

# CITY OF LIVINGSTON MONTANA – PARKS AND TRAILS NOXIOUS WEED MANAGEMENT PLAN

2017

A strategic guide assisting managers to address noxious weeds within the city of Livingston

Prepared by Invasive Species Action Network

## Table of Contents

Foreword.....	3
Executive Summary.....	4
Introduction .....	5
Noxious Weeds of Montana .....	6
Approaches to Noxious Weed Management.....	6
Programs and Authorities .....	7
Programs .....	7
Authorities .....	8
Geographic Scope of the Management Plan .....	8
Parks.....	9
Trails.....	11
Inventory and Monitoring of Noxious Weed Species of Livingston.....	12
Gaps and challenges .....	12
Noxious Weed Management Priorities.....	13
Management Goals and Objectives .....	13
I.    Communication and Coordination.....	13
II.   Early Detection and Monitoring.....	13
III.  Control and Eradication .....	13
IV.   Prevention and Outreach.....	13
V.   Programmatic Review .....	13
Noxious Weed Management Strategies .....	14
I.    Communication and Coordination.....	14
II.   Early Detection and Monitoring.....	14
III.  Control and Eradication .....	14
IV.   Prevention and Outreach.....	14
V.   Programmatic Review.....	14
Appendices.....	16
Appendix A – City of Livingston parks and trails.....	17
Appendix B – State of Montana Noxious Weed List, Department of Agriculture .....	18
Appendix C – Noxious weed species profiles.....	19
Appendix D – Herbicide Use Protocols .....	20

Appendix E – Material Safety Data Sheet Information ..... 21

Appendix F – Hazard Analysis Critical Control Point resources ..... 22

Appendix G – Noxious Weed Inventory of Livingston’s parks and trails ..... 23

## Foreword

From our majestic western mountains to the endless rolling prairies, Montana's natural spaces, agricultural lands and municipal properties are all threatened by noxious weeds. Montana has long been a leader in weed management and since the late-1990s the Montana Weed Management Plan has provided guidance to weed managers. While this contemporary and comprehensive plan provides an excellent statewide framework, Montana's cities and town have yet to develop specific plans for managing noxious weeds locally.

I am delighted that the City of Livingston has taken on the challenge of tackling the noxious weed issue within their community. This plan marks a great step forward for Livingston and Montana's other urban areas. This plan, with its focus on integrated weed management and prevention, encourages best practices that can lead to success. Through this management plan, Livingston has set the stage to effectively and efficiently marshal their resources to combat this serious threat.

Congratulations to Livingston for their leadership in taking action to mitigate against the problem of noxious weeds.

David Burch  
Montana Department of Agriculture  
Weed Program Manager

## Executive Summary

Noxious weeds pose a significant threat to the park and trail amenities of the City of Livingston, Montana (the City). The City is addressing the management of noxious weeds in an effort to better protect natural resources and minimize impacts to biological and economic resources of the area. In order to increase engagement and implement a vision for improved weed control, the City is taking steps to assume a role of pro-active noxious weed management. The City will continue to work with Park County to ensure that noxious weed management for the area is done cooperatively.

The management of noxious weeds on parks and trails of the City of Livingston will be guided by the following priorities;

- protect the human health and natural resource amenities of the City
- utilize a collaborative approach among county and other local partners
- prevent the introduction or expansion of new populations
- control existing noxious weed populations with integrated weed management practices
- engage city residents and landowners in actions to prevent or control noxious weeds

The goal of the Livingston Parks and Trails Noxious Weed Management Plan is to protect the city's natural resources and prevent spread and establishment of noxious weeds on the identified trail and park properties. Further, the plan will utilize a strategy which will be both effective and economically feasible. Steps that are taken now to prevent new infestations and control current noxious weed infestations from expanding is smart business. Proactive prevention is an investment that helps keep costs manageable.

