NEW YORK STATE OF OPPORTUNITY.

Department of Environmental Conservation

GIANT HOGWEED PROGRAM

2015 Annual Report

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Division of Lands & Forests, Forest Health

GIANT HOGWEED PROGRAM
2015 ANNUAL REPORT

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THE YEAR IN REVIEW

The year 2015 marks the eighth year that the New York State Department of Environmental Conservation (DEC) has implemented a statewide giant hogweed (GH) control program. DEC Forest Health (DEC-FH) crews have greatly reduced the number of giant hogweed plants at many sites throughout New York State. A giant hogweed site is defined as a unique property (by tax parcel or owner) where GH plants have been confirmed. We are pleased to report that in 2015, 639 sites previously infested no longer had any hogweed plants!

DEC-FH crew and partner agency efforts have resulted in the following dramatic achievements during 2015:

- DEC-FH and seven partner agencies visited 1,681 (95%) of the 1,771 active sites located throughout 49 counties in NY State.
- DEC-FH and six partner agencies controlled the giant hogweed plants at 1,180 sites using a combination of root cutting, herbicide and/or flower/seed head removal.
    - 761 sites were treated with root cutting.
    - 444 sites were treated with herbicide.
    - 324 sites were treated with flower/seed head removal.
- Approximately 489,000 giant hogweed plants were controlled.
- 1,511 sites (78%) now have zero or less than 100 giant hogweed plants.
    - 639 sites (33%) now have no plants following these control efforts!
        - 277 sites where hogweed has been eradicated. These are sites where no plants were found for three consecutive years after prior control; now considered inactive.
        - 362 previously controlled sites had no plants. These sites will be monitored yearly until no plants are found for three consecutive years; they will then be considered eradicated.
    - 586 sites (30%) had 1 to 19 plants.
    - 286 sites (15%) had 20 to 99 plants.
- The giant hogweed hotline responded to 2,414 phone calls and e-mails.
- 188 new sites were discovered.
- The DEC giant hogweed webpage was visited 535,516 times.

Three-quarters of the active sites now have less than 100 plants. Because small sites can be eradicated quickly with our developed treatment programs, this implies we should be able to remove the giant hogweed plants at the majority of our sites in the next few years. Our root-cut sites have become so small that one person can cover as many sites in a season as was previously controlled by two-person crews. The larger sites are also responding well to control; crews are reporting that most herbicide sites have fewer plants and many are now small enough to be treated by root cutting. Treatment crews are reporting fewer large flowering plants and in general, sites are patchier than in previous years. The total number of giant hogweed plants in New York State is declining dramatically!

For the 2015 field season, we hired ten DEC-FH seasonal staff using state funds and four interns through a cooperative program with the State University of New York College of Environmental Science and Forestry (SUNY ESF). The intern program is funded through the NYS Invasive Species Coordination Unit and the NYS Environmental Protection Fund. The USDA Forest Service supplied part of the funding through a Competitive Allocation Request Proposal (CARP) grant. Eight of the ten staff hired were returning professionals having two, three, four, six or

eight years of experience working on the program. Their collective memory, dedication, professionalism and expertise have been extraordinary assets for our program.

Collaboration improves success, and the GH program has cultivated strong working relationships with other agencies and groups. The Partnerships for Regional Invasive Species Management (PRISM) in particular have acquired GH control training and have developed survey, control and outreach programs for GH in their management areas. In 2015, seven partner agencies agreed to do outreach, survey and control for some or all of the GH sites within their boundaries:

- Capital/Mohawk PRISM
- Catskill Regional Invasive Species Partnership PRISM (CRISP)
- Adirondack Park Invasive Plant Program's PRISM (APIPP)
- Saint Lawrence Eastern Lake Ontario PRISM (SLELO)
- Lower Hudson PRISM
- Oswego County Soil and Water Conservation District (OCSWCD)
- New York City Department of Environmental Conservation (DEP)

These collaborative efforts resulted in treatment or monitoring of a total of 118 sites. We truly appreciate all of these partnerships and control efforts as their assistance enables more sites to be reached overall.

We have a strong outreach component to our program which provides information to the public and partner agencies on how to identify GH, how to report it, and how to safely and effectively control it. Our giant hogweed hotline staff person was busy all field season responding to 2,414 phone calls and e-mails, answering questions and identifying plants for the public. DEC staff have created giant hogweed brochures and posters for staff and agencies to distribute to help educate the public. This year, the Department of Health supported our outreach efforts by printing a large supply of giant hogweed posters. In 2015, 16,586 brochures and 3,840 posters were distributed.

We have a GH information webpage (www.dec.ny.gov and search "hogweed") that lists and provides access to an exhaustive amount of literature on this plant. The website is frequently accessed by people from within New York State and around the world. **The site was visited 535,516 times during 2015 and 1,938,676 times since its inception.** We have also assisted agencies in Canada and other US states in planning their own giant hogweed control and outreach programs.

We have established a tremendously successful program with highly visible results and an unprecedented amount of public interest in our plans and success. The control of giant hogweed is a personal safety issue that people care deeply about. Our giant hogweed control program continues to build upon past successes, and we look forward to eradication of many more of our giant hogweed infestations within the foreseeable future.

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INTRODUCTION

Giant hogweed (GH) *(Heracleum mantegazzianum)* is a significant forest health and public health issue for the people of New York. GH threatens biodiversity by shading and out-competing native plants and trees and leads to soil erosion along slopes and riparian areas. In addition to being an invasive plant threat to forest health and sustainability, GH is a *Federal Noxious Weed*. Giant hogweed is a public health hazard causing *severe* burns and even blindness when the sap gets on skin that is subsequently exposed to sunlight (Fig. 1). New York State law prohibits possession of GH with the intent to sell, import, purchase, transport, introduce or propagate it. GH is a monocarpic perennial, which generally flowers in its third or fourth year. The plant itself produces a large number of seeds that mostly fall within a few meters of the parent plant. Seedling mortality is generally high under these crowded conditions. The delayed flowering and limited dispersal (except where seed travel is assisted by people or water), in conjunction with very effective manual and chemical control methods, makes eradication of giant hogweed a feasible goal in New York State.

Fig. 1. Example of skin reaction to giant hogweed sap over a five-month period Photo credit: Bob Kleinberg

Giant hogweed plants are located in a variety of settings (e.g., riparian areas, fields, forests, yards, parks, roadsides) on both private and public properties. Control of these plants is very manageable when the plant numbers are few, but a site can quickly grow from a few plants to many within a short time. It is critical, therefore, that known sites are dealt with as soon as possible. Landowners as well as town, county and state highway departments are looking for and need help and guidance to deal with this problem.

