance

This section describes efforts by APIPP staff and partners to detect new infestations of target and watched species

Aquatic Invasive Plants

2019 marked the eighteenth season in which the Aquatic Project coordinated regional aquatic invasive plant surveillance activities. Eighty-four volunteers and four early detection team members surveyed 95 Adirondack waterways for aquatic invasive species (Figure 1). Since 2002, the program has retained on, average 94, core volunteers and recruited 47 new volunteers each year (Figure 2). Through these combined surveillance efforts, two newly invaded lakes were documented in 2019, Rockwood Lake and Utowana Lake.

- Utowana Lake (Hamilton County) - A single variable-leaf watermilfoil plant was found and removed by the lake steward of Blue Mountain Lake. Utowana Lake is upstream of established infestations of variable-leaf watermilfoil in the Marion River and Raquette Lake which was documented to be infested by variable-leaf watermilfoil in 2006. The plant was found near the dam and the hand launch where many non-motorized boaters portage from the infested waters of the Marion River into Utowana Lake. APIPP's early detection team completed an extensive survey of the lake following the report and no additional variable-leaf watermilfoil plants were found.
- Rockwood Lake (Fulton County) - An established infestation of variable-leaf watermilfoil was confirmed by an APIPP volunteer in 2019. Rockwood Lake is downstream of Peck Lake which had variable-leaf watermilfoil documented in 2015.

Small-bodied Aquatic Invasive Animals

2019 marked the seventh season in which the Aquatic Project coordinated regional small-bodied aquatic invasive animal surveillance activities. APIPP's AIS early detection team, staff, and partners conducted zooplankton tows in the deep areas on 46 prioritized lakes and sediment sieves in 36 lakes containing sandy areas with no new infestations of small-bodied aquatic invasive animals discovered. The year 2019 also marked the eighth season of the lake-wide Asian clam survey conducted by the Lake George Park Commission (LGPC) and volunteers on Lake George. Three new discrete sites were confirmed in summer 2019, bringing the total number of invaded sites in Lake George to 27.

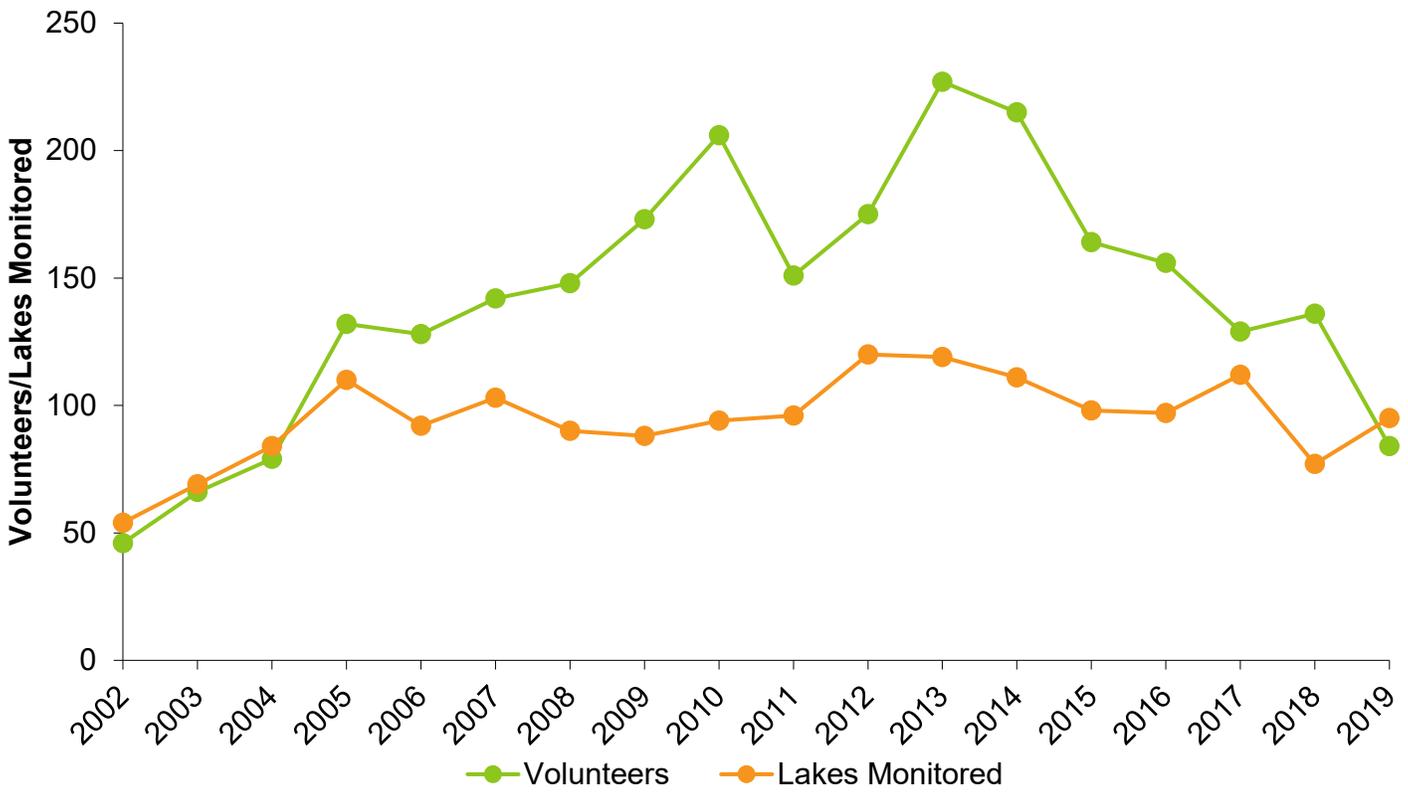


Figure 1. Number of lakes surveyed, and aquatic project volunteers engaged annually.

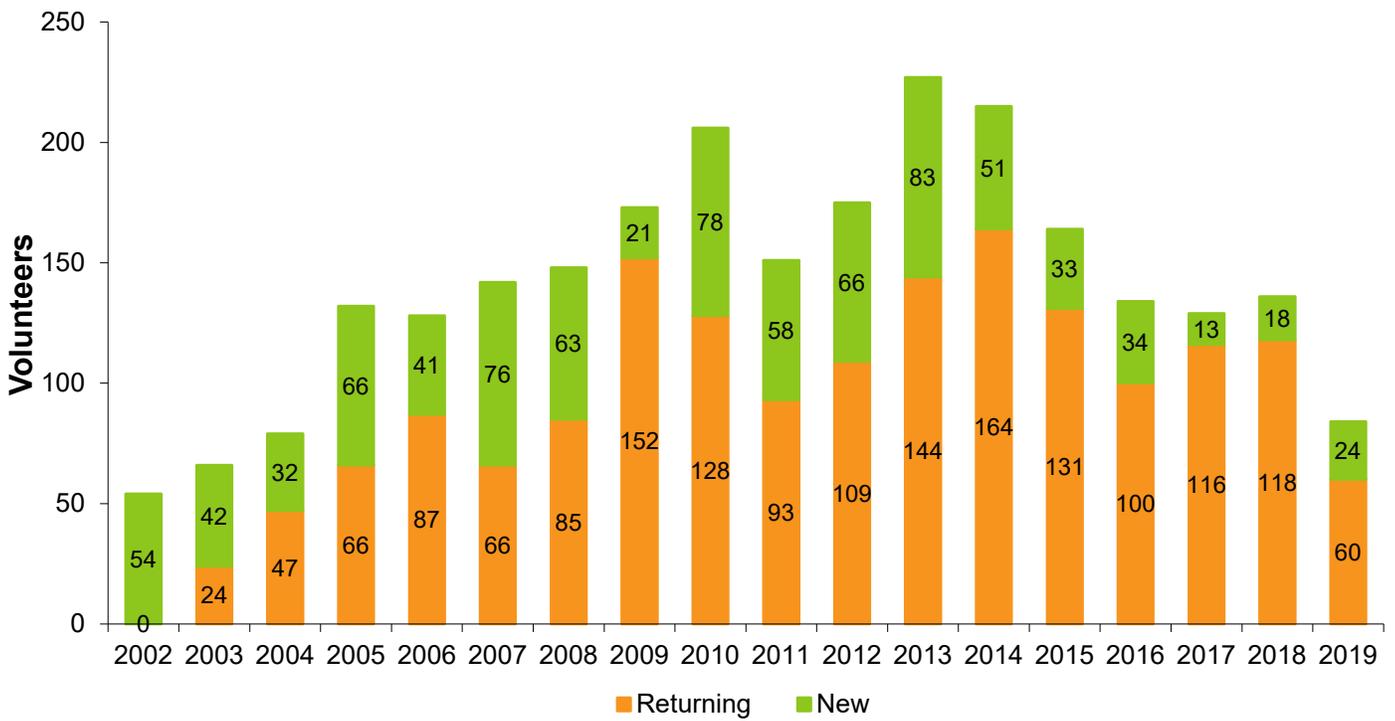


Figure 2. Number of new and returning aquatic surveillance volunteers annually.

Terrestrial Invasive Plants

2019 marked the ninth season in which the Terrestrial Project coordinated regional terrestrial invasive plant surveillance activities. APIPP's terrestrial response team, invasive species campground steward, staff and partners surveyed 39 NYS DEC campgrounds, 139 recreational access points (trailheads, boat launches, etc.), sections of 46 Forest Preserve units, and part or all of 45 state and county road corridors within the PRISM. The total number of new target terrestrial invasive plant infestations, confirmed through these surveillance activities, are listed below (Map 4). Five new infestations of two watched invasive plant species (mile-a-minute and Japanese angelica tree) were confirmed in 2019.

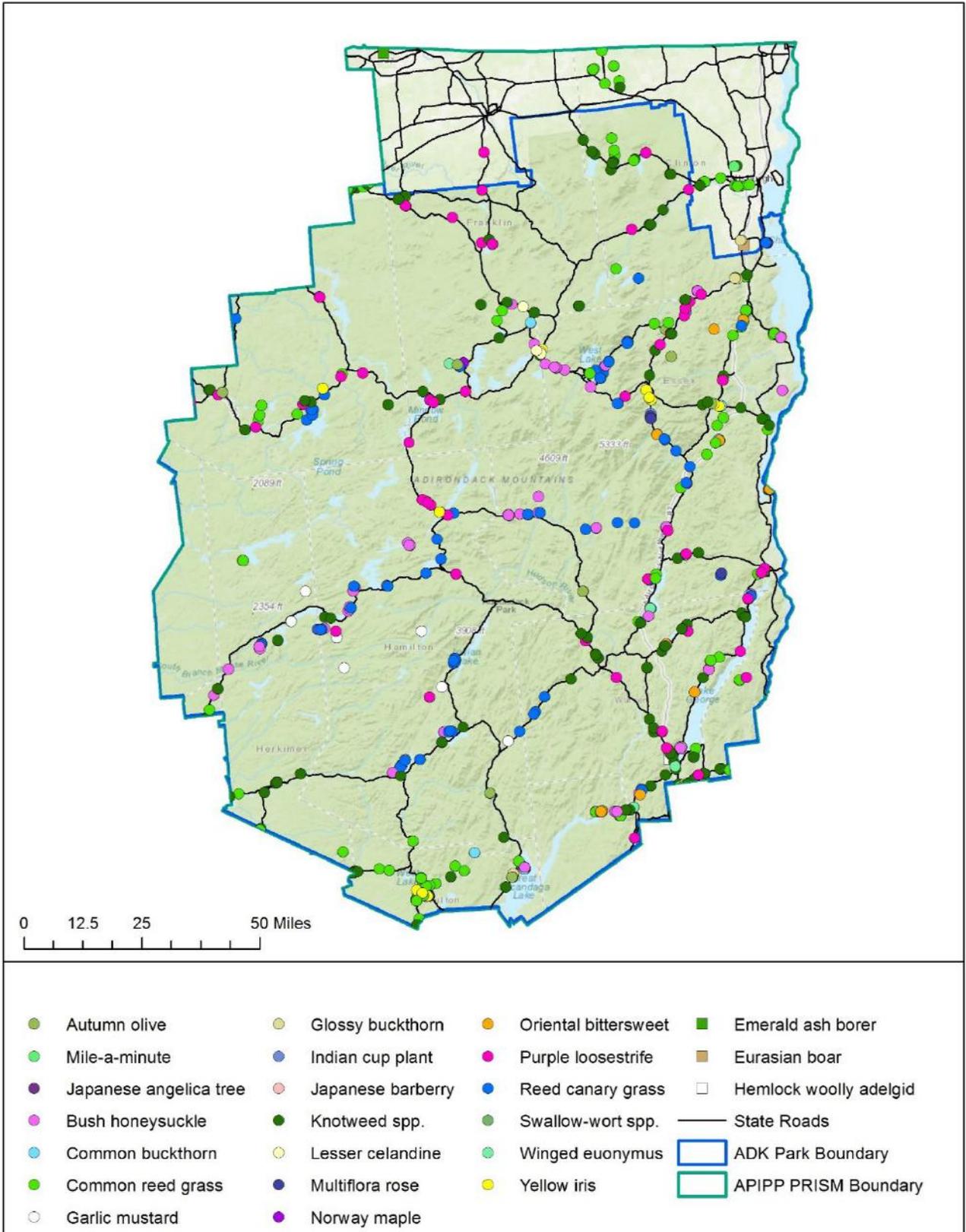
- Knotweed spp. – 199 infestations
- Common reed grass – 137 infestations
- Reed canary grass – 103 infestations
- Purple loosestrife – 82 infestations
- Bush honeysuckle – 78 infestations
- Garlic mustard – 33 infestations
- Oriental bittersweet – 28 infestations
- Yellow iris – 22 infestations
- Autumn olive – 18 infestations
- Common buckthorn – 18 infestations
- Japanese barberry – 14 infestations
- Black swallow-wort – 9 infestations
- Winged burning bush – 9 infestations
- Multiflora rose – 6 infestations
- Lesser celandine – 6 infestations
- Glossy buckthorn – 6 infestations
- Indian cup plant – 5 infestations
- Mile-a-minute – 4 infestations
- Norway maple – 2 infestations
- Pale swallow-wort – 1 infestation
- Japanese angelica tree – 1 infestation



APIPP's Invasive Species Management Steward, Julie Fogden, surveys an infestation of giant hogweed before mechanical treatment.

Terrestrial Invasive Animals

2019 marked the fifth season in which the Terrestrial Project coordinated with regional partners to train volunteers on forest pest identification, survey techniques and reporting. Volunteers, APIPP staff and partners surveyed approximately 15 forest areas for APIPP's target and watched invasive animals. No new infestations of target invasive animals were detected in 2019.



Map 4. Distribution of newly detected target terrestrial invasive species infestations in the Adirondack PRISM.

Management

This section describes efforts by APIPP staff and partners to eradicate or control priority infestations.

Aquatic Invasive Species

Rapid Response – The Aquatic Project mapped infestations of target AIS in 20 lakes in 2019. The majority of the infestations mapped were larger than 0.1 acres in size and were well-established populations. There were two instances of rapid response management in 2019.

- **Water Chestnut** – One infestation totaling .0016 acres was managed in Lake Alice (Clinton County) via hand pulling. This infestation was under 0.1 acres in size upon initial discovery in 2016.
- **Variable-leaf Watermilfoil** – A single plant was removed from Utowana Lake (Hamilton County) by the Blue Mountain Lake Steward.

Ongoing Management – Mechanical and manual management for target aquatic invasive species infestations is underway throughout the region by various partners. A list of waterbodies receiving ongoing management by species is provided below.

- **Eurasian watermilfoil** – Augur Lake, Brant Lake, Caroga Lake, Chateaugay Lake, Chazy Lake, Fish Creek Ponds, Hadlock Pond, Kiwassa Lake, Lake Colby, Lake George, Lake Luzerne, Loon Lake, Minerva Lake, Mountain View Lake, Paradox Lake, Schroon Lake, and Upper Saranac Lake
- **European frog-bit** – Wetlands connected to the Grasse River near Lampson Falls
- **Variable-leaf watermilfoil** – Fish Creek Ponds, Lake Placid, Long Lake, Raquette Lake, and Upper Saranac Lake
- **Water chestnut** – Hadlock Lake and Lake Champlain
- **Zebra mussels** – Lake George



Volunteers harvesting water chestnut in the South Bay of Lake Champlain.

Photo Credit: Fred Dunlap, DEC.

Terrestrial Invasive Species

The Terrestrial Project managed 773 infestations of 26 different terrestrial invasive species (Figure 3) in 2019 totaling 38.33 acres. Infestations ranged in size from 0.000001 to 7 acres. All infestations were treated with site- and species-specific best management practices using principles of integrated pest management. A summary of management activities for APIPP's priority species is provided below:



Figure 3. Count of terrestrial infestations managed in 2019 by species. *Other* includes all species with less than ten infestations managed.

Common reed grass – Two-hundred nineteen infestations were treated with herbicide, totaling 12.32 acres. Infestations ranged in size from 0.000001 - 1.04 acres.

