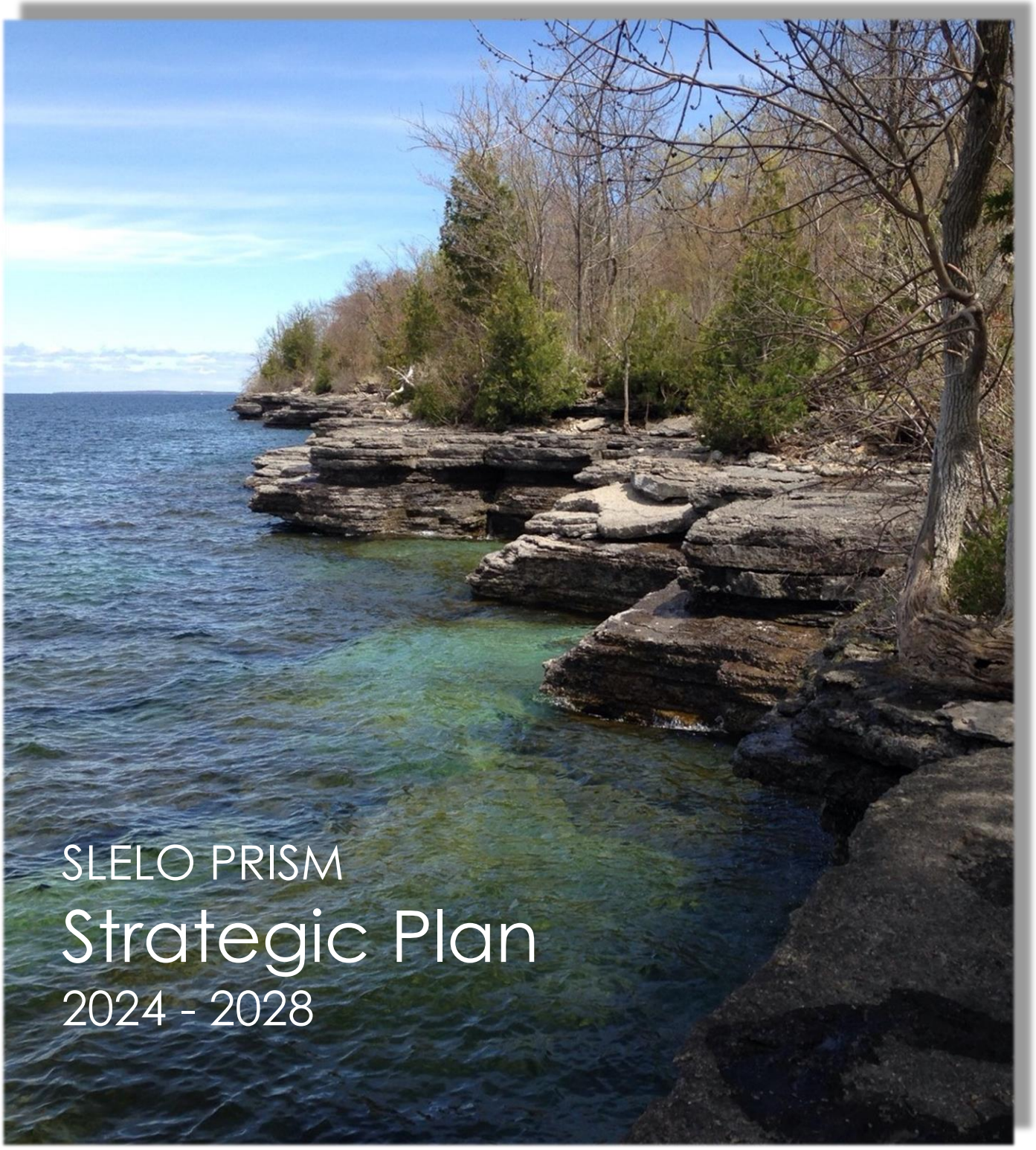

SLELO PRISM
Strategic Plan
2024 - 2028

INVASIVE SPECIES MANAGEMENT
SAINT LAWRENCE
EASTERN LAKE ONTARIO

Hosted By
The Nature Conservancy
269 Ouderkirk Road
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Acknowledgements

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Cover Photo
Eastern Lake Ontario Shoreline, ©TNC-Rob Williams

Strategic Planning

The purpose of strategic planning is to set overall goals for our program and to develop a plan to achieve them. It involves stepping back from everyday activities and asking where a program is headed and what its priorities should be. This Strategic Plan represents a high-level or an umbrella under which we determine objectives that, once completed will help us to achieve our goals for the program. It takes into consideration that all elements' strategies, objectives, and goals all must be in alignment to remain focused towards achieving successful outcomes.

Established partners of the PRISM have been engaged to participate in planning sessions to define the future ofthe program including setting priorities for the coming years. Break-Out Groups (Ranger Teams) were formed to focus on and refresh specific sections of this plan.

It should be noted that Annual Work Plans developed by the PRISM, are linked to this Strategic Plan as a means by which to ensure that we are always working in a direction that supports the desired outcomes. Both our Strategic Plan and Annual Work Plans ensure support of the New York State Invasive Species Comprehensive Management Plan as well as The Nature Conservancy's work to benefit people and nature.

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Introduction

Invasive species of plants, animals, insects, and microorganisms are among the most seriousthreats to native species, habitats, ecosystems and public health within the five-county area that defines the St. Lawrence Eastern Lake Ontario (SLELO) Region. Invasive species are opportunistic and almost always out-compete, damage, or displace native species resulting inserious disruptions of ecosystem processes. Interdependency on food and habitat, hydrology, nutrient cycling, natural succession, soil erosion and water quality are among the processes impacted. As our climate changes, these processes are affected in ways that can compound the adverse impacts of both native and non-native flora and fauna.

Invasive species affect almost all aspects of our culture. They interfere with many types of outdoor recreation. They reduce crop yields and interfere with harvest operations on local farms. Along public roads and highways, invasive plants restrict visibility and create roadside hazards. Invasive insects and diseases kill trees in forested areas as well as along community streets. Some invasive species have a direct negative impact on public health.

The economic impact of invasive species in the United States has been estimated at 120 billion annually, (Pimentel, et. al.2004). Local communities have been challenged with controlling invasive species or remediating their impacts at costs ranging from several thousand to millions of dollars. The economic, cultural and ecosystem impacts resulting from invasive species invasions, signify the need for New York's PRISM's (Partnerships for Regional Invasive Species Management) and thus the SLELO PRISM.

By addressing the threat of invasive species through a combined sharing of resources, PRISMs and other community partnerships can have tangible and lasting affects in the mitigation of the negative implications caused by invasive species.

Problem Statement

According to the New York Invasive Species Council web site, an invasive species is a species that is: 1) nonnative to the ecosystem under consideration, and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. As a threat to our biodiversity, they have been judged second only to habitat loss. Invasives come from all around

the world and as the rate of international trade increases so do opportunities for introducing new invasive species.

Invasive species have caused many problems in the past, are causing problems now, and pose threats to our future. A wide variety of species are problematic for many sectors of our society including ecosystem impacts on both natural systems and managed systems such as forests, our food supply, including not only agriculture but also harvested wildlife, fish and shellfish and our man-made environments, including landscaping, infrastructure, industry, gardens, and pets. Invasive species have implications, too, for recreation and for human health. In the SLELO region, invasive species are having a negative effect on sensitive ecosystems (lands and waters) and are causing economic harm and public health concerns.

In 1999 there were approximately 50,000 foreign species in the United States and this number increases each year. About 42% of the species on the Threatened or Endangered species lists are at risk primarily because of non-indigenous species (Pimentel 2004).

In the history of the United States, non-native species are introduced into the United States both intentionally and accidentally. Introduced species, such as corn, wheat, rice, and other food crops, and cattle, poultry, and other livestock, now provide more than 98% of the U.S. food system. Other exotic species have been introduced for landscape restoration, biological pest control, sport and as pets. Some non-native species, however, have caused major economic losses in agriculture, forestry, and several other segments of the U.S. economy, in addition to harming the environment.

Estimating the full extent of the damages caused by invasive species and the number of species extinctions they have caused is difficult due in-part to the lack of comprehensive understanding. Nonetheless, about 400 of the 958 species that are listed as threatened or endangered under the Endangered Species Act are considered to be at risk primarily because of competition with and predation by non-indigenous species. Many other species worldwide that are not listed are also negatively affected by invasive species and/or ecosystem changes caused by alien species.

Estimating the economic impacts associated with invasive species in the United States is also difficult; nevertheless, enough data are available to quantify some of the impacts on agriculture, forestry, and public health. (Wilcove et al. 1998).

Biological Diversity & Climate

In support of and to strengthen conservation outcomes of the NYS DEC's Comprehensive Invasive Species Management Plan, the SLELO PRISMs strategic approach addresses invasive species issues by aligning with key strategies. This includes an integrated approach to protecting, enhancing, and preserving lands and waters in the Eastern Lake Ontario region that leverages science, innovation, and a proven track record of success. To meet our objectives, we consider the following when developing programs and projects, the reflections of which are presented in this report:

Natural Climate Solutions via Green Infrastructure:

By implementing ecological-restoration measures post invasive species management, we foster biological diversity and ecosystem site stability which play a key role in sustaining healthy stable natural areas e.g., climate-ready green infrastructure.

Carbon Sequestration:

Maintaining the carbon sequestration potential of places like Tug Hill by reducing the threat from invasive species is an important strategy for success. A recent study showed forest plots damaged by insect pests stored 69% less carbon than less disturbed plots and plots recently impacted by disease stored about 28% less carbon (Quirion et al 2021). SLELO's efforts to slow the spread of forest pests and pathogens is a key strategy for sequestering carbon in regional forests.

Conservation of Connected Lands and Waters:

Incorporated into the work of the SLELO PRISM is a resilient and connected lands approach that allows us to maximize conservation impact at-scale and the ability of natural systems to sustain themselves in the realm of climate change. The combined work of the SLELO PRISM and multiple partners across the region continues to minimize the impact of invasive species on 7.4 million acres of NY's resilient and connected lands, waters, and wetlands that are at risk. Future programing will be targeted at connected areas and will be referred to as CLAW (Connected Lands and Waters).

Recover Ecosystem Resilience and Promote Biodiversity:

Implementing effective management on public and private lands to improve the resilience and health of terrestrial and aquatic systems is paramount to maintaining healthy lands and waters. In the Eastern Lake Ontario and St. Lawrence Region, SLELO partners are helping to prevent new infestations of invasive species and are restoring invaded lands to natural conditions. This success directly contributes to shared managing for resilience goals and to the conservation benefits desired under the NYS Invasive Species Comprehensive Management Plan.

