CITY OF LOUISVILLE

PARKS, RECREATION & OPEN SPACE
INTEGRATED WEED MANAGEMENT PLAN

City of Louisville, Department of Parks, Recreation and Open Space

February 17, 2009
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Table of Contents

I. Document History

The Integrated Weed Management Plan (IWMP) was originally drafted in 2009 in response to citizen concerns regarding herbicide use. The plan was peer reviewed, revised, and supported by the State Weed Coordinator with Colorado Department of Agriculture, the Weed Coordinator with Boulder County Parks and Open Space, a Professor of Weed Sciences with Colorado State University, the Weed and Pest Management Specialist with Jefferson County Open Space, and the Open Space Superintendent with the City of Lafayette Open Space.

Revisions to the document were made in 2016 with unanimous approval from the Open Space Advisory Board (OSAB). The Parks and Public Landscape Advisory Board supported the IWMP but did not feel review of revisions was necessary. The IWMP will be reviewed and revised every 5 years by staff and OSAB. Staff will annually update the noxious weed list.

II. Purpose

Noxious weeds are one of the most serious threats facing City of Louisville public lands. Noxious weeds out-compete native vegetation for resources such as sunlight, water, growing space, and soil nutrients. They are able to do so because they have few natural predators or diseases, are not as palatable to wildlife and livestock as native vegetation, have deep and extensive root systems which more easily sequester water and nutrients, produce thousands of seeds per plant, and/or have allelopathic capabilities which inhibit the growth of surrounding native plants.

Once established, noxious weeds cause severe ecological and agricultural impacts to our public lands by decreasing biodiversity, diminishing habitat and forage for wildlife, and decreasing crop yield. Additionally, management of weed control efforts requires a considerable amount of funding and time for planning and implementation. For these reasons it is essential that, as land managers, the City develop an integrated weed management plan to establish guidelines that will aid the City in controlling noxious weeds.

The Purpose of this integrated weed management plan is to provide weed management guidelines that:

- Identify weed control options for integrated weed management as mandated by the Colorado Noxious Weed Act.
- Consider the environmental, economic, and social impacts of different control methods.
- Protect visitors and applicators, water quality, non-target vegetation, federally endangered or threatened species, and local species of concern.
- Reduce the spread of weeds from City of Louisville properties to adjacent or downstream and downwind properties.

This IWMP is intended to be a dynamic document. It will be reviewed and updated to reflect advancements in professional weed control management and changes to the Colorado Department of Agriculture regulations and species lists.

III. Scope

This integrated weed management plan will be implemented on properties that are managed by the Parks, Recreation and Open Space Department in which the City of Louisville is the sole owner.

Golf Course, Parks, and Open Space staffs manage approximately 1,435 acres or 2.2 square miles of land. More specifically, the Coal Creek Golf Course manages approximately 210 acres. The Parks Division, which is made up of the sports complex, community and neighborhood parks, parkways, greenbelts, cemetery, and facility grounds manages approximately 538 acres. The Open Space Division manages approximately 687 acres of land (not including properties owned jointly with other municipalities).

Currently, all Open Space parcels have infestations of noxious weeds which vary in species composition, density, and patch size. Latest monitoring efforts indicate that there are at least 30 different species of noxious weeds found on Open Space ranging from A, B, and C list species. Please see the appendix for the complete list of noxious weed species.

IV. Definitions

A. Noxious Weed

As written in the Colorado Noxious Weed Act, a noxious weed "means an alien plant or parts of an alien plant that have been designated by rule as being noxious or has been declared a noxious weed by a local advisory board, and meets one or more of the following criteria:

- **(i)** Aggressively invades or is detrimental to economic crops or native plant communities;
- **(ii)** Is poisonous to livestock;
- **(iii)** Is a carrier of detrimental insects, diseases, or parasites;
- **(iv)** The direct or indirect effect of the presence of this plant is detrimental to the environmentally sound management of natural or agricultural ecosystems" (Colorado Noxious Weed Act, 35-5.5)

B. Integrated Weed Management

According to the Colorado Noxious Weed Act, integrated weed management (IWM) is "the planning and implementation of a coordinated program utilizing a variety of methods for managing noxious weeds, the purpose of which is to achieve desirable plant communities" (Colorado Noxious Weed Act, 35-5.5). Methods used in integrated weed management include, but are not limited to, preventative measures, education, monitoring, mechanical control, cultural control, biological control, and chemical control. The process

of integrated weed management takes into account each method's potential hazard to people, the environment, and property while also taking into consideration limitations of budget and human resources.

