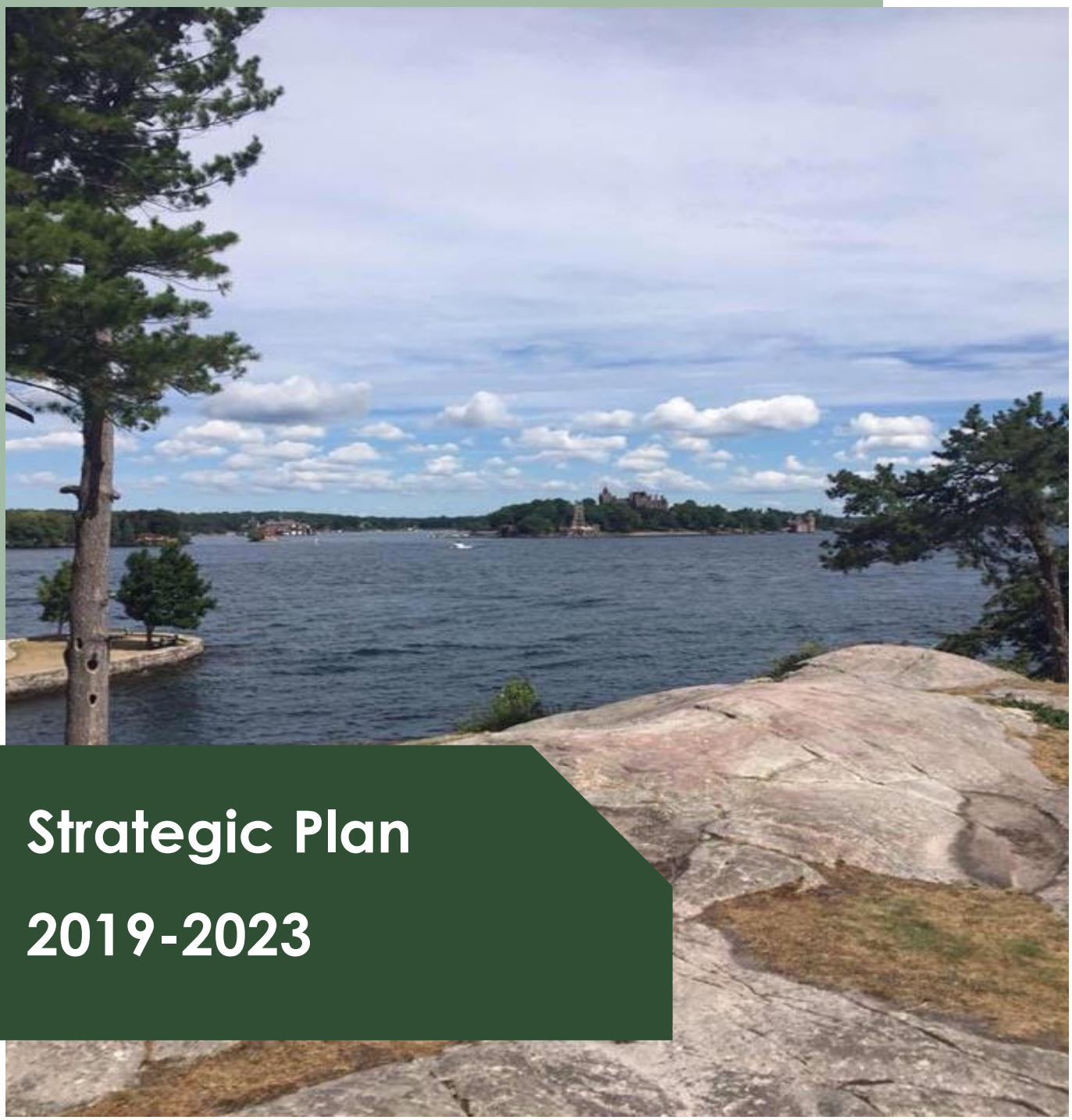

Strategic Plan 2019-2023

SLELO PRISM

St. Lawrence Eastern Lake Ontario
Partnership For Regional Invasive Species Management

Acknowledgements

This report was prepared by

Robert K. Williams
Invasive Species Program Coordinator, SLELO-PRISM
With assistance from the SLELO PRISM Partners
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The representatives of the numerous partner organizations and interested individuals whom continue to contribute their expertise, time and resources to the development of this PRISM and to our accomplishments.

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.

Toward that end, over 30 partners have participated in planning sessions to define the future of the program including setting priorities for the coming years. Two Break-Out Groups (Ranger Teams) were formed to focus on specific goals. In addition, representatives from each of the two groups served on a special team to develop program implementation tools. This same approach was used for this revision.

Cover Photo

St. Lawrence River © TNC-Kiersten Williams

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Introduction

Invasive species of plants, animals, insects and microorganisms are among the most serious threats 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 in serious disruptions of ecosystem processes. Interdependency on food and habitat, hydrology, nutrient cycling, natural succession, soil erosion and water quality are among the processes impacted.

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).