Garlic mustard – One-hundred seventy infestations were managed mechanically via pulling or digging, totaling 1.63 acres. Infestations ranged in size from 0.000001 - 1.11 acres.

Knotweed spp. – One-hundred sixty-one infestations were treated with herbicide, totaling 4.68 acres. Infestations ranged in size from 0.000001 - 0.48 acres.

Purple loosestrife – One-hundred twenty-five infestations were managed. Forty-five were treated with herbicide, 79 were treated manually via digging or pulling and one received biocontrol agents. Managed sites totaled 8.04 acres and ranged in size from 0.000007 - 2.970914 acres.

Yellow iris – Thirty-six infestations were managed. Three were treated with herbicide and 33 were treated manually via digging, totaling 0.87 acres. Infestations ranged in size from 0.000011 - 0.33 acres.

Swallow-wort spp. – Eighteen infestations were managed. Sixteen were treated with herbicide and two were treated manually via digging, totaling 2.67 acres. Infestations ranged in size from 0.000004 - 1.4 acres.

Wild parsnip – Ten infestations were managed manually via digging, totaling 0.005 acres. Infestations ranged in size from 0.00004 – 0.004 acres.

Giant hogweed – Six infestations were managed mechanically via digging, totaling 0.086 acres. Infestations ranged in size from 0.00008 - 0.08 acres.

Mile-a-minute – Four infestations were managed. Two were treated with herbicide and two were managed manually via pulling, totaling 0.22 acres. Infestations ranged in size from 0.0002 - 0.19 acres.

Scotch broom – One infestation was treated manually via digging, totaling 0.17 acres.

Tree-of-heaven – One infestation was treated with herbicide, totaling 0.16 acres.

Hemlock woolly adelgid – In collaboration with the NYS DEC, the Terrestrial Project completed the third year of management for the first confirmed infestation of hemlock woolly adelgid in the

PRISM, located on Prospect Mountain near Lake George. APIPP and NYS DEC staff performed prophylactic basal bark insecticide applications on 87 trees over approximately seven acres to provide long-term protection against future invasion. No live adelgids were detected in 2019.

Other – The Terrestrial Project completed year four of mechanical management for several lower priority invasive plants—such as knapweed, sweetclover, etc.—growing along the Whiteface Mountain Veterans Memorial Highway. These species are not typically targeted by APIPP but are controlled at this site to protect populations of over ten rare, threatened, or endangered plants. The team removed 30 contractor bags of invasive plant material, a slight reduction from 2018.

APIPP’s terrestrial project hosted the Adirondacks first-ever WeedWrangle® as part of invasive species awareness week. Volunteers from the Adirondack Garden Club and members of the public assisted with mechanical management of bush honeysuckle, common buckthorn and Japanese barberry at The Nature Conservancy’s Boquet River Nature Preserve in Willsboro.



APIPP’s hosted the Adirondack’s first Weed Wrangle as part of Invasive Species Awareness Week. Photo Credit: © Erika Bailey (The Nature Conservancy).

Species Distribution & Management Trends

This section describes efforts by APIPP staff and partners to assess progress and evaluate success.

Aquatic Invasive Species Distribution Trend Analysis

- Approximately 75% of lakes and ponds surveyed by the Aquatic Project to-date are free of AIS (Figure 4).
- On average four Adirondack lakes are newly documented as being invaded by AIS each year.

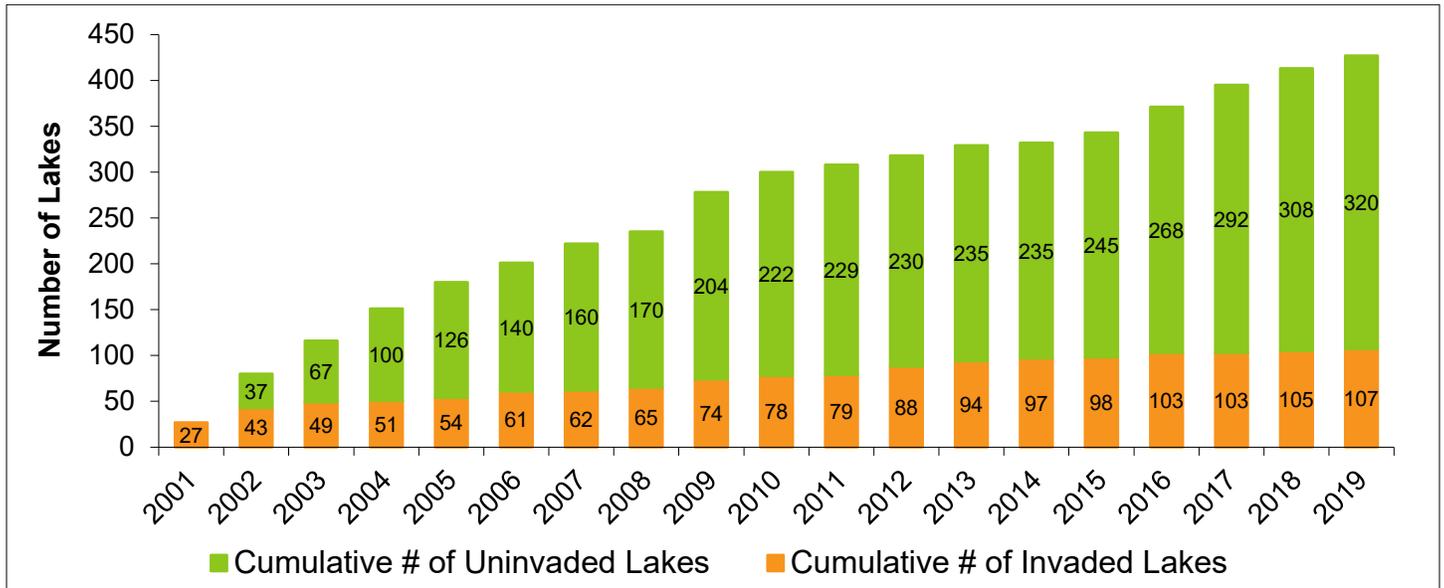


Figure 4. Cumulative number of lakes surveyed and confirmed to be invaded/uninvaded.

Aquatic Invasive Species Management Trend Analysis

Water chestnut

Since the beginning of the Aquatic Project's invasive plant mapping efforts, four water chestnut infestations have been identified within the PRISM, with two prioritized for management (Lake Alice and Loon Lake). In 2019, 66 water chestnut plants were removed from Lake Alice with no plants detected in Loon Lake for the second year in a row (Figure 5).

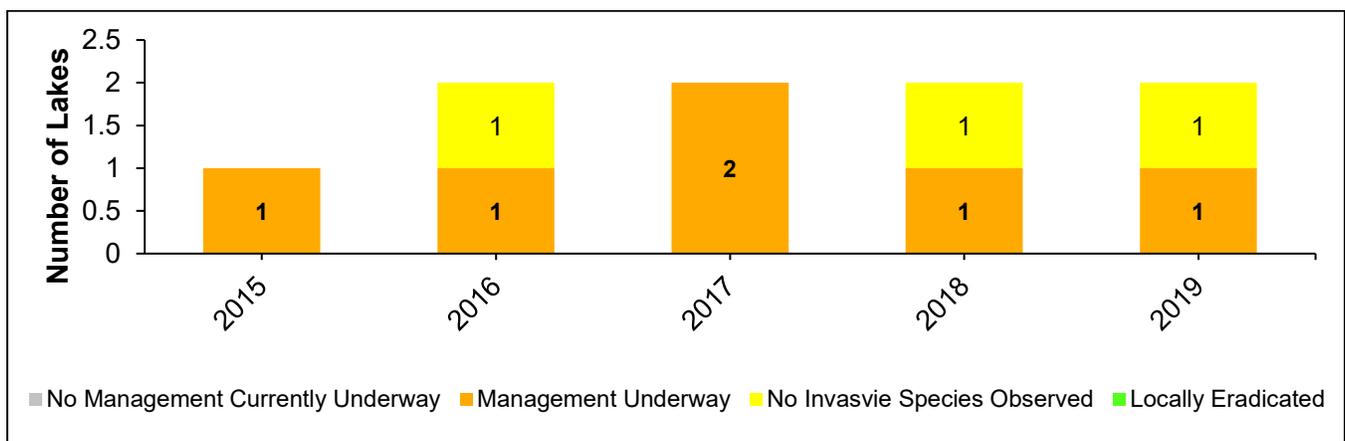


Figure 5. Progression of water chestnut management annually.

Terrestrial Invasive Species Management Trend Analysis

In 2019, APIPP advanced 23 priority terrestrial invasive species management projects addressing 12 species. The projects varied greatly in scale, scope and objective. Some projects focused on local eradication of species with a limited distribution, such as tree-of-heaven, scotch broom and mile-a-minute, while others focused on landscape level suppression of established species such as common reed grass and knotweed.

APIPP's 23 priority terrestrial invasive species management projects include over 2,820 distinct infestations (Figure 6). In total, 944 infestations (33%) were managed using site- and species-specific best management practices. An additional 484 sites (17%) had no invasive species observed upon follow-up survey, while 693 (25%) were deemed eradicated after progressing through at least three consecutive years of invasive species absence. Approximately 700 priority infestations (25%) require permits or permissions before management can begin.

75%

Percent of priority terrestrial invasive plant infestations are under active management or have been successfully removed.

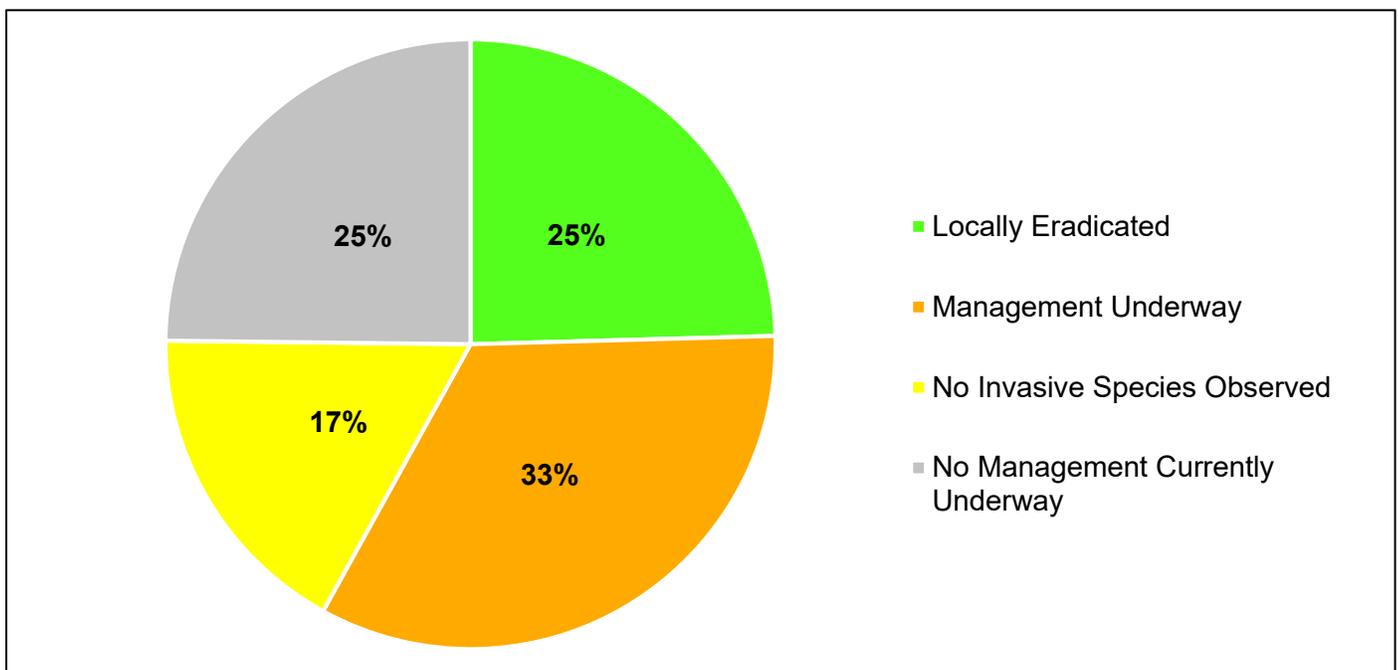


Figure 6. Summary of management status for all priority terrestrial invasive species infestations in 2019.

In total, 75% of APIPP's priority terrestrial invasive species infestations are currently under active management or have been successfully removed. Approximately 10.1 acres have been restored or is in the process of transitioning to native habitat.

The following section provides an overview terrestrial management projects that have been evaluated under APIPP's [priority setting process](#). Distribution trends and outcome monitoring data is provided by project for each species. Additional management projects will be included in future seasons as permissions are secured from landowners and as time and resources allow.

Common reed grass (common reed)

Ausable River Watershed Common Reed Grass Suppression



Common reed was first identified in the project area in 2010 and management efforts began the same year. In total, 127 common reed infestations have been mapped in the project area, with 87 prioritized for control by APIPP. The remaining 40 infestations are located in highly developed or residential areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project area increased quickly from 2010-2016 as APIPP’s survey effort and footprint increased, but has recently begun to plateau. Management efforts have also increased gradually since 2010, with 27 sites currently under active management.

Eighteen previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while ten additional infestations have had no invasive species for at least one year. In total, 32% of priority infestations are free of common reed and approximately 0.64 acres have been restored.

The suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

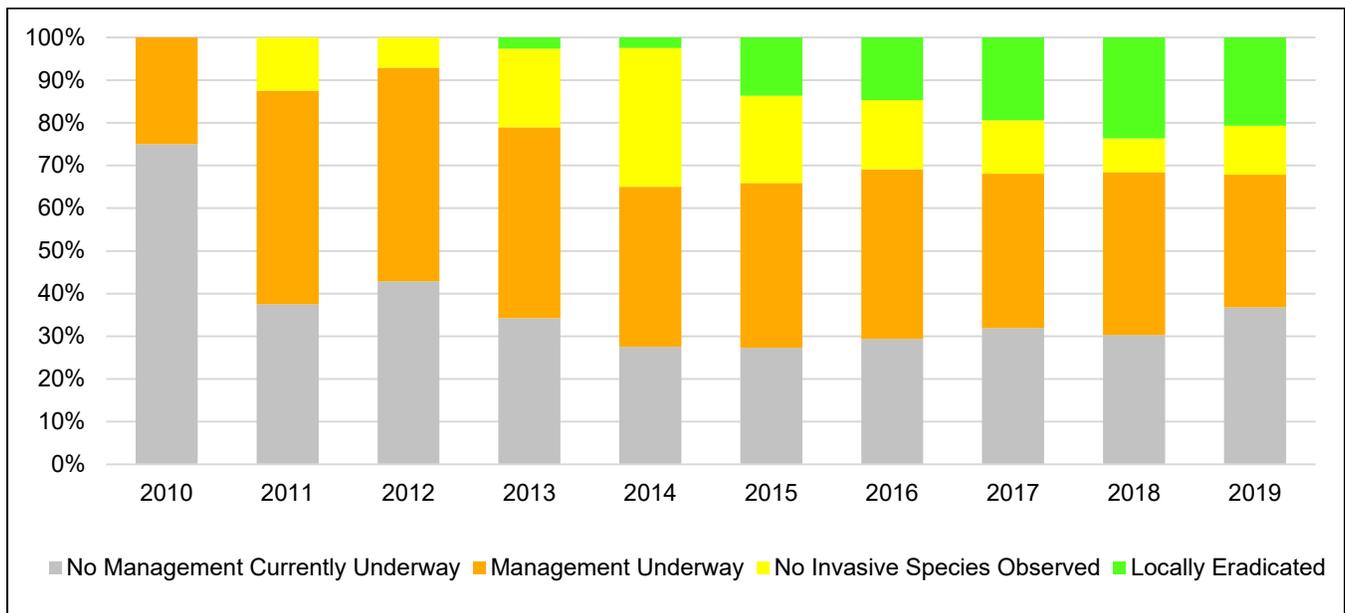
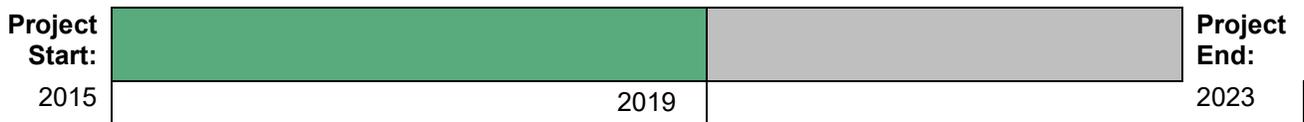


Figure 7. Annual management progress for the Ausable River Watershed Common Reed Grass Suppression Project (2010-2019).

Chateauguay-English Watershed Common Reed Grass Suppression



Common reed was first identified in the project area in 2015 and management efforts began the same year. In total, 71 common reed infestations have been mapped in the project area, with 28 prioritized for control by APIPP. The remaining 43 infestations are located in highly developed, residential, or agriculturally dominated areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased consistently from 2015, with an average of 11 new infestations identified each year. Management efforts have also increased slowly since 2015, with eight sites currently under active management.