## Introduction

The City of Livingston, Montana is initiating a proactive effort to manage noxious weeds for the benefit of all city residents. Noxious weeds are a significant threat to Livingston's outdoor recreation opportunities, natural resources and urban wildlife habitat. Further, noxious weed infestations can negatively impact economic resources. While many introduced plants can impact the ecology or economy of a region, noxious weeds are *any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities* as per Montana Code Annotated. The City of Livingston (the City) is addressing the management of noxious weeds within its parks and trails (Appendix A) in an effort to better protect natural resources and minimize impacts to biological and economic resources of the area. There may be other weed species that are found within the boundaries of the City, however the focus of this management plan is on noxious weed species legally defined by the State of Montana's Department of Agriculture (Appendix B).

There are a variety of noxious weed species found throughout the City that have been introduced and spread both by intentional and unintentional means. Human activities, foot traffic, vehicle movement and even gardening habits have introduced and spread weeds. Additionally, soil disturbance due to development or other management activities can leave habitats open for weed establishment. Established noxious weeds can impact the water quality of local streams and rivers, alter the quality of habitat for wildlife, change the characteristics of the soil and decrease real estate values. Further, the impacts of noxious weeds can include declines in forage for livestock or wildlife, changes to the native plant and insect communities, increased expenses for control measures, and changes to human activity (e.g. limiting recreational access).

The City of Livingston manages the care of vegetation throughout the city parks, trails and open spaces with the guidance of the Public Works - Parks Department. Management actions by the Parks Department include maintenance of both developed and undeveloped landscapes, vegetation improvement and weed control. The City also conducts turfgrass management within the parks. Turfgrass management is a different effort from noxious weed management. Turfgrass management includes proper irrigation, aeration and trimming practices as well as control of plants such as dandelions or quack grass. Parks with significant turf acreage, such as Sacajawea and North Side Soccer Park, are subject to turf management. Turfgrass management is not addressed within this noxious weed management plan.

Historically, a cooperative working relationship between the City and Park County has allowed the Park County Weed Coordinator to address weed issues within the City. Consequently, the City has deferred to the County in matters of noxious weed management, including prioritization of species, specific areas and methods of control, and monitoring. In order to increase engagement and implement a vision for improved weed control, the City is taking steps to assume a role for pro-active noxious weed management. Steps that are taken now to prevent new infestations and control current noxious weed infestations from expanding is smart business. Proactive prevention is an investment that helps keep costs manageable. The City will continue to work with Park County to ensure that noxious weed management for the area is done cooperatively.

## Noxious Weeds of Montana

The control, inventory or monitoring of weeds will be focused on the species identified in the Montana Department of Agriculture Noxious Weed list (Appendix B). A suite of species are categorized by presence and abundance as well as by management criteria. The current noxious weed list includes 33 species or species complex for management. Individual species profiles generated by the Montana State University Extension Office have been included as part of this plan, if available (Appendix C). Additional species-specific resources can be accessed at the [Montana Weed Control Association](#).

## Approaches to Noxious Weed Management

The management of noxious weeds requires multiple strategies and methods to achieve the desired outcome. Depending on the species of noxious weed, the level of infestation and other social or environmental factors, the methods used may vary considerably. The commonly accepted practice of Integrated Weed Management (IWM) combines an organized, flexible and varied strategy to manage a particular area or species. There are five categories of control that IWM will fall into. These categories may work in isolation or in combination. It is important to understand characteristics of weed species in order to apply the most appropriate methods. If methods are applied incorrectly it can result in poor results, increased weed infestations or human injury.

- **Biological control** uses ecological concepts of introduced competition or predation, such as insects, pathogens, or predators. This may include the use of goats to graze.
- **Chemical control** uses herbicides to control weeds. The application of any chemical will require a full understanding of the application requirements based on the product labeling.
- **Cultural control** uses techniques to maintain the landscape in such a condition where noxious weeds are less likely to become established. These techniques might include grazing rotation, or in some cases restricted motorized recreational vehicle use.
- **Physical control** uses physical or mechanical methods, such as mowing, pulling, burning, and cultivation to control weeds. Proper tools and disposal are essential components of utilizing physical methods.
- **Prevention** uses a variety of techniques that modify behaviors to prevent the introduction or spread of noxious weeds. This may include requiring the use of certified weed-free forage, or public outreach.