NEW YORK STATE GIANT HOGWEED PROGRAM

DEC-FH uses an integrated pest management strategy to control and even eradicate GH from public and private lands in New York. The program uses manual and chemical control methods with an emphasis on minimal ecosystem impact from treatment.
This strategy:

- Enables native plants and trees to reoccupy sites
- Increases biodiversity
- Reduces impacts on streams and fisheries from soil erosion
- Encourages outdoor recreation
- Reduces human health risks

DEC-FH's public awareness component improves understanding of giant hogweed's dangers and reduces human health risks through education and outreach. Our eight years of GH control have demonstrated the efficacy of repeated treatments in attaining an eradication goal. The GH program has strengthened our partnerships with other agencies to train and encourage them to help with outreach, survey and control of giant hogweed.

Funding for this program has come from a variety of sources since its inception:

- American Recovery and Reinvestment Act (ARRA)
- United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine
- USDA Forest Service
- NYS Environmental Protection Fund
- NYS Invasive Species Coordination Unit

Starting in 1998, the USDA, NYS Department of Agriculture & Markets (NYSDAM) and Cornell Cooperative Extension surveyed for this weed in New York through the Cooperative Agricultural Pest Survey (CAPS). CAPS led to the detection of GH in approximately half the state's counties, with most records from the western portion of NY. In 2006-2007, NYSDAM maintained the GH hotline while DEC Forest Health crews visited and confirmed new reported sites and gathered updated site information on known GH sites. A GH site is defined as a unique property (by tax parcel or owner) where GH plants have been confirmed. In 2007, property ownership information was also gathered by DEC-FH using GIS and an outreach mailing.

DEC-FH implemented manual control of GH plants starting in 2008 with three crews hired to control giant hogweed plants using a root-cutting method. DEC-FH also began maintaining the GH hotline at this time. In 2009, two crews were hired to control the smaller sites using a manual root-cutting method, and one crew was hired to use herbicide to control the larger sites. In 2010 and 2011, DEC-FH received an ARRA grant allowing the GH control program to double in size with five and six crews hired respectively to use either manual or chemical control tactics. In 2012-2015, state funds were used to hire six to eight control crews. The USDA Forest Service supplied part of the 2013-2015 funding through a Competitive Allocation Request Proposal (CARP). In 2012-2015, four partner agencies agreed to control GH sites within their boundaries: APIPP, CRISP, SLELO and OCSWCD. In 2014 and 2015, the Lower Hudson PRISM joined the statewide GH control effort. In 2015, the Capital Mohawk PRISM joined the DEC crew to visit the sites in their region with the intention of controlling them in 2016. Accomplishments of the NY State GH control program from 2006 to 2015 can be found in Table 1.

Table 1. DEC Forest Health Giant Hogweed Control Program Accomplishments 2006-2015

	2006/ 2007	2008	2009	2010	2011	2012	2013	2014	2015
# of Hotline Calls	N/A	200	660	912 calls	1,976 calls	967 calls	592 calls	1,019 calls	1,099 calls
# of Hotline e-mails	N/A	N/A	N/A	237 e-mails	861 e-mails	1,045 e-mails	801 e-mails	1,472 e-mails	1,315 e-mails
# of Website visits	N/A	6,373 visits	10,770 visits	25,066 visits	307,444 visits	65,044 visits	345,665 visits	642,798 visits	535,516 visits
# of sites root-cut controlled	N/A	130 sites	195 sites	402 sites	538 sites	494 sites	593 sites	556 sites	761 sites
# of plants root-cut controlled	N/A	10,558 plants	13,354 plants	39,411 plants	73,793 plants	38,781 plants	43,023 plants	22,255 plants	34,422 plants
# of sites herbicide controlled	N/A	N/A	146 sites	210 sites	270 sites	347 sites	486 sites	551 sites	444 sites
# of plants herbicide controlled*	N/A	N/A	871,000 plants	1,177,000 plants	1,482,000 plants	375,000 plants	637,000 plants	397,000 plants	454,000 plants
Monitored** *No plants found*	N/A	64 sites	106 sites	139 sites	204 sites	282 sites	251 sites	354 sites	448 sites
New sites	60 sites	122 sites	158 sites	341 sites	234 sites	179 sites	183 sites	226 sites	188 sites
Sites with plants	346 sites	433 sites	539 sites	805 sites	959 sites	1,010 sites	1,188 sites	1,259 sites	1,309 sites
Sites with no plants (includes eradicated sites)	N/A	64 sites	106 sites	139 sites	207 sites	339 sites	348 sites	501 sites	639 sites
Eradicated sites**	N/A	N/A	N/A	28 sites	55 sites	97 sites	149 sites	239 sites	277 sites
DEC-FH staff hired	N/A	6 people	7 people	13 people	15 people	11.5 people	13 people	13 people	14 people
Funding source	State & Federal	State & Federal	State & Federal	ARRA & Federal	ARRA	State	State & Federal	State & Federal	State & Federal

*Starting in 2012, we used a different but more consistent method of calculating the number of plants controlled by herbicide to allow for better comparison to future plant counts. The year 2012 and later calculations are based on the amount of herbicide used; prior year plant counts were calculated using crew plant density estimates.

**Monitored sites have had prior control but no GH regrowth/plants were found during the latest yearly field season's monitoring visit. After three consecutive yearly visits with no plants found, a site is deemed eradicated.

DEC-FH crews use the appropriate giant hogweed control method at each site. In general, herbicide control is used at larger sites with greater than 400 plants. Root-cutting control is used at smaller sites with less than 400 plants. Flower or seed-head removal is used at all sites to limit seed dispersal.

2015 DEC-FH CONTROL STAFF

For the 2015 field season, we hired ten people using state funds and four interns through a cooperative program with the State University of New York College of Environmental Science and Forestry (SUNY ESF) (Fig. 2). The intern program is funded through the NYS Invasive Species Coordination Unit and the NYS Environmental Protection Fund.

Fig. 2. 2015 DEC-FH Giant Hogweed Crew Staff pictured from top to bottom, left to right: Lindsay Rutte, Jeff Fridman, Mike Grosso, Timothy Pietrzykowski, Bob Slocum, Jordan Zachritz, Sylvia Albrecht, Maren Alexander, Hayden Premore, Andrew MoskaLee, Timothy Yeatts, Grace Frenzel, Stephanie Mogil, Naja Kraus. Not pictured: Brian Siklinski

These crews consisted of:

- Four one-person crews to use the root-cutting method at sites with less than 400 plants
- Three two-person crews and one three-person crew to apply herbicide at sites with more than 400 plants and to apply herbicide or root-cut control at smaller sites at nearby locations
- One program assistant to manage the hotline, control southeastern NY sites and help with the overall program

Eight of the ten staff hired were returning professionals having two, three, four, six or eight years of experience working on the program. Their collective memory, dedication, professionalism and expertise have been extraordinary assets for our program. The crews were hosted at the following DEC offices: Avon, New Paltz, Syracuse and Montezuma Audubon Center.