Whole Systems

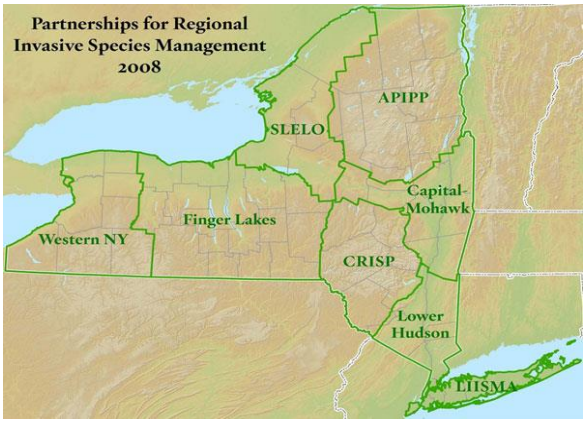
Nature is a whole system. It is a complex community, an economy, a dynamic interlinked family and many other things. Whole systems encompass the geographical and ecological complexities found in natural landscapes which include the interactions of people (Ward et al., 2011). The size of a whole system is typically defined by its dominant ecological features and functions and therefor may cover an extensive geographic area such as the Great Lakes or the Central Appalachians. Among the many considerations of whole systems are ecological processes which are interlinked and altering one may intern alter or affect the other therefor affecting the whole system.

Invasive species can and do affect whole systems. The Great lakes are affected by aquatic invasives for example as are large scale forested areas within the Great Lakes watershed by other invasives. Strategies that are implemented at the local or regional level to prevent and/or manage invasive species often affect or are affected by strategies that take place at the whole systems level. While preparing this strategic plan, the whole systems concept has been considered where appropriate.

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 Advisory Committee. The Council is co-led by the NYS Departments of Environmental Conservation (DEC) and Agriculture and Markets.



Above: Eight PRISM's in New York State

Among the Council's numerous statutory responsibilities is the requirement to encourage and support within available funds, Partnerships for Regional Invasive Species Management [PRISMs] [1]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.

Above: Five Counties Representing the SLELO-PRISM

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

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 international borders.

SLELO-PRISM Population by County U.S. Census Bureau 2017	
St. Lawrence	108,047.00
Jefferson	111,755.00
Lewis	26,447.00
Oneida	229,557.00
Oswego	117,898.00
Total	**593,704.00**

Source: United States Census Bureau 2018 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.

Table 1 – Forested Land in the SLELO Region

County	Forested land (acres)**	Land Area (square miles) *
St. Lawrence	1,324,823.00	2,070.00 square miles
Jefferson	423,624.00	661.00 "
Lewis	558,353.00	872.00 "
Oneida	459,347.00	717.00 "
Oswego	324,040.00	506.00 "
Total	**3,090,187.00**	**4,826.00 square miles**

*2010 U.S. Census

**USDA Forest Service. Forest Inventory and Analysis National Program 2017 (https://www.fia.fs.fed.us/program-features/rpa/index.php).

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. These aquatic environments are an important part of the SLELO landscape supporting diversity of aquatic flora and fauna.

Agricultural land use within the SLELO five county region includes approximately 1,051,442.00 acres or 6% of the total land area. A county breakdown is presented in Table 2.

Table: 2 – Agricultural Land Use in the SLELO Region.

County	Acres in Agriculture
St. Lawrence	342,595.00
Jefferson	247,456.00
Oswego	86,167.00
Lewis	182,457.00
Oneida	192,767.00
Total	**1,051,442.00**

Source: USDA National Agricultural Statistics Service, 2017.

PARTNERSHIP STRUCTURE:

The SLELO partnership consists of any organization that has an interest in our mission. For organizational purposes our partnership has three levels: Principle 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 Principle 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

Responsibility of Partners and Committees

The PRISM is managed as a cooperative effort between the program coordinator, the host organization 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 and resources and to provide expertise to the PRISM. Principle partners act as the steering committee to provide initial reviews of things such as our annual work plan or project contracts and to provide general recommendations to the partnership, but not to make final decisions. Ultimately it will be our entire partnership that provides input and makes decisions for the PRISM based on consensus. 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 2014-2018 Strategic Plan and Annual Work Plans which include prevention; early detection/rapid response; education and outreach; information management; invasive species control 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, farmland and open space by using a collaborative and integrated approach to invasive species management. The emphasis of these activities will be on prevention, early detection, rapid response and education.

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).

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 3,229,541.00 acres of the land base (USDA Forest Service Resource FIA 2010). 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 the emerald ash borer (EAB), the Asian long-horned beetle (ALB), the hemlock woolly adelgid (HWA) and the sirex wood wasp. 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 (*Acer platanoides*), garlic mustard (*Alliaria petiolata*), autumn olive (*Elaeagnus umbellata*), Japanese knotweed (*Polygonum cuspidatum*), bush honeysuckle (*Lonicera* spp.), common reed *(Phragmites australis)*, buckthorn (*Rhamnus spp)* and Black Swallow-wort (*Vincetoxicum nigrum*).

