

2018 Annual Report



Giant Hogweed Treatment, Sullivan County 7/5/18

Prepared By:

John Thompson
Catskill Regional Invasive Species Partnership Coordinator

Dan Snider
Field Projects Manager

Catskill Regional Invasive Species Partnership
Catskill Center for Conservation and Development
Arkville, New York



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conservation creates opportunity



Figure 1. "To Be Forever Wild" Screening with Director David Becker at Catskill Interpretive Center in Mt. Tremper

Executive Summary

During 2018 the Catskill Regional Invasive Species Partnership (CRISP) performed Rapid Response, led Early Detection and Rapid Response trainings, control and management programs, prevention and awareness presentations and citizen science trainings. CRISP documented and treated 4 new infestations of high priority Early Detection species. CRISP provided 52 Invasive Species programs for 1030 participants.

An Early Detection Working Group was formed to prioritize 169 invasive species into five different tiers. This categorization was used to determine rapid response and funding priorities during 2018. Trillium treated mile-a-minute in Cohecton and Woodstock and treated Japanese angelica tree in Tusten and Woodstock.

CRISP released a Request For Proposals and received 10 complete proposals. Three Early Detection surveys (one using environmental DNA), one Rapid Response project and one citizen science project were funded.

A total of 437 Giant Hogweed stems were controlled in 2018. Silverflies (*Leucopis* spp.) were released as a biocontrol for hemlock woolly adelgid at one location.

Contents

Executive Summary	1
Contents	2
Introduction.....	4
Prevention	5
Early Detection	11
Control.....	15
Awareness	17
Science.....	20
Partnership	22
Acknowledgement.....	24



Figure 2 Waterwheel (*Aldrovanda vesiculosa*). CRISP has the only infestation of waterwheel in New York State.

Introduction

The mission of CRISP is to promote education, prevention, early detection and control of invasive species to limit their impact on the ecosystems and economies of the Catskills. CRISP performs this mission in a region of over 3.3 million acres, encompassing all of Otsego, Delaware, and Schoharie Counties; most of Greene, Ulster and Sullivan Counties; and part of Orange County. CRISP's vision is to protect the ecological integrity, water resources, recreational values and the economy from the devastating impacts of invasive species, working across a diverse landscape with both public and private landowners.

The CRISP region is an important ecological region in New York State and the work of CRISP and its partners help to protect the biodiversity supported in the region. The CRISP region supports 78 state rare plants and animals and 22 rare communities.

During 2018, CRISP provided 52 Invasive Species programs for 1030 participants. Subcontractors greatly augmented the educational opportunities presented in the CRISP region. Cornell Cooperative Extension provided 27 programs for 680 people. In addition, the CCE presented displays at 14 county fairs and festivals, reaching more than 75,550 people. The Monitoring and Managing Ash Project, provided eight workshops for 100 citizen scientists to join in the search for “lingering ash.”

CRISP staff led Early Detection and Rapid Response trainings, control and management programs, prevention and awareness programs and citizen science trainings. CRISP documented and treated infestations of high priority Early Detection species.

A total of 437 Giant Hogweed (*Heracleum mantegazzianum*) stems were controlled at five sites over 0.14 acres in 2018. Silverflies (*Leucopis* spp.) were released as a biocontrol for hemlock woolly adelgid (*Adelges tsugae*) in one hemlock stand.

CRISP released a Request For Proposals and received 10 complete proposals. Three Early Detection surveys (one using environmental DNA), one Rapid Response project and one citizen science project were funded.

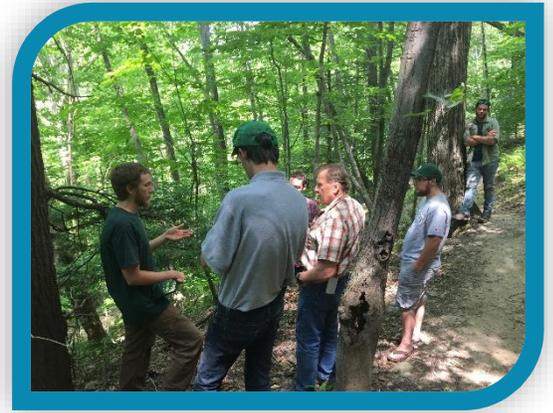


Figure 3 Hemlock Woolly Adelgid Phenology Training

Prevention

A major emphasis of CRISP effort and resources focused on preventing the introduction of invasive species into the CRISP PRISM. Toward that end, CRISP subcontracted with SUNY Oneonta to provide a Watershed Stewards Program for the seventh consecutive year. In 2018, SUNY Oneonta trained 36 Watershed Stewards to interpret invasive species prevention and collect waterbody use data at high use access sites. Watershed Stewards provided information and boat inspections (in Otsego, Delaware, and Sullivan Counties) at Otsego Lake, Canadarago Lake, and along the Delaware River within the Upper Delaware River National Scenic and Recreation Area (a unit of the National Park Service).

