



Department of
Environmental
Conservation

GIANT HOGWEED PROGRAM

2017 ANNUAL REPORT



DIVISION OF LANDS AND FORESTS
Bureau of Invasive Species & Ecosystem Health

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Year in Review

Through the ongoing work of the Department of Environmental Conservation (DEC) Giant Hogweed Program and our partners, the number of giant hogweed (GH) plants at many sites throughout New York State are declining dramatically!

During the 2017 season, crews surveyed 604 sites previously treated for GH infestations and found no plants. We designated 123 of these eradicated—no plants for 3 consecutive years. This brings the total of eradicated sites to 498, up from 387 in 2016. Of all sites that had been previously treated for infestation, 40 percent (904 sites) have no plants in 2017.

Of the sites that still have plants, 80 percent (1,804) now have less than 100 plants and are considered small sites. Since small sites can be eradicated relatively quickly, we expect many more of these sites to have no plants in the next few years. Root-cut sites have become so small that one person can cover as many sites in a season as were previously controlled by two-person crews.

Larger sites are also responding well to control. Most herbicide sites have fewer plants and many are now small enough to be treated by root cutting. Fewer sites have large flowering plants and, in general, sites are patchier than in previous years.

2017 Highlights

- 2,253 confirmed sites in 49 counties (no sites discovered in any new counties)
- 1,755 of the confirmed sites are in the monitor or treatment stage
- 123 sites newly designated as eradicated for a total of 498 eradicated sites (no plants for 3 consecutive years)
- 1,804 sites (80%) have 0-99 plants
- 140 new sites identified
- 1,872 sites visited
- 1,233 sites controlled – approximately 668,000 plants controlled
- 1,106 phone calls and e-mails responded to by GH Information Line staff
- 205,857 visits to DEC's GH webpages

Cumulative Site Totals

- Total sites: 2,253
- Sites with no plants: 904
 - Eradicated sites (no plants for 3 consecutive years): 498
 - Monitor sites (no plants for < 3 consecutive years): 406
- Sites with plants: 1,349
 - 1-99 plants: 900
 - 100-399 plants: 209
 - 400 or more plants: 240

Staffing

Much GH Program work depends on seasonal staff. In 2017, we hired 17 seasonal staff. Field staff work full time for three to four months surveying sites for GH and controlling plants by root-cutting or applying herbicide. We commend their hard work, dedication and professionalism. Seven staff were returning professionals. Their collective knowledge and expertise has been an extraordinary asset to our program.

Partnerships

Collaboration improves success. The GH Program has strong working relationships with other organizations and groups. Program staff have trained staff from seven other organizations who have subsequently developed survey, control and outreach programs for GH in their areas. These collaborative efforts resulted in treatment or monitoring of 147 sites. We truly appreciate these partnerships and control efforts as their assistance enables more sites to be reached overall.

Outreach

Outreach plays a significant part in the GH Program. We provide the public and our partners information on how to identify, report, and safely and effectively control GH. We have also assisted agencies in Canada and other U.S. states in planning their own GH control and outreach programs.

In 2017, GH staff responded to 1,106 phone calls and e-mails to the GH information line. In addition, program staff and partners distributed more than 6,800 educational brochures, posters and control guides.

The GH information webpages (www.dec.ny.gov and search “hogweed”) provide exhaustive information on this plant. The webpages are frequently accessed by people, not only from New York State, but around the world. People visited the webpages 205,857 times during 2017 and have visited them 2,471,451 times since their inception.

Looking Forward

New York State’s GH Program has been tremendously successful. The control of this plant is a personal safety issue that people care deeply about. We continue to build upon past successes and look forward to eradication of many more GH infestations.

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Introduction

About Giant Hogweed

Giant hogweed (GH) is a significant public health and environmental issue. It is a public health hazard because it can cause severe burns when skin comes in contact with the sap and is then exposed to sunlight (Figure 1). It is an environmental problem because it is an invasive plant that threatens biodiversity by shading and out-competing native plants, which can also lead to soil erosion along slopes and riparian areas.



Photo credit: Bob Kleinberg

Figure 1. Skin reaction to GH sap over five month period

GH is listed by the federal government as a “noxious weed.” New York State law prohibits possession of GH with the intent to sell, import, purchase, transport, introduce or propagate it.

Giant hogweed (*Heracleum mantegazzianum*) is a monocarpic perennial (dying after setting seeds), which generally flowers in its third or fourth year, sets seed and dies. The plant produces an average of 20,000 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 GH a feasible goal for most sites in New York State.

GH grows in a variety of settings, e.g., riparian areas, fields, forests, yards, parks, roadsides. Control is very manageable when the number of plants is low, especially before seed has dropped. But since each adult plant produces an average of 20,000 seeds, a site can quickly grow from a few plants to hundreds within a short time. It is critical, therefore, that we deal with known sites as soon as possible. Landowners, as well as town, county and state highway departments, need help and guidance finding and dealing with GH.



GH grows in a variety of settings: riparian areas, fields, forests, yards, parks, roadsides

New York DEC's Approach

DEC uses an integrated pest management strategy to control and 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 former GH sites
- Increases biodiversity
- Reduces impacts on streams and fisheries from soil erosion
- Encourages outdoor recreation
- Reduces human health risks

We have shown that repeated treatments over multiple years are effective at eradicating GH from entire sites. DEC's public awareness component improves understanding of GH's dangers and reduces human health risks through education and outreach. The GH program has strengthened partnerships with other organizations to train and encourage them to help with outreach, survey and control.

2017 Staff

DEC hired seventeen staff for the 2017 field season (Figure 2). DEC offices in Avon, New Paltz, Reinstein Woods and Syracuse hosted field crews. Crews consisted of:

- Three one-person crews that used the root-cutting method at sites with less than 400 plants
- Six two-person crews that applied herbicide at sites with more than 400 plants and that applied herbicide or root-cut control at smaller sites at nearby locations.