For the four herbicide crews based out of the Avon and Syracuse offices, we hired three NY-certified commercial pesticide applicators, one certified commercial pesticide technician and six commercial pesticide apprentices. The crews used the herbicide Accord XRT II (EPA Reg. No. 62719-556). In 2011, we applied for and received a 2ee exemption letter allowing the use of herbicides for GH control. We also applied for and received a statewide general wetland permit in 2011 which allows us to use herbicide to control GH in DEC-regulated wetlands and their regulated adjacent areas.

Giant hogweed training occurred April 20-23 for eight DEC-FH staff and May 18-21 for four ESF interns and one DEC-FH staff person. Return staff were trained on all protocol and paperwork changes from last year. All interns and new staff were trained on program protocols, how to identify GH and its look-alikes, the hazards of the plant, and how to safely apply the root-cutting and/or herbicide control methods. Training on data collection was also provided, including use of GPS and GIS for DEC-FH staff/interns. For herbicide crews, discussion of herbicide protocols and safety was covered as well.

FIELD SEASON 2015 ACCOMPLISHMENTS

During the 2015 field season, DEC-FH and partner agency crews visited 1,681 (95%) of the 1,771 total active sites (259 sites that had no plants in 2014, 1,261 sites that had plants in 2014, 54 eradicated sites last visited in 2011 or 2012, and new sites found in 2015). At each site, they performed control (if plants were found and permission obtained), collected current site information (plant count, property owner, etc.), and, where missing, obtained signed property permission forms to access the property and perform control.

Control was performed by DEC-FH and partner agency crews at 1,180 sites (Table 2). Most sites controlled by DEC-FH/partner agency had either root-cutting (712 sites) or herbicide (395 sites) control performed, but some (49 sites) received both forms of control. Flower/seed-head removal was the only form of control implemented at 23 sites and also occurred at 91 herbicide sites (23% of herbicide sites), 188 root-cut sites (26% of root-cut sites), and at 22 root-cut and herbicide sites (45% of root-cut and herbicide sites). Owners and other organizations performed sole control at 47 sites and provided control along with DEC-FH/partner agency at another 30 sites. Ninety-six sites were not controlled for a variety of reasons, the most common being no landowner contact or permission (54%), and end-of-season reached (37%). Permission for control was refused at 15 sites.

In total, 1,227 sites (69%) were controlled, 448 sites (25%) were monitored (meaning no plants were found at sites that once had plants) and 96 sites (5%) were not controlled/monitored.

Pre-control

Post-control

Table 2. 2015 control method, number of sites and plant number controlled by each agency

Agency	Root-cut control	Herbicide control	Flower/ seed-head control	Other or unknown control method	Total sites controlled	Total sites monitored (no plants found during site survey)
DEC-FH	735 sites *33,738 plants*	380 sites *387,000 plants*	319 sites *4,332 plants*	0 sites	1,094 sites *421,000 plants*	421 sites
APIPP	2 sites *2 plants*	3 sites *14 plants*	0 sites	0 sites	5 sites *16 plants*	1 site
CAPMO	3 sites *311 plants*	0 sites	0 sites	0 sites	3 sites *311 plants*	0 sites
CRISP	7 sites *666 plants*	0 sites	3 sites *183 plants*	0 sites	7 sites *666 plants*	2 sites
OCSWCD	0 sites	39 sites *66,000*	0 sites	1 site	40 sites *66,000 plants*	5 sites
SLELO	13 sites *37 plants*	21 sites *382 plants*	0 sites	0 sites	30 sites *415 plants*	15 sites
Lower Hudson	5 sites *90 plants*	2 sites *361 plants*	3 sites *6 plants*	0 sites	6 sites *451 plants*	4 sites
DEC-FH & Partner Agency Total	761 sites *34,422 plants*	444 sites *454,000 plants*	324 sites *4,422 plants*	0 sites	1,180 sites *489,000 plants*	448 sites
OTHER	14 sites	30 sites	8 sites	25 sites	77 sites	0 sites

Root-cutting by DEC-FH and partner agencies occurred at 761 sites and totaled 34,422 plants controlled throughout 19 acres. The sites solely controlled by DEC-FH root-cutting averaged 30 minutes of control per site. The sites with DEC-FH root-cutting and flower/seed-head (umbel) removal averaged 75 minutes per site. Sites that were root-cut and/or root-cut with umbel removal had an average of 46 plants per site. The largest number of plants root-cut at a site was 2,612.

Herbicide control by DEC-FH and partner agencies occurred at 444 sites with a total of 454,000 plants sprayed throughout 75 acres. The sites solely controlled by DEC-FH herbicide control averaged 97 minutes of control work per site. The sites with herbicide control and flower/seed-head removal averaged 131 minutes per site. Sites that received herbicide control and/or herbicide and umbel removal had an average of 1,097 plants per site. The largest number of plants sprayed at a single site was 40,000.

DEC-FH and partner agency crews cut and removed 4,422 flower/seed heads from 324 sites. Flower/seed-head removal was the only form of control at 23 of those sites. The program has continued to stress to field staff the importance of collecting flower/seed heads. This form of manual control keeps seed from spreading and is an extremely important part of control at small sites.

Owners and other organizations performed control at 77 sites; 18% of these sites were controlled by root-cutting, and 39% were controlled using herbicide. Thirty of these 77 sites were also controlled by the DEC-FH/partner agency. Control outcomes should be even more effective at sites where landowners or other organizations provide an additional round of control.

The 2015 field data from the giant hogweed crews was entered by field crews using a mobile app later checked for accuracy and entered into the statewide database. In 2015, 188 new sites were discovered in 2015 (Fig. 3) either by crews or through hotline reports.

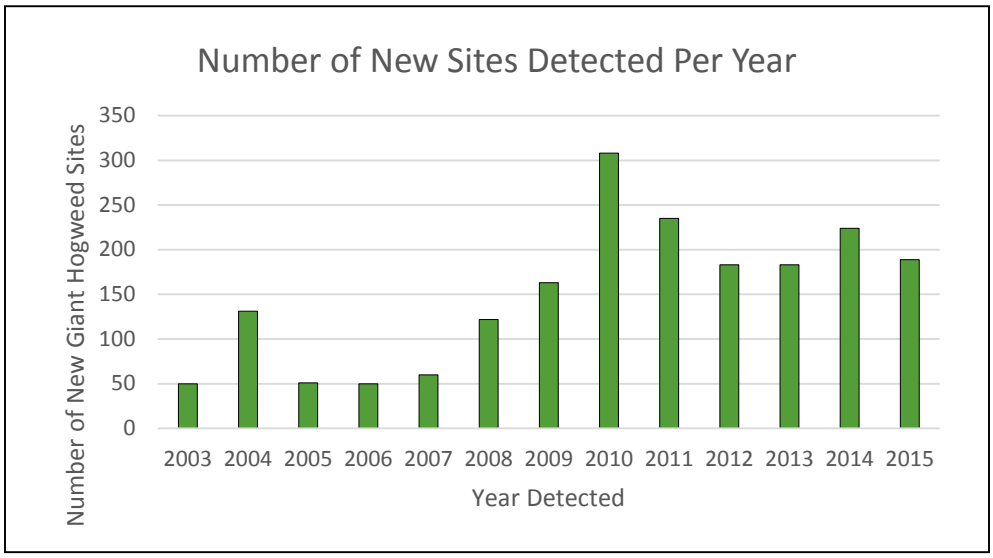


Fig. 3. Number of new sites detected per year

The property owner's name and contact information for new sites (and, if missing, for existing sites) were determined by hotline staff, by crews during visits/calls, or by staff during the postseason. This allows for owners to be contacted regarding future control work and makes the field crews more efficient during the field season.