Other (non-forest) terrestrial invasive plants are affecting the health and biodiversity of non-forested areas. Examples include pale and black swallow-wort, giant hogweed and porcelain-berry. Swallow-wort adapts well to almost any soil type and growing conditions. giant hogweed tends to become established in disturbed areas such as roadsides. Porcelain-berry has been planted as a garden species.

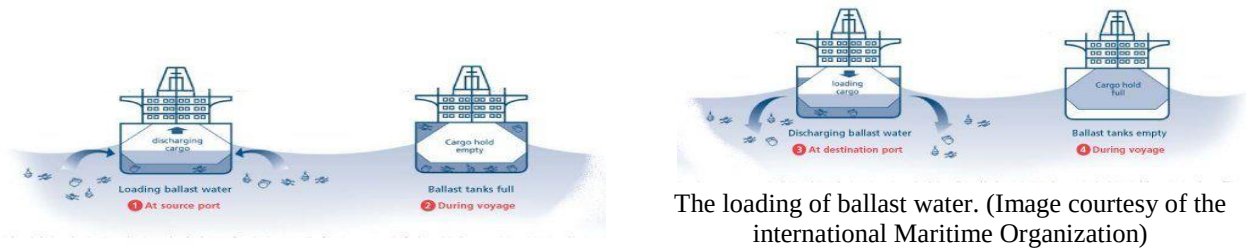
Aquatic Invasive Species

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)* and round goby *(Neogobius melanostomus).* The bloody red shrimp (*Hemimysis anomala*), chinese mitten crab (*Eriocheir sinensis*) and Eurasian 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 right-of-ways. (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.

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 forests 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 Shared Conservation Agenda

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 have the ability to 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:

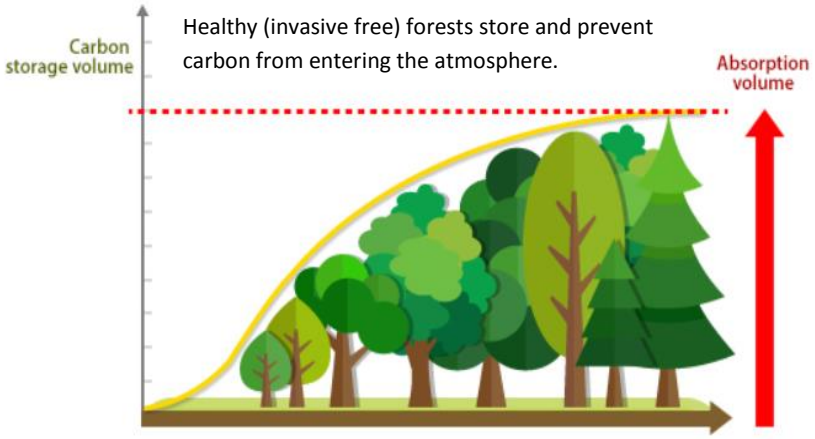
Educating the general public on various issues related to invasive species is at the forefront of any long-term management effort. Educational efforts will be tailored to meet the needs of each stakeholder group. Increasing the stakeholders' awareness of invasive species literacy, negative impacts, and 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 invoke behavioral change is an 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.

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.[8]

Professional Capacity:

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 increased capacity will also allow for more collaboration 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

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

Invasive Species Management Plan. The AIS Coordinator will develop and deliver early detection surveillance, focused presentations, trainings and assist in the deployment of boat launch

stewards. 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 of annual 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.

Scientist/Analyst

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.

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 propose efforts to assist local communities to plan and prepare for invasive pests and climate issues affecting municipal trees and forests. We've included funds to offset native street tree planting! *Urban/cities climate work.* [9]

Healthy Forests and Tug Hill Restoration: Sustaining healthy forests are important for nature and people. On Tug Hill we will require a subcontract with a local forester/control company to continue with invasive species control, additional site preparation and tree planting, restoration, climate adaptability, carbon sequestration effort.

Healthy Freshwater and Integrated Boat Launch Stewardship: Ten stewards will be assigned two locations each and will rotate weekly between each site for a total coverage of 20 sites.[10] This effort will help to reduce the spread and establishment of aquatic invasive species and will promote healthy waters.

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

eDNA Cisco: Utilizing eDNA and removing Dreissenids (zebra/quagga mussel) from Lake Ontario shoals may help to encourage successful spawning of the native fish known as Cisco.

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

AIS Plant Analyses: Quantify the amount of nutrients (Total Kjeldahl Nitrogen, Soluble reactive phosphorus and total phosphorus) removed from waterways via annual removal of water chestnut plants and other key aquatic plant species. This may enable us to quantify potential reductions in internal nutrient loading and its effect on harmful algal blooms.

[9] Aligns with the NYSDEC Invasive Species Comprehensive Management Plan
[10] Aligns with the NYSDEC Aquatic Invasive Species Management Plan

Marketing Campaign: We will contract with a communications firm to adopt a campaign strategy towards the SLELO region that utilizes a standard theme used by New York State DEC "*Pledge to Protect*".

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 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 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 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. SLELO Partnership will maintain close communication with other PRISM's to identify potential threats and to stay informed about control methods they are deploying.

