BEST MANAGEMENT PRACTICES FOR

Lesser Celandine

in the Metro Vancouver Region

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

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INVASIVE SPECIES COUNCIL OF METRO VANCOUVER

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Introduction

The impacts of invasive species on ecological, human, and economic health are of concern in the Metro Vancouver region. Successful control of invasive species requires concerted and targeted efforts by many players. This document - "**Best Management Practices for Lesser Celandine in the Metro Vancouver Region**" - is one of a series of species-specific guides developed for use by practitioners (e.g., local government staff, crews, project managers, contractors, consultants, developers, stewardship groups, and others who have a role in invasive species management) in the region. Together, these best practices provide a compendium of guidance that has been tested locally by many researchers and operational experts.

Lesser celandine[1], a low-growing invasive perennial buttercup, is native to Northern Africa, temperate Asia and most of Europe (Axtell, DiTommaso, & Post, 2010). Introduced to North America as a garden ornamental in the 1860s, lesser celandine's population surged in the 1990s and it is expected to continue expanding throughout the next century. Its ability to reproduce through tubers, bulblets, and seeds within months after its early emergence enables it to spread aggressively, forming dense mats above and below ground (Axtell, DiTommaso, & Post, 2010). When in bloom, large infestations appear as a green carpet with yellow dots.

Early emerging and short-lived native herbaceous plants are vulnerable to competition from lesser celandine (Washington State Noxious Weed Control Board, 2013). Lesser celandine is toxic to most mammals if ingested, and its sap can cause skin irritation (Cowlitz County Noxious Weed Control Board, 2025) (Axtell, DiTommaso, & Post, 2010).

Many ornamental lesser celandine varieties are available in nurseries across Canada and the United States (Axtell, DiTommaso, & Post, 2010). All varieties are considered invasive in North America (Swearingen, 2005). Lesser celandine is challenging to control due to its multiple reproductive strategies (Cowlitz County Noxious Weed Control Board, 2025).

Academic institutions, government, and non-government organizations continue to study this species in British Columbia. As researchers and practitioners learn more about the biology and control of lesser celandine, it is anticipated that the recommended best management practices will change. This document will be updated to reflect these changes as the information becomes available. Please check **metrovancouver.org** regularly to obtain the most recent version of these best management practices.

REGULATORY STATUS

Although this species is not currently classified as a noxious weed in BC, it is designated as an "invasive plant of concern" in the Province's **Field Guide to Noxious Weeds and Other Selected Invasive Plants of British Columbia**.

1 Lesser celandine (*Ficaria verna*) is also known by the common names fig buttercup, pilewort, figroot buttercup, figwort, bulbous buttercup and small crowfoot (Axtell, DiTommaso, & Post, 2010). It is referred to as 'lesser celandine' in this document. It was previously known as the scientific name *Ranunculus ficaria*. Five subspecies have been identified in Europe and North America, however broad variations and overlap across the subspecies in bulblet presence, leaf stalk length, flower diameter, and petal length make them difficult to distinguish (Post, Krings, Wall, & Neal, 2009). All subspecies and cultivars are considered invasive in North America, and expanding their ranges at similar rates (Post, Krings, Wall, & Neal, 2009).

IMPACTS

Indigenous Peoples have an intrinsic relationship with the natural world, built on reciprocity and stewardship. Many native plants and animals have cultural and spiritual significance for Indigenous Peoples, in addition to being important food and medicine sources. Indigenous communities in British Columbia have collectively called for invasive species prevention, management, and control due to their impact on infrastructure, the economy, human health, ecosystems, and cultural practices. Further collaboration with Indigenous Peoples will deepen our understanding about the impacts of invasive species, such as lesser celandine, on Indigenous ways of life and our shared environment.

Lesser celandine forms dense groundcover infestations that compete with native plants, especially understory species with a similar early season life cycle (Washington State Noxious Weed Control Board, 2013). Even after leaf die-back in June, the dense underground network of roots and tubers persist, inhibiting the sprouting and growth of other plants. Lesser celandine exhibits allelopathic tendencies. Laboratory and greenhouse studies have demonstrated that compounds extracted from lesser celandine can inhibit the growth, flowering, and germination of other plant species (Cipollini, Titus, & Wagner, 2012). Lesser celandine may also alter soil conditions that negatively impact native plants even after its growing season has ended (Cipollini & Schradin, 2011). These impacts on native plants may have negative consequences for wildlife (Washington State Noxious Weed Control Board, 2013).

Fresh plant parts contain protoanemonin, a chemical that is poisonous for most mammals to ingest, including humans; although it makes livestock sick, it rarely causes death (Cowlitz County Noxious Weed Control Board, 2025). The sap can cause skin irritation (Washington State Noxious Weed Control Board, 2013). Dead plants pose no risk (Axtell, DiTommaso, & Post, 2010).

The tuberous and bulbous root system of lesser celandine make control very difficult (Oregon Department of Agriculture, 2025). After seeding, the above-ground portions of lesser celandine die back, leaving bare ground that is susceptible to invasion by other invasive plants and weeds (Axtell, DiTommaso, & Post, 2010). It invades turf, outcompeting desirable grass species (Axtell, DiTommaso, & Post, 2010). After its brief growing season, it leaves gaps in turf that are costly to manage (Yong, 2025).

REPRODUCTION AND SPREAD

Lesser celandine reproduces vegetatively, forming dense monocultures early in the spring, and all the subspecies produce viable seeds except *Ranunculus ficaria subspp. Bulbilifer* (Post, Krings, Wall, & Neal, 2009). When disturbed, the plants invest more heavily in seed production (Kermack & Rauschert, 2019).