We have signed property permission forms for 1,399 sites (72%) allowing us access to the property to monitor for plants and to perform control. Additional landowners have given verbal permission which is sufficient for root-cut control and monitoring; signed permission forms are necessary for herbicide control. All signed property permission forms were scanned and saved in electronic site folders. Digital photos taken during crew visits and by hotline callers were also copied to the electronic site folders.

Currently there are 1,671 active sites throughout 49 counties in New York State (Fig. 4) and 277 eradicated sites (Fig. 5). Two counties had their first confirmed giant hogweed sites: Delaware and Greene.

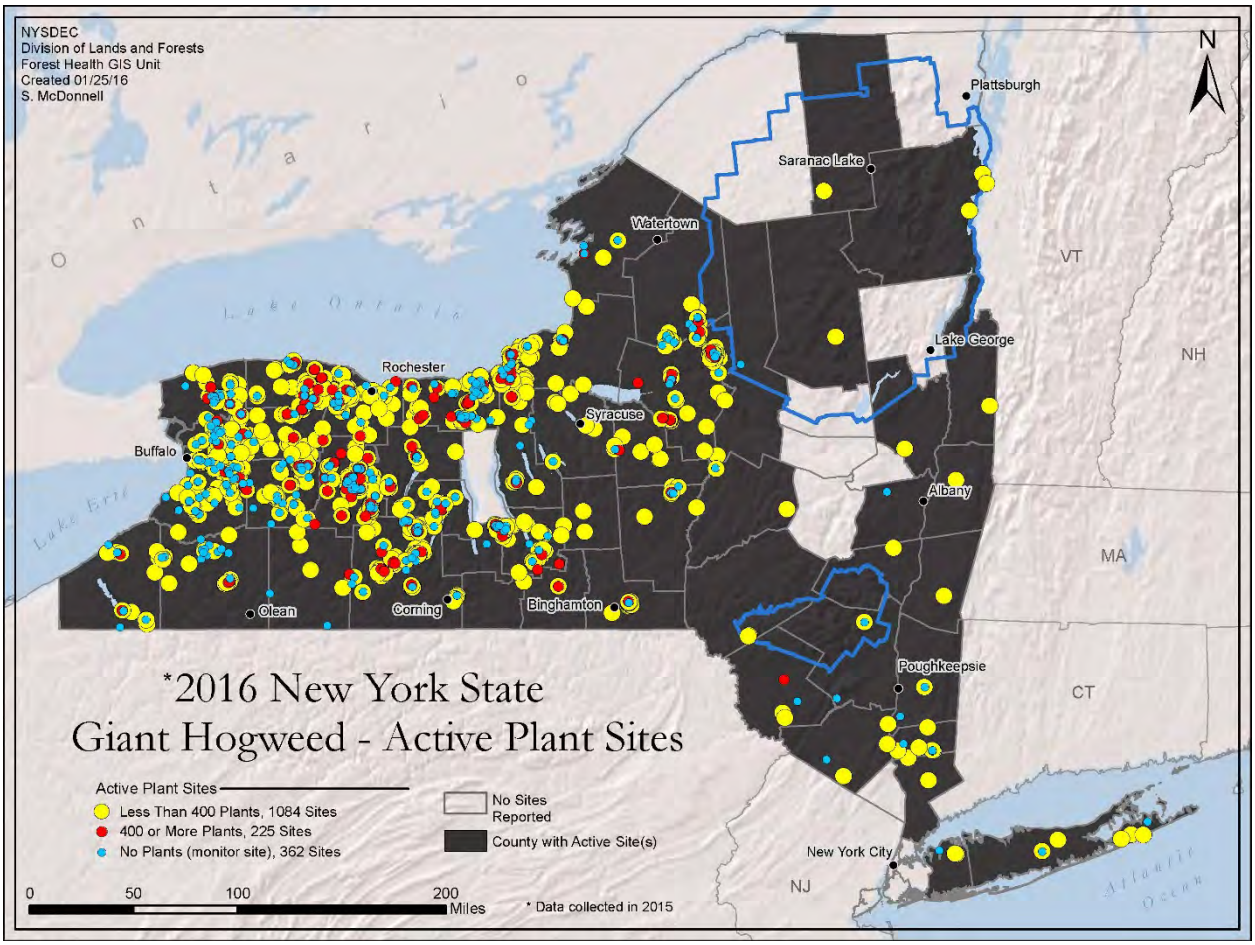


Fig. 4. New York State active giant hogweed sites

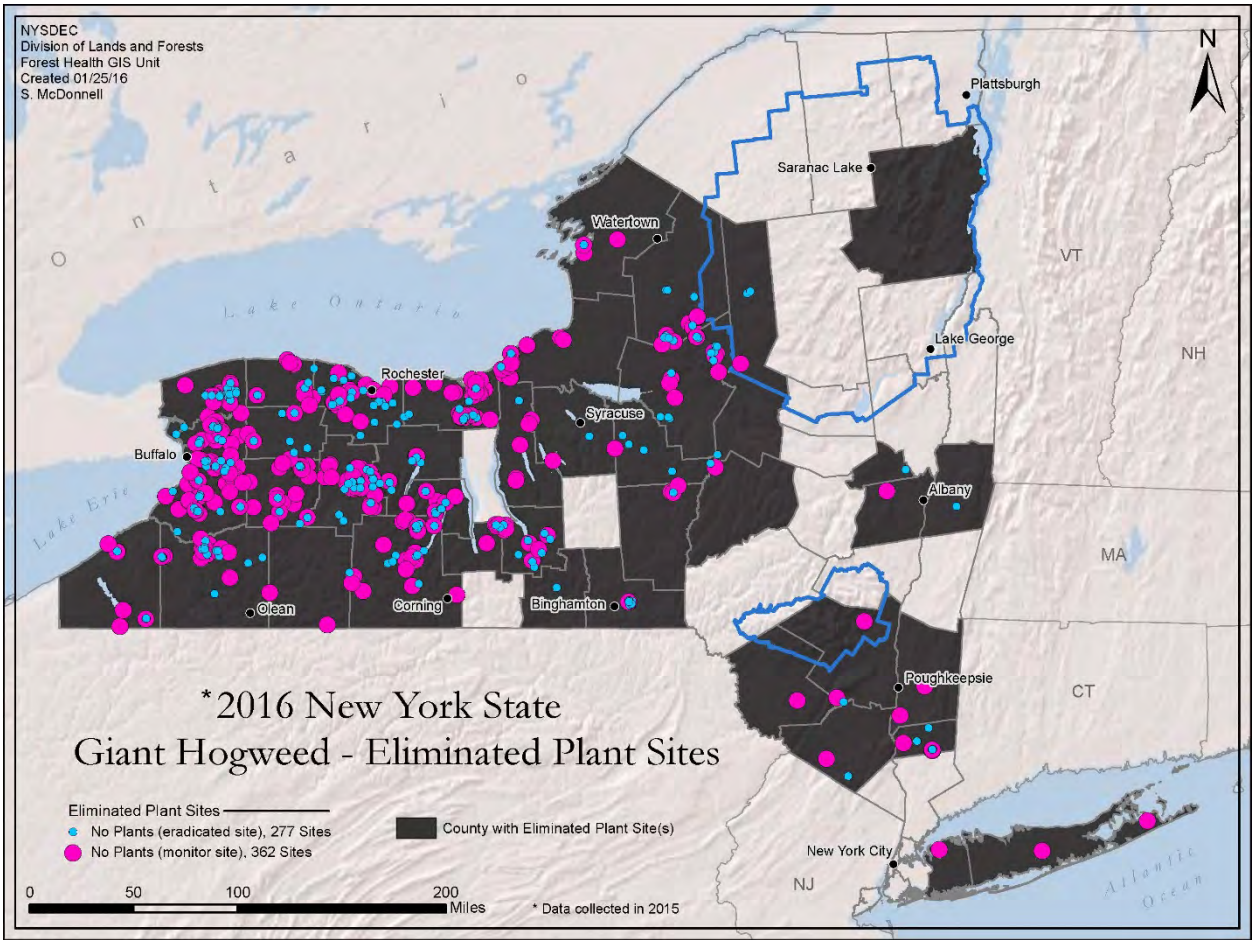


Fig. 5. New York State giant hogweed eliminated sites. A site is considered eradicated after three consecutive years of monitoring with no plants found during site visit.

CONTROL EFFICACY

DEC-FH crews have greatly reduced the number of giant hogweed plants at many sites throughout New York State (Fig. 5 and Fig. 6). In 2015, no plants were found at 639 properties that once had giant hogweed, (Table 3) which means that 33% of all sites now have no plants post-control. Our control over the past few years is certainly making a difference! We have found that small sites can be eradicated fairly quickly. This is exciting because 948 active sites (57% of active sites) currently have zero plants or less than 20 plants, and an additional 286 sites (17% of active sites) have 20-99 plants (Table 4). Eradication is quick if there is no seed bank (seeds in the soil) at the site; if seed is present in the soil, then control of those small sites needs to continue yearly until all seeds in the seed bank have germinated and been controlled. Many of the small sites are now in the stage where we are controlling newly germinating plants from the seed bank which means we should be able to remove the plants at these sites in the next few years. For larger sites, crews are reporting that many sites have fewer plants, some former herbicide sites are now small enough to be transferred to a root-cut crew, sites are patchier than in prior years, and crews are seeing fewer large flowering plants as well.

Table 3. Number of sites per size class per year

Number of plants	Number of sites after 2008 field season	Number of sites after 2009 field season	Number of sites after 2010 field season	Number of sites after 2011 field season	Number of sites after 2012 field season	Number of sites after 2013 field season	Number of sites after 2014 field season	Number of sites after 2015 field season
0	64	106	139	219	339	348	501	639
1-99	155	316	414	474	563	674	793	872
100-399	85	78	119	167	172	220	214	203
400-999	38	44	91	81	105	132	116	100
1000+	77	73	113	138	135	143	108	124
Unknown	78	28	68	31	35	19	28	10