Partnerships for Regional Invasive Species Management (PRISM)

Invasive species are defined by Environmental Conservation Law (9-1703 (1) as non-native to the ecosystem under consideration; and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. They are a form of biological pollution that comes from all around the world and the rate of invasion is increasing due to increasing international trade. A wide variety of species negatively impact many sectors of our global community including our ecosystems, our food supplies, our economies, and human health.

Responding to the growing invasive species problem, New York State passed legislation in 2003 that created the New York Invasive Species Task Force (ISTF). The ISTF final report led to a 2008 statute, known as Title 17 of ECL Article 9, which established the New York Invasive Species Council and Invasive Species AdvisoryCommittee. The Council is co-led by the NYS Departments of Environmental Conservation (DEC) and Agriculture and Markets.

Among the Council's numerous statutory responsibilities is the requirement to encourage and support within available funds, Partnerships for Regional Invasive Species Management [PRISMs] in their efforts to address invasive species through coordination, recruitment, and training of volunteers, education, early detection, rapid response, eradication, research, and planning.

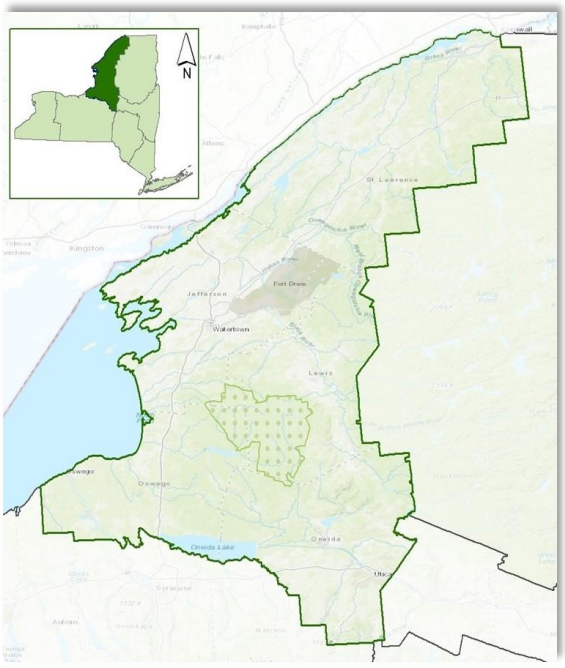
The purpose of this document is to outline a strategy by which the SLELO-PRISM will employ to prevent the introduction of invasive species, detect and respond to new infestations and control existing populations of prioritized invasive species within the SLELO focus area. The priorities to accomplish these objectives are outlined within this strategy.

DESCRIPTION OF SLELO PRISM REGION:

Geographic Region – SLELO

The PRISM encompasses a 7,387 square mile region and includes the counties of St. Lawrence, Jefferson, Lewis, Oneida and Oswego outside of the Adirondack Park. The SLELO region includes

portions of the Lake Ontario watershed and shoreline and the Oneida Lake northern watershed. The northern and western end of the region corresponds to the county boundaries of Jefferson, St. Lawrence and Oswego Counties along the Lake Ontario coastline. The eastern and southern boundaries correspond to the county boundaries of Oneida and Lewis. Both the western and northern portions of the SLELO region are contiguous internationalborders.



SLELO-PRISM Population by County U.S. Census Bureau 2022	
St. Lawrence	107,733.00
Jefferson	116,637.00
Lewis	26,699.00
Oneida	228,846.00
Oswego	118,287.00
Total	**598,202.00**

Insert Left: The SLELO jurisdiction to include the counties of St. Lawrence, Jefferson, Lewis, Oswego and Oneida outside of the ADK Park.
Insert Above: Population by SLELO Counties. Source: United States Census Bureau 2022 Statistics.

Natural Resources

The SLELO-PRISM region is a region rich with natural resources. Prominent geographical features found throughout the region have generated a vast diversity of habitat, landscapes, plant, and animal life. Some of the more prominent natural features include the Tug Hill Plateau, the Lake Ontario Shoreline, and the St. Lawrence River. To the east (and bordering) the SLELO region is the Adirondack Park. Other prominent natural features include numerous wildlife management areas and preserves, inland lakes, rivers, wetlands, and fens. These resources support diverse terrestrial and aquatic habitats including nesting and spawning areas.

The five county PRISM region supports a nominal forest industry (Table 1). The areas forests and trees add immensely to the quality of life for the people of the region as well as providing healthy and diverse habitat. These forested lands filter the air, safeguard private and public drinking water sources, produce locally grown forest products including lumber and maple syrup, provide essential habitat for wildlife, and moderate summer and winter temperatures near homes. Forests and trees are integral to the character of the SLELO region. They also provide a

spectacular annual display of fall color across our landscape.

New York State Forest Metrics (NYS DEC).

- New York State Forest area: 18.6 million acres, 61% of land area.
- Publicly owned Forest land: at least 3.7 million acres.
- Privately-owned forest land area: 14.4 million acres; 76% of forest land; owned by 687,000 landowners.

Table 1 – Forested Land in the SLELO PRISM Region (PRISM Boundary Only)

County	Land Area in PRISM (acres)	Forested Area in PRISM (acres)	% Forested
Jefferson	801,455	279,014	35%
Lewis	661,489	381,363	58%
Oneida	787,923	388,377	49%
Oswego	649,082	337,626	52%
St Lawrence	1,143,954	528,750	46%
TOTAL	**4,043,903**	**1,915,129**	**47%**

Statistics From National Landcover Database. Boundary Break Out by Zack Simek TNC, 2024.

Forested Area in PRISM Left: Map depicting the boundary of the SLELO PRISM (black line) with forested area. Non-shaded area (brown line) is outside of the SLELO PRISM jurisdiction. ©TNC, Zack Simek. 2024

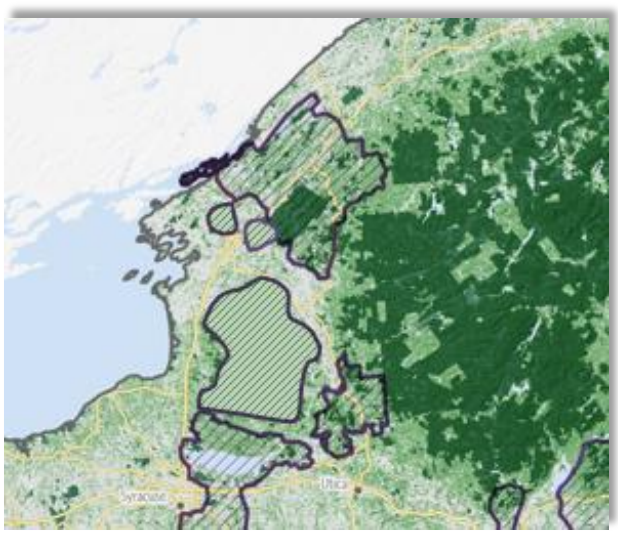
Freshwater resources are abundant in the SLELO-PRISM area and include hundreds of miles of rivers and tributaries, inland lakes and reservoirs and the Lake Ontario Shoreline which includes numerous harbors and embayment's and a significant section of the St. Lawrence River. These aquatic environments are an important part of the SLELO landscape supporting diversity of aquatic flora and fauna.

Of particular concern are the riparian areas within the SLELO region. Riparian areas that span climatic gradients might provide natural corridors that species could use to move and relocate as the ambient climate changes. These areas of climatic suitability and have been called riparian climate corridors. If we define site resilience as the capacity of a site to maintain diversity, productivity, and ecological function as the climate changes and if these climate-resilient sites, are adequately conserved and managed, they can then be expected to support a diverse array of native species and communities that change over time and reflect the individual character and productivity of the site. (Anderson et al 2016). This elevates the importance of these riparian areas as a need to maintain the ecological health of these systems.

CONNECTIVITY:

The Nature Conservancy's Science Team has identified a network of what we call resilient and connected lands, which if protected and conserved will allow these habitats to be more resilient to external stressors. (Anderson et al., 2012). What we do in the SLELO PRISM region serves to protect these larger connected systems. What we do in the Oswego River serves to protect the Finger Lakes, Oneida Lake and hundreds of miles of inland waterways within New York. What we do in the core forest of Tug Hill helps to protect the entire 750,000-acre forest including the entire Blue Ridge to Boreal Forest system.

As our climate changes, native plants and animals shift their distributions by colonizing and establishing new territory, finding suitable conditions including microclimates that allow them to persist, and produce offspring to continue the process (Anderson et al 2012). The problem is that this takes time – generations and the process is complicated by landscape fragmentation such as roads, dams, development, and other barriers to movement such as invasive species. Invasive species also lesson the quality of the ecosystem services that are provided in support of range shifts to wildlife an example being specialized feeding habits (Tallamy 2021). By reducing the invasives found along connected systems and by reestablishing native plant assemblages we can begin to recover ecosystem resilience and biodiversity on these types of green watershed infrastructures. The scale of this suggests that we should no longer manage invasive species at the backyard scale, but at the connected landscape scale.



Above Left: Depiction of connected forest lands within the SLELO Region.
Above Right: Depiction of connected waters within the SLELO Region.
Source: Anderson et al 2016.

Based on a gap analysis, a program that focusses on connected systems would serve to increase our conservation impact on lands and waters (forest and riparian areas) that are substantially connected, affected by non-native plants and that will benefit from restorative measures. By adding this Connected Lands and Waters or CLAW as an additional focus to our program, we maximize our conservation impact.

PARTNERSHIP STRUCTURE:

The SLELO partnership consists of any organization that has an interest in our mission. For organizational purposes our partnership has three levels: Principal Partners (those organizations with the greatest vested interests with our mission), At-Large Partners (representatives from each of the five counties within the PRISM), and Cooperating Affiliates (any organization that takes an active interest and a desire to cooperate on SLELO endeavors). In addition, the Principal Partners make up the SLELO Steering Committee and the At-Large Partners make up the SLELO Advisory Committee. Current partners are presented in Table 3 below.