After flowering, some lesser celandine subspecies produce bulblets (aerial bulbs formed on the stems, also called bulbils). Some populations have shown a low seed production is inversely related to bulblet production (Kermack & Rauschert, 2019). Bulblets are easily dislodged from the leaf stalks, remaining on the ground after the plant has died (Cornell Cooperative Extension of Oneida County, 2012). Lesser celandine produces dense networks of roots and tubers (bulbous underground roots). Tubers and bulblets can grow into new plants once separated from the parent plant (Washington State Noxious Weed Control Board, 2013).

Bulblets, roots, and tubers can be easily spread by mowing, disturbance or movement of soil, digging by people and animals, and water/flooding (Yong, 2025) (Axtell, DiTommaso, & Post, 2010). Digging animals, such as moles, contribute to the spread by breaking tubers and moving them in soil (Tualatin Watershed Invasive Species Team, 2024). Lesser celandine can escape from gardens and private property (Oregon Department of Agriculture, 2025) or be introduced from contaminated compost and soil (Oregon Department of Agriculture, 2025).

Lesser celandine growing in a garden

CREDIT: ISCMV

HABITAT AND DISTRIBUTION

Lesser celandine has a short growing season and begins to die back above 20 °C (Axtell, DiTommaso, & Post, 2010). It is common in moist environments such as ditches, streambanks, floodplains, ponds, marshes, and bogs (Axtell, DiTommaso, & Post, 2010). Lesser celandine also grows in a variety of disturbed and undisturbed sites, including established lawns, gardens and landscaped areas, forests, fields, waste areas and roadsides, and thrives in irrigated areas where natural moisture is lacking (Axtell, DiTommaso, & Post, 2010). Soils with low sand content support higher density growth and increased tuber and bulblet production (Kermack & Rauschert, 2019). Lesser celandine favours flat sites and is less common on slopes. It prefers shaded areas but can grow in full sun if moisture is sufficient.

This species is becoming more widespread in the northern United States and southern Canada (Axtell, DiTommaso, & Post, 2010). It is documented in 23 US states and across parts of Canada, including British Columbia, Newfoundland, Ontario and Quebec (Washington State Noxious Weed Control Board, 2013). In the Pacific Northwest, it occurs in higher densities west of the coastal mountain ranges (Cowlitz County Noxious Weed Control Board, 2025). In Whatcom County, adjacent to the Canadian-American border south of Metro Vancouver, lesser celandine is present in most urban creeks and parks (Washington State Noxious Weed Control Board, 2013). While not considered widespread in the Metro Vancouver region, it has been detected in nearly every municipality, with a high concentration in the City of Vancouver. It has also been found in the Fraser Valley and southern Vancouver Island.

CLIMATE CHANGE ADAPTATION

Climate models predict that the Metro Vancouver region will experience warmer temperatures; a decrease in snowpack; longer dry spells in summer months; more precipitation in autumn, winter, and spring; more intense extreme events; and an extended growing season. In the past, our region had an average of 252 days in the growing season. At lower elevations, 45 days will be added to the growing season by the 2050s, and 56 days by the 2080s, resulting in nearly a year-round growing season of 357 days on average. In higher elevation ecosystems the growing season length will increase by 50% to 325 days by the 2080s (Metro Vancouver, 2016). These changes will stress many sensitive ecosystems, increasing their vulnerability to competition from invasive species.

Lesser celandine's ability to survive in a variety of soil conditions and habitats will likely influence its capacity to adapt to future climate changes. It is speculated that this plant may benefit from our future climate in several ways:

- **Early growing season:** Lesser celandine has an early and brief growing season, emerging in late December to January, thus avoiding higher temperatures and drought conditions more typical of the summer months (Whatcom County Noxious Weed Board, 2025). It can even germinate in winter conditions under the snow (Kermack & Rauschert, 2019). Early emergence gives lesser celandine a competitive edge against later-emerging native plants and ornamentals.
- **Increased precipitation and flooding:** Tubers and bulblets can spread by floodwaters and heavy rain (Cowlitz County Noxious Weed Control Board, 2025) (Tualatin Watershed Invasive Species Team, 2024). Bulblet production is higher in lesser celandine plants growing along riverbanks (Kermack & Rauschert, 2019). Rivers and waterbodies that flood regularly should be prioritized for lesser celandine management (Kermack & Rauschert, 2019).

With these kinds of competitive advantages, this species is more adaptable than native species in a variety of ecosystems, suggesting that it will be able to withstand, and possibly thrive in changing climate conditions.

Identification

Unless otherwise noted, the following identification information was collected from Axtell, DiTommaso, & Post, 2010; Cowlitz County Noxious Weed Control Board, 2025; and Washington State Noxious Weed Control Board, 2013.

Lifecycle: Perennial herb, emerging from December to February, forming mounded rosettes with basil and stem leaves; low growing, up to 40 centimetres tall; becomes dormant by June when temperatures reach 20°C.

Stems: Stems are succulent, 10-30 centimetres tall for leafy stems and slightly taller for flowering stems. Small, pale, spherical bulblets (also called bulbils) may form in leaf axils (the space where leaf stalks grow from the stem), and may not be visible until late in the flowering period. Easily dislodged, 0-18 bulblets are produced per season (Kermack & Rauschert, 2019). Lesser celandine's bulblets have the highest germination rate among bulbet-producing herbaceous forest understory plants.

Leaves: Thick, shiny, smooth leaves are kidney to heart-shaped, 4-9 centimetres long and 4-8 centimetres wide. Basal leaves have longer petioles than stem leaves. Leaves are dark green, often paler underneath, sometimes mottled, with smooth or round-toothed edges (Cascadia Prairie-Oak Partnership, 2019).

Flowers: Solitary, symmetrical, glossy flowers typically 2-3 centimetres wide, but up to 6 centimetres; 6-26 petals (averaging 8-10) and 3-4 green sepals. Petal colour varies by cultivar, ranging from yellow (most typical) to white or orange, with a slightly darker centre (Whatcom County Noxious Weed Board, 2025). A double-flowered variety has up to 60 petals. Blooms in late winter/early spring (March to May). Flowers fade to white with age. Flowering stems extending beyond the leaves.