B. SLELO Partners will 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.

D. Support efforts that prevent the introduction of aquatic invasive species into the Great Lakes basin via the primary pathways; ballast water, live trade, trailered boats and artificial connections (canals, etc.)

Strategies: Prioritized

1. Implement an integrated Boat Launch Steward Program: Ten stewards will be assigned two locations each and will rotate weekly between each site for a total coverage of 20 sites.
2. Engage with the New York's State DEC, Invasive Species Advisory Committee and the New York State Invasive Species Council on regulatory measures that can reduce the import and export of invasive species.
3. Develop a "Clean Equipment" and "Topsoil Translocation" educational piece.
4. Identify a means by which to monitor effectiveness of the Ballast Water Convention of 2017.
5. Identify and provide outreach to target audiences such as anglers, boaters, recreationists, firewood haulers, based on major pathways.
6. Increase advertising on radio, TV, local ads, NEWZJUNKY etc, regarding prevention measures.
7. Initiate continued communications among PRISM's, i.e. monthly calls and meetings.
8. Hold trainings and workshops for the public and private sector.
9. Develop Invasive Species Prevention Zones (ISPZ's) and criteria.
10. Encourage public agencies (DOT, DEC, OPRHP and municipalities, SWCD's etc., to incorporate invasive species awareness/training into annual meetings and annual plans.
11. Support the use of BMP's on all new development and land use projects.
12. Produce & distribute informational brochures about potential threats/species.
13. 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.
14. Support local ordinances and compliance that deter accidental spread of invasive species via trailered boats.
15. Explore legislation or public policies to address the movement of Inv. Spp.

Outputs:

1. Identify and establish at least one ISPZ each year.
2. Provide three training sessions for the public and private sectors.
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 Process that provides a consistent mechanism for detecting, reporting and responding to newly identified populations.
B. Identify and survey high risk areas and (priority areas).
C. Develop and maintain an early detection/prevention species list.

Strategies: - Prioritized

1. Determine potential close threats (species) and their respective pathways.
2. Utilize the ED/RR process developed by SLELO partners.
3. Conduct searches for host species rather than the invasive species itself, e.g., search for tree of heaven rather that spotted lanternfly) and monitor the host for invasion.
4. eDNA Inland Rivers: eDNA lab testing for invasive and key species in inland rivers and lakes.
5. Engage the New York State Rapid Response Incident Command System for large-scale infestations or lake wide AIS.[12]
6. Implement DEC's Rapid Response Framework.
7. Determine effective monitoring plan.
8. Establish a rapid response team to react to situations and eradicate or control?
9. Engage and train angler groups/clubs to report early detections of AIS.
10. Assist with broader (regional) scale early detection efforts such as environmental DNA analyses on the Erie Canal and in Eastern Lake Ontario.
11. Support New York State's effort to develop statewide regional response teams.
12. Utilize new/emerging technologies to assist in identification of specimens such as (plant snap®) app.
13. Communicate new detections etc. with partners and other appropriate audiences
14. Reach out to other PRISM's, agencies, partners on information regarding BMP's.
15. Secure funding for implementing the ED/RR process.
16. Align (and integrate) the SLELO ED/RR Process with the state level process.
17. Develop a "go to" list of experts for positive ID of new threats.

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.

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

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 Control

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 and direct annual invasive species control efforts
B. Control Inv. Spp. within priority areas and prevention zones using BMP's with a high probability of success.
C. Secure adequate funding to conduct cost effective control activities (ie. Chemicals, equipment, education).
D. Utilize demonstration projects that provide new tools and methods of invasive species control which intern provide benefits to native species.

Strategies: - Prioritized

1. Implement biological controls when and where appropriate to augment suppression on invasive species.
2. Work with Natural Heritage (iMap team) to develop the Tiered Species List for SLELO PRISM priority species.
3. Implement/release approved biological controls when and where appropriate.
4. Engage the New York State Rapid Response Incident Command System for large-scale infestations or lake wide AIS.[13]
5. Continue to develop priority species list(s) for prevention (watch list) and management species.
6. Develop a protocol for adding new species to our lists.
7. Identify priority areas or sensitive areas and prevention zones as needed.
8. Create an annual work plan with input from all partners.
9. Continue to coordinate special projects via RFP that includes a control category.
10. Provide extra points to our special projects RFP's for control projects that include a "restoration" component.
11. Implement control projects in Priority Conservation Areas using a contractor and/or volunteers based on available funds and resources to maximize control efforts.
12. Utilize TNC's Decision Analyses Tool to prioritize control efforts.
13. Identify available resources for control, i.e. Pesticide applicators, volunteers, etc.)
14. Develop a list of possible funding sources.
15. Coordinate projects using partner agencies and organizations when possible utilize volunteers and partner agencies to conduct citizen science (hands on) control in low abundance infestations.
16. Identify species specific BMP's.
17. Review and refine BMP's to be results oriented and cost effective.

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

18. Compile a “General Treatment Summary” e.g. Short spreadsheet that summarizes acceptable and approved control options.

