

# CDOT PROJECT IM 0703-294

## I-70/32<sup>nd</sup> AVENUE INTERCHANGE ENVIRONMENTAL ASSESSMENT

### VEGETATION TECHNICAL REPORT

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

BCC	Bear Canyon Consulting, LLC
CNHP	Colorado Natural Heritage Program
CDOT	Colorado Department of Transportation
EA	Environmental Assessment
FHU	Felsburg Holt & Ullevig
FHWA	Federal Highway Administration
ha	hectares
I-70	Interstate Highway 70
LLC	Limited Liability Corporation
NEPA	National Environmental Policy Act
NRSI	Natural Resource Services, Inc.
ROW	Right of Way
SH 58	Colorado State Highway 58
UTM	Universal Transverse Mercator

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## 1.0 INTRODUCTION

In accordance with the National Environmental Policy Act of 1969 (NEPA) and its related regulations, the Federal Highway Administration (FHWA), as the Lead Agency, in cooperation with the Colorado Department of Transportation (CDOT) as the Applicant Agency, is preparing an Environmental Assessment (EA) for proposed improvements to the Interstate 70 (I-70)/32<sup>nd</sup> Avenue Interchange (the Proposed Action). The project is proposed by the City of Wheat Ridge. Natural Resource Services, Inc. (NRSI) was contracted on August 30, 2005 by Felsburg Holt & Ullevig (FHU), acting on behalf of CDOT and the City of Wheat Ridge, to conduct environmental assessments for the I-70/32<sup>nd</sup> Avenue Interchange EA. The detailed information included in this report is intended to support the EA document and associated local agency projects to be completed by the City of Wheat Ridge. A summarized version of this report was incorporated into the EA.

Bear Canyon Consulting, LLC (BCC) , under contract to NRSI, conducted surveys of vegetation community types within the I-70/32<sup>nd</sup> Street Interchange EA study area during September, 2005 to document existing conditions of the plant communities prior to proposed construction. This document describes the methods employed and reports the survey results.

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## 2.0 PROJECT LOCATION

The I-70/32<sup>nd</sup> Avenue interchange project is located in the western part of the Denver metropolitan area, as shown in **Figure 2-1**. The project area falls partially within the cities of Wheat Ridge and Lakewood and within unincorporated Jefferson County. The City of Arvada is located north of the project area, and the City of Golden is located west of the project area. The project area is shown in **Figure 2-2**.

The project area includes about two miles of I-70 from 26<sup>th</sup> Avenue to Ward Road and two miles of SH 58 from McIntyre Street to I-70. The general coordinates are 39° 46' 00" N latitude and 105° 09' 00" W longitude (UTM Zone 13 487,500E and 4,402,000N). The Study Area can be found on the USGS Golden, CO 7.5 minute topographic quadrangle at the following locations:

- ▶ SE1/4 of Section 24 in Township 3 South, Range 70 West of the 6<sup>th</sup> Prime Meridian, Golden, Colorado quadrangle
- ▶ NE1/4 of Section 25 in Township 3 South, Range 70 West of the 6<sup>th</sup> Prime Meridian, Golden, Colorado quadrangle
- ▶ S1/2 of Section 19, Township 3 South, Range 69 West of the 6<sup>th</sup> Prime Meridian Golden, Colorado quadrangle
- ▶ NW1/4SW1/4 of Section 20, Township 3 South, Range 69 West of the 6<sup>th</sup> Prime Meridian Golden, Colorado quadrangle
- ▶ W1/2 of Section 29, Township 3 South, Range 69 West of the 6<sup>th</sup> Prime Meridian, Golden, Colorado quadrangle
- ▶ N1/2 of Section 30, Township 3 South, Range 69 West of the 6<sup>th</sup> Prime Meridian Golden, Colorado quadrangle
- ▶ NW1/4 of Section 32, Township 3 South, Range 69 West of the 6<sup>th</sup> Prime Meridian, Golden Colorado quadrangle

