

Partnership Grant
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Introduction

Ordinary human actions have led to countless inadvertent introductions of non-native fungi, insects, plants, animals, and other organisms such as Dutch Elm disease, Hemlock woolly adelgid, purple loosestrife, zebra mussels, and water chestnut. And these introductions have had varying negative effects from the loss of species to reduction in biodiversity to economic loss. Unfortunately, when organisms escape into an ecosystem, they often go unnoticed at first. As a result, the organism has time to become well established, making control or eradication more difficult to obtain.

This is not the case for the naturalization of Indian Cup Plant (*Silphium perfoliatum*) along the banks of the Au Sable River. Over the past several years, staff at the Nature Conservancy has tracked the prolific spread of this plant along the river's banks. The plant was first noticed just outside of Keene Valley and has since spread north along the East and Main Branches of the Au Sable River to at least Keeseville, which is approximately 30 miles from the plant's original sighting.

This area is the only known location in the Adirondack Park and Lake Champlain Basin of the perennial plant with daisy-like yellow flowers that is native to the tall grass prairies of the Midwest United States. But, this does not mean that the plant will not continue to spread throughout the floodplains in the Adirondack Park and along the shores of Lake Champlain. Therefore, there is an imminent need to determine the exact extent of the plant's geographic footprint, educate the public of the plant's presence, and design a management plan.

Objectives and Tasks

The project's objectives were met through a joint effort of the ASRA and the Nature Conservancy. The projects specific objectives and tasks were as follows:

- To complete a walking/canoeing inventory of the East and Main Branches of the Au Sable River from Keene Valley to the mouth of the river documenting the location of Indian Cup Plant along the banks of the river. The team was able to survey from the start of the East Branch to Clintonville on the Main Branch this past year. Tasks to complete this objective included:
 - Creating a volunteer team of local citizens and past ASRA and Nature Conservancy volunteers to help complete the inventory.
 - Training the volunteer team in plant identification and mapping.
 - Conducting the inventory.
 - Creating a map, housed in the Adirondack Park Invasive Plant Program's database, using GIS that indicates the locations of the Indian Cup Plant.

- To increase the public's awareness of Indian Cup Plant through educational programming at local events and meetings and through educational articles. Tasks completed for this objective included:
 - Contact the local newspapers to see if they would be willing to run a piece on Indian Cup Plant.
 - Creating an article for the ASRA's newsletters.
 - Creating and distributing a brochure to be placed at the Nature Conservancy, the ASRA office, and local businesses.
 - Speaking the members of the Adirondack Park Invasive Plant Program to educate them regarding this issue.
- To create experimental treatment plots to determine the most effective yet least disturbance causing control method. Tasks for completing this objective included:
 - Finding a location to conduct experimental treatments. The control plot location selected was located in the NYS DOT ROW of State Rt. 9N west of Stickney Bridge Rd
 - Applying various experimental treatments in the early summer using the sampling process developed by Victoria A. Nuzzo, of the Ecology and Management of Invasive Plants Program, for monitoring garlic mustard. See Appendix B for photos of treatments.
 - Examining results of the treatments to check for effectiveness and kill zones.
- To create a document outlining a management plan for Indian Cup Plant. Please see Appendix A for the management plan. Tasks included:
 - Researching the plant's life history, extent of natural range, and whether or not it is causing similar problems elsewhere.
 - Writing a report outlining the geographic footprint of Indian Cup Plant along the Au Sable River, the plant's life history and requirements, whether or not the plant has caused similar problems elsewhere, if it has what has been done to control the plant's spread, the results of the experimental treatments, and recommendations for either eradication or control of Indian Cup Plant along the Au Sable River.

Conclusion

This project, Establishing a Control Plan for Indian Cup Plant: A New Invasive Species Established Along the Banks of the Au Sable River, helped two organizations, the ASRA and the Nature Conservancy, concerned about the health of the Au Sable River, Adirondack Park, and Lake Champlain ecosystems understand and learn how to control Indian Cup Plant by establishing treatment plots, educate the public of the plant through educational talks and a fact sheet, and design and distribute a management plan. With the current management plan in place these two organizations can work to create new partnerships with other concerned organizations and secure additional funding for the plant's management.

In addition, this project increased the capacity of local groups to work towards the goals of *Opportunities for Action*. The project directly address one of the four priorities

outlined in *Opportunities for Action* by controlling the spread and impact of a nonnative species, Indian Cup Plant, which will preserve the integrity of the Lake Champlain ecosystem.