Fruits: Small, green, globular shaped clusters of achenes (seed capsules), each 3-4 millimetres long containing a single seed (Cascadia Prairie-Oak Partnership, 2019). All subspecies produce viable seeds except *Ranunculus ficaria subspp. bulbilifer* (Post, Krings, Wall, & Neal, 2009). Seeds are not fully mature when released and continue to ripen where they land.

Roots: Fibrous roots with small, gray, club-shaped tubers interspersed. Tubers grow up to 8 centimetres long, resembling tiny sweet potatoes (Tualatin Watershed Invasive Species Team, 2024). Plants produce 1-11 tubers each growing season (Kermack & Rauschert, 2019).

The following photos show lesser celandine plant parts.

Leaves forming a rosette

CREDIT: ISCMV

Bottom and top sides of leaves

CREDIT: ISCMV

Flower

CREDIT: ISCMV

Cluster of achenes with seeds inside

CREDIT: L. J. MEHRHOFF, UNIVERSITY OF CONNECTICUT, **BUGWOOD.ORG**

Roots and tubers

CREDIT: ISCMV

Bulblets forming in the leaf axils

CREDIT: WISCONSIN FIRST DETECTOR NETWORK

SIMILAR SPECIES

The species most commonly mistaken for lesser celandine are listed below.

NATIVE SPECIES

- **Marsh Marigold (*Caltha palustris*)**, a native perennial found in wet environments, is most commonly mistaken for lesser celandine (Axtell, DiTommaso, & Post, 2010). It belongs to the same plant family as lesser celandine (*Ranunculaceae*). Marsh marigold lacks true petals and only has 5 petal-like sepals. Flowers bloom in clusters later in the season (July to August) (Cascadia Prairie-Oak Partnership, 2019). Prior to flowering, the best way to distinguish between marsh marigold and lesser celandine is to inspect the root system (Axtell, DiTommaso, & Post, 2010). Marsh marigold does not produce tubers or bulblets, and has short, fleshy roots (Washington State Noxious Weed Control Board, 2013). Marsh marigold also does not grow in continuous mats like lesser celandine (Tualatin Watershed Invasive Species Team, 2024).
- **White marsh marigold (*Caltha leptosepala*)** is a perennial herb with thick stems 5-40 centimetres tall (Klinkenberg, 2020). Basal leaves are waxy, green, egg- to kidney-shaped, 2-12 centimetres long with toothed edges and long stalks. White or green flowers 2-4 centimetres wide are solitary or in pairs and bloom in the late spring. White Marsh marigold is common in moist habitats such as meadows, bogs and streambanks in BC west of the coastal mountains (Klinkenberg, 2020).
- **Violets/pansies (*Viola* species)** have similar sizes, spreading tendencies, and leaf shapes as lesser celandine. Violet flowers are easy to distinguish with 5 petals, the lower petal with a pouched spur, and the lower 3 petals usually with thin, purplish, vertical markings (Klinkenberg, 2020). Flowers are yellow, white, or blueish-purple to pink.

Marsh marigold

CREDIT: L. J. S. KATOVICH, **BUGWOOD.ORG**

White marsh marigold

CREDIT: D. POWELL, USDA FOREST SERVICE (RETIRED), **BUGWOOD.ORG**

Trailing yellow violet (*Viola sempervirens*)

CREDIT: N. TURLAND, FLICKR

NON NATIVE SPECIES

- **Ground ivy/creeping Charlie (*Glechoma hederacea*)** smells like mint when crushed. Leaves are hairy on the surface and grow along runners, not in rosettes. Leaf stems are attached to the middle of the leaf and purple-blue, funnel-shaped flowers grow in clusters (Anderson, 2012).
- **Creeping buttercup (*Ranunculus repens*)** is invasive throughout the Metro Vancouver region, and commonly grows alongside lesser celandine. It is a perennial herb with multiple erect and creeping stems, and many slender, fibrous white roots (Klinkenberg, 2020). Alternate leaves on stalks 40 centimetres long have 3 parts; leaflets are lobed and have pale spots at the base between lobes. One to a few yellow flowers grow at the ends of 15 centimetre long stems. Flowers usually have five petals, sometimes 6-9 or more. In Metro Vancouver, it is common in moist to wet lawns and borders, fields, roadsides and ditches (Klinkenberg, 2020).
- **Greater Celandine (*Chelidonium majus*)**, a member of the poppy family (*Papaveraceae*), is not related to lesser celandine (Cornell Cooperative Extension of Oneida County, 2012). Introduced to North America from Europe as a herbal medicine, it is sold as an ornamental plant (Tree Canada, 2025). This upright annual shrub grows 0.6-1 metres tall and has deeply lobed leaves and bright yellow flowers with four petals (Cornell Cooperative Extension of Oneida County, 2012). It produces numerous small black seeds that are dispersed by ants (Cornell Cooperative Extension of Oneida County, 2012). Greater celandine thrives in moist soils and may occupy similar habitats as lesser celandine, but it is rarely found in southern BC (Klinkenberg, 2020). Its shallow root system makes it easy to remove, but like lesser celandine, all greater celandine plant parts are toxic (Cornell Cooperative Extension of Oneida County, 2012). Although greater celandine is not currently classified as a noxious weed in BC, it is designated as an "invasive plant of concern" in the Province's **Field Guide to Noxious Weeds and Other Selected Invasive Plants of British Columbia**.

