

# Interim Report on Lesser Celandine Control Efforts during 2009 (1<sup>st</sup> year) of the Cleveland Metroparks Invasive Plant Management Program

Cleveland Metroparks Technical Report 2009/NR-11



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## *Background*

Expanding on several decades of invasive plant management at Cleveland Metroparks, an expanded Invasive Plant Management Program (IPMP) was begun in 2008 with the appropriation of funding for January 2009. Details about the structure and methods of the program are described in [Mack and Hillmer \(2009\)](#). The start-up for the program began in March 2009, with field work starting in early April. Start-up for the program included a preliminary inventory of major invasive plant populations, the development of a system for mapping and recordkeeping, hiring and training seasonal staff, and the purchase of materials, equipment, and herbicides for the control program. Natural Resources staff involved in the IPMP met weekly to set priorities for surveys, site goals, mapping and recordkeeping protocols, and to assign responsibilities for removal at specific populations.

The first species on the list of targets is lesser celandine, a highly-invasive perennial flower that emerges and blooms coincident with native spring wildflowers. The plant emerges in early spring (March in northern Ohio), blooms in April and May, and dies back completely by early June. Lesser celandine is one of the top 12 invasive plant species in the Cleveland Metroparks, and is of particular concern in Rocky River, Mill Stream Run, and Big Creek reservations. It is present in low numbers at North and South Chagrin, Ohio & Erie Canal, and Garfield Park reservations ([Mack and Hillmer 2009](#); [Mack 2008](#)).

A six-year control plan for lesser celandine in Rocky River ([Mack 2008](#)) has been designed to remove or reduce to manageable levels the lesser celandine from Bagley Road, downstream to Puritas Road. For all other reservations, lesser celandine removal is planned for all known infestations. Ongoing surveys for new populations or points of introduction are part of the work, and will be a principal responsibility of the volunteer recon teams starting in later winter 2010. Some off-property sites were identified as source populations onto the Metroparks property. Owners of those properties will be contacted for permission to manage celandine in 2010.

### *Measuring Success: Acres Treated and Acres Protected*

There are two methods to estimate invasive plant acreage, but their relevance depends on the prevailing site and habitat conditions. In either case, the basic area is defined by the suitable habitat for the invasive plant (for lesser celandine, lowland forest or moist, open to shaded river and stream banks, turf, and woodlands). The invasive plant management teams work from a map on which a relatively large area is designated as an “occurrence” (see [Figure 1](#), Big Creek - Fern Hill). These occurrences are an arbitrary designation of area which can be scouted and treated within a limited time period, usually no more than 2 – 5 days.

Occurrences may be densely covered with the target plants, and adjacent to one another, such as in Rocky River Reservation, or the weed populations may be small and dispersed over a large area, such as in Sulphur Springs of South Chagrin Reservation ([Figure 2](#)). In Rocky River Reservation, management goals are to reduce the extensive stands of lesser celandine to low levels. Given this goal, acres treated becomes an appropriate measure of success: 332 acres were “treated” out of a total treatable acreage of 689 acres ([Figure 2](#), Rocky River treatments). Treated acreage represents the area that was searched for the invasive plants, with boundaries mapped at the observable limit of the large or widely dispersed plant populations.

In South Chagrin Reservation, where the lesser celandine is limited to very small, localized stands on the Sulphur Springs floodplain, the management goal is to prevent its spread and expansion into South Chagrin Reservation. Given this goal acres protected becomes an appropriate measure of success given the diversity of native species and high-quality habitat: 61 acres in the Sulphur Springs watershed were protected from the further spread of lesser celandine ([Figure 3](#), South Chagrin – Sulphur Spring).

The 2008 estimates of acreage for lesser celandine populations in Rocky River reservation were very conservative, with about 25 acres of heavy cover in the Bagley Road to Puritas Road section. Field surveys have increased that area significantly, in particular when mapping sites where lesser celandine was scattered throughout an extensive area. The northern section acreage is very likely a significant underestimate of the areas where lesser celandine is present at low density. Acreage for other areas was not known, with the exception of North and South Chagrin reservations, where the occurrences have been assessed and mapped over numerous years of repeated treatments.