If chemical control of noxious weeds has been identified as the method of choice, several factors will be considered prior to use. Those include appropriate herbicide for the target noxious weed, appropriate timing of herbicide application and consistent use of herbicide application technique. All herbicide application will require licensing and certified applicator training. Standard Herbicide Use Protocols (Appendix D) such as proper handling of chemicals, and safety measures must be adhered to for the protection of human health and safety, and compliance of the law. Herbicides are labeled with instructions, site restrictions and precautions. These labels outline the legal use for that chemical. Additional safety information on herbicides, such as chemical hazards or spill-handling procedures, are contained in Material Safety Data Sheets (MSDS; Appendix E). The MSDS should be available for use where herbicides are being stored.

The prevention of noxious weed introduction and spread is a critical aspect of any weed management effort. There are a variety of methods that can be used to address prevention. Prevention

often requires multiple partners to implement and will involve various stakeholder that affect the spread of weeds. For example, a prevention effort to trail users may include informational signage and opportunities for community involvement. Whereas a prevention effort to city employees may include developing activity plans that minimize weed transfer on equipment. A structured method to develop such an activity plan is the Hazard Analysis Critical Control Plan (Appendix F). HACCP is a method that assists professionals in identifying points in work activities where the risk of weed transfer can be either eliminated or reduced. Examining areas of high risk for weed introduction and spread can help focus prevention efforts.

Finally, successful noxious weed removal efforts may result in a disturbance to the area. This disturbance will make the treated site vulnerable to new weed infestations. Therefore it is important to include a plan to revegetate the site to encourage the establishment of desirable plant species. At the outset of any noxious weed management effort, the desired landscape condition and plant species will be considered. Revegetation will be a critical component of any management effort.

## Programs and Authorities

Many programs that specifically address noxious weeds are conducted across the state of Montana and its counties. Further there are a variety of authorities that guide these weed management efforts. Understanding the current authorities and programs of Montana, Park County and the City of Livingston will help define a noxious weed management plan for the future.

### Programs

Multiple entities conduct work cooperatively throughout Park County. The primary agencies associated with weed management relevant to Livingston include;

- I. **Montana Department of Agriculture** (MDA)
  - i. **Agricultural Sciences Division** provides agricultural producers and consumers, commodity and environmental protection through the administration of the Montana laws and rules in many areas, including but not limited to noxious weed control.
- II. **Montana Fish Wildlife & Parks** (FWP)
  - i. **Parks Division** conducts weed management activities throughout Park County on FWP managed properties.
- III. **Montana Department of Natural Resources and Conservation** (DNRC) conducts weed management activities throughout Park County on DNRC managed forest lands.
- IV. **Park County**
  - i. **Park County Weed Control Board** provides a management strategy and oversight on weed management issues throughout the county. The Park County Weed Management Plan outlines actions to be taken by the Park County Weed Control Board. Additional county weed management guidance documents include, Subdivision Requirements.
  - ii. **Park County Conservation District** partners with Natural Resource Conservation Service (NRCS), FWP and Montana Department of Natural Resources and Conservation (DNRC) and others to achieve conservation goals across the county, including noxious weed control.
- V. **City of Livingston**

- i. **The Public Works Department** makes the city of Livingston livable, and safe for residents through the following departments; water and sewer; streets; solid waste, and parks management.
  - a. **Parks Department** maintains a variety of properties for the residents to take advantage of. The Parks Department is ultimately responsible for implementing weed management activities within the City.

Other entities within the state are engaged in noxious weed management that may affect the management of noxious weeds within the city of Livingston. In recent years, Park County Cooperative Weed Management Area (CWMA), Joe Brooks Trout Unlimited, Park County Environmental Council and other local stakeholders have been involved in noxious weed efforts. Additionally, weed management efforts may include co-managed areas of responsibility or maintenance agreements (e.g. the City hold a maintenance use agreement at FWP Mayor's Landing).

