

Workplan for Lesser celandine (*Ranunculus ficaria*) control in Rocky River Reservation v. 1.0

Cleveland Metroparks Technical Report 2008/NR-05



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1.0 THE LESSER CELANDINE CRISIS IN ROCKY RIVER RESERVATION

Lesser celadine has been observed in nearly every reservation of Cleveland Metroparks but, to date, has been able to be controlled with existing levels of management everywhere except Rocky River Reservation. Coverage of primary lesser celandine infestations in Rocky River Reservation was visually estimated by Natural Resource staff in spring 2008. The visual estimates focused on forests and wetlands with coverages of lesser celandine >50% and should be considered a very conservative underestimate.

A total of 183 acres of forest and wetland within Rocky River have been identified as having lesser celandine coverage >50% (7.1% of the reservation) (See attached maps of areas from Puritas Road north). Staff resources precluded a more thorough inventory and mapping of celandine but it is known that lesser celandine infests mowed fields, lawns and mowed margins of the Valley Parkway and the All Purpose Trail (APT) within the park. Smaller stands south of the Puritas road and in Mill Stream Run Reservation have also been identified by Natural Resource Staff. If a more thorough mapping was performed, it is expected that more than 300 acres (~12%) of Rocky River Reservation are infested with lesser celandine.

Rocky River is likely a major source for the spread of lesser celandine to other locations in northeast Ohio and the midwest given its popularity as a fishing, walking, hiking, and riding location. If unchecked, lesser celandine will continue spreading and the spring flora of Rocky River will be largely destroyed.

2.0 BIOLOGY AND CONTROL OF LESSER CELANDINE

Lesser celandine is perennial, low-growing plant (4 to 11 in tall) with attractive, bright yellow flowers. It is a native of Eurasia and was brought to North America as a colorful spring garden perennial. It grows in full shade to full sun and prefers moist to wet soils but it does not tolerate being under water for any length of time. In Rocky River reservation it appears to be most abundant in wetlands and valley bottoms but is also found on steep slopes and valley walls. Lesser celadine appears to have entered Rocky River Reservation from 1970s era plantings at two houses north of Puritas Road (Krock, personal communication).

Lesser celandine is a member of the buttercup family (Ranunculaceae). In winter to early spring (December to March), seeds can germinate and existing plants can send up leaves from their thick cluster of small tuber-like roots. In Rocky River Reservation, lesser celandine blooms in mid- to late-April or early May and sets seeds and dies back by June. By summer it completely disappears except for the tuberous roots which can be observed at the surface as soils dry (see photo on cover). Initial establishment is probably by seed although roots can be carried in boots, horse hooves, mower decks and equipment tires. Once established, expansion is probably vegetative with large clonal stands forming monocultures that completely crowd out native forest floor plants.

The plant does not appear to be well studied and much remains to be learned about the best, control methods. Experience controlling the plant by the Natural Resources department indicates that glyphosate-based herbicides (Round-upTM, RodeoTM) can effectively destroy large infestations over several years (Krock, personal

communication). The main practical limitation on control is the relatively short window (14-21 days) in which to apply herbicides such that they are translocated to the root system of the plant. Pre-bloom or late post-bloom application of glyphosate-based products do not appear to be as effective in killing the plant (Krock, personal communication). Other herbicides (e.g Habitat™) appear to be more effective pre- and post-blooming (Tyler, personal communication). Cloud cover and rain can also limit the number of days when herbicides can be effectively applied. From a practical man-power perspective, the period when control is most effective coincides with a very busy period at for Cleveland Metroparks staff as the parks are readied for summer usage. Applied research, with the goal of determining how to extend the period of effective control, is planned for 2009 and 2010.

3.0 APPROACH FOR INVASIVE PLANT MANAGEMENT AT CLEVELAND METROPARKS

The *Invasive Plant Management Program (IPMP) for Cleveland Metroparks v. 1.0* adopts and implements an early detection-early control (ED-EC) approach, so that invasive plants can be managed in a "day-to-day" maintenance mode with existing Cleveland Metroparks financial and staff resources. To implement this approach at Cleveland Metroparks, a combination of volunteer, full-time and seasonal staff will find and control infestations of invasive plants before they can expand. However, at many reservations with existing large scale infestations, separate multi-year programs will need to be implemented before "maintenance-mode" ED-EC program will be possible.

