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Prioritizing Control of Lesser Celandine (*Ficaria verna*) in Deciduous Forests in Indianapolis, IN

Lesser celandine (*Ficaria verna*) is an aggressive ephemeral perennial native to Europe and western Asia that invades floodplains and mesic forests. It has been recorded to escape from cultivation throughout the eastern deciduous forest and has become abundant in many riparian areas in the Mid Atlantic, Great Lakes, and Ohio Valley. It emerges earlier than most native vernal flora and forms a dense mat that replaces the less aggressive native spring ephemeral community. Control efforts on floodplains are often unsuccessful due to floodwater transport of upstream propagules. Eco Logic LLC, a local ecological restoration firm, worked with Indy Land Stewardship to set up a treatment and monitoring program to develop an effective strategy for confining the lesser celandine to the low floodplain terraces to prevent it from invading the adjacent uplands.

Keywords

urban forested natural areas, practitioner notes, urban forests, invasive species, forest health, forest restoration

CONTEXT

Lesser celandine has been increasing rapidly in coverage since 2000 in the Indianapolis metropolitan area, particularly along major floodplains. Treatment efforts prior to 2020 consisted of foliar applications of glyphosate and Ecomazapyr in various concentrations early in the blooming period and had unsuccessfully focused on the primary infestations on low floodplain terraces. This failure resulted from propagules in the form of bulbils formed in the leaf axils being continually replenished by floodwaters from upstream. The decision was made to refocus efforts on higher, infrequently flooded terraces and satellite populations in the adjacent uplands. An updated strategy was formulated to treat these infestations and establish permanent monitoring plots to evaluate the efficacy of the treatments. Indy Land Stewardship worked with Eco Logic LLC under their existing stewardship contract to develop this strategy. This project was funded through the stewardship budget provided to Indy Land Stewardship by the Indianapolis Department of Public Works.

GOAL

The goal of this treatment and monitoring program was the development of a successful protocol for eliminating lesser celandine from areas that were not subject to an annual influx of propagules by floodwaters.

APPROACH

Two parks along White River were selected for the revised protocol for monitoring and treatment of lesser celandine. Holliday Park and Marott Park are located on the north side of Indianapolis. Both parks have nearly complete coverage of lesser celandine on the low floodplain terraces. There were also isolated to widespread infestations on the higher floodplain terraces and adjacent uplands. Prior to treatment in 2020, five four-meter square quadrats divided into four one-meter square quadrants were set up in each park in the areas of infestation on the higher terraces and uplands. Each quadrat was monitored for frequency (number of crowns) and percent cover of lesser celandine. A photograph was also taken of each quadrat to document the current stage of infestation. Coverage in 2020 ranged from 20% to 90%, with the number of crowns ranging from 16 to 52 per square meter. Following the monitoring, these areas were treated with 0.5% Ecomazapyr 2 SL and 2% glyphosate 5.4, including with the surrounding woodlands that were prioritized for management.

In 2021 through 2023, when the lesser celandine reached the same stage of growth, the monitoring for frequency and percent cover was repeated. This monitoring showed a high rate of efficacy from the herbicide applications performed in 2020 through 2022. All quadrats showed significant declines in both frequency and percent cover following three years of treatment. Those that started out with less than 50% coverage showed more effective control than those that originally had 60 to 90% coverage.

KEY RESULTS

- All quadrats showed significant declines in both frequency and percent coverage of lesser celandine.
- Average coverage dropped from near 50% in both parks in 2020 to 1–4% in 2023.
- Average number of crowns dropped from 31.5 to 4.35 in Holliday Park and from 19.4 to 1.85 in Marott Park.
- Lesser celandine was completely eradicated from one quadrat in Marott Park.
- Control of Lesser celandine on low floodplain terraces may not be possible if large populations upstream are continually renewing the infestation with propagules transported by floodwaters.
- Practitioners should evaluate the local population and vectors of spread prior to developing a control strategy.



Example of Reductions in lesser celandine Coverage at Marott Park 2020-2023, Quadrant 4 SE. The first photo was taken on 3/17/2020 and the second on 3/09/2023

OPEN QUESTIONS

Although reductions in coverage were immediate and dramatic following the treatment protocol, eradication remains a challenge, as small specimens of lesser celandine remain in most quadrats after three years of treatment. Elsewhere in Indianapolis, a small infestation in one park was totally eradicated after several years of treatment and several upland infestations in another park were eradicated in a similar time frame.

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