Outputs:

1. One annual work plan will be developed each year.
2. A priority species list is created for the PRISM.
3. The number of priority areas will be determined and evaluated annually.
4. The number of implementation and control projects will be recorded and compared annually.
5. 3 ISPZ’s will be established.
6. The number of acres, stems 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 No. 4 - Increase public awareness, understanding and promote management of invasive species.

Objectives:

A. Incorporate invasive species research and innovation into E/O initiatives.
B. Foster a greater understanding of climate adaptability, carbon sequestration and disturbance, resiliency in educational and outreach messaging.
C. Provide support for our Boat Launch Stewards and program.
D. Provide trainings that enhance invasive species early detection efforts and encourage, stewardship & community preparedness against invasive species.
E. Establish a SLELO invasive species marketing campaign aimed at raising awareness at a broad level across our region.
F. Enhance engagement and increase retention for the SLELO volunteer Network.
G. Provide measurable E/O statistics.

Strategies:

Incorporate invasive species research and innovation into E/O initiatives

1. Include climate adaptability, carbon sequestration and disturbance resiliency in educational and outreach messaging.
2. Incorporate relative research findings or innovative approaches to invasive species management into presentations/exhibits, feature in newsletter and showcase on website and our online presence.
3. Draw upon recipients of invasive species grants and SLELO Special Project funding that are pursuing relevant research or innovation and share their findings in our seasonal newsletter.
4. Provide trainings that enhance volunteer invasive species early detection efforts and encourage stewardship & community preparedness against invasive species.
5. Host a biennial Eastern Lake Ontario Invasive Species Symposium that incorporates high level topics that enhance our work, seek additional space and donors to expand this symposium.
6. Host species specific workshops in strategic areas aimed to recruit and train volunteers to recognize priority invasive species, search highly probable areas and report observations via iMapInvasives.org.
7. Host trainings that cover: aquatic invasive species identification, management & prevention techniques, & required DEC permitting overview. Engage lake associations and waterfront property owners to pledge to protect their waterbodies and take action against invasives that threaten their waters.

8. Encourage municipal leaders and stakeholders to incorporate and implement invasive species management strategies into their community plans. Strategies may include: workshops that place emphasis on urgency and provide guidance tools, communications to municipal leaders outlining invasive species threats and provide guidance and resources, engagement in community events that may provide media attention (tree tagging events, exhibits), attendance and participation in local government conferences.
9. Approach and engage various community entities and municipalities throughout the region, regarding existing tree management plans that incorporate forest pest preparedness strategies and the establishment of invasive species resistant and climate adaptable native street trees.
10. Support the Eastern Lake Ontario Swallow-wort Collaborative, website and webinars and encourage broader participation.
11. Engage established outdoor groups & educational programs in invasive species outreach (Ex: kayaking clubs, girl/boy scouts citizen scientist journey programs, Protectors of Water & Habitat on Indian River Lakes Program, Black River Outdoor Educator Program, Host and participate in invasive species related educational and outreach programs).
12. Attend community and partner events to promote SLELO-PRISM and our mission.

Establish a SLELO invasive species marketing campaign aimed at enhancing invasive species awareness across our region

1. Integrate the "Pledge to Protect" motto and tag-line into our outreach materials, media outlets and website.
2. Consider using a communications firm to develop a more readable and printable logo for SLELO PRISM while maintaining our regional identity.
3. Create Pledge to Protect certificates for specific target audiences: gardeners, hikers, boaters, forest/land owners. Those who take the pledge can download and print the certificate. We could have a running list of those who have taken the pledge to display on the website next to the Pledge to Protect "button."
4. Incorporate (behavior change methodologies) into our messaging.[14]
5. Work with NYS DEC to develop consistent messaging across the Empire State.[15]
6. Support and develop educational materials for the use by our Boat Launch Stewards and our participation in the New York State Watercraft Inspection Survey Program, WISP.
7. Engage more with newspaper/radio/newzjunky PSA for Inv. Spp. awareness (timed appropriately per Inv. Spp.).
8. Maintain and promote SLELO website and online presence in social media (facebook/youtube)
9. Continued development of timely educational materials geared towards specific target audiences in various mediums, (mailings, brochures/fliers, door hangers, billboards.
10. Develop specific materials for rural property owners to educate on the process of dealing with invasive species.

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

11. Annually purchase promotional materials SWAG for use by our Boat Launch Stewards and for distribution at events, etc. Additional educational materials could be distributed to target audiences (farm, garden & tractor supply stores, outdoor & recreational equipment retailers, realtors)
12. Continue a quarterly electronic newsletter, utilize our Blitz Box theme for front page and manage targeted mailing lists. Promote newsletter through partner networks. Engage partners to contribute articles.
13. Continue to develop and use a SLELO display for exhibits and make available for partner use.
14. Collaborate with NYSDEC to develop physical traveling totes or backpacks (one to be stored in each SLELO county) & digital "toolbox" that can be used by partners, educators, volunteers for various invasive species outreach events.
15. Work with Cornell University's Human Dimensions Section to develop a follow-up public survey to determine changes in awareness of invasive species and how they are managed.