Recon Teams comprised primarily of volunteers will be recruited for each reservation and assigned to a geographic area. They will be equipped with low cost GPS units and high resolution maps. Several times a year, the recon teams will be asked to physically survey their assigned area and report back with locations of invasive plants. These problem areas will then be assigned to Strike Teams comprised primarily of full time and seasonal park staff. The Strike Team will visit these locations and perform invasive plant control. Strike Teams are designed to focus on infestations of 1-2 acres or less. Larger infestations will be approached with separate focused campaigns until they are controlled. Control of larger infestations of lesser celandine will require a coordinated effort of Recon and Strike Team efforts and an outside contractor.

After the initial population identification, a schedule will be developed, on a week-by-week basis, for the eradication of lesser celandine in Rocky River Reservation. This schedule will be developed by the Area, Park Managers and Nature Center Managers in consultation with the Recon and Strike Teams and will be dictated by three primary factors: 1) phenology of each species and identification of most effective time periods during growing season in which to perform control treatments; 2) distribution and abundance of each population at a given location; and 3) weather.

A management treatment will be delivered to each population of lesser celandine based upon the best available scientific information. The Strike Teams and contractors will proceed through each reservation in a careful, systematic way, ensuring that no, or few, target plants are missed. Some treatments may require several different techniques

delivered over the course of a month or more. The success of management techniques will be monitored during the year in which it was implemented and in subsequent years.

The controlling lesser celandine in Cleveland Metroparks will require the commitment and involvement across nearly every part of the Cleveland Metroparks organization. **Table 1** outlines primary organizational tasks. These are discussed in more detail below.

Table 1. Organizational responsibilities for Invasive Plant Management Program for Cleveland Metroparks

division	responsibilities
Contractor(s)	Large-scale herbicide application (generally areas >1ac or that would require >1 day of staff time to apply herbicide to)
Golf Services	Mapping and control of invasive plants within golf courses, adjust mowing program in spring to limit lesser celandine spread in Rocky River, change equipment cleaning practices to limit spread of seed and roots, quarantine of equipment from Rocky River golf courses to limit spread of lesser celandine
Human Resources - Volunteer Coord.	Provide coordination of volunteers for Invasive Plant Recon Teams (IPRCs)
Legal	Research legal issues associated with controlling invasive plants on land adjacent to metroparks
Marketing	Outreach and contact to neighbors about program and spraying of plants outside park
Natural Resources	Overall project management, staff and oversee invasive plant strike teams (IPSTs) training and coordination of recon and strike team, oversight of contractors, mapping and planning, research
Outdoor Education	Interpretation of program, Nature Center assistance with volunteer recon teams
Park Operations	Mapping and control of invasive plants within golf courses, adjust mowing program in spring to limit lesser celandine spread in Rocky River, change equipment cleaning practices to limit spread of seed and roots, quarantine of equipment from Rocky River golf courses to limit spread of lesser celandine
Planning	planning, GIS support, mapping, aerial interpretation
Visual Communications	change equipment cleaning practices to limit spread of seed and roots, quarantine of equipment from Rocky River golf courses to limit spread of lesser celandine
Volunteers	Staff invasive plant recon teams (IPRCs), perform on-the-ground identification of new infestations

3.1 *Natural Resources and Planning*

The Divisions of Natural Resources and Planning will be responsible for day to day oversight and technical and scientific direction of the invasive plant management program. Oversight and coordination of invasive plant recon and strike teams will be performed by Natural Resource Area Managers. Oversight and coordination of mapping of invasive plants will be performed by the Division of Planning.

3.2 *Park Operations*

The Division of Park Operations will be responsible for the day-to-day management of invasive plant strike teams staffed by full time and seasonal Park Operations staff and coordination of invasive plant management activities with the Natural Resource and Planning Divisions.