The 2017 program had five NYSDEC certified commercial pesticide applicators, six pesticide technicians and 4 pesticide apprentices.

- Two information-line staff managed the information line, performed control on southeastern NY sites, and helped with the overall program.



Figure 2. 2017 DEC Giant Hogweed Program Staff pictured: Dan Waldhorn, Bob Slocum, Stradder Caves, Stephen Scaduto, Luria Lee, Joe Ordway, Joe Bodine, Brandon Swart, Dylan Hurd, Alicia Sullivan, Jerry Carlson, Sarah Cruz, Megan Gorss, Alex McGraw, Dan Vladu, Naja Kraus, Sylvia Albrecht, Alex Wyatt. Not pictured: Andrew MoskaLee, Megan Correia, Lucy Nuessle

Eight staff were returning professionals with prior experience working in the giant hogweed program. Their knowledge, dedication, professionalism and expertise have been extraordinary assets.

Training

DEC held GH training April 17-20 for twelve staff and May 22-25 for five staff. We trained returning staff on all protocol and paperwork changes from last year. We trained new staff on the following topics:

- How to identify GH and its look-alikes
- Knowing the hazards of the plant and what to do if they encounter the sap
- How to safely and effectively apply root-cutting, umbel removal, and herbicide control methods
- Program protocols and paperwork
- Data collection methods, including the use of GPS, GIS and associated applications
- Herbicide crews also received training on herbicide protocols and safety



DEC staff training session

Funding

DEC hired 12 seasonal staff and 5 interns. The interns were hired through a cooperative program with the State University of New York College of Environmental Science and Forestry (SUNY-ESF). Nine of the seasonal staff and the five interns were funded by various state funding sources, including the Environmental Protection Fund. Three seasonal staff were funded through a cooperative agreement between the United States Department of Agriculture (USDA) Natural Resources Conservation Service and the Finger Lakes Institute in conjunction with the Finger Lakes PRISM. DEC also received funding from the USDA Forest Service to help fund this program.

2017 Field Season Activities

Site Visits

During the 2017 field season, DEC and partner agency crews visited 1,872 (95%) of 1,966 total active sites. The 1,966 active sites consisted of:

- 140 new sites confirmed in 2017
- 1,297 sites that had plants in 2016
- 431 monitoring sites that had no plants in 2016
- 98 eradicated sites last visited in 2012-2015



A GH site is defined as a unique property (by tax parcel or owner) where GH plants have been confirmed.

At each of the 1,872 visited sites, crews:

- Obtained signed permission forms to access the property and perform control.
- Surveyed for GH plants and applied control methods to plants found.
- Photographed, recorded GPS points, created GIS polygons and collected other current site information (e.g. plant count and property-owner contact information)
- Recorded control information (e.g. time spent on control, number of plants root-cut or that had umbels removed, or amount of herbicide applied).

Control was performed by DEC and partner crews at 1,233 sites (*Table 1*). Crews used root-cut control at 786 sites and herbicide control at 453 sites; both forms of control occurred at 22 sites. Umbel control (flower/seed-head removal) was the only form of control used at 15 sites. Umbel control also occurred at 113 herbicide sites (26%), 75 root-cut sites (10%), and at 8 root-cut and herbicide sites (36%). Mowing was used at one site. Landowners and other organizations performed controls at 18 sites and assisted DEC and partner crews at another 12 sites. One hundred sites were not controlled for a variety of reasons, the most common being no landowner contact or permission (73%), and end-of-season reached (13%). Permission for control was refused at 21 of these sites.

Table 1. 2017 control methods, sites and plants controlled per agency

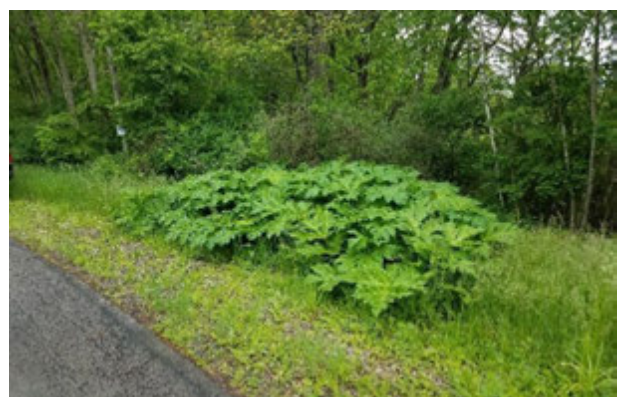
Agency	Root-cut control	Herbicide control	Umbel control	Other or unknown control method	Sites and plants controlled	Sites monitored (no plants found during survey)
DEC	754 sites 25,191 plants	411 sites 640,300 plants	147 sites 1,085 plants	0 sites	1,159 sites 665,500 plants	532 sites
APIPP	3 sites 9 plants	2 sites 18 plants	1 site 2 plants	0 sites	5 sites 27 plants	7 sites
CAPMO	2 sites 74 plants	0 sites	0 sites	0 sites	2 sites 74 plants	2 sites
CRISP	5 sites 412 plants	0 sites	0 sites	0 sites	5 sites 162 plants	5 sites
Lower Hudson	8 sites 21 plants	2 sites 115 plants	0 sites	0 sites	10 sites 136 plants	11 sites
OCSWCD	0 sites	26 sites 1,158 plants	0 sites	1 site	27 sites 1,158 plants	26 sites
SLELO	14 sites 507 plants	12 sites 195 plants	0 sites	0 sites	26 sites 702 plants	21 sites
DEC & Partner Agency Total	786 sites 26,214 plants	453 sites 641,800 plants	148 sites 1,087 plants	0 sites	1,233 sites 668,000 plants	604 sites
OTHER	2 sites	12 sites	5 sites	12 sites	30 sites	0 sites