One previously managed infestation has been deemed locally eradicated after having no common reed observed for at least three consecutive years, while two additional infestations have had no invasive species for at least one year. In total, only 11% of priority infestations are currently free of common reed and approximately 0.02 acres have been restored. However, compared to APIPP's other common reed control efforts, this is a relatively new project. The percentage of sites with no invasive plants observed is expected to increase significantly over the coming years as permissions or permits are obtained to control priority sites.

The suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

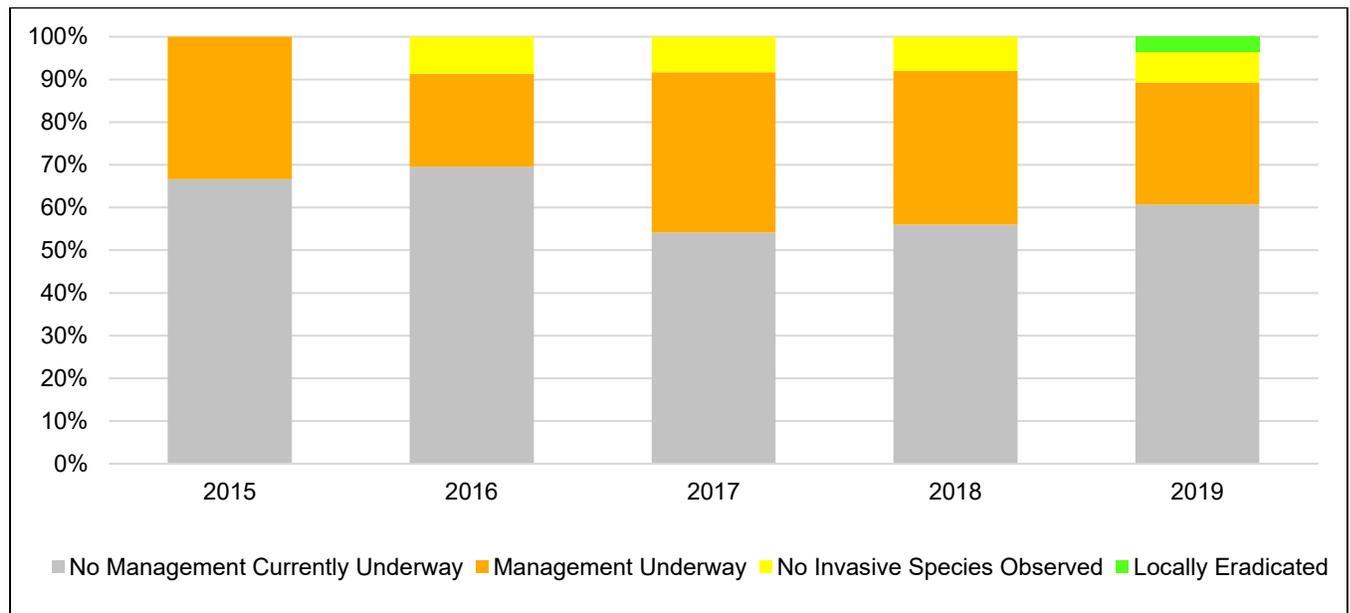
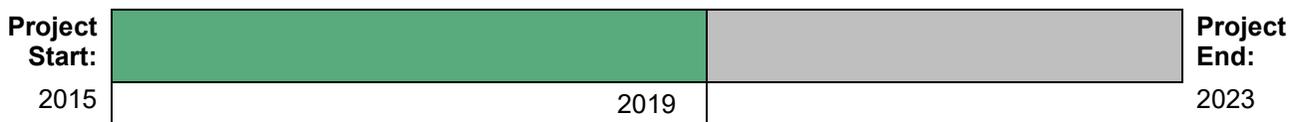


Figure 8. Annual management progress for the Chateauguay-English River Common Reed Grass Suppression Project (2015-2019).

Lake Champlain Watershed Common Reed Grass Suppression



Common reed was first identified in the project area in 2003, but management efforts did not begin until 2015. In total, 657 common reed infestations have been mapped in the project area, with 198 prioritized for control by APIPP. The remaining 459 infestations are located in highly developed, residential, or agriculturally dominated areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased consistently from 2015-2019, with an average of 76 new infestations identified each year. Management efforts have also increased slowly since 2015, with 67 sites currently under active management.

Two previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while eight additional infestations have had no invasive species for at least one year. In total, only 5% of priority infestations are currently free of common reed and approximately 0.78 acres have been restored. However, compared to APIPP’s other common reed control efforts, this is a relatively new project. The percentage of sites with no invasive plants observed is expected to increase significantly over the coming years as permissions or permits are obtained to control priority sites.

This suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

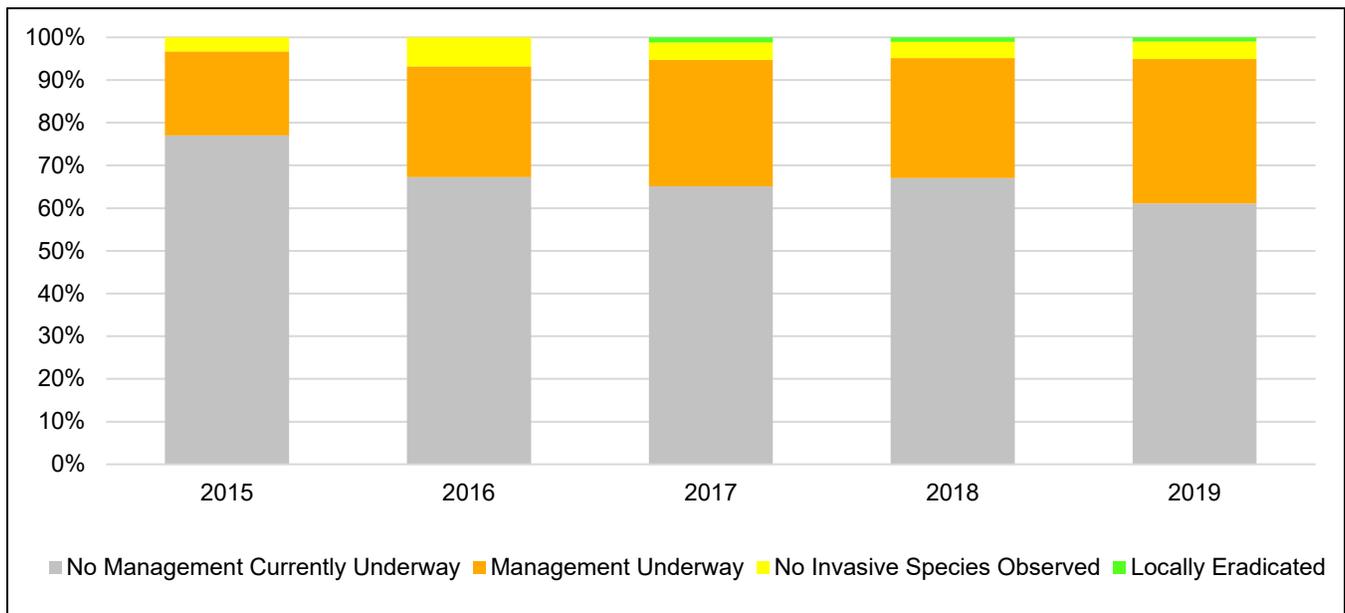
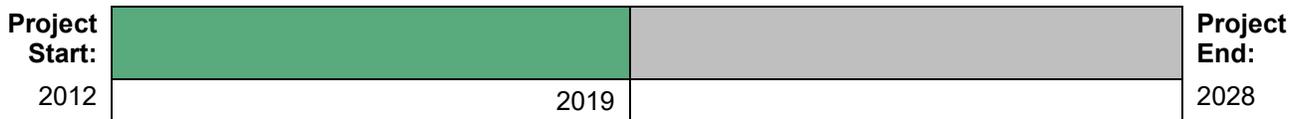


Figure 9. Annual management progress for the Lake Champlain Watershed Common Reed Grass Suppression Project (2015-2019).

Mohawk River Watershed Common Reed Grass Exclusion



Common reed was first identified in the project area in 2004, but management efforts did not begin until 2012. In total, 161 common reed infestations have been mapped in the project area, with 154 prioritized for control by APIPP. The remaining seven infestations are located in highly developed or residential areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased consistently from since 2012, with an average of 16 new infestations identified each year. No new infestations were mapped in 2019. Management efforts have also increased consistently since 2012, with 36 sites currently under active management.

Twenty-two previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while 20 additional infestations have had no invasive species for at least one year. In total, 27% of priority infestations are currently free of common reed and approximately 0.24 acres have been restored.

This exclusion project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

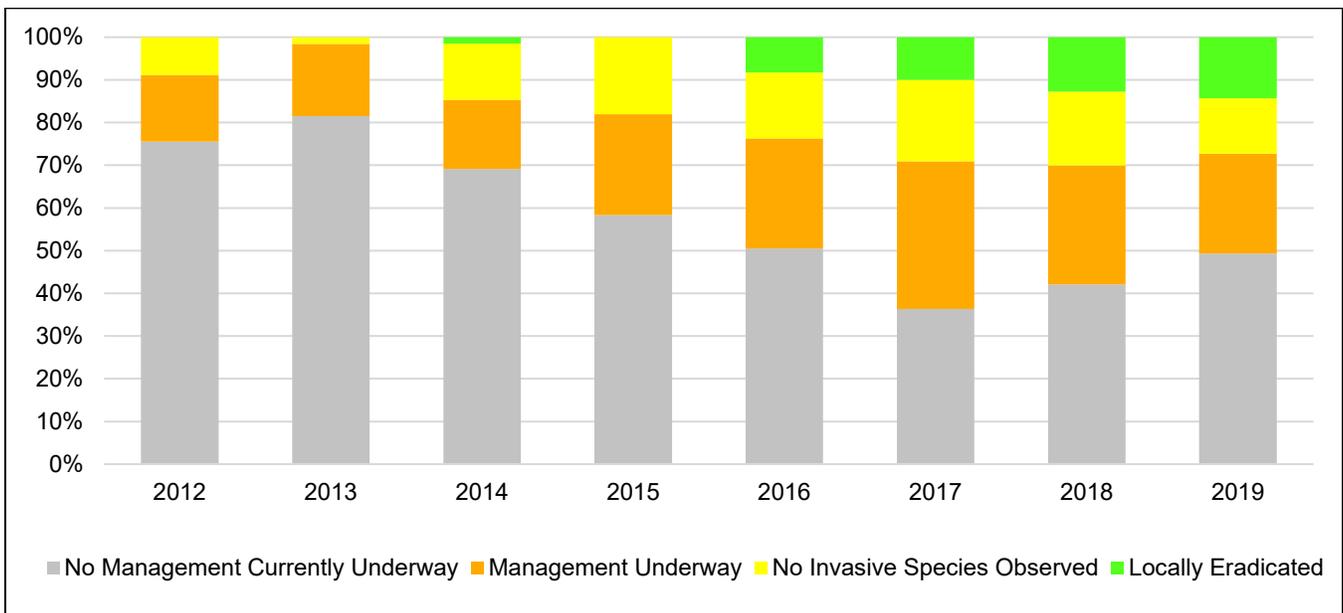
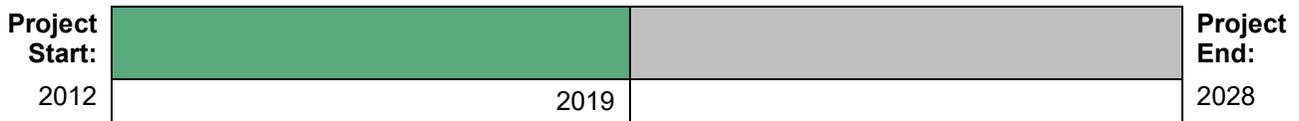


Figure 10. Annual management progress for the Mohawk River Watershed Common Reed Grass Exclusion Project (2012-2019).

Northeastern Lake Ontario Watershed Common Reed Grass Exclusion



Common reed was first identified in the project area in 2000, but management efforts did not begin until 2012. In total, 36 common reed infestations have been mapped in the project area and all are prioritized for control by APIPP. The total number of infestations in the project has increased slowly from 2012, with an average of three new infestations identified each year. Management efforts have also increased steadily since 2012, with seven sites currently under active management.

Nine previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while five additional infestations have had no invasive species for at least one year. In total, 39% of priority infestations are currently free of common reed and approximately 0.005 acres have been restored.

This exclusion project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

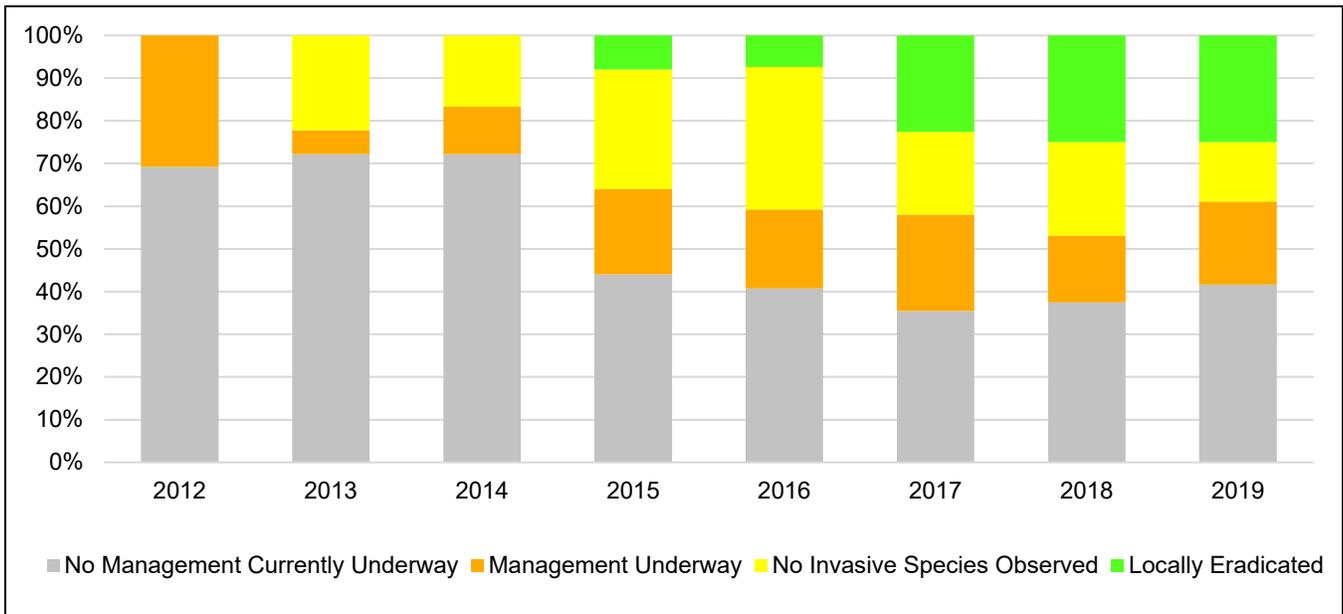
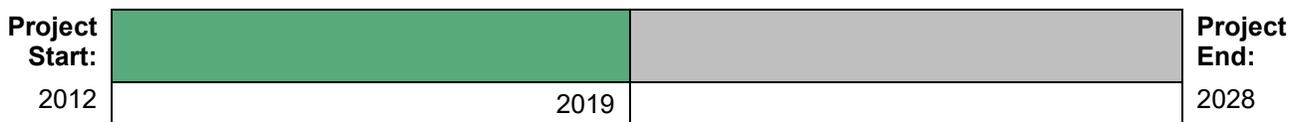


Figure 11. Annual management progress for the Northeastern Lake Ontario Watershed Common Reed Grass Exclusion Project (2012-2019).

Sacandaga River Watershed Common Reed Grass Exclusion



Common reed was first identified in the project area in 2006, but management efforts did not begin until 2012. In total, 124 common reed infestations have been mapped in the project area and all are prioritized for control by APIPP. The total number of infestations in the project has increased consistently from 2012, with an average of 12 new infestations identified each year. A spike in the total number of mapped infestations was observed in 2018, resulting from surveys of county roadways. Management efforts have also increased slowly since 2012, with 46 sites currently under active management.

Twenty-three previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while 20 additional infestations have had no invasive species for at least one year. In total, 35% of priority infestations are currently free of common reed and approximately 0.61 acres have been restored.