CRISP Watershed Stewards trainings were offered from April to June. Trainings were held at Otsego Lake, at the Delaware River, and in Sullivan County. The CRISP Watershed Stewards program trained 36 Watershed Stewards. Those stewards interacted with 3,835 boaters, a 4% increase over 2017. A total of 210 aquatic invasive species were reported in 2018, a 20%



Figure 4 Mark Walker (center) was recognized as first CRISP Super Steward by Ryan Fagan (left), Canadarago Lake Improvement Association President, and Paul Lord (right), SUNY Oneonta.

increase over 2017, preventing them from moving in or out of the CRISP region. Zebra mussels and water chestnut were some of the species removed and disposed of. Most surveys were entered from the Canadarago Lake and the Cooperstown boat launches. The CRISP Watershed Stewards Program used the Watershed Inspection Stewardship Program Application of iMapInvasives to enter survey information. A total of 3,688 surveys were submitted by CRISP Watershed Stewards in 2017, with the majority from the Canadarago Lake and Cooperstown launches.

To recognize the dedication and hardwork of our Watershed Stewards, the CRISP Watershed Stewards Program began a “Super Steward” Award in 2018. The first-ever CRISP Super Steward was Mark Walker from the Canadarago Lake Improvement Association (CLIA). Mark was recognized for being “consistently diligent and enthusiastic.” He was personally responsible for

multiple finds of water chestnut on boat trailers parked in the New York State Parks boat launch area. Jean Kosina, also of CLIA, was presented with the CRISP Super Steward Award for her exceptional role in protecting the region's waterbodies. She accounted for nearly 50% of CLIA's boat inspections, she inspected over 1200 boats in 2018! We wholeheartedly thank Mark and Jean for their dedication and passion for protecting our waters!

Vector diagrams created by SUNY Oneonta depict the trajectory of boaters entering CRISP waterbodies. Last used waterbody maps show that many of the boats entering at the CRISP launches are coming from outside the CRISP region and could potentially bring invasive species with them from other regions of New York State and beyond.



Figure 5 CRISP Super Steward Awardee Jean Kosina (left) inspected over 1200 boats for Canadarago Lake Improvement Association. Paul Lord (right) presents Jean with her certificate.

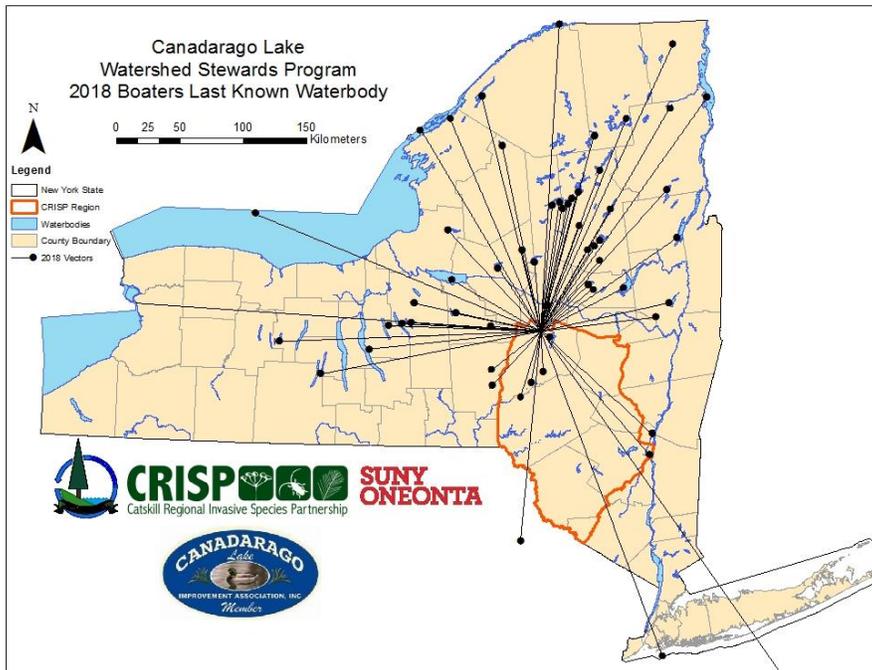


Figure 6 Last used waterbodies prior to 2018 entry at Canadarago Lake.

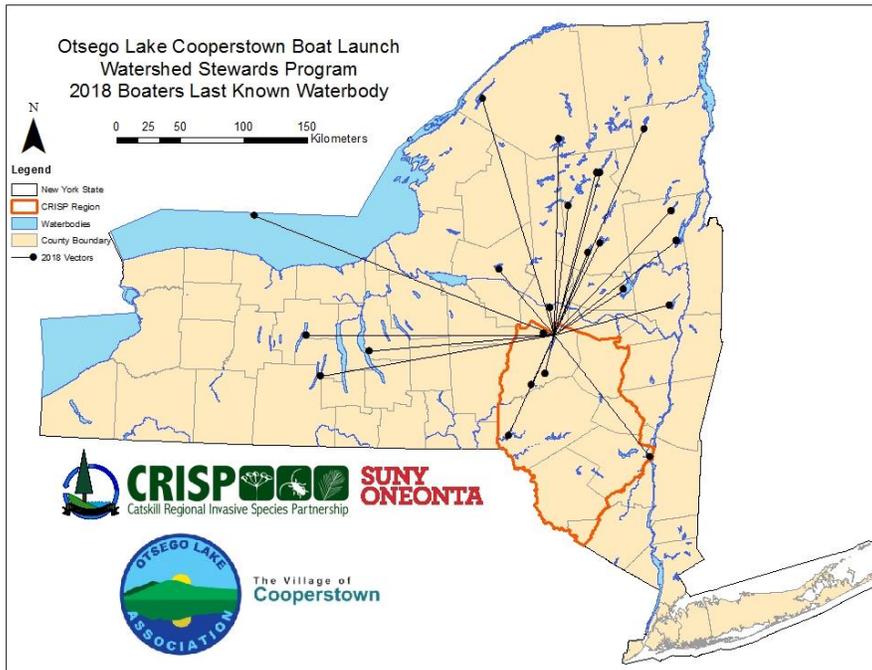


Figure 7 Last used waterbodies prior to 2018 entry at Otsego Lake Cooperstown Boat Launch.