Appendix A. Indian cup plant management plan.

Introduction

Ordinary human actions have led to countless inadvertent introductions of non-native fungi, insects, plants, animals, and other organisms such as Dutch Elm disease, Hemlock woolly adelgid, purple loosestrife, zebra mussels, and water chestnut. And these introductions have had varying negative effects from the loss of species to reduction in biodiversity to economic loss. Unfortunately, when organisms escape into an ecosystem, they often go unnoticed at first. As a result, the organism has time to become well established, making control or eradication more difficult to obtain.

This is not the case for the naturalization of Indian Cup Plant (*Silphium perfoliatum*) along the banks of the Au Sable River. Over the past several years, staff at the Nature Conservancy has tracked the prolific spread of this plant along the river's banks. The plant was first noticed just outside of Keene Valley approximately 15 years ago. From there, the plant started to spread downstream. Over the years, *Silphium perfoliatum* has spread north along the East and Main Branches of the Au Sable River to at least Keeseville, which is approximately 30 miles from the plant's original sighting.

It is this aggressive characteristic that makes *Silphium perfoliatum* an invasive. Like purple loose strife, Japanese knotweed, or common reed, *Silphium perfoliatum* pushes out the native vegetation, creating a monoculture, which can negatively effect native soils and wildlife. What makes this characteristic even more alarming is the fact that this is the first occurrence of this plant escaping into the Adirondack Park. Therefore, it is imperative to enact control measures to keep the plant from spreading into more pristine areas of the Park.

Identification and Life Characteristics



Image 1. The yellow, showy flowers of *Silphium perfoliatum*.

Indian cup plant (*Silphium perfoliatum*) is a perennial with yellow daisy-like flowers in the *Asteracea* family. It is a native to the tall-grass prairies of the mid-west United States. The plant grows to be between three and eight feet tall and clumps spread out to be between one and three feet across. The leaves are opposite and simple, broadly triangular to ovate. In addition, the plant's leaves are also rough and deeply pinnatifid. Besides the showy flowers, the plant's most notable characteristic is the fact that the large leaf fuse together at their bases to form a "cup."

This plant propagates mainly by seed. The Natural Resource Conservation Service Plants Database states that vegetative propagation is slow while seed propagation is moderate in its native habitat. The plant prefers moist, rich soils and to grow along streams and floodplains but can tolerate drought once established. The plant is also highly tolerant of anaerobic soil conditions and is not fire tolerant at all. The plant is not palatable to grazing or browsing animals.

The Au Sable River Association (ASRA) and the Adirondack Park Invasive Plant Program (APIPP) are still trying to fully understand how *Silphium perfoliatum* behaves in the Au Sable and Champlain Valleys. It is apparent, from the spread of the plant that *Silphium perfoliatum* has moved downstream with the flow of the river's waters. And, it is also apparent that the plant establishes itself in areas where the bank has been scoured by flood waters and ice flow. Unfortunately, there is still much to be learned such as the viability of the plant's seed and additional means of seed transportation.



Image 2. The leaves of *Silphium perfoliatum* fuse together around the stem to form a cup, which is a defining characteristic of this plant..

Known Infestations

The only known incident of this plant naturalizing and becoming invasive anywhere in the United States, outside of its native tall-grass prairie habitat, is in the Adirondack Park, along the East Branch of the Au Sable River. APIPP has spent two summers inventorying the East Branch. Inventory work has been completed from Keene Valley, New York to Au Sable Forks, New York. Known infestations start in Keene Valley, New York and spread to Keeseville, New York. It is possible that the plant may have already reached the shores of Lake Champlain, since this section of the river has yet to be inventoried by trained APIPP staff or volunteers.

There are still several areas that are in need of mapping. These areas include, in order of importance, the remainder of the Main Branch of the Au Sable River, the immediate area of the river's mouth at the shores of Lake Champlain, the East Branch River tributaries, and the upper fields along both the East and Main Branches of the River. Mapping is vital in helping the partners understand the infestation area and life characteristics of *Silphium perfoliatum*.

Current Control Research

During the summer of 2006 the ASRA and APIPP) partnered to determine the best control methods, which was funded by a Lake Champlain Basin Program grant. The

control plots are located in the New York State Department Of Transportation Right Of Way of State Rt. 9N west of the Stickney Bridge Rd. The Department of Transportation Reference Marker for this location is 9N-1203-1656.