This exclusion project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

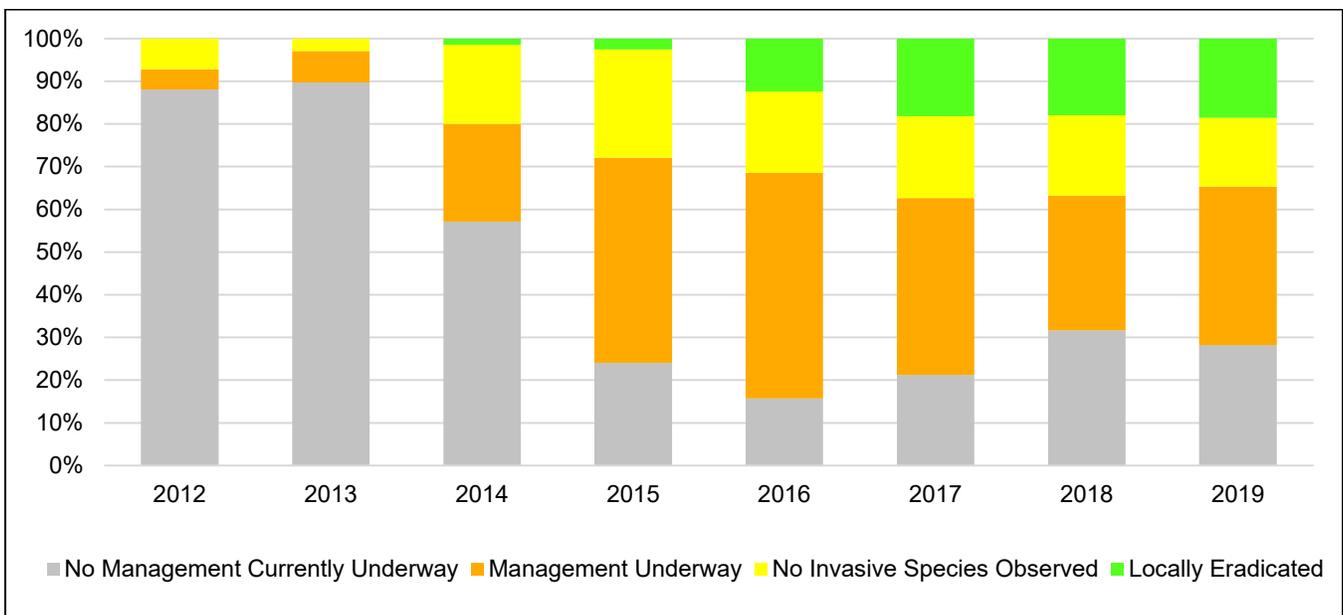
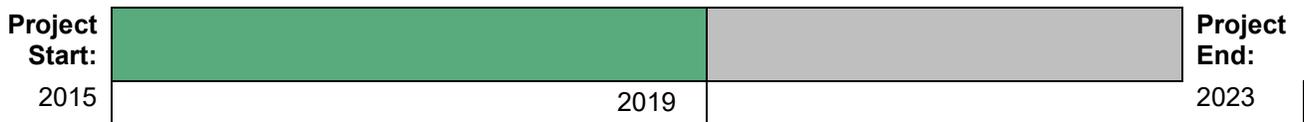


Figure 12. Annual management progress for the Sacandaga River Watershed Common Reed Grass Exclusion Project (2012-2019).

Salmon River Watershed Common Reed Grass Suppression



Common reed was first identified in the project area in 2015 and management efforts began the same year. In total, 41 common reed infestations have been mapped in the project area, with seven prioritized for control by APIPP. The remaining 34 infestations are located in highly developed, residential, or agriculturally dominated areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased significantly in 2017 as survey efforts expanded in the project area. The number of new infestations detected per year has since plateaued. Management efforts have remained consistent since 2015, with two sites currently under active management.

As of 2019, no infestations have been successfully removed. Two infestations are under active management and have been significantly reduced in extent and cover. Five additional priority infestations require permits or permissions before management can begin.

This suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

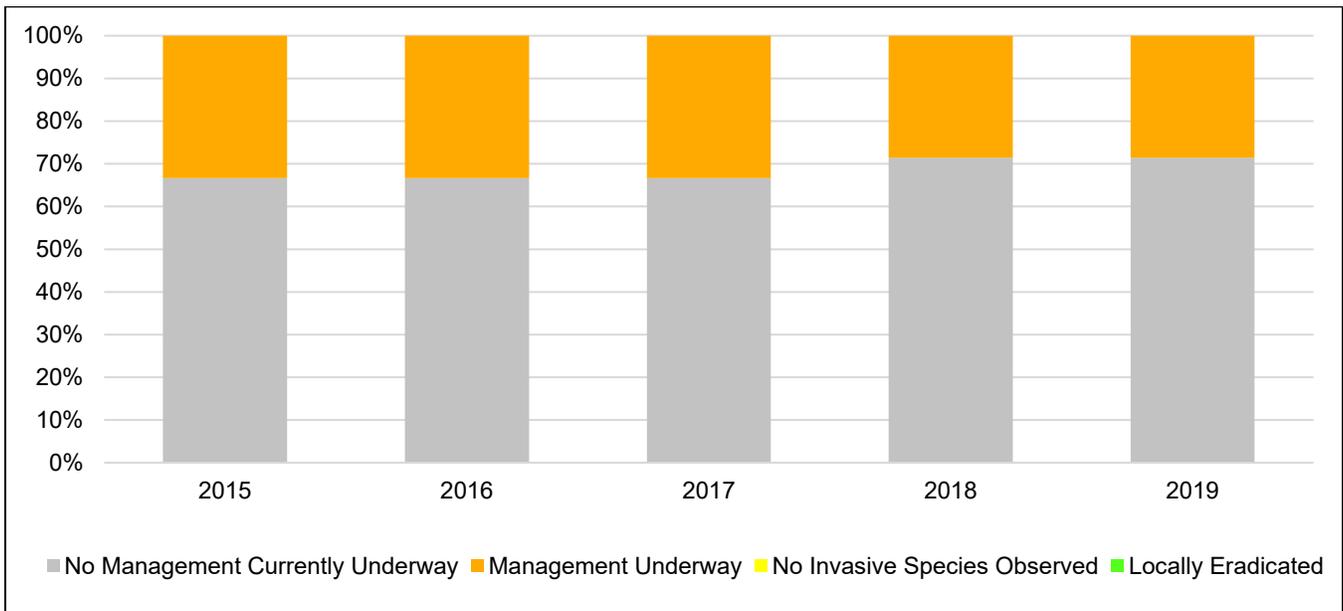


Figure 13. Annual management progress for the Salmon River Watershed Common Reed Grass Suppression Project (2015-2019).

Saranac River Watershed Common Reed Grass Suppression



Common reed was first identified in the project area in 2004, but management efforts did not begin until 2012. In total, 80 common reed infestations have been mapped in the project area, with 62 prioritized for control by APIPP. The remaining 18 infestations are located in highly developed, residential, or agriculturally dominated areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased consistently from 2012, with an average of eight new infestations identified each year. Management efforts have also increased slowly since 2012, with 12 sites currently under active management.

Twenty previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while 13 additional infestations have had no invasive species for at least one year. In total, 53% of priority infestations are currently free of common reed and approximately 0.37 acres have been restored.

This suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

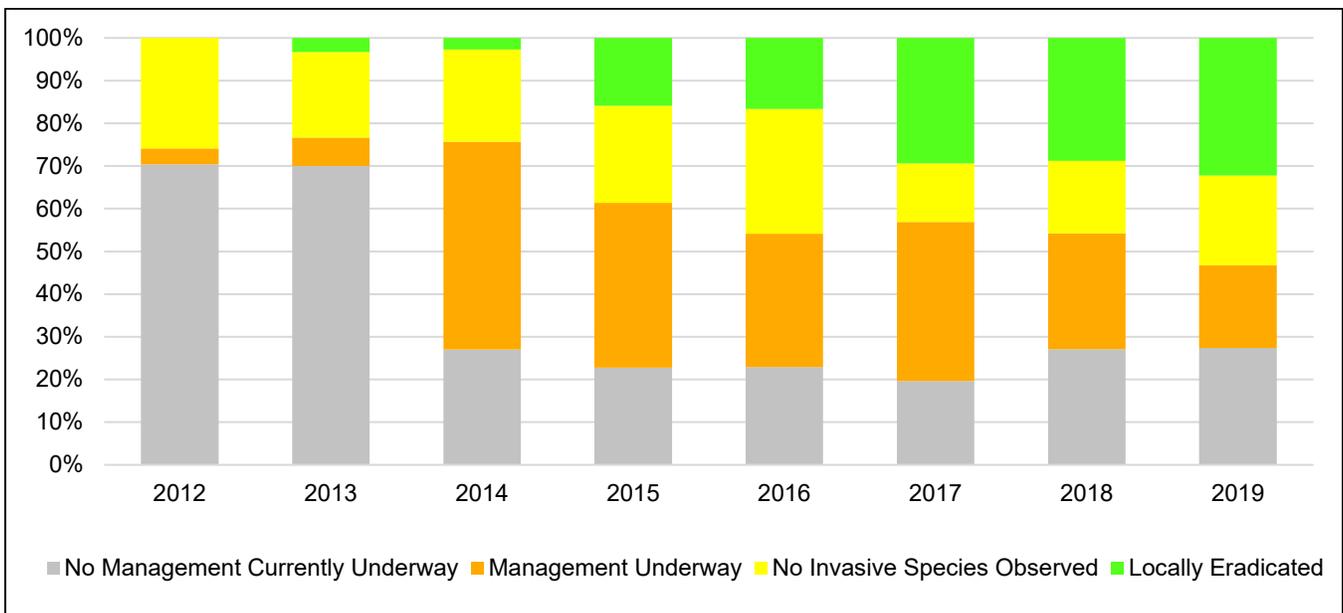
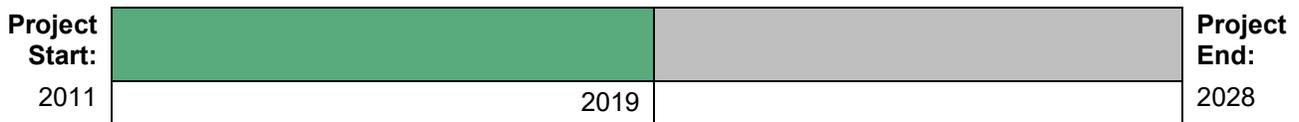


Figure 14. Annual management progress for the Saranac River Watershed Common Reed Grass Suppression Project (2012-2019).

Southern St Lawrence Watershed Common Reed Grass Exclusion



Common reed was first identified in the project area in 2004, but management efforts did not begin until 2011. In total, 189 common reed infestations have been mapped in the project area, with 185 prioritized for control by APIPP. The remaining four infestations are located in highly developed or residential areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased consistently from 2011, with an average of 14 new infestations identified each year. Management efforts have also increased slowly since 2011, with 53 sites currently under active management.

Seventy-two previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while 42 additional infestations have had no invasive species for at least one year. In total, 62% of priority infestations are currently free of common reed and approximately 1.77 acres have been restored.

This exclusion project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

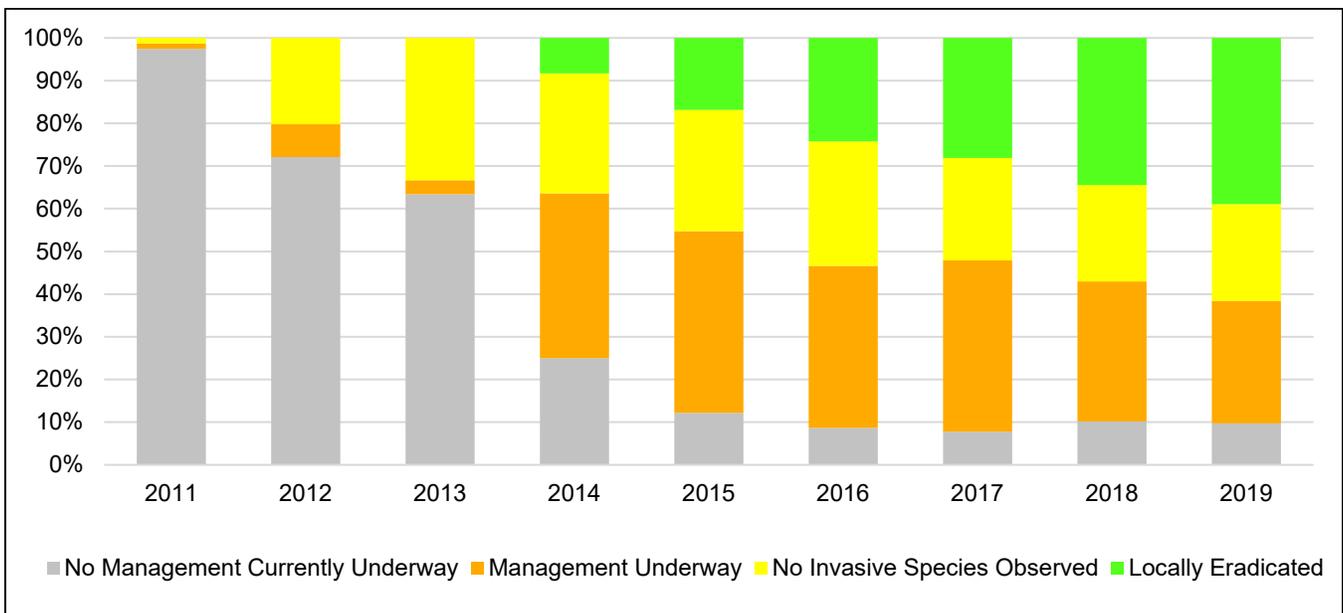
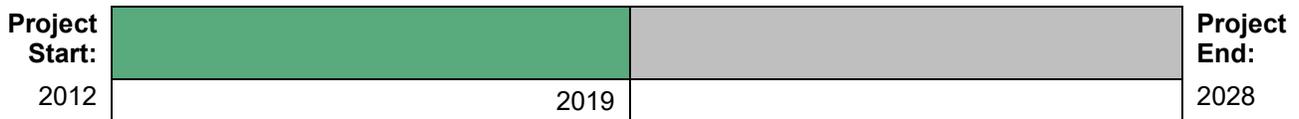


Figure 15. Annual management progress for the Southern St. Lawrence Watershed Common Reed Grass Exclusion Project (2011-2019).

St. Regis River Watershed Common Reed Grass Exclusion



Common reed was first identified in the project area in 2006, but management efforts did not begin until 2012. In total, 77 common reed infestations have been mapped in the project area, with 67 prioritized for control by APIPP. The remaining 10 infestations are located in highly developed or residential areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased consistently from 2012, with an average of eight new infestations identified each year. Management efforts have also increased slowly since 2012, with 16 sites currently under active management.

Twenty-three previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while 20 additional infestations have had no invasive species for at least one year. In total, 64% of priority infestations are currently free of common reed and approximately 0.32 acres have been restored.

This exclusion project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

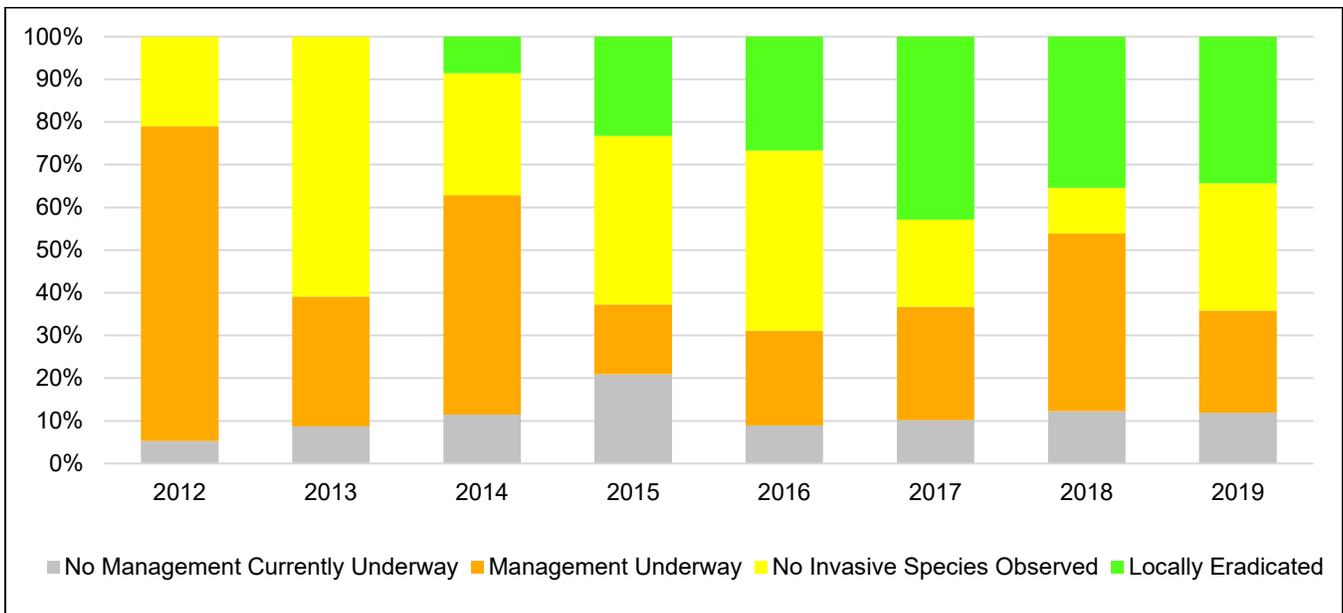


Figure 16. Annual management progress for the St. Regis River Watershed Common Reed Grass Exclusion Project (2012-2019).