Total active sites	497	645	944	1,111	1,252	1,439	1,521	1,671

It is hard to judge control efficacy by plant numbers post-control because in areas where a seed bank is present, sites will often have more plants before they have fewer plants. This is because once we control the larger plants, we have frequently found that more and smaller plants take up that same space the following year, so even though the control was effective, the number of plants for that site will increase the next year. This high number of plants will likely continue until most seeds in the seed bank germinate and are controlled, after which we expect the numbers to drop.

During the 2015 field season, 448 sites were visited and found to have no plants; 51 of those sites have had no plants found during visits for three consecutive years, allowing us to mark them as eradicated. There were 138 more sites without plants this year than last year. Of the 259 sites that started the 2015 field season as monitor sites (active site with prior control, no plants found in 2014), 74% (191 sites) remained free of giant hogweed. Eight monitor sites were not visited. Ninety percent of the sites (61 of 68 sites) that had plants had less than 20 of them. The reappearance of giant hogweed indicates that crews either overlooked plants during their prior visits, a plant re-sprouted from a cut root, or germination from the seed bank occurred.

It typically takes multiple years of control before no plants are found at a site post-control. However, occasionally after just one year of control, no plants are found at a site the following year. Since the start of DEC's control program, this has occurred 234 times. Eighty-two percent of these 234 sites originally had less than 20 plants. Small sites are easiest to eradicate due to having no seed bank or a small seed bank.

After a site is deemed eradicated (no plants for three consecutive years), it becomes inactive. As an added precaution in case seed germinates from the seed bank or new seed is spread to the site from another source (e.g., seed from a site upstream), we plan to start revisiting inactive sites three years after they were last monitored. In order to have a manageable workload in 2015, we visited sites last visited in 2010 and 2011 and in 2016, we will visit sites last visited in 2012 and 2013. From then on, we will cycle in all sites so that they are monitored three years after their last visit. In 2015, we revisited 54 sites that were last monitored in 2010 or 2011; 5 of these sites had plants that were found and controlled. All landowners are provided with information to contact us should they notice giant hogweed plants growing during the years their sites are inactive. In 2015, additional inactive sites with plants came to our notice; three sites last visited in 2013 had plants and four sites last visited in 2014 had plants. This shows the importance of occasionally monitoring sites even after it seems that the giant hogweed plants are all gone.