Figure 8 Last used waterbodies prior to 2018 entry at Otsego Lake Springfield Boat Launch.

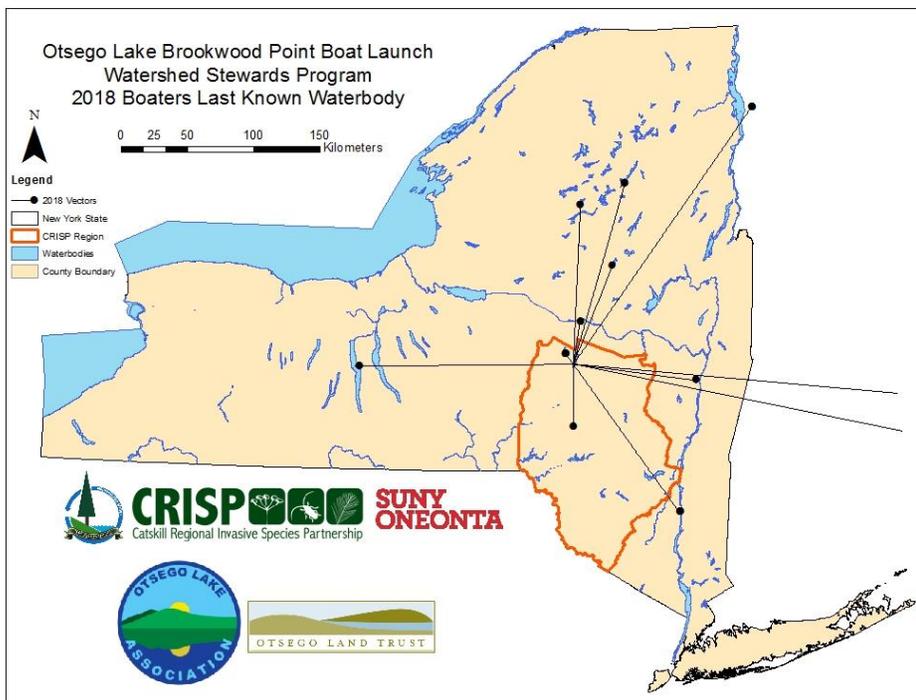


Figure 9 Last used waterbodies prior to 2018 entry at Otsego Lake Brookwood Point Boat Launch.



Figure 10 Last used waterbodies prior to 2018 entry at Delaware River Boat Launches.

Spotted lanternfly (*Lycorma delicatula*) an invasive plant hopper was included in prevention trainings and many of the outreach events offered in 2018 including a presentation by Sarah Hall-Bagdonas, Program Manager of the Northern Tier Hardwood Association. Sarah gave a presentation on spotted lanternfly at the April CRISP Partners Meeting. This pest is a native of China, is now found in adjacent states and is threatening to move into our region. Six CRISP programs included spotted lanternfly identification, life history, current known distribution, how to report sightings and trainings for volunteer Lanternfly Spotters to identify and report tree-of-heaven and to monitor spotted lanternfly sticky traps. Because tree-of-heaven appears to be an important host plant for the spotted lanternfly, an effort was made to recruit and train volunteers to map tree-of-heaven stands. A total of 34 tree-of-heaven stands were added to the iMapsInvasives database increasing the number of infestations from 23 to 57. Volunteer intern, Malcolm Kaletsch assisted with mapping tree-of-heaven growing both within the CRISP region and along the Lower Hudson PRISM boundary. Using this information, staff located 14 tree-of-heaven trunks to place sticky traps on. Traps were placed in eight towns in areas that were both visible and expected to be higher risk sites for spotted lanternfly infestations. Volunteers assisted with monitoring the sticky traps every two weeks for spotted lanternfly - none were detected during the survey.

We thank the following businesses, organizations and private landowners for assistance with this project:

Town	Property Owner
Deerpark	Auto Dreams Group
Hurley	Town of Hurley
Kingston	Woodstock Harley Davidson
Kingston	Mara's On The Way
Deerpark	City of Port Jervis
Tusten	Ten Mile River Boy Scout Camp
Wawarsing	Elks Lodge #1971
Wawarsing	Congregation Ezrath Israel
Wawarsing	Doug and Diane Hart

CRISP 2018 Prevention and Reporting Trainings

Date	Title	# People
4/19	Spotted Lanternfly - Sarah Hall-Bagdonas	20
5/20	ALB Workshop & Tree Tagging – Schoharie River Ctr	11
7/10	Spotted Lanternfly/Tree-of-Heaven Training	1
8/28	Lanternfly Spotter Training	1
Total (n=4)		33

Early Detection

Once an invasive species becomes established, the only remediation action possible is the partial mitigation of negative impacts of the invasive. The goal of Early Detection and Rapid Response (EDRR) efforts are to increase the likelihood that invasions will be eradicated before they become established. The CRISP high priority Early Detection species were selected because they could invade important habitats and spread within the region, or they are approaching the region and likely to invade.