*Priorities and management effort*

All occurrences of lesser celandine outside of Rocky River were priority 1 (high priority for 2009 treatment). Within that reservation, additional occurrences were downgraded to priority 2 (treat in 2009 if practical), priority 3 (low priority for treatment at this time), or were not rated (most of the sites north of Puritas Road). See [Table 1](#) and [Figure 4](#) (Rocky River, Priority). The prioritization process was a good measure of what was feasible for the strike team and area managers to accomplish within the optimum

**Table 1. Priority sites treated**

<b>Reservation</b>	<b>Occur- rences</b>	<b>Priority 1</b>	<b>Priority 1 complete</b>	<b>Priority 1 partial</b>	<b>Priority 1 not done</b>	<b>Priority 2 (all)</b>	<b>Priority 3</b>
Big Creek	5	5	4	1			
Euclid Creek	2	1	1				1
Garfield Park	1	1	1				
Mill Stream Run	5	5	5				
North Chagrin	5	5	5				
Ohio & Erie Rocky River (south of Puritas)	3 44	3 25	2 16	1 6		3 5	
South Chagrin	10	10	6		4		
<b>Total</b>	<b>75</b>	<b>55</b>	40	8	7	<b>5</b>	<b>8</b>
			73%	15%	13%	100%	

time period. For 2010, the priorities will be adjusted and the season of control will start earlier in the year.

The intensity of management effort is closely linked to the goals for a site ([Appendix A](#)), which depends on factors like habitat quality, native plant diversity, and landscape context. High-diversity sites such as South Chagrin Reservation or some of the floodplain terraces in Rocky River Reservation are searched more intensively than those with low native diversity and high densities of lesser celandine. Nonetheless, a reasonable

**Table 2. Management effort summary.**

<b>Reservation</b>	<b>Occurrences</b>	<b>Occurrence Acres treated</b>	<b>CM staff hours for treatments</b>	<b>Gallons of herbicide solution used (CM staff)</b>	<b>Gallons of herbicide solution used (Contractor)</b>
Big Creek	5	69	107	200	
Euclid Creek	2	2	4	4	
Garfield Park	1	< 1	3	3	
Mill Stream Run	5	26	5	5	
North Chagrin	5	5	6	6	
Ohio & Erie Rocky River (south of Puritas)	3	1	3	3	
	44	332	244	478	2420
South Chagrin	10	19	54	54	
<b>Total</b>	<b>75</b>	<b>452</b>	<b>425</b>	<b>753</b>	<b>2420</b>

**Table 3. Herbicide cost for lesser celandine removal, 2009.**

<b>Herbicide use* and cost</b>	(excludes contractor use)
Average spray dilution	4%
Average per-gallon cost	\$ 36.00
<b>Gallons used</b>	<b>30</b>
<b>Cost of herbicide</b>	<b>\$1,080.00</b>

\*excludes herbicide used by contractor (48 gallons)

estimate of management effort can be derived from staff hours per acre, with the amount and cost of herbicides used (Tables 2 and 3). For a detailed use summary, see Appendix B.

*Literature cited*

Mack, J.J. 2008. Workplan for lesser celandine (*Ranunculus ficaria*) control in Rocky River, version 1.0. Cleveland Metroparks Technical Report 2008/NR-05. division of Natural Resources, Cleveland Metroparks, Fairview Park, Ohio.

Mack, J. J. & J.A. Hillmer. 2009. Invasive Plant Management Program (IPMP) for Cleveland Metroparks Version 1.2. Cleveland Metroparks Technical Report 2009/NR-01. Division of Natural Resources, Cleveland Metroparks, Fairview Park, Ohio.



## **Appendix A: Site Goals and Management Intensity**

### Site Goals (the condition we're heading for at a given site)

**PREVENT** - Early detection - rapid response. Eradicate population upon discovery. Prevent any seed set or reproduction if found. Highest quality sites which are surveyed annually for invasion ("watch areas").

**MAINTAIN** - Weeds are below acceptable threshold. Minimal annual effort (e.g. one treatment only).

**RESCUE** – High-value site has good native diversity or resilience and/or good restoration potential if invasives removed or controlled (e.g. mature forest with garlic mustard invasion, high quality wetland with purple loosestrife).

**REDUCE** - Several years of sustained effort needed. Overall annual reduction of 25-50% per year. Prevent seed set or other reproduction, remove mature plants, and/or shrink patch as goals. Site may be of lower ecological value than "rescue" sites, but are still important for invasive plant removal. (Restoration of site could shift goal from "reduce" to "rescue" over time.)

**CONTAIN** - Prevent population from spreading further especially along available pathways (e.g. off-site population where access not allowed to control at source).

**AESTHETICS** - Control where appearance and not ecological concerns are important.

### Management Intensity (how hard we will work at a given site in a given year)

**WATCH** – Annual or seasonal surveys needed to ensure that area is not invaded by important invasive plants.

**SWEEP** - "Hiking with herbicide." Cover lots of ground where density of invasives relatively low (e.g. forest with scattered patches of barberry).

**MOP-UP** - Seasonal (or follow up 1-2 months after treatment) to continue mapping, treat missed plants, resprouts, rootsprouts, seedlings.