Table 4. Number of sites per size class by county (data from 2015 field season)

County	Sites with plants	Sites without plants	Eradicated *0 plants for 3 years*	Monitor 0 plants	1-19 plants	20-99 plants	100-199 plants	200-399 plants	400-999 plants	1000+ plants	unknown plant #
Albany	0	1		1							
Allegany	6	3	1	2	1	2	1		2		
Broome	13	12	11	1	10	2			1		
Cattaraugus	32	35	22	13	21	1		2	1	6	1
Cayuga	69	18	4	14	26	10	2	4	11	13	3
Chautauqua	22	11	3	8	7	8	5			2	
Chemung	1	0				1					
Chenango	11	4	1	3	5	2		1	3		
Columbia	1	0				1					
Cortland	3	0			1	2					
Delaware	2	0				1	1				
Dutchess	1	3		3	1						
Erie	149	107	43	64	85	30	14	5	5	8	2
Essex	3	1	1		3						
Franklin	1	0			1						
Genesee	48	9	6	3	17	14	2	8	4	3	
Greene	1	0					1				
Hamilton	1	0			1						
Herkimer	1	7	6	1	1						
Jefferson	5	4	1	3	3		1		1		
Lewis	27	19	8	11	21	5			1		
Livingston	121	46	15	31	46	29	6	13	12	13	2
Madison	9	4	4		4	1	1	2	1		
Monroe	101	50	30	20	38	25	9	12	7	10	
Nassau	2	1		1	1	1					
Niagara	37	42	22	20	15	9	4	4	3	2	
Oneida	75	23	12	11	25	14	12	8	7	8	1
Onondaga	7	6	3	3	3	2	1	1			
Ontario	28	24	12	12	19	6			1	2	
Orange	4	1	1		4						
Orleans	47	14	6	8	24	7	4	3	3	6	
Oswego	54	5		5	26	15	4	4		5	
Otsego	4	2	1	1	4						
Putnam	7	10	7	3	5	1		1			
Rensselaer	1	1	1		1						
Saratoga	1	0						1			
Schenectady	0	2	2								
Schuyler	35	6	2	4	7	9	6	4	4	5	
Steuben	136	35	13	22	62	36	9	11	8	10	
Suffolk	8	2		2	6	2					
Sullivan	3	2		2	2				1		
Tioga	2	1	1		1					1	
Tompkins	49	18	8	10	23	10	3	1	3	9	
Ulster	1	3	1	2		1					
Washington	2	0			1	1					
Wayne	113	52	11	41	37	21	14	9	16	15	1
Westchester	1	0			1						
Wyoming	41	34	8	26	14	14	3	3	2	5	
Yates	23	21	10	11	13	3	2	1	3	1	
Grand Total	**1309**	**639**	**277**	**362**	**586**	**286**	**105**	**98**	**100**	**124**	**10**

Site #373 - Wyoming County. This site is located directly behind a school and the photos show the amazing progress at a larger site after three years of herbicide control. It started with 10,000 plants in 2008 and seven years later in 2015, there were only 78 plants to control by root-cut.

2009

2012

Site # 100 - Genesee County. This is a good example of the effectiveness of root-cut control and the importance of continued control to remove plants germinating from the seed bank. Plant numbers from 2008-2015: 425, 95, 35, 9, 0, 13, 3, 1. Control of this site will continue until no plants are found for three consecutive years, at which time the site will be considered eradicated.

2009

2014

Site # 1390 - Orleans County. There was a 72% reduction in plant numbers after one year of herbicide control.

2014

2015

Site #110 - Livingston County. This is a large site that has been controlled since 2009. In 2015, one-quarter the amount of herbicide was used to control the plants at the site than was used in 2012. The number of plants at this site is dropping but there are still many left to control.

2012

2015

Site #579 - Livingston County. This site was cooperatively controlled with the landowner since 2009, with no herbicide use permitted. In 2011, there were over 3,000 plants root-cut; in 2015, there were only 64 juvenile plants to root-cut.

2012

2015

Fig. 6. Five photo examples of DEC-FH giant hogweed control success

OUTREACH AND COMMUNICATIONS

We have a strong outreach component to our program. We provide information to the public and partner agencies on how to safely and effectively control giant hogweed. Our giant hogweed hotline is busy all field season answering questions and identifying plants for the public. Every year we incorporate our lessons learned from that season and improve our outreach materials. We offer trainings, distribute our GH brochure, control guide and new GH poster, and have a multitude of GH information available on DEC's website. Our website information is accessed by people from around the world. We have also assisted agencies in Canada and other US states in planning their own giant hogweed control programs.

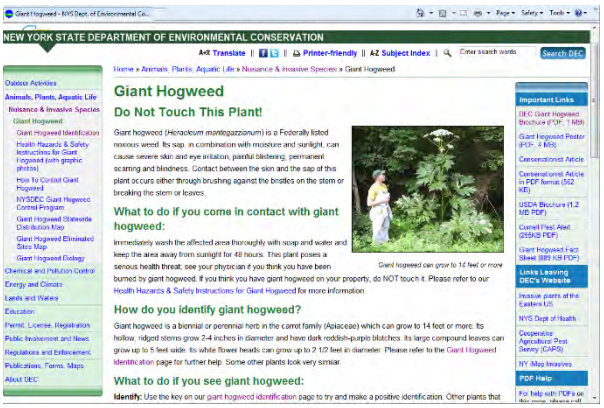
DEC-FH Giant Hogweed Hotline

The DEC-FH giant hogweed hotline processed 1,099 calls and 1,315 e-mails in 2015. Hotline reports generated 104 new giant hogweed sites. Hotline callers were notified of the DEC giant hogweed webpage and, if interested, received a giant hogweed brochure and/or control guide. Callers with confirmed sightings were also sent a control guide and a license-to-enter-property form to sign and return. Sites were confirmed by use of photos (flower, closeup of stem, leaves, and overall plant) supplied via text, e-mail or mail by the caller. In cases where callers were unable to provide photos, we reached out to Cornell Cooperative Extension (CCE) staff for help. In many instances, they were able to send out a CCE staff member or master gardener to verify the sites in their counties for us. Newly confirmed hotline sites were communicated to crews and incorporated into their schedules if time allowed.

Update and Post Maps of Known Giant Hogweed Locations in New York State

Updated maps, reflecting the 2015 field season data, of known giant hogweed locations in New York State and locations where giant hogweed is no longer present, were posted on the DEC website http://www.dec.ny.gov/animals/39809.html. Giant hogweed site information was passed along to the NYS invasive species database, *i*MapInvasives, to update the giant hogweed data shown on their website http://www.imapinvasives.org/nyimi/map/.

NYSDEC Giant Hogweed Website Visits http://www.dec.ny.gov/animals/39809.html



The DEC website has a number of informative webpages on giant hogweed: giant hogweed identification, health hazards and safety instructions; how to control giant hogweed; a giant hogweed statewide distribution map; and links to relevant giant hogweed information (articles, pest alerts, brochures) and other giant hogweed webpages; the DEC-FH GH program; and GH biology. **The GH webpages were visited 535,516 times during 2015**.