The species on the high priority Early Detection list were the highest priorities for control within the PRISM. The list served as the focal species for Early Detection projects funded through the 2019 CRISP Request For Proposals and for Early Detection trainings. High priority EDRR species included: mile-a-minute (*Persicaria perfoliata*), slender false brome (*Brachipodium sylvaticum*), Japanese angelica tree (*Aralia elata*), Japanese tree lilac (*Syringa reticulata*), hydrilla (*Hydrilla verticillata*), floating primrose-willow (*Ludwigia peploides*), common frogbit (*Hydrocharis morsus-ranae*), yellow floatingheart (*Nymphoides peltata*), Brazilian waterweed (*Egeria densa*), Carolina fanwort (*Cabomba caroliniana*), and waterwheel (*Aldrovanda vesiculosa*).



Figure 11 Jeff O'Handley and Emily Proutey at Training.

CRISP 2018 Early Detection and Rapid Response Trainings

Date	Title	# People
4/20	Invasive Species and You - CCE Sullivan County	6
4/21	Priority Forest Pests – CCE Delaware County	4
5/12	Spring Ephemerals & Lesser Celandine at Mountain Top Arboretum	12
5/23	Mile-A-Minute Training - DEC Region 3	3
6/15	Mile-A-Minute Identification and Management	3
7/7	Mile-A-Minute Survey	1
7/10	Mile-A-Minute Removal	4
Total (n=8)		43

Early in the year, the Early Detection Working Group developed a prioritization of 169 invasive species into five tiers. The categorization attempted to prioritize invasive species based on the threat of each invasive to the CRISP

region and the ability of CRISP to perform prevention, early detection and control efforts for these invasive species based on the species invasiveness (according to NYS ranking evaluation) and distribution (according to iMapInvasives and expert knowledge of the Early Detection Working Group).

The Invasive Species Tiers were developed between New York State iMapInvasive staff and the Partnership for Regional Invasive Species Management Coordinators. Each very high, or high, impact invasive species is assigned to the following tiers (See Invasive Species Tiers Table):

Tier 1 Early Detection/Prevention- Highest level of early detection survey efforts. Should conduct detection surveys and assign to appropriate Tier if detected.

1a) Inside Buffer (within 100 miles of PRISM), but not in PRISM

1b) Outside PRISM and Buffer, but close (Eastern North America)

1c) Far outside PRISM and Buffer (not in Eastern North America), but introduction pathway exists.

Tier 2 Eradication – Highest level of early detection response efforts. High impact species with low enough abundance and suitable treatment method available to make eradication feasible within the PRISM. Need delineation surveys to determine extent.

Tier 3 Containment – Target strategic management to slow the spread (e.g. remove outlying and border populations), as likely too widespread for eradication, but many surrounding regions could be at risk if left unattended. Use Invasive Plant Management Decision Analysis Tool (IPMDAT) for plants. Possible eradication candidate only if adequate resources and effective control methods available.

Tier 4 Local Control – Eradication from PRISM not feasible; focus on localized management over time to contain, exclude, or suppress to protect high-priority resources like rare species or recreation assets. Be strategic when deciding if/where to control.

Tier 5 Monitor – Species that need more research, mapping, and monitoring to understand their invasiveness. This includes naturalized species and cultivated-only species that are known to be invasive in other regions but are not yet invasive here. Invasiveness may change with environmental or genetic changes. Should monitor populations on a regular basis to see if they are starting to become invasive and assign to appropriate Tier if invasive infestations detected.

CRISP staff used this list to develop a list of species to focus on for prevention, early detection and rapid response. Research on Tier 5 species will be encouraged, and supported where possible, and Tier 3 and Tier 4 species are worked on collaboratively, when partners are able to provide resources and expertise to leverage CRISP efforts. The Early Detection Working Group will review this list annually, recategorizing species based on the best information available.

Early detection surveys led by Donna Vogler (SUNY Oneonta) were conducted during the summer. The most likely sites for new infestations of terrestrial high priority early detection species were targeted by Donna and two graduate students. New infestations of Japanese angelica tree (3 sites), Japanese tree lilac, Caroline fanwort, frogbit and Himalayan balsam (2 sites). Observations were documented in iMapInvasives of both early detection species and more well-established invasive species. Sixteen significant records were documented in iMaps through this program. In addition, CRISP staff documented a county record of cut-leaved teasel in Ulster County.

Michael Tessler and colleagues at the American Museum of Natural History conducted an environmental DNA survey for CRISP high priority early detection aquatic plant species. Metabarcoding uses a broadly applicable primer to amplify DNA from a variety of organism in a single next generation sequencing run. This resulted in an optimal set of barcodes; specifically, using rbcL, ITS2, and matK primers in combination. To begin that work, test sites for Hydrilla at New Croton Reservoir were used to assess and establish various eDNA metabarcoding methods for that plant. The 2018 eDNA survey of priority aquatic invasive plant species found putative new detections of Hydrilla, and common frogbit. Other invasive species, such as curly pondweed and waterchestnut were also found. Further surveys in 2019 will follow up on the eDNA detections.



Figure 12 Seth Cunningham and Michael Tessler collecting waterwheel.

An aquatic plant survey, led by Paul Lord (SUNY Oneonta) was conducted along the Delaware River. Due to heavy rains and adverse water conditions, the

survey was not completed. The survey will be completed and a final report will be prepared in 2019.

