

City of Lakewood

Department of Community Resources

Natural Areas Plan

Purpose: To conserve high quality natural open space and wildlife habitat, and provide quality outdoor recreational experiences within the City of Lakewood through efficient and progressive trail, vegetation and wildlife management.

Natural resource management in the urban interface, such as the natural areas that the Department of Community Resources manages, is a challenging endeavor. Many of the management difficulties the department faces are a result of the high public use that the natural areas receive. Large amounts of recreational use can result in increased erosion, creation of social trails, trampling of vegetation, spread of invasive species, recreational user conflicts, wildlife displacement or harassment, and human/wildlife conflicts. The natural areas also face threats from surrounding development and encroachment. Natural resource managers must manage each of these issues in a professional manner and resolve them to the extent possible while still providing high quality recreation. This plan will serve as a guideline for all resource management activities that are undertaken in the natural areas within the City.

For the purpose of this plan, natural areas management will be divided into five general topics:

- I. Vegetation Management
- II. Invasive Species Management
- III. Habitat Management
- IV. Wildlife Management
- V. Natural Surface Trail Management.

This document will cover these topics and subtopics in depth, and will also include any park specific management in the Community Resources program. The vegetation management section will also serve as the Invasive Species Control Plan for the Regional Parks division.

Vegetation Management

Vegetation is an integral part of the Community Resources landscape. The City's natural areas consist of three major vegetation zones, rangeland, shrubland and riparian. The rangeland zone is made up of rolling hills of short grass prairie. There are areas with small patches of shrublands with great cover and habitat for wildlife. The riparian zone has deciduous forests, wetlands, streams and lakes. Much of the vegetation in these areas is native. A smaller, but much more aggressive, portion of the zones is dominated by noxious weeds. Lakewood's management goal for the natural areas is to restore them as close as possible to the natural state that existed prior to the arrival of European settlers. A recent vegetation inventory was completed in 2010 (Appendix A), as a baseline for future vegetation management.

Native Vegetation

Management actions to restore and protect Lakewood's natural areas will take into account threats to native vegetation, including high recreational use, noxious weeds, residential encroachment and other development. Vegetation can be protected through management techniques such as environmental restoration, a process in which a damaged resource is renewed and put back to a natural state. This is accomplished through a process involving re-vegetation, mowing, controlled burns and invasive species control.

Re-vegetation

This is the process of replacing vegetation in an area that has been disturbed. Disturbances can be as large as construction projects or as small as placing a trail sign. All disturbances disrupt natural processes and can cause bare areas or allow the encroachment of weeds. Each project/disturbance site needs to be seeded by the best means for that specific project, taking into account factors such as topography and soil conditions. There are several seeding/revegetation methods that can be used.

Hand seeding can be effective on areas less than a quarter acre in size, and is accomplished with a rake or similar tool. The first step in seeding is to scarify the ground by raking or ripping the soil to break the upper crust. Seed can then be spread on the scared ground. The seed needs to be raked into the ground to get good soil-seed contact. Walking on the soil is beneficial once the process is done to compact the soil and get even better soil-seed contact.

On larger projects that encompass acres of land, a drill seed process needs to be utilized. This is typically done with a tractor and a drill seeder implement that attaches to the tractor. The implement loosens the soil, deposits the seed than compacts the soil behind it. Once this is done, a straw spreader follows behind and spreads straw over the newly seeded area. A crimper makes the final pass to push the straw into the soil so it can hold the soil in place while the seeds begin to grow. Some agencies are moving away from straw and Lakewood will make a project-to-project determination on whether straw is used. The use of soil amendments will also be considered on a project-by-project basis. Additional consideration will also be given to using soil stabilization techniques as warranted by slope and soil conditions, or water quality concerns.

Seed Specs for Lakewood Open Space Parks

SPECIES	VARIETY	% OF MIX	PDS. Of PLS/ ACRE
Western Wheat grass	Arriba	58%	7
Sand dropseed	Borden county	<1%	0.1
Blue Grama	Lovington	17%	2
Buffalo grass	Cody	25%	3

Total 12 PDS PLS/Acre

PLS = Pure Live Seed

Seed must be drill seeded in.

Seed specs can change over time due to price and soil types. This seed spec is a general use spec that has worked well in the past.

Mowing

Mowing can be a valuable tool if used correctly. When weed areas are mowed at the correct times there can be a reduction in weed population and seed output. If mowing is used at the wrong time it can stunt native vegetation growth and promote weed growth. Mowing should be used during the natural burn cycles for short grass prairies. Burns usually happen in middle to late summer when temperatures increase and there is little precipitation.

Winter mowing can also be a useful tool. Mowing thick vegetation patches in the winter can clear the dense overgrowth and allow increased native grass growth in the spring. This also promotes competition between native grasses and noxious weeds. Weeds will be sprayed in the early spring in the mowed areas to give native vegetation the competitive edge in the spring.

Mowing should be used when herbicide application has not been done, or if the herbicide was not effective, in order to limit weed seed spread. *Mowing will typically not be done in areas containing healthy stands of native vegetation.* If a location is composed of more than 40% weeds it should be mowed; less than 40 % needs to be sprayed or selectively cut with a weed whip. Due to the large acreage of the natural areas, and limited resources, not all sites will receive this treatment. Sites will be prioritized by park staff.

Fire in Lakewood's Open Space

Fire ecology for short grass prairies shows historically burns happened in intervals from every one to ten years. Fire suppression since the early 1900's has dramatically altered this natural process. Fire helps to remove dense cover and replaces nutrients in the soil that native species depend on. Wetlands burn intervals are spaced further apart due to the wet ground and plants having more water content. Wetland burns have not been done by the City and should be researched more in the future for possible burns in these areas. Fire can also help control invasive plant species that are invading natural areas. These species have not evolved with fire and often cannot compete with the natives that have.

Prescribed Burns

Lakewood works closely with the West Metro Fire Department (WMFD) because both agencies benefit from prescribed burns. Lakewood gains a tool for controlling weeds, stimulating native plant growth and restoring the rangeland ecosystem. WMFD receives valuable training for their wild land firefighters. A prescribed burn agreement will be written and updated every five years; the last update was in 2008. A specific burn plan will be written for each burn. Once the plan is in place, the Natural Resource Specialist will work closely with WMFD on the following:

- There are three agencies (Lakewood, Foothills and Ken Caryl Ranch) competing for burn time with WMFD. Only one or two agencies will be selected for burns each year.
- If Lakewood is selected, sites need to be chosen. There are several factors to take into account when choosing a burn site:
 1. Public safety is always the top priority. Park patrons, residences, roads, trails and other infrastructure are the main concern.
 2. Protection of the natural resources needs to be considered. The resources are going to be burned but the least amount of impact is best. Access points, staging areas and natural firebreaks need to be researched. Limiting use of brush trucks to protect the resources is another option that can be discussed with WMFD.
 3. Types and amount of fuel need to be reviewed. Without enough fuel the fire will not burn. This excludes some areas of high weed infestation because fuels are too sparse. Moderate to low infested weed sites benefit most from the burns.
 4. Higher visibility locations may result in more complaints about smoke and after-burn appearance.
 5. The time of year can dictate where burns occur. Historical burn cycles occurred in the late summer and early fall when temperatures are high and the vegetation is dry. This is the best time to burn. Spring burns can happen but impacts to ground-nesting birds need to be considered.
 6. Both Lakewood and WMFD need to agree to the site.

- WMFD will apply for a smoke permit for the year and Lakewood will pay half the cost.
- There is a spring (March – April) and a fall (September – October) window for burning. Special permits can be acquired for burns during the winter months between the fall and spring dates. Dates need to be set for the burns at least a week in advance.
- Notify supervisor of burn dates. Notification will be sent to the department director and the City Manager’s office.
- When meeting with WMFD a specific site will be agreed upon and all details of the burn will be discussed.
- Park staff will ensure that all public access to the burn area is blocked. Signs will be placed at the main gate and all entrances into the burn areas notifying the public of the date of the burn and that trails will be closed. This needs to be done at least a week in advance of the fire.
- Signs need to be placed at trail sites where closures will occur at the same time the trail head signs are placed. On the day of the burn park staff will be stationed at each sign placement to secure the site.
- All staff working inside the fire zone is required to have a red card and all wild land fire personal protective equipment (nomex clothing, fire shelter, helmet, gloves, fire tool, eye protection, neck/face shroud).

Bear Creek Lake Park was the main area for burns until 2007 when Green Mountain had its first burn. BCLP is the best option due to distance from residences and the roads around the park that act as a firebreak. Green Mountain needs special planning and has only been burned on the southwest side of the mountain, due to distance from residential areas.

Fire Mitigation for Lakewood Residents

Per the Lakewood Department of Community Resources Rules and Regulations:

Owners of real property adjacent to City parks may, where necessary to mitigate against danger of wildfire, enter onto the City’s parkland for the purpose of maintaining and controlling vegetation, including but not limited to mowing, cutting or raking grasses and ground cover or removing, trimming, pruning or otherwise reducing shrubs, bushes, trees and other vegetation, in the area on the City park land within ten (10) feet of the owner’s property line. Property owners must abide by the following stipulations:

- A. Pre-approval is required for the removal of trees over three (3) inches in diameter.
- B. No clearing of vegetation down to mineral soil.
- C. No landscaping or other improvements will be allowed on City property.

Invasive Species Management

Weeds are a concern for both Urban and Regional Parks in Lakewood. In all of Lakewood's natural areas any plant that is not native to Colorado is considered a weed. The Colorado Department of Agriculture defines weeds that can significantly disturb natural areas as noxious. The Natural Resources Specialist maps weeds in the Regional Parks and is also responsible for treating them. The Urban Parks Division develops an annual management plan based on the Colorado Noxious Weed Act. Weed control in Urban Parks is the responsibility of the right-of-way management crew and the parks crew leader.

In addition to invasive weeds, land managers also need to manage for a variety of Aquatic Nuisance Species. These species are not highly prevalent in Colorado yet, so a plan to prevent infestation is the current management tool.

Integrated Pest Management

Noxious weeds are a well-established threat to Lakewood and cannot be controlled by one method alone. A variety of management techniques has been developed to control the aggressive invaders. Integrated Pest Management (IPM) consists of several different aspects: chemical, physical, biological and cultural control. Each one of these control methods has a time and place when they work best. As part of the IPM, it is the responsibility of park staff to use the correct tool for the correct job at the correct time.

Chemical Control

- Chemical consists of applying herbicides to all areas with weeds where the other methods would not work due to the large size of the areas.
- Any application of herbicide needs to be done with the supervision of a certified applicator or a qualified supervisor.
- Herbicide application training will be done at the beginning of each season with a specific checklist for that training.
- All applications have windows of opportunity for each species. The Natural Resource Specialist will monitor these windows, and will dictate when each application will occur in open space areas.
- A record of all herbicide application needs to be taken per state law. Sheets will be filled out the day of application. This will be covered in the herbicide application training.
- A GIS record of applications will also be kept.

Physical Control

- Physical methods are pulling, mowing and any other physical removal of weeds.
- Some training is required to identify the weeds that need to be removed.
- Some species of weeds will be weed whipped then picked up and placed in a truck. The truck will then be dumped in a pre-designated storage area for decomposition.
- After any pulling is done a GIS record needs to be taken for park records.

Biological Control

- Biological methods consist of using other biological organisms to help with the removal of weeds.
- The release of Department of Agriculture approved insects is the only current biological control in use in the parks. Insects are currently in use for field bindweed, musk thistle, Canada thistle, diffuse knapweed, dalmation toadflax, leafy spurge and puncture vine.
- Insects are only used in areas with populations of weeds large enough to distribute bugs.
- Several acres of the same species of weeds are required.
- Once a patch is determined to be suitable for insects, an order for that specific insect needs to be placed.
- When the order of insects is delivered, and the placement takes place, a record for the Department of Ag needs to be taken. They are usually on site, but if not a copy needs to be sent to them.
- A GIS point should be taken for park records.

Cultural

- Cultural is the use of environmental factors that are man made to control weeds.
- Controlled burns are currently the most effective cultural method in use.
- Once a burn has been done, a herbicide application will take place at the earliest convenience.
- Then the reintroduction of native grasses through seeding will be applied to compete with the noxious weeds in the area.
- Other cultural methods include grazing (goats, cows and other grazers).
- A GIS record for burns will be taken also.

Control Plan

The control methods listed above need to have a plan of use otherwise they will have limited effectiveness. Different aspects of weed control need to be taken into consideration such as: trails, wind direction, water flow, disturbed areas and roads. All of these contribute to the spread of the weed seeds.

In order to control the spread of seeds, all road and trail corridors need to be sprayed and mowed where possible to limit seed production. These herbicide applications should take place in the spring to stop the plant growth. Later in the summer, when spraying is no longer the best control method, mowing should be done to limit seed production by controlling plant size. The combination of the two methods should slow or stop seed spread along these travel corridors.

Water flow can move seeds down stream, so a plan of control from upstream to down stream should be implemented.

Weather systems in the Lakewood area tend to move from west to east a majority of the time. When applicable, control needs to start on the west side of each property. This should slow the spread of weed seeds by wind and approaching storms.

Any disturbances, ranging from social trails to construction projects, can increase noxious weed spread. All disturbed areas should be seeded (see Seed Spec chart on page 3) as soon as the project is completed or the social trail is shut down. The native seeds will provide competition for weed seeds that have taken root in these areas. Once the native vegetation is established the area needs to be treated with a broadleaf herbicide. This will kill any invading weeds and give a competitive edge to the native vegetation. Controlled burns are a disturbance that can be used to our advantage as we can get out and spray right after the fire to control the weeds.

The use of weed mapping will also help set priorities of where to spray, or use other control methods. The maps will show populations and locations, and will also help evaluate control effectiveness. Weed population densities will be considered because high population areas will be sprayed to thin out the numbers, and small populations will be sprayed to possibly eliminate the weeds completely.

Location of weeds is crucial to where they fit in the spray priorities. Weed infestations that are easy to access can readily be sprayed. A majority of the weeds in Lakewood are in locations that are hard to reach or to spray. Green Mountain consists of many steep slopes, and the riparian zones contain many trees. Spraying in these areas is limited to backpack sprayers, which is very time consuming.

Priorities and Goals

In order to establish control over noxious weeds in Lakewood a list of priorities and goals will be set. These priorities and goals will enable the City to follow a specific plan for control and also measure effectiveness from year to year. The priorities apply the information from the control plan and focus them on specific sites, issues and weeds. The Colorado Department of Agriculture has categorized noxious weeds as follows:

- List A: designated for eradication on all county, state, federal and private lands.
- List B: List B weed species are species for which the Commissioner of Agriculture, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, develops and implements state noxious weed management plans designed stop the continued spread of these species.
- List C: List C weed species are species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, will develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans will not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species.

The following are Lakewood's weed control priorities:

1. List A species on the Colorado Department of Agriculture's noxious weed list are the number one priority. There are four species in Lakewood at this time: myrtle spurge, cypress spurge, orange hawkweed and purple loosestrife. Park staff continually monitors for the other List A species.

Goal - Establish 90% control on all current populations of list A species within five years.

Goal Monitoring - GPS the outline of each population and record the canopy cover every other year and compare the outlines. Use this to develop a percentage of control. Use photos to maintain a visual record.

All other priorities involve List B and C weeds.

2. Small populations of one species of weed are high on the priority list. If the weed can be eradicated before the infestation becomes truly established then the problem may be avoided altogether. An example of this is the small infestation of garlic mustard in BCLP.

Goal - Spray any small population within two days discovery and return the following year for evaluation.

Goal Monitoring - Map these populations when they are found and return each year to check them. Continue until the weed population is eradicated and then follow-up one more year.

3. Over the last nine years Lakewood has been working with the West Metro Fire Department and conducting prescribed burns on open space properties. These sites are the next priority. The use of fire helps clear out old forage and stimulates native grass growth. When these sites are sprayed the weeds are more visible and susceptible to the herbicides used. Dramatic declines in weeds in these areas have been seen when implementing this practice.

Goal - Continue to use controlled burns whenever and wherever possible to control weeds.

Goal Monitoring - Map burn areas each year a burn is done using ArcMap software to keep the records.

4. The fourth priority in the integrated pest management plan is resolving public complaints. Depending on circumstances, complaints can raise weed control in an area to top priority. Park staff will evaluate each complaint based on the overall Natural Areas Plan. Significant time is spent to resolve any issue before complaints arise.

Goal - Respond to complaints within forty eight hours whenever possible.

Perform follow-up evaluation/control after three weeks and the next spring.

Goal Monitoring - Develop a system to track complaints and the actions taken to resolve them.

5. There is a fee to enter Bear Creek Lake Park, and this can result in higher expectations from park users. Therefore a greater amount of time has been spent

in the park trying to eliminate weeds. Staff has gained better control over BCLP infestations, and crews have been able to focus more on other parks.

Goal - Control approximately 70 % of the weeds issues shown on the 2008 map (Appendix B) within five years.

Goal Monitoring - Complete a weed inventory of Bear Creek Lake Park every three years to determine percentage of weeds controlled.

6. Lakewood has a large spray trailer that can cover a lot of acreage at one time. The sixth priority focuses on larger sites where this trailer can be effective. An example of this is the 50-acre plot of flat land just to the east of the Rooney Road parking lot at William Frederick Hayden Park.

Goal - Utilize the spray trailer to control weeds in large flat areas until 90% of the weeds have been controlled. Follow-up with more selective methods to kill off the last 10%.

Goal Monitoring - Effectiveness can be monitored through the mapping of the park that will happen every three years.

7. Park areas with large numbers of trees, steep slopes or difficult access are last on the priority list. These sites are very time consuming to spray with small backpack sprayers and limited resources.

Goal - Start on the upper portions of Bear creek in Bear Creek Lake Park and control all weeds with backpack sprayers for the first half mile. The next year check the previous year's treatment area and start on the next half mile segment. Continue until Bear Creek is completed and then start begin Turkey creek. Once BCLP is completed staff will focus on the Bear Creek Greenbelt.

Goal Monitoring - Weed mapping for ongoing evaluation.

Other considerations that are taken into account are direction of wind, stream flow, trails, roadsides, and concentrations of weeds. Wind primarily comes out of the west so efforts are made to spray from the west to east sides of the properties. Weeds are also controlled from up stream to down stream, to slow spread. Trails and roads help promote the spread of weeds through recreation and vehicle use. By controlling these areas weed spread is minimized. Areas with smaller concentrations of weeds are controlled to keep low populations on those sites.

Additional Goals

- Provide public education about the importance of noxious weed control through volunteer events, brochures and programs.
Goal Monitoring - Maintain records of events and programs each year.
- Weeds spread the most when they establish along trails and roads; control these weeds to slow spread.
Goal Monitoring - Weed mapping of the parks along with hiking the trails and taking notes at the next years spraying.

Weed Species and Priority Level

The following table lists the Colorado noxious weed species that are known to be on Lakewood park property. Each species has a “high”, “moderate” or “low” priority next to it as a priority level for the City of Lakewood. The species designated “high” are the most significant concern and will receive the most control focus. These species are either List A, newly found with a small population, or very aggressive. Weeds designated as “moderate” are still important to control but are not as aggressive and currently exist in larger populations, making eradication difficult and time consuming. “Low” priority weeds include those with very large populations, making control much more difficult. “Low” priority weeds are not considered to be an immediate threat to the ecosystem around them. Appendix C contains the most recent weed infestation maps.