Table 3 – Current SLELO Partners

Principle Partners (Steering Committee)	**At-Large Partners (Advisory Committee)**	**Cooperating Affiliates**
NYS Dept. of Transportation	St. Lawrence Co. Representative	Ducks Unlimited
NYS Dept. of Environmental Cons.	Jefferson County CCE	Tug Hill Tomorrow Land Trust
The Nature Conservancy	Lewis County Representative	Tug Hill Commission
Cornell Coop. Extension ISP	Oneida County Representative	Fort Drum Military Installation
NYS Parks, Recreation & Hist. Pres.	Oswego County Representative	Lake Bonaparte Conservation Club
Thousand Islands Land Trust		Save The River Organization
		Audubon Central NY Chapter
		New York Power Authority
		CNY Regional Planning Council
		U.S. Coast Guard Auxiliary
		Indian River Lakes Conservancy
		St. Regis Mohawk Tribe

PARTNERSHIP PURPOSE STATEMENT

Invasive species pose a serious ecological and economic threat in the St. Lawrence and Eastern Lake Ontario Region and unacceptable levels of invasive species adversely affect biodiversity, wildlife habitat, visual quality, recreational opportunities. Furthermore, a cooperative and coordinated approach amongst a diverse group of organizations will result in a more efficient and effective effort to prevent and manage invasive species where all parties have a mutual interest in preventing and controlling the spread of invasive species.

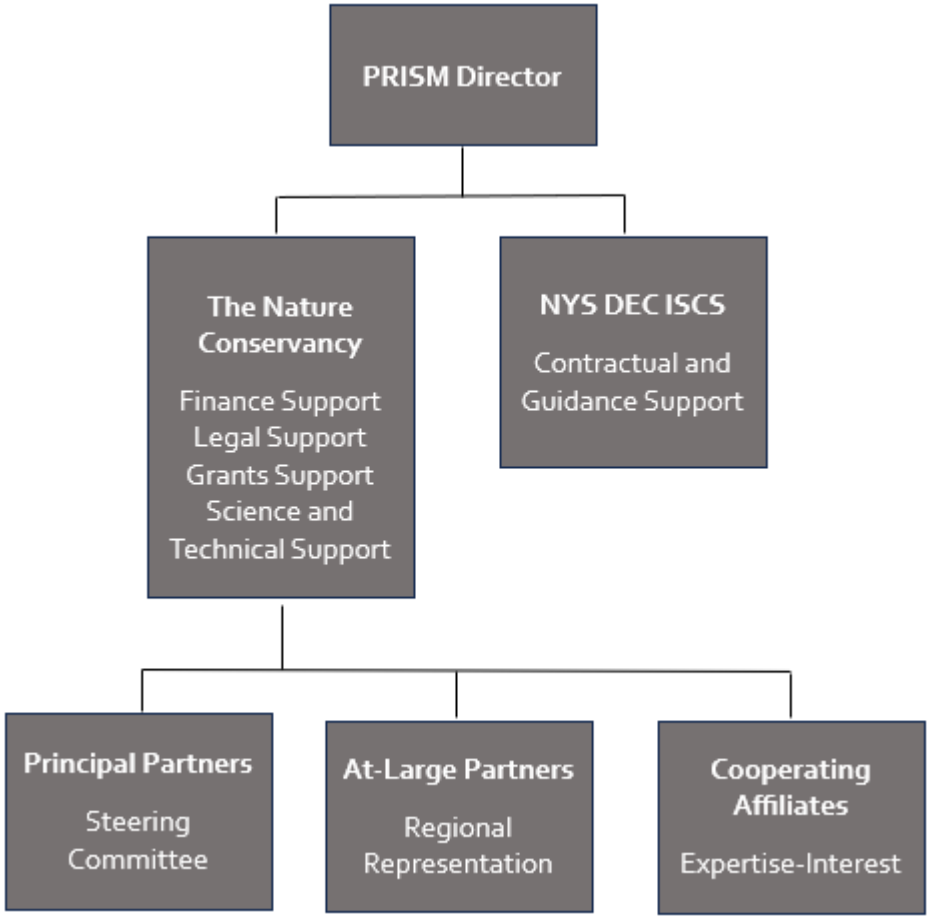
The purpose of this partnership is to define the approach under which the SLELO PRISM facilitates coordination and cooperation among partners towards the mutual interest of protecting our regions lands and waters from the negative impacts caused by invasive species and to restore the ecological health of the same. The emphasis of this collaboration will be on the prevention, early detection, rapid response, containment, and management of invasive species in St. Lawrence, Jefferson, Oswego, Lewis and Oneida counties outside of the Adirondack Park Blue Line.

Responsibility of Partners and Committees

The PRISM is managed as a cooperative effort between the Program Director, the host organization, the NYS DEC and the partners. As partners of the SLELO-PRISM, each partner is expected to support and participate with PRISM activities based on the respective organizations mission andresources and to provide expertise to the PRISM. Principle partners act as the steering committee to provide general recommendations to the partnership, but not to make final decisions. Ultimately, with the PRISM Director as Lead, it will be our entire partnership that provides input and makes decisions for the PRISM based onconsensus. Involving the entire group as an "open partnership" is how programs grow, expand, and sustain themselves.

At large partners act in an advisory capacity should the need arise, and cooperating affiliates participate with projects and activities based on need and desire.

SLELO - PRISM Organization and Committees



HOST ORGANIZATION:

Since 2011, The Nature Conservancy (TNC or simply Conservancy) has continued to demonstrate strong leadership, coordination, facilitation, and administration in executing the contract requirements for the St. Lawrence and Eastern Lake Ontario (SLELO) PRISM. The Nature Conservancy has worked to further the goals identified in the SLELO PRISM Strategic Plans and Annual Work Plans which include prevention; early detection/rapid response; education and outreach; information management; invasive species management measures; site restoration and collaboration among regional and statewide partners. Based in part on the leadership and success achieved by TNC to date in combating invasive species, the SLELO Partnership endorsed TNC to continue hosting the PRISM under renewed grant funding.

SLELO PRISM MISSION:

The mission of the SLELO PRISM is to protect native habitats, biodiversity, natural areas, parks and refuges, habitats, waterbodies, and open space by using a collaborative and integrated approach to invasive species management and ecological restoration. The emphasis of these activities will be on sustaining biological diversity in increasing resiliency.

SLELO PRISM VISION:

Within five years our PRISM will have the capacity to effectively address invasive species issues within the five-county region through cooperation and partnerships to include active invasive species management, public awareness and participation and community engagement. (SLELO Partnership Questionnaire, 2011).

GENERAL APPROACH to INVASIVE SPECIES MANAGEMENT on PRVATE LANDS:

SLELO PRISM and TNC does not have the resources to conduct invasive species related work wherever invasives may exist and typically will not conduct similar work on private property unless the work is part of a larger conservation initiative such as participating with the New York Giant Hogweed Program or large-scale efforts such as our Salmon River Initiative. To achieve success, we will focus on Priority Conservation Areas or PCAs that meet minimum qualifications to include:

1. The site must be sponsored by a SLELO partner -*not owned by* just sponsored by.
2. The site must have some uniqueness or ecological importance such as unique habitat,grassland, Alvar, wetland, dune, freshwater spawning area, fen, bog, etc.
3. The site "should be" host to a rare, threatened or endangered species.

OVERVIEW OF INVASIVE SPECIES PROBLEMS AND PATHWAYS

Many invasive species found within the SLELO region have and continue to have detrimental impacts on the region. Invasive species of plants, animals, insects, and microorganisms are among the most serious threats to native species, habitats, ecosystems and public health. They interfere with outdoor recreation in parks, on waterways, and in other natural areas. On local farms, invasive plants reduce crop yields and interfere with harvest operations (Young 2011). Along public roads and highways, invasive trees and shrubs restrict visibility and create dangerous roadside hazards. Invasive species kill trees in forested areas as well as along community streets. Other species have a direct and negative impact on public health. The following are some of the common problems and species within the SLELO region.

Forest Pests and Pathogens

Forest cover in the SLELO Region occupies 1,915,129 acres of the land base (National Landcover Database). These forests have tremendous ecological and economic importance. Forests are relied upon for industry, recreation, clean drinking water, and biodiversity. The trees in this region are threatened by the negative impacts of invasive forest pests such as the emerald ash borer (EAB), the Asian long-horned beetle (ALB), the hemlock woolly adelgid (HWA) and the spotted lanternfly. EAB and ALB are of particular concern to this region due to the abundance of ash and sugar maple trees. In the five counties that make up the SLELO region, Ash makes up approximately 6% of the forest area and red and sugar maples makes up approximately 31% of the forested area (USDA FIA 2010).

Terrestrial Invasive Plants

The threat of invasive plant species to forest ecosystems of the SLELO Region in Northern New York has not been well documented. A 2006 study by the Eastern Chapter of The Nature Conservancy assessed the distribution and threat of 12 invasive plant species to forest and aquatic ecosystems in the nearby Catskill Mountains and identified factors that best predicted their distribution. Species considered during the study were chosen because they are known to be invasive in New York State and have the potential to occur in the Catskill Mountains. They included: Norway maple, garlic mustard, autumn olive, invasive knotweed, bush honeysuckle, common reed, buckthorn, and swallow-wort to name a few.

Aquatic Invasive Species

The SLELO PRISM region has been invaded by both aquatic plant and aquatic animal species to include water chestnut (*Trapa natans*), Eurasian water milfoil (*Myriophyllum spicatum*) and Frogbit (*Hydrocharis morus-ranae*). Several aquatic animal species documented in the region include: tench (*Tinca tinca*), Spiny waterflea (*Bethotrephes cedarstroemi*), fishhook Waterflea (*Cercopagis pengoi*), zebra mussel (*Dreissena polymorpha*), quagga mussel *(Dreissena bugensis)* andround goby *(Neogobius melanostomus).* The bloody red shrimp (*Hemimysis anomala*), chinesemitten crab (*Eriocheir sinensis*) andEurasian ruffe (*Gymnocephalus cernuus*) are expected to be in Lake Ontario and St. Lawrence River waters soon. Two unique features in the SLELO PRISM region include Lake Ontario and the St. Lawrence River which encompass the entire western and northern portions of the region. This is an important aspect since the lake and river (both international waterways) are prime pathways for the introduction and import/export of invasive species (Kate Breheny, 2012).

PATHWAYS:

Pathway - Bilge/Ballast Water

Commercial ships and boats traveling Lake Ontario and the Great Lakes have probably been one of the primary vectors for moving aquatic invasive species. Historically, organisms may have attached themselves directly to the hulls of vessels. In recent years, ballast water has received increasing attention as a vector. Post-transport ballast water contains high densities of both plankton, fish and microscopic organisms. Ballast tanks may hold millions of liters of water allowing numerous individuals to be introduced in a single event. (Roman 2010).