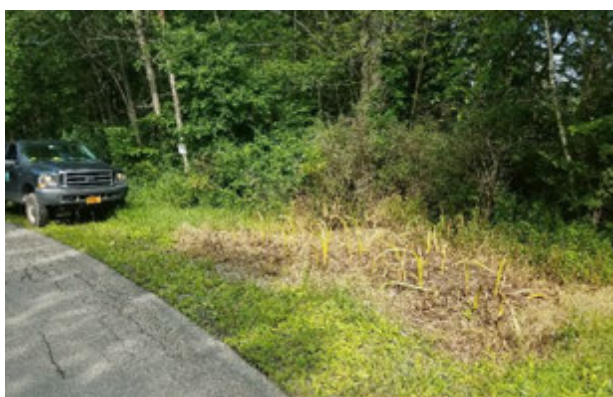
Before umbel control



After umbel control



Before herbicide control



After herbicide control

Treatments

Root-cutting is typically used at smaller sites (less than 400 plants), at sites where owners refuse to allow chemical treatment, and at ecologically sensitive portions of larger sites. DEC and partners used root-cutting at 786 sites, totaling 26,214 plants on 24 acres. Sites solely controlled by DEC root-cutting averaged 37 minutes of control per site. Sites with DEC root-cutting plus umbel removal averaged 72 minutes per site. Sites that were root-cut or root-cut with umbel removal had an average of 37 plants per site. The largest number of plants root-cut at a site was 746.



DEC staff cutting the GH plant root

Herbicide control is typically used at larger sites (more than 400 plants). Herbicides are also used at smaller sites directly adjacent to larger sites, at sites where root-cutting is ineffective due to rocky soil conditions, and at smaller sites with less than 100 plants that are assigned to an herbicide crew for efficiency reasons. Herbicide control by DEC and partners occurred at 453 sites with a total of 641,800 plants sprayed on 107 acres. DEC crews used the herbicide Accord XRT II (EPA Reg. No. 62719-556) at most sites, and Spectracide (EPA Reg. No.9688-109-8845) at one site. Sites solely controlled by DEC herbicide control averaged 105 minutes of control per site. Sites with herbicide control and umbel removal averaged 152 minutes per site. Sites that received herbicide control or herbicide and umbel removal had an average of 2,045 plants per site. The largest number of plants sprayed at a single site was about 45,000.



DEC staff spraying GH with herbicide

Umbel control is used at sites where flower/seed heads (umbels) are present. DEC and partner crews cut and removed 1,087 umbels from 148 sites. Umbel removal was the only form of control at 15 of those sites. Crews are trained on the importance of collecting umbels. This form of manual control keeps seed from spreading and is an extremely important part of control, especially at small sites and areas where seed can easily spread to new sites (e.g. along streams and roadsides).



DEC staff removing seed heads

Owners/Others performed control at 30 sites using a variety of control methods. Thirteen percent of these sites were controlled by mowing, 27 percent were controlled by root-cutting and/or umbel removal, 23 percent were controlled by other or unknown methods, and 37 percent were controlled using herbicide. Twelve of these 30 sites were also controlled by DEC and partners. Control outcomes should be even more effective at sites where landowners or other organizations provide an additional round of control.

Data Management

The 2017 field data was entered by field crews using a mobile app. The data was later checked for accuracy and entered into the statewide database. In 2017, 140 new sites were discovered (Figure 3) either by crews or through information line reports.

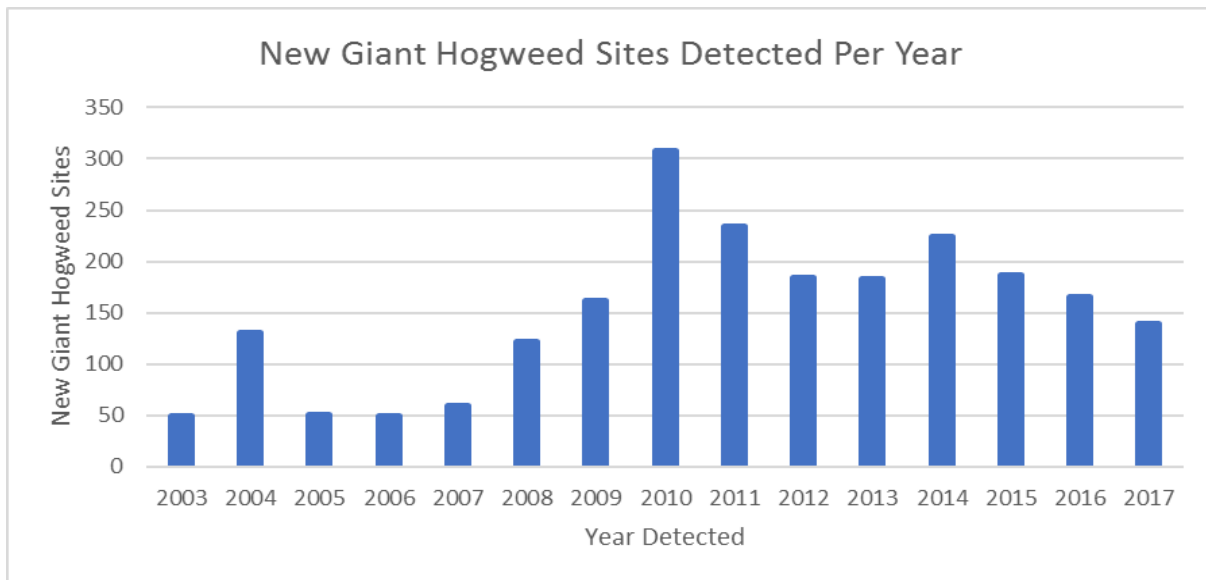
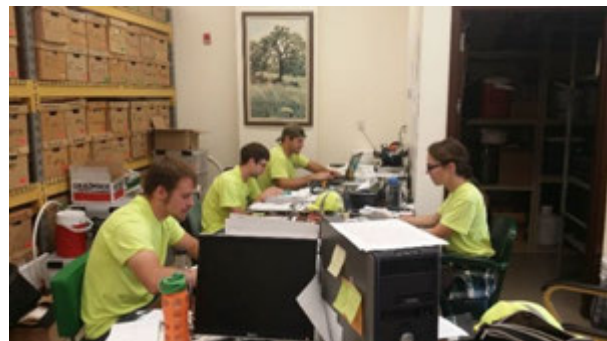


Figure 3. New sites detected per year

Information line staff and field crews obtained owner names and contact information for new sites and, if missing, for existing sites. One staff person worked during the off season to gather missing owner and contact information. Field crews are more efficient when they can contact landowners regarding future control work.