3.3 *Outdoor Education and Visual Communications*

The Division of Outdoor Education will be responsible for the interpretation of the Invasive Plant Management Program. Interpreting the need for invasive plant management, the use of chemical herbicides, the scale of the problem with Cleveland Metroparks, the need for volunteers to implement the program, among other things, is a critical part of an integrated invasive plant program. Nature Center managers are also in a key position to effect understanding in the greater public, leverage existing volunteer networks, aid in invasive plant control by full-time staff, and identify and monitor existing and new invasive plant infestations.

3.4 *Volunteer Services*

The Cleveland Metroparks volunteer coordinator in the Division of Marketing and Golf Services will play key role with coordinating the large number of volunteers needed to perform invasive plant reconnaissance and mapping activities.

3.5 *Golf Services*

Invasive plants are present within golf courses owned and managed by Cleveland Metroparks. In particular, lesser celandine control in Rocky River Reservation will require the active involvement of Little and Big Met and Mastick Woods Golf Courses. Given the constant attention required to maintain the golf course areas, active management to control invasive plants and minimize secondary natural resource damage is required indefinitely.

3.5 *Zoo*

The horticultural (Don Krock) and facility operation staff of the Zoo have been under-taking invasive plant control for over 5 years within and in the nearby environs of the Cleveland Metroparks Zoo. Substantial gains have been made in eradicating invasive plants from the Zoo. It is recommended that Zoo staff be responsible for continued invasive plant management at the Zoo and within Brookside Reservation and surrounding areas in lower Mill Creek watershed.

4.0 5 Year Workplan for Lesser Celandine Control in Rocky River Reservation.

Table 2 outlines a 5 year workplan to eradicate or control lesser celandine in Rocky River Reservation. The basic approach is to proceed south to north (upstream to downstream). The plan is set up for initial control efforts to occur in the least infested zone of Bagley Road to Puritas. This will allow the new established procedures and teams to “work the kinks” out of the program and procedures before tackling the major infestations north of Puritas.

Once a Zone is initially attacked, mop up work will occur in that zone for the two following years, while the main attack shifts north to the next zone of the lesser celadine campaign. The goal is to get a treated zone to a low level of infestation by the third year such that an early-detection/early control program will be sufficient to keep lesser celandine from reinfesting that area. As control is achieved in zones over the 5 years, the schedule collapses the zones into bigger and bigger areas.

The basic campaign is as follows:

In 2009, attack Bagley to Puritas zone, with recon and strike teams handling smaller infestations south of Brookway and a contractor handling larger infestations between Brookway and Puritas.

In 2010, use recon and strike teams to mop up remaining infestations in all Bagley to Puritas zones unless areas >1 acre remain, in which case the contractor will be sent back to reattack those areas. The main focus on the attack will be from Puritas to Old Lorain Road zone, with the contractor attacking the many large infestations in that area.

In 2011, the Bagley to Brookway zones will shift to early detection/early control and mop up work will occur in the Brookway to Puritas and Puritas to Old Lorain zones. The Old Lorain to Rockcliff zone will be the focus of the main attack in 2011, using a contractor for the large infestations in this area.

In 2012, all zones from Bagley to Puritas will shift to early detection/early control using recon and strike teams. Mop up activity will continue in the Puritas to Old Lorain Zone and Mop up will start in the Old Lorain to Rockcliff zone. The main area of attack in 2012 will be the Rockcliff to Marina zone.

In 2012, all zones from Bagley to Old Lorain will shift to early detection/early control. Mop up activity will occur in the Old Lorain to Rockcliff and Rockcliff to Marina zones.

In 2013, all zones except Rockcliff to the Marina will be in early detection/early control mode.

Final mop up of any remaining large infestations will occur in 2014 with the entire park shifting to early detection/early control mode in 2015.