### Authorities

The original weed legislation of Montana was passed in 1895 with the creation of a noxious weed program in 1921. There are a variety of authorities that address noxious weeds across Montana. The authorities that guide the noxious weed management of Montana are primarily housed in MDA and each subsequent county.

**Montana County Weed Control Act:** This act is implemented and enforced at a county level. The law establishes a weed management district in every single county of the state which includes all the land within the boundaries of the county. The county government is required to appoint a county weed control board. The law further requires the development of a long-term noxious weed control management plan. The noxious weed management program must be based on a plan approved by the county weed control board. The Montana County Weed Control Act further authorizes that any state agency controlling land within a district enter into a written agreement with the county weed control board. Under this act, MDA receives the responsibility to create and maintain weed supervisor training standards and listing statewide noxious weed species by rule. All counties must implement management standards for the statewide listed noxious weeds consistent with weed management criteria.

**Montana Weed Control Act:** This act provides the mechanism for funding noxious weed management programs and providing technical assistance from the MDA. The act further authorizes the MDA to expend funds for the utilization of biological control methods of leafy spurge and spotted knapweed.

**Montana Noxious Weed Seed Free Forage Act:** This act created a state noxious weed seed free forage and mulch certification program on public and private lands. MDA manages the Noxious Weed Seed Free Forage Program.

**Montana Noxious Weed Trust Fund Act:** This act was created as a grant-funding mechanism to assist local cooperative weed management programs, support research in weed control and educational programs. MDA manages the Montana Noxious Weed Trust Fund.

### Geographic Scope of the Management Plan

The City of Livingston's Parks and Trails Noxious Weed Management Plan will address specific areas within the city boundaries which include designated parks and trails (Appendix A) These areas represent diverse habitat types and habitat conditions. In some instances, city parks require more complex

strategies that include turfgrass management in addition to noxious weed management. Alternatively, trail corridors represent a more simple strategy for noxious weed management with trail right-of-way defining the management area.

The parks and trails addressed in this plan may be categorized by management type to help characterize management actions. Management types include;

- Turf – management area is composed largely of turf, shade trees and shrubs, and recreation structures; therefore noxious weed management will focus on the perimeter areas. Examples: Northside Soccer Park and Katie Bonnell Park.
- Riparian – management area is composed largely of grasses, shrubs and trees in the riparian zone and are influenced by the Yellowstone River or Fleshman Creek. Additional precautions are undertaken prior to initiating control actions due to proximity to water sources. Example: Bozeman Connector Trail.
- Grassland – management area is composed largely of bunch grasses, and annual or perennial plants. Example: Reservoir Park.
- Trail Corridor – management area is composed either of paved or gravel trail with pre-determined right-of-way surrounding the trail on both or one side. Example: Bike Path.

Sacajawea Park represents a complex management situation due to the variety of amenities that are managed, including the lagoon, playground, picnic areas, soccer fields, and band shell. The Sacajawea Lagoon represents a unique management resource impacted by noxious weeds that will likely require a more detailed strategy which falls outside the scope of this plan. Other areas within Sacajawea Park however can be addressed by simple integrated weed management.

There are some cases where co-management of noxious weeds takes place due to shared ownership or neighboring landowners. Additionally, many parks border neighborhoods or businesses. Management actions at neighborhood or business interfaces focus on cooperation, communication and shared stewardship. Finally, if additional parks or trails are created or expanded following the completion of this plan, the general principles of this plan will likely apply. The parks and trails identified below are the focus of the noxious weed management plan.

### Parks

There are 12 park properties managed by the City. The properties vary in vegetation type, habitat quality, acreage and amenities provided. Many parks are highly developed for human use, while others offer a more natural feel. The management strategies applied to park properties will differ between parks and be based on a consideration of factors.