We have signed property permission forms for 1,658 sites (74%) allowing us access to monitor for plants and 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 have been scanned and saved in electronic site folders. Digital photos taken during crew visits and by information line callers were also saved in electronic site folders.

Currently, there are 498 eradicated sites (Figure 4) and 1,755 active sites in the treatment or monitoring stage throughout 49 counties in New York State (Figure 5).

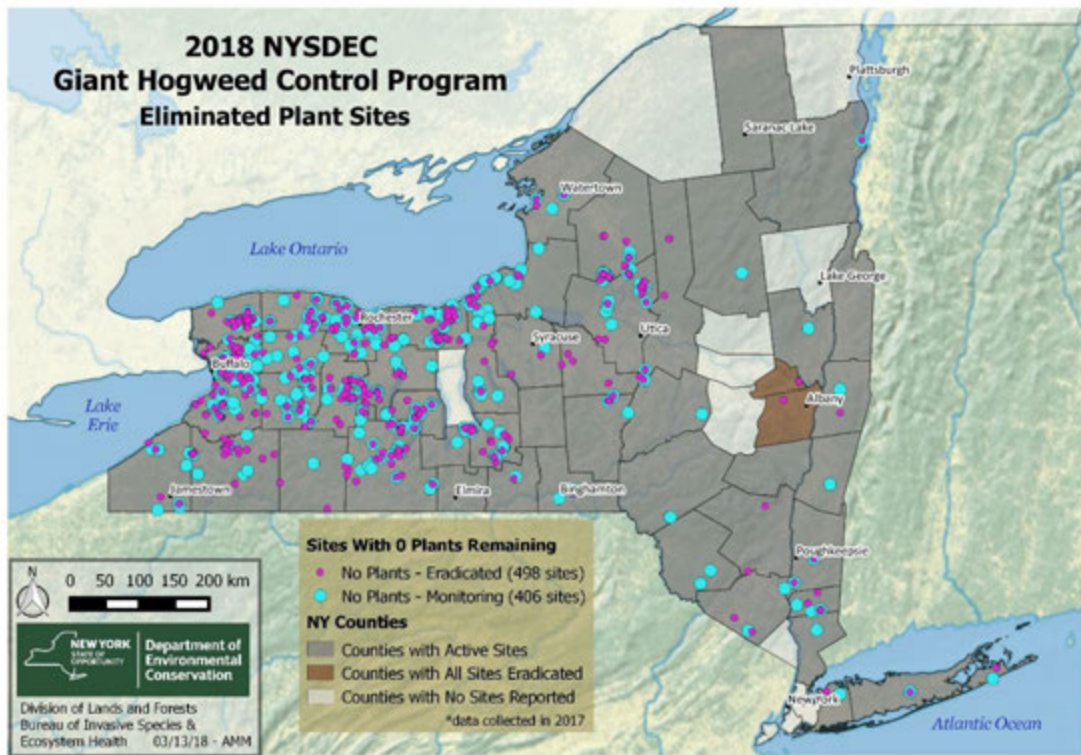


Figure 4. New York State giant hogweed eliminated sites. A site is considered eradicated after three consecutive years of monitoring with no plants found during site visit.

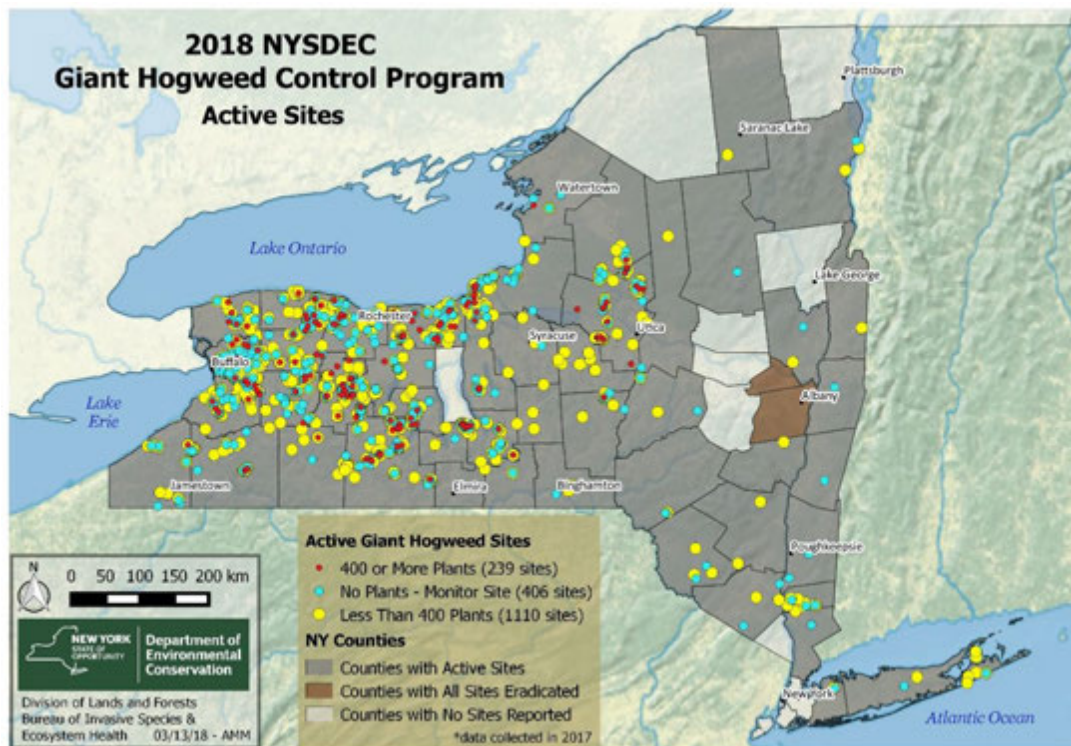


Figure 5. New York State active giant hogweed sites in treatment or monitoring stage.