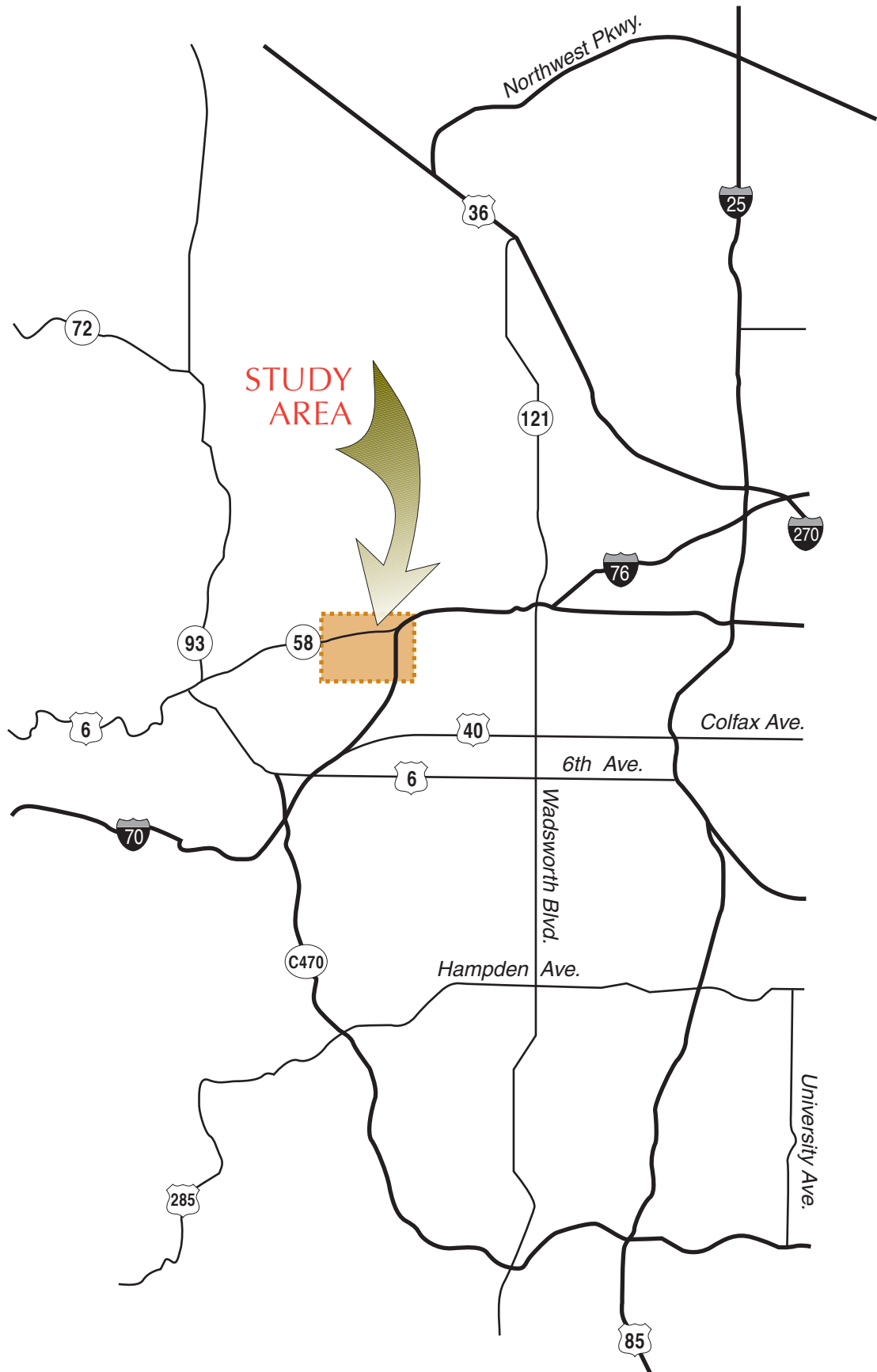


Figure 2-1

**Project Location**



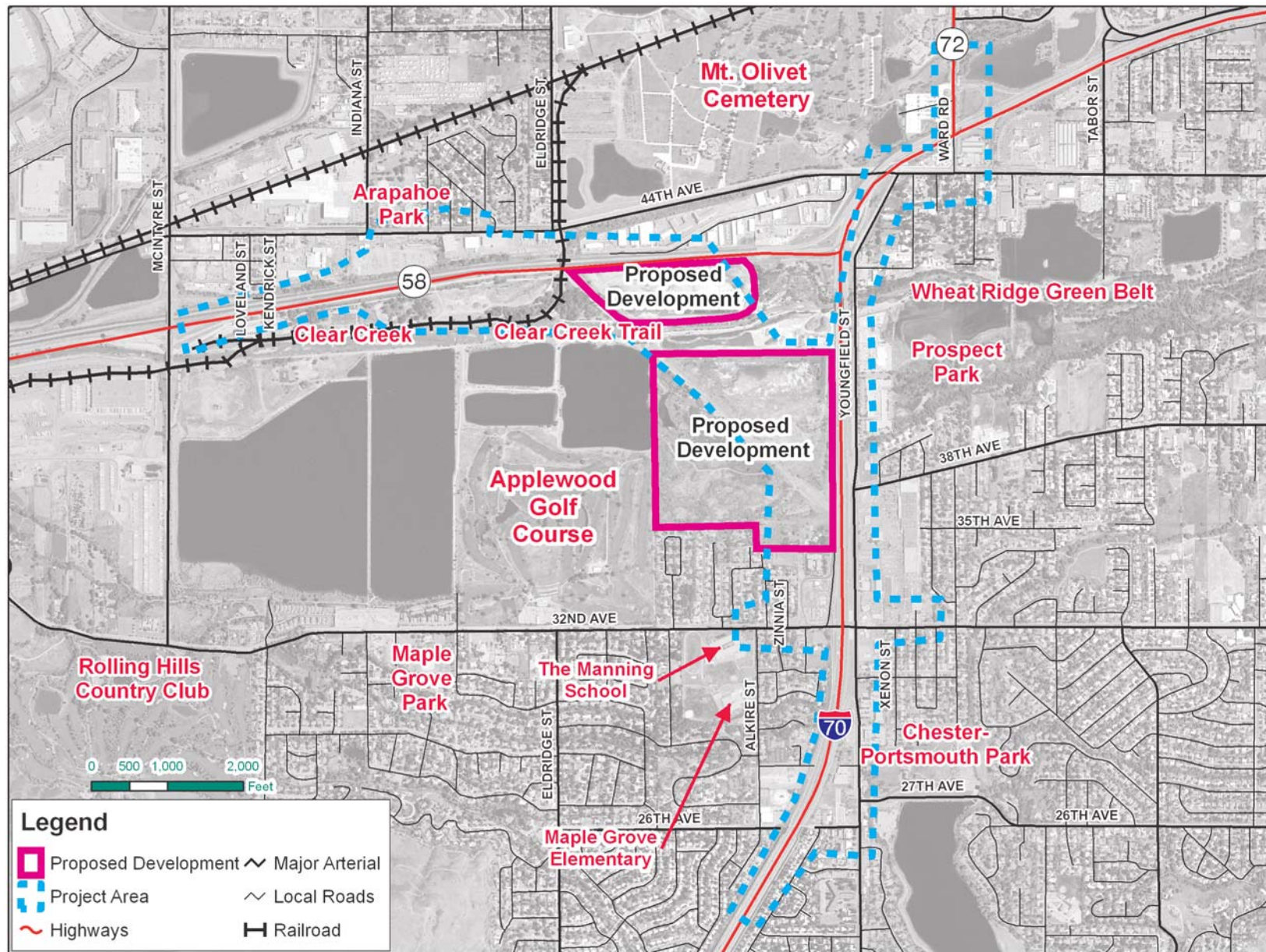


Figure 2-2  
Project Area

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## 3.0 PROJECT DESCRIPTION

The I-70/32<sup>nd</sup> Avenue interchange improvement process began with the development of a broad range of alternatives to address potential effects on traffic operations by regional growth and a proposed development located southwest of the I-70/SH 58 interchange. The *I-70/32<sup>nd</sup> Avenue Interchange System Level Feasibility Study* (FHU 2005) examined 21 alternatives and nine sub-alternatives. The System Level Feasibility Study, which was approved by the Colorado Transportation Commission in September 2005, advanced three alternative packages for further study in the EA. Technical screening and evaluation narrowed down the list of alternatives and resulted in identification of the Proposed Action.

### 3.1 Proposed Action

The Proposed Action is shown on **Figure 3-1** and consists of the following series of elements:

- ▶ **New I-70/32<sup>nd</sup> Avenue Interchange Hook Ramps**
  - Construction of off-set hook ramps at the I-70/32<sup>nd</sup> Avenue interchange with the westbound hook ramps located north of 32<sup>nd</sup> Avenue at approximately 35<sup>th</sup> Avenue and the eastbound hook ramps located at Youngfield Street and 27<sup>th</sup> Avenue
  - Construction of a third I-70 bridge over 32<sup>nd</sup> Avenue for the I-70 westbound ramp traffic
  - Closure of the existing westbound I-70 off-ramp that exits to 32<sup>nd</sup> Avenue. The existing westbound I-70 on-ramp would remain open but access would be limited to eastbound 32<sup>nd</sup> Avenue traffic only
  - Reconstruction and restriping of Youngfield Street between 27<sup>th</sup> Avenue and approximately 30<sup>th</sup> Avenue to achieve a 5-lane roadway section
- ▶ **32<sup>nd</sup> Avenue Improvements**
  - Widening of 32<sup>nd</sup> Avenue between approximately Alkire Street and approximately Xenon Street and the widening of Youngfield Street between approximately 35<sup>th</sup> Avenue and 30<sup>th</sup> Avenue in the vicinity of the I-70/32<sup>nd</sup> Avenue interchange
  - Connection of Cabela Drive with 32<sup>nd</sup> Avenue west of I-70 (40<sup>th</sup> Avenue to 32<sup>nd</sup> Avenue)
- ▶ **New SH 58/Cabela Drive Interchange**
  - Construction of a new diamond interchange on SH 58 west of Eldridge Street and connection of Cabela Drive to this interchange.
  - Connection of Cabela Drive with 44<sup>th</sup> Avenue north of the new interchange on SH 58
- ▶ **I-70/Ward Road Interchange**
  - Restriping of the Ward Road and westbound I-70 on-ramp intersection to add an additional southbound left turn lane onto the ramp and widen the ramp to receive this lane
  - Addition of a second right-turn lane for the eastbound I-70/Ward Road off-ramp