The loading of ballast water. (Image courtesy of the international Maritime Organization)

Pathway - Ports of Entry

Many invasive species enter the United States each year in cargo, mail, and passenger baggage or as contaminants of commodities. In today's global marketplace, the volume of international trade brings increased potential for these invaders to enter our country. Agricultural produce, nursery stock, cut flowers, and timber can harbor insects, disease-causing microorganisms, slugs, and snails (APHIS 2010). These pests can also hitchhike on containers, crates, or pallets and enter the SLELO region via ports of entry (POE's). In the SLELO region direct POE's include the St. Lawrence River, Oswego Harbor, Henderson Harbor, Cape Vincent and international roadways extending from Canada. Indirect POE's include all international and national airports and the New York City Harbor.

Pathway - Roads and Corridors

Roads and utility corridors that bisect the landscape move invasive species from one location to another. New road construction as well as re-construction can contribute significantly to the spread of invasive species. Maintenance of roadways can also play a critical role in spreading invasives along roadsides and rights-of-way (Miller, 2011). Mowing and ditching equipment and processes can spread seeds by deflection as well as by transporting equipment from one location to another without thorough cleaning.

Both the construction of and maintenance of utility corridors can be a vector for transporting invasive species. Overhead and subsurface corridors require frequent maintenance which creates disturbed areas allowing invasives to become established. The movement of equipment supplies the transport mechanism.

Pathway – Firewood

Forest pests and pathogens pose a major threat to the health of the forest ecosystems and economy in the region. Movement of firewood and other wood products is considered the primary vector. With the threat of the Emerald Ash Borer advancing into our region along with the threat of the Asian Long-horned Beetle, educating the public and local communities will become increasingly important.

Pathway - Boating and Fishing Gear

Recreational boating and fishing are an important pathway for the movement of aquatic invasive species. Boats are known vectors of aquatic plants and animals and standards for boat cleaning

are only in place on a limited number of water bodies. The aquatic invasive diatom Didymo can easily be spread by droplets of water on fishing gear and can persist in the moisture of felt-soled boots over long periods (M. Taylor 2011).

Pathway - Fishing and Bait:

Biologists have recognized "bait bucket introductions" as a common means of spreading aquatic invaders. One example is the Rusty Crayfish **(***Orconectes rusticus***).** Native to the central and midwest United States, the Rusty Crayfish has spread to other states to include New York, Massachusetts, New Jersey and Pennsylvania. This species was likely spread by anglers who transported them for use as fishing bait, largely via bait buckets. The rusty crayfish is larger than most native crayfish, so it outcompetes them, and its size makes it unattractive prey for many fish. It also destroys the aquatic plant beds that serve as cover and food for other aquatic organisms, as well as nursery habitat for sport fish. In addition, rusty crayfish prey on fish eggs, further harming local fish populations (Don't Dump That Bait, 2011).

Pathway - Soil Transport and Land Development:

Soil is often imported and/or exported to and from development sites based on need. The movement of fill or soil from one site to another can spread invasive plant propagules both within the region and from other regions into this area. Japanese Knotweed and Phragmites are commonly brought to new areas in this way because of the ability of the plant to reproduce from tiny fragments of virtually every part of the plant. These fragments can take root in areas and establish new populations in areas previously free of these plants. Seeds are also contained in untreated soil, allowing for long-distance transportation of any invasive plant.

Land development is occurring in areas within the SLELO region in-part due to the pressure to provide housing, services, and transportation routes for the Fort Drum army base. In addition, areas of the region especially along the eastern shores of Lake Ontario known for its prevailing winds are being considered for several large wind power projects. All these projects along with

others have the potential to promote the spreading of invasive species through the transmission corridors, heavy equipment usage and transport and/or ground disturbance. The lack of or improper cleaning of equipment prior to transport also contributes to the spread of invasive species (Rainbolt, 2012).

Pathway – Recreation

Seeds from invasive species can stow away on hiking boots, waiters, clothing, tires, bumpers, wheel wells or the underside of vehicles and equipment used in recreational activities. These seeds can be transported great distances before falling off in a new location. Activities such as stream fishing, trail hiking, hunting, ATV riding and other activities can be a significant mechanism for transporting aquatic and terrestrial invasive species.

Pathway - Nurseries and Landscaping

Historically, the nursery industry has brought invasive ornamental plants to new areas. Known invasive species such as barberry and Burning Bush are still commonly planted in the region. Inadvertent introduction of invasive pests may also occur in the movement of plants and plant materials. The emerald ash borer was introduced to Maryland in infested saplings. This pathway shall be addressed by the New York State Department of Agriculture and Markets.

Pathway - Commercial/Retail

Some aquatic invasives can be linked to the commercial and retail industry. These include the aquarium industry, retail sales in live fish markets and ornamental water garden plant sales. Often, these exotic plant and animals are released into ponds, lakes and streams when the owner no longer wants to care for them, or the fish outgrow their surroundings.

Live fish markets have also been linked to the introduction of non-native fish species, including the snakehead fish and several varieties of carp. Since some species cannot survive in small tanks for extended lengths of time, market owners have been accused of discarding them in local waterbodies when the fish are not sold quickly (LaManche, 2007).

Pathway - Natural Spread

Natural spread can be achieved via wind dispersal mechanisms of various terrestrial plants. Streams carry plant materials and animals throughout a watershed via natural hydraulics. Insects will naturally disperse by flight. (Taylor, 2011). Seeds can also be spread by animals in undigested feces.

CAUSES / KNOWN STRESSORS, PROBLEMS, THREATS

Ecosystem Disturbance Terrestrial and Aquatic):

Invasives species become easily established in disturbed areas. Disturbed areas provide less competition, increase soil temperatures and sunlight which create an opportune situation for the establishment of invasives.

In many cases, land disturbance either by development or natural causes can create disturbed areas within ecologically important areas such as preserves, wetlands, wildlife management areas and important aquatic ecosystems. Development of land including infrastructure development can play an active role in transporting invasive species seed stock. In aquatic ecosystems, native plants and organisms can be displaced by invasives due to hydrologic changes and changes in the benthic composition.

Declining Forest Health:

Forest health can be impacted by deer overgrazing, reduced regeneration due to invasive ground cover, tree mortality from invasive pests and pathogens and by a changing climate. Combined, these changes can reduce forest health and the forest's ability to filter and store carbon. [2]

Forest Regeneration:

Regeneration of forests can be limited by invasive species. As invasive ground cover becomes prevalent, more beneficial native species are out-competed thus preventing regeneration. White tail deer, preferring native plant sustenance, augments the growth of understory invasive plants further limiting forest regeneration.

[2] Aligns with TNC's 2030 Carbon and Biodiversity Goals

Changes in Land Use:

Since many invasive species are fast-growing and highly opportunistic, changes in land use generally favors biological invasion. Cleared areas and newly established agricultural areas can create ideal conditions that allow for the introduction of invasive species. Even abandoned agricultural areas may be susceptible to an invasion before natural succession can restore the local plant community. In addition, changes in land use practices can accelerate or exacerbate the spread of invasive species. Certain land use practices, such as overgrazing, fertilization, and the use of agricultural chemicals, can enhance the growth of invasives while suppressing native species. Other species can alter fish and wildlife habitat, contribute to decreases in biodiversity, and even create health risks to livestock and humans.

Climate Change and Carbon Storage:

Climate change [3] may also alter the amount and seasonal distribution of precipitation and seasonal temperature patterns in ways that can favor invasive species. Stressed natural communities are more open and their resources are ripe for the invasion and establishment of invasive plant species. The invaders may also be better adapted than native species to the new environmental conditions resulting from climate change. Additionally, *deforestation as the result of forest pests can reduce healthy trees and cause a loss of carbon storage which in-turn can increase greenhouse gases and thus contribute to climate change.*

International Borders:

The SLELO PRISM region is located along the eastern shores of Lake Ontario and the St. Lawrence River. Being part of the Great Lakes allows for international movement of commercial vessels and goods as well as recreational vessels. This creates a stressor by exposing our region to those invasive species that may be introduced into our area as a result of international movement. The northern portion of the SLELO region is a gateway for international travel and may pose additional risks in the introduction (import/export) of invasive species.

Nursery Trade:

The nursery industry has historically participated in the import of non-native species. As a result, some species have been intentionally introduced into our environment. Due to the nature of the business, the nursery industry is, by default, a stakeholder in the invasive plant issue. The issue

[3] Aligns with the DEC Invasive Species Comprehensive Management Plan and TNC's Shared Conservation Agenda

involves having unrestricted import and selling of nonnative plants, some of which may be potentially invasive, versus the control of the sale of potentially or known invasive plants. In New York a regulation (Part 575) was adopted in July 2014, that prohibits or regulates the possession, transport, importation, sale, purchase and introduction of select invasive species. The purpose of this regulation is to help control invasive species by reducing new infestations and spread of existing populations, https://www.dec.ny.gov/animals/99141.html.

STRATEGIC ALIGNMENT

The New York State Department of Environmental Conservation (DEC) developed a strategic framework for the statewide PRISM network to maximize the state's effectiveness in addressing invasive species impacts. The goals and strategies identified in the NYS Aquatic Invasive Species (AIS) Management Plan, and the NYS Invasive Species Comprehensive Management Plan, including recommendations for invasive species education and outreach, are all reflected in SLELO's current Strategic Plan and corresponding annual work plans. These focal initiatives include.

- Continued partnership and capacity building
- Commitment to a centralized framework for sharing invasive species information
- Setting priorities for invasive species management and advance preparedness
- Engaging and informing the public
- Advancing prevention and early detection initiatives
- Rapidly responding to invasive species
- Restoring ecosystem resilience
- Evaluating success

The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends and ensure that both people and nature thrive. Through our Shared Conservation Agenda, we are working towards a climate resilient future that includes sustainable working forests in both a rural and urban context, natural infrastructure that protects our drinking water and provides benefits to surrounding communities, and innovative strategies for mitigating the impact of pests, pathogens, and invasive species that threaten our natural resources. The Conservancy pursues non-confrontational, pragmatic, science-based solutions in order to achieve this mission. This makes it essential for us to work collaboratively with partners, communities, businesses, government agencies, such as DEC and OPRHP, multilateral institutions, individuals, and other non-profit organizations such as land trusts and conservation organizations. The Conservancy also works in close cooperation with private landowners and local stakeholders, such as farmers, foresters, and anglers, to ensure sound ecological management while continuing to support the local economy. The Nature Conservancy's strategy

for implementing the SLELO PRISM from 2019 through 2023 includes an integrated approach to protecting, enhancing, and preserving New York's lands and waters that leverages our organizational strengths of science, innovation, and a proven track record of success. The Conservancy is also very interested in working closely with DEC and the Invasive Species Council to continue to evaluate our past invasive species actions and work with all partners across the state and region to ensure our invasive species work is effective, efficient and sets the stage for long-term conservation success. [4]

PROGRAMMATIC STRATEGIES:

Integration with Statewide Partners and Programs:

SLELO PRISM representatives and the Program Coordinator continue to integrate SLELO activities with other statewide efforts. We will continue to collaborate with statewide partners, including:

- The NYS DEC Invasive Species Coordination Section.
- Other NYS PRISMs through PRISM leader's meetings, Priority Setting Workshops, Lake Ontario eDNA projects.
- The NYS Invasive Species Research Institute (NYISRI), In-Service Conference, Priority Setting Workshops, Statewide Research Priority setting.
- The NYS Hemlock Initiative and Biocontrol Lab at Cornell University.
- NYiMapinvasives program, regional species database entries and species alerts.
- NYS Invasive Species Advisory Committee (ISAC). The SLELO PRISM Coordinator serves in dual capacity as PRISM representative and as Secretary to ISAC.