DEC Giant Hogweed Brochure and Control Methods Guide

The DEC giant hogweed brochure is used to educate the public about giant hogweed in NY. It can also be found in an electronic format on our website http://www.dec.ny.gov/docs/lands_forests_pdf/ghbrochure.pdf. The GH brochure provides general information, what to do if you see GH, how to report it to DEC, how to protect yourself, how to control GH, a description of GH's life cycle, and how to identify giant hogweed. The giant hogweed control methods guide is distributed in paper or electronic format and is available on our website http://www.dec.ny.gov/docs/lands_forests_pdf/ghcontrol.pdf.

After the original printing of 35,000 brochures had all been distributed, the giant hogweed brochure was redesigned to meet the new state branding guidelines for all state agencies and the new brochure was printed in 2015. This year, the giant hogweed program and control staff distributed 22,669 brochures and 315 control guides to interested persons and to organizations to help further their giant hogweed outreach efforts.

DEC Giant Hogweed Poster

In 2014, we designed a giant hogweed poster to be used to educate the public about giant hogweed in NY; it was redesigned in 2015 to meet the state branding guidelines. This poster will help people learn how to identify giant hogweed, know to avoid touching it, and encourage them to report giant hogweed locations to DEC so we can help control it. The poster can be found on our website and can be downloaded and printed http://www.dec.ny.gov/animals/39809.html (poster found under important links on the right side); paper copies can be requested by contacting the giant hogweed program.
The poster is available in two sizes: 12x16 and 18x24. In 2015, the Department of Health partnered with us and paid for the printing of a very large supply of the posters. The giant hogweed program and control staff distributed 3,846 posters to interested persons or organizations to help further their giant hogweed outreach efforts.

Training Provided to Landowners

A small percentage of landowners is assisting with the control of giant hogweed on their properties. Our outreach and training efforts have enabled and will continue to enable landowners to safely and effectively control GH on their property. DEC-FH crews emphasize to owners interested in controlling giant hogweed on their property that, while giant hogweed requires caution, control is something they can perform if they receive some basic training and wear appropriate clothing and protective equipment (e.g., goggles, gloves and waterproof clothing). It is suggested to interested owners that they initially approach the plants early in the season when they are small and less of a hazard. Because landowners usually live on site, it is also suggested that they control the patch many times each season, which would stop latecomer seedlings from attaining a more dangerous size. These suggestions should help keep plant numbers down and overall patch size small, leading to a safer and potentially speedier eradication. Crews have learned to stress not only the public health hazard of the plant but also the benefits of landowner control. Training is provided to receptive owners. We encourage all

landowners to read and follow the DEC control guide public health hazards and safety instructions section prior to initiating control.

Collaboration with Partnerships for Regional Invasive Species Management (PRISM) and Other Agencies

APIPP

CRISP

OCSWCD- Chase Enterprises

SLELO

Lower Hudson

DEP

The GH program has cultivated strong working relationships with other agencies and Partnerships for Regional Invasive Species Management (PRISM) to train and encourage them to help with outreach, survey and/or control of giant hogweed. In 2015, four PRISMs (Adirondack Park Invasive Plant Program (APIPP), Catskill Regional Invasive Species Partnerships (CRISP), Lower Hudson, Saint Lawrence Eastern Lake Ontario (SLELO)) and the Oswego County Soil and Water Conservation District agreed to again do outreach, survey and control for some or all of the GH sites within their boundaries. This year an additional PRISM joined the statewide giant hogweed control effort; the Capital/Mohawk PRISM assisted with control of some sites after being trained on how to identify and safely control GH, and they have agreed to do outreach, survey and control for the sites within their boundaries in 2016. New York City Department of Environmental Protection (DEP) staff assisted by surveying along their properties and neighboring areas in Putnam County for giant hogweed plants; plants found were controlled by Lower Hudson PRISM staff.

DEC-FH crews also collaborate with state, county, town and village highway departments, many of which are concerned about giant hogweed affecting the safety of their workers or park visitors. We stretch our limited resources by training them to safely control GH, assigning sites for control, coordinating primary and follow-up control, or joining forces to control some of the larger sites together. When GH infestations occur on state, town, county and village park land, we coordinate control efforts with park staff; we will either do control for them or train them to do control themselves and report their findings to us. Control outcomes will be even more effective at sites where a partner agency or landowner provides an additional round of control.

Presentations and Interviews

Local interest is evident in the more than 200 interviews, special reports and solicited presentations on television, radio, Internet and print media and at technical symposia and workshops since we started the GH program. NY's giant hogweed program has also had national and international radio and television exposure, with England, India and Canada requesting interviews for their national news, which dramatically increased public attention to the program's efforts and achievements. In addition, public awareness has led to our finding more small infestations at earlier stages. Of note, Naja Kraus spoke about NY's giant hogweed control program at a workshop hosted by the QueBERCE research group on June 8-9 in Quebec City, along with two internationally recognized experts on giant hogweed, Petr Pysek and Jan Pergl; much valuable information was learned and exchanged at this excellent workshop.

CONCLUSION

Since 2006, DEC forest health crews have worked to visit and confirm new reported GH sites, gather updated site information, and apply control techniques to known GH sites on a priority basis. We now have a very good understanding of where GH infestations are located throughout the state and we have mechanisms available for creating priority-based lists to allocate scarce resources on a best-outcome basis. Although GH is an invasive plant, it has features that make control achievable. Our past efforts in treating GH infestations have shown that manual root-cutting and herbicide control are very effective methods and 78% of all known sites have either no plants post-control (639 sites) or less than 100 plants (872 sites)! We have done eight consecutive years of control efforts with each year expanding to treat new sites. The continued treatments on existing sites are more often directed to young plants instead of flowering plants, which increases efficacy.

We have mapped the known giant hogweed sites across the state, obtained permission from property owners allowing us to control the plants on their property, collected current information about each site, created a DEC giant hogweed webpage www.dec.ny.gov/animals/39809.html (visited 1,938,676 since inception), created a GH brochure and a new GH poster, and have provided information to many people through the hotline. We have seasonal staff dedicated to the success of our project; this year, 8 of 14 people hired were returning staff. In short, we have established a tremendously successful program with highly visible results and unprecedented public interest and concern with our success. Our outreach, education and hotline campaigns

(2,414 calls and e-mails in 2015) have prompted the public to find and report new sites. These efforts have led to a large amount of local, national and international press. This year's public awareness campaign has shown us once again that GH is a personal safety issue people care deeply about.