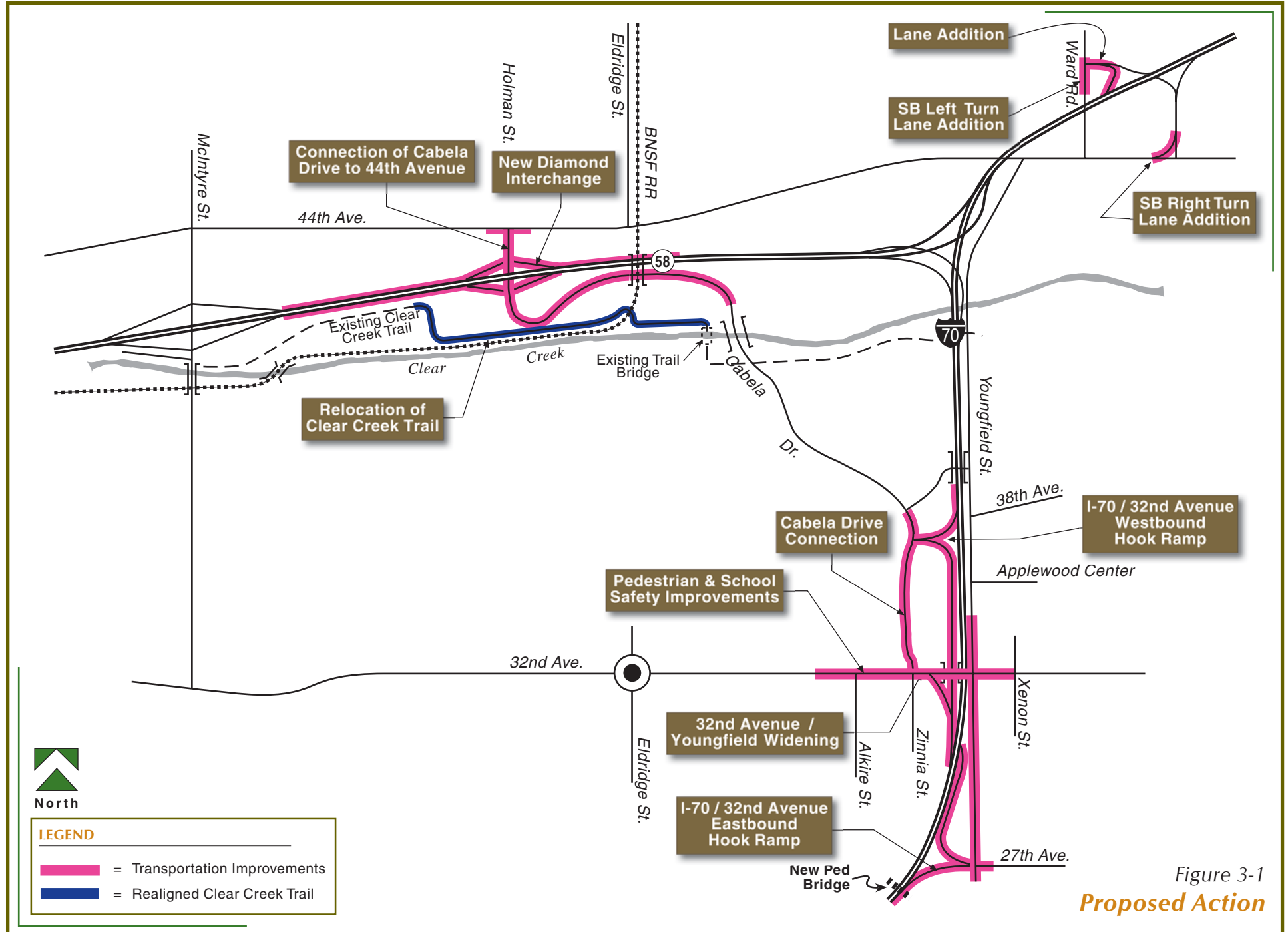


Figure 3-1  
Proposed Action

▶ **Bicycle/Pedestrian Improvements**

- Relocation of the Jefferson County Open Space Clear Creek trail in the vicinity of the new SH 58/Cabela Drive interchange
- Replacement of the 32<sup>nd</sup> Avenue trail detached sidewalk along the south side of 32<sup>nd</sup> Avenue from Alkire Street to Cabela Drive with an attached sidewalk
- Improvements to pedestrian and school safety along 32<sup>nd</sup> Avenue
- Construction of an Americans with Disabilities Act (ADA) compliant pedestrian bridge at 27<sup>th</sup> Avenue to replace the existing pedestrian bridge at 26<sup>th</sup> Avenue as part of the eastbound I-70 hook ramps
- Provisions for Jefferson County Open Space Clear Creek Trail access through the development site from 32<sup>nd</sup> Avenue
- Wider sidewalks under I-70 on the south side of 32<sup>nd</sup> Avenue to better accommodate bicycles and pedestrians

### **3.2 Local Agency Projects**

The City of Wheat Ridge submitted an application to CDOT for construction of a series of local agency projects that are common to each of the three alternative packages presented in the System Level Feasibility Study and that would be independent and stand on their own merits should no other improvements take place. The local agency projects do not preclude any of the alternatives evaluated in the EA. The local agency projects include:

- ▶ Construction of the 40<sup>th</sup> Avenue underpass of I-70
- ▶ Widening of Youngfield Street from 38<sup>th</sup> Avenue to 44<sup>th</sup> Avenue
- ▶ Construction of Cabela Drive from 40<sup>th</sup> Avenue to the proposed development just north of Clear Creek

These local agency projects are to be completed by the City of Wheat Ridge as separate projects that are not dependent on the interchange improvements or on federal funding and thus are included in the travel demand forecasting for the traffic analysis. Access approval through a Categorical Exclusion allowed access to interstate right-of-way to accommodate the 40<sup>th</sup> Avenue underpass of I-70 and the widening of Youngfield Street from 38<sup>th</sup> Avenue to 44<sup>th</sup> Avenue. Cabela Drive from 40<sup>th</sup> Avenue to the proposed development just north of Clear Creek is a local agency project and can proceed without FHWA and CDOT approval. As a local agency action not requiring CDOT right-of-way, FHWA/CDOT approval for construction of Cabela Drive from 40<sup>th</sup> Avenue to the proposed development just north of Clear Creek is not required; however, environmental permitting for these projects such as the Clean Water Act and other relevant environmental regulations will be the responsibility of the local agency or developer.

### *3.2.1.1 Youngfield Street Widening from 38<sup>th</sup> Avenue to 44<sup>th</sup> Avenue*

The widening of Youngfield Street would occur from 38<sup>th</sup> Avenue north to 44<sup>th</sup> Avenue. From 32<sup>nd</sup> Avenue north to 38<sup>th</sup> Avenue, Youngfield Street is already a five lane facility; the widening of Youngfield Street would extend this cross-section further north to its terminus at 44<sup>th</sup> Avenue. The widening of Youngfield Street from 38<sup>th</sup> to 44<sup>th</sup> Avenue, from its current two lane configuration, would incorporate two additional through lanes in each direction and a center left turn lane at intersections.

The bridge over Clear Creek on Youngfield Street is wide enough for four lane usage, but currently only two lanes are being used. The barriers blocking the additional two lanes on the bridge would be removed and the bridge would begin to function as four 12-foot lanes.

The Youngfield Street improvements would also incorporate needed turn lanes at the 44<sup>th</sup> Avenue intersection such that double left turn lanes from westbound 44<sup>th</sup> Avenue and double right turn lanes from northbound Youngfield Street can be accommodated. These turn lane additions are also a common element to the three short-listed alternative packages.

### *3.2.1.2 40<sup>th</sup> Avenue Underpass of I-70*

The 40<sup>th</sup> Avenue underpass of I-70 is proposed to be four lanes with a 10-foot sidewalk on the north side. Three lanes and the sidewalk would be initially constructed: one inbound to the proposed development and two outbound to Youngfield Street. Depending on the final extension of Cabela Drive to 32<sup>nd</sup> Avenue, this design could change slightly. The underpass would be designed to accommodate the potential future widening of I-70 and would accommodate all the improvements planned for the I-70 and SH 58 build out project by CDOT.

The 40<sup>th</sup> Avenue underpass would intersect with the Youngfield Service Road, creating an at-grade signed “T” intersection with the segment north of 40<sup>th</sup> Avenue. The southern segment of the Youngfield Service Road would not connect to 40<sup>th</sup> Avenue, but would continue to provide access to businesses located immediately north of 32<sup>nd</sup> Avenue on the service road. Access to the Jefferson County Open Space Clear Creek Trail would occur from the east via Youngfield Street through the 40<sup>th</sup> Avenue underpass to the northern portion of the Youngfield Service Road, and from the west via the proposed development roadway network.

### *3.2.1.3 Cabela Drive from 40<sup>th</sup> Avenue to the proposed development just north of Clear Creek*

The construction of Cabela Drive would include a portion of 40<sup>th</sup> Avenue extending from the 40<sup>th</sup> Avenue underpass to the west where 40<sup>th</sup> Avenue would intersect with Cabela Drive, which is a north-south roadway. 40<sup>th</sup> Avenue is proposed to be a four lane facility with adjacent sidewalks through the proposed development site. From the Cabela Drive/40<sup>th</sup> Avenue intersection to the proposed development just north of Clear Creek, Cabela Drive would consist of four through lanes with a center turn lane and adjacent sidewalks. The Clear Creek bridge crossing of Cabela Drive would include three through lanes transitioning to a three through lane facility with a center turn lane north of Clear Creek. The proposed crossing of the Jefferson County Open Space Clear Creek Trail, south of Clear Creek, would be grade separated.



## 4.0 METHODS

To complete the vegetative communities survey, the vegetation study area (see **Figure 4-1**) was visually searched on foot in a systematic fashion, during a period with no snow cover, to thoroughly cover the area as efficiently as possible. Fieldwork was conducted on September 1, 22, 23, and 26 by Anne Ruggles, Senior Biologist and Melissa Reed-Eckert, Wildlife Biologist, both with BCC, and focused on describing the presence and distribution of plant communities and the common plant species composing the communities. A list of species observed was compiled. This list was intended to be descriptive, not comprehensive. The most obvious plants were those that mature in late summer and fall, whereas many spring, early summer, and mid-summer flowering plants were inconspicuous or dormant and thus, unlikely to be identified. Several species were identified from the litter of the previous growing season. No plant species that are listed as Federal or State Threatened or Endangered or tracked by the Colorado Natural Heritage Program (CNHP) were observed on the Property.

Plant communities were described based on the dominant species present. While in the field, the approximate boundaries of different community types were drawn on orthophotos and UTM boundary coordinates were recorded using Global Positioning System (GPS) equipment. Representative digital photographs of each community were also taken and descriptive data forms (see **Figure 4-2**) were completed. The data forms were used to record percent tree, shrub, graminoid, and forb cover as well as percent bare ground or litter and the most dominant plant species identified in each category.

Because the plant communities of the study area are the result of over a century of intensive modification by agriculture, mining, and development, they are a unique function of the site history. Thus, it was not possible to classify the plant communities according to any standardized classification system. Vegetation was, therefore, grouped into communities based upon the form of the dominant species. These included: grass/forb dominated areas, shrub dominated areas, and tree dominated areas. Plant species nomenclature follows Carter (1988), Gleason and Cronquist (1963), Hitchcock 1971, Weber 1976, Weber and Wittman (1992), Weber and Wittman (1999), and Wingate (1994).