Integration with Regional and National Programs:

A benefit of a large organization like The Nature Conservancy is the ability to capitalize on staff expertise located throughout the organization. This includes:

- TNC's internal Invasive Species Advisory Committee where others across the organization can share best management practices, new concepts and success or challenges that help benefit the local work of TNC.
- Relationships with numerous universities including Cornell University and Notre Dame's eDNA lab focused on invasive species detection.
- The Don't Move Firewood Program run by a TNC staff person based in Montana.
- TNC's Great Lakes Program which brings together government agencies from the US and Canada as well as conservation partners to develop a unifying vision to advance Great Lakes conservation including shared goals on invasive species management.

[4] Aligns with the DEC Invasive Species Comprehensive Management Plan and TNC's Shared Conservation Agenda

- The Continental Dialogue on Non-Native Forest Insects & Diseases which was formed by TNC to bring together multiple partners to develop shared goals to address the impact from forest pests.

SLELO PRISM's PRIORITY ISSUES

Within the SLELO region, partners have identified several priority issues which are poised for action. According to the 2012 SLELO Partnership Questionnaire, partners identified several issues that are considered very important, and four issues identified as "extremely important". Issues identified as extremely important include:

Prevention:

Preventing the introduction of new invasive terrestrial and aquatic plant and animal species not currently found in the SLELO region is the number one SLELO priority. These species are those that are not currently found in the SLELO region but are in proximity and that have the potential to have the greatest negative impact. Examples include hydrilla, the Asian long horned beetle and the mile-a-minute vine. [5]

Early Detection and Rapid Response ED/RR:

ED/RR for new species is a priority for the SLELO PRISM. This includes a **control component** that will help to eradicate new infestations and to contain and/or suppress species populations upon initial detection. [6]

Education / Outreach / Marketing:

Educating the public on various issues related to invasive species is at the forefront of any long-term management effort. Educational efforts will be tailored to meet the needs of each stakeholder group. Increasing the stakeholders' awareness of invasive species literacy, negative impacts, and strategies for limiting negative impacts is a goal of SLELO's educational efforts. The public needs to be aware of the numerous ways in which invasive species impact our daily lives and how they can help address the issue. Consistent messaging that invokes behavioral change isan important element of our education, outreach and marketing efforts.[7]

[5] Aligns with the NYSDEC Invasive Species Comprehensive Management Plan
[6] Aligns with the NYSDEC Invasive Species Comprehensive Management Plan

[7] Aligns with the NYSDEC Invasive Species Comprehensive Management Plan

Community Preparedness:

Certain invasive species problems require that communities be prepared to deal with them. An example is the Emerald Ash Borer, a species that can have detrimental impact on communities both from an aesthetic as well as an economic standpoint. The SLELO partners have identified community preparedness as a priority issue for communities within the five county PRISM region. This includes an urban forest sustainability practice (guide) that is shared to municipalities.

Climate Change and Invasive Species:

In recognition that a changing climate can affect species range and distribution and recognizing That invasive species can indirectly affect climate by reducing forest carbon storage, incorporating climate considerations into invasive species management, can result in greater conservation impact when managing invasive species and host environments.

Professional Capacity:

PRISM Director

The PRISM Director is responsible in overseeing and directing all elements of the PRISM Program. This includes employee supervision, strategic planning, and program implementation. The Program Director directs some or all aspects of protection, science, and community relations for a geographic area within a Business Unit (BU) or program such as the SLELO PRISM five county region. This position serves as the principle contact to government agencies, other conservation organizations, foundations, and the academic community within the confines of the PRISM program.

Aquatic Invasive Species (AIS) Restoration and Resiliency Coordinator

The Nature Conservancy has identified the need to increase program capacity by employing an Aquatic Invasive Species (AIS) Restoration and Resiliency Coordinator. This increased capacity will allow us to deliver more effective and targeted approaches to AIS spread prevention, early detection, control and management including integrated boat launch stewardship. This position will also allow for implementation of aquatic invasive species biomass reduction and potential aquatic habitat restoration and resiliency efforts. This capacity allows for morecollaboration with the NYS DEC Invasive Species Coordination Unit on aquatic invasive species issues as related to the NYS Aquatic Invasive Species Management Plan and Comprehensive
Invasive Species Management Plan. The AIS Coordinator will develop and deliver early detection surveillance and focused presentations. The AIS Coordinator will also interact with stakeholder groups at local, state and regional levels, participate in education and outreach events, and assist with the development ofannual work plans.

Terrestrial Restoration and Resiliency Coordinator

This staff member will allow us to deliver more effective and targeted approaches to terrestrial invasive species early detection, spread prevention, control and management including efforts that will enrich the SLELO mission. Additionally, this increased capacity will lend support to future releases and monitoring of approved biological controls. This increased capacity will also allow us to implement site specific ecological restoration measures and, by incorporating climate and pathway considerations, provide opportunities to restore treatment sites to native character while increasing resiliency to future disturbances. We also anticipate that this increased terrestrial capacity will assist in implementation of various components of the NYS Invasive Species Comprehensive Management Plan.

Education and Outreach and Community Science:

Educating the public on various issues related to invasive species is at the forefront of any long-term management effort. Past and future educational efforts established by SLELO partners will be tailored to meet the needs of each stakeholder group. Increasing the stakeholders' awareness of invasive species literacy, negative impacts, and strategies for limiting negative impacts is a goal of SLELO's educational efforts. The SLELO PRISM and via our Education and Outreach Coordinator provides educational and outreach material as requested by or produced by the NYS DEC Invasive Species Coordination Section.

Data Manager

As the SLELO PRISM continues to implement successful and innovative projects, many of which produce large data sets, there is a growing need for a part time individual with a science related background. This position has been added to assist with data collection and analysis, technical

report preparation and to provide guidance on potential articles for submission to various scientific journals. This capacity will allow us to share information, innovative advances in invasive species prevention and management and conservation successes with statewide partners and the broader scientific community. Sharing this information will also allow for cross-PRISM development of efforts to manage invasive species along with a better understanding of ecological restoration.

SLELO PRISM's ADVANCED INITIATIVES – A Summary

Core Program: Prevention, Early Detection, Rapid Response/Control, Ecological Restoration, Education & Outreach.

Connected Lands and Waters – CLAW: Incorporated into the work of the SLELO PRISM is a resilient and connected lands and water approach that allows us to maximize conservation impact at-scale and the ability of natural systems to sustain themselves in the realm of climate change. This is achieved by focusing efforts on areas that are substantially connected, e.g., forests, freshwaters and riparian areas.

Community Preparedness: Throughout the region, municipal leaders are looking for existing tree management plans that incorporate forest pest preparedness strategies and the establishment of invasive species resistant and climate adaptable native street trees. We will continue to utilize and encourage the adoption of our Urban Forest Sustainability Guide developed as a joint effort between the SLELO PRISM, The Nature Conservancy and the NYS Department of Environmental Conservation.

Healthy Forests: Sustaining healthy forests are important for nature and people. Within forested areas of the PRISM and associated 'linkage' areas we will work with The Nature Conservancy to promote forest health via the suppression of forest pests and pathogens. This is done via early detection assessments, biological control liberation and restoration as needed.

Healthy Freshwater: Freshwater protection through the PRISM will be accomplished through aquatic invasive species education and messaging, riparian invasive species suppression and ecological restoration and through early detection and strategic responses to connected areas via CLAW programming.

Biological Controls: Augment biocontrol releases andcage studies when and where appropriate.

eDNA: Utilizing eDNA as an early detection tool to strategically respond to new AIS entrees and to support native species that may be jeopardized by the establishment of AIS.

eDNA Inland Rivers: eDNA lab testing for invasive and key species in inland rivers and lakes.

Marketing Campaign: We will contract with a communications firm to adopt a campaign strategy towards the SLELO region that utilizes a standard theme known as Pledge-to-Protect as approved by NYS DEC.

SLELO Special Projects with partners: This strategic plan component is designed to implement invasive species projects in collaboration with SLELO partners that will augment work of the CLAW Program and the PRISM.

GOALS, OBJECTIVES AND STRATEGIES:

A programmatic approach known as the Shared Conservation Agenda or SCA[11], (TNC 2019) is a strategic planning and implementation process that engages stakeholders focusing on achieving the best possible results for the most important natural resource issues of today. Partners of the SLELO PRISM have engaged in a similar, complementary process to identify goals and objectives along with specific (action oriented) strategies with accompanying measurable results. In addition, the partners benefited from a strategic planning outline developed by the DEC Office of Invasive Species Coordination.

What follows is a framework of goals, objectives, strategies, outputs and outcomes and supporting documentation that will help the SLELO partners to not only achieve the best possible outcomes, but to maximize conservation benefit within the SLELO PRISM region.

[11] Shared Conservation Agenda developed by The Nature Conservancy in New York and North America 2019.

Prevention

Goal 1. – Prevent the introduction of Tier 1 invasive species into the SLELO PRISM including target conservation and priority areas. Prevention must be the first line of defense in implementing a program.

Objectives:

A. Maintain close communication with other PRISM's, state agencies, and other education/environmental organizations to identify potential threats and to stay informed about control methods they are deploying.

B. Create and sustain public awareness of new threat species and appropriate Best Management Practices that are important to SLELO's prevention program.

C. Support prevention efforts that focus on primary pathways to prevent potential threats of invasive species from entering the PRISM.