Control Effectiveness

DEC crews have greatly reduced the number of giant hogweed plants at many sites throughout New York State (Figures 4, 5 and 6). In 2017, crews found no plants at 904 properties that once had giant hogweed (Table 2), which means that 40% of all sites now have no plants.

We have found that small sites can be eradicated fairly quickly. This is exciting because 1,051 active sites (60% of active sites) currently have less than 20 plants, and an additional 255 sites (15% of active sites) have 20-99 plants (Table 3).

Eradication is quick if there is no seed bank in the soil at the site. If seeds are present in the soil, control must continue yearly until all seeds 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. We should be able to remove the plants at these sites in the next few years.

Many larger sites that required herbicide treatment previously are now small enough to be transferred to a root-cut crew. These sites are patchier than in prior years, and crews are seeing fewer large flowering plants as well.

Figure 6. Five photo examples of DEC giant hogweed control success

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. There were 10,000 plants in 2008; in 2017 there were only 2 juvenile plants root-cut.



2009



2012

Site #110 - Livingston County. This formerly large site has been controlled since 2009. In 2017, 96% less herbicide was needed for control than was used in 2009. The number of plants at this site has dropped dramatically.



2009



2016

Site #579 - Livingston County. This site has been cooperatively controlled with the landowner since 2009, with no herbicide use permitted. In 2011, over 3,000 plants were root-cut. In 2017, 35 plants were root-cut.



2012



2015

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 2008-2017: 425, 95, 35, 9, 0, 13, 3, 1, 0, 0. Survey and 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



2017

Site # 849 - Broome County. This is a good example of the effectiveness at small sites with a limited seedbank. After three years of root-cut control (2011-2013) there were no plants found at this site in 2017, 2016 and 2014. One plant was controlled in 2015.



2012



2017

Table 2. Sites per size class per year

Plants per site	Sites after 2008 field season	Sites after 2009 field season	Sites after 2010 field season	Sites after 2011 field season	Sites after 2012 field season	Sites after 2013 field season	Sites after 2014 field season	Sites after 2015 field season	Sites after 2016 field season	Sites after 2017 field season
0	64	106	139	219	339	348	501	639	823	904
1-99	155	316	414	474	563	674	793	872	892	900
100-399	85	78	119	167	172	220	214	203	191	208
400-999	38	44	91	81	105	132	116	100	73	104
1000+	77	73	113	138	135	143	108	124	127	135
Unknown	78	28	68	31	35	19	28	10	10	2
Total number of sites	497	645	944	1,110	1,349	1,536	1,760	1,948	2,116	2,253
Total active sites*	497	645	944	1,111	1,252	1,439	1,521	1,671	1,729	1,755

*Active sites refers to sites with plants or sites still being monitored. It does not include eradicated sites.

Table 3. Sites per size class by county (2017 field data)

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	8	4	3	1	2	3	1	1	1		
Broome	13	13	9	4	11	1		1			
Cattaraugus	33	37	29	8	14	2	4	2	3	8	
Cayuga	63	33	14	19	31	5	6	4	8	9	
Chautauqua	23	15	8	7	11	3	4	4	1		
Chemung	1	0			1						
Chenango	9	7	4	3	3	3		1	2		
Columbia	0	1		1							
Cortland	4	0			3	1					
Delaware	1	2		2				1			
Dutchess	0	4	2	2							
Erie	196	136	76	60	115	38	7	15	10	11	
Essex	2	2	1	1	2						
Franklin	1	0			1						
Genesee	47	17	6	11	18	12	4	5	4	4	
Greene	1	0						1			
Hamilton	0	1		1							
Herkimer	2	6	5	1	2						

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 #
Jefferson	4	7	3	4	2	1			1		
Lewis	23	25	15	10	18	4			1		
Livingston	122	61	34	27	45	21	8	19	12	15	2
Madison	11	3	3		4	6		1			
Monroe	98	78	42	36	50	16	8	8	4	12	
Nassau	1	2	1	1	1						
Niagara	36	49	36	13	17	9	2	3	2	3	
Oneida	95	26	15	11	32	25	8	5	12	13	
Onondaga	9	7	6	1	5	2	2				
Ontario	26	35	19	16	21	3		1	1		
Orange	3	3	1	2	3						
Orleans	42	25	11	14	19	8	1	7	2	5	
Oswego	34	28	5	23	18	11	3	1		1	
Otsego	3	4	2	2	2		1				
Putnam	8	11	8	3	6	1	1				
Rensselaer	0	2	1	1							
Saratoga	1	0				1					
Schenectady	0	2	2								
Schuyler	33	10	3	7	7	7	2	4	6	7	
Steuben	136	65	35	30	62	20	6	14	14	20	
Suffolk	7	6	2	4	7						
Sullivan	3	3	1	2	2		1				
Tioga	1	2	1	1	1						
Tompkins	45	28	17	11	17	8	5	2	3	10	
Ulster	2	2	2		2						
Washington	2	0				2					
Wayne	138	67	37	30	58	28	17	11	14	10	
Westchester	0	1		1							
Wyoming	41	44	18	26	20	9	1	3	3	5	
Yates	21	29	20	9	12	5	2			2	
Grand Total	1349	904	498	406	645	255	94	114	104	135	2

It is hard to judge control efficacy by using plant numbers following treatments since areas with seed banks will grow more plants from seeds. It takes a few years of treatment for seed banks to be completely used up and plant numbers to drop significantly.