Enhance engagement and increase retention for the SLELO's volunteer surveillance network:

1. Establish a merit system in which volunteers receive SWAG or stature depending on their contributions or the amount of time volunteered.
2. Showcase achievements on our website in the VSN page.
3. Create various invasive species challenges that foster a fun competition among participants.
4. Hold an annual invasive species photo contest and develop and distribute a free calendar based on entries. Photos can also be featured in the seasonal newsletter.
5. Continue to showcase a volunteer experience in the newsletter

Outputs:

1. Record # of SLELO sponsored or SLELO participation in events.
2. Record # of people targeted and attending SLELO events.
3. Record # of press releases prepared and submitted.
4. Record # of electronic and printed newsletters created and distributed
5. Record # of educational materials created and distributed

Outcomes:

1. Various groups and the public will have a better understanding of invasive species, their impacts and management options.
2. SLELO will have a consistent message, logos and catch phrases
3. Stakeholders and local residents will have better access to SLELO information.
4. Demonstrate an increase in public awareness and management of invasive species (through survey, public participation at workshops, disbursement of materials, etc.)

Cooperation & Community Preparedness

Goal # 5- Facilitate opportunities for sharing resources, including funding, personnel, equipment, information, and expertise and engage at the community level to further the SLELO mission.

Objectives:

A. Develop a shared understanding of partner organizations, their charter and their responsibilities relevant to invasive species management.
B. Establish collaboration among partners on projects and various SLELO activities.
C. Work cooperatively to assist with implementing components of the strategic plan developed by SLELO partners.
D. Determine challenges and opportunities for community leaders and local champions to better manage invasive species and prevent their spread.
E. Enhance community efforts to manage and prepare for invasive species by engaging community and municipal entities.
F. Continue to develop our partnership by engaging new and diverse partners while considering existing relationships and trusted messengers in developing new relationships and connections.

Strategies:

1. Approach and engage various community entities, municipalities and cities throughout the region, regarding existing tree management plans that incorporate forest pest preparedness strategies and the establishment of invasive species resistant and climate adaptable native street trees.
2. Evaluate efforts to assist local communities to plan and prepare for invasive pests and climate issues affecting municipal trees and forests.
3. Utilize budgeted funds to offset native street tree planting and urban/cities climate work.[16]
4. Invite partners to volunteer and participate in coordinated invasive species activities.
5. Approach academia, nursery and business organizations and institutions to participate as partners.
6. Coordinate with partners in hosting educational activities, exhibits and materials.
7. Create partner information sharing opportunities at quarterly partner meetings as well as other venues.
8. Facilitate meetings to report out on cooperative efforts, evaluate strategies and plan for future activities.
9. Continue to provide opportunities to share information and collaborate with partners by contributing to newsletters, maintaining and updating an email contact list and holding quarterly partner meetings throughout the region.

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

Outputs:

1. Host or co-sponsor strategic and targeted educational events each year.
2. Provide a minimum of 3 opportunities for partners to volunteer for SLELO activities.

Outcomes:

1. Better cooperation among partners to achieve SLELO's mission.
2. Increased collaboration among partners, community organizations and municipalities.
3. Less duplication of efforts.
4. A sense of "belonging" among SLELO partners.
5. New partners and collaborative efforts promoted.

Information Management

Goal # 6. Collect, utilize, and share information regarding surveys, infestations, control methods, monitoring, and research.

Objectives:

A. Create opportunities to share partner resources and information.
B. Maintain a database that includes new species observations, treatment sites and project management sites.
C. Promote and utilize the SLELO website.
D. Establish and make available an archive of relevant partner reports and studies.

Strategies: - Prioritized

1. Utilize partner training, workshops, conferences to compile the best and most up to date information possible.
2. Incorporate SLELO information into the invasive species bookshelf on the NYIS.info website.
3. Create an invasive species herbicide/management reference list and share with our partners.
4. Update links to partner websites on the SLELO website.
5. Fully utilize iMapinvasives software including species observations, treatment sites and project management tools.
6. Develop a SLELO resource directory to include partners, capacities and resources available.
7. Provide training to staff and partners in iMapinvasives software.
8. Conduct round-table updates from partners at SLELO meetings.
9. Conduct partner and guest presentations at SLELO meetings.
6. Work with CCE offices to collect invasive species reports from the public.
7. Create a “studies & reports” page on the website.

Outputs:

1. 12 round table discussions. One at each monthly SLELO meeting.
2. 12 partner guest presentations. One at each monthly SLELO meeting.
3. Establish an Education & Outreach page to our website.
4. Conduct at least two invasive species training workshops each year for all interested individuals and organizations.
5. Target 50% of training workshop attendees to input data into iMapinvasives.
6. Identify and designate one Point-Of-Contact at each county CCE to receive IS reports from the public.
7. Increase SLELO list-serve subscribers by 10% each year.

Outcomes:

1. Increased knowledge of IS among partners within the SLELO region.
2. A more comprehensive understanding of IS issues and management among SLELO partners.
3. Less duplication of efforts.
4. Increase in website usage by partners and the public.
5. Enhanced understanding of IS distribution.