Noxious weeds

Priority	Latin	Common
*H	<i>Alliaria petiolata</i>	Galic mustard
M	<i>Acroptilon repens</i>	Russian knapweed
L	<i>Arctium minus</i>	Common burdock
L	<i>Bromus tectorum</i>	Cheatgrass
M	<i>Cardaria draba</i>	Hoary cress
M	<i>Carduus acanthoides</i>	Plumeless Thistle
M	<i>Carduus nutans</i>	Musk Thistle
M	<i>Centaurea diffusa</i>	Diffuse Knapweed
M	<i>Chrysanthemum leucanthemum</i>	Oxeye daisy
L	<i>Cichorium intybus</i>	Chicory
M	<i>Cirsium arvense</i>	Canada Thistle
M	<i>Cirsium vulgare</i>	Bull Thistle
M	<i>Conium maculatum</i>	Poison Hemlock
L	<i>Convolvulus arvensis</i>	Field Bindweed
M	<i>Cynoglossum officinale</i>	Hound’s Tongue
M	<i>Dipsacus fullonum</i>	Common Teasel
M	<i>Dipsacus laciniatus</i>	Cutleaf Teasel
M	<i>Elaeagnus angustifolia</i>	Russian Olive
L	<i>Erodium cicutarium</i>	Redstem Filaree
H	<i>Euphorbia cyparissias</i>	Cypress spurge
M	<i>Euphorbia esula</i>	Leafy Spurge
H	<i>Euphorbia myrsinites</i>	Myrtle spurge
M	<i>Hesperis matronalis</i>	Dames rocket
H	<i>Hieracium aurantiacum</i>	Orange hawkweed
L	<i>Hypericum perforatum</i>	Common St. Johnswort
M	<i>Lepidium latifolium</i>	Perennial pepperweed

M	<i>Linaria dalmatica</i>	Dalmatian toadflax
M	<i>Linaria vulgaris</i>	Yellow Toadflax
H	<i>Lythrum salicaria</i>	Purple loosestrife
M	<i>Matricaria perforata</i>	Scentless chamomile
H	<i>Onopordum acanthium</i>	Scotch thistle
*H	<i>Polygonum cuspidatum Sieb</i>	Japanese knotweed
L	<i>Saponaria officinalis</i>	Bouncingbet
H	<i>Tamarix ramosissima</i>	Salt cedar
M	<i>Tribulus terrestris</i>	Puncturevine
L	<i>Verbascum thapsus</i>	Common Mullein

* Is not listed currently but will be placed on the Colorado weed list in the near future

Pesticide Applicators’ Act

As an agency that applies pesticide on public property, Lakewood must be in compliance with all rules and regulations set forth by the state in the Pesticide Applicators’ Act. Lakewood must have a qualified supervisor and certified operators on staff that know the applicators act and stay current with any updates to the rules. The Natural Resources Specialist with Regional Parks will be a Qualified Supervisor and will manage the pesticide program for that department.

All public notification regulations will be followed by posting the appropriate signs at park entrances, trail heads and the spray areas, as designated by the Act. Lakewood will also place larger, more informative signs, on location when necessary. A calendar with general spray times and targets will be made available on the City’s website. If posted, notification will also be given that herbicide applications are time and weather dependant.

Aquatic Nuisance Species (ANS) Policy and Procedure

I. Overview

Zebra and quagga mussels are freshwater mussels that resemble small clams. They were introduced to North America from the Black and Caspian seas in the 1980’s. Since introduction they have spread rapidly through the Great Lakes and Mississippi River watershed and have caused billions of dollars in damage to any and all water structures including drinking water systems and agricultural water supply. They have also spread into several western waters including Lake Mead. They have no effective predators in North America and no techniques have been found to remove them from infested waters.

Zebra mussels pose no health risks, however they can cause severe damage to water systems, boating equipment and the ecosystem. They have spread by attaching to boats, waders and other equipment, are difficult to detect and can live for extended periods in

moist conditions while being transported to another body of water. Additionally, the mussel larva can be carried in any area of a boat that holds water, including ballast tanks and live wells. A single female can produce up to 1 million eggs per year. The mussels are free-floating in their larval stage (veligers), then develop shells and attach to any solid surface. The attached mussels can form a thick mass and effectively block water flow through any water system, having a serious impact to water supply lakes and reservoirs. These impacts have resulted in agencies at all levels of government investing billions of dollars to treat and clean water systems.

The mussels can also have severe impacts to reservoir fisheries, wildlife, plants and recreation. They consume large quantities of the microscopic plants and animals that form the base of the food chain, leaving little for native and stocked species. They can also encrust and smother native species. The negative impacts to fisheries and wildlife can then reduce recreational uses such as boating, fishing and wildlife viewing.

In February 2008 zebra mussels were found in Pueblo Reservoir. Shortly thereafter, state biologists found mussels in 6 more Colorado reservoirs: Lake Granby, Grand Lake, Shadow Mountain, Willow Creek, Tarryall and Jumbo.

There are numerous additional Aquatic Nuisance Species that are of concern. These include rusty crayfish, New Zealand mudsnails, spiny water fleas, fishhook water fleas, Brazilian elodea, hydrilla, African elodea, Eurasian watermilfoil, parrotfeather, giant salvinia, water hyacinth, purple loosestrife and yellow floating heart. The zebra and quagga mussel prevention procedures detailed in this plan will also help to prevent the spread of these species.

II. Bear Creek Lake Park Inspection and Decontamination Plan

- A. Bear Creek Lake Park has adopted the State of Colorado Watercraft Inspection and Decontamination Procedures as described in the Aquatic Nuisance Species Watercraft Inspection Handbook (Appendix L). Lakewood has also adopted portions of the state ANS regulations into City ordinance. Boat inspections will be mandatory for all motorized boats, trailered boats, sailboats and fishing boats launching on Bear Creek Reservoir and Big Soda Lake.
- B. Location: The inspection station will be located in the Whitetail parking lot. It will be situated so that horse trailer parking is still available.
- C. The station will consist of a boat lane, a small office, and a trailered Hotsy pressure washer for decontamination.
- D. Station hours:
 - a. From May through September boating hours will be limited to 6am-8pm. Boats will be allowed to remain on the water until 10pm, but may not launch after 8pm. The reservoir will be closed to all motorized and trailered boats from November 15 until March 15 annually. Boating hours for the spring and fall will be regular park hours.

- b. The inspection station will be available during all hours that boating is allowed, however Monday through Thursday onsite staffing will be limited to the morning and evening hours. During these times a trained inspector will be available in the park to perform inspections on an on-call basis using the gate attendant as a first point of contact.
- c. Staffed hours at the inspection station will be:
 - i. Monday-Thursday: 6am-10pm and 4pm-8pm
 - ii. Friday-Sunday: 6am-10pm

E. Inspectors

- a. All inspectors will complete a state certification course in inspection and decontamination procedures. Refresher training as mandated by Colorado Parks and Wildlife will be completed each year.
- b. The park will have several Stage II level certified employees. These employees are authorized to train and certify Stage I inspectors. All employees expected to staff the station or inspect boats will maintain a minimum of Stage I certification.

F. Inspection and Decontamination Procedure

- a. All inspectors are expected to follow the procedures provided in the Aquatic Nuisance Species Watercraft Inspection Handbook. These procedures are fully adopted into this policy.
- b. All paperwork, including daily inspection logs, high-risk inspection forms, and decontamination forms will be completed.
- c. State required forms will be submitted to Colorado Parks and Wildlife on a monthly basis.
- d. Any suspect ANS found by inspectors will be handled in accordance with full Colorado Parks and Wildlife standards.
- e. Any decontamination will follow the procedures provided in the Aquatic Nuisance Species Watercraft Inspection Handbook. Any updates to this handbook, or further state guidelines, will be adopted as part of this policy.
- f. If an inspector finds suspected ANS on a boat, the boat will not be allowed to launch at BCLP or to leave the park without decontamination. If the boat owner is uncooperative a park ranger should be called immediately, and the boat may be quarantined. Any quarantine should involve contact with Lakewood Police and Colorado Parks and Wildlife law enforcement.

Habitat Management

Natural Areas Management Designations

In order to effectively protect and enhance the various habitats and wildlife populations within the City's natural areas, the following management designations will be used (Appendix D):

- **Recreation Zones-** These zones will include all portions of the parks and natural areas where recreation will be a priority use. These areas will be managed with recreation as a priority, while still providing for the protection and restoration of natural habitats to the extent possible. Examples include trailhead areas, campgrounds, playgrounds and the swim beach.
- **Natural Zones-** Natural zones will be relatively large areas with little site disturbance, where ecological processes are to a large extent unimpaired. These areas will be managed for passive recreation, focusing on trail use, wildlife observation, and providing a sense of solitude. The focus of management in these areas will be on restoration and protection of native vegetation and wildlife. These areas will typically not be developed for more active uses.
- **Sensitive zones-** This designation will be used for areas that provide high quality wildlife habitat and could be particularly sensitive to human impacts. This will include many wetland and riparian areas and any areas that are determined to be of significant value for breeding or nesting (deer fawning areas, coyote den sites, etc.). Management in sensitive zones will be focused on restoration and protection of native vegetation and wildlife, and human use and recreation will be more limited than other zones. Trails and other recreational development will be limited in these zones, and human use may be restricted. This may include small closure areas, or requirements to remain on designated trails only.
- **Sensitive Closure-** A temporary or permanent closure of an area will be considered if park staff or state wildlife officials determine that human use could result in negative impacts to a specific wildlife breeding or nesting process. Examples include certain raptor nesting sites. Temporary closures will be kept as minimal and short as possible to protect the wildlife values. Permanent closures of an area will be considered if a particular species of concern is documented (endangered or threatened species), or if human use of an area has resulted in significant degradation.

Several additional management designations will be used within these zones to provide for specific management objectives. These designations are detailed within the prairie dog and beaver management sections.

Corridors

Corridors are strips of undeveloped land that provide a connection from one large park or open space to another. Wildlife uses corridors for food, cover, habitat and movement. Corridors can also consist of trails, waterways, parks, golf courses and greenbelts intended for human use. The Bear Creek Greenbelt is a great example of a corridor

within Lakewood. It provides all the needs that wildlife may have as well as many recreational opportunities for residents.

Maintaining healthy corridors is vital for multiple reasons. Healthy corridors can prevent some wildlife conflicts by limiting wildlife from moving into residential areas, and providing larger expanses for wildlife to disperse within. They can also provide for exceptional wildlife viewing and recreation. Managing for healthy corridors includes controlling noxious weeds, ensuring that corridors are wide enough for wildlife to use, limiting development within established or potential corridors, limiting barriers such as streets and fences, and providing cover for animals. The vegetation section of this management plan sets the basic guidelines necessary to maintain basic corridor health. The City of Lakewood should be mindful of possible land acquisitions, planning of street and fence locations, and planned developments in order to expand and keep corridors in good condition.

Rangeland

Rangeland, composed mainly of short grass prairie, is a habitat type historically dominated by native grasses and forbs. These areas were extensively converted by early European settlers to cropland and used for grazing, farming and other agricultural functions. This has left large portions in less than pristine condition. Very few areas remain in the natural state that existed before settlers arrived. Lakewood's goal is to restore the rangeland within the open space properties to a native mosaic that wildlife and park users can benefit from. This can be accomplished by implementing the processes described in the vegetation management section of the plan.

Shrubland

The rangeland areas within Bear Creek Lake Park and WF Hayden Park transition into the foothills habitat, increasing plant diversity to include various shrubs and small trees. This habitat is important because it provides valuable cover for deer, mountain lions, coyotes and other wildlife. It also provides shade in the summer and shelter from the cold winds of winter. The shrubs also provide berries and leaves that many species use for food throughout the year.

Riparian Areas

Riparian ecosystems occur along the banks of rivers, streams and other bodies of water. These areas are dominated by deciduous trees and have a wide diversity of plant and wildlife species. Many of Lakewood's riparian areas evolved over hundreds of years without the impacts of man, while some have been created by the construction of dams, irrigation ditches and detention ponds. Many of the manmade impacts have changed the natural processes within the riparian areas by preventing flooding and allowing the introduction of exotic species. The riparian zones are dominated by cottonwoods and willows.

Cottonwoods have a relatively short life span, usually around 70 years. Their reproduction cycle is directly linked to the flooding of riparian areas. Cottonwoods depend on high water to create new sandbars where seeds can come to rest and establish roots. This can change the route of the river and create wetlands that other riparian

species use. Since the construction of reservoirs, the natural spring flood cycle has been changed and many of the native species cannot reproduce as they historically have. These factors, combined with impacts from drought and beaver activity, are reducing the overall population of cottonwoods within the riparian areas, and allowing invasive species such as the Russian olive to expand greatly.

One way to counter act these processes is to implement a seeding and planting program in Lakewood's riparian corridors. The seeding of native wetland species, particularly in sites that are overrun by weeds or have been reduced to bare ground, should be a yearly priority. In the areas where there is bare ground willow staking can be done, which will increase vegetative cover and prevent erosion.

A cottonwood-planting program should be implemented to include the planting of seedlings and larger 2 inch DBH (diameter at breast height) trees. This can be a complicated endeavor with low success, and the program will require ongoing monitoring. A watering and chicken wire wrap program will be needed to provide water (in case of a dry season) and protection from beaver and deer.

A growing list of exotic plant species are found in riparian areas, such as purple loosestrife, Russian olive and tamarisk. Each one of these species creates a unique impact to the ecosystem, ranging from using large amounts of water to out-competing the native plants. The control program for these species is described in the invasive species portion of this plan.

Wetlands

A majority of the wetlands in the natural areas are cattail marshes. Many of these areas were ponds at one time, but cattails have filled them in and they are now composed of wet soils with little open water. Wetlands are common in Bear Creek Lake Park and the Greenbelt, and a few wetlands are found on Green Mountain in areas where the water table reaches the surface during the spring. Wetlands are home to the largest variety of plants because of the wet soils. These areas create very significant wildlife habitat and provide important water quality functions. For these reasons they need to be protected from recreational use, development, erosion, and other negative impacts to the greatest extent possible. These areas will receive special consideration during any project or trail planning, and ongoing efforts will be made to protect and restore and improve the existing wetlands within the parks. Wetland areas may also be designated as sensitive zones.

Habitat Mapping

Mapping the different habitats throughout the city can be useful when making management decisions. These maps will include rangeland, riparian areas, wetlands and corridors. Habitat maps are included at the end of this plan (Appendix E). For mapping purposes, the following criteria will be used:

Riparian habitats are areas associated with water and dominated by shrubs and/or trees. The most common shrub in Lakewood is the coyote willow (*Salix exigua*). This is a low growing species with average heights of four to eight feet. The most common large tree is the plains cottonwood (*Populus deltoides*). Riparian and wetlands habitats overlap, so wetlands will be placed with riparian areas even though they have their own designation. Wetlands are areas that have saturated soils and standing water in them at some point during the year. Cattail marshes and swamps are good examples of wetlands. Some examples of this vegetation will be rushes, cattails and willows. When analyzed the Lakewood flood plain map covered all the riparian and wetland areas in natural areas. Several smaller areas outside the flood plain maps will be evaluated and included as riparian areas when necessary.

Rangeland will be all other areas outside the flood plains and without wetland vegetation. Examples of rangeland vegetation are; big bluestem, blue grama and needle and thread grass. Rangeland makes up a majority of the park land in Lakewood.

Shrublands occur in the transition zone between short grass prairie and the foothills zones. In Lakewood these zones come together at William Frederick Hayden Park on Green Mountain. Most of the shrubs consist of scrub oak (*Quercus gambelli*), mountain mahogany (*Cercocarpus kunth*), and wax currant (*Ribes cereum* var. *cereum*). Aspect and moisture play a large role in where this vegetation is located. The majority of the shrubland vegetation is on the north facing slopes where water is not evaporated as fast by the hot sun in the summer.

Corridors can be riparian or rangeland habitats. Corridors will be identified as any portion of undeveloped land that connects other larger portions of land. The ravine parks are great examples of corridors as they connect William Frederick Hayden Park to Bear Creek Lake Park or the Bear Creek Greenbelt.

Habitat Specialists

Wildlife generally falls into two different categories in suburban settings; habitat specialists and habitat generalists. Areas that are dominated by human landscaping that intersect with different habitats and natural areas tend to be home to generalist species. These animals tend to be more common because they adapt well to humans and the urban interface. These species are also called “edge” species.

Habitat specialists tend to live in larger areas of one habitat type. It can be a riparian, rangeland or wetland habitat. These species have specific needs that can only be filled by that specific habitat, typically making them less common. In order to manage for valuable functioning native habitats it is important to emphasize on habitat specialists and monitor their numbers and diversity. As a general guideline for wildlife habitat management, if either number or diversity of habitat specialists varies or decreases, the health of the larger open spaces could be in jeopardy.

Wildlife Management

Residents of the city of Lakewood were asked through a master plan survey what they felt were the most important programs, facilities, budget concerns and funding preferences. Wildlife management appears at the top of the programming items, with 85% of the respondents indicating that such a program is important.

Wildlife management focuses on three aspects of wildlife; habitat, threatened and endangered species, and conflict. All wildlife needs a place to live and Lakewood needs to provide good habitat for each species of wildlife that live here. Special emphasis should be placed on protecting threatened and endangered species. Lakewood is an urban interface where wildlife and human habitats come together. This can result in conflict situations. Lakewood's wildlife management will focus on reducing conflicts and helping humans and wildlife live together.

Lakewood is home to hundreds of species of wildlife (Appendix B), each with its own habitat and niche. The City will not focus on managing a particular species, but will focus on managing, restoring and protecting the various ecosystems. The restoration and protection of these ecosystems will help each species to function and thrive. An example is prairie dog management. This species is very important to the short grass prairie ecosystem, but can also have negative impacts on other species such as native vegetation and ground nesting birds such as the meadow lark. Meadow larks use the same habitat type but need the cover of longer grass, where prairie dogs cut down the taller grass to see approaching predators.

Human Wildlife Conflict

As cities and towns have grown and encroached on wildlife habitat over the past hundred years, conflicts have increased between humans and wildlife. Urban wildlife populations have both increased in species that have adapted well to humans and decreased in other populations that have not adapted. Many species that have not adapted well are now found on the threatened or endangered lists. The species that have thrived tend to also be the species that humans have the most conflict with.

Coyotes, geese, prairie dogs and beaver are examples of species that have thrived and come into conflict with humans in Lakewood. Steps have been taken to minimize human/wildlife conflict with these species through monitoring and mapping, education, hazing and population control. The best way to minimize conflicts is to use all of these methods together, while also implementing new techniques as they become available. These methods are covered for each specific species in their management sections.

How to educate the public about human wildlife conflict

One effective way to ease conflicts with any wildlife species is through public education on ways to live with wildlife or keep them at a distance. When areas of increased conflict are recognized, educational signs will be placed in those areas. Brochures can be distributed to residents that have concerns. Trained staff can walk the conflict area as a

roving ranger/interpreter and answer any questions the concerned public may have. If this is not enough, and the public needs more information, community meetings may be set up, or trained Lakewood employees can attend ward meetings to educate the public further. On an individual basis, as phone calls or concerns come in, trained staff that work with wildlife can alleviate the public concerns with wildlife management techniques that work for private residences.

Wildlife Conflict

As a general rule, elimination of the species causing the conflict is ineffective. Studies have shown that animals will adapt and produce more offspring when there are low populations, high food sources and good habitat. When a species is eliminated from an area the habitat improves; food sources increase; and there is no competition from other animals of the same species. Therefore, when you eliminate the species from an area it often allows for a new animal of the same species to move into that habitat and thrive. The animal will often produce more offspring and conflicts can rise to levels even higher than before the elimination took place. This can be particularly true with predatory species such as coyotes and foxes.

Beaver Management

This plan seeks to maintain a balance between human and beaver use within the Lakewood Regional Parks. This will ensure the safety of human recreationists and protect the intrinsic value of the city's riparian habitats, while maintaining a reasonable beaver population to ensure a healthy riparian habitat.

Location

Bear Creek Lake Park and the Bear Creek Greenbelt are the two proposed sites for the beaver management plan. These two sites both contain beaver populations at the present time and have habitat for more beaver. Bear Creek Lake Park is on the western outskirts of Denver, Colorado. The park is bordered on the south by US 285, on the west by C470, on the north by Morrison road and on the east by Fox Hollow and Homestead golf courses. Bear Creek Greenbelt is a greenway running east and west along Bear Creek, bordered on the west by Bear Creek Lake Park, on the east by Wadsworth Boulevard.

Beaver natural history

Beavers are the largest rodent in North America and are usually reddish brown in color. On average they typically weigh forty to sixty pounds but can get to around one hundred pounds. Because their front incisor teeth never stop growing, beaver file their teeth down by grinding them on their bottom teeth and by eating aspen, willow and cottonwood trees. Beaver live in colonies that do not overlap and are very territorial. Colony sizes range from two to twelve animals and are made up of two adults, three to five kits, and three to five yearlings. Parents have three to five kits a year depending on food and living conditions. In the spring of the second year, yearlings leave parents, lodge and territory. Beavers are nocturnal and are most commonly seen at dusk and dawn. Domestic dog, coyotes, mountain lion, lynx, wolverines and occasionally bears, otters and eagles are the

predators of beaver. Humans and beaver are the only two species that change their environment.