Through a program established by New York State Department of Environmental Conservation (DEC) and SUNY College of Environmental Science and Forestry, a Catskill Invasive Species Campground Steward position was filled in 2018 by James Pfitzer. This was the third consecutive year for the Catskill Invasive Species Campground Steward. James worked for 8 weeks beginning on May 29th. James' primary project was to perform Early Detection surveys for high priority Early Detection terrestrial plants and forest pests on the eight DEC Campgrounds in the Catskills region. All high-risk areas at each campground, such as campsites, buildings and trailheads, were surveyed. Campgrounds are high-risk areas for invasive species infestation because visitors traveling from outside our region can potentially be vectors for invasive species movement. No new infestations were found but an inventory of established invasives and management actions were recommended to DEC. (A link to James' full report is here:

<http://catskillinvasives.com/index.php/updates/>

Three mile-a-minute sites were treated at least twice during the growing season. Trillium Invasive Species Management treated Mile-A-Minute in the Skinner's Falls area and at one of the Woodstock sites near Mt. Tremper. The total area of Mile-A-Minute either treated or pulled was 10 acres, with most of that area in Skinner's Falls. CRISP staff worked with five landowners at Skinner's Falls to get permission for treating or pulling Mile-A-Minute in June and July. CRISP staff worked with 15 Woodstock landowners to arrange removal, or surveys of properties adjacent to the known infestations.

CRISP subcontracted with Trillium, ISP to work with two landowners for Japanese angelica tree treatments. In Tusten, Trillium applied basal bark treatment to 100 plants. In Woodstock, Trillium used cut stem application for 41 plants.

Staff worked with DEC Forest Health Unit to establish two Southern Pine Beetle (*Dendroctonus frontalis*) traps in the eastern CRISP region near pitch pine and red pine populations. Southern Pine Beetle (SPB) was first discovered in New York State in 2014 and has been detected in the Hudson Valley in recent years. Staff and interns monitored the traps during the summer.

Control

Working with the New York State Hemlock Initiative, CRISP staff helped prioritize release sites for hemlock woolly adelgid biocontrol. A total of 120 silver flies (*Leucopis argenticollis* and *L. piniperda*) were released at one location on DEC property. A further 1020 *Laricobius nigrinus* were released at the Schoharies and Pepacton Reservoirs. NYS Hemlock Initiative staff surveyed for *Leucopis* establishment at the 4 original 2017 release sites in the Neversink region. A survey for the biocontrol, *Laricobius nigrinus*, was conducted at the 2016 biocontrol release site but none were recaptured.

Giant hogweed was surveyed for at 11 sites in the CRISP region. No hogweed was found at six sites surveyed. On the remaining five sites covering 0.14 ac, CRISP staff treated 437 plants, a decrease of 271 plants from the previous year.

In the second year of a three-year Stream Management Incentive program grant, awarded by the Ashokan Watershed Stream Management

Program, control efforts continued on a patch of Japanese Knotweed on a private property in Oliverea. The Catskill Center subcontracted with Trillium Invasive Species Management to continue treating a 2,800 square feet (0.064 ac.) patch of Japanese Knotweed along a headwater stream.

CRISP staff and volunteers removed over 2,500 Mile-a-Minute plants, treated Mile-a-Minute twice at sites at Skinner's Falls and Mt. Tremper, and responded to reports of potential new Mile-a-Minute infestations throughout the region.

CRISP staff led six programs and trainings that focused on Best Management Practices (BMP's) to control established invasive species, reaching 105 landowners and industry professionals. These trainings focused on communicating up-to-date information on best management practices of each species, as well as detailed biological characteristics that might inform landowner management. Some programs included information on native alternatives to commonly planted invasive ornamentals and best management practices for Japanese knotweed.

In 2018, CRISP staff and subcontractors managed a total of 18 infestations on private and public land: 11 giant hogweed infestations, 3 mile-a-minute



Figure 13 Surveying for giant hogweed.

infestations, 2 Japanese angelica tree infestations, and 2 Japanese knotweed infestations. Of these, 1 giant hogweed infestation was successfully eradicated, 10 giant hogweed, 3 mile-a-minute and 2 Japanese angelica tree infestations were contained, and 2 Japanese knotweed infestations were suppressed.

CRISP 2018 Control Programs and Trainings

Date	Title	# People
4/19	SUNY Cobleskill Hemlock Woolly Adelgid Management	36
4/26	DOT Roadside Invasives	23
5/5	Aliens in Our Backyard - Woodchuck Lodge	20
5/26	Native Alternatives to Invasive Ornamentals	17
6/2	Native Alternatives to Invasive Plants and iMapInvasives Training	11
6/7	Community Japanese knotweed BMPs and Pull	3
6/21	Monitoring and Managing Ash Workshop	16
7/9	Hemlock Health Hike	1
7/11	Hemlock Woolly Adelgid Phenology Training	4
7/12	Japanese Knotweed Removal	3
7/14	Fence Raising at Thorn	1
8/30	Riparian Demonstration/Invasive Pull	2
9/8	HWA Observation Training	15
9/10	HWA Observation Training	4
10/6	Hemlock Fence Raising	2
12/9	4H Infestation Management Walk	4
12/12	OCCA Emerald Ash Borer Management	15
Total (n=17)		177

Dan Snider, CRISP Field Projects Manager, continued his certification as a technician to apply pesticides. Dan will use his certification to both provide control treatments and to offer pesticide certification credits for trainings. Dan was approved as a pesticide instructor for the NYS Department of Transportation training on April 26.