Ground ivy leaves

CREDIT: B. ACKLEY, OHIO STATE UNIVERSITY, **BUGWOOD.ORG**

Creeping buttercup leaves and flower

CREDIT: ISCMV

Greater celandine

CREDIT: K. PIHLAVIITA, FLICKR

Tracking

The provincial government maintains **InvasivesBC**, an invasive species database, map and mobile data collection application available for use by all land managers, contractors, government agencies and non-profit organizations completing surveys and/or management activities on invasive species in BC. InvasivesBC contains invasive species occurrence, treatment, and monitoring records for the entire province. The data can be searched using many criteria, and exported into a variety of summary reports. An active BC Public Service IDIR or Business BCEID is required to request access to the database. Many agencies, including local governments, have their own internal invasive species inventory and mapping protocols that are used by staff, contractors, and, in some cases, the public. For example, the City of North Vancouver has its own system called AlienMap.

When tracking lesser celandine, it is helpful to know that leaves will emerge in late December to February (Whatcom County Noxious Weed Board, 2025). It is one of the first herbaceous plants to emerge in the Metro Vancouver region. Lesser celandine is easily detected in turf grass because the leaves appear darker, glossy, and much wider than blades of grass (Yong, 2025). From June to December, when the plant has died back, sites may be identified from the gaps in vegetation and bulblets on the soil surface (Oregon State University, 2022).

When carrying out a lesser celandine inventory it is useful to record the following information as it will later inform treatment plans:

- Size and density of infestation;
- Location in relation to the 10-metre Pesticide-Free Zone adjacent to water courses;
- Location in relation to other water sources, such as wells;
- Whether it is growing around desired vegetation or structures.

Reporting

Due to the health hazard posed by lesser celandine found in public spaces, it is advisable to report known or suspected infestations. Please report lesser celandine occurrences to:

- The Provincial Report Invasive Species program (via smart phone app **gov.bc.ca/invasive-species**).
- The Invasive Species Council of Metro Vancouver: 604-880-8358 or **iscmv.ca**.
- The municipality where the lesser celandine was found.
- The landowner directly – If the landowner is unknown, the **Invasive Species Council of Metro Vancouver** can provide support to identify the appropriate authority.

Reports submitted through these channels are reviewed by invasive species specialists who coordinate follow-up activities when necessary with the appropriate local authorities. However, some people may be hesitant to report infestations as their presence may affect property values.

Many species identification apps are available for mobile devices. Some apps allow users to record observations and participate in community science projects. For example, reports made on the online public platform **iNaturalist** may be used by government and community groups to track sightings and distributions of high priority invasive species. The Invasive Species Council of Metro Vancouver maintains a **list of available apps** for identifying native and/or invasive species.

Prevention and Control Strategies

Effective invasive plant management may include a variety of control techniques ranging from prevention, chemical, manual, mechanical, biological, and/or cultural methods. Each method is described below in order of effectiveness. Early identification and timely management planning are key to preventing the spread of lesser celandine. Its early seasonal growth creates a narrow window for effective control, requiring action immediately after snowmelt or winter conditions (Yong, 2025). To manage it successfully, plans must be in place by late winter, with contractors and staff ready earlier than usual for other spring emergent invasive plants (Yong, 2025).

Whatever method is used, persistence will be required since lesser celandine spreads easily by vegetative methods (Washington State Noxious Weed Control Board, 2013). Once established, it becomes difficult to control. Management should focus on populations with high reproductive output (mainly bulblets) (Kermack & Rauschert, 2019). Areas prone to frequent flooding, such as riparian areas, should also be prioritized. Control efforts should also target sites where people or animals may easily come in contact with the plants.

STRATEGY COLOUR LEGEND

GREEN: RECOMMENDED

ORANGE: CAUTION

RED: NOT RECOMMENDED OR NOT AVAILABLE

HANDLING LESSER CELANDINE SAFELY

Since lesser celandine is toxic to touch and ingest, personal protective equipment (PPE) should be used to reduce the risk of harm to workers. When handling lesser celandine plants protective gloves should be worn (Tualatin Watershed Invasive Species Team, 2024). Wash hands thoroughly after management activities and before eating. After use, gloves and clothing should be disposed or laundered.

Due to the safety concerns, and high risk of spread, this plant is not suitable for community weed pull activities for the general public or school/youth groups. However, experienced volunteers could undertake this work if they have received training on the safety hazards of the plant, have access to appropriate PPE, and are directly supervised by an expert who can advise on best practices and disposal.

PREVENTION: IMPERATIVE

Prevention is the most economical and effective way to reduce the spread of lesser celandine over the long term.

When working in or adjacent to lesser celandine, it is best to inspect and remove plants, plant parts, and seeds from personal gear, clothing, pets, vehicles, and equipment and ensure soil, gravel, and other fill materials are not contaminated with lesser celandine before leaving an infested area. Where lesser celandine is growing in areas that require mowing, such as sports fields, it's best to keep mowing equipment onsite to prevent spread (Yong, 2025). Plants, plant parts, and seeds should be tarped or bagged before transport to an appropriate disposal site (see Disposal section).

When selecting plants for a site, do not purchase, trade, or transplant lesser celandine. The Invasive Species Council of BC's '**Grow Me Instead**' Program or **Metro Vancouver's Grow Green website** provide recommendations for non-invasive, drought-tolerant plants, and garden design ideas. All materials (e.g., topsoil, gravel, mulch, compost, wood chips, plant stock) should be weed-free. Lesser celandine can be introduced via these materials and sites where they are used should be monitored carefully for any growth (Crosby, 2018). Healthy green spaces are more resistant to invasion by invasive plants, so it is also important to maintain or establish healthy plant communities.

MANUAL/MECHANICAL: RECOMMENDED

Due to its high density and the risk of spreading plant parts, manual control is most effective for small patches of lesser celandine (less than 1 metre squared) and when there is adjacent desired vegetation (District of Saanich, 2025) (Washington State Noxious Weed Control Board, 2013). The larger the infestation, the less likely manual/mechanical control methods will be successful (Axtell, DiTommaso, & Post, 2010). Except for individual plants, manual control is not recommended for aquatic or wetland sites due to the additional risk of spreading tubers (4-County Cooperative Weed Management Area, 2025).