The sampling process used was developed by Victoria A. Nuzzo, of the Ecology and Management of Invasive Plants Program, for monitoring garlic mustard. There are 4 treatment plots. Plot one is a cut-stem treatment using 8% triclopyr herbicide. Plot two is a foliar treatment of RoundUp Pro, 20%. Plot number three is a cut-stem treatment utilizing a 20% Rodeo herbicide, which is a glyphosate approved for wetland application. And, plot number four is a control plot, which did not receive any treatments. Each plot was randomly chosen using an open-ended quadrat frame with the fourth side removable. Plots were marked, for future reference using flagging. All treatments will be carried out by Steven Flint of the Adirondack Chapter of the Nature Conservancy. Effectiveness will be measured by documenting the percentage of *Silphium perfoliatum* pre and post treatment. Results of the treatment will be available after the 2007 growing season.

Educational Efforts

One of the key components of an invasive plant species' management plan is education. Over the last several years, the APPIP, the Nature Conservancy (TNC), and the ASRA has worked at educating the public about this new threat. Information has been provided to the Adirondack Park Agency (APA), the Heritage Program, the New York State Department of Conservation (DEC), the ASRA's general membership, the partners of APPIP, and home-owners along the East Branch of the Au Sable River. To help in this effort, the ASRA has created a brochure for distribution. The one-page brochure is available from the ASRA office, the Keene Valley TNC office, which is also home to APPIP, and on-line at www.ausableriver.org/icpbrochure.

Because education is so important to future management plans, educational efforts should still continue. The partnership established between the ASRA and APPIP should be enlarged to include area universities and colleges, federal and state agencies, and other not-for-profit organizations. In addition, educating the general public about *Silphium perfoliatum* needs to continue. Strategies to reach the public could include a door-to-door campaign of individuals living along the river, educational presentations to town boards, schools, and clubs, and newspaper articles.

One-Year Goals

Over the next year, the project's partners hope to continue their work towards the control of *Silphium perfoliatum*. The goals for the coming year include:

- Distribute educational fact sheets to landowners along the Au Sable River to inform them of the presence of *Silphium perfoliatum*,
- Continue inventory of the Main Branch of the Au Sable River,
- Record the results of the treatment plots, and

- Work towards forming more partnerships with agencies and organizations in the watershed willing to work towards the control of *Silphium perfoliatum*.

Five-Year Goals

Over the next five years, the project's partners hope to:

- Continue educating the public of the threat of *Silphium perfoliatum*,
- Continue forming working partnerships,
- Inventory the tributaries leading into the East and Main Branch of the Au Sable River,
- Monitor the West Branch to make sure that *Silphium perfoliatum* does not spread to this section of the river,
- Secure additional funding to implement control, and
- Implement initial controls along the East and Main Branches of the Au Sable River.

Long-Range Planning

Since *Silphium perfoliatum* has already become established along the banks of the river, complete eradication of the plant may be impossible. Eradication will only be possible if *Silphium perfoliatum* responds well to one or more of the chemical treatments implemented this summer and if private landowners are willing to work with the project's partners. Because of these restraints, the ASRA and APPIP feel a more obtainable goal would be control of *Silphium perfoliatum*. Control will include education to prevent people from spreading the plant through transplants, continued monitoring to map the spread of *Silphium perfoliatum*, and chemical treatment to reduce the population size of *Silphium perfoliatum*. If this control plan is vigilantly followed it should be possible to prevent the plant from spreading further into the Adirondack Park and Champlain Valley.

Conclusions

In today's mobile society, invasive species will continue to be a threat to all ecosystems. Even though this is a grim fact, it does not mean that society should allow new species to invade ecosystems. Invasive species greatly decrease the biodiversity of an area. Reductions in biodiversity allow natural occurring disasters such as floods, droughts, and disease to have a greater impact on the area of decreased biodiversity. Therefore, maintaining biodiversity and keeping invasive species under control is important. This fact is why the ASRA and APPIP feel controlling the spread of *Silphium perfoliatum* into the Adirondack Park and Champlain Valley, two unique ecosystems, is important.

Appendix B. Photographs of treatment plots.



Photo 1. Steven Flint, of the Nature Conservancy, marking the control plot.



Photo 2. Steven Flint marking the foliar spray treatment plot.



Photo 3. Steven Flint applying the foliar treatment.



Photo 4. Steven Flint marking the cut stem treatment plot.



Photo 5. Photograph of the cut stem treatment.