Benefits that beaver provide

When beaver dams are constructed, the flow of the creek or river is slowed and a pond is formed. Erosion and sedimentation have a direct correlation to the speed of the water flow. Slower water does not pick up any more sediment and lets the sediment already in the water drop to the bottom of the pond. Sediment is comprised of nutrients, dirt, trash, pebbles, chemicals and many other small particles. When the sediment settles, the pond acts as a nutrient trap and catches all of these particles. The water may enter the pond dirty but exits the pond filtered. After flowing through the pond the water quality is improved.

Beaver ponds provide a more nutrient rich habitat than low volume creek ecosystems and provide benefits to other trophic levels. Once the beaver pond is established the static water begins to warm. Aquatic plant and bacteria populations start to utilize the nutrients in the sediment caught by the pond. The aquatic vegetation provides food for waterfowl. Insect populations grow as they feed on the plants and bacteria. The fish, amphibian and bird populations grow from the increased insect food source. Fish sizes also increase with the increase in food concentrations. With the increase of water level and nutrients more bank side vegetation begins to grow. Shrubs start populating and growing on the banks of the pond. When the shrubs get mature enough they will provide great medium level nesting habitat for birds, above the grass but not in the high branches of a tree.

When water levels rise because of the pond, the water leaches out into the ground raising the water table. This provides valuable water to support vegetation growth around the pond. Vegetation can grow on the outskirts of the riparian area creating a buffer zone between different habitats and the pond. This is a catalyst for wildlife and plant species diversification. Thus, beaver provide a rich habitat in riparian areas.

Reasons to manage beaver in an urban park setting

Humans trapped the majority of beaver out of the Lakewood region in the 1700 and 1800's. Since then beaver have been making a comeback along the Front Range river corridors. As an example, a beaver population survey was conducted in 1987 and approximately fifteen beaver were counted in the Bear Creek Greenbelt. Approximately thirty beaver were counted in 2003 in the Greenbelt. As beaver populations have recovered in Lakewood, and throughout the state of Colorado, beaver have come into more direct conflict with man.

One of these conflicts is that beaver take down trees for food and dam construction. When the beaver start chewing on trees, they can leave them more than half chewed and ready to fall at any moment. These trees can create hazards for people, bridges, power lines or other structures. Along the Bear Creek corridor trees are not in abundance and need to be protected from beavers. Beavers can take down all of the trees in an area leaving it empty of food and building materials for their dams. This is a process called "denuding".

When beaver dams are constructed, ponds form on the creek. As trees are taken down they are cut up and placed into dams that make ponds along the creek. These ponds can then flood onto roads, trails, private property and into buildings. The flooding can cause damage to various structures, and can cause disrupt recreational uses. Flooding of trails often causes people to walk around the flooded areas and start new trails called “social trails”. These trails lead to disturbance of soil, wildlife and vegetation. Flooding onto neighboring private property can also reflect poorly on the City. The flooding can cause damage to crops, storage areas, driveways and many other areas. The water can also flood into buildings causing water damage and other costly expenses.

In urban areas, beaver population controls are much less frequent than in the past. Development in residential areas has driven out predators of beaver. The only true predators in residential areas for beaver are domestic dogs and coyotes. Natural flooding also controlled beaver populations in the past. With the building of Bear Creek Lake dam, and other water control structures up stream, the chance of population control by flooding is significantly less. The lack of these two controls allows beaver populations to grow at faster rates.

Diseases also play a large part in beavers’ lives. Some diseases come from beavers while others come from the environment that they create. West Nile virus is transmitted from mosquitoes that breed and live around beaver ponds. When beaver populations get too large and dense, tularemia can set in and wipe out entire colonies. Another disease associated with beaver and many other mammals is giardia. Giardia can cause stomach pains and diarrhea for humans, and is found in many untreated water sources.

Management Practices for beaver

In order to provide a safe recreational experience and a healthy habitat for beavers, three management categories have been developed. The first category is assessment: researching and taking inventory of the resources and habitat currently available. The second category is preventative measures: the protection and management of the unaffected resources. The final category is damage control: managing affected areas to provide a healthy habitat and a safe park environment.

Assessment

- Frequent monitoring of sites for damage
- Mapping populations (fall)
- Prioritizing hot spots
- Establishing population size from observing food caches and lodges
- Re-evaluating carrying capacity habitat when necessary
- Determining if inactive dams need to be taken down

Preventative measures

- Tree wrapping with chicken wire to prevent tree clearing and hazards
- Monitoring of wrapped trees for damage from wire and rewrapping if necessary
- Leaving active dams in place to prevent further tree injury

- Spraying tree trunks with beaver repellent
- Shocking ponds to discourage beaver
- Painting tree trunks with paint and sand mixture
- Creating artificial scent mounds to move beaver on
- Manipulating food supply, so beavers will not want to use the area

Damage control measures

- Cutting down hazard trees
- Leveling off pointed stumps near trails
- Placing beaver tubes in the beaver dams (to control water levels)
- Relocating beaver to park sites (need permit from DOW, August thru October 1)
- Relocating beaver to outside city areas when possible (contracted)
- Trapping and euthanasia (in-house or contracted, no trapping April thru June)
- Sterilizing by surgical means if price allows
- Removing with lethal means (as a last resort)
- Planting new trees in the area to restore old ones that have been taken down
Tree species to be planted are: willow (*salix*, sp.), narrowleaf cottonwood (*Populus angustifolia*), and plains cottonwood (*Populus, sargentii*),

Note: Management practices will be updated and put into practice when proven beaver management methods have been found.

Criteria for the “Beaver Concern Areas”

Managing land for multiple use means that there will be areas where beaver activity is not welcome. Trees need to be protected for their aesthetic and ecological value in areas with limited number of trees. Recreational ponds are there for public enjoyment and are landscaped for the public. Beavers can damage that landscaping. Sites near bridges, trails, power lines, or other vital infrastructure can be impacted by falling trees. This could also damage vehicles and injure humans in the area. Certain dammed sections of the stream could cause flood damage on private property. In other areas, flood damage can affect crucial wildlife habitat. Other sensitive areas are sites along the creek where there is no viable habitat for beaver. These sites lack food and dam building materials. The most important reason for these areas is to protect the public from any danger caused from beaver activity.

All beaver concern areas will be a minimum of one hundred and fifty feet up and down the creek from the structure that is being protected or a distance the staff sees necessary. Beaver concern areas on ponds will be the area of that pond. All the other areas not classified as beaver concern areas will be classified as beaver monitoring areas, where beavers are acceptable but at manageable populations.

Beaver Monitoring Areas

Manageable populations will be determined by using current fieldwork methods. A general field rule for counting beaver is five beaver per lodge. When counting beaver by caches the general rule is one beaver for each pickup truck load of cache material. After

counting the beaver and getting an average from these two techniques, a population will be determined. The best population harvest numbers for beaver that research journals have supplied is to take one third of the whole population or one third of a family unit each year. When this technique is applied to the population, a manageable number of beaver will be present in the Greenbelt and at Bear Creek Lake Park.

Beaver are very territorial mammals. Territories affect beaver densities while food affects size and use of territories. Bear Creek Greenbelt and Bear Creek Lake Park have feasible habitat for food. Mapping of cottonwood, aspen (populus species) and willow (salix species) populations are being conducted to determine exact food densities for beaver. When food sources are viable territories can be the only limiting factors in population sizes. Using the territories to determine a carrying capacity could be a useful tool in beaver management. Carrying capacity is the number of beaver that a certain sized habitat can sustain. The territory method will be researched while it is implemented here.

Current Territories and Future Carrying Capacity

Carrying capacities will be determined by length of river section, beaver home territory, a quarter mile up and down stream from the primary pond, and subtracting beaver sensitive zones. The creek length was measured at two and a half miles by using a Garmin global positioning system (GPS). Beaver sensitive zones measured out to almost a half-mile (.43 of a mile). Subtracting a half-mile from the creek length of two and a half miles equals two miles of creek for beaver control areas. Dividing the two miles by the beaver home territory of a half-mile comes out to four territories. On average, colonies have five beavers. We feel that a conservative estimate of four beaver per territory will lead to a sustainable population within the parks. Any more than four beaver will put stress on the limited resources and will exceed the carrying capacity. Taking four beaver per colony and multiplying that by the four territories, a result of sixteen beaver in the Greenbelt is the carrying capacity. Bear Creek Lake Park has only one lodge at this time. Due to the multiple-use recreational activities that Bear Creek Lake Park provides, only three colonies will be allowed in the park: one at Bear Creek Lake, one on Turkey Creek and one on Bear Creek. These lodges in Bear Creek Lake Park would allow for a carrying capacity of twelve. These carrying capacity numbers may change with future study and observations over time.

Plan of Action

The plan of action for managing beaver in the city of Lakewood will begin with assessment. Maps have been developed to designate “beaver sensitive areas,” lodges and dams (Appendix F). An on going inventory map of lodges, dams and hot spots will be taken every fall. If any of the beaver activity is found in the beaver sensitive areas the beaver will need to be moved from those sites, by trapping and relocating or by trapping and euthanasia. This will be determined by budget, availability of relocation sites, and if the time of year dictates relocation or euthanasia. The next step will be preventative measures to stop any further damage. Preventative measures will be implemented as “hot spots” are found or reported. If the populations get large enough, damage control measures will be taken to thin the growing population. One third of each family unit will

be taken from the areas with highest densities of beaver. This will slow the dispersal of beaver throughout the rest of the Greenbelt.

When trapping, the sizes of the beaver will be taken into consideration. Any beaver over forty pounds will be considered an adult, and released. Beaver weighing under the forty-pound limit will be considered a yearling or kit, and will be trapped from the area and relocated, or euthanized. Trapping out the adults from a colony can cause the family units to break up and disperse. This can negate the goal of keeping beaver in one area and limiting the damage that they can cause.

Conclusion

Through the many beaver management practices that will be initiated, the City of Lakewood will provide a healthy beaver habitat and a safe recreation experience within the parks.

Prairie Dog Management

History

Black-tailed prairie dogs (*Cynomys ludovicianus*) are native rodents that live in the short grass prairie ecosystem. They are 12 – 15 inches long including a two inch tail with a black tip. Females can reproduce once a year after they are two years old. Pups are born in April or May with an average litter size of 3 – 4 pups, but can have up to 8 pups. Life spans are approximately three to five years. Prairie dogs live in complex burrow systems and feed on the vegetation around their holes. They get their water from the plants that they eat. In the winter when green vegetation growth is not present they survive by eating the root systems of the plants.

Lakewood has historically been a part of the black-tailed prairie dog's home range that extends from the Rocky Mountains to the Mississippi River and from Mexico to Canada. Since European settlers came to the American west, prairie dog populations have declined. Prairie dogs have received a negative reputation for destroying crops and injuring livestock. Ranchers, farmers, developers and government agencies have attempted to eradicate prairie dogs through poisoning and shooting, and populations have decreased dramatically from pre-settlement. The killing of prairie dogs has slowed in recent years and numbers have begun to increase again.

Plague has played a role in the decrease in prairie dog numbers. Plague arrived in the United States from Europe where it was commonly known as the Black Death. While very few human cases are reported in the United States each year, plague is devastating to prairie dogs. Plague has killed off several colonies in Lakewood and can make its way through the colonies on a four to seven year cycle. The only colonies that seem to be affected are the ones in larger open spaces that do not have residences or roads surrounding them.

The Army Corp of Engineers has documented prairie dogs at Bear Creek Lake Park since 1970. There are no historical population records for the other open spaces in Lakewood. Currently there are approximately thirteen colonies that the Department of Community Resources manages. There are eight colonies in the Bear Creek Greenbelt, one colony at Bear Creek Lake Park and four colonies at William Frederick Hayden Park.

Management

Research has found that prairie dogs are an integral part of the prairie ecosystem and steps need to be taken to protect and manage populations. The overall goal of prairie dog management in Lakewood is to allow colonies to exist in a natural state, while also managing for the protection of a variety of habitat types, park and private property, and park visual appeal. This will allow prairie dogs to fill an important niche that many other animals depend on in the prairie ecosystem. Lakewood does not intend to eradicate prairie dogs within the natural areas.

Each existing colony will be monitored throughout each year, and when colonies reach the control guidelines designated in this plan some management action will be taken. The first management option will be passive management through visual barriers, raptor poles, predator hides or any other structure used to slow the growth of the colony. The second option will be live relocation from the wild to the wild. Lakewood has a few relocation sites available on Green Mountain where several hundred can be relocated. When this is no longer an option, or is not sufficient to meet management goals, relocation to the black-footed ferret program or a raptor rehabilitation program will be the next alternative. The third option is to perform population control using lethal measures.

Other management options will be considered as they become available, including birth control for prairie dogs. At this time these processes are experimental and very expensive. If birth control, or other non-lethal control options, becomes financially and scientifically viable, Lakewood will evaluate the possibility of employing them for population control.

Guidelines for implementing population management

Lakewood will use several guidelines to determine when prairie dog population control is necessary. All prairie dog colonies within the natural areas will be mapped and designated using the following:

- **Active Management:** Prairie dog populations in these areas will be actively managed to maintain a sustainable and healthy population.
- **Passive Management:** Prairie dog populations will be essentially left alone in these areas. This designation will only be used in large natural areas where impacts to overall habitat values, scenic values and park or private developments will be minimal or non-existent.
- **No Prairie Dog Zones:** No prairie dog populations will be allowed in these areas. This will be done to provide a diversity of habitat areas, protect other wildlife and native plant species, to protect scenic values, and to protect park or private developments.

Lakewood will take several factors into consideration to determine what designation a colony will receive and at what point population control will begin. These factors are listed below:

1. Carrying capacity with destruction to natural resources

The carrying capacity for most urban prairie dog colonies is 20 prairie dogs per acre. Once this capacity is exceeded vegetation in the colony is stressed and can be denuded to bare earth. When colonies reach 25% bare ground this is an indicator that the carrying capacity has been met. Each site will be evaluated using these criteria and an analysis will be done to determine if controls are necessary.

2. Spread of noxious weeds into prairie dog colonies

Noxious weeds thrive in areas that have been disturbed and prairie dog colonies are prime areas for weed invasion. When colony vegetation exceeds 70% noxious weeds, populations will need to be drastically thinned so that effective weed management can take place. In previous years revegetation and weed control attempts have been made without reducing prairie dog populations. These efforts have not proven to be successful.

3. Manage for diversity of habitat types

Regional Parks intends to manage for a variety of habitat types in the parks. Managing for one species, such as prairie dogs, does not meet this goal. The intention is to maintain several prairie dog colonies while also restoring native short grass prairie, wetlands and riparian areas.

4. Damage to private property and developed park areas.

When prairie dogs encroach onto private property and cause vegetation or structure damage, site-to-site analysis will be done to see what management technique will work best or if lethal control is the only option. This will include working with the private property owner on techniques to mitigate encroachment and damage on their property. A twenty five foot buffer (No Prairie Dog Zone) will be considered if there are ongoing issues at one site. When a buffer is designated, lethal control will be conducted at least two times a year to keep the buffer prairie dog free. Passive relocation will also be considered if the land the prairie dogs will be moved to is suitable habitat and is acceptable within the standards of this plan. Population control will also be implemented when prairie dogs cause damage to developed park property, including turf and landscaped areas.

Population counts

Each year in March and October a population count will be completed to get an estimate on each colony's population and condition. These counts are performed by City natural resources staff in order to collect consistent data. A staff member enters the edge of a colony, sits down, and waits for approximately five minutes to let the prairie dogs get used to their presence. Data collection includes an above ground population count for prairie dogs for the entire colony as well as per acre; temperature; bare ground

percentage; native vegetation percentage; noxious weed coverage percentage; and date/time. This is repeated for each of the colonies.

Colony Perimeter Mapping

A colony perimeter map is created for each colony every October to get an approximation on colony growth. The same process is used for each mapping. A standard GPS (Global Positioning System) is taken into the field and a staff person walks the perimeter of a colony where a distinct line of grazed grass and untouched grass appears. This is done in the winter so that the prairie dogs have an entire summer and fall to expand the boundaries. Once the data has been taken it is downloaded into a GIS (Geographic Information System) program to be mapped. This allows for a visual record of growth or decline for each colony over time.

Passive Management in Prairie Dog Colonies

Passive management can be effective but will only slow the growth of a colony not stop it. Passive techniques include visual barriers such as fencing or vegetation to block the sight line of the prairie dog. Prairie dogs clear vegetation around the colony in order to see approaching predators and warn the rest of the colony. If they cannot see they tend not to expand in that direction as quickly. The use of predator hides and raptor poles helps to keep the dominant prairie dog predators in the area to help control populations. Natural predator control has proven to be ineffective in managing populations in small natural areas in urban settings.

Prairie dog wild-to-wild relocation

The City of Lakewood will follow all of the procedures specified within Colorado Parks and Wildlife permit process for wild-to-wild relocations. The natural resources crew will be trained on flushing to perform all wild-to-wild relocations of black-tailed prairie dogs. Flushing consists of pumping soapy water into the prairie dog holes to force them out, then grabbing them and placing them into a cage for relocation. All relocation sites are on Green Mountain within former colonies that died off because of plague. There is a limited amount of space for relocations. Colorado Parks and Wildlife carrying capacity standards and designated areas of prairie dog habitat will be followed to determine when the sites can not handle any more prairie dogs.

Population control using a raptor or ferret program

When relocation is no longer an option, and larger numbers of prairie dogs need to be removed to reduce to the designated populations, prairie dogs will be removed and sent to ferret or raptor rehabilitation programs. This is done through flushing prairie dog burrows and catching them alive to send to the ferret program. The ferret program requires them alive and dusted for fleas to help accustom the ferrets to the wild through hunting and living in areas with live prairie dogs. The raptor program requires that the prairie dogs be euthanized and washed so no flea powder is transferred to the raptors. A contractor will be used whenever euthanasia will take place. City staff can assist with the flushing to minimize cost and increase numbers flushed. Lakewood recognizes that this

is a form of lethal control of prairie dogs, but that the results are also a benefit to other injured or endangered wildlife.

Population control using lethal methods

The final option for population control is lethal control. This will be used when passive management, relocation and transfer to ferret/raptor programs has not met, or has been determined to be impractical to meet, the City's population management goals. Up to date fumigants will be used to minimize animal suffering and gain the best population control. The use of bait or poisoned food will be avoided because of the negative impacts it can have on the ecosystem. This method can cause mortality in more than just the targeted species, since numerous other species have access to the food/bait. There is also a risk of spreading poison up the food chain to predators that feed on poisoned prairie dogs. Contractors will be used when implementing lethal control techniques and all federal and state regulations will be followed.

Plague

Bubonic plague was brought to the United States in 1900 by infected rats that escaped from boats in San Francisco. Plague moved east into Colorado and all over the west. Prairie dogs have a low tolerance to plague and entire colonies can be wiped out in 7 – 10 days. Plague is transferred by rodent fleas and is hard to identify in the wild. Prairie dogs are an indicator species for plague because the first signs of plague are usually when a prairie dog colony dies off. When an outbreak occurs, staff will install signs around the infected colony warning the public about the outbreak. The Jefferson County Health Department will test fleas found within the colony to verify if plague is in the area. If the tests are negative, but there has been a significant die-off, the signs will remain in place and the colony will be considered positive for plague. All prairie dog holes within thirty feet of trails, parking lots, sidewalks or other public use areas will be treated with flea powder to reduce the risk of fleas transferring the infection to pets, people or other colonies. The warning signs will remain in place for a minimum of 12 weeks for public safety.

Determining factors of good prairie dog habitat (Appendix G, H, I)

Lakewood will take several additional factors into consideration when determining if areas are suitable habitat for prairie dogs. Prairie dogs prefer flat ground, so any site with a slope greater than 9% will not be considered good habitat. A site that does not contain at least 90% native vegetation has a high risk of significant noxious weeds invasion and will not be considered good habitat. Any recreation use that comes into direct conflict with prairie dog habitat will be analyzed to see what use is most appropriate. Certain recreational uses, including trail use, can exist within prairie dog colonies. Lakewood will also consider the impacts that prairie dogs can have to other wildlife species and habitats, as well as to the overall visual appeal of natural areas. These factors will be taken into account when determining the prairie dog management designations in the parks.