Manual/mechanical control of lesser celandine is highly disruptive, particularly in natural areas, and can easily spread bulblets and tubers (Axtell, DiTommaso, & Post, 2010). Workers using this method should be trained to minimize soil disturbance and prevent the spread of plant parts (Thomas, 2025).

- **Hand digging and sifting the soil** is labour intensive, but effective for small sites. Using a trowel or shovel dig up as much of the roots, tubers and bulblets as possible as remaining parts can sprout into new plants. Use a fine mesh screen to sift soil and capture remaining fragments (Cornell Cooperative Extension of Oneida County, 2012) (Tualatin Watershed Invasive Species Team, 2024). Avoid shaking the soil from the plants (unless shaken over the screen), as this may dislodge bulblets and tubers and encourage spread (Whatcom County Noxious Weed Board, 2025). This method is best conducted from January to March (Tualatin Watershed Invasive Species Team, 2024) and should be repeated every few weeks to remove new growth (4-County Cooperative Weed Management Area, 2025). Digging plants earlier reduces the number of tubers and bulblets.
- **Mowing** is not recommended as it will likely increase spread by unearthing the shallow tubers and roots (Whatcom County Noxious Weed Board, 2025). Mowing may also promote the spread of bulblets (Axtell, DiTommaso, & Post, 2010).

REMOVAL TIMING

Manual control should be completed in the winter to early summer (Cascadia Prairie-Oak Partnership, 2019). Once the plants die back, they can be difficult to relocate. If digging and sifting for underground plant parts is planned for later in the year, it's helpful to flag the plants earlier in the season.

APPLYING MANUAL/MECHANICAL CONTROL METHODS IN RIPARIAN AREAS

Lesser celandine often grows in large contiguous patches along streams, watercourses, and natural sources of water supply. Land managers must consider the impact of control techniques and the resulting bare soil on the adjacent aquatic environment. Removal works should be scheduled during a period of least risk to fish species, outside of the **fish window**. When planning instream activities (in or around water), including removal of invasive vegetation, a water licence or use approval may be required under the BC ***Water Sustainability Act*** (for pesticide application, see the Applying Pesticide in Riparian Areas section). To access guidance documents or to learn or to learn more about water licenses and approvals in BC visit the Province's **Working Around Water webpage**. Working around water may also require authorization under other applicable Provincial or Federal legislation, such as the ***Federal Fisheries Act***. It is recommended to consult with a Qualified Environmental Professional when working around water.

CHEMICAL: CAUTION

When alternative methods to prevent or control invasive plants are unsuccessful, professionals often turn to herbicides. Herbicide application will provide some control but may not eradicate lesser celandine (Whatcom County Noxious Weed Board, 2025). Chemical control is often used when infestations are too large for manual control or when the site may be challenging for manual control, such as on a slope. Multiple treatments per year, for multiple years, are required to achieve some control (Washington State Noxious Weed Control Board, 2013). The first year of treatment often produces the greatest results, but annual follow-up visits are needed until no plants are found (Thomas, 2025).

This method should be used with caution for the following reasons (Crosby, 2018):

1. Weather conditions greatly influence treatment efficacy;
2. Lesser celandine often grows in riparian areas where pesticide use is restricted; and
3. Since lesser celandine growth is often closely associated with other plants, chemical control can easily damage non-target species (Province of BC, 2002).

With the exception of substances listed on Schedule 2 of the **BC Integrated Pest Management Regulation**, the use of herbicides is highly regulated in British Columbia. Site characteristics must be considered with herbicide prescribed, based on site goals and objectives and in accordance with legal requirements. **This summary of BC's *Integrated Pest Management Act*** provides an overview of the provincial legislation.

PESTICIDE LICENCE AND CERTIFICATION

A valid pesticide licence is required to:

- offer a service to apply most pesticides;
- apply most pesticides on public land including local government lands[2]; and
- apply pesticides to landscaped areas on private land, including outside office buildings and other facilities.

Pesticides (e.g., herbicides, insecticides, fungicides) are regulated by the Federal and Provincial governments, and municipal governments often have pesticide bylaws.

- Health Canada evaluates and approves chemical pest control products as per the ***Pest Control Products Act.***
- The **BC *Integrated Pest Management Act*** sets out additional requirements for the use and sale of pesticides in British Columbia beyond federal requirements. This Act is administered by the Ministry of Environment and Parks.
- Several municipalities have adopted bylaws that prohibit the use of certain pesticides.

Everyone who uses pesticides must be familiar with all relevant laws.

ONLY companies or practitioners with a valid Pesticide User Licence and staff who are certified applicators (or working under a certified applicator) may apply herbicide on invasive plants located on public lands in British Columbia. Applicators must be either the land manager/owner or have permission from the land manager/owner prior to herbicide application.

On private residential property the owner may apply pesticides to manage invasive or noxious weeds without a Pesticide User Licence, depending on the product classification or label directions. A private residential property owner may also hire a licensed service company to perform the work. A Residential Applicator Certificate is required to apply domestic class pesticides to landscaped areas including lawns and ornamental garden beds, although there are exceptions. For more information, please visit the **Provincial Pesticides and Pest Management** webpage.

Questions? Contact the BC Integrated Pest Management Program:
Telephone: (250) 387-9537
Email: bc.ipm@gov.bc.ca

2 on up to 50 ha/year by a single organization. Organizations looking to treat over 50 hectares of land per year are also required to submit a Pest Management Plan and obtain a Pesticide Use Notice confirmation.

Before controlling Provincially-regulated invasive plants and noxious weeds with pesticide on private or public industrial land, roads, power lines, railways, and pipeline rights-of-way, an 'Industrial Vegetation and Noxious Weed' Pesticide Applicator Certificate should be obtained. However, since lesser celandine is not a Provincially-regulated invasive plant or noxious weed, the 'Landscape' Pesticide Applicator Certificate category may be more appropriate for herbicide use on public and private lands. While there can be some overlap in categories, applicators should consider the most relevant category for their work depending how much time is spent on invasive plant control versus general plant management. Assistant applicator training is also available and the **online course and exam** are free.