CRISP continued working with the Catskill Streams Buffer Initiative (CSBI) to maintain the restoration of a 0.24 acre riparian corridor at the Catskill Interpretive Center in Mt. Tremper. CSBI led an initial invasives removal in an area that experienced high white ash mortality due to emerald ash borer. CSBI planted the riparian area with native trees and shrubs. Repeated manual removal of invasives has been performed to maintain the plantings.

Awareness

In 2018, CRISP staff led a total of 52 events for 1030 participants. Besides the trainings and workshops described above, CRISP staff conducted 24 programs and presentations reaching a total of 787 individual landowners, volunteers, and industry professionals with the goal of raising awareness of invasive species and prevention actions. Many of these events focus on species and habitats that are likely to be impacted by invasive species. Prevention and awareness-focused events also discuss achievable prevention activities such as the “Don’t Move Firewood” campaign, and the “Clean/Drain/Dry” and “PlayCleanGo” initiatives. All of these campaigns play an important role in targeting pathways and changing behaviors that contribute to both the spread of established invasive species and the introduction of emerging invasive species.



Figure 14 Shavertown Boot Brush Station ribbon cutting. photo by Kristen Rendler.

To promote the “PlayCleanGo” campaign, Meredith Taylor (New York City Department of Environmental Protection) offered a ribbon cutting at the boot brush station that was installed at Shavertown Trailhead during New York States Invasive Species Awareness Week.

CRISP was represented at 6 tabling events and interacted with 372 people at those events.

CRISP 2018 Awareness Programs and Events

Date	Title	# People
2/10	Minekill State Park Snowfest	36
2/22	Riparian Buffer Working Group	36
3/13	Emerald Ash Borer and Hemlock Woolly Adelgid	6
4/7	Hemlock Woolly Adelgid at Spillian’s Trout Tails	21
5/3	Invasive Species & CRISP – Upper Delaware Council	23
5/5	Intro to GPS – Catskill Expo	40
5/9	Invasive Species & CRISP	9
5/25	Beginning Birding – Taking Flight	18
6/14	BioBlitz Summary & Forest Management	14
7/7	Pakatakan Farmers Market	75
7/11	Woodstock Farm Festival	57
7/13	Boot Brush Ribbon Cutting	15

7/13	To Be Forever Wild Film Screening	44
7/21	Minekill State Park Summerfest	69
7/28	Catskill Forest Festival	100
8/16	Worms	26
9/21	Thorn Preserve BioBlitz	95
9/21	Fall Gala - Tabling	35
9/29	Forest History Walk	3
10/17	Intro to CRISP	31
10/18	Feral Swine	10
10/27	What Makes a Species Invasive?	6
11/27	Woodstock Day School EAB	9
11/29	Woodstock Day School HWA	9
Total (n=24)		787

In addition to the programs led and organized by CRISP staff, CRISP subcontracted with Cornell Cooperative Extension for the past six years to provide outreach throughout the CRISP region. During 2018, Cornell Cooperative Extension provided 27 programs for 680 people. In addition, the CCE presented displays at 14 county fairs and festivals, reaching more than 75,550 people.

The CRISP website (<http://www.catskillinvasives.com>) was updated with events and other information throughout the year. The number of people that liked CRISP's webpage increased by 24% to 533 people by year's end. The number of followers of the CRISP Facebook page (www.facebook.com/catskillinvasives/) increased significantly during the year, from 418 to 541 followers, a 29% increase. A post on March 4th about spotted lanternfly was the most viewed post with 1,236 views, while spotted lanternfly post on March 23rd received the most clicks and reactions. A total of 56 CRISP events were posted on the CRISP Facebook page, with 28,900 reached and 948 responses. The most popular event was "Making Paper from Invasive Plants" - the reach was 11,200, with 325 responses. At the end of the year, CRISP had 351 Twitter followers, a 26% increase over 2017 (www.twitter.com/CRISP_news).

Total Page Followers as of Today: 541



Figure 16 Increase in Facebook Followers in 2018

CRISP staff were interviewed for a WAMC story by Allison Dunn on the installation of the DEP boot brush station at Shavertown Trail on July 13th and by Mike Sakell for the Thunder Country Ag & Garden Report that aired on July 14th.

The Catskill Center subcontracted with Faction Studio to begin working on updating the CRISP website, www.catskillinvasives.com. The new website will be built on a SquareSpace template.

Grants and Donations

The Catskill Center received a \$2,050 grant from the O'Connor Foundation to replace the fence protecting the hemlock insectary at Thorn Preserve. The Catskill Center is in the second year of the Stream Management Incentive Program grant from the Ashokan Watershed Stream Management Program.

An anonymous donation supported the Hemlock Health Intern for four months, during the summer of 2018, to perform old growth hemlock surveys, hemlock monitoring and outreach about hemlock woolly adelgid.

Science

Ten iMapInvasives trainings were conducted in CRISP during 2018: Cobleskill (three), Oneonta (three), Woodstock, Mt. Tremper, Delhi, and Cooperstown. A total of 120 people were trained in iMapInvasives, an increase in trainees of 50% over 2017! The number of invasive species observations entered into iMaps decreased by 11%, to 608 records in 2018. The iMaps mobile app is becoming more popular and, for the first time, the iMaps mobile app is by far the most popular method to enter observations, much greater than bulk uploads and on-line data entry combined. The top observers were Kris Gilbert, John Thompson and Donna Vogler. The top reported species of 2018 were honeysuckle spp., hemlock woolly adelgid, and tree-of-heaven.