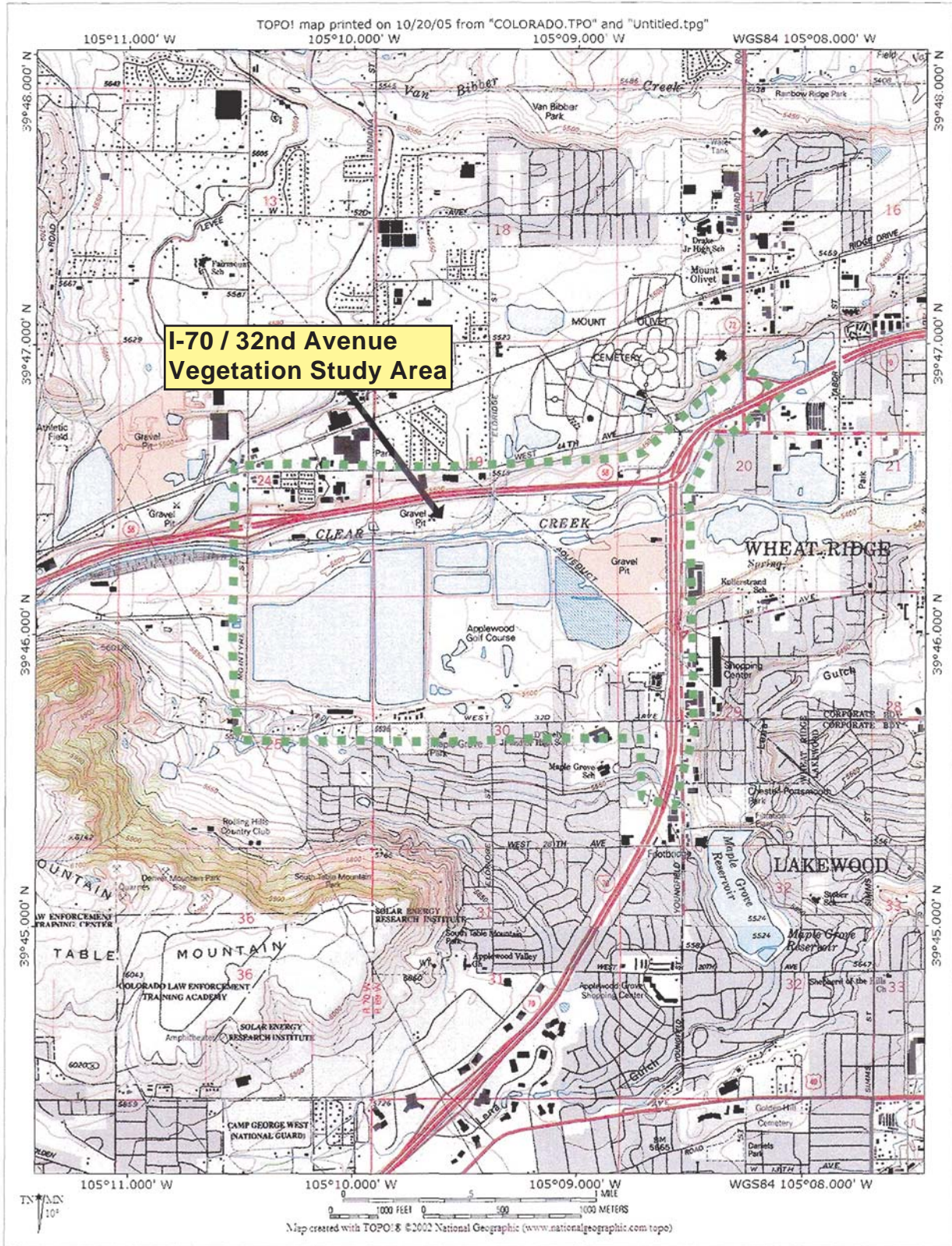


Figure 4-1

**Vegetation Study Area**



Figure 4-2 Plant Cover and Community Data Form

<b>PLANT COVER AND COMMUNITY DATA FORM</b>		
Site: _____ Date: _____ Observer _____		
Transect: _____ UTM: _____		
	Structural Variables	Dominant Species
<b>Tree Component</b>	% canopy cover: 0 10 20 30 40 50 60 70 80 90 100 Richness = n species 0 or 1 2 or 3 4 or 5 more than 5	
<b>Shrub Component</b>	% canopy cover: 0 10 20 30 40 50 60 70 80 90 100 Richness = n species 0 to 1 2 or 3 4 or 5 more than 5	
<b>Herbaceous component I</b>	<b>Grasses</b> – % canopy cover: 0 10 20 30 40 50 60 70 80 90 100 Richness = n species 0 to 1 2 or 3 4 or 5 more than 5	
<b>Herbaceous component II</b>	<b>Forbs</b> – % canopy cover: 0 10 20 30 40 50 60 70 80 90 100 Richness = n species 1 to 3 4 to 7 >7	
<b>Litter/Bare ground</b>	% of plot 0 10 20 30 40 50 60 70 80 90 100	
Community type: _____		
Comments: _____		

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## 5.0 RESULTS

**Table 5-1** presents the approximate acreages occupied within the entire study area by the various major vegetative community complexes identified during the September 2005 field work. Estimated percent coverage by these communities is also provided. Descriptions of each major community type and associated sub-types is provided below. **Appendix A** includes a summary of species identified in the study area.

**Table 5-1 Identified Vegetative Communities**

Vegetative Community Type	Approximate Area in Acres (Hectares )
<b>Grass and Forb Dominated Communities:</b> Reclaimed grassland – non-native species Reclaimed grassland – native species Weedy grass-forb dominated disturbed areas Weedy forb dominated disturbed areas	<b>369 (149.5)</b>
<b>Shrub Dominated Communities:</b> Rabbitbrush dominated mixed herbaceous Willow dominated riparian shrub	<b>59 (24.1)</b>
<b>Tree Dominated Communities:</b> Cottonwood/mixed shrub/mesic grass woodland Mixed non-native hardwood/no understory woodland Mixed hardwood/mesic mixed shrub/mesic grass-forb woodland	<b>66 (26.8)</b>
<b>Aquatic Communities:</b> Shallow water areas with aquatic macrophytes Cattail marsh/emergent wetlands	<b>21 (8.4)</b>
<b>Open Water</b> Deep open water ponds	<b>261 (105.6)</b>
<b>Highway Rights of Way and Residential/Commercial</b>	<b>210 (85.0)</b>

### 5.1 Grass and Forb Dominated Communities

**General Description:** These comprise areas that are dominated by a cover of grass and forb species. Some individual tree and shrub species may be present although they represent a very small proportion of the total cover. In the study area these are primarily previously disturbed and developed sites that may consist of former facilities including roads, landfills, old gravel mines, storage sites, and building sites. Some of these sites have been revegetated with native or introduced grass species while others have been allowed to recover with minimal intervention. The Applewood golf course is included in this community type. The community type includes approximately 369 acres (149.5 ha) (see **Table 5-1**).

### 5.1.1 Reclaimed Grassland – non-native species

**Description:** The dominant species in this community type area are non-native grass and forb species. Grass species include smooth brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*), with smaller proportions of intermediate wheatgrass (*Agropyron intermedium*), squirrel-tail grass (*Elymus elymoides*), and cheat grass (*Bromus tectorum*). Forb species include yellow sweet clover (*Melilotus officinalis*), white sweet clover (*Melilotus alba*), kochia (*Kochia iranica*), curly dock (*Rumex crispus*), alfalfa (*Medicago sativa*), and common mullein (*Verbascum thapsus*). A few native forbs are present and include curly-cup gumweed (*Grindellia squarrosa*) and many-flowered aster (*Aster ericoides*). Shrubs are scattered and total shrub canopy is less than 20 percent. The primary shrub present is rubber rabbitbrush (*Chrysothamnus nauseosus*). There is sparse tree cover which may include planted Douglas fir (*Pseudotsuga menziesii*), honey locust (*Gleditsia triacanthos*), crack willow (*Salix fragilis*), and green ash (*Fraxinus pennsylvanica*). This community is found on floodplain and elevated floodplain terraces.

**Locations within the Study Area:** This community was found at the west end and the southcentral portion of the study area south of Clear Creek. Another area which could be classified in this community was found in the extreme southwest corner of the study area south of the large open water lake. The latter area had a thickly scattered tree cover consisting of Siberian elms (*Ulmus pumila*), locust, and other mesic species.

Representative photo of the **reclaimed grassland – non-native species** community south of Clear Creek and just east of McIntyre Street.



### 5.1.2 Reclaimed Grasslands – native species

**Description:** Several sites along the Jefferson County Clear Creek Open Space Trail have been revegetated with native grasses representative of a mesic mixed grassland. These sites are dominated by grasses but bare ground comprises up to 60 per cent of some sections. The dominant species in these areas include side oats gramma (*Bouteloua curtipendula*), blue gramma (*Bouteloua gracilis*), green needle grass (*Nassella viridula*), horseweed (*Conyza canadensis*), common sunflower (*Helianthus annuus*), and switch grass (*Panicum virgatum*) with small amounts of little bluestem (*Schizachyrium scoparium*), sand dropseed (*Sporobolus cryptandrus*), and purple three-awn (*Aristida purpurea*). Forbs cover approximately 20 per cent of the areas and are dominated by non-natives including horehound (*Marrubium vulgare*) and common mullein. Wild licorice (*Glycyrrhiza lepidota*) is also a common native forb. Rubber rabbitbrush and broom snakeweed (*Gutierrezia sarothrae*) are the only shrubs present and comprise less than 5 per cent of the cover.