It is best practice for personnel supervising or monitoring pesticide contracts to maintain a Pesticide Applicator Certificate or be familiar with all applicable regulations and contractor obligations to limit liability.

For more information on how to obtain a certificate and other requirements when working under the Provincial ***Integrated Pest Management Act and Regulation***, please review the Provincial **Noxious Weeds and Vegetation Management** webpage.

HERBICIDE LABELS

Individual herbicide labels must always be reviewed thoroughly prior to use to ensure precautions, application rates, and all use directions, specific site and application directions are strictly followed. Under the federal *Pest Control Products Act* and the BC Integrated Pest Management Regulation, **persons are legally required to use pesticides (including herbicides) only for the use described on the label and in accordance with the instructions on that label**. Failure to follow label directions could cause damage to the environment, create poor control results, or pose a danger to health. Contravention of laws and regulations may lead to cancellation or suspension of a licence or certification, requirement to obtain a qualified monitor to assess work, additional reporting requirements, a stop work order, or prohibition from acquiring authorization in the future. A conviction of an offence under legislation may also carry a fine or imprisonment.

Herbicide labels include information on both the front and back. The front typically includes trade or product name, formulation, class, purpose, registration number, and precautionary symbols. Instructions on how to use the pesticide and what to do in order to protect the health and safety of both the applicator and public are provided on the back (BC Ministry of Environment, 2011).

Labels are also available from the Pest Management Regulatory Agency's **online pesticide label search** or **mobile application** as a separate document. These label documents may include booklets or material safety data sheets (MSDS) that provide additional information about a pesticide product. Restrictions on site conditions, soil types, and proximity to water may be listed. If the herbicide label is more restrictive than Provincial legislation, the label must be followed.

HERBICIDE OPTIONS

The following herbicides can be used on lesser celandine. Although not specifically listed on the herbicide labels, lesser celandine may be treated under the general application provision for perennial broadleaved plants. Unless otherwise noted, information is from Cowlitz County Noxious Weed Control Board, 2025 and Axtell, DiTommaso, & Post, 2010.

ACTIVE INGREDIENT (EXAMPLE BRAND NAMES)+	APPLICATION	PERSISTENCE	GROWTH STAGE++	TYPE+++	COMMENT
Glyphosate§ (many products)	foliar application	non-residual*	actively growing	non-selective	Apply in late winter to early spring, most research indicates this is the most effective herbicide for lesser celandine
Triclopyr (e.g.: Garlon™)	foliar application	residual	actively growing, turf grass	selective, no effect on grasses	Found to be ineffective on populations in Whatcom County (Washington State Noxious Weed Control Board, 2013)
Metsulfuron (e.g.: Escort™)	foliar application	residual	actively growing plants only on pastures, rangeland and non-crop sites	selective, no effect on grasses	For best results, use a surfactant
Imazapyr (e.g.: Arsenal™)	foliar application	residual	actively growing	non-selective	Dust on plants may reduce effectiveness

+ The mention of a specific product or brand name of pesticide in this document is not, and should not be construed as, an endorsement or recommendation for the use of that product.

++ Active growing periods vary from year to year depending on weather and other factors. There may be more than one active growing period for a plant in a year.

+++ Herbicides that control all vegetation are non-selective, while those that control certain types of vegetation (e.g., only grasses or only broadleaf plants) are termed selective.

§ Glyphosate can impact trees with roots within or adjacent to the treatment area.

* Non-residual herbicides are active only on growing plant tissue and have little or no persistence in the soil, whereas residual herbicides persist in the soil, remaining effective over an extended period.

APPLYING PESTICIDE IN RIPARIAN AREAS

Provincial legislation prohibits the use of herbicides within 10 metres of natural water courses and 30 metres of domestic or agricultural water sources on public lands. On private lands herbicide labels need to be followed (which means for glyphosate products treatment can happen up to the water's edge) and other restrictions may apply (e.g. industrial sites, forestry sites, golf courses, etc.). On public lands, glyphosate is the only active ingredient that can be applied within the 10 metre Pesticide-Free Zone (PFZ)[3] in British Columbia in accordance with the *Integrated Pest Management Act and Regulation* and all public land Pesticide Management Plans (PMPs). A plant must be either a listed Noxious Weed (under the ***Weed Control Act***) or appear in the *Forest and Range Practices Act* **Invasive Plants Regulation** to be treated within the 10 metre PFZ. **Lesser celandine is not listed and therefore glyphosate and other herbicides can only be applied on lesser celandine up to 10 metres away from the high water mark (HWM)**[4]. The 30 metre no-treatment zone around a water supply intake or well used for domestic or agricultural purposes may be reduced if the licencee or PMP holder is "reasonably satisfied" that a smaller no-treatment zone is sufficient to ensure that pesticide will not enter the intake or well.

When managing lesser celandine with herbicide in riparian areas:

- Observe and mark all PFZs before treatments.
- The HWM should be determined by careful evaluation by the applicator.
- Distances in PFZs should be measured as horizontal distance.
- Herbicides restricted in a PFZ must not enter these zones by leaching (lateral mobility) through soil or by drift of spray mist or droplets.
- Treatments should be conducted when water levels are low (e.g. summer months) to reduce risk.
- Note that efficacy may be dependent on site conditions, including moisture in the soil.

3 The Pesticide-Free Zone (PFZ) is an area of land that must not be treated with pesticide and must be protected from pesticide moving into it, under the *Integrated Pest Management Act and Regulation*.

4 The High Water Mark (HWM) is defined as the visible high water mark of any lake, stream, wetland or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river stream, or other body of water a character distinct from that of the banks, both in vegetation and in the nature of the soil itself. Typical features may include, a natural line or "mark" impressed on the bank or shore, indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive physical characteristics. The area below the high water mark includes the active floodplain (BC Ministry of Environment, 2011).