Coyote Management

Overview

Coyotes (*canis latrans*) are a common wildlife species throughout North America, and have adapted to a wide variety of habitats. They are very common throughout the Regional Parks and many of the Urban Parks within Lakewood, and have adapted very well to living within residential areas. Coyotes are opportunistic feeders. Their diets include a variety of small mammals, fruit, vegetables, insects, garbage and the occasional small pet or livestock animal. They are active any time of the day and night, but are most active at dawn and dusk. Their mating season begins in January and young are usually born in April or May. A typical litter size can be between 3 and 9 pups.

Coyotes have always lived in urban areas; however reports of human/coyote conflicts have been on the rise in recent years. Residential areas provide excellent sources of food, water and shelter for coyotes. Living within close proximity to humans has resulted in habituation, and many urban coyotes have lost much of their wariness of people. There have also been numerous cases where people have reinforced “bad” coyote behavior by intentional or unintentional feeding, or by leaving various attractants out. Recent complaints throughout the metro area have included attacks on pets (multiple pets taken in fenced yards); coyotes approaching and showing little fear, or direct aggression, towards people; and several incidents of attacks on people.

Coyote Management

The increase in public complaints about coyote behavior over the last few years has resulted in a need to create a management strategy for coyotes within the City. The Animal Control Division (AC) has taken the lead on this, and has formulated a Coyote Response Plan. This document is attached with this plan (Appendix J). It details the roles and responsibilities of AC and Community Resources in regards to coyote conflict management. All coyote management within the parks will be coordinated closely with Colorado Parks and Wildlife. Regional Parks will operate within these protocols as follows:

Education and Monitoring: The natural resources specialist, in coordination with AC and Colorado Parks and Wildlife, will monitor coyote populations, trends and conflict reports throughout the park system, and will also track all reported coyote conflicts within the City of Lakewood. A protocol has already been established for this process including an online reporting system accessible to AC and park staff. The resource specialist will track sightings, encounters, incidents, pet attacks and human attacks in a database and will map the data using GIS. Park rangers and naturalists have also been trained to report coyote conflicts and will assist with monitoring.

When conflicts have been reported in a specific area within the parks, or when staff has reported a significant increase or change in coyote behavior, an educational outreach program will begin. Regional Parks has created various educational tools including bright orange “Living with Coyotes” signs and an educational sandwich board, and also has access to pamphlets created by Colorado Parks and Wildlife. Signs will be placed in

any park or area where conflicts are reported, and the sandwich board will be used when extra attention is needed (school areas, den sites, etc.). The park naturalists, rangers and natural resources staff will provide formal and informal educational information within the parks and at area schools and community groups as necessary. Park rangers and resource staff will also be available to assist park neighbors with yard assessments to determine what residents can do to limit the attractiveness of their properties for coyotes. Educational campaigns will be coordinated with AC and the City Manager's Office, and may also include press releases, mailings, the City website and social networking sites.

Hazing:

Various hazing techniques will be used in an effort to restore some wariness of humans in the coyote populations in the City's natural areas. These efforts can take three forms:

1. **Soft Hazing:** Soft hazing techniques will be recommended to park users and neighbors as part of the educational campaign. These techniques are intended to maintain user safety, protect pets, and avoid injury to wildlife. Soft hazing should be used when coyotes are demonstrating habituated behavior, such as directly approaching a person and their dog. Recommendations will include making loud noises (clapping, shouting, air horns, etc.); throwing sticks or rocks; or spraying with a hose.
2. **Staff hazing:** Park staff will be trained to soft haze coyotes that show habituated behavior. When the City receives more formal complaints of coyote aggression, certain park staff (rangers, natural resources) and Animal Control Officers, have been trained in the use of pepperball guns specifically for hazing. Only staff that has completed training with the Lakewood Police Department will be allowed to use the pepperball guns, and all use will be in accordance with the policy set forth in the Park Ranger Manual.
3. **Colorado Parks and Wildlife Volunteers:** Colorado Parks and Wildlife and the City have entered into an agreement to allow Colorado Parks and Wildlife volunteers to use non-lethal hazing techniques within the parks to haze coyotes when necessary. These techniques include the use of pepperball guns and bear spray. This agreement is attached as Appendix K.

Trapping and Relocation: The trapping and relocation of coyotes is regulated by the state. Coyote relocation is not permitted by Colorado Parks and Wildlife and has proven to be an ineffective control technique. Trapping on park property will only be considered if a lethal control program is implemented.

Lethal Control: The City recognizes that coyotes are an important component of a healthy ecosystem within the natural areas. They provide some control of a variety of small animal species and can provide wonderful wildlife viewing and education opportunities. Lethal control has been shown to be relatively ineffective for coyote population control unless the purpose is to target a specific aggressive animal. For these reasons the City is not pursuing a general lethal population control plan within the natural areas.

The lethal control of coyotes will only be considered when a direct risk to human health has been demonstrated. The decision to use lethal control techniques, and which techniques to employ, will be made in coordination with Colorado Parks and Wildlife, the City Manager's Office, the Director of Community Resources and the Lakewood Police Department.

Nothing in this document is intended to prevent Colorado Parks and Wildlife from taking direct management actions when human life or safety has been directly threatened.

City of Lakewood **Natural Surface Trail Management**

The City of Lakewood Regional Parks Division is responsible for the natural surface trails located within Bear Creek Lake Park, William Frederick Hayden Park, the Bear Creek Green Belt; and Smith, Main and East Reservoirs (trail maps are attached as Appendix M). These properties contain approximately 40 miles of designated soft surface trails used for a variety of recreation including hiking, mountain biking and horse-back riding.

The intention of this trail management plan is to create and maintain a sustainable soft surface trail system for the enjoyment of all designated users. Included are definitions of existing trails, parameters for building new trails, directions on maintaining park approved trails, signage requirements and parameters for closing unauthorized trails.

Section I: Existing Trails

The majority of Lakewood's soft surface trails will be managed for non-motorized multi-use recreation. Trails will not typically be closed to specific uses unless there are significant multi-use conflicts or potential resource or trail degradation. If these situations occur, management options will include closing the trail to specific user types, or implementing other strategies such as alternating use days.

Existing trail types

Crusher Fine Trails

Crusher fine trails are trails that have been hardened to improve access or protect resources. Crusher fine use should typically be restricted to nature trails, ADA trails, and wide maintenance paths, or used in areas where existing soil conditions are not sustainable (elevated trail structures, muddy areas, etc.).

Natural Trails

Natural trails are embedded into the land and the tread consists solely of dirt and rock. They are typically single-track or double track and are either user-created or built using hand tools. Natural trails require inspection and maintenance on a regular basis ensuring that erosion, loose rock and hazards are minimal.

Horse Trails

Any trail designated as a horse trail has the same characteristics of a natural trail. However, they are typically wider and require higher trail clearance.

Social Trails

Consist of trails created by individuals repeatedly walking off trail, thereby trampling the vegetation. These are often created by users attempting to reach a desirable destination that is off trail. This consideration should be taken into account when planning new trails or deciding when to close social trails. Social trails are not designed to be sustainable and will typically not be made into designated trails. They will typically be closed in order to protect resources and maintain a quality trail system for all users.

Access Trails

Encompass trails that are used to reach existing, natural trails.

Grandfathering existing trails

When deciding to designate or close an existing trail, the following will be considered:

- Is it in the existing trail plan?
- Is maintenance cost effective?
- How popular is the trail?
- Will closing the trail be effective?
- Is closing the trail vital to preserving the natural resources in the area?

Section II: Planning and creating new trails

For the most part the Regional Parks have an over-abundance of trails. For this reason new trail development will be kept to a minimum. New trail segments will typically be built to reroute an existing trail, develop a trail to replace a popular social trail, or to bring users to a new recreational experience.

The following physical guidelines will be followed when designing and building new trails:

- New trails should not exceed 6 degrees in grade; 10-12 degrees may be used for short (50 ft) distances. At WF Hayden Park trail grades will be between 6 and 10 degrees to the extent possible due to the topography. Out slope dimensions should be 1"-2" for every 12" of trail width to ensure drainage. Backslope will be cut to a 45 degree angle when possible.
- Trails will be cut using the full-bench method to avoid destabilization.
- New trails should be cut to a width of 3 feet. This allows 18 inches of single-track tread through the middle of the cut trail allowing vegetation to grow back in the unused portion of the cut.
- Open and flat areas will be avoided to maintain drainage. Trails through flat areas will be designed with drainage in mind.

- New trail planning will follow the Natural Areas Designations outlined in this plan.
- All other trail design and construction will follow the guidelines in the Volunteers for Outdoor Colorado Trail Handbook and Crew Leader Manual.

Section III: Trail Closures

The following procedures for closing designated trails will be followed in order to limit public objection as well as to ensure the success of closing the trail:

1. Evaluate the use of the trail. Does it have an appropriate purpose? Is it an authorized trail? Will the closure cause more resource damage than leaving it? Is there an alternate route that is more sustainable?
2. Before closing a designated trail because of poor sustainability, an alternate, sustainably designed, trail should be planned and built whenever possible, using the guidelines in section II.
3. Closed trails will be posted with signs and blocked with natural material (brush, rocks), fences or both. Split rail or post and dowel fences will be used in highly visible areas. Wire fencing may be used in more remote areas. Closed trails will be reclaimed using the guidelines in the vegetation management section of this plan

Section IV: Trail Maintenance

Trail maintenance will be performed on all trails as needed to maintain safety, decrease trail and resource degradation, and improve user experiences. This will also provide an opportunity to foresee areas of degradation, and to reassure park visitors of the reliability of the park staff. The natural resource staff, park rangers and trail volunteers will assist with ongoing trail inspections to report any maintenance needs. Maintenance priorities are listed below:

Trail Clearance

Trees and heavy brush adjacent to the trail should be limbed to a height of 12' for head clearance with side clearance cut to the existing mow line. While checking for trail clearance, rocks and other hazards should be removed from the trail. The majority of the trails within BCLP and the Greenbelt will be mown for clearance at least twice per year. Mowing will not be utilized at WF Hayden Park.

Erosion

Regular inspections should be made on all trails to check for erosion issues. Creating sustainable trails will minimize erosion problems, however heavy rain or precipitation can cause unforeseen problems. Erosion inspections should be carried out after wet periods. Before addressing or repairing ruts a determination of the cause of ruts should be

made and the issue mitigated immediately. Proper outslloping of trails should minimize excessive erosion, however, in many cases waterbars and drainage dips should be installed on steep trails to allow proper runoff.

Mud Puddles

Wet and muddy areas of trail can be resolved by hardening the surface with rock or crusher fines, creating a crown in the center of the trail, creating an elevated trail surface or installing drainage trenches to eliminate low spots. Extremely wet or muddy areas result in widened or braided trails and vegetation damage.

Hazards

Hazards to the trail user include overhanging trees and limbs, rocks, ruts, holes, poisonous plants and sharp objects. Efforts will be taken to minimize these hazards to the extent possible as they are observed or reported.

Access

Whenever possible, trail repairs and trail work should be accessed by walking to the job site rather than driving on the trail to minimize trail damage and in order to keep single-track trails single rather than double track. This will also demonstrate a good conservation ethic to park users.

Section V: Trail Sign Plan

Kiosks

Appropriate use of kiosks is very important for trail users. They are a source of information for the user in terms of appropriate trail use, designated trails, trail maps, and an excellent means for park staff to inform trail users of special circumstances pertaining to the trails they are using. Kiosks should be placed at every parking lot trailhead location for these purposes.

Regulation signage

Regulation signs will be posted at each trailhead and other park access points, detailing an overview of the most important regulations for the particular park. These signs will consist of a brown background with white wording. The park name and the words “Park Rules (partial listing)” will be included on the sign. For properties such as the Ravines parks, the wording may say “Regional Parks” in place of the park name. Regulation signs will be worked into the existing park kiosks where practical. Additional regulation signs will be placed as warranted by rules violations and use issues.

Recommended regulation sign wording:

Bear Creek Lake Park

Park Rules (partial listing)

- No motorized vehicles
- All Colorado State fishing and boating regulations are enforced
- No swimming or camping except in designated areas
- Keep pets on leash at all times
- Pets are prohibited in water
- Pick up and remove dog excrement
- No alcohol greater than 6%
- Respect other trail users

Main Reservoir

Park Rules (partial list)

- Park hours 5am to 10pm
- No swimming, wading, boating or belly boating
- All Colorado State fishing regulations are enforced
- Keep pets on leash at all times
- Pets are prohibited in water
- Pick up and remove dog excrement
- No glass containers
- No alcohol greater than 6%

Smith Reservoir

Park Rules (partial list)

- Park hours 5am to 10pm
- No swimming, wading, boating or belly boating
- All Colorado State fishing regulations are enforced
- Keep pets on leash at all times
- Pets are prohibited in water
- Pick up and remove dog excrement
- No glass containers
- No alcohol greater than 6%

East Reservoir

Park Rules (partial list)

- Park hours 5am to 10pm
- No swimming, wading, boating or belly boating
- All Colorado State fishing regulations are enforced
- Keep pets on leash at all times
- Pets are prohibited in water
- Pick up and remove dog excrement
- No glass containers
- No alcohol greater than 6%

Bear Creek Greenbelt

Park Rules (partial listing)

- Park hours 5am to 10pm

- No swimming, wading or boating
- All Colorado State fishing regulations are enforced
- Keep pets on leash at all times
- Pets are prohibited in water
- Pick up and remove dog excrement
- No glass containers
- No alcohol greater than 6%

William Frederick Hayden Park

Park Rules (partial listing)

- Park hours 5am to 10pm
- No motorized vehicles
- Use designated trails only
- Keep pets on leash at all times
- Pick up and remove dog excrement
- No firearms or hunting
- No camping or fires
- Respect other trail users

User safety and education signs

In addition to park regulation signs, a variety of educational signs will be posted focusing mostly on multiple-use issues. The yielding triangle, consisting of red wording and symbol on white background, will be posted throughout the soft surface trail system at Bear Creek Lake Park, the Greenbelt, and at Hayden Park. These signs will be posted at trailheads, various intersections, and in areas where yielding issues have been reported. A more specific educational sign has been developed specifically for Bear Creek Lake Park's paved trail system:



These signs will be placed along the paved bike trail at areas near each entrance to the park. These same signs, or a similar design incorporating a 15 MPH speed limit instead of the yielding triangle, will be placed at each paved trail access point in the Greenbelt. They may also be placed in other parks as necessary. Additional educational signs relating to use of muddy trails and other resource issues may also be posted as necessary.

Sign and sign post descriptions

Bear Creek Lake Park:

4 X 4 treated wood posts are to be used whenever installing directional trail signs. They should be cut in 6-foot lengths with 45-degree angles on the top end. The bottom should be set 2 feet in the ground, leaving 4 feet above the ground. The 45-degree angle cut should face away from the trail and vision of the user. Trail signs should be placed 3 feet off of the trail when mowing clearance is an issue. Signs are white with the trail name and the circled paw print. Signs should be placed on the post, just below the 45-degree cut.

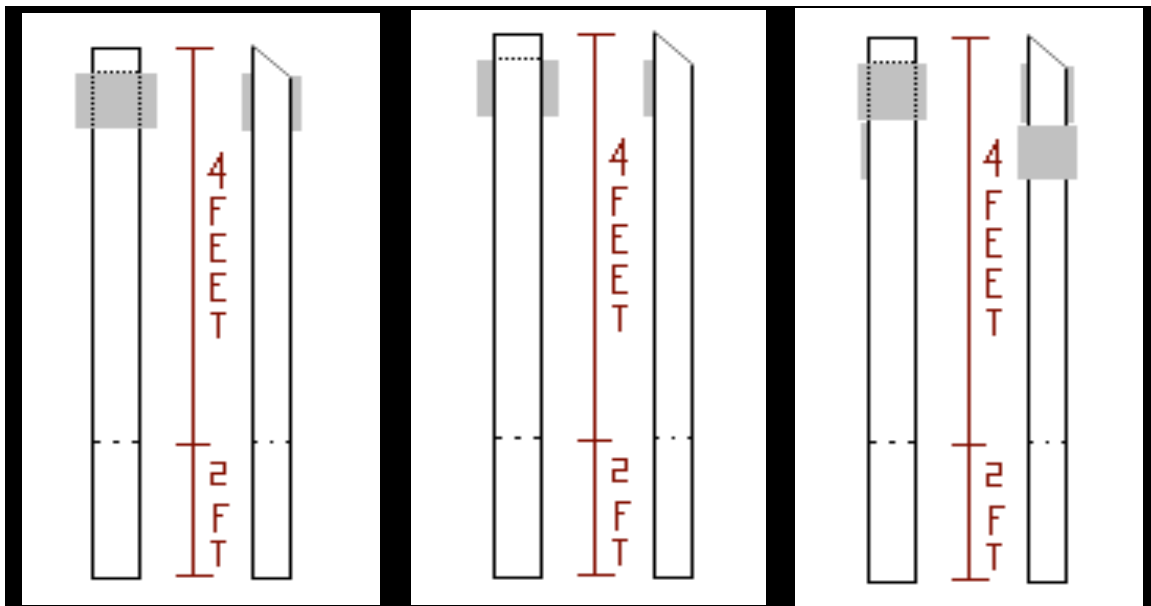


Figure 1 Front view

Back view

Side view

BCLP Greenbelt:

Greenbelt signs use the same parameters for placement, with the actual signs being white lettering with a brown background. Directional trail signs for the “Stonehouse Trail” will be placed at each trail intersection.

William Frederick Hayden Park:

Any directional sign to be placed on the trail system in William Frederick Hayden Park will follow the same size and dimensions as those of BCLP. Directional signs will be the approved diamond symbol with the park name, trail name, and directional arrow.

Sign maintenance

Regular inspection and maintenance should be completed in order to assure proper placement, mitigation of vandalism and assessment of disrepair.

Mile markers

As of January of 2011, William Frederick Hayden Park is the only trail system in Lakewood Regional Parks that uses mile markers. The same considerations should be used for these signs as those of BCLP. Mile markers will typically only be placed on loop trails, particularly the Green Mountain Trail.