<b>Park Name</b>	<b>Location Detail</b>	<b>Vegetation and characters</b>	<b>Management Type</b>	<b>Other information</b>
<i>Jack Wiemer Memorial Park</i>	Northern Lights Subdivision	Grassland species	Turf Riparian	Voyich Ditch forms a border of the park

<b>Northside Soccer Park</b>	Northwest Neighborhood	Managed turf surrounded by grasslands	Turf	
<b>Mars Park</b>	Northern Lights Subdivision	Developed terrain with playground equipment	Turf	
<b>Highground Public Use Area</b>	North Hill	Grassland species	Grassland	Encompassing water storage facilities
<b>Reservoir Park</b>	North Hill	Grassland species	Grassland	Encompassing the gully
<b>Depot Park</b>	City center on Park St between 2 <sup>nd</sup> St and 7 <sup>th</sup> St	Irrigated turf and mature shade trees	Turf Trail Corridor	Montana Rail Link land is on the parks northern border; co-managed with Depot Center
<b>Judson Park</b>	City center on Park St between 7 <sup>th</sup> St and 9 <sup>th</sup> St	Irrigated turf and mature shade trees and shrubs	Turf	
<b>Riverside Park</b>	9 <sup>th</sup> Street Island Bridge	Irrigated turf and mature shade trees	Turf Riparian	Yellowstone River is on the parks southern border
<b>Sacajawea Park</b>	Located at the transect of Yellowstone St and River Dr	Irrigated turf, mature trees, gravel dike, variety of recreation equipment	Turf Riparian	Primary location for outdoor gathering in the city. The lagoon falls within the Park <sup>1</sup>
<b>Mike Webb Splash Park</b>	Located at South G St	Irrigated turf, shrubs, playground equipment	Turf Riparian	City managed splash equipment
<b>Katie Bonnell Memorial Park</b>	Located on East Gallatin	Irrigated turf, shade trees, playground equipment, concrete pad	Turf	
<b>Mayor's Landing</b>	Located at the eastern terminus of View Vista Drive	Grassland species, cottonwoods, boat launch to the Yellowstone River	Riparian Grassland	Managed in cooperation with Montana Fish, Wildlife & Parks
<b>Moja Dog Park</b>	Located at the eastern terminus of View Vista Drive	Grassland species, cottonwoods, gravel trail	Riparian Grassland	Site of the historic city dump

<sup>1</sup> The management of noxious weeds surrounding the Sacajawea Lagoon will not be specifically addressed in this plan. This area requires a very specific weed management approach that falls outside the scope of this plan.

## Trails

There are 7 trails currently managed by City of Livingston. The trails serve a variety of purposes; to connect neighborhoods, provide recreational opportunities, and provide safe areas for pedestrians or cyclists. For most or all of the trails, there is a defined legal right of way that will delineate the noxious weed management zone of that trail. In some cases the right-of-way will be a narrow distance from the trail and in other cases the right-of-way will be much wider, the distance of the right-of-way will determine the area of management for each trail. The management strategies applied to trail properties will differ between trails and be based on a consideration of factors.

Trail	Location	Vegetation	Distance	Other information
Bozeman Connector Trail	Begins at Northern Lights Road and terminates at Fleshman Creek Road	bunch grasses, sagebrush, willows and chokecherries	1 mile gravel	Fleshman Creek borders the northeast side of the trail
Bitterroot Trail	Begins at the Northside Soccer Fields and terminates at N. 9 <sup>th</sup> St.	immature shade trees, perennials and grasses	½ mile gravel	Serves to connect neighborhoods
Summit Trail	Located between Montana and Summit Streets	Bunch grasses	¼ mile gravel	Serves to connect neighborhoods
Hopi Mountain Trail	Located behind the Park County Museum	Bunch grasses	¼ mile dirt	Serves to connect neighborhoods
Myers' River View Trail	Begins at Hwy 89 near the hospital and terminates at Myers Road	riparian diversity of vegetation, grasses, shrubs and mature trees	1 mile gravel	The Yellowstone River and an irrigation ditch encompass the trail
Alpenglow Trail	Begins at Livingston property line and terminates at Myers' River View Trail	Bunch grasses	¼ mile gravel	Serves to connect to Myers River View Trail; Co-managed with Livingston Health Care
Bike Path	Begins at the Livingston Depot and terminates roughly at East River Road	urbanized	paved path runs 4 ½ miles south parallel to Park Street/Hwy 89 South	Co-managed with Park County