**STANDARD** - Labor-intensive but still selective effort characteristic of early stages of control program.

**HEAVY** - Intensive and relatively nonselective level effort to control large scale infestations or especially pernicious new or existing infestations (e.g. controlling a new stand of giant hogweed).

## Appendix B. Lesser Celandine Removal Summary, 2009

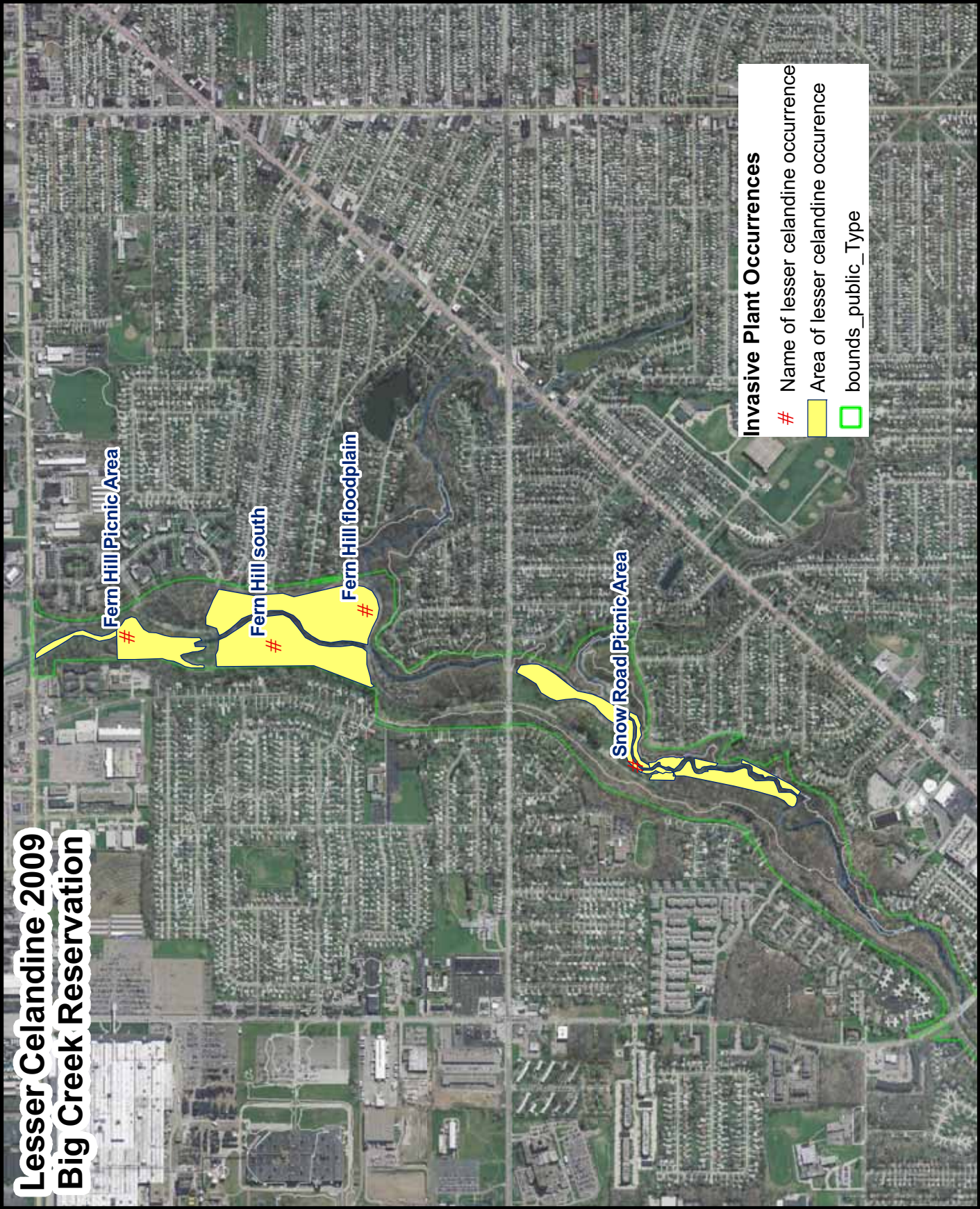
Weed Occurrence	Area - (acres)	Date	Treatment Coverage	Spray mix (gal)	Product	Concen. % by vol	Person Hours	Notes	Who treated
Fern Hill Floodplain		5/4/2009		40	Razor Pro	0.05	16.00		strike
Fern Hill Picnic Area & Fern Hill South	15.03	5/13/2009	I > 50%	31	Aqua Neat	0.02	10.50		strike
		4/17/2009		22	Aqua Neat	0.015	18.00		strike
	35.77	4/23/2009		16	Aquastar	0.01	6.00		Gollas
Memphis PA	6.37	5/5/2009	Complete	4	Aquastar	0.03	1.34		Gollas
Snow Rd PA		4/9/2009		6.5	Aqua Neat	0.02	3.75		strike
		4/9/2009		10.5	Aqua Neat	0.02	14.00		strike
		4/16/2009		18	Aqua Neat	0.015	7.50		strike
Highland Rd	11.88	4/16/2009	Complete	51.5	Aqua Neat	0.015	30.00		strike + NR
Old Boat Pond WolfCreek	1.21	5/21/2009	Complete	13.5	Razor Pro	0.02	4.00		strike
	0.22	4/24/2009		2	Aquastar	0.03	0.83		Gollas
Bonnie Park PA		4/27/2009		2	Aquastar	0.03	1.87		Gollas
Green Lodge	0.01	4/23/2009	Complete	0.5	Kleenup Pro	0.05	0.75		Krock
	12.30	4/23/2009	Complete	0.9	Kleenup Pro	0.05	0.50		Krock
Handle Road		4/23/2009		2.5	Kleenup Pro	0.05	1.50		Krock
	6.73	5/20/2009	Complete	1	Kleenup Pro	0.05	2.00		Krock
Paw Paw PA	0	4/27/2009	Complete	0.1	Kleenup Pro	0.05	0.15		Krock
The Chalet	5.16	5/3/2009	Complete	0.5	Kleenup Pro	0.05	0.50		Krock
Base of Oxlane Hill (map 23)	0.48	4/27/2009	Complete	1	Habitat	0.05	1.00		Tyler
Fishers Tavern (off-site, map 65)				6	Habitat	0.05	1.00		Tyler
Forest Lane Picnic area (map 32)	3.43	4/27/2009	Complete	4	Habitat	0.05	1.00		Tyler
River Farm (map 11)	0.19	4/27/2009	Complete	1	Habitat	0.05	1.00		Tyler
Squires Castle Area (map 64)	0.25	4/30/2009	Complete	6	Habitat	0.05	1.00		Tyler