Appendix A – Vegetation and Wildlife Inventory for Bear Creek Lake Park

Genus species	Common name	Genus species	Common name
<i>Acer glabrum</i>	Rocky Mountain Maple	<i>Clematis ligusticifolia</i>	Western White Clematis
<i>Acer negundo</i>	Boxelder	<i>Cleome serrulata</i>	Rocky Mt. Bee Plant
<i>Achillea millefolium</i>	Western Yarrow	<i>Conium maculatum</i>	Poison Hemlock
<i>Achnatherum hymenoides</i>	Indian Rice-grass	<i>Convolvulus arvensis</i>	Field Bindweed
<i>Agropyron cristatum</i>	Crested Wheatgrass	<i>Conyza Canadensis</i>	Horseweed
<i>Agrostis gigantea</i>	Redtop	<i>Crataegus erythropoda</i>	Cerro Hawthorn
<i>Agrostis stolonifera</i>	Creeping Bentgrass	<i>Cynoglossum officinale</i>	Hound's Tongue
<i>Alnus tenuifolia</i>	Thinleaf Alder	<i>Dactylis glomerata</i>	Orchard Grass
<i>Amaranthus albus</i>	Prostate Pigweed	<i>Dipsacus fullonum</i>	Common Teasel
<i>Amaranthus retroflexus</i>	Redroot Amaranth	<i>Elaeagnus angustifolia</i>	Russian Olive
<i>Ambrosia coronopifolia</i>	Cuman Ragweed	<i>Eleocharis macrostachya</i>	Pale Spike-rush
<i>Ambrosia trifida</i>	Great Ragweed	<i>Elymus Canadensis</i>	Canada Wild Rye
<i>Amorpha fruticosa</i>	Desert False Indigo	<i>Elymus repens</i>	Quackgrass
<i>Andropogon gerardii</i>	Big Bluestem	<i>Equisetum arvense</i>	Field Horsetail
<i>Arctium minus</i>	Burdock	<i>Equisetum laevigatum</i>	Smooth Horsetail
<i>Argemone intermedia</i>	Annual Prickly Poppy	<i>Erigeron bellidiastrum</i>	Western Daisy Fleabane
<i>Aristida purpurea</i>	Fendler Threeawn	<i>Erigeron divergens</i>	Spreading Fleabane
<i>Artemisia campestris</i>	Field Sagewort	<i>Erodium cicutarium</i>	Redstem Filaree
<i>Artemisia frigida</i>	Fringed Sage	<i>Euphorbia dentata</i>	Toothed Spurge
<i>Artemisia ludoviciana</i>	White Sage	<i>Euphorbia esula</i>	Leafy Spurge
<i>Asclepias speciosa</i>	Showy Milkweed	<i>Fraxinus pennsylvanica</i>	Green Ash
<i>Asparagus officinalis</i>	Garden Asparagus	<i>Geranium caespitosum</i>	Parry's Geranium
<i>Atriplex canescens</i>	Four-winged Saltbush	<i>Glycyrrhiza lepidota</i>	Wild Licorice
<i>Berteroa incana</i>	Hoary Alyssum	<i>Grindelia subalpina</i>	Gumweed
<i>Berteroa incana</i>	Hoary Alyssum	<i>Helianthus annuus</i>	Common Sunflower
<i>Betula occidentalis</i>	Water Birch	<i>Helianthus pumilus</i>	Little Sunflower
<i>Bouteloua curtipendula</i>	Sideoats Grama	<i>Hesperostipa comata</i>	Needle-and-thread
<i>Bouteloua gracilis</i>	Blue Grama	<i>Heterotheca villosa</i>	Hairy False Golden Aster
<i>Brassica juncea</i>	Indian Mustard	<i>Hieracium aurantiacum</i>	Orange hawkweed
<i>Bromus inermis</i>	Smooth Brome	<i>Hordeum jubatum</i>	Foxtail Barley
<i>Bromus tectorum</i>	Cheatgrass	<i>Humulus americanus</i>	Common Hops
<i>Carduus nutans</i>	Plumeless Thistle	<i>Hypericum perforatum</i>	Common St. Johnswort
<i>Carex nebrascensis Dewey</i>	Nebraska Sedge	<i>Juglans nigra</i>	Black Walnut
	Wholeleaf Indian		
<i>Castilleja integra</i>	paintbrush	<i>Juncus saximontanus</i>	Rocky Mountain Rush
<i>Catalpa speciosa</i>	Northern Catalpa	<i>Juncus tenuis</i>	Poverty Rush
<i>Centaurea diffusa</i>	Diffuse Knapweed	<i>Juniperus communis</i>	Common Juniper
<i>Cercocarpus montanus</i>	Mountain Mahogany	<i>Juniperus scopulorum</i>	Rocky Mtn. Juniper
<i>Chenopodium album</i>	Lambsquarter	<i>Kochia scoparia</i>	Kochia
<i>Chenopodium desiccatum</i>	Aridland Goosefoot	<i>Lactuca ludoviciana</i>	Biannual Wild Lettuce
<i>Chenopodium incanum</i>	Mealy Goosefoot	<i>Lathyrus spp.</i>	Sweet pea
<i>Chrysanthemum leucanthemum</i>	Oxeye Daisy	<i>Lepidium latifolium</i>	Perennial pepperweed
			Blazing Star Dotted
<i>Chrysothamnus viscidiflorus</i>	Yellow Rabbitbrush	<i>Liatris punctata</i>	Gayfeather
<i>Cichorium intybus</i>	Chicory	<i>Linaria dalmatica</i>	Dalmatian toadflax
<i>Cirsium arvense</i>	Canada Thistle	<i>Linaria vulgaris</i>	Yellow Toadflax
<i>Cirsium vulgare</i>	Bull Thistle	<i>Linum lewisii</i>	Lewis Flax

Genus species	Common name	Genus species	Common name
<i>Machaeranthera bigelovii</i>	Bigelow's Tansyaster	<i>Scirpus microcarpus</i>	Panicled Bulrush
<i>Malus sp.</i>	Apple	<i>Scirpus pallidus</i>	Cloaked Bullrush
<i>Malva neglecta</i>	Common Mallow	<i>Setaria pumila</i>	Yellow Foxtail
<i>Marrubium vulgare</i>	Common Horehound	<i>Setaria viridis</i>	Green Bristlegrass
<i>Medicago lupulina</i>	Black Medic	<i>Silene latifolia</i>	White Champion
<i>Medicago sativa</i>	Alfalfa	<i>Sitanion hystrix</i>	Squirreltail
<i>Melilotus officinalis</i>	Yellow Sweet Clover	<i>Solanum rostratum</i>	Buffalo-bur Nightshade
<i>Mentha arvensis</i>	Wild Mint	<i>Solidago Canadensis</i>	Canada Goldenrod
<i>Mertensia lanceolata</i>	Prairie Bluebell	<i>Sphaeralcea coccinea</i>	Copper Mallow
<i>Nepeta cataria</i>	Catnip	<i>Symphoricarpos occidentalis</i>	Snowberry
<i>Oenothera biennis</i>	Common Evening Primrose	<i>Symphyotrichum falcatum</i>	White Prairie Aster
<i>Opuntia spp.</i>	Prickly Pear	<i>Symphyotrichum fendleri</i>	Fendler's Aster
<i>Panicum capillare</i>	Witchgrass	<i>Tamarix ramosissima</i>	Saltcedar
<i>Pascopyrum smithii</i>	Western Wheatgrass	<i>Taraxacum officinale</i>	Common Dandelion
<i>Penstemon unilateralis</i>	Oneside Penstemon	<i>Thelesperma megapotamicum</i>	Hopi Tea Greenthread
<i>Physalis longifolia</i>	Longleaf Ground Cherry	<i>Toxicodendron rydbergii</i>	Poison Ivy
<i>Pinus ponderosa</i>	Ponderosa Pine	<i>Tragopogon dubius</i>	Yellow Salsify
<i>Plantago lanceolata</i>	Buckhorn Plantain	<i>Tribulus terrestris</i>	Puncturevine
<i>Plantago major</i>	Broadleaf Plantain	<i>Trifolium pratense</i>	Red Clover
<i>Poa pratensis</i>	Kentucky Bluegrass	<i>Trifolium repens</i>	White Clover
<i>Polygonum aviculare</i>	Prostrate Knotweed	<i>Typha latifolia</i>	Broadleaf Cattail
<i>Polygonum pensylvanicum</i>	Pinkweed	<i>Ulmus Americana</i>	American Elm
<i>Polypogon monspeliensis</i>	Rabbitsfoot Grass	<i>Urtica dioica</i>	Stinging Nettle
<i>Populus angustifolia</i>	Narrowleaf Cottonwood	<i>Verbascum thapsus</i>	Common Mullein
<i>Populus deltoides</i>	Plains Cottonwood	<i>Verbena bracteata</i>	Bigbract Verbena
<i>Prunella vulgaris</i>	Common Selfheal	<i>Veronica salina</i>	Water Speedwell
<i>Prunus virginiana</i>	Chokecherry	<i>Viola odorata</i>	Violet
<i>Psoraleidum tenuiflorum</i>	Slimflower Scurfpea	<i>Vitis vulpina</i>	Frost Grape
<i>Ratibida columnifera</i>	Upright Prairie Coneflower	<i>Yucca glauca</i>	Soapweed Yucca
<i>Rhus trilobata</i>	Skunk Bush		
<i>Ribes aureum</i>	Golden Currant		
<i>Ribes cereum</i>	Wax Currant		
<i>Robinia pseudoacacia</i>	Black locust		
<i>Rosa woodsii</i>	Woods Rose		
<i>Rubus deliciosus</i>	Delicious Raspberry		
<i>Rudbeckia hirta</i>	Black-eyed Susan		
<i>Rumex crispus</i>	Curly Dock		
<i>Rumex triangulivalvis</i>	Willow Dock		
<i>Salix exigua</i>	Narrowleaf Willow		
<i>Salix monticola</i>	Park Willow		
<i>Salix sp.</i>	Willow		
<i>Salsola kali</i>	Russian Thistle		
<i>Salvia reflexa</i>	Lanceleaf Sage		
<i>Saponaria officinalis</i>	Bouncingbet		
<i>Schoenoplectus tabernaemontani</i>	Softstem Bullrush		

Appendix B – Wildlife inventory for Bear Creek Lake Park

Genus species	Common Name	Genus species	Common Name
Mammals		Amphibians	
<i>Alces alces</i>	Moose	<i>Ambystoma tigrinum</i>	Tiger Salamander
<i>Antilocapra americana</i>	Pronghorn	<i>Bufo woodhousii</i>	Woodhouse's Toad
<i>Bison bison</i>	Bison	<i>Pseudacris triseriata</i>	Striped Chorus Frog
<i>Canis latrans</i>	Coyote	<i>Rana catesbeiana</i>	Bullfrog
<i>Castor canadensis</i>	Beaver	<i>Rana pipiens</i>	Northern Leopard Frog
<i>Cervus elaphus</i>	Elk	Reptiles	
<i>Chaetodipus hispidus</i>	Pocket Mouse	<i>Chelydra serpentina</i>	Snapping Turtle
<i>Cynomys ludovicianus</i>	Black-tailed Prairie Dog	<i>Chrysemys picta</i>	Painted Turtle
<i>Eptesicus fuscus</i>	Big Brown Bat	<i>Cnemidophorus sexlineatus</i>	Six lined Racerunner
<i>Erethizon dorsatum</i>	Porcupine	<i>Coluber constrictor</i>	Racer
<i>Lasionycteris noctivagans</i>	Silver-haired Bat	<i>Crotalus viridis</i>	Rattlesnake
<i>Lasiurus cinereus</i>	Hoary Bat	<i>Lampropeltis triangulum</i>	Milk Snake
<i>Lepus townsendii</i>	White tailed Jackrabbit	<i>Pituophis melanoleucus</i>	Bullsnake
<i>Lynx rufus</i>	Bobcat	<i>Sceloporus undulatus</i>	Eastern Fence Lizard
<i>Mephitis mephitis</i>	Striped Skunk		Western Terrestrial Garter Snake
<i>Microtus ochrogaster</i>	Prairie Vole	<i>Thamnophis elegans</i>	Snake
<i>Microtus pennsylvanicus</i>	Meadow Vole	<i>Thamnophis radix</i>	Plains Garter Snake
<i>Mus musculus</i>	House Mouse	<i>Thamnophis sirtalis</i>	Common Garter Snake
<i>Mustela frenata</i>	Long tailed Weasel	*	
<i>Myotis lucifugus</i>	Little Brown Myotis		
<i>Myotis volans</i>	Long Legged Myotis		
<i>Neotoma cinerea</i>	Bushy-tailed Woodrat		
<i>Odocoileus hemionus</i>	Mule Deer		
<i>Odocoileus virginianus</i>	White tail Deer		
<i>Ondatra zibethicus</i>	Muskrat		
<i>Ovis canadensis</i>	Bighorn Sheep		
<i>Peromyscus maniculatus</i>	Deer Mouse		
<i>Procyon lotor</i>	Raccoon		
<i>Puma concolor</i>	Mountain Lion		
<i>Rattus norvegicus</i>	Brown Rat		
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse		
<i>Sciurus aberti</i>	Abert's Squirrel		
<i>Sciurus griseus</i>	Western Gray Squirrel		
<i>Sciurus niger</i>	Fox Squirrel		
<i>Sorex</i>	Shrew	*	
	Golden-mantled Ground Squirrel		
<i>Spermophilus lateralis</i>	Squirrel		
	Thirteen lined Ground Squirrel		
<i>Spermophilus tridecemlineatus</i>	Squirrel		
<i>Sylvilagus floridanus</i>	Eastern Cottontail Rabbit		
<i>Sylvilagus nuttallii</i>	Mountain Cottontail		
<i>Tamiasciurus hudsonicus</i>	Red Squirrel		
<i>Taxidea taxus</i>	Badger		
<i>Thomomys talpoides</i>	Northern Pocket Gopher		
<i>Ursus americana</i>	Black Bear		
<i>Vulpes vulpes</i>	Red Fox		
<i>Zapus princeps</i>	Western Jumping Mouse		

Genus species	Common Name	Genus species	Common Name
Birds			
<i>Accipiter cooperii</i>	Cooper's Hawk	<i>Buteo regalis</i>	Ferruginous Hawk
<i>Accipiter gentilis</i>	Northern Goshawk	<i>Buteo swainsoni</i>	Swainson's Hawk
<i>Accipiter striatus</i>	Sharp-shinned Hawk	<i>Calamospiza melanocorys</i>	Lark Bunting
<i>Actitis macularia</i>	Spotted Sandpiper	<i>Calcarius mccownii</i>	McCown's Longspur
<i>Aechmophorus clarkii</i>	Clark's Grebe	<i>Calidris bairdii</i>	Baird's Sandpiper
<i>Aechmophorus occidentalis</i>	Western Grebe	<i>Calidris mauri</i>	Western Sandpiper
<i>Aeronautes saxatalis</i>	White-throated Swift	<i>Calidris melanotos</i>	Pectoral Sandpiper
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	<i>Calidris minutilla</i>	Least Sandpiper
<i>Aimophila cassinii</i>	Cassin's Sparrow	<i>Calidris pusilla</i>	Semipalmated Sandpiper
<i>Aix sponsa</i>	Wood Duck	<i>Carduelis pinus</i>	Pine Siskin
<i>Anas acuta</i>	Northern Pintail	<i>Carduelis psaltria</i>	Lesser Goldfinch
<i>Anas americana</i>	American Wigeon	<i>Carduelis tristis</i>	American Goldfinch
<i>Anas clypeata</i>	Northern Shoveler	<i>Carpodacus cassinii</i>	Cassin's Finch
<i>Anas crecca</i>	Green-winged Teal	<i>Carpodacus mexicanus</i>	House Finch
<i>Anas cyanoptera</i>	Cinnamon Teal	<i>Cathartes aura</i>	Turkey Vulture
<i>Anas discors</i>	Blue-winged Teal	<i>Catharus guttatus</i>	Hermit Thrush
<i>Anas platyrhynchos</i>	Mallard	<i>Catharus ustulatus</i>	Swainson's Thrush
<i>Anas strepera</i>	Gadwall	<i>Catherpes mexicanus</i>	Canyon Wren
<i>Anthus rubescens</i>	American Pipit	<i>Catoptrophorus semipalmatus</i>	Willet
<i>Aphelocoma californica</i>	Western Scrub-Jay	<i>Certhia americana</i>	Brown Creeper
<i>Aquila chrysaetos</i>	Golden Eagle	<i>Ceryle alcyon</i>	Belted Kingfisher
	Black-chinned		
<i>Archilochus alexandri</i>	Hummingbird	<i>Charadrius semipalmatus</i>	Semipalmated Plover
<i>Ardea alba</i>	Great Egret	<i>Charadrius vociferus</i>	Killdeer
<i>Ardea herodias</i>	Great Blue Heron	<i>Chen caerulescens</i>	Snow Goose
<i>Asio otus</i>	Long-eared Owl	<i>Chlidonias niger</i>	Black Tern
<i>Athene cunicularia</i>	Burrowing Owl	<i>Chondestes grammacus</i>	Lark Sparrow
<i>Aythya affinis</i>	Lesser Scaup	<i>Chordeiles minor</i>	Common Nighthawk
<i>Aythya americana</i>	Redhead	<i>Cinclus mexicanus</i>	American Dipper
<i>Aythya collaris</i>	Ring-necked Duck	<i>Circus cyaneus</i>	Northern Harrier
<i>Aythya marila</i>	Greater Scaup	<i>Cistothorus palustris</i>	Marsh Wren
<i>Aythya valisineria</i>	Canvasback	<i>Coccythraustes vespertinus</i>	Evening Grosbeak
<i>Bombycilla cedrorum</i>	Cedar Waxwing	<i>Coccyzus americanus</i>	Yellow-billed Cuckoo
<i>Botaurus lentiginosus</i>	American Bittern	<i>Colaptes auratus</i>	Northern Flicker
<i>Branta canadensis</i>	Canada Goose	<i>Columba fasciata</i>	Band-tailed Pigeon
<i>Branta hutchinsii</i>	Cackling Goose	<i>Columba livia</i>	Rock Pigeon
<i>Bubo virginianus</i>	Great Horned Owl	<i>Contopus cooperi</i>	Olive-sided Flycatcher
<i>Bubulcus ibis</i>	Cattle Egret	<i>Contopus sordidulus</i>	Western Wood-Pewee
<i>Bucephala albeola</i>	Bufflehead	<i>Corvus brachyrhynchos</i>	American Crow
<i>Bucephala clangula</i>	Common Goldeneye	<i>Corvus corax</i>	Common Raven
<i>Bucephala islandica</i>	Barrow's Goldeneye	<i>Cyanocitta cristata</i>	Blue Jay
<i>Buteo jamaicensis</i>	Red-tailed Hawk	<i>Cyanocitta stelleri</i>	Steller's Jay
			Black-throated Blue
<i>Buteo lagopus</i>	Rough-legged Hawk	<i>Dendroica caerulescens</i>	Warbler
<i>Buteo platypterus</i>	Broad-winged Hawk	<i>Dendroica castanea</i>	Bay-breasted Warbler

Genus species	Common Name	Genus species	Common Name
<i>Dendroica coronata</i>	Yellow-rumped Warbler	<i>Lophodytes cucullatus</i>	Hooded Merganser
<i>Dendroica nigrescens</i>	Black-throated Gray Warbler	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
<i>Dendroica petechia</i>	Yellow Warbler	<i>Melanerpes lewis</i>	Lewis' Woodpecker
<i>Dendroica townsendi</i>	Townsend's Warbler	<i>Melanitta fusca</i>	White-winged Scoter
<i>Dolichonyx oryzivorus</i>	Bobolink	<i>Melanitta perspicillata</i>	Surf scoter
<i>Dumetella carolinensis</i>	Gray Catbird	<i>Melospiza lincolni</i>	Lincoln's Sparrow
<i>Egretta thula</i>	Snowy Egret	<i>Melospiza melodia</i>	Song Sparrow
<i>Empidonax hammondii</i>	Hammond's Flycatcher	<i>Mergus merganser</i>	Common Merganser
<i>Empidonax minimus</i>	Least Flycatcher	<i>Mergus serrator</i>	Red-breasted Merganser
<i>Empidonax oberholseri</i>	Dusky Flycatcher	<i>Mimus polyglottos</i>	Northern Mockingbird
<i>Empidonax occidentalis</i>	Cordilleran Flycatcher	<i>Molothrus ater</i>	Brown-headed Cowbird
<i>Empidonax traillii</i>	Willow Flycatcher	<i>Myadestes townsendi</i>	Townsend's Solitaire
<i>Empidonax wrightii</i>	Gray Flycatcher	<i>Myiarchus cinerascens</i>	Ash-throated Flycatcher
<i>Eremophila alpestris</i>	Horned Lark	<i>Nyctanassa violacea</i>	Yellow-crowned Night-Heron
<i>Euphagus carolinus</i>	Rusty Blackbird	<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	<i>Oporornis formosus</i>	Kentucky Warbler
<i>Falco columbarius</i>	Merlin	<i>Oporornis tolmiei</i>	MacGillivray's Warbler
<i>Falco mexicanus</i>	Prairie Falcon	<i>Oreoscoptes montanus</i>	Sage Thrasher
<i>Falco peregrinus</i>	Peregrine Falcon	<i>Otus asio</i>	Eastern Screech Owl
<i>Falco sparverius</i>	American Kestrel	<i>Oxyura jamaicensis</i>	Ruddy Duck
<i>Fulica americana</i>	American Coot	<i>Pandion haliaetus</i>	Osprey
<i>Gallinago delicata</i>	Wilson's Snipe	<i>Passer domesticus</i>	House Sparrow
<i>Gavia immer</i>	Common Loon	<i>Passerculus sandwichensis</i>	Savannah Sparrow
<i>Geothlypis trichas</i>	Common Yellowthroat	<i>Passerina amoena</i>	Lazuli Bunting
<i>Grus canadensis</i>	Sandhill Crane	<i>Passerina amoena x cyanea</i>	Lazuli x Indigo Bunting
<i>Guiraca caerulea</i>	Blue Grosbeak	<i>Passerina cyanea</i>	Indigo Bunting
<i>Haliaeetus leucocephalus</i>	Bald Eagle	<i>Pelecanus erythrorhynchos</i>	American White Pelican
<i>Helmitheros vermivora</i>	Worm-eating Warbler	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow
<i>Himantopus mexicanus</i>	Black-necked Stilt	<i>Phalacrocorax auritus</i>	Double-crested Cormorant
<i>Hirundo rustica</i>	Barn Swallow	<i>Phalaenoptilus nuttallii</i>	Common Poorwill
<i>Icteria virens</i>	Yellow-breasted Chat	<i>Phalaropus tricolor</i>	Wilson's Phalarope
<i>Icterus bullockii</i>	Bullock's Oriole	<i>Phasianus colchicus</i>	Ring-necked Pheasant
<i>Icterus spurius</i>	Orchard Oriole	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak
<i>Ixoreus naevius</i>	Varied Thrush	<i>Pheucticus melanocephalus</i>	Black-headed Grosbeak
<i>Junco hyemalis</i>	Dark-eyed Junco	<i>Pica hudsonia</i>	Black-billed Magpie
<i>Lanius excubitor</i>	Northern Shrike	<i>Picoides pubescens</i>	Downy Woodpecker
<i>Lanius ludovicianus</i>	Loggerhead Shrike	<i>Picoides villosus</i>	Hairy Woodpecker
<i>Larus argentatus</i>	Herring Gull	<i>Pipilo chlorurus</i>	Green-tailed Towhee
<i>Larus californicus</i>	California Gull	<i>Pipilo maculatus</i>	Spotted Towhee
<i>Larus delawarensis</i>	Ring-billed Gull	<i>Piranga ludoviciana</i>	Western Tanager
<i>Larus marinus</i>	Great Black-backed Gull	<i>Piranga olivacea</i>	Scarlet Tanager
<i>Larus pipixcan</i>	Franklin's Gull	<i>Plegadis chihi</i>	White-faced Ibis
<i>Limnodromus scolopaceus</i>	Long-billed Dowitcher	<i>Podiceps auritus</i>	Horned Grebe
<i>Limosa haemastica</i>	Hudsonian Godwit	<i>Podiceps nigricollis</i>	Eared Grebe