Once we control the larger plants at seed-bank sites, more and smaller plants grow from seed in the same space the following year. Even though control was effective and large plants were eliminated, the total number of plants for these sites will increase the

following year. High plant numbers will likely continue until most seeds in the seed bank have germinated and are controlled, after which we see numbers drop rapidly.

During the 2017 field season, we surveyed 604 sites previously treated for GH infestation and found no plants; 123 of these had no plants for three consecutive years, allowing us to designate them eradicated. This brings the total of eradicated sites to 498, up from 387 in 2016. We had 111 more sites without plants this year than last year. Of all sites that had been previously treated for infestation, 40 percent (904 sites) have no plants in 2017.



Of the 430 sites that started the 2017 field season as monitor sites (no plants found in 2016 but not yet an eradicated site), 72% (311 sites) remained free of GH. Sixteen monitor sites were not visited because crews were unable to contact the landowners for permission to survey their property.

Eighty-eight percent of monitor sites where plants were found (113 of 128 sites) had less than 20 plants. Reappearance of GH indicates that crews overlooked plants during prior visits, seeds germinated from the seed bank, or seeds were spread from another site.

It typically takes multiple years of control before we find no plants at a site. However, occasionally, we find no plants at a site after just one year of control. Since the start of the GH program, this has occurred 317 times. Eighty-four percent of these 317 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 we deem a site eradicated (no plants for three consecutive years), it becomes inactive. As an added precaution in case seeds germinate from a seed bank or new seeds spread to the site from another source (e.g., an upstream site), we now revisit inactive sites three years after they were last monitored. Landowners are also provided with information to contact us should they notice new plants once we deem their property inactive. In 2017, we surveyed 98 sites last monitored in 2012-2015; eight of these sites had one to fifty plants which we controlled. This shows the importance of occasionally monitoring inactive sites. Natural and human-assisted seed dispersal along dispersal corridors (e.g., streams and roads) has not stopped, so it remains likely that these sites have a higher probability of being infested again.



Outreach and Communications

Our program has a strong outreach component. We provide information to the public and partner organizations on how to identify and safely and effectively control GH. GH information line staff are busy all field season answering questions and identifying plants for the public. Every year, we incorporate lessons learned from previous seasons and improve our outreach materials. We offer training, distribute brochures, control guides and posters, and have ample GH information available on DEC's website. Our website information is accessed by people from around the world. We have also previously assisted agencies in Canada and other U.S. states in planning their own GH programs.

DEC's Giant Hogweed Information Line

DEC Information Line staff answered 635 calls and 471 e-mails from the public in 2017. Fifty-four (54) new GH sites were confirmed from information line reports. Reports of possible giant hogweed locations made up 81 percent of the 1,106 calls and emails, 3 percent of which were from landowners of established sites. The remaining 19 percent of calls and emails were for information about giant hogweed or other invasive species, not to report possible GH sites.

Of the portion of public calls and emails of possible giant hogweed sites, 27 percent were confirmed by information line staff as correctly identified by the reporter and 73 percent were determined to be lookalike plants, not giant hogweed. The most common lookalike plants reported were: cow parsnip, angelica, wild parsnip, elderberry, wild lettuce, poison hemlock, and pokeweed.

Of the portion of calls and emails where the reporter correctly identified giant hogweed, 34 percent were for new sites and 66 percent were for established/known sites.

Staff told callers about DEC's giant hogweed webpage and, if they were interested, sent them a GH brochure and control guide. We also sent callers with confirmed GH sightings on their properties a control guide and a license-to-enter-property form to sign and return.

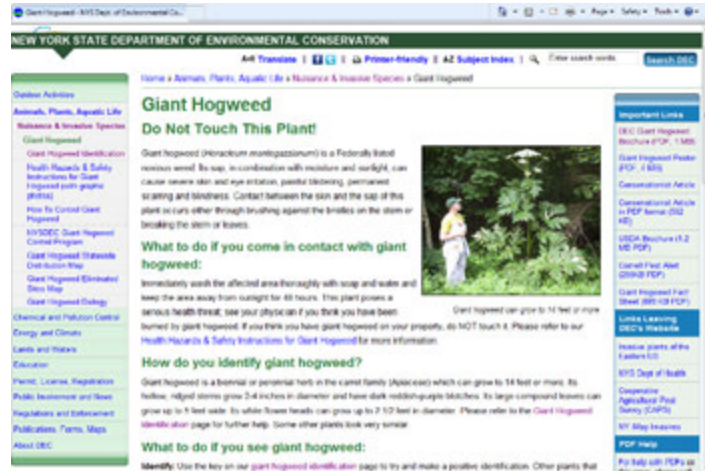
We confirmed sites by viewing photos of flowers, stems, leaves, and entire plants sent by callers via cell-phone texts, emails or by U.S. mail. In cases where callers were unable to provide photos, we reached out to Cornell Cooperative Extension (CCE) staff or PRISM partners for help. In many instances, a CCE staff member, master gardener, or PRISM staff person were able to verify the sites in their counties for us.

Information line staff communicated newly confirmed sites to field crews, who incorporated them into their schedules if time allowed.

Giant Hogweed Maps

We posted updated maps on DEC's website www.dec.ny.gov/animals/39809.html. These maps reflect 2017 field data of known GH locations and locations where GH is no longer present in New York State (Figure 4 & Figure 5). We passed along GH site information to the NYS invasive species database, iMapInvasives, to update GH data on their website www.nyimainvasives.org.

Web Pages



DEC's giant hogweed webpage www.dec.ny.gov/animals/39809.html leads to a number of other webpages with information on GH identification, health hazards and safety instructions; control methods; maps; and links to articles, pest alerts, brochures, and non-DEC giant hogweed webpages. People visited DEC's giant hogweed webpages 205,857 times in 2017 and have visited them 2,471,451 since their inception.