**Locations within the Study Area:** This assemblage was found along the Jefferson County Clear Creek Open Space Trail from the railroad bridge east toward the I-70 bridge and also within the Jefferson County wetland mitigation site (Dog Pound Pit) just south of Clear Creek at the east end of the study area.

Representative photo of the **reclaimed grasslands – native species** community just east of the railroad overpass over SH 58.





### 5.1.3 Weedy Grass-Forb Dominated Disturbed Areas

**Description:** These areas have been disturbed and allowed to re-vegetate naturally. The plant community currently present on these areas is comprised primarily of non-native species. Grasses comprise about 60 per cent of the cover and include: crested wheatgrass, smooth brome, Japanese brome (*Bromus japonicus*) and intermediate wheatgrass. Forbs represent about 30 per cent of the cover and consist primarily of kochia, curly dock, yellow sweet clover, white sweet clover, horseweed, and diffuse knapweed (*Centaurea diffusa*). Native species present include curlycup gumweed and rabbitbrush.

**Locations within the Study Area:** This community is found in many of the open areas to the north of Clear Creek and along the dikes between the large open water ponds. The type encompasses the area surrounding the Coors grain storage elevators.

Representative photo of the **weedy grass-forb dominated disturbed areas** community just north of Clear Creek and just east of McIntyre Street.





#### **5.1.4 Weedy Forb Dominated Disturbed Areas**

**Description:** This plant community consists of reworked gravel with a very high proportion of bare ground. Non-native forbs represent approximately 70 per cent of the plant cover. White sweet clover, horseweed, kochia, and curly cup gumweed are the dominant species. Cheat grass is the only grass present and represents less than one per cent of the cover. Bare ground is the dominant feature at this site.

**Locations within the Study Area:** This community type is predominant over the center of the portion of the study area north of Clear Creek and south of the Jefferson County Clear Creek Open Space Trail. It is also predominant over the entire central part of the eastern end of the study area to the west of I-70.

Representative photo of the ***weedy forb dominated disturbed areas*** community north of Clear Creek in the center of the study area.



## 5.2 Shrub Dominated Communities

**General Description:** Shrub dominated communities include areas that are dominated by a cover of shrubby species with very little tree overstory. Grass and forb species may be present beneath the shrubby canopy and scattered individual trees may also be present, but do not account for a significant portion of the total cover. The most common shrub species are rabbitbrush in xeric upland sites, and willow species in riparian sites. Tree species consist primarily of Siberian elm and Russian olive (*Elaeagnus angustifolia*) in the drier sites and boxelder (*Acer negundo*), crack willow, and green ash in the wetter sites. The community type includes approximately 59 acres (24.1 ha) (see **Table 5-1**).

### 5.2.1 Rabbitbrush Dominated Mixed Herbaceous Shrub Community

**Description:** These are reclaimed xeric uplands that are dominated by native rubber rabbitbrush. Where there is an understory, it consists largely of non-native herbaceous species. Forbs comprise approximately 30 per cent of the cover and include western aster (*Aster hesperis*), Canada goldenrod (*Solidago canadensis*), common sunflower, curly dock, field bindweed (*Convolvulus arvensis*), horehound, leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), and white sweet clover. Where grasses occur, they comprise approximately 10 per cent of cover and include cheat grass and crested wheatgrass. At one site, there was no herbaceous understory.

**Locations within the Study Area:** There are three sites in the study area that have the characteristics of a rabbitbrush dominated shrubland. One of these sites is located at the northeast corner of the reclaimed non-native grassland just south of Clear Creek and just east of McIntyre Street. The second site is located immediately west of Juchem Ditch and a third site, the largest, is located southwest of the grain storage structures, south of Clear Creek and north of the large open water ponds.

Representative photo of the ***rabbitbrush dominated mixed herbaceous shrub community*** located south of Clear Creek and north of the open water ponds in the center of the study area.



## 5.2.2 Willow Dominated Riparian Shrub Community

**Description:** These are areas dominated almost entirely by native willow shrubs (primarily *Salix exigua*). Some areas support an understory of mesic grasses. Where there is very dense shrub cover and/ or frequent flooding there may be no herbaceous understory, however. Typically, this community is dominated by coyote (sandbar) willow and contains no other shrub species. The other shrub species that may be present are yellow willow (*Salix lutea*) and whiplash willow (*Salix lasiandra*). Most of these areas occur in close proximity to the creek channel or ditches in areas where inundation and saturated soil conditions occur frequently and on steep raised banks adjacent to Clear Creek. Understory forbs are scarce, comprising less than 10 per cent of cover where they occur. They include western aster, common mullein, Canada goldenrod, lamb's quarters (*Chenopodium album*), Canada thistle, horseweed, hound's tongue (*Cynoglossum officinale*), and, at the water's edge, smartweed (*Polygonum* spp.) and cattails (*Typha* spp.). Grasses are most likely to occur immediately adjacent to the water where there is no overstory and include Kentucky bluegrass (*Poa pratensis*), rabbitfoot grass (*Polypogon monspeliensis*), reed canary grass (*Phalaris arundinacea*), and meadow fescue (*Festuca pratensis*). Bare ground is significant, comprising up to 50 per cent of some plots, and along Clear Creek at the western half of the study area, consists of large rip-rap (to 4 feet diameter). The community type includes approximately 66 acres (26.8 ha) (see **Table 5-1**).

**Locations within the Study Area:** Examples of this community were identified at various points all along the main channel of Clear Creek and in small areas along the drainage ditch along the SH 58 frontage road and along Bayou Ditch. The community was also found in unreclaimed aggregate pits north of Clear Creek and immediately west of I-70.

Representative photo of the ***willow dominated riparian shrub community*** located along Clear Creek in the northwest corner of the study area.





Representative photo of the **willow dominated riparian shrub community** located along the Jefferson County trail just south of the SH 58 frontage road in the north-central portion of the study area.



### 5.3 Tree Dominated Communities

**General Description:** These communities include areas that are dominated by a cover of tree species. Often there is also an understory of woody shrub species and an herbaceous ground cover. Native and non-native deciduous hardwood species are the most common trees found in the study area. Cottonwood (*Populus* spp.) and box elder dominated areas are either composed of large widely spaced older trees with a more or less open and grassy understory (gallery forest or open woodland) or are dominated by a dense stands of mixed-age trees with understory vegetation varying from sparse to dense (riparian forest). The community type includes approximately 66 acres (26.8 ha) (see **Table 5-1**).

#### 5.3.1 Cottonwood/Mixed Shrub/Mesic Grass Woodland

**Description:** This area is dominated by a mix of native cottonwood (*Populus deltoides* and *P. angustifolius*) and box elder in the overstory with a midstory of mixed shrubs. The understory is open and consists largely of grasses including smooth brome, intermediate wheatgrass, Canada wildrye (*Elymus canadensis*), and cheat grass. Shrubs represent less than 10 percent of cover and include rubber rabbitbrush and prickly pear cactus (*Opuntia polyacantha*) along the ecotone between grassland and forest, and western snowberry (*Symphoricarpos occidentalis*) in more mesic sites (depressions) within the forest. Forbs are sparse, representing less than 10 percent of cover. Most are not native and include: horseweed, musk thistle, kochia, common mullein, hound's tongue, yellow toadflax (*Linaria vulgaris*), and Dalmatian toadflax (*Linaria genistifolia dalmatica*). The one native forb present, false solomon seal (*Smilacina stellata*), is found only in depressions where conditions are more mesic.

**Locations within the Study Area:** This community was found immediately east of the grain storage elevators.

Representative photo of the ***cottonwood/mixed shrub/mesic grass woodland*** community located north of Clear Creek and south of the Jefferson County Open Space Clear Creek Trail in the center of the study area.





### 5.3.2 Mixed Non-native Hardwood/No Understory Woodland

**Description:** This community occupies areas dominated by a diverse mix of mature primarily non-native species of trees. The species present may include Siberian elm, Russian olive, crack willow, and green ash. Other species that may be present are the native boxelder, hackberry (*Celtis occidentalis*) and cottonwood (*Populus* spp.). Understory in this forest is sparse consisting of small amounts of poison ivy (*Toxicodendron rydbergii*), western virgin's bower (*Clematis ligustifolia*), and Virginia creeper (*Parthenocissus inserta*). The forest floor is characterized by significant amounts of large dead woody debris.

**Locations within the Study Area:** This community occurs at the east end of the study area just north of Clear Creek along the Bayou and Juchem ditches on both sides of the railroad.

Representative photo of the ***mixed non-native hardwood/no understory woodland*** community located just west of the Jefferson County Open space Clear Creek Trail and just north of Clear Creek on the east side of the railroad.