Upper Hudson Watershed Common Reed Grass Exclusion



Common reed was first identified in the project area in 2003, but management efforts did not begin until 2013. In total, 116 common reed infestations have been mapped in the project area and all are prioritized for control by APIPP. The total number of infestations in the project has increased consistently from 2013, with an average of ten new infestations identified each year. Management efforts have also increased slowly since 2013, with 34 sites currently under active management.

Twenty-eight previously managed infestations have been deemed locally eradicated after having no common reed observed for at least three consecutive years, while 18 additional infestations have had no invasive species for at least one year. In total, 40% of priority infestations are currently free of common reed and approximately 0.84 acres have been restored.

This exclusion project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

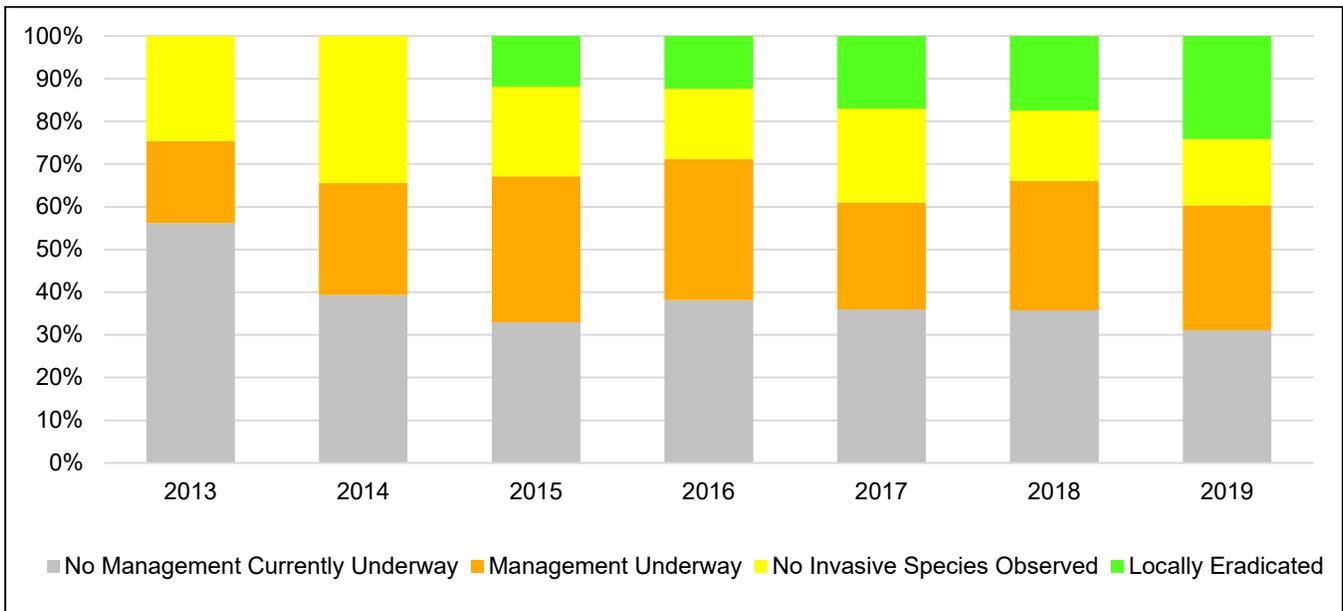


Figure 17. Annual management progress for the Upper Hudson Watershed Common Reed Grass Exclusion Project (2013-2019).

Garlic mustard

Resilient and Connected Land Network Garlic Mustard Suppression



Garlic mustard was first identified in the project area in 2000, but management efforts did not begin until 2012. In total, 889 garlic mustard infestations have been mapped in the project area, with 797 prioritized for control by APIPP. The remaining 655 infestations are in developed or residential areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has grown consistently since 2000 as APIPP's survey effort and footprint increased but has recently begun to plateau. An average of 56 new infestations are identified each year. Management efforts have also increased considerably since 2012, with 174 sites currently under active management.

Four-hundred previously managed infestations have been deemed locally eradicated after having no garlic mustard observed for at least three consecutive years, while 174 additional infestations have had no invasive species for at least one year. In total, 72% of priority infestations are currently free of garlic mustard and approximately 0.29 acres have been restored.

This suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

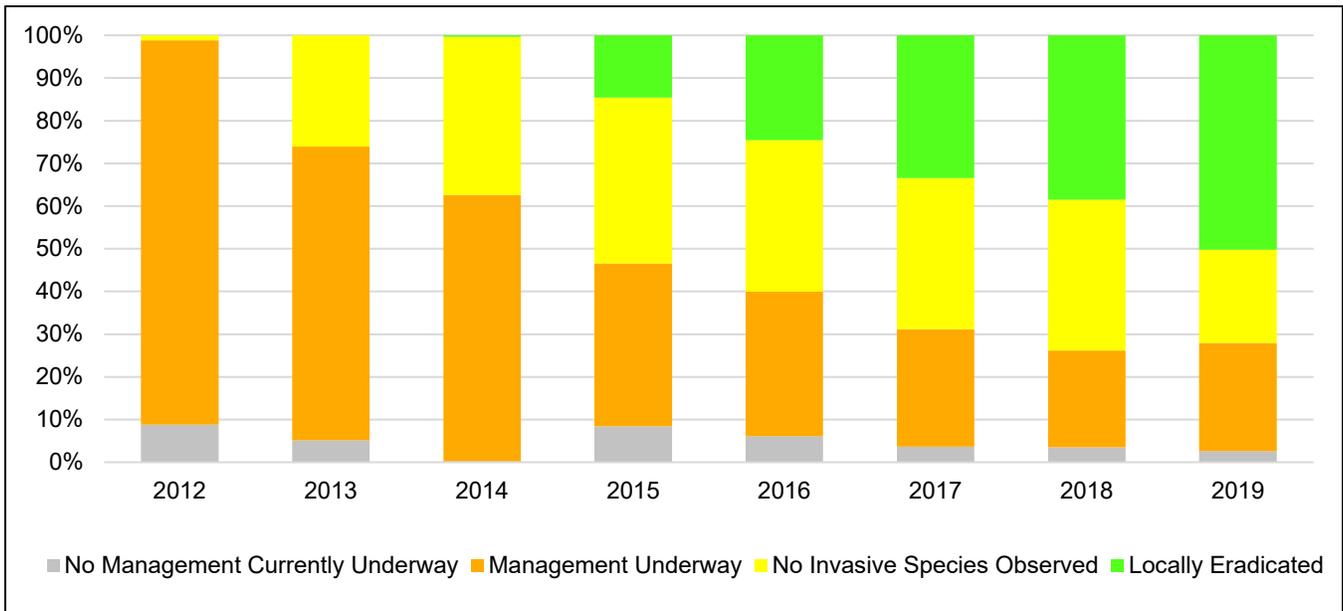


Figure 18. Annual management progress for the Resilient and Connected Land Network Garlic Mustard Suppression Project (2012-2019).

Giant hogweed

APIPP PRISM Giant Hogweed Eradication Project



Giant hogweed was first identified in the PRISM in 2010, but management efforts did not begin until 2011. A total of 16 giant hogweed infestations have been identified within the PRISM and all locations are prioritized for management. The total number of infestations within the project area has remained static since 2014. Management efforts began in 2011 and expanded gradually to include all identified sites by 2015.

As of 2019, nine previously managed infestations have been deemed locally eradicated after having no giant hogweed plants observed for at least three consecutive years. One additional infestation had no plants observed for the first time in 2019. In total, 63% of priority infestations have no giant hogweed observed and approximately 0.09 acres have been restored. Six infestations were managed in 2019 using mechanical control techniques.

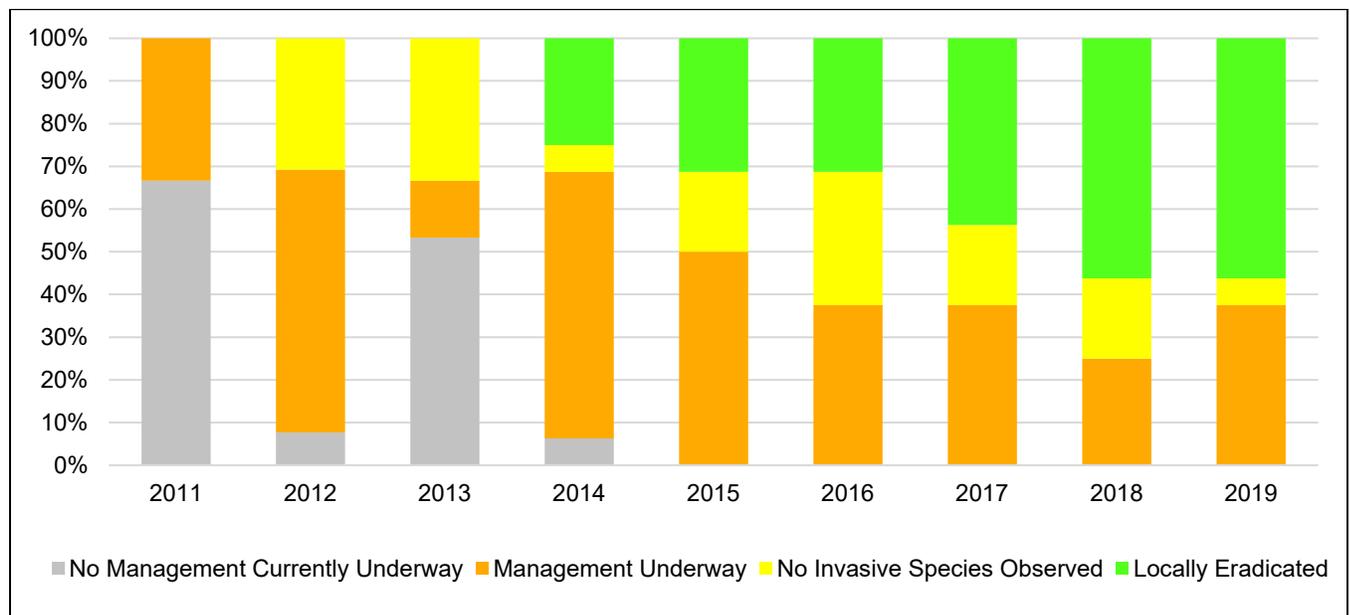


Figure 19. Annual management progress for the APIPP PRISM Giant Hogweed Eradication Project (2011-2019).

Japanese angelica tree

APIPP PRISM Japanese Angelica Tree Eradication

Japanese angelica tree was first detected in the PRISM in 2019 on a private property. Landowner permission is required before management actions can occur. Outreach to secure necessary permissions will be conducted in 2020.

Knotweed species

Resilient and Connected Land Network Knotweed Spp. Suppression



Knotweed was first identified in the project area in 2000, but management efforts did not begin until 2012. In total, 1,169 knotweed infestations have been mapped in the project area, with 514 prioritized for control by APIPP. The remaining 655 infestations are located in highly developed, residential or agriculturally dominated areas and would yield lower conservation benefit/return on investment. The total number of infestations in the project has grown consistently since 2000 as APIPP’s survey effort and footprint increased, but has recently begun to plateau. An average of 109 new infestations identified each year. Management efforts have also increased considerably since 2012, with 204 sites currently under active management.

Forty-six previously managed infestations have been deemed locally eradicated after having no knotweed observed for at least three consecutive years, while 73 additional infestations have had no invasive species for at least one year. In total, 23% of priority infestations are currently free of knotweed and approximately 2.36 acres have been restored.

This suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

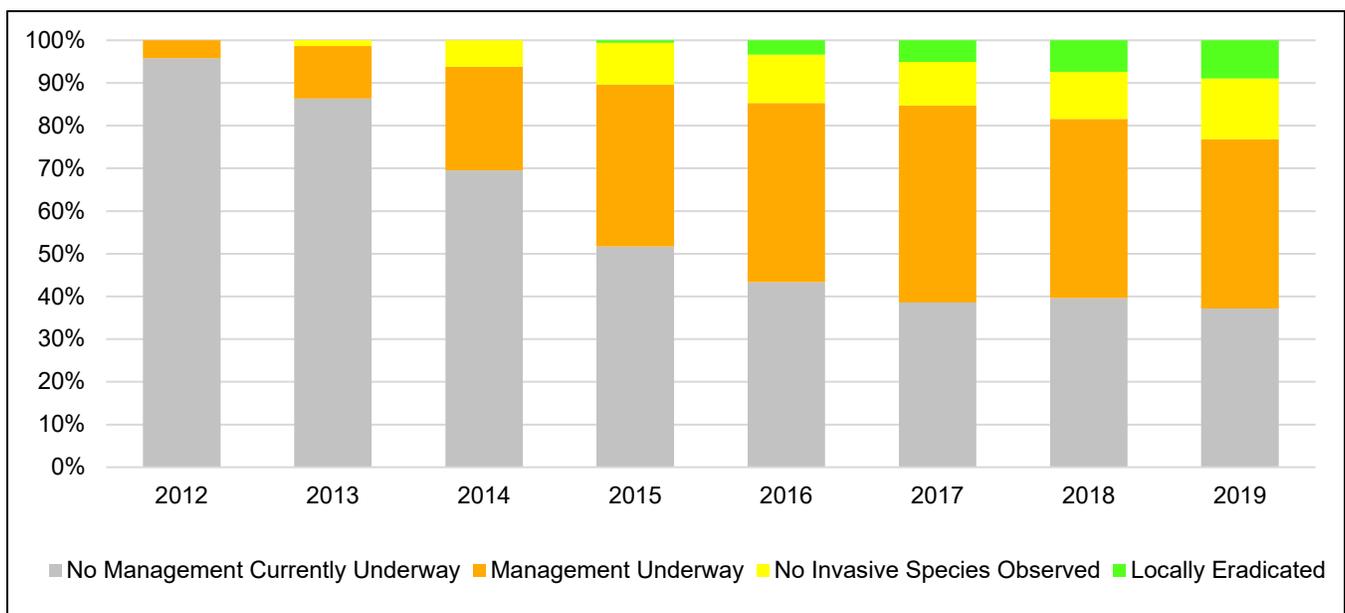


Figure 20. Annual management progress for the Resilient and Connect Land Knotweed Suppression Project (2012-2019).

Mile-a-minute

APIPP PRISM Mile-a-Minute Eradication

Mile-a-minute was first detected in the PRISM in 2019 on a private property. Four distinct infestations were mapped and are all currently under active management. This eradication project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

Purple loosestrife

Resilient and Connected Land Network Purple Loosestrife Suppression



Purple loosestrife was first identified in the project area in 2007, but management efforts did not begin until 2012. In total, 353 purple loosestrife infestations have been mapped in the project area and all are prioritized for control by APIPP. The total number of infestations in the project has increased steadily since 2012 as APIPP’s survey efforts have expanded. An average of 42 new infestations are identified each year. Management efforts have also increased considerably since 2014, with 192 sites currently under active management. This suppression project relies heavily on the use of biocontrol.

Eight previously managed infestations have been deemed locally eradicated after having no purple loosestrife observed for at least three consecutive years, while 58 additional infestations have had no invasive species for at least one year. In total, 19% of priority infestations are currently free of purple loosestrife and approximately 0.65 acres have been restored. A high rate of eradication or removal is not expected for this project due to the frequent use of biocontrol.

This suppression project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

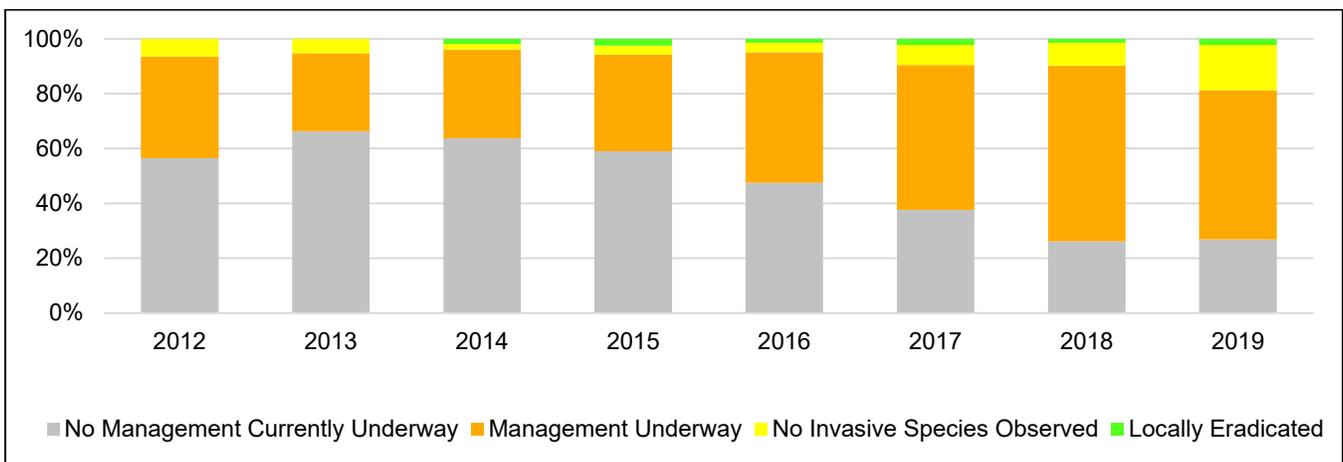


Figure 21. Annual management progress for the Resilient and Connected Land Network Purple Loosestrife Suppression Project (2012-2019).