C. List A Species

List A species are uncommon noxious weeds that are found in Colorado in small populations or are not yet found in Colorado but are in surrounding states and threaten to become established. These weeds are mandated for eradication by the Colorado Noxious Weed Act. Please see the appendix for List A species occurring within the City of Louisville.

D. List B Species

List B species are so well established and common throughout Colorado that their total eradication in the State is not feasible. However, isolated populations are recommended for eradication. Suppression and containment are the goals for all other populations. Please see the appendix for List B species occurring within the City of Louisville.

E. List C Species

List C species are widespread and well established within Colorado. The State's goals are to provide education, research, and biological controls to local governments. List C species are the lowest priority for control for the City of Louisville Open Space and Parks Divisions. As resources of time, budget, and staff permit, controls will be conducted to help suppress and contain their spread. Please see the appendix for List C species found within the City of Louisville.

F. Watch List Species

Watch List Species were added to the noxious weed list in 2011 to help with early detection of potential noxious weeds. The impact of these species has not been identified yet and they may be present in adjacent states where they could potentially spread to Colorado.

V. Weed Management Strategies

Using a combination of methods for noxious weed control increases the effectiveness and efficiency of control. This is accomplished by continually depleting nutrient reserves and reducing the ability of the weed to reproduce. Being able to use a variety of methods also allows for the flexibility required to control different species of weed infestations in varying locations under varying and unpredictable environmental conditions. The following list of control methods is not exhaustive. Alternative methods that are not listed below will be evaluated for effectiveness by Open Space and Park staff. Also, some methods may be considered in multiple categories.

A. Prevention

The most effective way to control noxious weeds is to prevent their initial establishment. Once noxious weeds become established, their control is costly and time consuming.

1. Methods

a. Limit disturbance to landscapes, especially those that create bare ground
b. Clean boots, clothing, and equipment of seed before entering and leaving City properties
c. Monitor and amend soil where appropriate
d. Require dogs to be leashed
e. Limit social trails
f. Require contractors and utility maintenance personnel to reseed or plant native vegetation, where appropriate, after creating a disturbance to the soil
g. Require weed-free restoration materials
h. Ongoing property monitoring

B. Education

Noxious weed education is an important step in IWM for both the City staff and the public. Weed management is a complex and evolving field of study that requires staff to continually increase their knowledge and understanding so that weed control methods can be used in the most effective means possible. Also, it is important to educate the public about noxious weeds so that they understand the necessity of their control and will support the City's efforts. Furthermore, a more educated public will be able to more effectively control noxious weeds on their own property.

1. Methods to Educate Staff

a. All applicators will have the oversight of an individual licensed by the Colorado Department of Agriculture as a public pesticide applicator
b. For licensed public pesticide applicators, obtain continuing education credits as required by the Colorado Department of Agriculture
c. Attend noxious weed workshops, presentations, and conferences
d. Network and communicate with other Colorado weed managers
e. Form collaborative partnerships with stakeholders involved with noxious weed management

2. **Methods to Educate the Public**
    a. Presentations given by staff and other weed control professionals
    b. Create interpretive signage
    c. Host volunteer weed pull events
    d. Make field contacts
    e. Distribute weed identification and control pamphlets to system users and homeowners adjacent to public lands that have List A species in their private yards
    f. Submitting articles to the local newsletter and newspapers
    g. Provide information through the City's website
    h. Form collaborative partnerships with stakeholders involved with noxious weed management

C. Monitoring

Monitoring is a critical tool in integrated weed management as it helps to detect initial weed infestations before they get out of control and also helps to determine if the current methods of control are effective. A goal of Open Space and Parks is to hand-map weeds and make general observations which will be recorded throughout the season as weed control takes place. All herbicide treatments will be recorded as required through the Colorado Pesticide Applicators' Act.

1. **Beneficial Uses**
    a. Monitoring restoration sites or newly disturbed sites for weed encroachment and restoration progress
    b. Monitoring locally uncommon weed species populations
    c. Monitoring trail corridors for weed dispersal and establishment
    d. Monitoring pastures for overgrazing and weed encroachment
    e. Monitoring high priority weed infestations
2. **Limitations**
    a. Difficulty in determining cause and effect of weed control actions
    b. Can become time consuming
3. **Methods**
    a. Transects and plots
    b. Photopoints
    c. Ocular observations
    d. Mapping by hand or with GPS units

D. Mechanical Control

Mechanical controls are those methods that physically remove all or part of a weed, often using hand tools or machinery.