Table 2. Five year workplan for lesser celandine control in Rocky River Reservation.

year	Zone(s)	Activity
2009	All zones	<ul style="list-style-type: none"> • Initiate equipment quarantine and disinfection procedures • Adjust mowing program as needed to facilitate control • Initiate Public Education program (signs, interpretation at RRNC, outreach to fishing and riding communities, contact adjoining neighbors, etc.) • Complete training and organization of Recon and Strike teams • Finalize contract with herbicide applicator • Locate and eradicate infestations using Recon and Strike Teams
	Bagley to Cedar Point (estimated <1 acre)	<ul style="list-style-type: none"> • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway • Locate and eradicate infestations using Recon and Strike Teams
	Cedar Point to Brookway (estimated <5 acres)	<ul style="list-style-type: none"> • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway • Locate and eradicate infestations using Recon and Strike Teams
	Brookway to Puritas (estimated 20 acres)	<ul style="list-style-type: none"> - >1 ac or more than 1 day by contractor - small stands by Strike Teams • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway • Locate and eradicate infestations using Recon and Strike Teams, spray APT and parkway as needed
2010	Bagley to Cedar Point	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2009 • Locate and eradicate infestations using Recon and Strike Teams, spray APT and parkway as needed
	Cedar Point to Brookway	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2009 • Locate and eradicate infestations using Recon and Strike Teams, spray APT and parkway as needed
	Brookway to Puritas	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2009 • Control infestations on east side of Rocky River from Puritas to Old Lorain Road • Control infestations on west and east sides of Valley Parkway from Puritas to Old Lorain Road
	Puritas to Old Lorain (~65 acres mapped)	<ul style="list-style-type: none"> • Adjust spring mowing schedules in order to identify and spray celandine in Sycamore and North Mastick Picnic areas • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway
	Old Lorain to Rockcliff	<ul style="list-style-type: none"> • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway
2011	Rockcliff to Marina	None
	Bagley to Brookway	<ul style="list-style-type: none"> • Locate and eradicate infestations using Recon and Strike

	Brookway to Puritas	<ul style="list-style-type: none"> Teams, spray APT and parkway as needed • Locate and eradicate infestations using Recon and Strike Teams, spray APT and parkway as needed
	Puritas to Old Lorain	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2010 • Locate and eradicate infestations using Recon and Strike Teams, spray APT, parkway mowed fields as needed
	Old Lorain to Rockcliff (~100 acres mapped)	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2010 • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT, Valley Parkway and mowed fields
	Rockcliff to Marina	<ul style="list-style-type: none"> • Control infestations on east and west side of Rocky River from Old Lorain Road to Rockcliff • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway
2012	Bagley to Puritas	<ul style="list-style-type: none"> • Locate and eradicate infestations using Recon and Strike Teams, spray APT and parkway as needed
	Puritas to Old Lorain	<ul style="list-style-type: none"> • Locate and eradicate infestations using Recon and Strike Teams, spray APT, parkway mowed fields as needed
	Old Lorain to Rockcliff	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2011 • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway
	Rockcliff to Marina (~20 acres mapped)	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2011 • Control infestations on east and west side of Rocky River from Rock Cliff to Marina
2013	Bagley to Old Lorain	<ul style="list-style-type: none"> • Locate and eradicate infestations using Recon and Strike Teams, spray APT and parkway as needed
	Old Lorain to Rockcliff	<ul style="list-style-type: none"> • Adjust spring mowing schedules to identify and spray lesser celandine in mowed edges of APT and Valley Parkway
	Rockcliff to Marina (~20 acres mapped)	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2012
2014	Bagley to Marina	<ul style="list-style-type: none"> • Perform mop-up control at larger scale infestations sprayed in 2012 • Locate and eradicate infestations using Recon and Strike Teams, spray APT and parkway as needed
2015	All zones	<ul style="list-style-type: none"> • Perform larger-scale mop-up control as needed • Shift to maintenance and early detection mode using Recon and Strike teams