APPLICATION METHODS

Foliar application works best for spot treatments and can be used for any size infestation, but eradication is unlikely, especially for large populations (Axtell, DiTommaso, & Post, 2010) (Washington State Noxious Weed Control Board, 2013). Foliar application is most effective and will have the least impact on native plants during late winter to early spring (March through April) when temperatures exceed 4.4 °C and leaves are visible, but prior to full flowering (Thomas, 2025) (Whatcom County Noxious Weed Board, 2025) (Cascadia Prairie-Oak Partnership, 2019). It is recommended to apply herbicide for at least two consecutive years and monitor the site for at least five years (Washington State Noxious Weed Control Board, 2013). After no presence is detected for one or more years, it is common for lesser celandine to reappear (Washington State Noxious Weed Control Board, 2013).

If treating lesser celandine in highly public recreation areas, such as sports fields, installation of fencing and educational signage is recommended (Yong, 2025).

CULTURAL: CAUTION

- **Mulching** lesser celandine sites with at least 15 centimetres of wood chips may suppress small patches but will not eradicate the plant, as it can emerge through covering materials (Washington State Noxious Weed Control Board, 2013) (Cascadia Prairie-Oak Partnership, 2019). This method should not be used on its own but can be combined with other management strategies (Tualatin Watershed Invasive Species Team, 2024). Mulch can be applied in the winter prior to emergence or in the spring prior to peak plant growth, and should be reapplied annually (Tualatin Watershed Invasive Species Team, 2024) (Cascadia Prairie-Oak Partnership, 2019).

BIOLOGICAL: NOT AVAILABLE

There are currently no biocontrol options available in British Columbia for lesser celandine. The short life cycle of lesser celandine and its close relation to many native North American members of the *Ranunculaceae* plant family makes finding a suitable biological control agent for this species unlikely (Axtell, DiTommaso, & Post, 2010).

In preparation for herbicide application in a public park, exclusion fencing and signage should be installed

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CONTROL SUMMARY

The following table provides a summary and comparison of control methods for lesser celandine.

CONTROL STRATEGY	TECHNIQUES	APPLICABLE SITE TYPE	PROS	CONS
Manual	**Hand digging and sifting the soil**	Small sites (<1m^2), sites with desirable vegetation; except for individual plants, not recommended at aquatic sites	Selective, non-chemical	Labour intensive, regrowth from tubers and bulblets may occur, high risk of soil disturbance, must remove entire plant and reproductive parts, must deal with biomass
Chemical	**Foliar application**	Small or large infestations except in environmentally-sensitive areas and/or where herbicide use is restricted	Selective with appropriate herbicide and application, minimizes soil disturbance, less labour intensive	Unintended environmental/health impacts, high public concern, weather dependent, requires trained staff, must be applied for at least 2 consecutive years, not likely to provide eradication
Cultural	**Mulching**	Small infestations, in combination with other methods	Non-chemical	Challenging to implement around existing vegetation, not successful on its own, must be repeated annually
Mechanical	**Mowing**	None	Non-chemical	Not recommended due to the high risk of spread
Biological	**No biological control agents are currently available for lesser celandine**			

CONTROL SUMMARY COLOUR LEGEND

GREEN: RECOMMENDED

ORANGE: CAUTION

RED: NOT RECOMMENDED OR NOT AVAILABLE

Disposal

ON SITE DISPOSAL

Due to the risk of spread of seeds, bulblets and tubers, lesser celandine should not be composted on site (Cascadia Prairie-Oak Partnership, 2019).

OFF SITE DISPOSAL

When transporting lesser celandine offsite for disposal, containing all plant parts in sturdy bags is recommended to prevent spread (Thomas, 2025) (Cowlitz County Noxious Weed Control Board, 2025). In the Metro Vancouver region, several facilities accept lesser celandine plants and/or infested soil. Please consult **this disposal facility list** for current details.

PLEASE CONTACT ALL FACILITIES BEFOREHAND TO CONFIRM THEY CAN PROPERLY HANDLE THE MATERIAL.

CLEANING AND DISINFECTION[5]

Before leaving a site, all visible plant parts and soil from vehicles, equipment, and gear should be removed and rinsed if possible. When back at a works yard or wash station, vehicles should be cleaned and disinfected using the following steps:

- Wash with 180 °F (82 °C) water at 6 gpm, 2000 psi*, with a contact time of ≥ 10 seconds on all surfaces to remove dirt and organic matter such as vegetation parts or seeds. Pay special attention to undercarriages, chassis, wheel-wells, radiators, grills, tracks, buckets, chip-boxes, blades, and flail-mowing chains.
- Use compressed air to remove vegetation from grills and radiators.
- Sweep/vacuum interior of vehicles paying special attention to floor mats, pedals, and seats.
- Steam clean poor access areas (e.g., inside trailer tubes) – 200 psi @ 300 °F (149°C).
- Fully rinse detergent residue from equipment before leaving the facility.

* Appropriate self-serve and mobile hot power-wash companies in the Metro Vancouver area include: Omega Power Washing, Eco Klean Truck Wash, RG Truck Wash, Ravens Mobile Pressure Washing, Hydrotech Powerwashing, Platinum Pressure Washing Inc, and Alblaster Pressure Washing. Wash stations should be monitored regularly for lesser celandine growth.

Follow-up Monitoring

Whatever control method is used, follow-up monitoring and maintenance treatments are components of an integrated management plan or approach. Follow-up monitoring is essential, as above- and below-ground plant parts are easily missed and can produce new plants (Cowlitz County Noxious Weed Control Board, 2025). Sites should be monitored at least once a year for 2-3 years (4-County Cooperative Weed Management Area, 2025) (Oregon State University, 2022). After herbicide application monitor sites annually for at least five years (Thomas, 2025) (Washington State Noxious Weed Control Board, 2013).