1. **Beneficial Uses**
    a. Controls many annual and biennial weed species

b. Controls smaller infestations or infestations where the use of chemicals may be undesirable
c. May prevent seed production and seed spread, if timed correctly
d. Provides excellent opportunities for volunteer events and work for the Boulder County Youth Corps

2. Limitations

a. Can cause soil disturbances and leave bare areas
b. Often ineffective at controlling rhizomatous perennials (Colorado Natural Areas Program, 2000)
c. Are labor intensive
d. Are not cost or time effective for larger infestations of weeds
e. May cause plants to re-sprout seed heads in greater number
f. Can injure desirable plants

3. Methods

a. Hand pulling
b. Clipping seed heads
c. Using shovels and similar bladed hand tools to sever tap roots below ground
d. Mowing/weed trimmers
e. Using weed whips
f. Using chainsaws
g. Using a propane torch

E. Cultural Control

Specific to Open Space, cultural controls involve the re-establishment and promotion of desirable, competitive vegetation through revegetation and mimicking natural disturbances by conducting prescribed burns and grazing.

Revegetation of degraded Open Space through reseeding and planting a diverse mix of native grasses, forbs, shrubs, and trees is a long term goal. Many Open Space properties were acquired in a degraded state that is susceptible to noxious weed infestations. Healthy, native flora communities are more able to resist and compete against invasions of noxious weeds, ultimately reducing the costs of weed control.

1. Benefits of Revegetation

a. Controls noxious weeds in the long term
b. Changes degraded sites into ecologically healthy lands
c. Increases native plant diversity
d. Increases native plant competition against noxious weeds
e. Increases structural value of habitat
f. Increasing nutrient value of forage

2. Limitations of Revegetation

a. Difficulty and length of time necessary to establish native and/or desirable vegetation
b. Risk of seed mixes or hay/straw mulches containing weed seed
c. Difficult environmental conditions to seed in

d. Cost of reseeding can be expensive
e. Cost of seeding and soil bed preparation equipment

3. **Methods of Revegetation**
    a. Broadcast seeding
    b. Drill seeding
    c. Direct planting trees and shrubs
    d. Direct planting wetland vegetation plugs

Prescribed burns mimic the natural process of fire that grasslands have adapted to over thousands of years on the Colorado Front Range. Prescribed burns are increasingly used as a tool by land managers to reduce weeds and promote healthy communities of native vegetation.

1. **Beneficial Uses of Prescribed Burns**
    a. Creates species and stand structure diversity in plant communities
    b. Invigorate root growth of perennial grasses
    c. Reduces infestations of certain weeds
2. **Limitations of Prescribed Burns**
    a. Difficulty burning in areas surrounded by residential neighborhoods
    b. Availability of experienced fire crews to conduct a prescribed burn
    c. Time it takes to properly plan a prescribed burn that will meet resource objectives
    d. Short windows of time to conduct a prescribed burn due to the need for specific weather conditions to meet resource objectives
    e. Some weeds are favored by fire and may increase in density following a prescribed burn.
3. **Methods of Prescribed Burns**
    a. Local fire departments/districts, or qualified staff, to write burn plans and conduct prescribed burns
    b. Independent contractors

Grazing by ungulates has historically been a part of the Front Range ecosystem which invigorated root growth and created diverse grassland communities. Grazing by cattle and horses on Open Space helps to simulate this process that was once performed by buffalo. Mowing can also be used to serve as a substitute for grazing. Beneficial uses, limitations, and methods can be found in section V.F. Biological Control.

F. Biological Control

Biological controls involve using a weed's natural insect predators or grazing animals to control the weed.

Biocontrol Insects for specific noxious weeds are reared by the Colorado Department of Agriculture's Insectary. Most are available free-of-charge or for a small fee.

1. **Beneficial Uses of Insects**
    a. Controls infestations that are not easily accessible to people and equipment
    b. Controls very large and dense infestations where other control methods would not be cost effective
    c. Controls low priority List C species in which budget and time may not be available for other control methods
2. **Limitations of Insects**
    a. May reduce but not eradicate a weed infestation (Colorado Natural Areas Program, 2000)
    b. Limited availability
    c. Lack of biological control insects for all noxious weeds
    d. Variable successes (Colorado Natural Areas Program, 2000)
    e. Difficulty and length of time to establish
    f. Inability to try other methods once insects have been released
    g. Predation by other insects
    h. Although low, risk of insects attacking native vegetation
    i. Difficult to integrate with some other control methods
3. **Methods**
    a. There are dozens of different insects that specialize in consuming different noxious weeds.