Weed Occurrence	Area - (acres)	Date	Treatment Coverage	Spray mix (gal)	Product	Concen. % by vol	Person Hours	Notes	Who treated
Strawberry Picnic Area (map 16)	0.53	4/27/2009	Complete	1	Habitat	0.05	1.00		Tyler
First Energy ROW N of Canal		5/6/2009		2	Aquastar Roundup	0.03	1.17		Golias
Primitive Trail	0.41	5/11/2009	I > 50%	2	Pro Roundup	0.02	1.00		Golias
	0.1	5/7/2009	I < 50%	2	Pro	0.02	0.67		Golias
Berea Falls APT & Barrett Ford & Barrett Bridle Trail-APT & Willow Bend North & Willow Bend right bank & Nature Center Parking Lot									
Brookpark Bridge & South Mastick Wildflower & Lewis Riding Area	24.67	4/23/2009	Complete	23	Razor Pro	0.015	25.00		strike
Brookway East & Brookway West	76.47	4/24/2009	I > 50%	124	Kleenup Pro & Razor Pro	0.05	63.75	39.75 hr NR staff, 24 hr other park staff	Krock
Cedar Point South	35.45	5/18/2009	Complete	7	Kleenup Pro	0.05	2.65		Krock
		5/4/2009		4	Kleenup Pro	0.05	0.65		Krock
		5/12/2009		4	Kleenup Pro	0.05	2.00		Krock
Maple Grove	3.25	5/18/2009	Complete	1	Kleenup Pro	0.05	0.65		Krock
Old Mill Site	16.79	5/4/2009	Complete	3	Kleenup Pro	0.05	0.75		Krock
Old Trail Site	5	5/4/2009	Complete	16.5	Kleenup Pro	0.05	3.25		Krock
	27.88	5/11/2009	I > 50%	350	Rodeo	0.02	7.50	treated area 14.29 A	Davey + strike
		5/12/2009		270	Rodeo	0.02	16.50	w/davey	Davey strike