Ecological Site 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. Identify and establish priority restoration areas based on priority project areas.
B. Incorporate climate adaptability, carbon sequestration and resilience to future disturbances in restoration efforts.
C. Establish protocols for site restoration including selection of BMP's, monitoring and restoration goals for each site.
D. Recover ecosystem resilience by facilitating restoration projects in the SLELO region.
E. Implement appropriate restoration BMP's for various habitat types.

Strategies:

1. Tug Hill Restoration: Subcontract with a local forester/control company to continue with invasive species control, additional site preparation and tree planting, restoration, climate adaptability, carbon & resiliency work on Tug Hill.
2. Incorporate climate adaptability into species selection when restoring disturbed areas.
3. Identify and select tree species and plant materials that are resistant and/or resilient to forest pests and other invasive species when planning restoration actions.[17]
4. eDNA Cisco: eDNA site testing, Dreissenid (zebra mussel) removal and restoration work on Eastern Lake Ontario spawning shoals.
5. Continue a "site restoration" category on the SLELO Special Project RFP and;
   Provide extra points for projects that include a component(s) that address climate adaptation and/or resiliency to future invasive species disturbances.
6. Develop a protocol for adding new priority sites to our PRISM's list of priority conservation areas (PCA's).
7. Research Best Restoration Practices (BRP's) based on treatment site characteristics.
8. Secure additional funding for restoration projects.
9. Assemble a team of employees, volunteers and/or utilize contractors to implement restoration projects on sites treated by the SLELO PRISM.
10. Create and implement a monitoring plan for restored sites.

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

Outputs:

1. Implement one restoration project each year or as deemed appropriate based on site characteristics.
2. Achieve 30% or better survival of native plants/seed.
3. Achieve a minimum of 80% native cover on all sites restored.

Outcomes:

1. Disturbed sites are restored with native populations.
2. Sites are more able to adapt to a changing clime.
3. Sites are more resilient to future disturbances or invasions.
4. Best Management Practices are assessed for their worthiness.
5. Results of restoration efforts are ascertained and disseminated.

Innovation

Goal # 8. Develop and implement innovative technologies that help us to better understand, visualize, alleviate or manage invasive species and their impacts or that serve to strengthen ecosystem function and/or processes.

Objectives:

A. Identify technologies that are being utilized in other areas and determine their adaptability to the SLELO region.
B. Implement appropriate technologies within the SLELO region.

Strategies: – Prioritized.

1. Draw upon expertise of the partnership to strategize opportunities to apply innovations in our work or to expand upon research.
2. Engage with NYISRI, Regional Invasive Species and Climate Change management group, Hemlock Initiative and other research entities to stay informed about relative findings that may influence our work.
3. Continue to develop and use environmental DNA (eDNA) for aquatic invasive species early detection.
4. Better utilize eDNA for the detection of native aquatic species.
5. Consider using underwater ultra-violet light boats for controlling aquatic invasive plants.
6. Request drone assessments in areas of PCA's that may be difficult or inaccessible by humans, places such as tree-top canopy assessments for forest pests.
7. Evaluate alternatives for glyphosate for use in New York.

Outputs:

1. Implement eDNA AIS early detection measures annually.
2. Implement eDNA native species detection as needed.
3. Consider a UV light demonstration project.
4. Consider a tree-top canopy drone assessment of forest pest impacts on forest health.
5. Replacement for glyphosate found.

Outcomes:

1. AIS are detected before becoming established.
2. Native species are determined to be present in the region's waters.
3. AIP's (aquatic invasive plants) are suppressed.
4. An effective alternative to glyphosate is utilized.

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 citizen science initiatives.
- Increasing SLELO visibility by participating in community events.

Supporting Research and Citizen Science:
Submit academic research needs to the New York State Invasive Species Coordination Unit as needed in December/January.

AIS Plant Analyses:
Quantify the amount of nutrients (Total Kjeldahl Nitrogen, Soluble reactive phosphorus and total phosphorus) removed from waterways via annual removal of water chestnut plants and other key aquatic plant species. This may enable us to quantify potential reductions in internal nutrient loading and its effect on harmful algal blooms.[18]

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:

- Hydrilla monitoring via lake associations.
- Community Ash Tree Inventories
- Emerald Ash Borer Monitoring/surveillance/education
- Asian Long-horned Beetle Monitoring/surveillance/education
- Site Restoration 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 Nature Conservancy (as host organization) will utilize an existing recruitment process and database to generate volunteerism and to take part in SLELO activities.
- ✓ Second, press releases 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 and in cooperation with Cornell Cooperative Extension as one of SLELO's partner organizations.

IDENTIFYING AND PURSUING FUNDING OPPORTUNITIES:

In order to maximize and continue SLELO initiatives, sustained funding must occur. The SLELO PRISM currently has limited funding from New York State, which must be used strategically to address priority issues and to maximize the conservation benefit. The SLELO partners will, whenever possible, share in project expenses by separating components and assuming corresponding costs. In addition, SLELO partners will seek and pursue funding for new projects and seek to sustain PRISM support within the NYS Environmental Protection Fund.