Strategies:

By developing and refining prevention methodologies, we position the program in a way that will prevent invasive species arrivals, so that they cannot become established and have negative impact on biodiversity and the ecosystem. These efforts will be complimented by pathway mitigation measures including early detection/rapid response efforts for those species that do arrive in our region and possibly ecological restoration measures that return the site characteristics more towards their native plant assemblages strengthening the health of the system.

Supporting Documentation:
Established methodologies should be deployed. This includes attending meetings with other PRISM staff about control of invasive species not currently in SLELO PRISM. Other agencies such as DEC, OPRHP, NYS AGM, SWCD's, and education/environmental organizations should be used to stay current on approaching invasive species (e.g. early detection [traps, host surveys] and control [chemical, biocontrol, etc.] methods). Engage with the New York State DEC, Invasive Species Advisory Committee and the New York State Invasive Species Council and state and federal agencies on regulatory measures that can reduce the import and export of invasive species.

Provide outreach to target audiences such as anglers, boaters, hikers and campers concerning major invasive species pathways. Increase advertising on radio, TV, local ads, NEWZ JUNKY etc, regarding prevention measures. Hold trainings and workshops for the public and private sector concerning steps to prevent introduction/spread of invasive species. Produce and distribute informational brochures about potential threats/species in cooperation with DEC ISCS.
Support the use of BMP's on all new development and land use projects. Compile a list of BMP's for new development and land use projects that will reduce the spread or introduction of invasive species and provide to target audiences. Develop a "Clean Equipment" and "Topsoil Translocation" educational piece. Support efforts that prevent the introduction of aquatic invasive species into the Great Lakes basin and connected water systems (e.g. ballast water, live trade, trailered boats and artificial connections [canals, etc.]). Prevent the spread of forest pests by promoting our Urban Forest Sustainability Guide.

Outputs:

1. Record number of species that are approaching the SLELO boundary.
2. Provide at least three training sessions for the public and private sectors each year.
3. Provide outreach to at least one new target audience each year.

Outcomes:

1. Prevent the introduction and/or spread of invasive species within ISPZ's and/or the PRISM.
2. Increased public awareness of the need to prevent the spread of invasive species.
3. Invasive species awareness is incorporated into routine planning and operations of various agencies and organizations.
4. Comprehensive and consistent regulations are enacted on a regional and whole system scale.

Early Detection / Rapid Response

Goal # 2. Rapidly detect new and recent invaders and eliminate all individuals within a specific area. ED/RR is the next highest priority after prevention.

Objectives:

A. Develop an Early Detection/Rapid Response (ED/RR) Process that provides a consistent mechanism for detecting, reporting, and responding to newly identified populations.

B. Identify and survey high risk/priority areas.

C. Develop and maintain an early detection/prevention species list.

Strategies:

By developing and refining early detection and rapid response methodologies, we position the program in a way that will identify and suppress or eradicate new, low abundance, non-native species so that they cannot become established therefore reducing their negative impacts to biodiversity and the ecosystem. These efforts will be complemented by possible ecological restoration measures that return the site characteristics more towards their native plant assemblages, strengthening the health of the system.

Supporting Documentation:
Established methodologies should be deployed. This includes an early detection/rapid response team consisting of staff and volunteers which will be used to detect and respond to early arrival of invasive species. New technologies such as iNaturalist may be used for initial identification, but verification should be conducted through submission to iMapInvasives/ID Expert. Surveys may include visual search for invasive/host species, eDNA, traps, or other methods when appropriate. Invasive Species found in these surveys should be reported using an approved iMapInvasives App (e.g. iMMA, SAS Pro, Forest Pest tool, etc.). New detections should be communicated with partner agencies and other appropriate audiences. Standards for these surveys should be aligned with the DEC's Rapid Response Framework (https://extapps.dec.ny.gov/docs/lands_forests_pdf/isrrprogrampolicy.pdf)

Sites of high ecological significance (e.g., rare species, rare community) should be identified as Priority Conservation Areas (PCA) and considered high priority for invasive species surveys. Those sites with high human disturbance and traffic in PCAs should be considered high risk for invasive species introduction and selected as survey sites. ED/RR should be re-focused to include 25% on connected lands and waters such as Algonquin to Adirondacks (A2A) or Oneida to Tug Hill linkage areas.

The SLELO PRISM Tier List will be consistent with the New York State Natural Heritage Program. Focus of ED/RR will be on Tier 1 and 2 species. Tier 1 species are invasive species within 100 miles of the SLELO PRISM region or with an introduction pathway that are considered to have high impact on the environment, ecology, or human health. Tier 2 species are invasive species that have recently arrived/low abundance in the SLELO PRISM region that are considered to have high impact on the environment, ecology, or human health.

Outputs:

1. Record number of species that are approaching the SLELO boundary.
2. Record number of times the SLELO ED/RR process was activated and how successful it was.
3. Record number of early or new detections.

Outcomes:

1. New invasive species threats to our PRISM are halted.
2. Early detections are eradicated.
3. Invasive species presence and prevalence is reduced on priority conservation areas.
4. The quantity and diversity of invasive species entering and/or becoming established in our PRISM, are severely limited or stopped.

Invasive Species Management

Goal # 3. Control invasives using three basic levels of control; **ERADICATION** – to eliminate all individuals and the seed bank, **CONTAINMENT** – Contain established infestations to prevent invasive species from spreading. **SUPPRESSION** – Reduce the density but not necessarily the total area or boundary of established infestations.

Objectives:

A. Prioritize invasive species for control efforts.

B. Manage low abundance invasive species within priority areas and prevention zones using BMP's with a high probability of success.

Strategies:

By developing and refining management methodologies, we position the program in a way that will eradicate, contain, or suppress invasive species, depending on tier level, therefore reducing their negative impacts to biodiversity and the ecosystem. A focus on newly arriving Tier 2 species in low abundance will prevent their establishment. These efforts will be complemented by possible ecological restoration measures that return the site characteristics more towards their native plant assemblages, strengthening the health of the system.

Supporting Documentation:
Established methodologies should be deployed. This includes working with New York Natural Heritage Program (iMap team) to develop the Tiered Species List for SLELO PRISM. Continue to develop priority species list(s) for prevention (watch list) and management species. Develop a protocol for adding new species to our lists.

Management strategy should be in accordance with tier level of invasive species (i.e. Tier 2 – Eradication, Tier 3 – Containment, Tier 4 – Suppression). Invasive species management should be re-focused to include 25% on connected lands and waters such as A2A or Oneida to Tug Hill linkage areas (potential subcontractors [partners or private] should be identified to assist with CLAW areas). Identify the best control measure (chemical, biological, manual/mechanical) to limit cost and meet expectations. Identify priority areas or sensitive areas and prevention zones as needed. Create an annual work plan with input from all partners and utilize TNC's Decision Analyses Tool to prioritize control efforts.

Outputs:

1. One annual work plan will be developed each year.
2. Priority species list is reviewed annually for the PRISM.
3. The number of control projects will be recorded and compared annually.
4. The number of acres and sites where control activities occurred will be recorded and compared annually for effectiveness of invasive species control.

Outcomes:

1. Early detections of existing and new arrivals of invasive species will be eradicated, contained, or suppressed.
2. The spread of invasive species within the PRISM will be limited.
3. A better understanding of invasive species pathways within the PRISM, priority areas and ISPZ's will be developed and utilized.
4. New control measures are developed and utilized.

Education / Outreach/Marketing

Goal 4- Increase public awareness, understanding and promote management of invasive species.

Objectives:

1. Engage community members and partners in learning opportunities that enhance invasive species awareness, management, and prevention.

2. Strengthen early detection efforts for priority invasive species by providing trainings and recruiting volunteers to recognize and report priority species.

3. Increase volunteer participation and retention.

4. Promote SLELO PRISM initiatives.

5. Support our Pledge to Protect to gain more "pledgers" and to encourage its adoption within our partnership.

6. Develop and provide outreach materials as needed to implement our initiatives.

Strategies:

SLELO PRISM goes beyond core programming and provides high-level initiatives including but not limited to our biocontrol program, eDNA work, restoration projects and Pledge to Protect. The above objectives aim to support our goal to increase public awareness, understanding and promote the prevention and management of invasive species. Fully engaging the invasive species community of practice as well as the general public will serve to integrate and expand our capacity to meet our invasives species prevention and management goals. We will promote our program projects and special initiatives by featuring them in social media posts, press releases, website pages and blogs, as well as targeted Constant Contact emails.

Supporting Documentation:

Coordinating educational, outreach and marketing initiatives through the lens of our Education and Outreach Committee and partners we will develop and provide learning opportunities for various target audiences that enhance awareness of invasive species and encourage participants to take actions to prevent the spread of or to manage invasive species. Learning opportunities may include but are not limited to, workshops, webinars, conferences, exhibits, guided walks and paddles. Opportunities will be promoted through our network channels in addition to local and when applicable state-wide media outlets.

We have established a Volunteer Surveillance Network (VSN) with active members who are trained to recognize and report invasive species considered to be a priority in the SLELO region. We will increase volunteer participation by providing trainings, recruiting new volunteers. We will enhance retention of existing volunteers through acts of appreciation and acknowledgement in the form of earned SWAG items, recognition in seasonal newsletters, and showcases on our volunteer webpage.

The Pledge to Protect (P2P) serves as a pillar in our outreach and marketing initiatives. Over the next 5-year contract we will work with Break the Ice Media to enhance, market, and measure the effectiveness of the P2P. We will continue to promote the adoption of the P2P among our partnership and PRISM network. Promotion will include but won't be limited to, providing scripted slides that partners can incorporate into their own presentations, access to P2P logos and resources for resharing. Furthermore, we will continue to advocate for the inclusion of the P2P in state-wide events and campaigns such as NYISAW.

Outreach materials serve as an educational resource that is readily available to the public. SLELO has developed a variety of outreach materials that are currently available for download on our website. The development of new materials will take place when needed. Printed materials developed for distribution to the general public will undergo a review by the NYS DEC Invasive Species Unit E/O Coordinator to ensure quality information and continuity of messaging among the PRISM network and invasive species professionals.

Outputs:

1. Record statistics for SLELO events, media outreach and marketing efforts and include in quarterly and annual reports. Utilize data to enhance E/O efforts.
2. Record number of active volunteers, volunteer hours, and iMapinvasives observations via the SLELO PRISM VSN. Utilize data to recognize and award active volunteers.