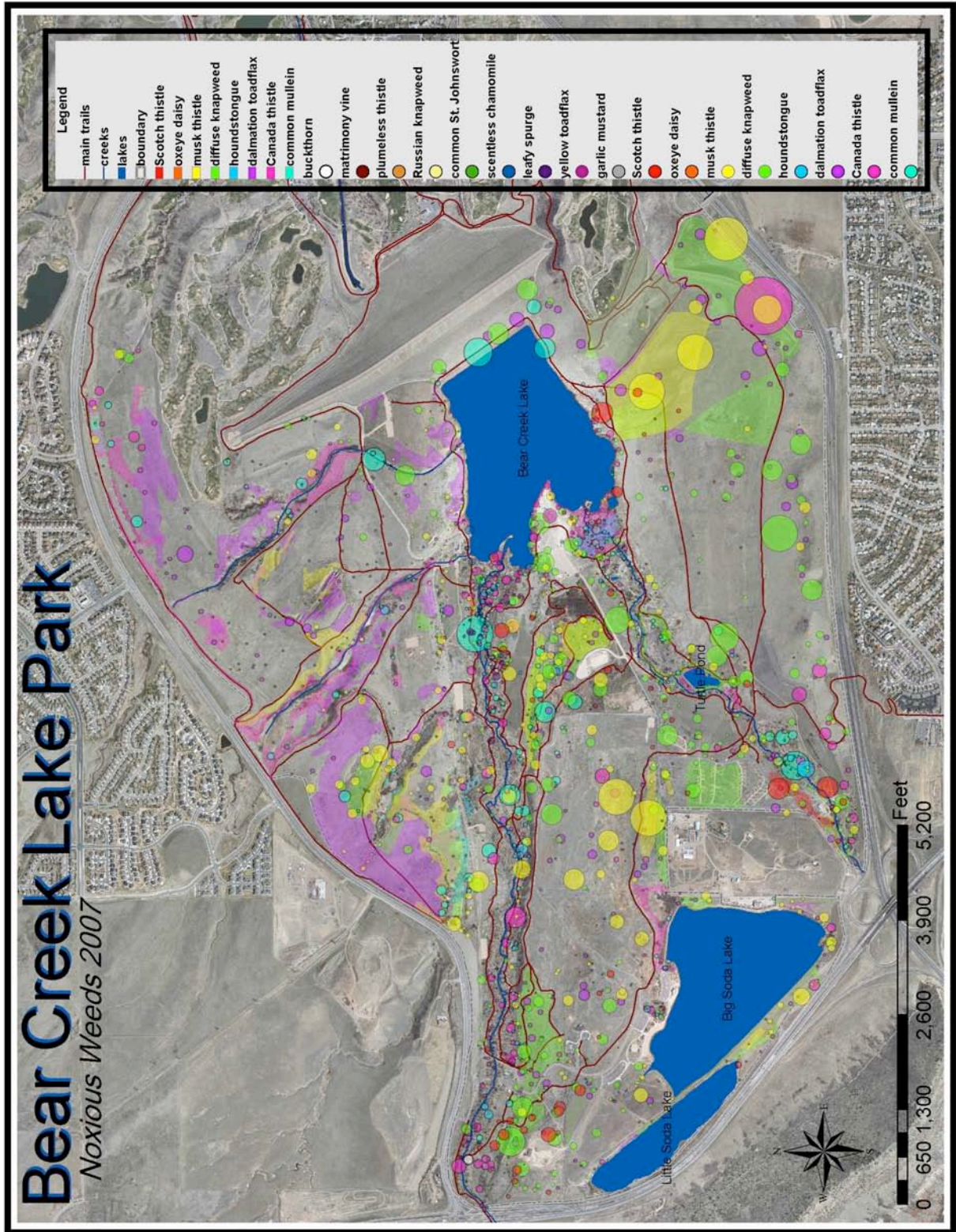
Genus species	Common Name
<i>Podilymbus podiceps</i>	Pied-billed Grebe
<i>Poecile atricapilla</i>	Black-capped Chickadee
<i>Poecile gambeli</i>	Mountain Chickadee
<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher
<i>Poocetes gramineus</i>	Vesper Sparrow
<i>Porzana carolina</i>	Sora
<i>Psaltriparus minimus</i>	Bushtit
<i>Quiscalus quiscula</i>	Common Grackle
<i>Rallus limicola</i>	Virginia Rail
<i>Recurvirostra americana</i>	American Avocet
<i>Regulus calendula</i>	Ruby-crowned Kinglet
<i>Riparia riparia</i>	Bank Swallow
<i>Salpinctes obsoletus</i>	Rock Wren
<i>Sayornis phoebe</i>	Eastern Phoebe
<i>Sayornis saya</i>	Say's Phoebe
<i>Seiurus noveboracensis</i>	Northern Waterthrush
<i>Selasphorus platycercus</i>	Broad-tailed Hummingbird
<i>Selasphorus rufus</i>	Rufous Hummingbird
<i>Setophaga ruticilla</i>	American Redstart
<i>Sialia currucoides</i>	Mountain Bluebird
<i>Sialia mexicana</i>	Western Bluebird
<i>Sialia sialis</i>	Eastern Bluebird
<i>Sitta canadensis</i>	Red-breasted Nuthatch
<i>Sitta carolinensis</i>	White-breasted Nuthatch
<i>Sitta pygmaea</i>	Pygmy Nuthatch
<i>Sphyrapicus nuchalis</i>	Red-naped Sapsucker
<i>Spizella arborea</i>	American Tree Sparrow
<i>Spizella breweri</i>	Brewer's Sparrow
<i>Spizella pallida</i>	Clay-colored Sparrow
<i>Spizella passerina</i>	Chipping Sparrow
	Northern Roughwinged Swallow

Fish

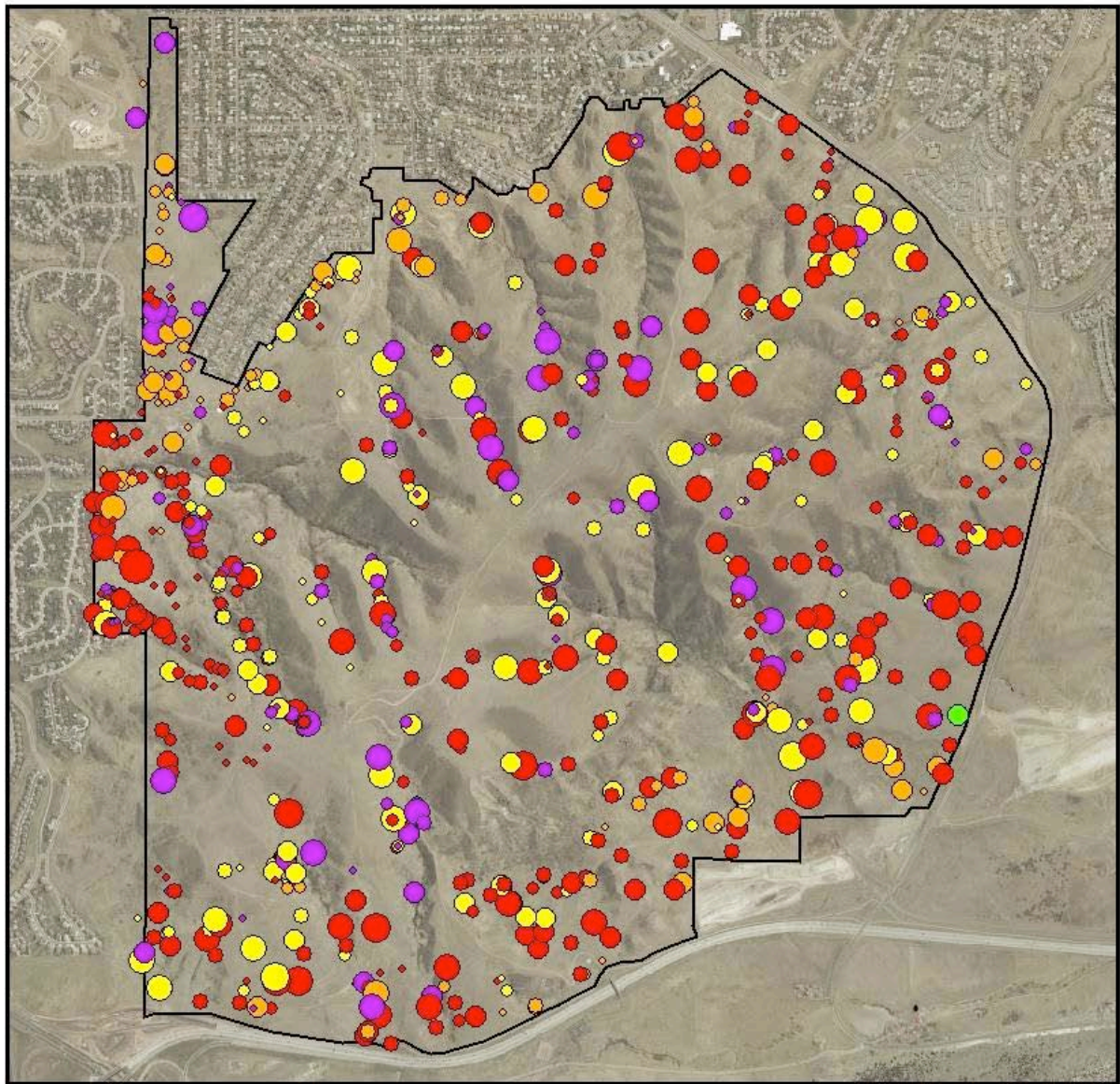
<i>Catostomus commersoni</i>	White Sucker
<i>Cyprinus carpio</i>	Common Carp
<i>Dorosoma cepedianum</i>	Gizzard Shad
<i>Esox masquinongy x lucius</i>	Tiger Muskie
<i>Ictalurus punctatus</i>	Channel Catfish
<i>Lepomis macrochirus</i>	Bluegill
<i>Micropterus dolomieu</i>	Smallmouth Bass
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Morone chrysops x saxatilis</i>	Wiper
<i>Oncorhynchus clarki</i>	Cutthroat Trout
<i>Oncorhynchus mykiss</i>	Rainbow Trout
<i>Oncorhynchus nerka</i>	Kokanee Salmon

Genus species	Common Name
<i>Stellula calliope</i>	Calliope Hummingbird
<i>Streptopelia decaocto</i>	Eurasian Collared Dove
<i>Sturnella neglecta</i>	Western Meadowlark
<i>Sturnus vulgaris</i>	European Starling
<i>Synthliboramphus antiquus</i>	Ancient Murrelet
<i>Tachycineta bicolor</i>	Tree Swallow
<i>Tringa flavipes</i>	Lesser Yellowlegs
<i>Tringa melanoleuca</i>	Greater Yellowlegs
<i>Tringa solitaria</i>	Solitary Sandpiper
<i>Troglodytes aedon</i>	House Wren
<i>Troglodytes troglodytes</i>	Winter Wren
<i>Turdus migratorius</i>	American Robin
<i>Tyrannus forficatus</i>	Scissor-tailed Flycatcher
<i>Tyrannus tyrannus</i>	Eastern Kingbird
<i>Tyrannus verticalis</i>	Western Kingbird
<i>Vermivora celata</i>	Orange-crowned Warbler
<i>Vermivora peregrina</i>	Tennessee Warbler
<i>Vermivora ruficapilla</i>	Nashville Warbler
<i>Vermivora virginiae</i>	Virginia's Warbler
<i>Vireo cassinii</i>	Cassin's Vireo
<i>Vireo gilvus</i>	Warbling Vireo
<i>Vireo olivaceus</i>	Red-eyed Vireo
<i>Vireo plumbeus</i>	Plumbeous Vireo
<i>Wilsonia pusilla</i>	Wilson's Warbler
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird
<i>Zenaida macroura</i>	Mourning Dove
<i>Zonotrichia albicollis</i>	White-throated Sparrow
<i>Zonotrichia atricapilla</i>	Golden-crowned Sparrow
<i>Zonotrichia leucophrys</i>	White-crowned Sparrow
<i>Zonotrichia querula</i>	Harris' Sparrow
<i>Perca flavescens</i>	Yellow Perch
<i>Pomoxis annularis</i>	White Crappie
<i>Pomoxis nigromaculatus</i>	Black Crappie
<i>Prosopium williamsoni</i>	Mountain Whitefish
<i>Salmo trutta</i>	Brown Trout
<i>Salvelinus fontinalis</i>	Brook Trout
<i>Salvelinus namaycush</i>	Lake Trout
<i>Salvelinus namaycush x fontinalis</i>	Splake
<i>Sander canadensis x vitreus</i>	Saugeye
<i>Stizostedion vitreum</i>	Walleye
<i>Thymallus arcticus</i>	Grayling

Appendix C



Appendix C



William F. Hayden
Park
Invasive Species
Inventory

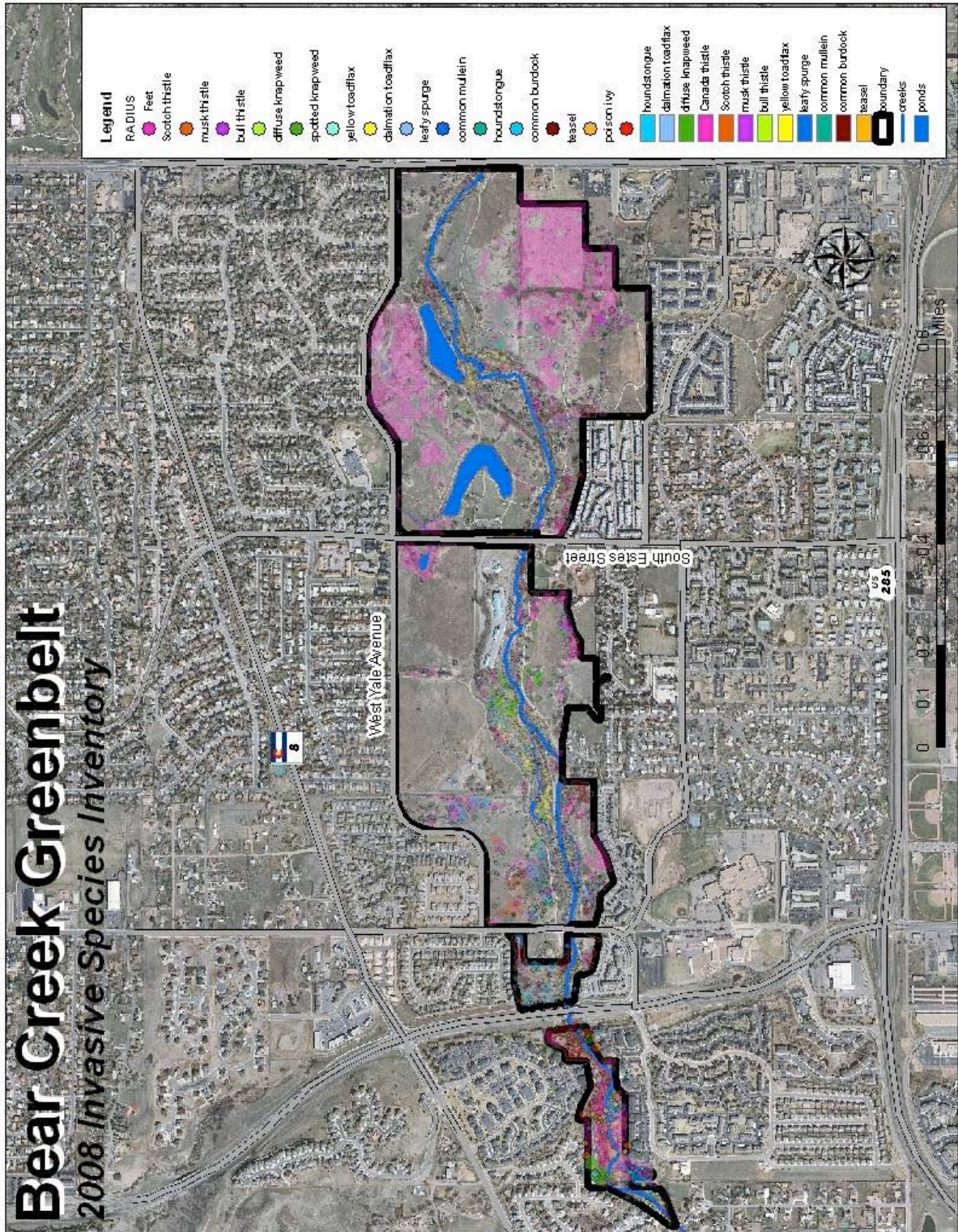
Legend

- Musk Thistle
- Canada Thistle
- Mullen
- Diffuse Knapweed
- Myrtle Spurge
- Teasel