### 5.3.3 Mixed Hardwood/Mixed Mesic Shrub/Mesic Grass-Forb Woodland

**Description:** These are areas dominated by a mix of native and non-native hardwood species in the overstory with a midstory of mixed mesic shrubs and an understory of mesic grasses and forbs. These areas occur as narrow strips along ditches in the study area and along some portions of Clear Creek. Some of these areas are dominated by native cottonwoods, and box elder while others may be almost entirely dominated by crack willow. Coyote willow is almost always present and at some sites yellow willow is also present. Other woody species present may include Russian olive, chokecherry (*Prunus virginiana*), snowberry, hackberry, green ash, and Siberian elm. Where the canopy is more open, the understory typically includes a mixed cover of mesic grass species, notably, smooth brome, orchard grass (*Dactylis glomerata*), and Canada bluegrass (*Poa compressa*), and forbs including cattails, hound's tongue, yellow toadflax, leafy spurge, mullein, horehound, teasel (*Dipsacus fullonum*), showy milkweed (*Asclepias speciosa*), Canada thistle, Canada goldenrod, catnip (*Nepeta cataria*), wild licorice, and common evening primrose (*Oenothera strigosa*).

This community includes tiny examples of two riparian community types tracked by the Colorado Natural Heritage Program. These include the Plains Cottonwood/Western Snowberry Riparian Woodland type, and the Plains Cottonwood/Chokecherry Riparian woodland type.

**Locations within the Study Area:** This community type is found as very narrow strips along the Bayou Ditch and the drainage ditch along the SH 58 frontage road, and also between the Bayou Ditch and Clear Creek immediately east of the pedestrian bridge along the Jefferson County Open Space Clear Creek Trail.

Representative photo of the ***mixed hardwood/mixed mesic shrub/mesic grass-forb woodland*** community type located just north of Clear Creek at the east end of the study area.





Representative photo of the ***mixed hardwood/mixed mesic shrub/mesic grass-forb woodland*** community type located north of Clear Creek and the railroad in the center of the study area.





## 5.4 Aquatic Communities

**General Description:** Aquatic plant communities within the study area included areas characterized by permanently saturated soil which were predominated by herbaceous emergent and aquatic plants. The dominant herbaceous species in these areas included cattails, bulrush (*Scirpus validus*), three-square rush (*Scirpus americanus*), baltic rush (*Juncus balticus*), Dudley's rush (*Juncus dudleyi*), sedges including Nebraska sedge (*Carex nebraskensis*), spikerush (*Eleocharis palustris*), reed canary grass (*Phalaris arundinacea*), and a large variety of other forbs and grasses. Primary shrubs associated with these wetland areas included coyote willow, yellow willow, whiplash willow, and alder (*Alder incana*). Most of these areas were associated with the Clear Creek channel, irrigation ditches, and drainage ditches associated with SH 58 and its frontage road. Several shallow water ponds were also included in the aquatic communities. The community type includes approximately 21 acres (8.4 ha) (see **Table 5-1**).

### 5.4.1 Shallow Water Areas with Aquatic Macrophytes

**Description:** Shallow water ponds included two man-made ponds located just east of the Coors grain elevators and north of Clear Creek, a man-made mitigation wetland constructed by Jefferson County just south of Clear Creek at the east end of the study area, several seasonal depressional wetlands located just east of McIntyre Street and just south of Clear Creek, and several shallow temporary depressional wetland areas with open water and emergent vegetation located south of Clear Creek at the east end of the study area. Also included in this community were several beaver ponds with open water located in the extreme northeast corner of the study area. Portions of the Clear Creek channel were also included.

**Locations within the Study Area:** Wetlands scattered throughout the study area in association with ditches, the Clear Creek channel and man-made shallow water ponds.

Representative photo of **shallow water areas with aquatic macrophytes** located north of Clear Creek and just west of the SH 58 and I-70 interchange. This is an example of the beaver pond site.



Representative photo of **shallow water areas with aquatic macrophytes** located just south of Clear Creek and just east of McIntyre Street at the west end of the study area. In the center of the photo is an example of a small seasonal depressional emergent wetland.



#### 5.4.2 Cattail/Emergent Wetlands

**Description:** There were several small areas of shallow water dominated almost exclusively by cattails (*Typha* spp.). Typically, the cattails form a monoculture, excluding other emergent and aquatic plant species. Most of these areas are flooded for a majority of the growing season and are considered jurisdictional wetlands. The dominant species are broad-leaved cattail (*Typha latifolia*) and narrow-leaved cattail (*T. angustifolia*). Several other areas of wetlands dominated by emergent species with hydrophytic grasses, sedges, rushes and forbs were identified on bars and benches within the Clear Creek channel. Potential habitat for sensitive species including the federally threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*) and the federally threatened Colorado butterfly plant (*Gaura neomexicana coloradensis*) existed within these areas.

**Locations within the Study Area:** There are scattered small patches of cattail marsh throughout the site along portions of Clear Creek, along the drainage ditch along the SH 58 frontage road, in the inactive aggregate pits to the north and south of Clear Creek, and along the north side of SH 58.

Representative photo of **cattail/emergent wetlands** located at the east end of the study area and north of Clear Creek.





## **5.5** *Open Water Areas*

**General Description:** Deep water sites are represented by the Coors Lakes south of Clear Creek which are reclaimed aggregate mining sites that today are used for process water by Coors Brewing Company. These deep water holding ponds are largely unvegetated. Open water areas occupy approximately 261 acres (105.6 ha) (see **Table 5-1**).

**Locations within the Study Area:** There is a series of rectangular holding ponds south of Clear Creek that extend from the west end of the study area to the east end. These are all deep ponds that do not support any aquatic macrophytes. A number of other similar ponds occupy the area immediately outside the study area.

Representative photo of the ***open water areas***.



## **5.6 Highway Rights of Way (ROW) and Residential/Commercial**

**General Description:** ROWs are narrow strips of land bounded by roadways. These areas are typically mowed frequently and are characterized by highly disturbed and compacted soils and harsh growing conditions, therefore they generally harbor a variety of weedy and noxious species. In the study area they are dominated by non-native weedy species including cheat grass, smooth brome, crested wheatgrass, yellow sweet clover, white sweet clover, kochia, field bindweed, Siberian elm, and Russian olive trees. Highway ROW and developed residential and commercial areas occupy approximately 210 acres (85.0 ha.) (see **Table 5-1**).

ROWs were evaluated along SH 58, McIntyre Street, 32<sup>nd</sup> Avenue, the Youngfield Street Service Road, Ward Road, the 44<sup>th</sup> Avenue/Youngfield Street intersection, and I-70.

Representative photo of the **SH 58 ROW**.



Representative photo of the **McIntyre Street ROW**: The ROW along McIntyre is an extension of the xeric rubber rabbitbrush – grass shrubland found in the southwest corner of the study area.



Representative photo of **West 32<sup>nd</sup> Street**. Between McIntyre Street and I-70, W. 32<sup>nd</sup> Street is flanked by residential development, a school, and a golf course.





Representative photo of the **Youngfield Street Service Road**: This road is immediately east of I-70 and connects 32<sup>nd</sup> Street to 44<sup>th</sup> Avenue over Clear Creek. The ROW is a narrow strip between Youngfield and I-70. It consists of xeric grasses and weedy forbs.



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## 6.0 SUMMARY

Six major vegetative community types and thirteen sub-communities were identified within the study area. The major cover types included 1) grass and forb dominated communities, 2) shrub dominated communities, 3) tree dominated communities, 4) aquatic communities, 5) open water, and 6) highway rights of way and residential/commercial communities. General descriptions of these communities are provided as follows:

- 1. Grass and Forb Dominated Communities.** These communities include areas that are dominated by a cover of grass and forb species. Some individual tree and shrub species may be present although they represent a very small proportion of the total cover. In the study area, these are primarily previously disturbed and developed sites that may consist of former facilities including roads, landfills, old gravel mines, storage sites, and building sites. Some of these sites have been revegetated with native or introduced grass species while others have been allowed to recover with minimal intervention. This type included approximately 369 acres (149.5 ha) (see **Table 5-1**).
- 2. Shrub Dominated Communities.** Shrub dominated communities include areas that are dominated by a cover of shrubby species with very little tree overstory. Grass and forb species may be present beneath the shrubby canopy and scattered individual trees may also be present, but do not account for a significant portion of the total cover. The most common shrub species are rabbitbrush in dry upland sites and willow species in riparian creekside sites. Tree species consist primarily of Siberian elm and Russian olive in the drier sites and boxelder, crack willow, and green ash in the wetter sites. The community type includes approximately 59 acres (24.1 ha) (see **Table 5-1**).
- 3. Tree Dominated Communities.** These communities include areas that are dominated by a cover of tree species. Often there is also an understory of woody shrub species and an herbaceous ground cover. Native and non-native deciduous hardwood species are the most common trees found in the study area. Cottonwood and box elder dominated areas are either composed of large widely spaced older trees with a more or less open and grassy understory (gallery forest or open woodland) or are dominated by a dense stands of mixed-age trees with understory vegetation varying from sparse to dense (riparian forest). This type included approximately 66 acres (26.8 ha) (see **Table 5-1**).
- 4. Aquatic Communities.** Aquatic plant communities within the study area included areas characterized by permanently saturated soil which were predominated by herbaceous emergent and aquatic plants. The dominant herbaceous species in these areas included cattails, bulrush, three-square rush, baltic rush, Dudley's rush, sedges including Nebraska sedge, common spikerush, reed canary grass, and a large variety of other forbs and grasses. Primary shrubs associated with these wetland areas included coyote willow, yellow willow, whiplash willow, and alder. Most of these areas were associated with the Clear Creek channel, irrigation ditches, and drainage ditches associated with SH 58 and its frontage road. Areas of wetlands dominated by emergent species with hydrophytic water-loving grasses,

sedges, rushes and forbs were identified on bars and benches within the Clear Creek channel. Potential habitat for sensitive species including the federally threatened Ute ladies'-tresses orchid and the federally threatened Colorado butterfly plant existed within these areas. Several shallow water ponds were also included in the aquatic communities. This community type included approximately 21 acres (8.4 ha) (see **Table 5-1**).