## Inventory and Monitoring of Noxious Weed Species of Livingston

In order to create a comprehensive noxious weed management strategy, an inventory of the noxious weed species and their distribution is needed. The documentation of noxious weed species also assists managers in understanding the results of weed management control efforts. The primary noxious weed species currently found across City of Livingston parks and trails include; bindweed (*Convolvulus arvensis*), Canada thistle (*Cirsium arvense*), common tansy (*Tanacetum vulgare*), houndstongue (*Cynoglossum officinale*), spotted knapweed (*Centaurea stoebe*), and whitetop (*Lepidium draba*).

An [initial inventory](#) of species present in Livingston parks and trails was conducted in May and June 2016 by City staff (Appendix G). Future inventories of this type will provide a benchmark and guide current and future weed management efforts as well as crafting annual budgets to address weed control efforts.

The methods used to inventory noxious weeds can be very simple but will ultimately depend on the needs of the management entity. Often a basic presence | absence of species can be sufficient for management purposes. One simple inventory method is to determine transects within the management area and record those species. The selection of that transect should be one that can be visited pre and post-control treatments. This type of inventory may include GPS location and digital photo with detailed labeling and file storage.

Monitoring for noxious weeds is a different effort than simply compiling long-term inventory and assessing management efforts. Monitoring efforts can be done on a schedule to help identify new or emerging populations of weeds. Often monitoring is the first step in conducting eradication efforts to completely remove newly established populations. Monitoring efforts might consist of scheduled visits to management areas to search for new species. A monitoring effort will be at the discretion of the management entity.

## Gaps and challenges

All management efforts are influenced by funding availability, enabling legislation, and political will. The City Livingston Parks and Trails Noxious Weed Plan is no exception. Specific gaps and challenges will influence the final implementation of the plan. A variety of gaps and challenges specific to the City have been identified:

- i. Financial resources – A stable budget to implement the plan will be necessary. With any city budget there will be prioritizations to different programs that may affect annual noxious weed management. The importance of adequate funding to maintain inventory information and methodical control applications will be critical for the success of managing noxious weeds in Livingston’s parks and trails.
- ii. Environmental conditions – A variety of environmental situations could influence the success of implementing management actions. These might include high wind conditions, weather constraints and unforeseen environmental conditions.
- iii. Social influences – Perception on the use of control methods, particularly chemicals, often creates adverse reactions. However, control methods will always be used in compliance of legal guidelines which minimizes risks to human and wildlife health.
- iv. An ideal condition for Livingston parks and trails would be free of noxious weeds. However, achieving completely noxious weed-free parks and trails may be difficult if not impossible to

realize. Recognizing that even with effective control and prevention actions, noxious weeds will still persist.

## Noxious Weed Management Priorities

The management of noxious weeds on parks and trails of the City will be guided by the following priorities;

- protection of human health and natural resource amenities of the city
- utilize a collaborative approach among Park County and other local partners
- prevent the introduction or expansion of new populations
- control existing noxious weed populations with integrated weed management practices
- engage city residents and landowners in actions to prevent or control noxious weeds

## Management Goals and Objectives

The goal of the Livingston Parks and Trails Noxious Weed Management Plan is to protect the City's natural resources and prevent the spread and establishment of noxious weeds on the identified trails and park properties. Further, the plan will utilize a strategy which will be both effective and economically feasible. To achieve these goals, the following objectives will apply:

### I. Communication and Coordination

A successful noxious weed management plan requires dialog with a variety of agencies and stakeholders. Coordination and oversight ensures that the plan objectives are being met during its implementation.

### II. Early Detection and Monitoring

Early detection and monitoring are important measures to a management plan. Actions to identify emerging or new infestations are essential for minimizing the impacts from noxious weeds. Similarly, monitoring current efforts will allow for progress evaluation and adaptive management.