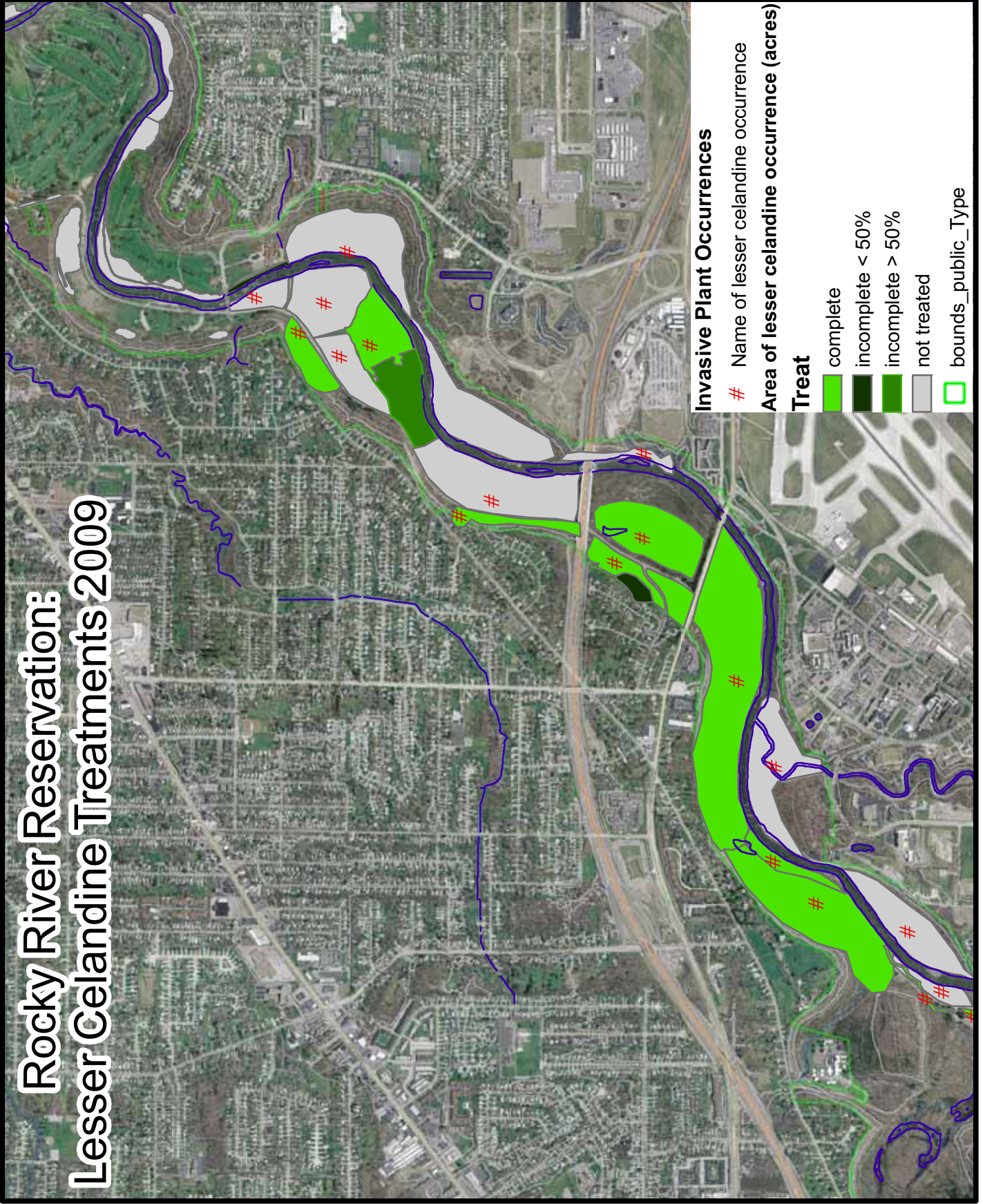
Weed Occurrence	Area - (acres)	Date	Treatment Coverage	Spray mix (gal)	Product	Concen. % by vol	Person Hours	Notes	Who treated
RR Maint. Hillside		5/4/2009		600	Rodeo	0.02	n/a	Contractor	Davey
		5/5/2009		600	Rodeo	0.02	n/a	Contractor	Davey
	10.28	5/6/2009	Complete	600	Rodeo	0.02	n/a	Contractor	Davey
RR Nature Center Wildlife Management & Frostville River & Frostville	37.17	4/27/2009	Complete	52	Kleenup Pro	0.05	21.00		Krock
		5/5/2009		175	Razor Pro & Kleenup Pro	0.05	65.50	15 hr call-out staff, 50.5 hr NR staff	strike
Seven Sisters & Seven Sisters River & flagged sites to N & S		5/15/2009		22	Razor Pro Kleenup	0.02	7.50		strike
	44.37	5/18/2009	Complete	2	Pro	0.02	0.50		Krock
		5/12/2009		4	Pro	0.05	2		Krock
	1.11	5/18/2009	I < 50%	2	Pro	0.05	0.65		Krock
Slide area and west valley wall (plus backyards offsite)	5.67	5/3/2009	Complete	3.5	Kleenup Pro	0.05	1.15		Krock
	42.16	4/25/2009	Complete	19	Razor Pro	0.05	16.00		strike
Spafford Ford & Barrett Road Bridle Access	1.26	5/5/2009	I < 50%	16	Razor Pro	0.05	6.50		strike
		4/16/2009		5	Habitat	0.05	3.00		Tyler
Stables River East	1.46	5/6/2009	Complete	1	Habitat	0.05	1.00		Tyler
		5/6/2009	Complete	1	Habitat	0.05	1.00		Tyler
Jackson Field (map 6), Cokebottle Creek (7) & Phone Lot Field (9)	0.78	5/14/2009	Complete	3	Razor Pro	0.02	2.00		strike
	0.62	4/27/2009	Complete	18	Razor Pro	0.05	19.75		strike
Middle Fork Sulfur Springs (map 1)	0.05	5/6/2009	Complete	1	Habitat	0.05	2.00		Tyler
	1.26	5/5/2009	Complete	2	Habitat	0.05	1.00		Tyler