5. **Open Water Areas.** Deep water sites are represented within the study area by the Coors Lakes south of Clear Creek which are reclaimed aggregate mining sites that today are used for process water by Coors Brewing Company. These deep water holding ponds are largely unvegetated. This type includes approximately 261 acres (105.6 ha) (see **Table 5-1**).
6. **Highway Rights of Way (ROW) and Residential/Commercial.** ROWs are narrow strips of land bounded by roadways. These areas are typically mowed frequently and are characterized by highly disturbed and compacted soils and harsh growing conditions, therefore they generally harbor a variety of weedy and noxious species. In the study area they are dominated by non-native weedy species including cheat grass, smooth brome, crested wheatgrass, yellow sweet clover, white sweet clover, kochia, field bindweed, and Siberian elm and Russian olive trees. ROWs were evaluated along SH 58, McIntyre Street, 32nd Avenue, the Youngfield Street Service Road, Ward Road, the 44th Avenue/Youngfield Street intersection, and I-70. This type included approximately 210 acres (85.0 ha) (see **Table 5-1**).

One hundred ninety two species of plants were identified within the study area. This represents a minimum inventory of plant species. Of those, 69 (36 percent) were non-native species, many of which are listed on the Colorado Department of Agriculture and the Jefferson County Noxious Weed Lists (Colorado Department of Agriculture 2006, Jefferson County 2006). Impacts are summarized in **Table 6-1**.

Table 6-1 Vegetation Resources Summary Matrix

Screening Measure	Existing Conditions	Local Agency Project 1. Youngfield St. Improvements 38 <sup>th</sup> to 44 <sup>th</sup> Avenue 2. 40 <sup>th</sup> Avenue Underpass 3. Cabela Drive from 40 <sup>th</sup> Avenue to north of clear creek	Proposed Action 1. SH 58/Cabela Drive Interchange Improvements 2. I-70/32 <sup>nd</sup> Avenue Hook Ramps
Vegetative Ground Coverage	Ranges from large areas of bare ground to heavy cover.	1. Will increase coverage. 2. Will increase coverage from spotty to 100 percent coverage. 3. Will increase coverage from mostly bare ground to 100 percent coverage.	1. Will significantly increase coverage. 2. Will increase coverage.
Native Species Frequency and Diversity	Low.	1. Will increase native species coverage if a native species mix is used. 2. Will increase native species if a native mix is used. 3. Will increase native species from no coverage to almost 100 percent if a native mix is used.	1. Will increase native species coverage significantly if a native species mix is used. 2. Will increase native species coverage if seeded with native mix.

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## Appendix A

Table A- 1 Identified Tree Species

Scientific Name	Common Name	Abundance
<i>Acer negundo</i>	Box elder	C
<i>Acer saccharinum</i> ^	Silver Maple	U
<i>Celtis occidentalis</i>	Hackberry	FC
<i>Elaeagnus angustifolia</i> *	Russian olive	C
<i>Fraxinus pennsylvanica</i> ^	Green ash	C
<i>Gleditsia triacanthos</i> ^	Honey locust	C
<i>Picea pungens</i> ^	Colorado blue spruce	U
<i>Pinus ponderosa</i>	Ponderosa pine	U
<i>Populus angustifolia</i>	Narrow-leaved cottonwood	C
<i>Populus deltoides</i>	Plains cottonwood	C
<i>Pseudotsuga menziesii</i> ^	Douglas fir	U
<i>Salix fragilis</i> *	Crack willow	C
<i>Tamarix pentandra (ramosissima)</i> *	Tamarisk	U
<i>Ulmus pumila</i> *	Siberian (Chinese) elm	C
* = non-native species ^ = native but out of range U =uncommon FC = fairly common C = common A = abundant 14 species: 10 native (5 out of range)/4 non-native		

Table A- 2 Identified Shrub and Vine Species

Scientific Name	Common Name	Abundance
<i>Alnus incana</i>	Alder	U
<i>Betula fontinalis</i>	Water (River) birch	U
<i>Chrysothamnus nauseous</i>	Rabbitbrush	A
<i>Clematis ligusticifolia</i>	Western virgin's bower	C
<i>Clematis orientalis</i> *	Chinese clematis	U
<i>Cornus sericea</i>	Red osier dogwood	U
<i>Gutierrezia sarothrae</i>	Broom snakeweed	U
<i>Humulus lupulus</i>	Wild hops	FC
<i>Parthenocissus inserta</i>	Virginia creeper	U
<i>Prunus americana</i>	American plum	U
<i>Prunus virginiana</i>	Chokecherry	FC
<i>Rhamnus cathartica</i> *	Buckthorn	FC
<i>Rhus trilobata</i>	Skunkbush (Three-leaved sumac)	U
<i>Ribes aureum</i>	Golden currant	U
<i>Ribes cereum</i>	Wax currant	U
<i>Rosa arkansana</i>	Arkansas rose	C
<i>Rosa woodsii</i>	Wood's rose	FC
<i>Rubus idaeus</i>	Wild raspberry	FC
<i>Salix exigua</i>	Coyote willow	FC
<i>Salix lasiandra</i>	Whiplash willow	FC
<i>Salix lutea</i>	Yellow willow	FC
<i>Sambucus canadensis</i>	Elderberry	FC
<i>Symphoricarpus occidentalis</i>	Western snowberry	FC
<i>Yucca glauca</i>	Yucca	U
* = non-native species U =uncommon FC = fairly common C = common A = abundant 24 species: 22 native/2 non-native		



Table A- 3 Identified Grasses and Grass-Like Species

Scientific Name	Common Name	Abundance
<i>Agropyron cristatum*</i>	Crested wheatgrass	A
<i>Agropyron intermedium*</i>	Intermediate wheatgrass	C
<i>Agropyron repens *</i>	Quackgrass	FC
<i>Agrostis gigantea*</i>	Redtop	C
<i>Agrostis scabra</i>	Ticklegrass	FC
<i>Aristida longiseta</i>	Red three-awn	FC
<i>Aristida purpurea</i>	Purple three-awn	FC
<i>Bouteloua curtipendula</i>	Side oats gramma	FC
<i>Bouteloua gracilis</i>	Blue gramma	FC
<i>Bromus inermis*</i>	Smooth brome	C
<i>Bromus japonicus*</i>	Japanese brome	U
<i>Bromus tectorum*</i>	Cheatgrass	C
<i>Carex filifolia</i>	Thread-leaved sedge	FC
<i>Carex nebraskensis</i>	Nebraska sedge	FC
<i>Dactylis glomerata*</i>	Orchard grass	C
<i>Deschampsia caespitosa</i>	Tufted hairgrass	U
<i>Echinochloa crusgalli</i>	Barnyard grass	FC
<i>Eleocharis palustris</i>	Spikerush	C
<i>Elymus canadensis</i>	Canada wild rye	FC
<i>Elymus elymoides</i>	Squirrel-tail grass	FC
<i>Eragrostis pectinacea</i>	Carolina lovegrass	U
<i>Festuca pratensis</i>	Meadow fescue	U
<i>Hordeum jubatum*</i>	Foxtail barley	C
<i>Juncus articulatus</i>		U
<i>Juncus balticus</i>	Baltic rush	FC
<i>Juncus dudleyi</i>	Dudley's rush	FC
<i>Juncus torreyi</i>	Torrey's rush	U
<i>Koeleria cristata</i>	Junegrass	U
<i>Leptochloa fascicularis</i>	Sprangletop	U
<i>Panicum capillare</i>	Witchgrass	FC
<i>Panicum virgatum</i>	Switchgrass	FC
<i>Phalaris arundinacea</i>	Reed canary grass	C
<i>Phragmites australis</i>	Giant reed grass	C
<i>Poa compressa</i>	Canada bluegrass	FC
<i>Poa pratensis*</i>	Kentucky bluegrass	FC
<i>Polypogon monspeliensis*</i>	Rabbitfoot grass	C
<i>Schizachyrium scoparium</i>	Little bluestem	FC
<i>Scirpus americanus</i>	American three-square bulrush	A
<i>Scirpus microcarpus</i>	Small-fruited bulrush	U
<i>Scirpus validus</i>	Great bulrush	FC
<i>Setaria viridis*</i>	Green bristlegrass	U
<i>Sporobolus cryptandrus</i>	Sand dropseed	A