### III. Control and Eradication

The ability to control noxious weeds suggests that weed populations can be managed to prevent further expansion. Eradication suggests that weed populations can be completely removed with adequate tools, timing and resources. Depending on a variety of factors, control or eradication may be the preferred method.

### IV. Prevention and Outreach

Prevention of further spread as well as engaging residents, the public and City staff in noxious weed issues are key components to managing noxious weeds. Targeted education and outreach will be needed for successful implementation efforts.

### V. Programmatic Review

A successful noxious weed management plan will require a process to plan for ongoing and future management efforts, establish stable long-term funding, and a review and update relevant noxious weed city regulations or ordinances.

## Noxious Weed Management Strategies

The following strategies have been identified to address the goals and objectives. In many cases, specific strategies will be analyzed for relevancy and completion after a 5-year period. Should strategies become obsolete, a process to develop methods to address noxious weeds management will be initiated.

- I. Communication and Coordination
  - a. Maintain appropriate staff to implement the plan; including but not limited to licensed applicators
  - b. Coordinate and collaborate with local agencies and stakeholders; including but not limited to the county weed coordinator, and other partners actively co-managing parks and trails in the City
  - c. Implement management practices that address the state listed noxious weeds and are also consistent with Park County noxious weed management practices
- II. Early Detection and Monitoring
  - a. Complete and maintain an annual inventory on park and trail properties
  - b. Develop a method to conduct early detection monitoring
  - c. Utilize state-sanctioned database to capture weed populations
- III. Control and Eradication
  - a. Identify a method to prioritize control projects based on scientific understanding and budget availability
  - b. Identify best management practices for local control issues utilizing Integrated Weed Management methods
  - c. Develop a revegetation strategy following control efforts for specific park or trail properties where appropriate
  - d. Utilize control options that minimize impacts to human health and maximize weed control
- IV. Prevention and Outreach
  - a. Identify areas or activities for pathway prevention
  - b. Conduct Hazard Analysis Critical Control Point analysis or plans for all activities conducted by city employees
  - c. Identify and implement cleaning strategies for city vehicles and equipment
  - d. Develop a protocol to properly dispose of discarded weed materials
  - e. Identify and implement outreach efforts or campaigns aimed at specific pathways of introduction
  - f. Coordinate with City Trails Committee to implement outreach efforts; including but not limited to volunteer monitoring and volunteer weed pulling events
  - g. Develop and distribute technical assistance to stakeholders and landowners
- V. Programmatic Review
  - a. Identify and secure long-term funding sources to implement the plan

- b. Conduct annual inventory/review of equipment and materials needed to conduct weed control projects
- c. Examine city codes and resolutions for amendments that may elevate or improve the outcome of prevention strategies
- d. Review changes to the Montana Noxious Weed list and incorporate into the plan as needed

# Appendices

## Appendix A – City of Livingston parks and trails

This map is currently under revision by the City Parks and Trails Committee and will be included once completed.

Appendix B – State of Montana Noxious Weed List, Department of Agriculture

## Appendix C – Noxious weed species profiles

The following Noxious Weed Species profiles have been included if available by Montana State University Extension Service *MontGuides* or Montana Natural Resources Conservation Service.

Bindweed (*Convolvulus arvensis*)

Common tansy (*Tanacetum vulgare*)

Houndstongue (*Cynoglossum officinale*)

Spotted Knapweed (*Centaurea stoebe*)

Knotweed (*Fallopia* spp.)

Leafy Spurge (*Euphorbia esula*)

Oxeye Daisy (*Leucanthemum vulgare*)

Saltcedar (*Tamarix* spp.)

St. John's Wort (*Hypericum perforatum*)

Toad Flax (*Linaria vulgaris*)

Whitetop (*Lepidium draba*)

Yellowstar Thistle (*Centaurea solstitialis*)

## Appendix D – Herbicide Use Protocols

Herbicides will be used only when necessary at recommended rates and times of application, and uses listed on the label.