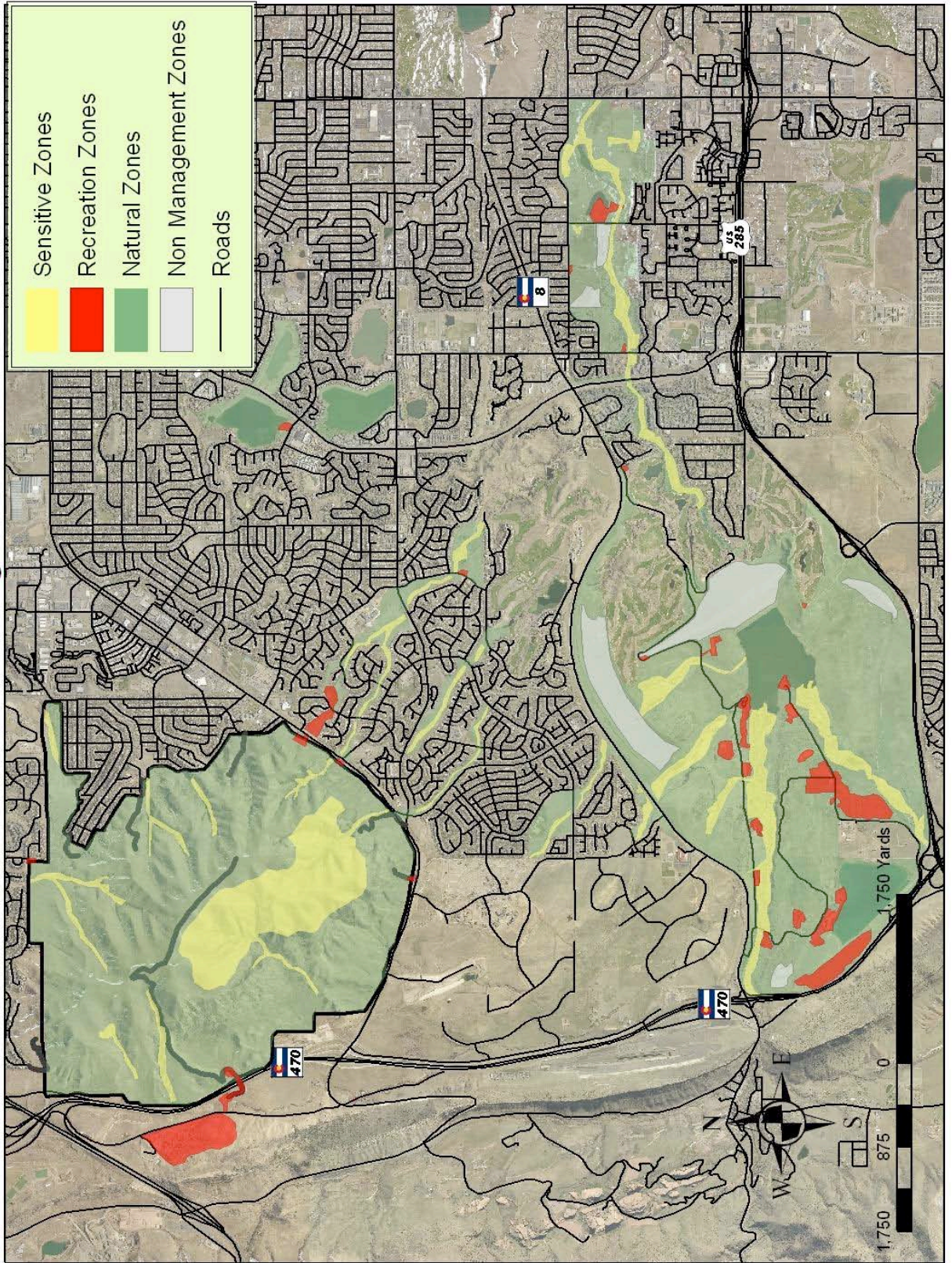
Coverage Radius

- 5-20 feet
- 25-35 feet
- 40-55 feet
- 60-85 feet
- 100-130 feet
- 150-200 feet

Appendix C

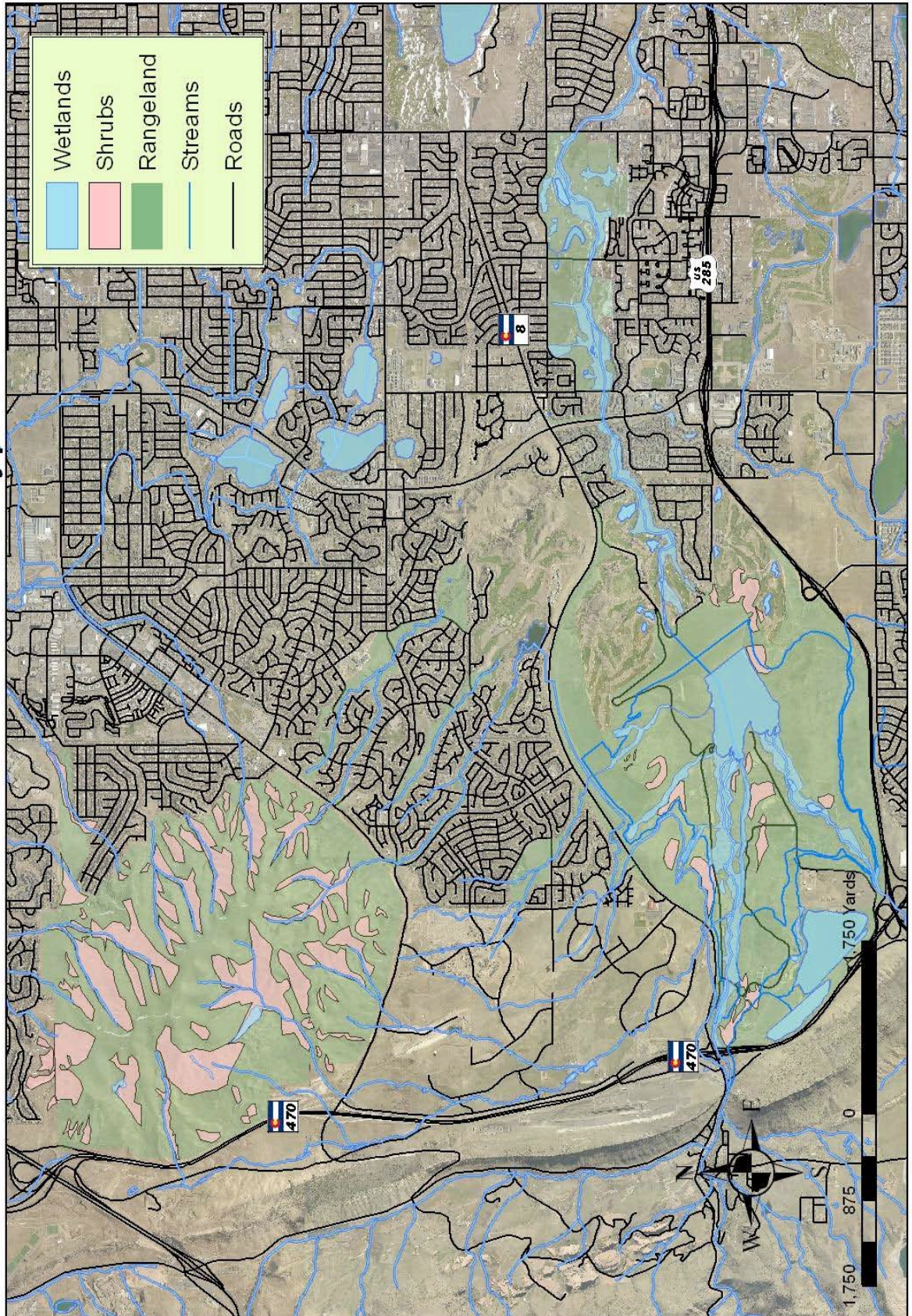


Natural Areas Designation Zones



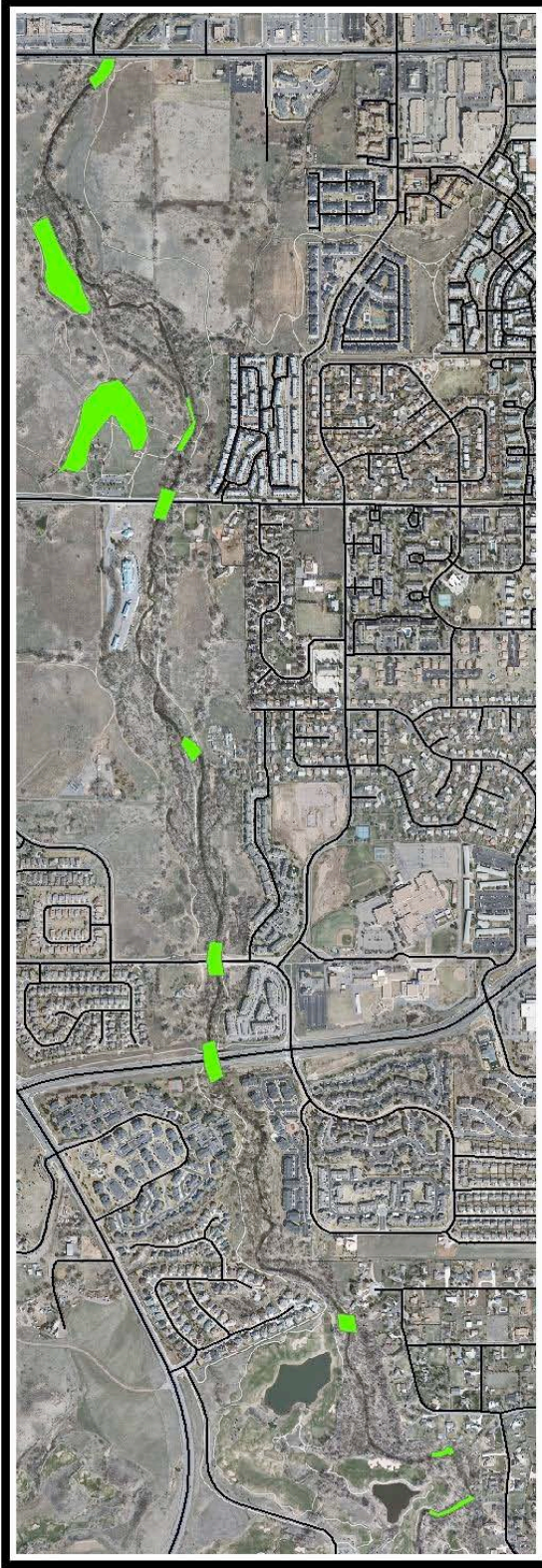
Appendix E

Natural Areas Habitat Types



Appendix F


Bear Creek Greenbelt



Bear Creek Lake Park

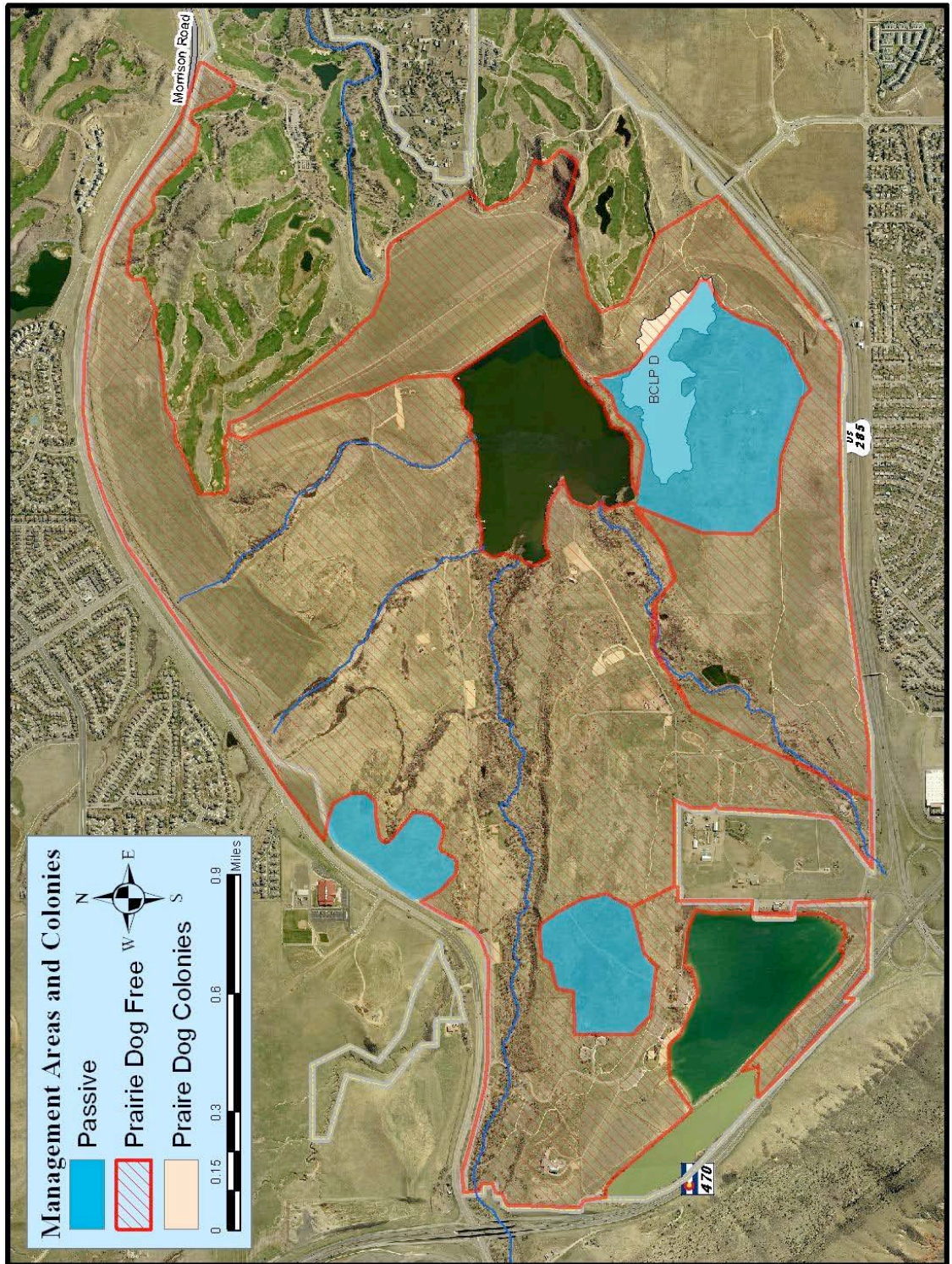


Beaver Management Areas

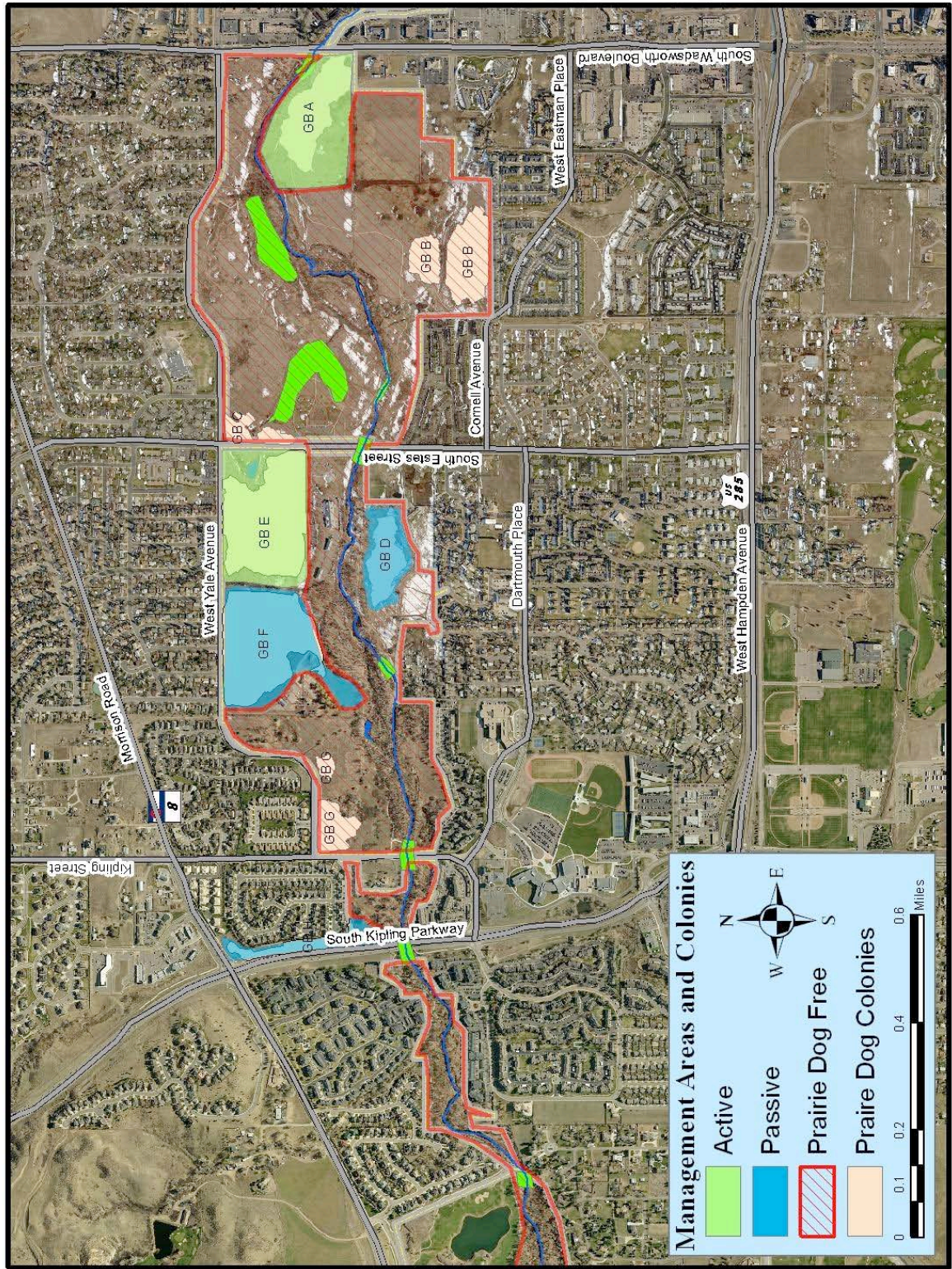
 beaver concerns areas



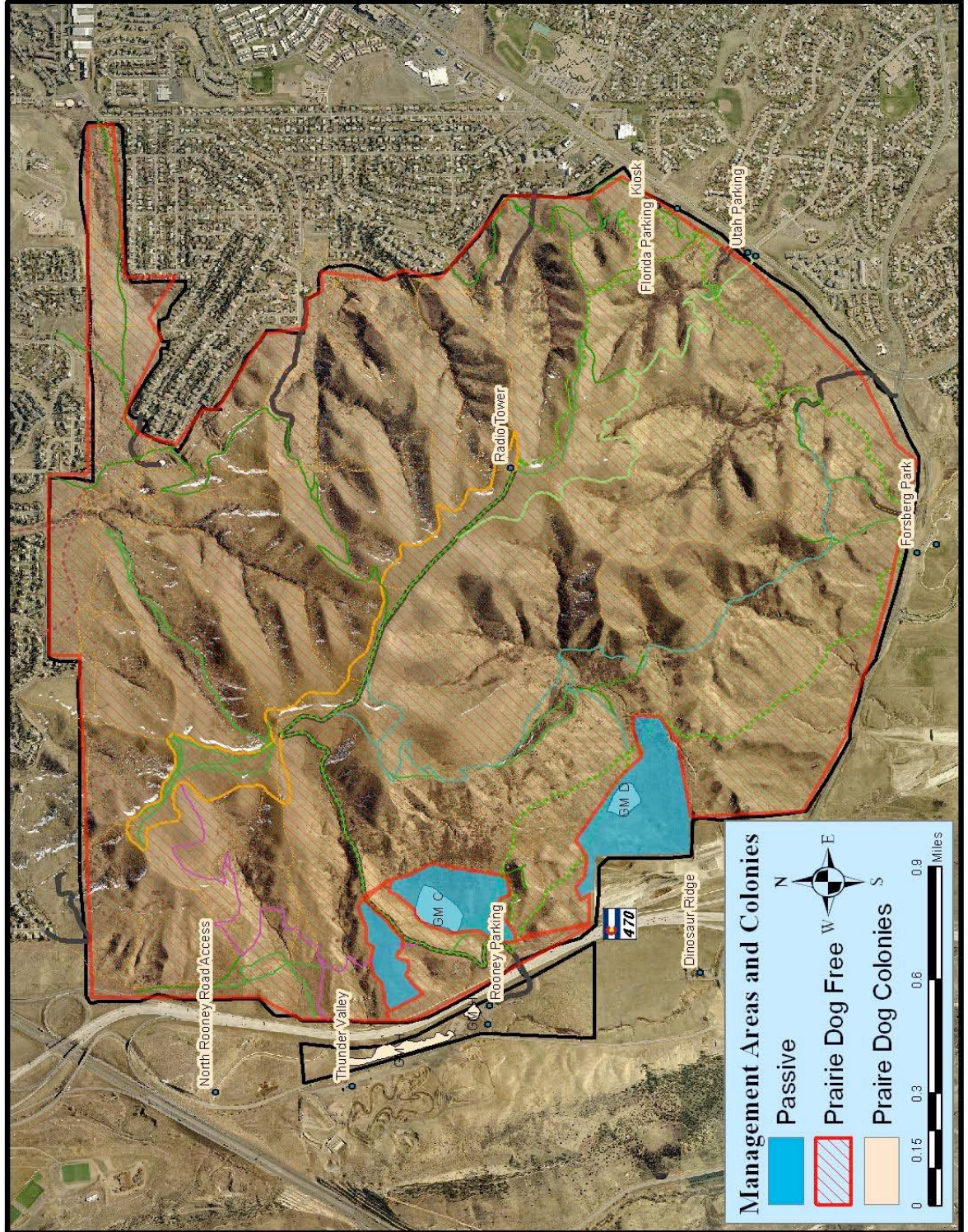
Prairie Dog Management

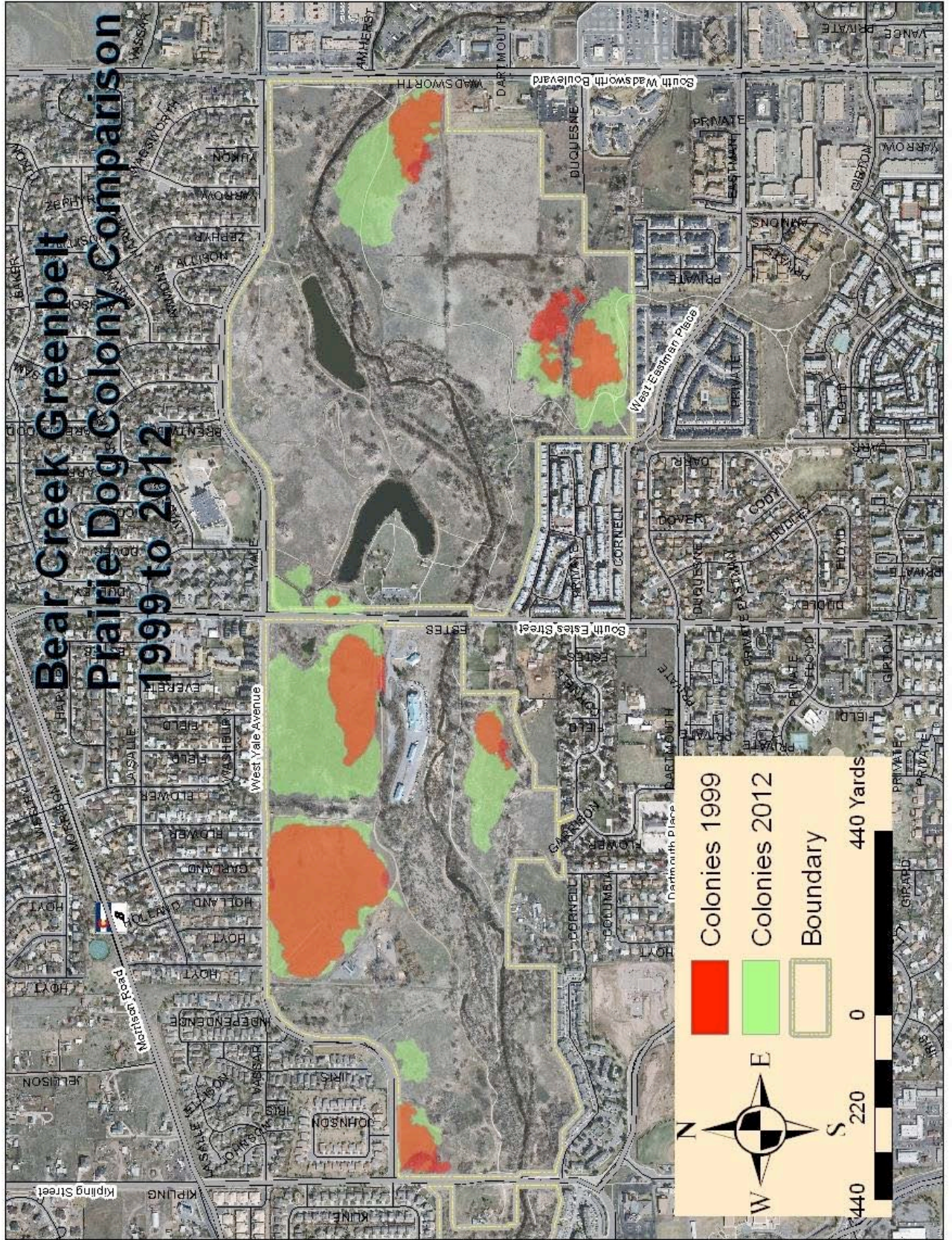


Prairie Dog Management



Prairie Dog Management





Appendix J

Lakewood Animal Control Coyote Response Plan

Purpose

The City of Lakewood has many types of wildlife residents and recognizes the need to address the inevitable conflicts of wildlife and people living as neighbors. This document outlines the response the City will take to address wildlife conflict issues. The plan will include ongoing and seasonally appropriate education that includes information about what private property owners can do via various media (channel 8, Looking at Lakewood, The Hub, neighborhood and ward meetings), monitoring identified packs and families, implementing hazing in city parks as a method to instill natural wildlife wariness, and lethal control on public property when a predator animal has shown documented aggression toward humans. This protocol excludes pest type wildlife such as skunk, raccoon, and rodent animals.

The City of Lakewood Department of Community Resources, the Animal Control Team in the Police Department and the Colorado Division of Wildlife are working cooperatively to develop and implement an action plan in the management of the City's resident wildlife population. This plan will identify protocols to address pre-conflict wildlife populations and conflict that occurs when wildlife is "too close for comfort." This plan includes educational aspects and proactive management actions.

Phase I Wildlife Education and Awareness (WEA)

Implementation Ongoing

This will be the educational and awareness phase which utilizes in-house expertise from Community Resources (CR) and the Animal Control Team (ACT) by utilizing informational programs broadcast through our government access television station KLTV8 to include graphic "infospots" which address seasonal wildlife issues. Lakewood's diverse wildlife population can be surprising to some, but with information, the shock of seeing wildlife close to residential areas and within our parks may minimize many misperceptions that wildlife only lives in unpopulated areas and away from people. Educational and awareness programs will be provided for sector, neighborhood and ward meetings, as well as other opportunities as they arise. Animal control will continue to provide education, evaluation and options to individuals calling for assistance.

During this phase, information about what residents can do to modify their own properties, identify attractants and remove them to avoid conflicts, as well as methods they can use to address conflicts occurring on their property will be provided via the above identified media.

Many times the use of descriptors of nuisance behavior (see Addendums B and C), especially when it comes to larger predator type animals, leads to confusion. Definitions of behaviors as identified through animal behavior studies will be included in internal training protocols, especially to ACT and CR personnel so that there is quantifiable descriptors to determine the proper response phase.

Phase II Hazing Program

Implementation

As needed

CR and ACT will work cooperatively with the Colorado Division of Wildlife to monitor and address behaviors in our wildlife population that have gone beyond identified norms. We will address this by implementing hazing protocols (see Hazing Protocol Addendum) in identified areas.

Phase III Lethal Control

City of Lakewood Public Property

Implementation

Need Determined by CR

CR has developed an action plan that includes wildlife management. Wildlife watching was identified in the top three outdoor activities enjoyed by Lakewood residents, thus their management efforts must include these identified priorities. Beyond the enjoyment aspect of wildlife watching, there is an environmental benefit to maintaining and encouraging natural wildlife populations in that it is self regulating (predator/prey cycles) and is beneficial to maintaining and/or developing natural ecosystems, another goal in the Department of Community Resources Needs Assessment Plan.

CR would be responsible for any decisions regarding lethal control of nuisance wildlife on City of Lakewood park properties. ACT will work cooperatively with CR within the parameters of their needs assessment study.

Private Property

City of Lakewood residents may use lawful methods on their property to control nuisance wildlife. Relocation of nuisance wildlife is restricted and, in most cases, prohibited.

City of Lakewood ordinances prohibit the poisoning of animals for everything but undesirable pests defined in CRS Title 35, Articles 7, 10, and 43. Intentionally placing poison where domestic pets and non-target animals can access it is a violation of our ordinance. The City also prohibits the discharge of firearms.

The use of leghold and conibear type traps, snares and poisons is prohibited under Amendment 14 of the state's constitution, however there are two exemptions that require approval through DOW, the Department of Agriculture and/or the Department of Health and Human Services.

Licensed private trappers are available to assist citizens with private property nuisance wildlife.

Hazing Plan Protocol Addendum

Hazing

ACOs, CR Personnel, DOW Volunteers

Implementation

Identified hazardous behaviors

1. Incoming complaint calls. Animal control will interview complainants to determine the animal's behavior level (see definitions).
2. Animal control monitors situations, communicates with DOW and Community Resources (CR)
3. Animal control identifies hazardous behaviors, notification of DOW, CR
4. Neighborhood notifications sent out prior to hazing implementation (time-sensitivity dependent upon identified hazard)
5. Hazing program takes effect in identified location- personnel involved trained acos, trained DOW volunteers, trained CR personnel

Hazing Program Description

The effectiveness of hazing has not been studied. It is implemented with the intention of reinforcing "normal" wildlife behaviors, i.e., fear of humans, as well as discouraging inappropriately located den sites.

Pepper ball Hazing

Used to discourage individual animals that have become habituated to humans
Used to disperse animals from inappropriately located dens

Bear Spray

Used to discourage individual animals that have become habituated to humans

Lethal Control Plan Protocol Addendum

Lethal Control Plan Protocol

City of Lakewood Urban and Regional Parks

CR has responsibilities to determine management of wildlife within the City's parks systems.

Private Property (See Addendum B)

City of Lakewood residents may use lawful methods on their property to control nuisance wildlife. Relocation of nuisance wildlife is restricted and, in most cases, prohibited.

The City of Lakewood ordinances prohibit the poisoning of animals for everything but undesirable pests defined in CRS Title 35, Articles 7, 10, and 43. Intentionally placing poison where domestic pets and non-target animals can access it is a violation of our ordinance. The City also prohibits the discharge of firearms.

The use of leghold and conibear type traps, snares and poisons is prohibited under Amendment 14 of the state's constitution, however there are two exemptions that require approval through DOW, the Department of Agriculture and/or the Department of Health and Human Services. A homeowner may apply to the Health Department for an exemption to Amendment 14.

Licensed private trappers are available to assist citizens with private property nuisance wildlife.

Addendum B

SUBJECT: HUMAN-COYOTE INTERACTIONS

Excerpt from Area 5 Guidelines, prepared for Lakewood Police Department

Colorado Division of Wildlife

AUTHORITY

- A. 33-1-106 gives the Wildlife Commission the authority to regulate the circumstances under which wildlife may be taken, and to determine the disposition of usable portions of wildlife.
- B. 33-1-105(1)(h) gives the Wildlife Commission the authority to provide for destruction of any wildlife that poses a threat to public health, safety, or welfare.
- C. 33-6-107(9) gives any person, any member of such person's family, or any employee of the person to hunt, trap, or take coyotes on land owned or leased by the person without securing licenses to do so, when such wildlife is causing damage to crops, real or personal property, or livestock.
- D. Wildlife Commission Regulations (WCR) 302(A)(3), WCR 302 (B) and WCR 303 (F) provide methods for removing nuisance wildlife, including coyotes. Live trapping and shooting are the most common. Since Amendment 14, only live traps may be used (see exemptions below). Traps must be checked every 24 hours and coyotes must be killed or released on site when the trap is checked.
- E. WCR 303 (A) the CDOW will not allow the relocation of coyotes due to risks associated with handling of predators and disease concerns. In addition, studies have shown that relocation is not effective.
- F. In November 1996, Colorado voters approved Amendment 14. This constitutional amendment created a "method of take" prohibition for wildlife with respect to the use of leghold and conibear type traps, snares and poisons. There were two exemptions written into the amendment. One is for agricultural damage and the other is to address human health and safety.
- G. 33-6-207 gives the CDOW and the Department of Agriculture the authority to adopt and enforce reasonable rules governing trapping, snaring and poisoning for landowners' protection of crops and livestock. (This is an exemption under Amendment 14).