Scotch broom

APIPP PRISM Scotch Broom Eradication

A single infestation of scotch broom was mapped in the PRISM in 2015 along State Route 28N, extending onto an adjacent private property. The portion of the infestation located in the State Route 28 right-of-way was treated for the first time in 2019, but landowner permission is needed to treat the entire infestation. Outreach to secure necessary permissions will be conducted in 2020. This eradication project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

Swallow-wort species

Resilient and Connected Land Network Swallow-wort spp. Exclusion



Swallow-wort species were first identified in the project area in 2009, but management efforts did not begin until 2014. In total, 28 swallow-wort infestations have been mapped in the project area and all are prioritized for control by APIPP. The total number of infestations in the project has increased significantly from 2015-2016 with an increase in survey efforts, but has since plateaued. An average of five new infestations are identified each year. Management efforts have also increased considerably since 2014, with 15 sites currently under active management.

Three previously managed infestations have been deemed locally eradicated after having no swallow-wort observed for at least three consecutive years, while eight additional infestations have had no invasive species for at least one year. In total, 39% of priority infestations are currently free of swallow-wort and approximately 0.12 acres have been restored. This exclusion project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

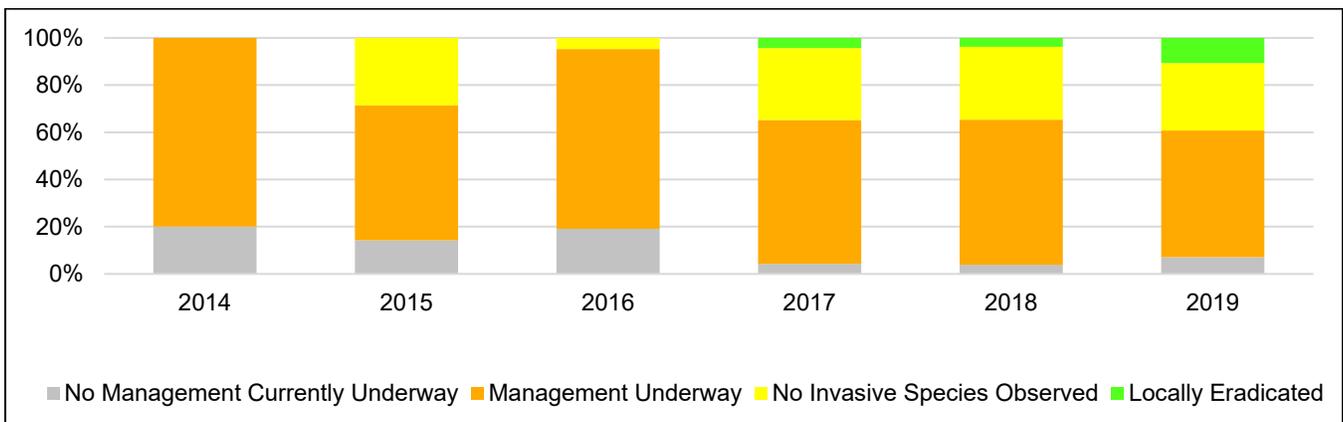


Figure 22. Annual management progress for the Resilient and Connected Land Network Swallow-wort Exclusion Project (2011-2019).

Tree-of-heaven

APIPP PRISM Tree-of-Heaven Eradication



Tree-of-heaven was first identified in the PRISM in 2017, but management efforts did not begin until the following year. Two distinct infestations have been mapped, but only one is currently under active management. Landowner permission is required before management actions can occur on the remaining infestation. Outreach to secure necessary permissions will be conducted in 2020.

This eradication project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

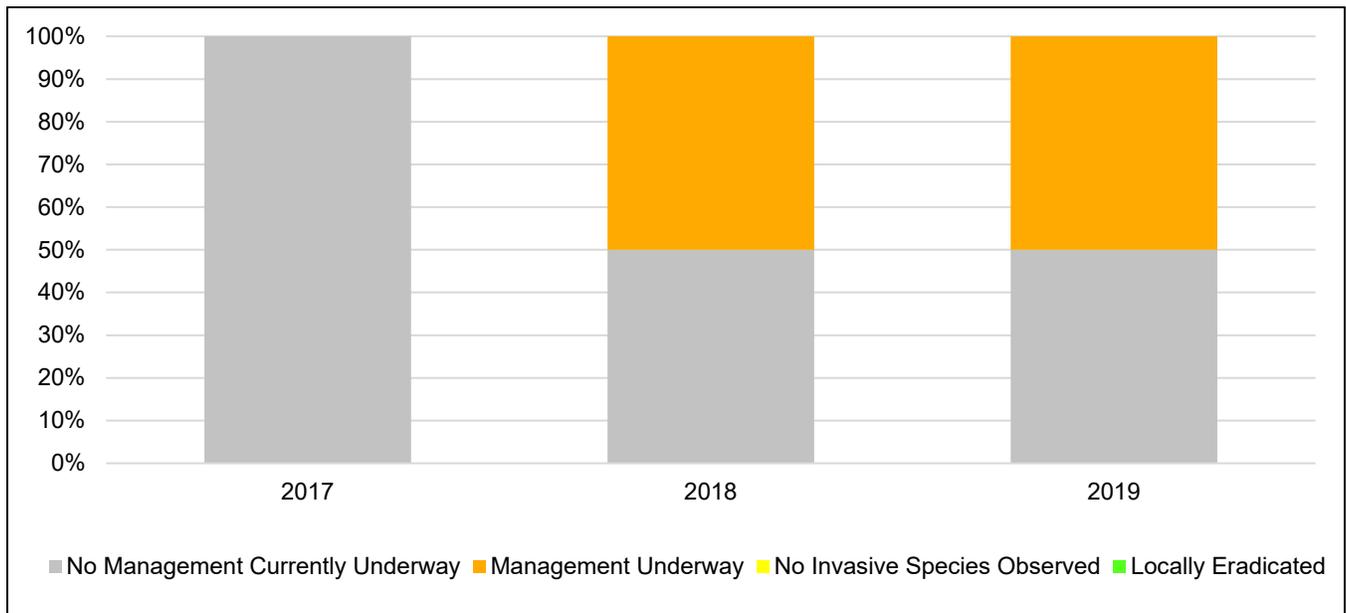
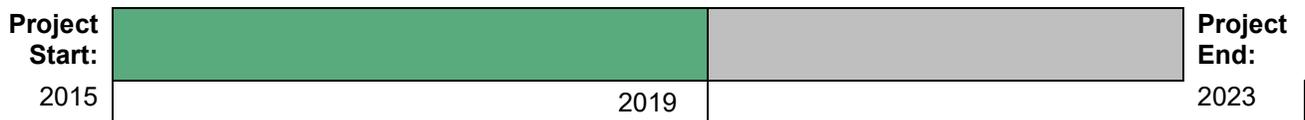


Figure 23. Annual management progress for the APIPP PRISM Tree-of-Heaven Eradication Project (2017-2019).

Yellow iris

St. Regis River Watershed Yellow Iris Eradication



Yellow iris was first identified in the project area in 2015 and management efforts began the same year. Only two yellow iris infestations have been mapped in the project area and both are prioritized for control by APIPP.

As of 2019, all known infestations in the project area had no invasive species observed for at least one year. Approximately 0.0005 acres have been restored.

This eradication project is currently scheduled to continue through at least 2023. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

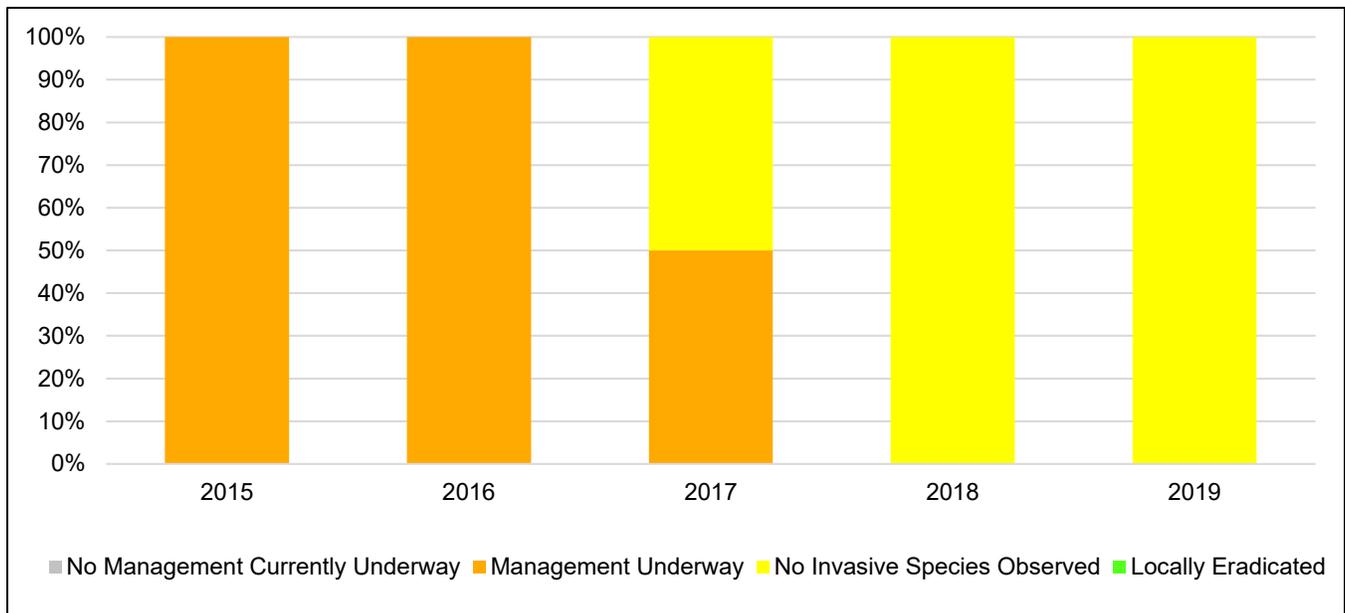


Figure 24. Annual management progress for the St. Regis River Watershed Yellow Iris Eradication Project (2015-2019).

Saranac River Watershed Yellow Iris Eradication



Yellow iris was first identified in the project area in 2011, but management efforts did not begin until 2013. In total, 40 yellow iris infestations have been mapped in the project area, with 39 prioritized for control by APIPP. The remaining infestation is located in a developed/residential area and would yield lower conservation benefit/return on investment. The total number of infestations in the project has increased consistently from 2011, with an average of six new infestations identified each year. Management efforts have also increased slowly since 2011, with 11 sites currently under active management.

Nine previously managed infestations have been deemed locally eradicated after having no yellow iris observed for at least three consecutive years, while ten additional infestations have had no invasive species for at least one year. In total, 49% of priority infestations are currently free of yellow iris and approximately 0.98 acres have been restored.

This eradication project is currently scheduled to continue through at least 2028. At that time, the project will be reevaluated to determine if management objectives are realistic based on current landscape conditions and resources.

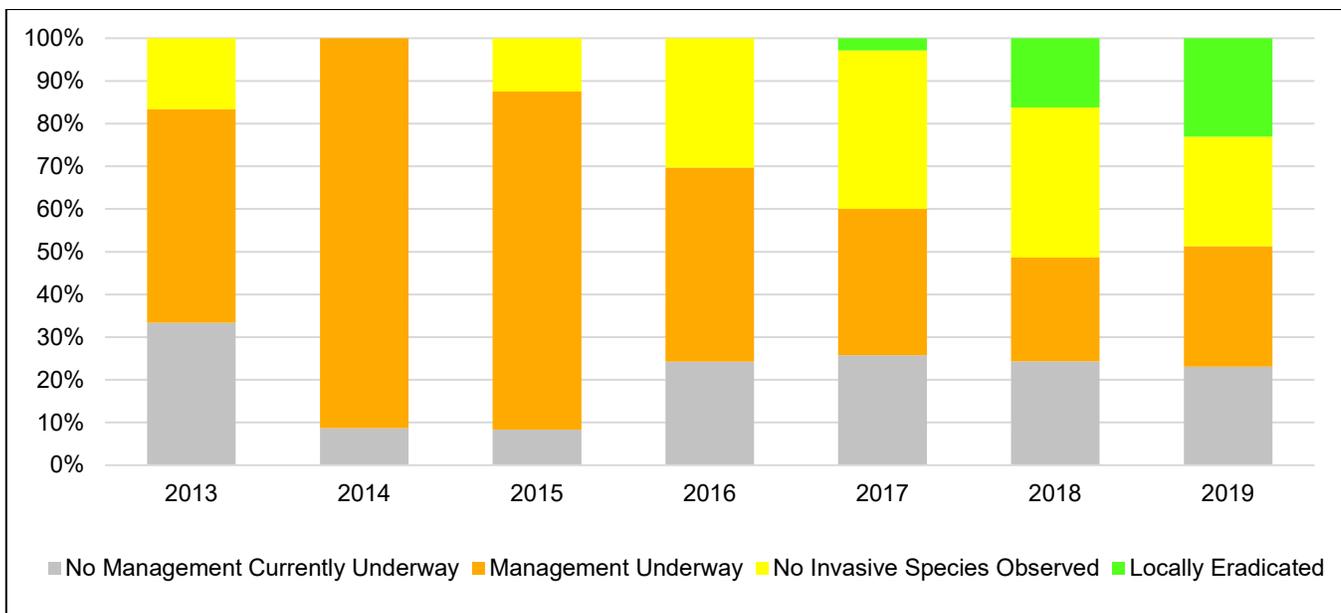


Figure 25. Annual management progress for the Saranac River Watershed Yellow Iris Eradication Project (2013-2019).

Innovation

This section describes efforts by APIPP staff and partners to pilot innovative approaches and technologies to improve program effectiveness.

Aquatic Project

- The Aquatic Project deployed its early detection team to collect and process sonar data utilizing the [BioBase](#) lake mapping system and produced high-resolution lake depth, bottom substrate hardness, and vegetation biovolume maps for a second year. BioBase data was collected for the entirety of 22 lakes and within the littoral zone of an additional 24 waterbodies in 2019. The Aquatic Project has now collected BioBase data for the entirety of 31 lakes and within the littoral zone of an additional 45 lakes. The technology is being evaluated for its utility in informing AIS prevention, early detection and management efforts as well as lake vulnerability assessments. Based on 2019 results, the Aquatic Project will likely continue to expand this pilot project into a citizen-scientist based mapping program in 2020.
- The Aquatic Project partnered with the APA and Adirondack Lakes Alliance to develop a Survey 123 based mobile monitoring tool and protocol—the Lake Management Tracker—for lake associations to assess progress and outcomes of their ongoing aquatic invasive plant management efforts. The project focuses on collecting outcome assessment data to improve decision making and resource allocation for aquatic invasive plant harvesting efforts. The project began as a pilot in 2018 with two lakes: Loon Lake and Hadlock Lake. In 2019, the project expanded onto four additional lakes: Chateaugay Lake, Friends Lake, Lincoln Pond, and Paradox Lake.