### Safe Herbicide Use for City of Livingston Weed Applicators

- Appropriate staff will be familiar with current federal and state pesticide laws and regulations and maintain current licenses.
- Minimize drift of spray or dust that may endanger other plants or animals.
- To protect yourself and others, follow all safety precautions on the label. Know and observe the general rules for safe pesticide use, and record the date, time, location, and amount of each pesticide used.
- Wear protective clothing and use protective equipment according to instructions on the pesticide label.
- Never eat, drink, or smoke while applying pesticides.
- Avoid spilling spray materials on skin or clothing. If such an accident occurs, wash immediately with soap and water.
- Wash clothing after applying pesticides, keeping in mind that, until laundered, such clothing must be handled according to the same precautions as the pesticide itself. Wash pesticide-contaminated clothing apart from other laundry, and take care in disposing of the wash water.
- Store pesticides in their original containers in a locked, properly marked cabinet or storeroom, away from food or feed.
- Do not store herbicides with other pesticides; avoid the danger of cross-contamination.

If you suspect poisoning, contact your nearest Poison Control Center, hospital emergency room, or physician. Take the pesticide label and, if possible, the Material Safety Data Sheet (MSDS) with you and give it to the attending physician.

## Appendix E – Material Safety Data Sheet Information

Information regarding herbicides can be found in specific Material Safety Data Sheets. These MSDS provide information regarding the overall safety precautions and additional steps to be taken should the herbicide be spilled or other accidental misuse occurs.

The MSDS for herbicides uses by the City of Livingston for noxious weed control are housed and can be accessed at the City Offices on 330 Bennet Street, Livingston MT.

## Appendix F – Hazard Analysis Critical Control Point resources

Hazard Analysis and Critical Control Point (HACCP) planning is a management tool that provides a structured method to identify risks and focus procedures in natural resource pathway activities. Understanding pathways and developing plans to reduce non-target<sup>2</sup> species and prevent biological contamination are necessary to avoid unintended spread of species.

### Five Steps to HACCP Planning<sup>3</sup>

1. Describing the activity: The activity description includes specific information such as who, what, when, where, how, and why of the project. The description offers a historical, working reference to facilitate plan review and communication with the facility staff and other resource management agency personnel.
2. Charting the flow of tasks for the activity: This step provides an important visual tool that the HACCP team can use to complete the remaining steps of the plan. Here, a clear and concise, yet complete description of the tasks necessary to complete the overall activity is diagramed in a linear fashion.
3. Identifying potential non-targets: Any species that has a reasonable potential to be moved or introduced to new habitats should be identified in order to implement appropriate control measures to prevent an unintended invasion. These may include vertebrates, invertebrates, plants, or other organisms (e.g., diseases, pathogens, and parasites).
4. Analyzing non-targets: It is crucial to identify significant non-targets with respect to each required task within a larger activity so that effective measures to control them may be employed. During the analysis, the significance of each potential non-target is assessed by considering risk.
5. Completing the action plan: The action plan addresses specific methods to control risks of non-target species. It lists specific information about controls, monitoring procedures, methods for evaluation, and corrective actions.

Additional web resources on HACCP planning and forms can be found here:  
[www.haccp-nrm.org](http://www.haccp-nrm.org)

---

<sup>2</sup> Non-target species are defined as the invasive species that may be spread or introduced during the management activity being performed. For example, if the management activity is mowing a native grasslands park then the target species are the native grass species. The non-target species are any identified introduced species that may be unintentionally moved during the management activity.

<sup>3</sup> Excerpted from Hazard Analysis Critical Control Point Planning to Prevent the Spread of Invasive Species by the US Fish and Wildlife Service, 2011.

## Appendix G – Noxious Weed Inventory of Livingston’s parks and trails

A preliminary weed inventory was conducted on several parks and trails of Livingston in May and June of 2016. This inventory does not include all parks and trails identified in this plan. The inventory below is meant to provide a sample of future inventories which will be more comprehensive.

<http://www.arcgis.com/home/webmap/viewer.html?webmap=a03247af90614d4584936abb2606ac68&extent=-110.6244,45.6363,-110.4977,45.6886>