5 Adapted from Metro Vancouver 2017 Water Services Equipment Cleaning Procedures and Inspection Protocols.

Restoration

Restoration after lesser celandine management prevents erosion and helps to establish native and desirable plants (Oregon State University, 2022). Examples of common competitive native species prescribed in Metro Vancouver sites are summarized in the table below based on site moisture.

WET SITES	MOIST SITES	DRY SITES
SHRUBS		
Salmonberry	Salmonberry	Thimbleberry
Hardhack	Willow	Nootka rose
Willow	Red osier dogwood	Red flowering currant
Red osier dogwood	Red elderberry	Snowberry
Pacific ninebark	Vine maple	Tall Oregon grape
	Osoberry	Oceanspray
TREES		
Western red cedar	Western red cedar	Douglas-fir
Red alder	Red alder	Red alder

Replacement species should be chosen based on the ecology of the site by a Qualified Environmental Professional. Local biologists, environmental professionals, agronomists, agrologists, native and domestic forage specialists, seed companies, and plant nurseries are all good sources for localized recommendations for regional native species and regionally adapted domestic species, based on site usage. Native grass seed mixes are also available. There are several science-based resources available to guide restoration efforts, such as the South Coast Conservation Program's **Diversity by Design** restoration planning toolkit.

Lesser celandine sites are often found in areas with existing or potential wildlife populations (e.g., deer, beaver, muskrat, vole, etc.) that can damage restoration plantings. Therefore, any revegetation plan must consider potential impacts from wildlife and utilize appropriate mitigation measures to protect the restoration and existing native plantings (e.g., tree wrapping, exclusion caging/fencing, vole guards, etc.).

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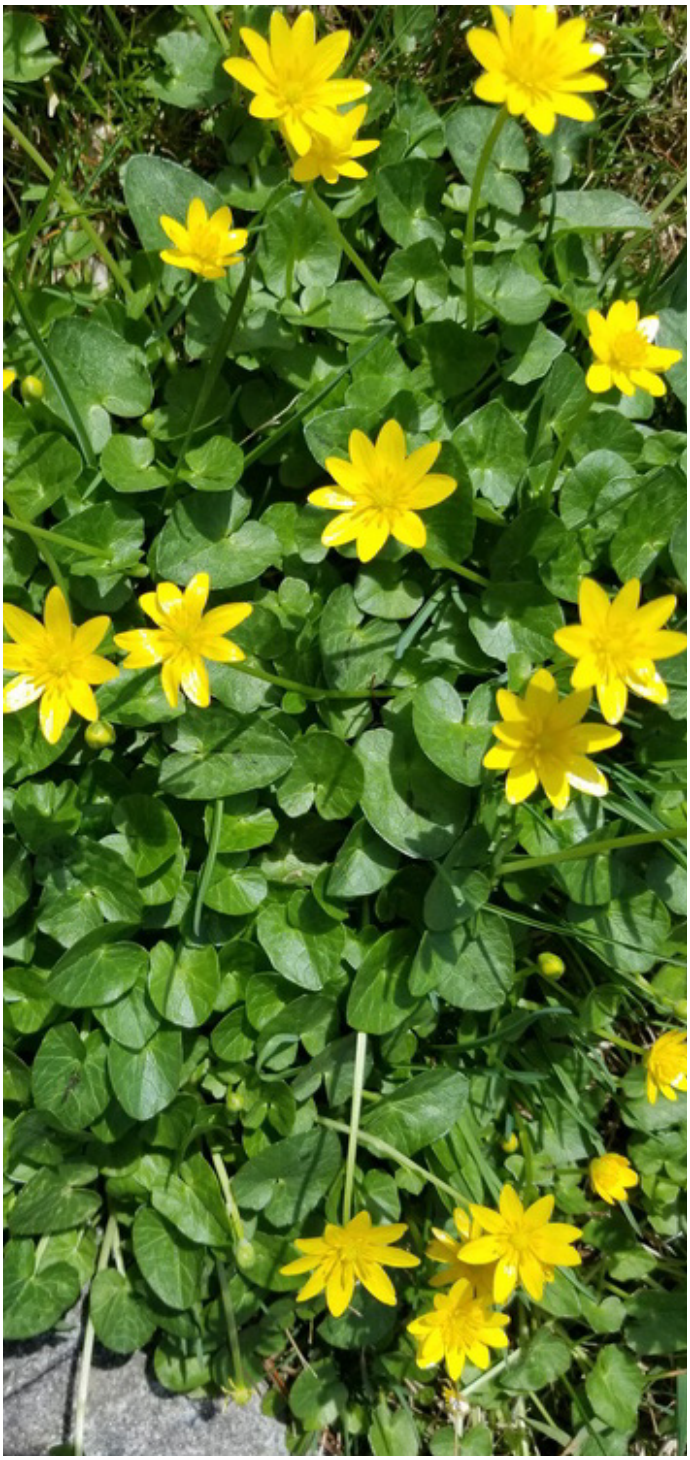

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Additional Resources

For more information please refer to the following resources.

- Axtell, A. E., DiTommaso, A., & Post, A. R. (2010). Lesser Celandine (*Ranunculus ficaria*): A Threat to Woodland Habitats in the Northern United States and Southern Canada. *Invasive Plant Science and Management*, 190-196.
- District of Saanich. *Lesser celandine invasive plant alert*. **https://www.saanich.ca/assets/Community/Documents/celandine-alert-web.pdf**
- Grow Green Guide. **www.growgreenguide.ca**
- Grow Me Instead. **http://bcinvasives.ca/resources/programs/plant-wise/**
- InvasivesBC is a Provincial invasive species database, map and mobile data collection application available for use by land managers and invasive species practitioners across BC. **https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/invasivesbc**
- Pesticides and Pest Management. Province of British Columbia **https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management**
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