PRIORITY SPECIES

As a result of the strategic planning process, partners of the SLELO-PRISM identified the need to create "lists" as related to invasive species management efforts. Significant progress towards the development of these lists was made. Please note that these lists are considered to be "tentative" pending further refinement in 2012.

These lists include;

- ✓ Prevention “Watch-List” Species (Table 4)
- ✓ Target Management Species List (Table 5), (Table 7)
- ✓ General Species of Concern List – All Species (Table 6).

Table 4 – Prevention “Watch-List” Species

- ✓ Mile-A-Minute Vine (*Polygonum perfoliatum*)
- ✓ Didymo (*Didymosphenia geminate*)
- ✓ Hydrilla (*Hydrilla verticillata*)
- ✓ Asian Long horned Beetle (*Anoplophora glabripennis)*
- ✓ Hemlock Woolly Adelgid (*Adelges tsugae*)
- ✓ Silver, Big Head and Grass Carp (*Ctenopharyngodon spp*.)
- ✓ New Zealand Mud Snail (*Potamopyrgus antipodarum)*
- ✓ Hemimysis (*Hemimysis anomala*)
- ✓ Asian Clam (*Corbicula fluminea*)
- ✓ Kudzu (*Pueraria lobata*)
- ✓ Feral swine (*Sus scrofa* Linnaeus)
- ✓ Porcelain Berry (*Ampelopsis spp.)*
- ✓ Water Soldier (*Stratiotes aloides*)
- ✓ Rusty Crayfish (*Orconectes rusticus*)
- ✓ Water Hyacinth (*Eichornia crassipes)*
- ✓ Fanwort (*Cabomba caroliniana*)
- ✓ Slender false brome (*Brachypodium sylvaticum*)
- ✓ Water lettuce (*Pistia stratiotes*)
- ✓ Tree-of-heaven *(Ailanthus altissima)*
- ✓ Spotted lanternfly (*Lycorma delicatula*)
- ✓ Tench (*Tinca tinca*)

Table 5 - Target Management Species within the SLELO-PRISM Focus Area

- ✓ Black & Pale Swallow-wort (*Cynanchum spp*.)
- ✓ Water Chestnut (*Trapa natans*)
- ✓ Giant Hogweed (*Heracleum mantegazziamum*)
- ✓ Asian Longhorned Beetle (*Anoplophora glabripennis)*
- ✓ Emerald Ash Borer (*Agrilus planipennis*)
- ✓ Phragmites (*Phragmites australis*)

- ✓ Japanese Knotweed (*Fallopia japonica*)
- ✓ Glossy /common Buckthorn (*Rhamnus spp.)*

Table 6 - General Species of Concern List – All Species

- ✓ Black & Pale Swallow-wort (*Cynanchum spp*.)
- ✓ Giant Hogweed (*Heracleum mantegazziamum*)
- ✓ Japanese Knotweed (*Polygonum cuspidatum*)
- ✓ Japanese Stiltgrass (Microstegium vimineum)
- ✓ Honeysuckle (Lonicera Caprifolium)
- ✓ Spotted Knapweed (Centaurea maculosa)
- ✓ Mile-A-Minute Vine (Polygonum perfoliatum)
- ✓ Glossy Buckthorn (Rhamnus spp.)
- ✓ Purple Loosestrife (Lythrum salicaria)
- ✓ Phragmites (Phragmites australis)
- ✓ Water Chestnut (Trapa natans)
- ✓ Eurasian Water Milfoil (Myriophyllum spicatum)
- ✓ European Frogbit (Hydrocharis morsus-ranae)
- ✓ Didymo (Didymosphenia geminate)
- ✓ Hydrilla (Hydrilla verticillata)
- ✓ Emerald Ash Borer (*Agrilus planipennis*)
- ✓ Asian Longhorned Beetle (*Anoplophora glabripennis*)
- ✓ Sirex (*Sirex spp.)*
- ✓ Hemlock Wooly Adelgid (*Adelges tsugae*)
- ✓ Leek Moth (*Acrolepiopsis assectella*)
- ✓ Round Goby (*Neogobius melanostomus*)
- ✓ Silver, Big head & grass carp (*Ctenopharyngodon spp.)*
- ✓ Zebra/Quagga Mussel (*Dreissena spp.)*
- ✓ Spiny Water Flea (*Bythotrephes longimanus*)
- ✓ New Zealand Mud Snail (*Potamopyrgus antipodarum*)
- ✓ White Nose Syndrome (Infectious agent)
- ✓ VHS-Disease (Viral hemorrhagic septicemia virus)
- ✓ Spring virema (Infectious agent/viral)
- ✓ Hemimysis (*Hemimysis anomala*)
- ✓ Curley Leaf Pondweed (*Potemogeton crispus*)
- ✓ Coltsfoot (*Tussilago farfara L.)*
- ✓ Wild Parsnip (Pastinaca sativa)

- ✓ Wild Chervil (*Anthriscus silvestris*)
- ✓ Leafy Spurge (*Euphorbia esula L.*)
- ✓ Yellow Iris *(Iris psuedacorus)*
- ✓ Asian Jumping Worm *(Amynthas spp.)*

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 focus areas.

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

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 CONTROL 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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