Outcomes:

1. Community members will have the ability to gain a better understanding of invasive species, their impacts and management options.
2. Early detection efforts for priority invasive species will be strengthened.
3. Stakeholders and local residents will have a better understanding of who SLELO PRISM is and the work that we do.
4. More individuals will be aware of the Pledge to Protect and will be more likely to take the pledge or adopt it into their programing.
5. Access to outreach materials is easily accessible.

Cooperation & Partnerships

Goal # 5- Foster a collaborative partnership with relevant organizations by facilitating opportunities to contribute to and further SLELO initiatives. Enhance cooperation through the sharing of information, expertise, and resources.

Objectives:

1. Collaborate with partners to enhance SLELO initiatives and to develop strategic plans.

2. Engage with new potential partner organizations and community entities while strengthening existing partner relationships.

3. Share programmatic information, reports, resources, and available equipment when needed with partners.

Strategies:

Partners are an essential component of the foundation of SLELO PRISM. The SLELO PRISM staff will continue to engage with existing partners and seek to expand and diversify its partner network. New partnerships can then be proposed for consideration to the SLELO PRISM Director for a determination as to the level of participations, e.g., Principle, At-Large or Cooperating Affiliates. The objectives identified herein aim to strengthen and retain collaboration and cooperation among our partnership. Below are supportive ways we intend to implement the listed objectives.

Supporting Documentation:
Serving as an essential component of our practice, partners will continue to be invited to attend and participate at partner meetings and be provided opportunities to contribute to the development of strategic plans when applicable. Partners involved in education and outreach initiatives are encouraged to participate in the SLELO PRISM E/O Committee and should reach out to the SLELO PRISM E/O and Communications Coordinator for more information.

It is important that our programmatic information, reports and resources be posted on our website so that these resources can be easily accessed by our partners and the public. Equipment retained by SLELO PRISM or that is otherwise contractually owned by NYS DEC, including but not limited to, early detection equipment, educational materials or specimens, field implementation tools or watercraft such as canoes, can be utilized upon request if used for reasons related to invasive species work and that support the SLELO PRISM mission.

Outputs:

1. Partner contact lists will be updated as needed to ensure inclusion in partner meetings and other correspondence.
2. Partners will be notified of programmatic efforts, provided partner meeting summaries, informed of opportunities to collaborate, and given other relevant information that enhances our mission and their ability to aid invasive species management efforts.

Outcomes:

1. The relationships among SLELO partners will be strengthened.
2. Programmatic strategies and plans will be developed collaboratively with enhanced expertise and guidance.
3. SLELO initiatives, projects and programs show transparency.
4. Partners will feel supported and informed resulting in less duplication of efforts.

Information Management

Goal # 6. Collect, utilize, and share information, resources, and expertise among SLELO PRISM and statewide partners.

Objectives:

A. Leverage the SLELO PRISM website, social media and list serves to share PRISM resources with all audiences within our community of practice and to the public.

B. Create opportunities to share partner resources and information, evaluate outcomes and share results.

C. Support and contribute data to NYS iMapInvasives database.

Strategies:

By utilizing various digital platforms that are continuously developed specific to the invasives community of practice, we can ensure quality data storage and management.

Supporting Documentation:
Human activity is one of the leading causes of the spread of invasive species. PRISM's are essential for building knowledge and creating opportunities for information sharing. By collecting, utilizing, and sharing information, SLELO PRISM partners and communities are equipped to utilize the best information available to prevent and respond to invasive species infestations.

This should include promoting PRISM and partner-developed resources on the SLELO PRISM website and sharing information via list serves and social media. The PRISM should continue to host frequent partner meetings where roundtable discussions are encouraged, release quarterly newsletters, and host a winter webinar series and the bi-annual symposium where professionals of invasive species work are invited to share new and updated information. iMapInvasives tools should be utilized, when possible, for data collection and sharing The SLELO website should include an interactive map of PCAs, PCA Score Cards (updated regularly) and annual field reports for terrestrial, aquatic and HWA surveys.

Outputs:

1. Maintain the SLELO PRISM website which includes species profiles, reports, and quarterly newsletters.
2. Host up to four SLELO PRISM partner meetings with round table discussions.
3. Host an annual winter webinar series and bi-annual in-person invasive species symposium.
4. Conduct at least four webinars, trainings or workshops each year for all interested individuals and organizations to share invasive species information, targeting unassessed areas to build engagement and capacity.
5. Disseminate reports for special initiatives, projects, and annual field reports.
6. Use iMapInvasives tools (ex. iMMA and SAS Pro) when possible, for data collection and data.
7. Create an online interactive map of PCAs and invasive species data.
8. Disseminate PRISM PCA Score Cards designed to better understand each PCA's current status.

Outcomes:

1. Increased knowledge of IS among partners within the SLELO region.
2. A more comprehensive understanding of IS issues, management, and resources among SLELO partners.
3. Enhanced understanding of IS distribution.

Ecological Restoration

Goal # 7. Develop and implement effective ecological restoration methods by reducing the impact of invasive species on ecosystem processes and in areas that have been disturbed or degraded by invasive species and where suppression or control has taken place.

Objectives:

A. Develop best management practices for restoration that include information on objective setting, site selection, and monitoring.

B. Identify and establish priority restoration areas that consider climate resilience, carbon sequestration, and resilience to future invasive species disturbances.

C. Develop ways to share restoration guidance, results, and lessons learned.

D. Collaborate with restoration professionals and PRISM partners on restoration work

Strategies:

SLELO PRISM should work both internally and with partners to identify priority restoration areas, implement projects using the best available science, monitor sites for restoration outcomes, and provide resources that will empower partners in the region to be successful in their own restoration efforts. This work should take into consideration assessments already completed including but not limited to the NYS Riparian Restoration Opportunity Assessment and NYS climate impacts assessment report.

Supporting Documentation:
Climate change is expected to alter species distributions, modify ecological processes, and exacerbate environmental degradation (Pachauri & Reisinger 2007). To offset these effects, the need is greater than ever for strategic land conservation, including ecological restoration, in response to invasive species management.

As recommended in the New York State Invasive Species Comprehensive Management Plan, recovering ecosystem resilience especially after management measures have been implemented is an important means by which to close-the-loop between management and recovery of an impacted biome.

Outputs:

1. Develop criteria for selecting sites to be considered Priority Restoration Areas (PRA) and special restoration projects.
2. Implement at least one restoration project each year or as deemed appropriate based on site characteristics.
3. Reduction of target invasive species populations and increase in native species and species richness within each restoration site.
4. Comprehensive restoration reports stored on the SLELO PRISM website, including BMPs utilized, guidance and resources for partner use, including monitoring plans and lessons learned from restoration practices at each site.

5. Enhance restoration occurring within SLELO PRISM by supporting partner restoration projects, monitoring, long-term collaborations, etc.

Outcomes:

1. Disturbed sites are restored with native populations.
2. Sites are more able to adapt to a changing climate and are more resilient to future disturbances or invasions.
3. Results of restoration efforts are ascertained and disseminated to PRISM partners and the public

Innovation

Goal # 8. Engage in applied research and innovation to improve invasive species prevention, monitoring, management, and restoration.

Objectives:

A. Identify, deploy, and/or evaluate innovative approaches to invasive species prevention, monitoring, management, and restoration.

B. Foster the exchange of knowledge about innovative techniques with partners and the public.

Strategies:

By leveraging new technologies and research to aid invasive species work, SLELO PRISM will be better equipped to achieve goals and objectives of invasive species prevention, management, restoration, and monitoring.
The program should explore innovative survey techniques including the use of aerial and underwater imagery, molecular-level laboratory testing (ex. eDNA sampling), and management techniques to suppress, contain, or eliminate invasive species and encourage native systems. The program should continue to draw upon the expertise of the partnership to strategize opportunities to apply innovations in invasive species work or to expand established and emerging research. The program should also continue to engage with the NY Invasive Species Research Institute, Regional Invasive Species and Climate Change network, NYS Hemlock Initiative, and other research entities to stay informed about relative findings that may enhance invasive species work.

Supporting Documentation:
Innovation is important within the invasive species community of practice because knowledge of invasive species is ever-changing. Applying innovative strategies can lead to new scientific methodologies that better support invasive species management and ecological recovery discoveries. It offers us an objective understanding because scientific knowledge is grounded in objective, tangible evidence and has a transformative impact in many areas, such as prevention, early detection, strategic response, and ecological restoration. Innovation also plays a key role in achieving objectives, goals and conservation targets.

Outputs:

1. Implement eDNA detection measures (aquatic and terrestrial) for native and invasive species bi-annually.
2. Utilize uncrewed aerial and aquatic vehicles to assist with surveys and management.
3. Identify, test, and share non-chemical management alternatives with partners and the public.
4. Explore opportunities to demonstrate ecosystem-based integrated invasive species management approaches.

Outcomes:

1. New, innovative strategies and technologies are tested within SLELO PRISM
2. Experience and data are compiled and used to improve SLELO's eDNA initiatives and shared with the broader scientific community.
3. Invasive species infestations are detected utilizing innovative tools before becoming well established.

4. Partners are informed on new and innovative techniques for invasive species prevention, monitoring and management.

ADDITIONAL PROGRAM ELEMENTS:

Involving and Engaging Public and Local Government:
Strong and prosperous communities provide opportunities for people to learn, explore and interact. The SLELO partners will identify opportunities and provide for community involvement on invasive species topics and issues. Strategies include;

- General correspondence with local government officials.
- Providing invasive species presentations based on requests.
- Posting announcements on the SLELO website
- Preparing press releases for local newspapers and media.
- Recruiting community volunteers for SLELO projects.
- Actively engaging in community science initiatives.
- Increasing SLELO visibility by participating in community events.

Supporting Research and Community Science:
Submit academic research needs to the New York State Invasive Species Coordination Unit via the New York Invasive Species Research Institute as needed.

Community or citizen science is a process of developing projects in which the public actively engages in scientific investigation and conservation practice. Participants to gain a better understanding of a particular scientific discipline and related issue such as invasive species. This process also promotes community involvement in shaping a particular outcome.

As opportunities are identified within the SLELO region, the SLELO partners will engage in citizen science activities. Potential opportunities may include:

- Early detection searches.
- Forest pest trap placement, monitoring, surveillance, and education.
- Site Restoration planting and monitoring.

[18] Aligns with TNC's Sustainable Waters initiative.

Recruiting & Training Volunteers:

Volunteers are a necessary and extremely helpful component of community initiatives. People from all walks of life donate their time and effort to various causes, day and night, every day of the year. The more connected to a community people feel, the more likely they are to take responsibility for the community and feel pride and a sense of commitment. Mobilizing community resources and expanding capacity through volunteers also enhance an organization's purpose, which can attract additional volunteers, program participants, and become an important component in achieving and organizations mission.