Weed Occurrence	Area - (acres)	Date	Treatment Coverage	Spray mix (gal)	Product	Concen. % by vol	Person Hours	Notes	Who treated
Old Field (map 11 & 12)	3.01	5/14/2009	Complete	5	Habitat	0.05	2.00		Tyler
Wiley Creek Flats (map 4)		4/23/2009	Complete	4	Habitat	0.05	2.00		Tyler
		4/24/2009		8	Habitat	0.05	4.00		Tyler
		5/4/2009		14	Habitat	0.05	6.00		Tyler
		5/5/2009		12	Habitat	0.05	6.00		Tyler
	11.44	5/6/2009	Complete	9	Habitat	0.05	5.00		Tyler
<b>Totals 2009</b>	<b>450.35</b>			<b>3227.5</b>	<b>Average %</b>	<b>0.04</b>	<b>425.28</b>		
			Contractor total	2420.0		48.4		Contractor herbicide (gal.)	
			Metroparks total	807.5		31.4		Metroparks herbicide (gal.)	

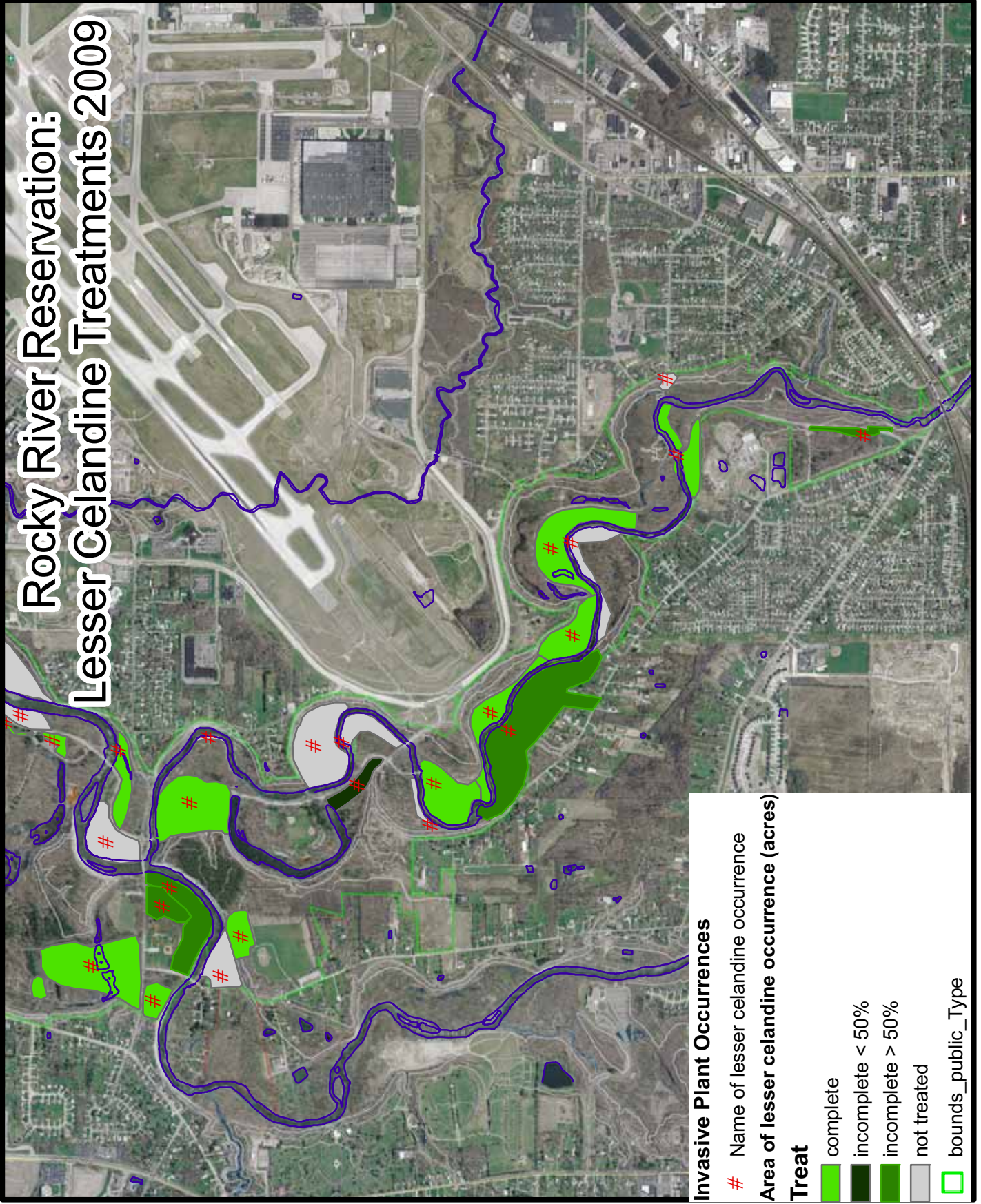
# Lesser Celandine 2009 Big Creek Reservation