Figure 17 Aliens in Your Backyard at Woodchuck Lodge.

Including stands monitored with the New York Hemlock Initiative, 44 hemlock stands were monitored by CRISP staff and interns. CRISP began monitoring of hemlock stands in 2014 to assess Hemlock Woolly Adelgid, and other pests, and assess the health of the stands. Ten of these stands were re-surveyed. At each stand, data was collected on 30-45 hemlock trees. Hemlock health was assessed and hemlock woolly adelgid density data was collected at each tree. Each stand surveyed in 2018 was permanently marked so that individual trees can be revisited and resurveyed in future years.

A private donation expanded the capacity of CRISP staff to monitor hemlocks. The donation supported the return of Skyler Susnick as Hemlock Health Intern, for a second summer. Skyler worked for CRISP from June 11th to October 6th. Skyler ground-truthed and collected pest information on 20 old growth hemlock stands identified by Michael Kudish. Dr. Kudish identified 31 old growth hemlock stands and those locations have been incorporated into the CRISP Geographic Information System.

The Thorn Preserve BioBlitz was offered for the fourth consecutive year. Ninety-five people came to the event in 2018. We have documented 485 species on the Preserve through these BioBlitz surveys.

The Catskill Center subcontracted with the Ecological Research Institute to deliver the Monitor and Managing Ash Program throughout the CRISP region.

MaMA provided eight workshops for 100 citizen scientists and landowners in CRISP during 2018. Citizen scientists were trained to set up ash mortality monitoring plots as part of the MaMA Monitoring Plot Network extending throughout the Catskills and beyond. MaMA is a comprehensive framework providing steps to be undertaken at each stage of emerald ash borer (EAB) invasion, and even before it, to achieve ash species conservation as well as local mitigation. The program provides citizen scientists and land managers that tools that can lead to finding crucial “lingering ash” (native trees that remain healthy after nearby ash have overwhelmingly died due to EAB).

A new citizen science initiative was started by Cornell Cooperative Extension of both Greene and Ulster Counties working together to develop an Invasive Species Awareness Team. Six teens were recruited to learn about invasive species in order to do outreach in their communities to raise awareness about invasive species. Each teen leader will be expected to do county fair outreach, engagement of county legislators and community educational events in 2019.

Additional citizen science trainings, mostly offered at Cornell Cooperative Extension offices, were provided to train volunteers to identify and report high priority Early Detection species as described above.

Publications

John Thompson participated in a regional panel workshop on forest climate vulnerability in the Mid-Atlantic region and contributed to the writing of the following publication, Butler-Leopold, Patricia R.; Iverson, Louis R.; Thompson, Frank R.; Brandt, Leslie A.; Handler, Stephen D.; Janowiak, Maria K.; Shannon, P. Danielle; Swanston, Christopher W.; Bearer, Scott ; Bryan, Alexander M.; Clark, Kenneth L.; Czarnecki, Greg ; DeSenze, Philip ; Dijak, William D.; Fraser, Jacob S.; Guggler, Paul F.; Hille, Andrea ; Hynicka, Justin ; Jantz, Claire A.; Kelly, Matthew C.; Krause, Katrina M.; La Puma, Inga Parker; Landau, Deborah ; Lathrop, Richard G.; Leites, Laura P.; Madlinger, Evan ; Matthews, Stephen N.; Ozbay, Gulnihal ; Peters, Matthew P.; Prasad, Anantha ; Schmit, David A.; Shephard, Collin ; Shirer, Rebecca ; Skowronski, Nicholas S.; Steele, Al ; Stout, Susan ; Thomas-Van Gundy, Melissa; Thompson, John ; Turcotte, Richard M.; Weinstein, David A.; Yáñez, Alfonso. 2018 Mid-Atlantic Forest Ecosystem Vulnerability Assessment and Synthesis: A Report from the Mid-Atlantic Climate Change Response Framework Project. US Forest Service Northern Research Station General Technical Report NRS-181, Newtown Square, PA.

Articles were published during the year in *Kaatskill Life* and Catskill Center newsletter.

Partnership

CRISP Partner meetings were held on April 19th, June 21st, August 16th, and October 18th. Attendance averaged 18 people at each meeting. The CRISP Steering Committee met five times during the year. Tom Pavlesch began serving as Committee Chair in 2018. The Steering Committee worked on strategic objectives, establishing Working Groups, and developing meaningful metrics to track the outcomes of CRISP.

Working Group charges were developed for the Early Detection, Aquatic, Education and Outreach Working Groups.

Early Detection Working Group - will work with the Coordinator to prioritize invasive species for early detection and control efforts. This working group will prioritize invasive species based on the ability of CRISP to perform prevention, early detection and control efforts for these species based on the species invasiveness (according to NYS ranking evaluation) and distribution (according to iMapInvasives and expert knowledge). This working group will meet at least annually to develop this prioritization and communicate as needed to share information on new detections of high priority species.

Aquatic Working Group will work with the Coordinator to prioritize efforts for the CRISP Watershed Stewards Program. This working group will meet at least annually to review the outcomes of each season of the Watershed Stewards Program and to adapt the program for the upcoming year.