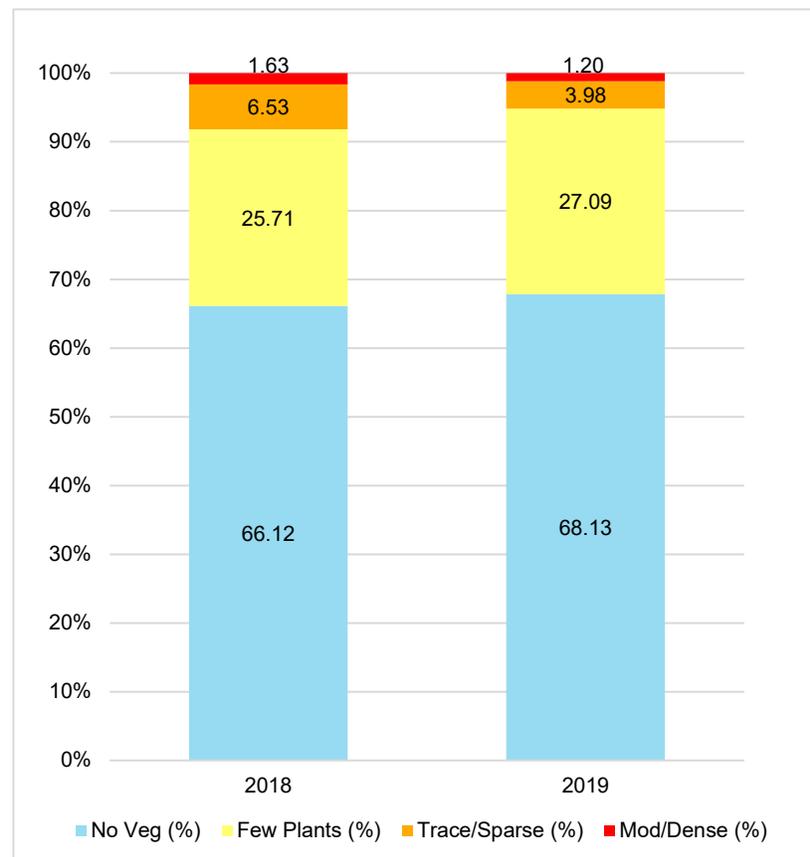
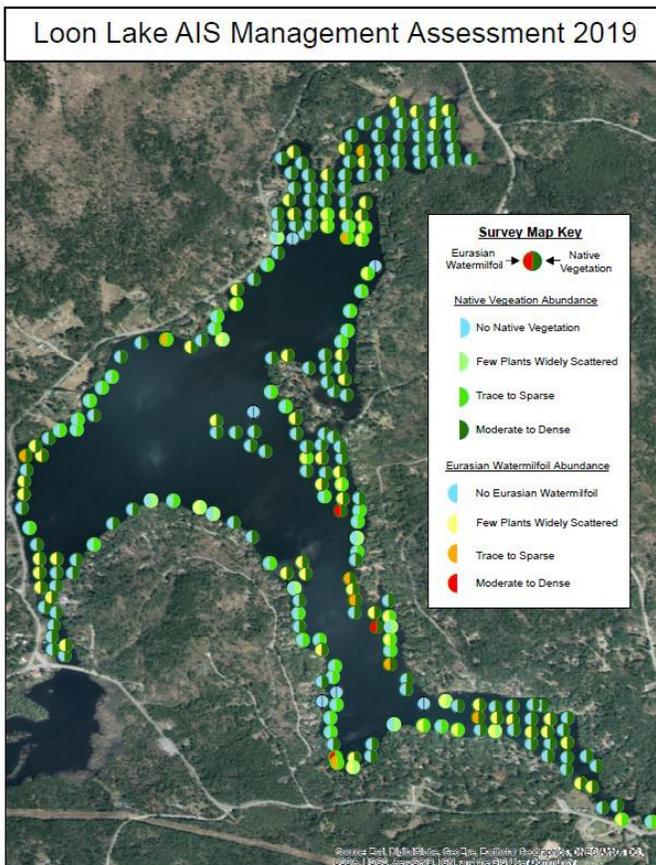


Figure 26. Comparison of the percent of sites in each Eurasian watermilfoil abundance category for 2018 and 2019 in Loon Lake.

Terrestrial Project

Phragmites Surveys

The Terrestrial Project completed its second year of unmanned aerial vehicle-assisted (UAS) surveys for wetland invasive species. Flights were completed over 1,539 acres of 21 previously surveyed wetlands in an effort to detect and map incipient infestations of common reed grass. All flights were performed at 400'AGL in August or September. A separate observer performed a ground-based GPS survey of each wetland to serve as a control. We compared infestation detection ability, mapping accuracy, and survey time of UAS against ground-based controls.

UAS successfully detected two infestations of common reed grass (range 0.15 - 0.68 acres) in one wetland. Infestation extent mapped with UAS differed by only 0.09 acres from ground-based controls. We also successfully confirmed the absence of common reed grass in 16 wetlands using UAS. For all locations, UAS provided an average time savings of 104 minutes per site vs. ground-based techniques.

UAS failed to detect five infestations of common reed grass (range 0.003 - 0.30 acres) in four wetlands. In these locations, common reed grass occurred in very low density or was growing under tree canopy. Both confounding variables precluded detection of the species from aerial imagery.

Computer Vision ML Modeling

To increase infestation detection accuracy and operational efficiency, APIPP is currently piloting the use of cloud-based machine learning tools to automatically detect infestations of common reed grass in UAS imagery. Through a Google Data Solutions for Change grant awarded to The Nature Conservancy, we developed a computer vision image classification model to automatically tag UAS images containing common reed grass (Figure 28). The initial model yielded 93.3% accuracy utilizing a dataset of 450 images (Figure 27). The model will be continually refined with additional data collected in future field seasons and expanded to include additional species of interest.

True Label	Predicted Label	
	Phragmites	No_Phragmites
Phragmites	89%	11%
No_Phragmites	4%	96%

Figure 27. Confusion matrix for a single label *Phragmites* classification model. Overall model precision was 93.3%.

True positives

Your model correctly predicted Phragmites on these images



Figure 28. Sample true positive images labeled by the model with their corresponding confidence score.

Seasonal Employment

This section describes efforts by APIPP staff and partners to support seasonal job opportunities.

- APIPP supported one invasive species management steward position in 2019. Julie Fogden was hired to lead terrestrial invasive species survey and management activities at NYS DEC campgrounds, recreational access points, and nature preserves. The results of this work can be accessed in the steward's [final report](#).
- APIPP collaborated with the State University of New York College of Environmental Science and Forestry (SUNY ESF) to coordinate two conservation biology interns. Dan Leavenworth and Makayla Thornton assisted with surveys and management of terrestrial invasive species at ten campgrounds and/or Forest Preserve units during a two-week period.
- APIPP contracted with Invasive Plant Control Inc. and Adirondack Research LLC. to staff two seasonal response teams, one for the Aquatic Project (four members) and one for the Terrestrial Project (four members). These teams assisted with the surveillance, early detection and rapid response, and ongoing management efforts described throughout this report. The results of both response teams can be accessed in their final [aquatic](#) and [terrestrial](#) response team reports.



Members of APIPP's 2019 Aquatic Invasive Species Early Detection Team.

Prevention and Awareness Building

This section describes efforts by APIPP staff and partners to prevent new invasions into the PRISM and to foster broad invasive species awareness to prevent the spread of invasives.

- APIPP collaborated with the Paul Smith's College Adirondack Watershed Institute (AWI), NYS DEC, and other regional partners to advance the [Adirondack AIS Prevention Program](#) which staffed boat launch stewards at priority launches and operated regional boat inspection and decontamination stations.
- APIPP's partner, NYS DOT, opened the first-of-its-kind boat inspection and decontamination station at the newly renovated I-87 Northway Adirondack Welcome Center in Glens Falls. The new station opened early in the season and helped ensure that boaters traveling north into the Adirondacks from more highly invaded southern waters were cleaned, drained and dried/treated.
- APIPP staff gave formal presentations to 37 audiences, reaching approximately 1,447 people in 2019. On average, the program presents to approximately 47 audiences and 1,727 people annually. Since 2009, the program has given formal presentations to 520 audiences reaching approximately 19,000 people (Figure 29). These totals do not include those reached through informal tabling or public display events.

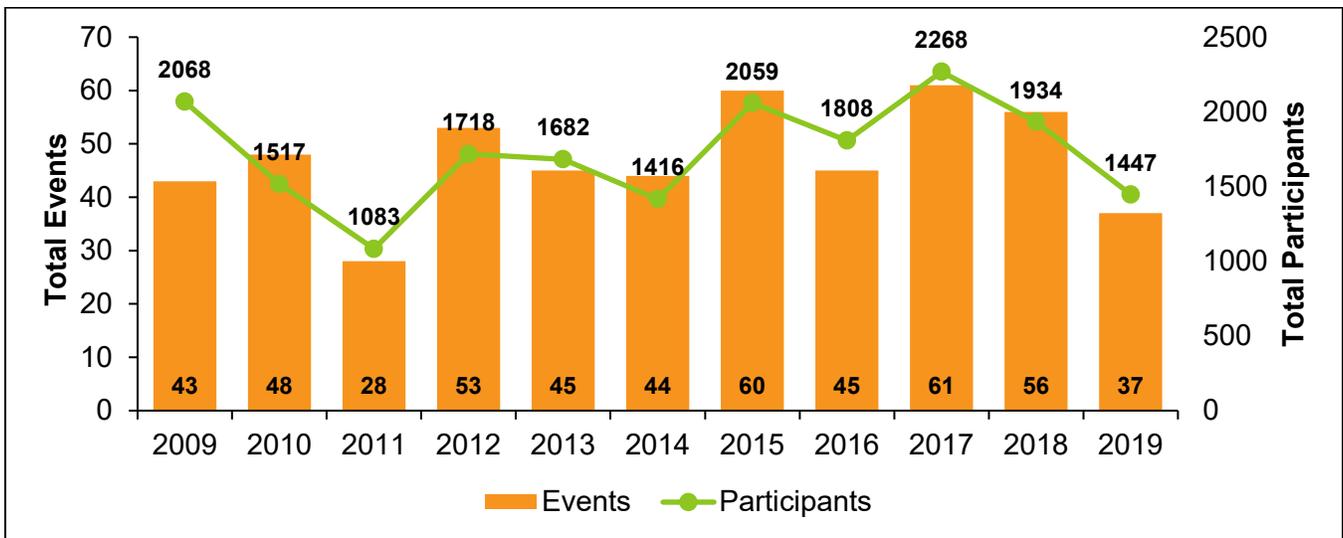


Figure 29. Audiences & participants reached through formal presentations annually.

- APIPP had 15,782 unique visitors to its main website - www.adkinvasives.com, and 737 unique followers on its Facebook page - www.facebook.com/adkinvasives in 2019. On average the program reaches approximately 8,439 people through its websites and recruits 298 followers on Facebook annually. Since 2015, the program has engaged 52,267 people through its website and social media platforms (Figure 30).

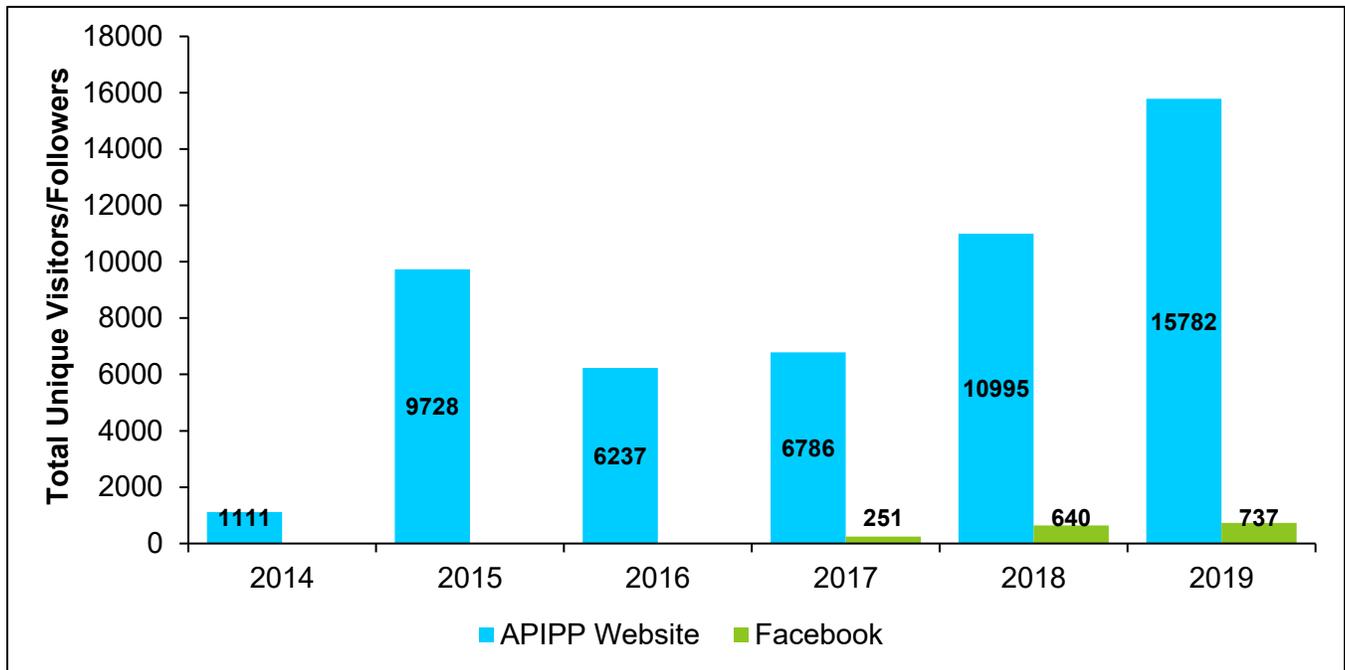


Figure 30. Unique visitors/followers to APIPP’s website and social media platforms annually.

- APIPP staff presented during the following professional conferences in 2019: New York State Federation of Lake Associations Conference; Adirondack Lakes Alliance Symposium; North America Invasive Species Management Association Annual Conference; North American Lake Management Society Conference.
- APIPP contracted with Trampoline Marketing and Design to create a unified look for the state’s invasive species work with a new logo for the state-wide PRISM network and four of the eight PRISMs.

Regional Planning and Coordination

This section describes APIPP’s efforts to organize and lead regional action.

- Collaborated with and provided guidance to the [Regional Inlet Invasive Plant Program](#).
- Coordinated one AIS steering committee meeting focused on advancement of the BioBase mapping project and Lake Management Tracker.
- Held one full APIPP partner meeting and provided meeting minutes.
- Participated in quarterly meetings with NYS Invasive Species Program Partners and participated in monthly [PRISM webinars](#).
- Contributed research priorities to the [NYS Invasive Species Research Institute](#).
- Submitted all invasive species related data collected by APIPP to the statewide [iMapInvasives](#) database.
- Attended and represented TNC at [NYS invasive species advisory committee](#) meetings.
- Shared information through over 120 posts on [APIPP’s Facebook page](#) with a total reach of 55,628.

State Partner Updates

State partners are a key part of APIPP's work. We thank the following partners for providing these updates for this annual report.

NYS DOT

- Funded research testing biological control agents for common reed grass.
- Funded research testing biological control agents for swallow-wort species.
- Included pay items for the disposal of material containing invasive plant species and cleaning of equipment for 100% of capital program projects.
- Offered an invasive plant awareness and best management practices training to construction and operations staff.
- Assisted with treatments of target invasive plants along I -87.
- Assisted with placement of signage for the roadside boat wash stations established under the Adirondack AIS Prevention Program.
- Coordinated with the Adirondack AIS Prevention Program to open the boat inspection and decontamination station for the I-87 Northbound Glens Falls rest area.
- Coordinated with APIPP staff to treat small areas of *Phragmites* at the Lincoln Pond wetland mitigation constructed by NYS DOT.
- Contracted with GEI, the statewide NYS DOT ecological term agreement consultant, to treat an area of *Phragmites* at the Rte. 149 wetland mitigation area off Rte. 9L in Queensbury. Initial treatment occurred in the fall of 2019, with inspection and follow-on spot treatments to occur for the next 2-3 years.
- Released 2000 purple loosestrife beetles at the Rte. 149 wetland mitigation area off Rte. 9L in Queensbury in July of 2019.
- Began following the soil and seeding scheme developed for the Park by the NYS DOT Working Group—including use of the recommended native seed and reliance on the native seedbank in areas of temporarily disturbed wetland.
- Conducted the annual Adirondack Railroad pesticide spraying and invasive inventory.
- Treated *Phragmites* on Route 28 in White Lake, Herkimer County.
- Trained Hamilton, Fulton and Oneida mowing operators through tailgate trainings and Fall safety meetings on identification and impacts of invasive species along rights-of-way.
- Made improvements to a popular boat wash station on Route 28 in Inlet with funding through a capital project.
- Identified a small stand of *Phragmites* at the Old Forge facility that will be treated in 2020.

NYS APA

- Surveyed two backcountry waters for the presence of AIS.
- Worked with APIPP and with the assistance of the Upper Saranac Lake Foundation to assess the current state of UAS (drone) technologies for use in mapping floating leaf and deep-water marshes (including those invaded by AIS).
- Presented the Lake Management Tracker Program at the North America Invasive Species Management Association (NAISMA) meeting.
- Assisted APIPP in training lake associations using the Lake Management Tracker.
- Issued General Permits for the management of AIS in the Fish Creek complex (Town of Santa Clara), and in the Marion River (Town of Arietta); authorized lampricide treatments in the

Hoisington Brook and its delta (Town of Westport) in Lake Champlain to control sea lamprey, and reauthorized the entire sea-lamprey control program for Lake Champlain.

- Engaged with state agencies, forest health researchers, and APIPP to monitor invasive pest disturbances within the lands and waters of the Adirondack Park. Continued vigilance and public education regarding these threats will be increasingly important in coming years as the spread of pests and the response to them will impact the future health of Adirondack forests.