# Rocky River Reservation: Lesser Celandine Treatments 2009



# Rocky River Reservation: Lesser Celandine Treatments 2009



**Invasive Plant Occurrences**

- # Name of lesser celandine occurrence

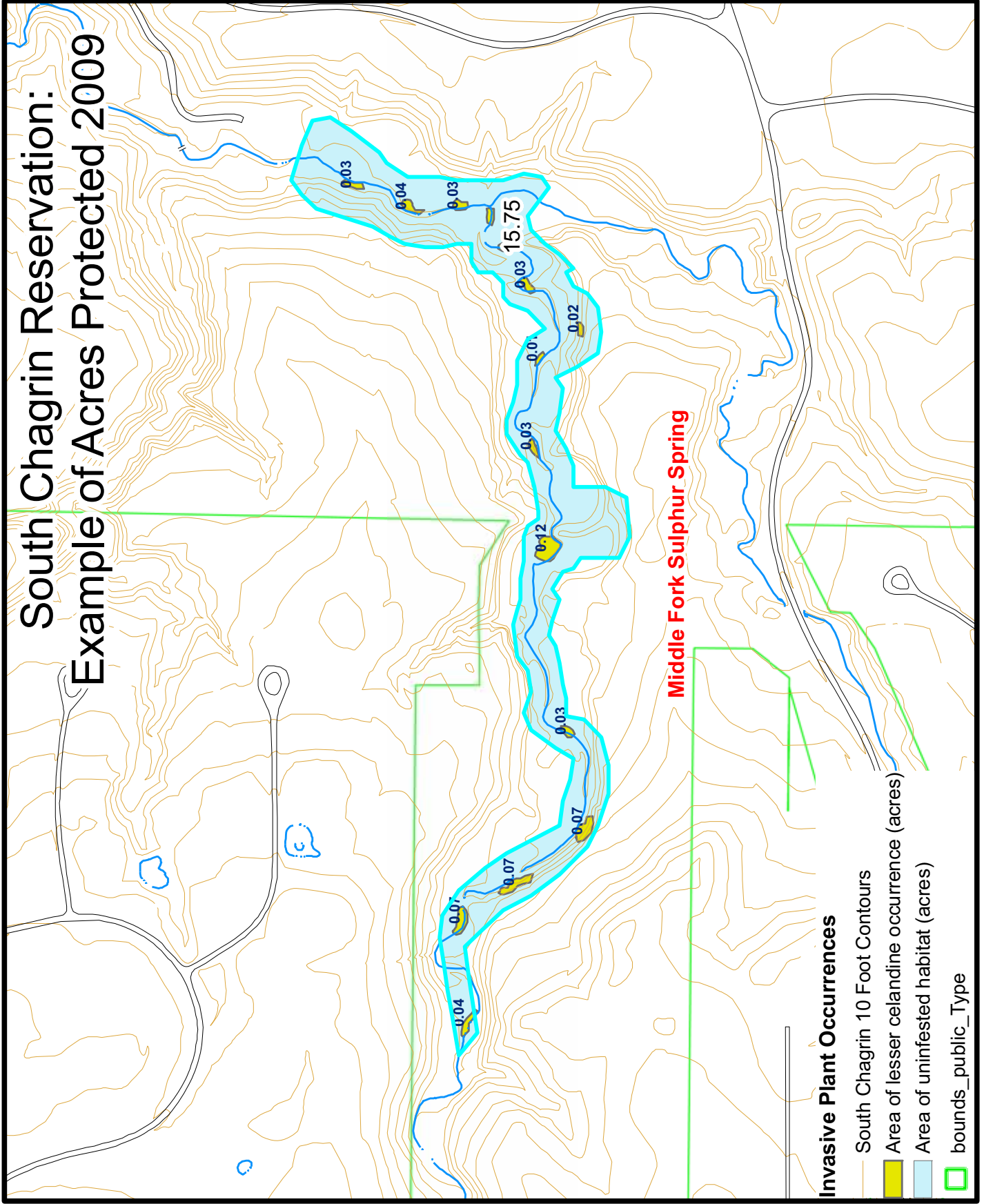
**Area of lesser celandine occurrence (acres)**