Social Media

DEC's Office of Communication Services staff help spread the word about giant hogweed. Social media is used during GH's blooming season to educate the public and request that they report new sites. We use photos to capture readers' attention and posts contain a variety of information about the plant. Five GH Facebook posts resulted in 960,000 views. Each post generates questions and comments that provide additional opportunity to educate the public. Two Instagram posts about giant hogweed had a combined 239 likes.



Giant Hogweed Poster, Brochure, and Control Methods Guide



We use DEC's giant hogweed brochure, poster and control methods guide to educate the public about giant hogweed in NY. The GH brochure and poster help people learn how to identify giant hogweed, to avoid touching it, and to report GH locations to DEC so we can help control it. The control methods guide offers more detailed information about how to safely control GH. In 2017, program staff and partners distributed more than 6,800 brochures, posters and control guides to interested persons and organizations.



These outreach documents are available on our website; paper copies can be requested by contacting the GH program.

- Poster: www.dec.ny.gov/animals/39809.html
- Brochure: www.dec.ny.gov/docs/lands_forests_pdf/ghbrochure.pdf
- Control Guide: www.dec.ny.gov/docs/lands_forests_pdf/ghcontrol.pdf

Landowner Training

A small percentage of landowners assist with GH control. We train them to safely and effectively control the plant on their property. Though controlling GH requires caution, we emphasize that landowners can do it with proper training and protective clothing and equipment. We urge landowners to read and follow the health hazards and safety instructions in DEC's control guide prior to initiating control.

We advise owners to initially control plants early in the season when they are small and less hazardous. Landowners usually live on the site where GH is growing, so we also advise them to control their GH patch many times each season. This stops latecomer seedlings from attaining a more dangerous size.

These best practices help keep plant numbers down and overall patch size small, leading to safer and speedier eradication. When training landowners, crews have learned to stress not only the health hazards of the plant but also the benefits of landowner control.

Partnerships

The GH program has cultivated strong working relationships with Partnerships for Regional Invasive Species Management (PRISMs) and other organizations. Program staff provided partner agencies with an initial training on GH identification, safe and

effective control methods, and an overview of GH control program protocols and data collection.

In 2017, six partner agencies conducted outreach, survey and control for some or all of the GH sites within their boundaries:

- Adirondack Park Invasive Plant Program (APIPP) PRISM
- Capital/Mohawk PRISM
- Catskill Regional Invasive Species Partnership (CRISP) PRISM
- Lower Hudson PRISM
- Saint Lawrence Eastern Lake Ontario (SLELO) PRISM
- Oswego County Soil and Water Conservation District



Other partner agencies assisted with survey, outreach and program management:

- New York City Department of Environmental Protection (DEP) staff assisted by surveying their properties and neighboring areas in Putnam County for GH. Plants found were controlled by Lower Hudson PRISM staff.
- Finger Lakes PRISM, in conjunction with the Finger Lakes Institute, hired three staff to work with the GH control program and two staff to work on GH outreach using funding received through a cooperative agreement with the United States Department of Agriculture Natural Resources Conservation Service.
- The Western NY PRISM assisted with survey and outreach.

As resources and interest allow, we work with state, county, town and village highway departments. Many of them are concerned about how GH will affect the safety of their workers or park visitors. We train them to safely control GH, assign sites for them to control, coordinate primary and follow-up control, and join 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 and, in some cases, we control the site for them. Control outcomes are more effective at sites where a partner agency or landowner provides an additional round of control.

Presentations and Interviews



Newspaper or television reporters interviewed GH staff six times during the 2017 field season. Staff also gave more than 20 presentations. Local interest is evident in the numerous interviews, special reports and solicited presentations on television, radio, internet and print media, and at technical symposia and workshops since we started the program. New York's GH program has also previously had national and international radio and television exposure. England, India and Canada have interviewed GH staff for their national news. This dramatically increased public attention to the program's efforts and achievements. In addition, greater public awareness has led to us finding more small infestations at earlier stages.

Conclusion

Unlike most invasive species, we can potentially eradicate giant hogweed from most sites in New York State. Since each mature plant can produce an average of 20,000 seeds annually, consistent and continuous efforts are required to reach this goal. DEC and partner agency efforts have eliminated GH from 498 of the 2,253 known sites to date. An additional 406 sites had no GH plants in 2017. This is a total of 904 sites (40%) with no GH plants in 2017.

Numbers of mature plants at treated sites have dropped dramatically. New sites are identified each year because of public outreach efforts. Based on feedback from the public, this may be one of the most well-known invasive species in the state. The added use of partners for outreach and treatment activities increases the annual impact.



Appendix A

History of New York's Giant Hogweed Program

Starting in 1998, USDA, NYS Department of Agriculture & Markets (NYSDAM) and Cornell Cooperative Extension surveyed for this weed in New York through USDA's Cooperative Agricultural Pest Survey (CAPS) Program. CAPS led to the detection of GH in approximately half the state's counties, with most detection records coming from Western NY.

In 2006-2007, NYSDAM maintained the GH information line. DEC crews visited and confirmed reported GH sites and updated site information on known 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 using GIS data and an outreach mailing. In 2007, we also applied for and received a 2ee exemption letter allowing us to use the herbicide Rodeo for GH control.

DEC implemented manual control of GH plants starting in 2008 with three crews hired to control giant hogweed plants by root-cutting. DEC also began maintaining the GH information line at this time. In 2009, two crews were hired to control smaller sites using manual root-cutting, and one crew was hired to use herbicide to control larger sites.

In 2010 and 2011, DEC received an ARRA grant, allowing the GH program to double in size. Five crews in 2010 and six crews in 2011 were hired to use either manual or chemical control tactics. In 2011, we applied for and received a 2ee exemption letter allowing the use of additional 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.