Specific to Open Space, **livestock** can be used to help control noxious weeds by limiting seed production and depleting nutrient reserves. The use of livestock requires the supervision of a knowledgeable herder who can manage the duration and intensity of the grazing so as not to damage the landscape and native vegetation. Associated costs can vary widely depending on the person contracted to manage the grazing and the infrastructure required.

1. **Beneficial Uses of Livestock**
    a. Controls infestations that are inaccessible to people and equipment
    b. Controls very large and dense infestations where other control methods would not be cost effective
    c. Invigorates root growth of perennial grasses
    d. Creates diverse grassland communities
2. **Limitations of Livestock**
    a. Limited availability of experienced and knowledgeable herders
    b. Need for infrastructure such as fencing and a water source
    c. Predation of livestock by coyotes, mountain lions, or bears
    d. Some noxious weeds are poisonous to certain livestock
    e. Some noxious weeds are only palatable to certain livestock
    f. Palatability of weeds varies throughout the season
    g. Risk of spreading weed seed through manure or fur
    h. Risk of overgrazing or trampling native vegetation

i. Will not eradicate a weed infestation (Tu et al., 2001)
j. Timing must be specific to prevent seed production
k. Cost

3. Methods

a. Goats
b. Sheep
c. Cattle

G. Chemical Control

Chemical control involves the use of herbicides to kill noxious weeds. The City of Louisville only uses herbicides that are legally registered by the Environmental Protection Agency. The use of herbicides is an effective means of noxious weed control when used by trained professionals in accordance with accompanying labels.

All applicators will have the oversight of an individual licensed by the Colorado Department of Agriculture as a public pesticide applicator. All contractors will be licensed as commercial pesticide applicators. Licensing requires continuing education on pesticide safety and use. Application equipment is also calibrated to ensure accurate delivery rates. Furthermore, herbicide labels, which are legal documents, are followed precisely and are kept with the applicator in the field.

Public concern over herbicide usage is always considered by the City. The City of Louisville refers to the Colorado Pesticide Sensitive Registry to be able to notify landowners adjacent to City owned proprieties when an herbicide application will be conducted. To reduce public interaction with treated areas, herbicide applications will be conducted when there is minimal impact to visitors. For example, areas adjacent to a school will not be treated during hours when children are walking to and from school. Alternatively, such properties may be treated on weekends or holidays when children are not present. Also, depending on the size and location of the application, properties may be closed to the public in the event that a broadcast application is necessary and will remain closed until the labeled re-entry interval is met.

The City uses herbicides in a responsible manner by doing the following:

- Reducing the amount of herbicides used through the use of IWM.
- Using herbicides that are in the Environmental Protection Agency's Toxicity Category III or IV, indicating low toxicity levels.
- Considering the use of herbicides in a Toxicity Category of I or II only when other methods have been determined to be ineffective, cost prohibitive, or unsafe. Having the ability to use various herbicides with different modes of action is critical to prevent the build up of herbicide resistance by populations of noxious weeds.
- Using herbicides at the lowest recommended rates that are effective to control the targeted weed species. Sometimes using the lowest rate may not control the targeted weed and result in the

need for a second herbicide application. Also using low rates that are ineffective may create herbicide resistance in the targeted weed species. For these reasons, the use of higher rates may be recommended.

- Spot spraying weed infestations whenever possible. Broadcast spraying will only be used on large infestations where spot spraying would be ineffective or too time consuming and costly.

1. **Beneficial Uses**
    a. Controls large infestations in which other methods would be time consuming and cost prohibitive
    b. Controls infestations of rhizomatous and perennial weed species (Colorado Natural Areas Program, 2000)
    c. Eradicate high priority List A species that require a fast response as required by the Colorado Noxious Weed Act
    d. Clear fields of vegetation in preparation for grassland reseeding
    e. Prevent weed establishment following a prescribed burn
    f. Prevent seedling establishment of undesirable species

2. **Limitations**
    a. Inability to spray certain herbicides near water
    b. Public sensitivity to herbicide use
    c. Formation of herbicide resistance
    d. Possible damage to non-target vegetation
    e. Possible bare-ground areas
    f. Possible tree damage

3. **Methods**
    a. Backpack sprayer
    b. Spray bottles
    c. Wicks
    d. Paintbrushes
    e. ATV or truck mounted hand guns/wands
    f. ATV or truck mounted booms
    g. Aerial applications

4. **Restrictions**
    The following synthetic herbicides shall not be used on any City owned and maintained property, except Coal Creek Golf Course.
    a. Glyphosate
    b. 2,4D (2,4-dichlorophenoxyacetic acid)

VI. Priority Weed Infestations

The City of Louisville recognizes that it has limited resources in terms of staff and budget which prevents all weed infestations from being controlled. Thus it is important to prioritize which populations of noxious weeds will be controlled so that these resources can be used efficiently and where they will be most effective.