**Treat**

- █ complete
- █ incomplete < 50%
- █ incomplete > 50%
- █ not treated
- bounds\_public\_Type



# South Chagrin Reservation: Example of Acres Protected 2009

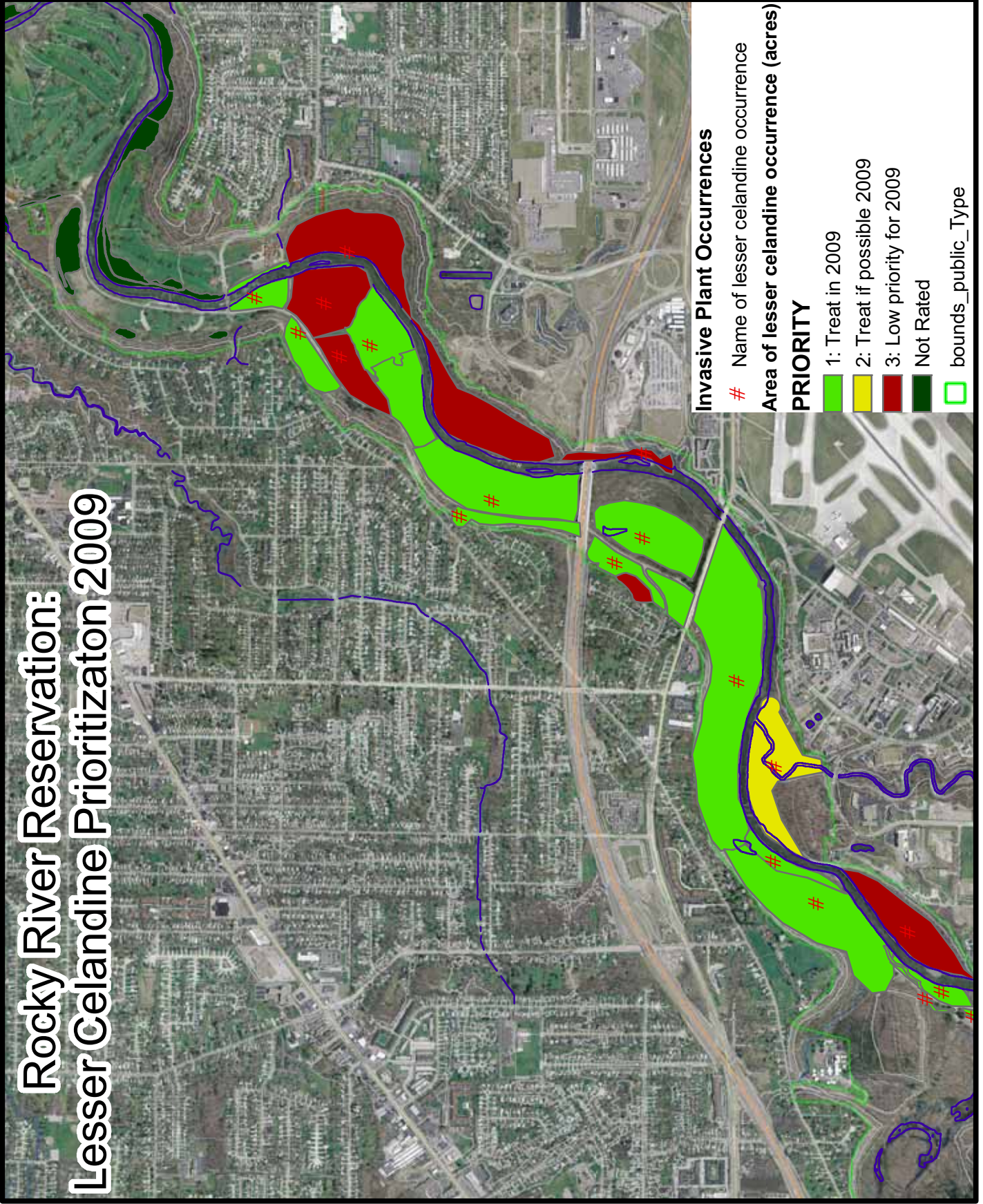


## Invasive Plant Occurrences

- South Chagrin 10 Foot Contours
- Area of lesser celandine occurrence (acres)
- Area of uninhabited habitat (acres)
- bounds\_public\_Type



# Rocky River Reservation: Lesser Celandine Prioritization 2009



# Rocky River Reservation: Lesser Celandine Prioritization 2009