Volunteers for the activities within the SLELO PRISM shall be recruited in several ways;

- ✓ First, the SLELO PRISM and The Nature Conservancy (as host organization) will utilize an existing recruitment process to generate volunteerism and to take part in SLELO activities as needed.
- ✓ Second, social media will be utilized to capture new recruits based on project needs.
- ✓ Finally, word of mouth on behalf of the SLELO partnership will enhance volunteer recruitment.

Training volunteers will be accomplished by providing on-site and/or classroom training using expertise from the partnership.

IDENTIFYING AND PURSUING FUNDING OPPORTUNITIES:

To maximize and continue SLELO initiatives, Special Project Funding will be made available to partner organizations based on availability of funds and through a project nomination process. Projects that align with SLELOs mission and current theme, will be considered priority.

PRIORITY SPECIES

Invasive species tiers help guide management priorities in each PRISM and across New York State. To generate tiers for invasive species, the New York Natural Heritage Program (NYNHP) devised a new method that combines data from iMapInvasives and other sources with invasiveness assessments and expert feedback. A species will only receive a tier value if it is considered to have high negative impacts. Also, the tiers rely on accurate data.

Tier categories include:

Tier 1 Prevention - Species are not known to be present within the region but are within a 100-mile radius or a pathway exists.

- Bighead, Silver, Black and Grass Carp
- Invasive Long horned Beetle
- Hydrilla
- Kudzu
- Mile-A-Minute Vine
- Slender False Brome
- Spotted Lanternfly
- Water Hyacinth
- Water Lettuce
- Water Soldier

Tier 2 Eradication - Species are present in the region, but at low abundance. Eradication feasible within Priority Conservation Areas.

- Bloody Red Shrimp (*Hemimysis*)
- Elm Zigzag Sawfly
- Fanwort
- Giant Hogweed
- Porcelain Berry
- Tench

Tier 3 Suppression - Species are too widespread for eradication although, some areas remain unaffected. Infestations found within Priority Conservation Areas (PCA's) are targeted.

- Common and Glossy Buckthorn
- Black and Pale Swallow-worts
- Hemlock Woolly Adelgid
- Invasive Knotweed (Reynoutria japonica)
- Invasive Stiltgrass
- Invasive Bittersweet (Celastrus orbiculatus)
- Phragmites
- Rusty Crayfish
- Spiny Waterflea
- Starry Stonewort
- Tree of Heaven
- Water Chestnut
- Wild Chervil
- Yellow Iris

Tier 4 Localized Control - Species are considered too widespread to eradicate. High priority resources, like rare plant or recreation assets, are protected through localized management strategies.

- Broad-leafed Helleborine
- Invasive clam (Corbicula fluminea)
- Coltsfoot
- Curly Leaf Pondweed
- Emerald Ash Borer
- Honeysuckle
- Invasive Water-Milfoil (Myriophyllum spicatum)
- Invasive frog-bit (Hydrocharis morsus-ranae)
- Feral Swine
- Leafy Spurge
- Purple Loosestrife
- Round Goby
- Spotted Knapweed
- Wild Parsnip
- Zebra Quagga Mussel

Tier 5 Monitor - Species that may or may not be in the SLELO region, but are difficult to respond to, or that require more knowledge to proceed with management.

- Jumping Worm
- Beech Leaf Disease

PRIORITY CONSERVATION AREAS:

Because time and resources are limited, it is important that SLELO-PRISM partners focus the management of invasive species on sites that are considered ecologically important and/or sites that are considered to have conservation value. In addition, sites that are considered to be seed-banks, vectors or that pose a proximity threat to high value sites are all factors involved in determining site-based management on both public and private lands. The SLELO partnership has named these sites as Priority Conservation Areas or PCA's.

The following is a working list of recommended invasive species management sites, PCA's. Several sites involve multiple ownerships or covenants via easement. The list does not include every site where invasive species management may occur but does provide a general list of focusareas.

Note: Other partners may take a lead role on some PCA's.

Site Name	Brief Site Description
Tug Hill	150,000 acre mixed forested lands.
Grenadier Island	1,290 acres island with TNC easement & TILT
Limerick Cedars	coastal dune/wetlands/limestone barrens complex.
Chaumont Barrens	Alvar barrens grassland
El'Dorado Preserve	Freshwater dune barrier system
Rome Sand Plains	TNC Preserve
State Parks (within SLELO region)	numerous
St. Lawrence State Park	St. Lawrence County
Salmon River & Reservoir	2,660 freshwater reservoirs
Whetstone Reservoir (State Park/Tug Hill)	Freshwater reservoir
St. Lawrence River	River system
Oswego River	NYS - 2nd largest river draining into L. Ontario
Black River	river system between Tug Hill and the Adirondacks.
French Creek	Near Clayton ? Empties into French Creek Bay ?
Three Mile Creek	WMA
Chaumont Bay	Lake Ontario shoreline embayment
Mud Bay	A bay of Lake Ontario at the west end of Cape Vincent
Rainbow Shores	
Selkirk Fen	Fen located near Selkirk state park
Salmon River Estuary	Near Port Ontario
Lake Ontario Shoreline	Coastal shoreline
Sandy Pond	Shoreline dunes and open water embayment
Black Pond	barrier beach dune/marsh/wetlands.
Oneida Lake	79.8 square mile inland freshwater lake
Lake Delta	Oneida Co.
Henderson Harbor	Lake Ontario embayment
Battle Island	Oswego River
Silver Lake Fen	Oswego County
Black Lake	St. Lawrence County
Grassland Bird Focus Area	See Irene, DEC Biologist Region 6
Golden Winged Warbler Focus Area	See Irene, DEC Biologist Region 6
Deer Creek Marsh Unit	1,195 acre WMU-shoreline/dunes/wetlands
Perch River WMA	See Irene, DEC Biologist Region 6
Fish Creek WMA	St. Lawrence County
Upper & Lower Lakes WMA	St. Lawrence
Lakeview WMA	3,461 acre coastal wetland complex
Happy Valley WMA	8,895 acres northern hardwood forest/wetlands
Three Mile Bay WMA	3,697 acres of wooded swamp and marsh
Little John WMA	7,912 acre Hemlock/Spruce stands.NW side Tug Hill
State Routes 3, 28, 56, 58 and 365	Pathways leading into the Adirondack Park

Priority Conservation Areas – CLAW

The Nature Conservancy's Science Team has identified a network of what we call resilient and connected lands, which if protected and conserved will allow these habitats to be more resilient to external stressors. (Anderson et al., 2012). What we do in the SLELO PRISM region serves to protect these larger connected systems. What we do in the Oswego River serves to protect the Finger Lakes, Oneida Lake and hundreds of miles of inland waterways within New York. What we do in the core forest of Tug Hill helps to protect the entire 750,000-acre forest including the entire Blue Ridge to Boreal Forest system.

Based on a gap analysis, this program would serve to increase our conservation impact on lands and waters (forest and riparian areas) that are substantially connected, affected by non-native plants and that will benefit from restorative measures. By adding Connected Lands and Waters (CLAW) as an additional focus to our program, we maximize our conservation impact.

Protocol for adding new sites to our Priority Site List:

1. The site must be sponsored by a SLELO partner -*not owned by* just sponsored by.
2. The site must have some uniqueness or ecological importance such as unique habitat, grassland, Alvar, wetland, dune, freshwater spawning area, fen, bog, etc.
3. The site "should be" host to a rare, threatened or endangered species.
4. We do not provide resources or work on private property unless it is part of a larger conservation project or effort, eg., *Salmon River Initiative*
5. Site info is then presented to the partnership for consideration.

Protocol for adding a species to one of our lists:

Any partner can nominate a species in one of two ways;

1. Inform Rob and Rob presents to entire partnership.
2. Call it out at or during our monthly meeting, via round-robin or presentation.

Either way the nominator should share the following information with the partnership;

1. Identification

2. Where it is currently found
3. Potential impacts
4. Level of perceived invasiveness.

Keep in mind:

- Inv. Spp. Do not always follow a linear path when spreading, there are “skip zones”.
- It’s no trouble to train ED crews to identify and look for multiple species.

Protocol for working on private property:

The SLELO PRISM does not have the resources to conduct invasive species management where ever they may occur. This is why we focus our efforts on Priority Conservation Areas or PCA’s. In situations that involve private landowners, we act in an advisory (guidance) capacity notifying landowners of their options. If controlling invasive species on private lands is part of a larger, landscape scale project, we reserve the right to engage landowners in other capacities.

INVASIVE SPECIES MANAGEMENT METHODS AND CONSIDERATIONS:

Many dynamics are involved in controlling invasive species. Dynamics such as species biology, resources available and costs all play a role in managing invasive species. This section discusses various considerations for the control and management of invasive species.

Table 8 - SUMMARY OF INVASIVE SPECIES BEST MANAGEMENT PRACTICES

Invasive Category						
Control Type:	Aquatic Plants	Terrestrial Plants	Insects	Animals		
Biological	X	X	X			
Chemical	X	X	X			
Physical						
*Hand Pull	X	X				
*Pod Pull	X	X				
*Hand Dig		X				
*Burn		X				
*Barriers	X	X				
Mechanical						
*Excavating		X				
*Mowing		X				
*Harvesting	X	X				
*Dredging	X					
*Trapping			X	X		
Biological: Refers to the use of aquatic or terrestrial insects such as *Gallarucell*a beetle for Purple Loosestrife.						
Chemical: Typically refers to the use of pesticides (insecticides, herbicides aquatic & terrestrial)						
Physical: Any type of control that results from physical manipulation of the population.						
Mechanical: Any type of control that results from using a mechanical device.						

Table 9. Invasive Species Disposal Methods

Invasive Species Disposal Methods

Invasive species that are not properly disposed of can live, grow and become relocated to uncontaminated areas. Here is a list of suggested disposal methods by category:

Woody Plants	Herbaceous Plants	Grasses & Sedges	Aquatic Plants	Aquarium Plants/Fish	Live Bait
Air dry until dead	Air dry until dead	Air dry until dead	Bury on dry land	Return to store	Freeze solid & bury
Bag & compost	Bag & compost	Bag & compost	Bag & compost	Freeze & bury	Bag, trash & landfill dead mtl.
Landfill dead material	Bag, compost & landfill	Bag, compost & landfill	Bag, compost & landfill	Freeze & landfill	
Burn or place in brush piles					

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