NYS LGPC

- Lake George continues to operate under a mandatory trailered boat inspection program to eliminate any new invasive species from entering the lake. Year 2019 was the busiest year in the six years of operation, with more than 33,000 boater contacts at the inspection sites. Invasive species continue to be transported to Lake George by boaters, as 163 boats were found with visible invasive species on them at the inspection stations. The program provides free 'decontamination' of those boats (high-pressure, hot-water washing) of any boat that is not 'clean, drained and dry.' No new invasive species have been identified in Lake George since the creation of the program in year 2014.
- The battle to eliminate all dense beds of Eurasian watermilfoil in Lake George is working. Through a partnership between the Lake George Park Commission, the Lake George Association, the Fund for Lake George and Warren County, more than \$420,000 was spent on diver-assisted suction harvesting of these dense beds of invasive plants in 2019. The number and size of milfoil beds in Lake George is decreasing due to these considerable efforts, and great progress is being made. Year 2020 promises to be another strong year of management, with approximately \$500,000 available for the hand harvesting efforts. This will be the highest single year of funding ever on Lake George, and great strides are expected to be made.

Equipment and Materials

APIPP's 2019-2023 contract with NYS DEC requires reporting on durable equipment purchased with Environmental Protection Fund moneys.

The Nature Conservancy defines durable equipment as items costing more than \$5,000. No such purchases were made with Environmental Protection Fund moneys in 2019. APIPP does have access to equipment owned by The Nature Conservancy (such as a canoe and a kayak), purchased with non-State funds, and is happy to help coordinate resources if partners or other PRISMs have emergency needs.

Obstacles and Solutions

APIPP's 2019-2023 contract with NYS DEC requires reporting on obstacles encountered in achieving the program's objectives during the year and potential solutions to the obstacles. Here are some lessons learned from 2019.

- Staff Transition

The departure of experienced Program Manager, Brendan Quirion, prevented APIPP from fully carrying out all of its program objectives in 2019, including completing the new APIPP logo and replacement materials for the Keep Invasives Out campaign. Fortunately, assistance provided by the SLELO PRISM helped bring the logo project to its conclusion. The hiring of the new Program Manager, Tammara Van Ryn, at the end of year will allow timely completion of the program's 2020 objectives. Work on replacement education materials will continue in 2020.

- Education

In 2019 APIPP was fortunate to have a seasonal steward with knowledge of invasive species identification. This enabled the steward to manage more infestations than previous stewards. In order to ensure the same success in 2020, experience identifying invasive plants was included as a minimum job qualification for the 2020 seasonal steward. In addition, the 2019 seasonal steward reported that many of the DEC campground employees she interacted were unaware that their facility was infested with an invasive plant species and were not familiar with invasive plant identification and management practices. With APIPP's increased education capacity in 2020, APIPP may be able to help DEC provide training to its campground staff to expand the ability to detect and treat priority infestations.

- Aquatic Invasives: Project Surveillance Volunteers

This past year APIPP saw a marked decrease in the number of volunteers for the AIS surveillance program. This was partially due to the challenge of getting all partner lake associations to report their AIS search efforts and volunteer numbers to APIPP. With expanded staff capacity in 2020, however, APIPP will be able to better support the volunteer network and encourage more timely, accurate reporting of AIS search efforts by lake associations.

- Terrestrial Invasives: Expanded Management Priorities

As part of a strategic priority setting process advanced in 2017-2018, APIPP's terrestrial project identified over 700 new terrestrial invasive plant infestations that could be treated over the next five years. Many infestations require private landowner permissions or public permits before control actions can occur. Securing the necessary permissions is time consuming and has been a challenge. There will be a substantial amount of time required over the next year to gather necessary permissions; however, with expanded staff capacity this challenge should be surmountable.

2020 Priority Objectives

This section provides an overview of objectives to be advanced by APIPP in the year ahead

- APIPP's 2020 Work Plan will be uploaded to its website in the spring of 2020 and will include a complete list of objectives and tasks. Priorities will include:
 - Coordinate professional and volunteer aquatic and terrestrial regional early detection and response teams.
 - Expand volunteer opportunities.
 - Increase education and outreach offerings.
 - Expand innovative projects such as the BioBase lake mapping project and UAS terrestrial surveys.
 - Explore ways to fill gaps in data about deer and earthworm impacts.
 - Evaluate roles for APIPP in the certification of clean fill and in the collection and processing of native seeds.
 - And much more!

- Our 2020 Work Plan will draw on the expertise of APIPP's current network, and will also require new or expanded partnerships. There will be many opportunities for volunteer citizen science participation. We look forward to expanding our partner and volunteer network.

Reference: Priority Setting Structure

In setting awareness building and prevention priorities, APIPP focuses on the primary invasive species introduction and spread pathways to and within the Adirondack PRISM. These include: for AIS, the overland transport of recreational boating and fishing equipment and human-assisted movement of fish and baitfish; for terrestrial invasive plants, the movement and use of contaminated fill/construction material, sale and use of non-native ornamental plants in agriculture/horticulture, and human-assisted spread of seeds and propagules through land-based recreation activities; and, for invasive forest pests and pathogens, movement of untreated firewood and use of out-of-region sources of trees and shrubs in landscaping, restoration, and nursery plantings.

APIPP utilizes a unified theory of invasive species management to set rapid response and ongoing management priorities (Figure 31). This unified theory includes:

1. Assessment of the relative threat of invasive species currently affecting the Adirondack PRISM;
2. Evaluation of whether high-threat species are affecting one or more conservation, economic, or societal assets in the Adirondack PRISM;
3. Assessment of whether effective management tools and techniques (chemical, mechanical, biological, etc.) are available to address both the species infestation and potential sources/pathways of reintroduction; and lastly,
4. Whether sufficient resources are available to ensure project completion and that expenditure of resources will result in a high return on investment and produce tangible, lasting results over a five- to ten-year time horizon.

APIPP utilizes several resources and pre-project planning tools to move through each step of this unified theory. These include NYS and Adirondack PRISM invasive plant and animal threat ranking assessments, Geographic Information Systems, conservation asset maps, climate change models, available best management practices, economic impact studies, invasive species distribution databases, evidence of human health impacts, and TNC's Invasive Plant Management Decision Analysis Tool (IPMDAT).

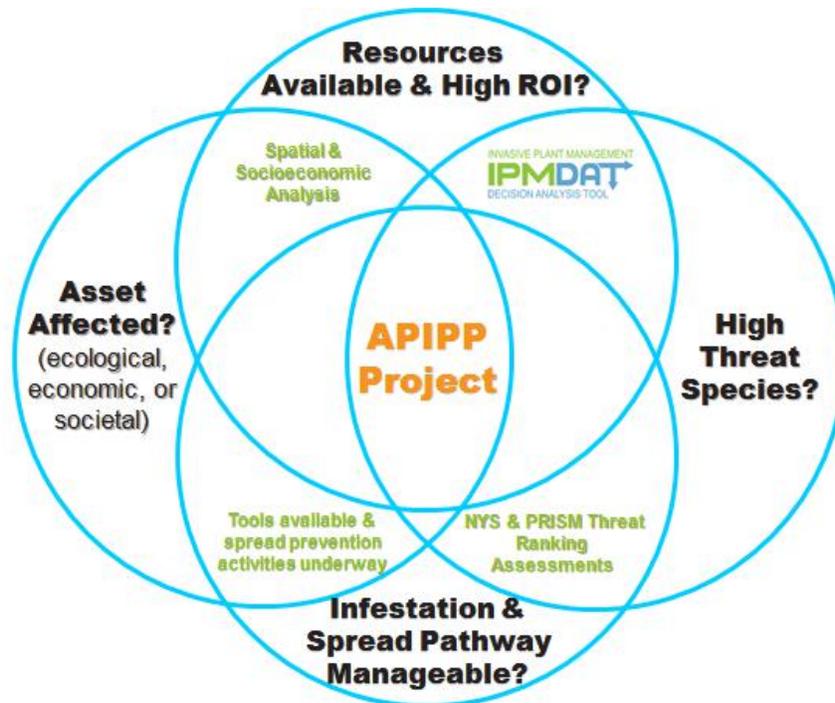


Figure 31. APIPP's Unified Theory of Invasive Species Management.

Reference: State Regulations

This section describes laws in place to prevent new invasions and minimize the spread of existing infestations.

Aquatic Invasive Species

- The [Part 575](#) regulation prohibits or limits the transport and sale of known invasive plants and animals in NYS.
- The [Part 576](#) regulation prohibits the launch of boats and associated equipment and floating docks at any public boat launch without having taken reasonable AIS spread prevention actions.
- The [Part 59.4 and 190.24](#) regulations prohibit watercraft from launching into or leaving NYS DEC owned launch sites without first draining the watercraft and internal water holding compartments and cleaning the boat, trailer and equipment of visible plant and animal material.
- The [Part 377.1](#) regulation prohibits watercraft from launching into or leaving Office of Parks, Recreation and Historic Preservation owned launch sites without first draining the watercraft

and internal water holding compartments and cleaning the boat, trailer and equipment of visible plant and animal material.

- Pursuant to [Section 35-D](#) of the NYS Navigation law, owners of public boat launches are required to display a [universal AIS spread prevention sign](#) at the boat launch.
- The [Subpart 646-9](#) regulation requires all trailered watercraft being launched into Lake George to be inspected at one of the lake's inspection stations. Watercraft must be clean, drained, and dry to pass inspection and enter the lake. If they are not, they receive a decontamination through a high-pressure, high-temperature wash.

Terrestrial Invasive Species

- The [Part 575](#) regulation prohibits or limits the transport and sale of known invasive plants and animals in NYS.
- The [Part 192.5](#) regulation prohibits the import of firewood into NYS unless it has been heat treated to kill pests and limits the transportation of untreated firewood to less than 50 miles from its source.
- NYS DEC Commissioner Orders have been issued to establish [quarantines](#) to prevent the spread of oak wilt in the towns of Glenville and Islip.

APIPP PARTNERS

Thank you for helping protect the Adirondack region from invasive species.

Founding Partners

- The Nature Conservancy
- NYS Department of Environmental Conservation
- Adirondack Park Agency
- NYS Department of Transportation

NYS Program Partners

- NYS Invasive Species Council
- NYS Invasive Species Advisory Committee
- NYS's seven other Partnerships for Regional Invasive Species Management
 - St. Lawrence Eastern Lake Ontario
 - Capital Mohawk
 - Catskills
 - Finger Lakes
 - Western New York
 - Lower Hudson
 - Long Island
- New York Invasive Species Research Institute
- New York Invasive Species Database (iMapInvasives)

Cooperating Partners

- Adirondack Association of Towns and Villages
- Adirondack Council
- Adirondack Garden Club
- Adirondack Lakes Alliance
- Adirondack Landowners Association
- Adirondack Mountain Club
- Adirondack Research LLC.
- Cornell Cooperative Extension
- Darrin Freshwater Institute
- Essex County Soil & Water Conservation District
- The Fund for Lake George
- Hamilton County Soil & Water Conservation District
- Lake Champlain Basin Program
- Lake Champlain Sea Grant
- Lake George Association
- Lake George Land Conservancy
- Lake George Park Commission
- Lake Placid Land Conservancy
- New York Power Authority
- NYS Department of Agriculture & Markets
- NYS Hemlock Initiative
- NYS Natural Heritage Program
- Paul Smith's College Adirondack Watershed Institute
- United States Department of Agriculture, Animal & Plant Health Inspection Service
- Warren County Soil & Water Conservation District

REFERENCE MATERIALS

- [Five-year Strategic Plan](#)
- [Best Management Practices Manual](#)
- [Target & Watched Species Profiles](#)
- [Past Annual Work Plans](#)
- [Past Annual Reports](#)
- [Past APIPP Partner Meeting Minutes](#)
- [Flagship Reports](#)
- [Brochures & Handouts](#)
- [Scientific Publications](#)
- [Videos & Recordings](#)
- [Training & Workshop Materials](#)
- [Press Releases](#)
- [Interactive Invasive Species Distribution Map](#)
- [APIPP Website](#)
- [APIPP Facebook Page](#)

ENGAGEMENT OPPORTUNITIES

- [Follow APIPP's Work](#)
- [Become an APIPP Volunteer](#)
- [Manage an Infestation](#)
- [Collaborate on Research with APIPP](#)
- [Make a Donation](#)

Appendix 1: iMapInvasives Summary Report



APIPP PRISM METRICS 2019

Records by Species Type*	2019*	Total* 2010-Present
Terrestrial Animal	2	98
Aquatic Animal	5	383
Terrestrial Plant	346	6,173
Aquatic Plant	20	579
<i>Not Detected</i>	215	5,484
TOTAL	588	13,400

Records by Data Entry Method* (Presence only)	2019*	Total* 2010-Present
Bulk Upload	4	5,978
Mobile App	203	429
On-line	166	1,509
TOTAL	373	7,916

* Data entry date as of 12/31/2019. These totals are both unconfirmed and confirmed data. Numbers for 2019 *do not* include approximate data.

2019 Training Classes

Date	Trainer	Training Class Name	Location
8/9/2019	Gabriela Wemple and Meg Wilkinson	2019 - Schroon Lake Association - Training	Schroon Lake

2019 Projects, Users, Organizations, and Species

	Users inputting data	Organizations	Species Reported
2019*	46	25	53
All Years	272	76	136

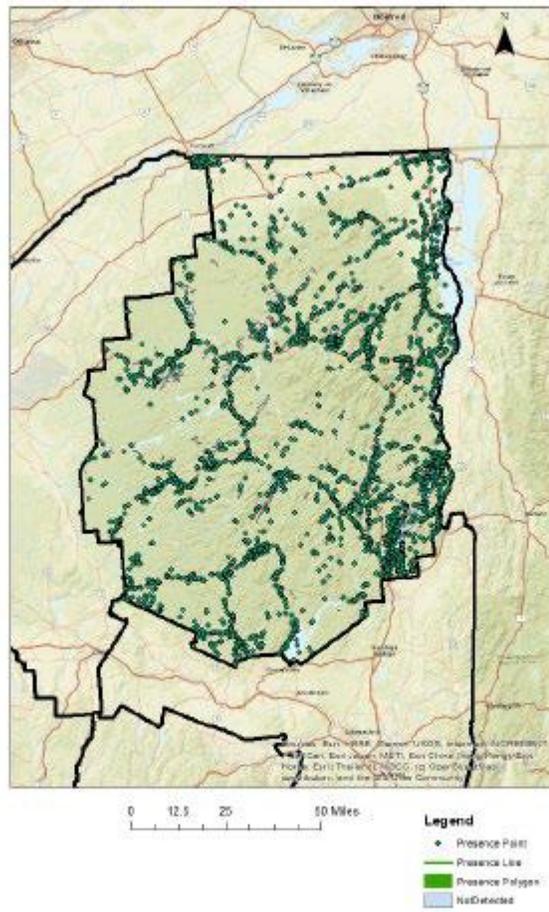
Top 10 Reported Species 2019*	
(Not Detected) Hemlock Woolly Adelgid	98
Japanese Knotweed, Japanese Bamboo	53
Knotweed (species unknown)	20
(Not Detected) Curly Pondweed	13
(Not Detected) Eurasian Water-milfoil	13
(Not Detected) Water Chestnut	11
(Not Detected) Variable Watermilfoil	10
(Not Detected) Fanwort	9
(Not Detected) Hydrilla	9
(Not Detected) European Frogbit	8

Top 10 Observers 2019*	
Coleman Perella	74
Daniel Leavenworth	50
Makayla Thornton	28
Frank Baehre	27
Leigh Walrath	11
Erin Vennie-Vollrath	10
David Wilson	9
Jay Pierz	7
Marcus Harazin	7
Roy Keats	7

New Species Reported in 2019*	
Species Name	Date Entered
<i>Lupinus polyphyllus</i> var. <i>polyphyllus</i> , Bigleaf Lupine	9/12/2019
<i>Amyntas-Metaphire</i> spp. (species unknown), Jumping Worms (species unknown)	8/18/2019
<i>Persicaria extremiorientalis</i> , Far-eastern smartweed	10/1/2019
<i>Syringa reticulata</i> , Japanese-Tree Lilac	7/14/2019
<i>Persicaria perfoliate</i> , Mile-a-minute Weed	5/2/2019
<i>Lychnis flos-cuculi</i> , Ragged Robin	7/16/2019
<i>Lamiastrum galeobdolon</i> , Yellow Arch-angel	8/2/2019
<i>Fiorinia externa</i> , Elongate Hemlock Scale	5/21/2019
<i>Digitalis purpurea</i> , Purple Foxglove	7/26/2019
<i>Lysimachia vulgaris</i> , Garden Loosestrife	7/14/2019

Top 10 Organizations Submitting Bulk Uploads	Observations 2010-Present*
Adirondack Park Invasive Plant Program (APIPP)	2,547
Adirondack Nature Conservancy and Land Trust	648
Lake George Land Conservancy (LGLC)	647
Regional Inlet Invasive Plant Program (RIIPP)	627
New York State Department of Transportation (NYS DOT)	563
United States Geological Survey (USGS) - Nonindigenous Aquatic Species (NAS)	468
New York Natural Heritage Program (NYNHP)	235
Hamilton County Soil and Water Conservation New York State Department of Environmental Conservation (Lands and Forests)	76
Ausable and Boquet River Associations	32
New York State Department of Environmental Conservation (Bureau of Fisheries)	20

APIPP IMapInvasives Data



* Data entry date 2010 to present. This map includes confirmed and unconfirmed data.