- H. 33-6-205 gives federal, state, county or municipal departments of health an exemption to Amendment 14 to take (by use of leg hold traps, snares, instant kill body-gripping design traps or poisons) wildlife for the purpose of protecting human health and safety.
- I. Jefferson County Health Department has the authority to issue Amendment 14 exemptions under Human Health and Safety to any private citizen, municipality or other entity within the county. Contact Dr. Jim Dale, Director for Jefferson County Health Department, at (303) 271-5718.

RESPONSIBILITY

The CDOW will provide guidance and education to landowners and local jurisdictions in managing nuisance coyotes. CDOW personnel [Area Wildlife Managers (AWM), District Wildlife Managers (DWM), and Wildlife Technicians] will respond to reports of dangerous coyotes and make

management decisions and recommendations based on the interest of public safety.

I. DEFINITIONS OF COYOTE BEHAVIOR

A. Nuisance Coyote

Habituated – A coyote that appears to frequently associate with humans or human related food sources, and exhibits little wariness of the presence of people.

Depredating – A coyote that is preying on pets or livestock (nothing in this guideline will negate definitions in the bear or lion directives).

Menacing – A coyote that exhibits aggravated abnormal behavior that does not qualify it as a dangerous coyote. This may include coyote incidents and/or encounters that were serious in nature or a coyote or group of coyotes that could potentially endanger public safety.

B. Dangerous Coyote

A coyote may be defined as dangerous using the following guidelines:

1. A coyote that has attacked a person.
2. A coyote that exhibits unprovoked aggressive behavior towards a human(s) or poses an immediate probable threat of death or injury to human life.

Addendum C

Descriptor Definitions

In the spirit of standardizing the definitions describing human and coyote encounters, the following definitions will be used by investigators to identify specific behaviors to better communicate individual or pack animal concerning behaviors as opposed to normal/acceptable animal behaviors:

Observation: The act of noticing or taking note. Residents may make an observation of tracks, scat, vocalizations.

Sighting: Visual observation of an animal. Vast majority of human-coyote interactions are sightings.

Encounter: An unexpected direct meeting that is without incident.

Incident: A conflict with an unsafe situation, an animal displayed unacceptable or abnormal behavior. Most attacks on pets fall into this category (Palo Alto, CA, Open Space Nature Preserves Policies and Procedures Manual, 2007)

Attack: An aggressive action initiated by the animal that involves physical contact with a human. Human is injured or killed by a wild animal. (Fox 2006)

Provoked: When a person enters an animal's personal space or purposefully tries to touch or injure, or lures (intentionally or not) with food or other attractant.

Unprovoked: Person did not enter an animal's personal space, try to touch, injure, or use an attractant.

***Credit for definitions:**

Coexisting in Coyote Country

City of Aurora Parks and Open Space Department, p. 3 and Lead
Park Naturalist Mary Ann Bonner

City of Palo Alto, CA Open Space Nature Preserves 2007 Manual

Coyote Hazing Program

Agreement

PARTICIPANTS:

The Colorado Division of Wildlife (CDOW) and the City of Lakewood.

LOCATION:

Various locations in Urban and Regional Parks systems within the City of Lakewood where the CDOW and local jurisdictions have determined and mutually agreed that the program could be effective.

PURPOSE:

To use a variety of non-lethal harassment or hazing methods, including but not limited to pepperball hazing and bearspray hazing, on coyotes that have displayed aggressive behavior or are approaching within close range of people that are using the parks. The action will help deter that behavior in the future and instill healthy fear of people back into local coyote populations. Coyotes are adaptable and can establish themselves.

IMPLEMENTATION:

- The local District Wildlife manager (DWM) will coordinate with local animal control, or other local contact as specified by the City on when and where to implement the Program.
- The Program can run for several days or several weeks, or as the need arises.
- CDOW volunteers will be utilized for the program.
- Only volunteers that have acquired a Colorado Hunter Education card, and who are proven marksmen, will be used for the Program when the hazing method includes use of any type of projectile launching device such as one that dispenses pepper bombs, paint balls, etc.
- City personnel may also participate if the City chooses to appoint designees for the Program.
- Volunteers will wear recognized CDOW volunteer attire.
- All hazing equipment that would not normally be encountered in a park setting will be blue or red (or similar bright color).
- All volunteers will coordinate and work directly with their local DWM on the days, location and times they will be out implementing the Program. These times and locations will be provided to the City of Lakewood 24 hours prior to any action being taken by volunteers.
- The DWM will communicate with local animal control, or other specified City appointee, on the volunteer's activities.
- The City can choose to designate a phone number (i.e.: local dispatch) that the DWM or volunteer can contact to notify them the day of implementation of the program and the location(s) they will be working.
- All volunteers/participants will carry the Coyote Hazing Information Sheet (see attached) that they can provide to any publics they encounter.

- Amendments can be made to this Agreement as the need arises.
- This Agreement can be canceled at any time by either participating authority.

EXPECTED OUTCOME:

Some hazing methods that will be utilized have not been used in the Front Range before. The program's success/outcome is unknown at this time. However, similar hazing techniques have been used on other wildlife successfully. Thus, the CDOW believes that this Program will be a useful tool in areas where human/coyote conflicts are occurring or are on the rise.

APPROVAL:

Kathy Hodgson, Director
Department of Community Resources
City of Lakewood

Date

Margy Greer, City Clerk
City Clerk's Office
City of Lakewood

Date

CDOW Authorizing Authority

Date

Coyote Hazing Program
Informational Sheet
Commonly Asked Questions

- 1.) What are you doing?
The Colorado Division of Wildlife (CDOW) has received several calls in this area from individuals who have had coyotes approach them too closely and that were not easily frightened away. The CDOW is using various hazing methods and techniques as tools for negative reinforcement for coyotes in the area. When a coyote approaches within a range that the CDOW feels is unhealthy for the coyotes, and for people, they will be hazed to remind them that approaching people is not acceptable behavior.
- 2.) Are you hurting the coyotes?
No long-term damage or injury to the coyotes will result from the hazing efforts. Consequences of hazing to the animal includes sneezing, bruising, itchiness, etc., that is not anticipated to last longer than a few days.
- 3.) How long will you be doing this?
The CDOW, in conjunction with local authorities, can implement this program for days or weeks as the need arises.
- 4.) Are you going to chase/haze the coyotes out of the area?
Chasing coyotes out of the area, or trapping them out of the area, is not the CDOW's goal. These activities are not effective in managing urban wildlife populations since other coyotes would move into the area. The CDOW hopes that this activity will get the coyotes that live in this area to start/keep acting like wild coyotes should (coyotes should have a healthy respect/fear of people and should not be approaching closely to us).
- 5.) Should I call the CDOW when I see a coyote?
The CDOW does not need a call on coyote sightings. There are coyotes in every city in the state and coyote sightings occur everyday along the Front Range. However, if you have a close encounter with a coyote that was not easily frightened off, the CDOW would appreciate a call in order to document the location and circumstances around that encounter.
- 6.) What can I do to help?
You can help your local wildlife, and the CDOW by following these simple guidelines:
 - Do not feed wildlife (except songbirds).
 - Keep your yard clear of attractants such as pet food, birdfeed, trash and dirty barbecue grills.
 - Protect your pets. Keep pets in at night or in a fully enclosed kennel.
 - Do not allow pets to run at large; walk your dog(s) on a leash.

- Remove food sources and cover for small rodents (such as mice and rabbits) since coyotes will be attracted to that prey base.
- Educate yourself and your family about coyotes, their needs and ways to avoid conflicts.
- Encourage your neighbors to follow these guidelines as well.
- Report individuals feeding coyotes to the CDOW.

7.) What if I encounter a coyote?

If you observe a coyote-enjoy the experience. Sighting of urban wildlife can be enriching and enjoyable. If the coyote approaches closely, scare it off by throwing objects or by making loud noises such as yelling or clapping.

8.) There are coyotes in the open space where I walk, should I be concerned?

Not at all. Coyotes are everywhere along the Front Range. However, if you are concerned, you can follow the following recommendations:

- Avoid walking during the hours the coyotes are most active – dusk through dawn.
- Keep all pets on a standard leash.
- Stay away from areas with active dens in the spring and summer.
- Avoid areas where there is a lot of vegetative cover for coyotes.
- Be prepared for an encounter: carry a noisemaker, walking stick, citronella spray, pepper spray or similar deterrent.
- Walk with a friend.

9.) What if I have more questions or want more information?

You can contact the Denver CDOW office at 303-291-7227, Mon-Fri, from 8 a.m.-5 p.m. to request coyote information or you may also want to obtain information from the CDOW website at www.wildlife.state.co.us.