Scientific Name	Common Name	Abundance
<i>Stipa comata</i>	Needle grass	FC
<i>Stipa viridula</i>	Green needle grass	FC
<i>Typha latifolia</i>	Broad-leaved cattail	A
<i>Typha angustifolia</i>	Narrow-leaved cattail	FC

\* = non-native species  
U =uncommon  
FC = fairly common  
C = common  
A = abundant  
46 species: 35 native/ 11 non-native

Table A- 4 Identified Forb Species

Scientific Name	Common Name	Abundance
<i>Achillea lanulosa</i>	Yarrow	C
<i>Alyssum minus</i> *	Field alyssum	C
<i>Amarantha graecizans</i> *	Prostrate pigweed	U
<i>Amaranthus retroflexus</i> *	Rough pigweed	FC
<i>Ambrosia psilostachya</i>	Western ragweed	C
<i>Ambrosia trifida</i>	Giant ragweed	FC
<i>Anaphalis margaritacea</i>	Pearly everlasting	FC
<i>Anthemis cotula</i> *	Mayweed chamomile	FC
<i>Apocynum cannabinum</i>	Dogbane	FC
<i>Arctium minus</i> *	Common burdock	C
<i>Argemone polyanthemus</i>	Prickly poppy	FC
<i>Artemesia campestris</i>	Common sagewort	U
<i>Artemesia ludoviciana</i>	Prairie sage	FC
<i>Asclepias incarnata</i>	Swamp milkweed	C
<i>Asclepias speciosa</i>	Showy milkweed	C
<i>Aster ericoides</i>	Many-flowered aster	FC
<i>Aster falcatus</i>	Whiteprairie aster	FC
<i>Aster hesperius</i>	Western aster	FC
<i>Bahia dissecta</i>	Perennial bahia	FC
<i>Bidens cernua</i>	Nodding beggar's tick	FC
<i>Bidens frondosa</i>	Beggar's tick	FC
<i>Capsella bursa-pastoris</i> *	Shepherd's purse	FC
<i>Cardaria draba</i> *	Whitetop	U
<i>Carduus nutans</i> *	Musk thistle	FC
<i>Centaurea diffusa</i> *	Diffuse knapweed	FC
<i>Chenopodium album</i> *	Lambs's quarters	C
<i>Cichorium intybus</i> *	Chickory	U
<i>Cirsium arvense</i> *	Canada thistle	A
<i>Cirsium ochrocentrum</i>	Yellow-spine thistle	U
<i>Cirsium vulgare</i> *	Bull thistle	U
<i>Conium maculatum</i> *	Poison hemlock	FC
<i>Convolvulus arvensis</i> *	Field bindweed	C
<i>Conyza canadensis</i>	Horseweed	A
<i>Cynoglossum officinale</i> *	Houndstongue	A
<i>Descurainia sophia</i> *	Flixweed	FC
<i>Dipsacus fullonum</i> *	Common teasel	C
<i>Dipsacus laciniatus</i> *	Cut-leaf teasel	FC
<i>Equisetum arvense</i>	Common horsetail	U
<i>Erodium cicutarium</i> *	Filaree (Cranesbill)	U
<i>Euphorbia cyparissias</i> *	Cypress spurge	U
<i>Euphorbia esula</i> *	Leafy spurge	C
<i>Euphorbia myrsinites</i> *	Myrtle spurge	FC
<i>Euthamia occidentalis</i>	Western goldenrod	C
<i>Gaillardia aristata</i>	Blanket flower	U
<i>Galium spurium</i>	False cleavers	FC

Scientific Name	Common Name	Abundance
<i>Guara parviflora</i>	Velvetweed (Many-flowered guara)	U
<i>Glycyrrhiza lepidota</i>	Wild licorice	FC
<i>Grindellia squarrosa</i>	Curly cup gumweed	C
<i>Helianthus annuus</i>	Common sunflower	FC
<i>Helianthus nuttallii</i>	Tall marsh sunflower	U
<i>Heterotheca villosa</i>	Golden aster	U
<i>Kochia iranica</i> *	Kochia	C-A
<i>Latuca serriola</i> *	Prickly lettuce	FC
<i>Lepidium latifolium</i> *	Broadleaved pepperweed	U
<i>Lepidium virginicus</i>	Pepperweed	U
<i>Liatris punctata</i>	Blazing star	U
<i>Linaria genistifolia dalmatica</i> *	Dalmatian toadflax	C
<i>Linaria vulgaris</i> *	Yellow toadflax (Butter and eggs)	C
<i>Machaeranthera canescens</i>	Hoary (Purple) aster	U
<i>Malva neglecta</i> *	Common mallow	U
<i>Marrubium vulgare</i> *	Horehound	C
<i>Medicago sativa</i> *	Alfalfa	U
<i>Melilotus alba</i> *	White sweet clover	AA
<i>Melilotus officinalis</i> *	Yellow sweet clover	AA
<i>Mentha arvensis</i>	Wild (field) mint	U
<i>Mentzelia nuda</i>	Plains evening star	FC
<i>Mollugo verticillata</i> *	Carpet weed	U
<i>Nasturtium officinale</i> *	Watercress	U
<i>Nepeta cataria</i> *	Catnip	FC
<i>Oenothera strigosa</i>	Common evening primrose	U
<i>Onopordum acanthium</i> *	Scotch thistle	FC
<i>Opuntia polyacantha</i>	Prickly pear cactus	U
<i>Osmorhiza sp.</i>	Sweet cicely	U
<i>Oxybaphus nyctagineus</i>	Heart-leaved umbrellawort	U
<i>Oxypolis fendleri</i> (?)	Cowbane	U
<i>Physalis heterophylla</i> *	Hairy groundcherry	U
<i>Phacelia heterophylla</i>	Scorpion weed	U
<i>Plantago lanceolata</i> *	English plantain	FC
<i>Plantago major</i> *	Common plantain	FC
<i>Polygonum amphibium</i>	Water smartweed	U
<i>Polygonum aviculare</i> *	Prostrate knotweed, devil's shoestring	FC
<i>Polygonum coccineum</i>	Scarlet smartweed	U
<i>Polygonum lapathifolium</i>	Dock-leaved smartweed	C
<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed	C
<i>Polygonum persicaria</i> *	Lady's thumb smartweed	C
<i>Portulaca oleracea</i> *	Common purslane	U
<i>Ranunculus repens</i> *	Creeping buttercup	U
<i>Rumex acetosella</i>	Sheep sorrel	FC
<i>Rumex crispus</i> *	Curly dock	FC
<i>Rumex salicifolius</i>	Willow dock	FC
<i>Salsola iberica (kali)</i> *	Russian thistle	FC
<i>Saponaria officinalis</i> *	Bouncing bet	FC



Scientific Name	Common Name	Abundance
<i>Senecio spartioides</i>	Broom senecio	U
<i>Sisymbrium altissimum</i> *	Tumble (Jim Hill) mustard	C
<i>Smilacina stellata</i>	False Solomon's seal	U
<i>Solanum ptycanthum</i>	Eastern black nightshade	U
<i>Solidago canadensis</i>	Canada goldenrod	C-A
<i>Sonchus arvensis</i> *	Perennial sowthistle	FC
<i>Taraxacum officinale</i> *	Dandelion	C-A
<i>Thermopsis divaricarpa</i>	Golden banner	U
<i>Thlaspi arvense</i> *	Pennycress	FC
<i>Toxicodendron rydbergii</i>	Poison ivy	C-A
<i>Tragopogon sp.</i> *	Salsify	U
<i>Trifolium pratense</i> *	Red clover	U
<i>Urtica dioica</i>	Stinging nettle	FC
<i>Verbascum thapsus</i> *	Common mullein	C
<i>Verbena bracteata</i>	Prostrate vervain	U
<i>Verbena hastata</i>	Blue vervain	U
<i>Veronica americana</i>	American speedwell	U
<i>Veronica anagallis-aquatica</i>	Water speedwell	U
<i>Virgulus ericoides</i>	Many-flowered aster	FC
<i>Xanthium strumarium</i>	Cocklebur	U
* = non-native species C = common U =uncommon A = abundant FC = fairly common 112 species: 60 native/ 52 non-native		

Table A- 5 Identified Aquatic Plant Species

Scientific Name	Common Name	Abundance
<i>Lemma minor</i>	Lesser duckweed	FC
<i>Spirodela polyrhiza</i>	Duckweed	FC
* = non-native species U =uncommon FC = fairly common C = common A = abundant 2 native species		