Priority will be placed on populations of noxious weeds that fulfill one or more of the following criteria:

- Is a List A noxious weed
- Located in environmentally sensitive area such as riparian areas, wetlands, or within populations of rare or imperiled native plant species
- Is small enough where eradication is possible
- Local rarity of weed
- Located along movement corridors such as trails and riparian areas
- Located within a restoration unit or park priority areas
- Located adjacent to private lands
- Weed infestations that cause a profit loss that is greater than the cost of control such as infestations at the Golf Course or other revenue driven properties

References

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Appendix A: List A, B and C Species

Last updated: December 2019

* - Toxic or injurious to livestock and/or people

List A species occurring within the City of Louisville:

- Cypress Spurge *(Euphorbia cyparissias)* – rhizomatous perennial*
- Hairy Willow-herb *(Epilobium hirsutum)* – perennial
- Myrtle Spurge (*Euphorbia myrsinites)* – rhizomatous perennial*
- Purple Loosestrife (*Lythrum salicaria*) – perennial

List B species occurring within the City of Louisville:

- Absinth Wormwood (Artemisia absinthium) – perennial
- Bouncing Bet (*Saponaria officinalis*) – rhizomatous perennial*
- Bull Thistle (*Cirsium vulgare*) – biennial, sometimes annual
- Canada Thistle (*Cirsium arvense)* – rhizomatous perennial
- Common Teasel (Dipsacus fullonum) – biennial
- Cutleaf Teasel (*Dipsacus laciniatus*) – biennial
- Dalmatian Toadflax (*Linaria dalmatica*) – rhizomatous perennial
- Dame's Rocket (*Hesperis matronalis*) – biennial or short lived perennial
- Diffuse Knapweed (*Centaurea diffusa*) – biennial, sometimes perennial
- Eurasian Watermilfoil *(Myriophyllum spicatum)* – rhizomatous perennial submersed aquatic
- Hoary Cress (*Cardaria draba*) – rhizomatous perennial
- Houndstongue (*Cynoglossum officinale*) – biennial*
- Leafy Spurge (*Euphorbia esula*) – rhizomatous perennial*
- Musk Thistle (*Carduus nutans*) – biennial
- Moth Mullein (*Verbascum blattaria*) – biennial
- Russian Olive (*Elaeagnus angustifolia*) – tree
- Scentless Chamomile (*Tripleurospermum perforatum)* – annual
- Scotch Thistle (*Onopordum acanthium*) – biennial
- Sulfur Cinquefoil (*Potentilla recta*) – perennial

List C species occurring within the City of Louisville:

- Cheatgrass or Downy Brome (*Bromus tectorum*) – winter annual
- Chicory (*Cichorium intybus*) – rhizomatous perennial
- Common Burdock (*Arctium minus*) – biennial
- Common Mullein (*Verbascum Thapsus*) – biennial
- Field Bindweed (*Convulvulus arvensis*) – rhizomatous perennial
- Puncturevine (*Tribulus terrestris*) – annual*
- Redstem Filaree (*Erodium cicutarium*) – winter annual or biennial

Watch List (these noxious weeds are List A species which have been identified in Boulder County and could appear in Louisville)

- Giant Reed (*Arundo donax)* – perennial
- Knotweed *(Polygonum x bohemicum)* – perennial

- Mediterranean Sage *(Salvia aethiopis)* – biennial or perennial
- Orange Hawkweed (*Hieracium auriacum)* – perennial

Other Nuisance Weed Species within the City of Louisville (sometimes controlled)

- American Pondweed *(Potamogeton epihydrus)* – rhizomatous perennial submersed aquatic
- Common Mallow (*Malva neglecta)* – annual
- Common Ragweed *(Ambrosia artemisiifolia L.)* – annual
- Curly Dock *(Rumex crispus)* – perennial
- Dandelion (*Taraxacum officincale)* – perennial
- Broadleaf Plantain (*Plantago major)* – perennial
- Prickly Lettuce *(Lactuca serriola)* – annual or biennial
- Russian Thistle *(Kali tragus)* – annual
- White Clover (*Trifolium repens)* – perennial