In 2012-2017, state funds were used to hire from six to nine control crews per season. USDA's Forest Service supplied partial GH program funding from 2013-2015 through a Competitive Allocation Request Proposal (CARP) and from 2016-2017 through a Landscape Scale Restoration (LSR) grant. Starting in 2012 four partner organizations agreed to control GH sites within their boundaries: APIPP, CRISP, SLELO and OCSWCD. In 2014 the Lower Hudson PRISM joined the statewide GH control effort. In 2015, the Capital Mohawk PRISM joined the statewide control effort. Table 4 shows GH program accomplishments from 2006 to 2017.

Table 4. DEC- Giant Hogweed Program Accomplishments 2006-2017

	2006/ 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
# of Information Line Calls	N/A	200 calls	660 calls	912 calls	1,976 calls	967 calls	592 calls	1,019 calls	1,099 calls	945 calls	635 calls
# of Information Line 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	1,006 emails	471 emails
# 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	326,918 visits	205,857 visits
# of sites root-cut controlled	N/A	130 sites	195 sites	402 sites	538 sites	494 sites	593 sites	556 sites	761 sites	812 sites	786 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	34,995 plants	26,214 plants
# of sites herbicide controlled	N/A	N/A	146 sites	210 sites	270 sites	347 sites	486 sites	551 sites	444 sites	391 sites	453 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	563,000 plants	642,000 plants
Monitored** <i>No plants found</i>	N/A	64 sites	106 sites	139 sites	204 sites	282 sites	251 sites	354 sites	448 sites	620 sites	604 sites
New sites	60 sites	122 sites	158 sites	341 sites	234 sites	179 sites	183 sites	226 sites	188 sites	167 sites	140 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	1,293 sites	1,349 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	823 sites	904 sites
Eradicated sites**	N/A	N/A	N/A	28 sites	55 sites	97 sites	149 sites	239 sites	277 sites	387 sites	498 sites
Seasonal staff hired	N/A	6 people	7 people	13 people	15 people	11.5 people	13 people	13 people	14 people	18 people	17 people
Funding source	State & Federal	State & Federal	State & Federal	ARRA & Federal	ARRA	State	State & Federal	State & Federal	State & Federal	State & Federal	State & Federal

Appendix B

Historical Funding

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
- NYS Department of Health- funded printing of GH posters

Appendix C

Additional Giant Hogweed Data

Table 5. Sites per size class by DEC region (2017 field data)

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	8	8	3	5	8						
3	16	24	14	10	13	1	2				
4	5	12	6	6	2		1	2			
5	6	3	1	2	3	3					
6	125	65	39	26	54	30	8	6	14	13	
7	188	121	59	62	93	37	16	9	13	20	
8	665	386	206	180	294	120	48	69	57	75	2
9	336	285	170	115	178	64	19	28	20	27	
Grand Total	1349	904	498	406	645	255	94	114	104	135	2

Table 6. Sites per size class by PRISM (2017 field data)

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 #
AIPP	5	7	5	2	5						
Capital Mohawk	4	8	5	3		3		1			
CRISP	8	10	4	6	5		2	1			
Finger Lakes	730	437	243	194	332	126	56	65	64	85	2
Long Island	8	8	3	5	8						
Lower Hudson	12	20	12	8	10	1	1				
SLELO	157	87	39	48	70	41	11	7	14	14	
Western NY	425	327	187	140	215	84	24	40	26	36	
Grand Total	1349	904	498	406	645	255	94	114	104	135	2

Table 7. Sites per size class for 2011-2017

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 #
2017	1349	904	498	406	645	255	94	114	104	135	2
2016	1293	823	387	436	627	265	99	92	73	127	10
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. Sites and plants controlled by DEC/partner agencies 2012-2017

Year	Sites controlled by DEC/ partner agency	Plants controlled by DEC/ partner agency
2017	1,233 sites	668,000 plants
2016	1,175 sites	598,000 plants
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 2012-2017

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*
2017	37 plants	2,045 plants	37 minutes	105 minutes
2016	41 plants	1,741 plants	43 minutes	148 minutes
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

*Average time for sites without umbel removal

Appendix D

Long-Term Conservation Goals

Eliminate GH from NY

Benefits: *Increase plant diversity, decrease soil erosion and reduce human health risks.* GH 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 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 slopes, reducing sediment delivery to important fish habitat. Giant hogweed is a human health hazard. Each site we eradicate becomes a safe place for people to work and recreate again.



Bare soil underneath GH

Eliminate GH from public access areas

Benefits: *Reduce human health risks.* Roads, trails and streambanks are important recreation access areas and are often frequented by children. GH infestations in these areas significantly threaten public health and the quality of recreational experiences as people risk contact with the plant's sap, which can lead to severe burns. GH infestations threaten the users of many fishing access trails and streambanks, parks, playgrounds, campgrounds, nature centers, hiking trails, mini-golf courses, fish and wildlife management areas, school grounds and sports fields. We place these infestations on high-priority lists for treatment. We intend to eliminate GH from these sites and return them to a state where people can safely resume recreation.

Eliminate GH from areas that threaten children

Benefits: *Reduce risk to children's health.* Children are particularly susceptible to severe burns from GH sap as they find the large plants with hollow stalks interesting to play with. We have targeted all infested sites with high use by children as first priority for eliminating GH and increasing awareness of its dangers. Controlling GH near schools, daycares, playgrounds, or at homes where children live or frequently visit will minimize risk of them touching GH.



Maintain and improve public awareness of GH's dangerous nature

Benefits: Reduce human health risks and improve GH infestation reporting. One of the major impediments to avoiding GH exposure is lack of knowledge of the plant's dangerous nature. Describing what GH looks like, how to distinguish it from similar plants, and how attending to sap exposure immediately can prevent serious burns are vital parts of our outreach effort. We will reduce human health risks from GH infestations through education and outreach efforts designed to:

- Describe how GH can cause harm
- Enable people to properly identify GH and similar looking plants
- Describe appropriate avoidance techniques
- Describe personal safety clothing and equipment for avoiding injury while working near or controlling GH
- Describe treatment techniques and methodologies that minimize harm when people touch the plant