Celandine In Northern Rocky River Reservation

Map 1



Celandine In Northern Rocky River Reservation

Map 2



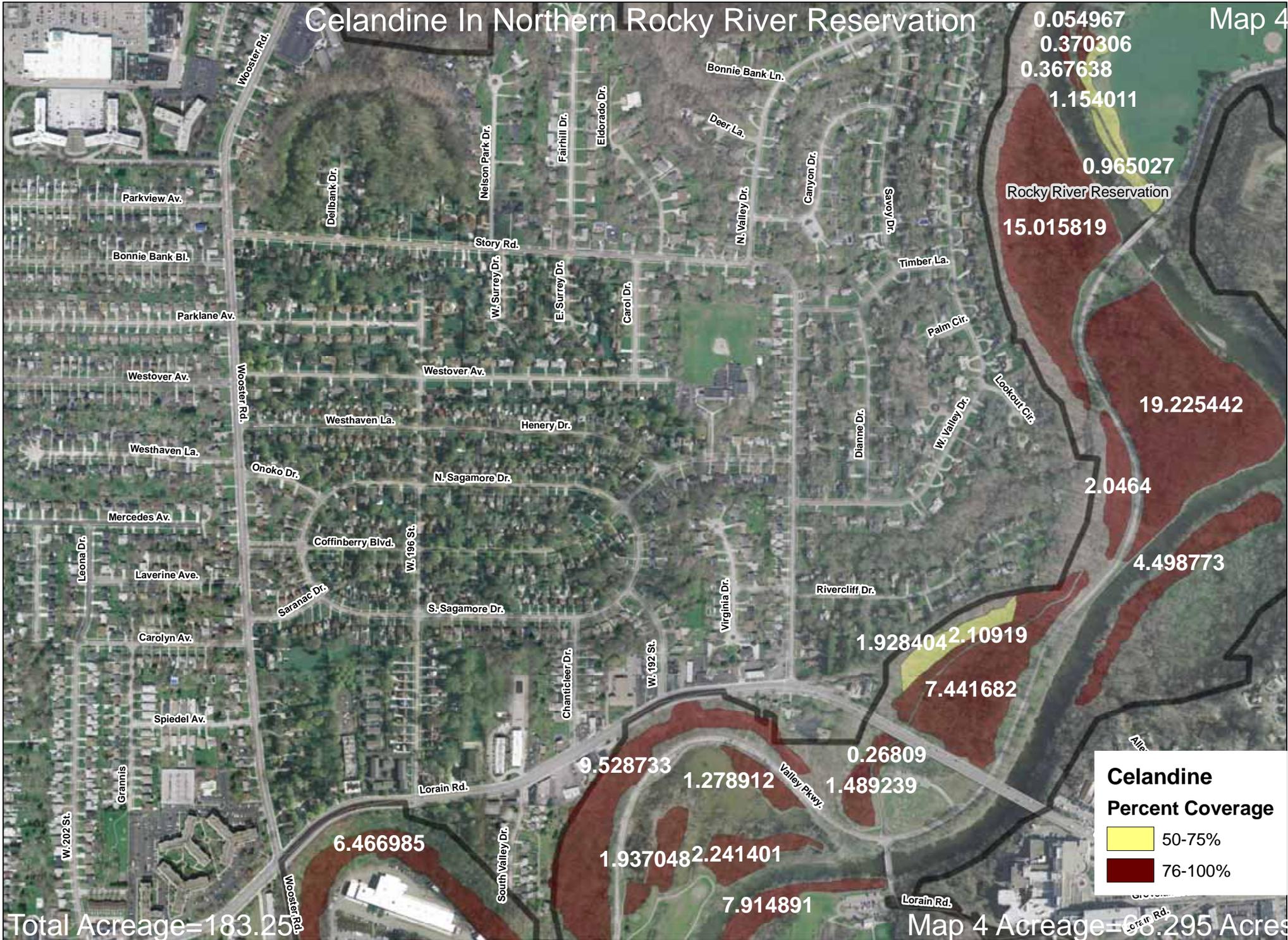
Celandine In Northern Rocky River Reservation

Map 3



Celandine In Northern Rocky River Reservation

Map 4



0.054967
0.370306
0.367638
1.154011

0.965027
15.015819

19.225442

2.0464

4.498773

1.928404
2.10919

7.441682

0.26809
1.489239

9.528733
1.278912

1.937048
2.241401

7.914891

6.466985