Education and Outreach Working Group will work with the Coordinator to develop priorities for CRISP Education and Outreach programs. This working group will define targeted audiences, develop messaging and the best tools to reach those audiences. This working group will use information from the Early Detection and Aquatic working groups to determine the priorities for communication and target audiences. This working group will meet at least annually to develop communication strategies.



Figure 18 CRISP Partners Meeting 4/19

CRISP Steering Committee

Name	Position	Organization
Tom Pavlesich	Forestry Program Manager	Watershed Agricultural Council
Ethan Angell	Senior Horticulture Inspector	New York State Department of Agriculture and Markets
Ian Dunn	Forester 1	New York State Department of Environmental Conservation
Kris Gilbert	Senior Landscape Architect	New York State Department of Transportation
Jessica Newbern	Biologist	National Park Service
Jeff Senterman	Executive Director	Catskill Center for Conservation and Development
Catherine Skalda	CSBI Coordinator	Delaware County Soil and Water Conservation District
Meredith Taylor	Invasive Species Biologist	New York City Department of Environmental Protection
John McNaught	Forest Program Manager	Catskill Forest Association
Donna Vogler	Professor of Biology	SUNY Oneonta
Marilyn Wyman	Issue Leader for Natural Resources and the Environment	Cornell Cooperative Extension of Greene County
Chris Zimmerman	Conservation Ecologist	The Nature Conservancy

The CRISP listserv was used frequently by CRISP staff, New York Invasive Species Research Institute, DEC, and other partners to share information, promote events and share the latest findings on invasive species. The CRISP listserv added 18 members in 2018, and now reaches a total of 233 individuals.

CRISP put out two Request for Proposals (RFP) during 2018. The deadline for the first RFP was April 23rd, 2018. A second RFP was released on October 31st for 2019 funding- the deadline was January 15th, 2019. Priorities for 2018 funding were the following:

1. Early Detection/Rapid Response projects
2. Early Detection Surveys and Monitoring for high priority species
3. Develop a structured Citizen Science Program that engages and retains participants
4. Improve understanding and raise public awareness of high priority and low abundance invasive species in the region
5. Improve the scientific understanding of the extent, ecological impact and effective controls of invasive species in the CRISP region

A total of ten complete proposals were received. The selection was made by a subcommittee of three Steering Committee members and the CRISP Coordinator based on a score card that had been developed to rank the projects in order of highest priority for funding. The following projects were funded:



Figure 19 Monitoring and Managing Ash Training at Agroforestry Resource Center, Acra.

- Ecological Research Institute for the Monitoring and Managing Ash Project,
- SUNY Oneonta to perform an Early Detection aquatic survey on the Upper Delaware River,
- SUNY Oneonta to perform an Early Detection terrestrial survey throughout the CRISP region,
- Michael Tessler at the American Museum of Natural History to use eDNA for Early Detection, and
- Trillium, Invasive Species Management to perform Rapid Response on Early Detection Species.

In addition, CRISP continued funding subcontracts for Cornell Cooperative Extension for education and outreach and SUNY Oneonta for the CRISP Watershed Stewards Program.

Acknowledgement

The bulk of the Catskill Regional Invasive Species Partnership funding was provided from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

CRISP Staff

John Thompson, CRISP Coordinator, joined the Catskill Center staff in 2016. John is collaborating with partners to coordinate invasive species management; Early Detection and Rapid Response; monitoring invasives; providing guidance on control of established invasive species; and leading education and outreach programs on invasive species, natural history and ecological management. John works through the New York State Partnerships for Regional Invasive Species Management (PRISM) network on statewide initiatives and initiatives across PRISM boundaries. In addition, John contributed to the Northern Institute of Applied Climate Science Mid-Atlantic forest vulnerability assessment published in 2018. John has over twenty years of experience collaborating with scientists and land stewards throughout Southeastern New York State promoting science-based management. John has developed partnership workplans to build integrity and resilience in ecological communities while promoting landscape connections. John serves on the John Burroughs Natural History Society Board and the John Burroughs Association Board. John earned an MS in Geology at University of Pennsylvania in 1995 and a BS in Environmental Conservation from the University of New Hampshire in 1989.



Dan Snider, Field Projects Manager, has been with CRISP since 2014, working first as an intern and currently as the program's Field Project Manager during which time he has cultivated familiarity with the common invasive species of the Catskills region. Dan has hosted numerous workshops and training events regarding identification and control of the common invasive species in the Catskills, targeting the public at large, Student Conservation Association volunteers, college students, and more. Dan has also led or participated in a number of surveys and invasive species pulls targeting species such as hemlock woolly adelgid, emerald ash borer,



Japanese barberry, and the bush honeysuckles. Dan regularly advises private landowners and partner organizations on the various management strategies available to them to help control common invasive species infestations of various sizes, requiring he stay up-to-date on current best management practices. Dan also spearhead's CRISP's surveys and control of giant hogweed each year, controlling about 700 stems of giant hogweed each year. Prior to his time at CRISP, Dan worked on an invasive species control team in West Virginia, dealing notably with emerald ash borer, hemlock woolly adelgid, kudzu, stilt grass, tree of heaven, and Japanese barberry, among others. Dan held a pesticide technician license in West Virginia, and so is familiar with pesticides and their application methods. Dan holds a BS in Ecology and Evolutionary Biology from the University of Maryland, 2012.