Funding has come from USDA-APHIS, USDA-Forest Service, New York State and ARRA. The history of our program through 2015 exemplifies the successes and progress we can attain through a furthering of the program. Controlling an invasive plant takes persistence, determination, and commitment to many years of control. Currently there are 639 properties where giant hogweed was once present that had no plants found in 2015, and for each year following, we expect an increase in the number of sites with no plants found. If we continue with similar funding levels, and as our crews become more efficient as sites shrink in size, we hope to be able to add an extra round of control for the larger sites which will enhance control efficacy. We hope that eradication of many of our GH infestations will be on the horizon following the 2016 campaign.

APPENDICES

Table 5. Number of sites per size class by DEC region (data from 2015 field season)

DEC Region	Sites with plants	Sites without plants	Eradicated *0 plants for 3 years*	Monitor 0 plants	1-19 plants	20-99 plants	100-199 plants	200-399 plants	400-999 plants	1000+ plants	unknown plant #
1	10	3		3	7	3					
3	17	19	9	10	13	2		1	1		
4	9	6	4	2	5	2	2				
5	8	1	1		6	1		1			
6	108	53	27	26	50	19	13	8	9	8	1
7	217	68	32	36	99	44	11	13	19	28	3
8	654	257	105	152	264	151	52	61	58	65	3
9	286	232	99	133	142	64	27	14	13	23	3
Grand Total	1309	639	277	362	586	286	105	98	100	124	10

Table 6. Number of sites per size class by PRISM (data from 2015 field season)

PRISM	Sites with plants	Sites without plants	Eradicated *0 plants for 3 years*	Monitor 0 plants	1-19 plants	20-99 plants	100-199 plants	200-399 plants	400-999 plants	1000+ plants	unknown plant #
APIPP	5	7	6	1	5						
Capital Mohawk	7	5	4	1	3	2	1	1			
CRISP	10	5	1	4	6	2	1		1		
Finger Lakes	722	297	125	172	296	159	53	59	70	79	6
Long Island	10	3		3	7	3					
Lower Hudson	13	16	9	7	11	1		1			
SLELO	161	51	21	30	75	34	17	12	9	13	1
Western NY	381	255	111	144	183	85	33	25	20	32	3
Grand Total	1309	639	277	362	586	286	105	98	100	124	10

Table 7. Number of sites per size class for 2011-2015

Year	Sites with plants	Sites without plants	Eradicated *0 Plants for 3 years*	Monitor 0 plants	1-19 plants	20-99 plants	100-199 plants	200-399 plants	400-999 plants	1000+ plants	unknown plant #
2015	1309	639	277	362	586	286	105	98	100	124	10
2014	1259	501	239	262	516	277	116	98	116	108	28
2013	1188	348	149	199	419	255	119	101	132	143	19
2012	1010	339	97	242	317	246	83	89	105	135	35
2011	947	219	55	164	310	220	88	79	81	138	31

Table 8. Number of sites and plants controlled by DEC-FH/partner agencies 2012-2015

Year	Number of sites controlled by DEC-FH/partner agency	Number of plants controlled by DEC-FH/partner agency
2015	1,180 sites	489,000 plants
2014	1,102 sites	419,000 plants
2013	1,067 sites	680,000 plants
2012	869 sites	415,300 plants

Table 9. Average plant number and control time at root-cut and herbicide sites 2012-2015

Year	Average plant number at root-cut sites	Average plant number at herbicide sites	Average control time at root-cut sites	Average control time at herbicide sites
2015	46 plants	1,097 plants	30 minutes	97 minutes
2014	39 plants	824 plants	30 minutes	76 minutes
2013	71 plants	1,547 plants	50 minutes	91 minutes
2012	79 plants	1,084 plants	51 minutes	91 minutes

LONG-TERM CONSERVATION GOALS

1. **Eliminate GH from NY** to increase plant diversity, decrease soil erosion and reduce human health risks. Giant hogweed is an early colonizer that can quickly establish itself on exposed sites in riparian areas, fields, forest edges, wetlands, roadsides and trails. Its rapid growth and broad leaves shade out native and desirable plants. Removing GH will allow other preferable species to grow and restore the plant diversity at GH colonized sites. Riparian areas and steep slopes with GH infestations are also prone to increased erosion as the large plants die back in the fall exposing large areas of bare soil. In many of our important fishery streams, bank erosion can be a critical factor threatening spawning beds. Controlling GH infestations on these sites will enable native plants to reoccupy and stabilize the slope and reduce the sediment delivery to important fish habitat. Giant hogweed is a human health hazard. As it is eradicated from each individual site, that area becomes safe for humans to work and recreate in.

Bare soil underneath GH plants

2. **Eliminate GH from public access areas** to reduce human health risk. Many of the GH infested areas along roads, trails and stream banks are important access areas for recreation pursuits and are often frequented by children. These GH infestations present a considerable threat to public health and to the quality of people's experience as they risk contact with the plant's sap, which can lead to severe burns. There are many fishing access trails and stream banks, parks, playgrounds, campgrounds, nature centers, hiking trails, mini-golf courses, fish and wildlife management areas, school grounds and sports fields where GH infestations threaten the users of these areas with the risk of severe burns. These infestations are placed on high-priority lists for treatment. We intend to eliminate GH from these sites and return them to a safe state for people to access and resume recreation activities.

3. **Eliminate GH from areas where children may easily contact GH** to reduce health risk to them. Children in particular are susceptible to severe burns from GH sap as they tend to find the large plants with hollow stalks interesting to play with. When they don't know the plant is dangerous, they have a high risk of sap exposure. We have targeted all infested sites with high use by children and intend to eliminate the GH risk as a first priority. Controlling GH near schools, daycares, playgrounds, or at homes where children live or frequently visit will minimize the risk of GH contact for them.

4. **Maintain and improve public awareness of GH's dangerous nature** to reduce the risk to human health. One of the major impediments to human avoidance of GH exposure is a

general lack of knowledge about the dangerous nature of the plant. Describing what the plant looks like, how to distinguish it from other similar plants and how exposure to GH sap can be immediately prevented from resulting in serious burns are vital parts of the outreach effort. We will reduce this human health risk from GH infestations through education and outreach efforts designed to:

- Describe how GH can cause harm
- Properly identify GH and the few plants that look similar
- Describe appropriate avoidance techniques
- Describe the proper personal safety equipment needed to avoid injury if someone needs to work near GH or wants to control it
- Describe treatment techniques and methodologies to minimize harm when people come in contact with the plant

TREATMENT PRIORITY PROTOCOL

Crews are told to give preference to sites based on a treatment priority protocol although it is hoped that all known sites can be visited.

a. Priority sites are those:
    - Near schools or day care centers
    - Homes with children
    - Public places
    - Roadside or mowing corridor
    - Near streams
    - On the outskirts of known infestations
b. Monitor sites are those with prior control where no plants were found during the latest year's visit. Sites need three consecutive years of survey without finding any plants to be declared eradicated.
c. Sites where control occurred during previous seasons
d. To be efficient, visit all nearby sites.
e. Small sites should be treated before large sites.
f. All other sites

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