CHAPTER 11: REGIONAL SETTING

INTRODUCTION

The Regional Setting chapter is a result of the Transportation Reauthorization Act of 2006 (also known as SAFTEA-LU) which required Metropolitan and Statewide Transportation Plans to contain a discussion of types of potential environmental mitigation activities for environmental resources affected by the Regional Transportation Plan (RTP). The 2035 RTP will provide many benefits to the human community in the metropolitan planning region because it will lessen traffic congestion, make the roadways safer, and improve public transportation. However, the addition of roadways, bridges, and more lanes as well as the large amount of construction needed to complete these projects will have a significant effect on the environment as well as the cultural and community resources in the region.

The Regional Setting of the 2035 RTP divides the areas of impact down into seven (7) categories and looks at the severity of each to assess general areas of concern:

1) Natural Setting
2) Landscape and Vegetation
3) Biological Resources
4) Surface Water and Groundwater Issues
5) Cultural Resources
6) Community Resources
7) Air Quality

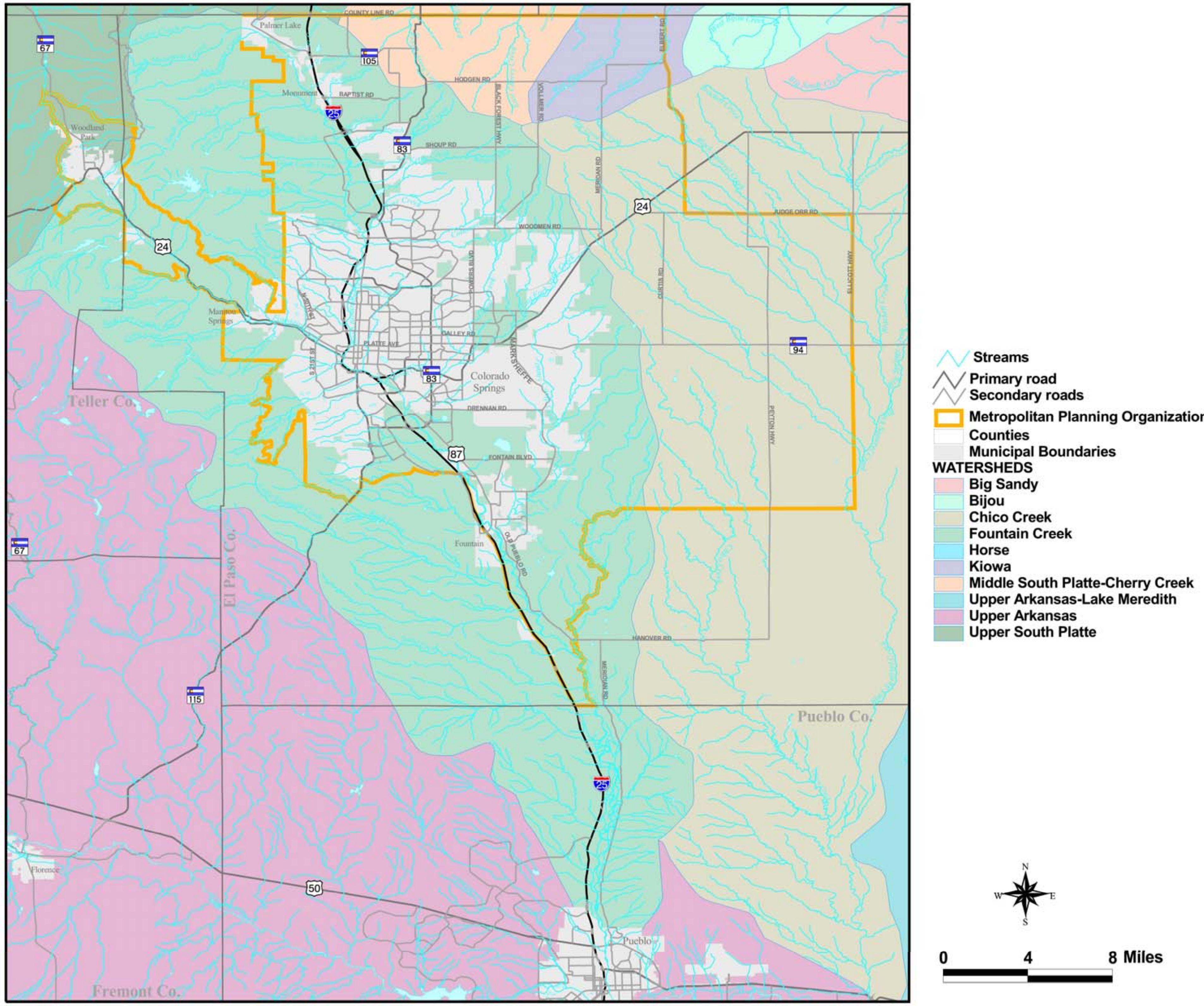
The Regional Setting chapter recognizes that because so many of the ecological functions are so closely related, it is important to look at the whole picture to understand how each project will affect the greater area and take an entire ecosystem approach to assess the cause and effect. The chapter is divided into two sections:

- **SECTION II** - Resource Description provides a discussion of each resource and the current conditions of that resource.

- **SECTION III -** Mitigation provides a description of the mitigation strategies that can offset unavoidable impacts and a description of mitigation locations where these resources are impacted.

Information in each of these resource categories is identified and described by the Metropolitan Planning Organization (MPO) boundary which encompasses parts of El Paso and Teller Counties. The environmental resource issue sections, landscape and vegetation, biological resources, and surface and groundwater issues were described according to the watershed boundaries because of the potential cumulative impacts of these issues. The watershed boundaries extend beyond the MPO boundaries into the City and County of Pueblo. Both the MPO boundaries and watershed boundaries are shown on Figure 11-1. The Regional Setting section recognizes that problems must be solved collectively by federal and state agencies, local governments, and private property owners. Table 11-1 shows the authority that each of theses agencies and others have in the MPO and Watershed.

FIGURE 11-1: MPO AND WATERSHED BOUNDARY



This Page Left Intentionally Blank

TABLE 11-1: PROGRAM AUTHORITIES FOR GOVERNMENT AGENCIES

Public Agency	Flood Control	Land Use	Water Quantity	Water Quality	Wastewater Treatment	Parks	Trails	Open Space	Storm Water Management	Flood Plains & Insurance	Erosion	Sedimentation	Wetlands	Habitat Protection
	FUNCTION													
FEDERAL GOVERNMENT														
U.S. Army Corp of Engineers	■		■						■	■	■	■	■	
U.S. Bureau of Reclamation			■											
Environmental Protection Agency				■	■						■	■		■
Fish and Wildlife Service				■										■
National Soil Conservation Service	■	■									■	■		
Bureau of Land Management		■				■	■	■						■
U.S. Forest Service		■	■			■	■	■						■
Federal Emergency Management Agency	■								■	■				
Dep't of the Army, Fort Carson	■	■	■	■	■	■	■	■	■	■	■	■	■	■
STATE GOVERNMENT														
Colorado Department of Natural Resources	■		■			■	■	■			■	■	■	■
Colorado Division of Wildlife													■	■
Colorado Division of Water Resources	■		■											
Colorado Soil Conservation Board	■		■						■	■	■	■	■	■
Colorado Water Quality Control Division				■	■						■	■		
Colorado State Parks						■	■	■						
GOCO						■	■	■						■
Colorado Department of Transportation									■				■	■
COUNTY GOVERNMENT														
County Government, BOCC		■				■	■	■						
County Health Department				■	■									
County Parks						■	■	■			■	■		■
County Transportation									■					
County Storm Water Management									■		■	■	■	■
CITY GOVERNMENT														
Home Rule City		■			■	■	■	■	■					
City Government		■			■	■	■	■						
City Storm Water Enterprise									■					
City Owned Utilties				■	■									
Home Rule Town		■				■	■	■						
Town Government		■				■	■	■						
OTHER LOCAL GOVERNMENT														
Independent Utitlies & Power Companies														
Area Council of Government		■		■	■									
Water Authority			■	■										
Soil Conservation District											■	■		
Water Conservancy District			■	■							■	■		
Metropolitan District	■		■		■	■	■	■	■		■	■		
Other Special District	■		■		■	■	■	■	■		■	■		

Source: Fountain Creek Vision Task Force Meeting

RESOURCE DESCRIPTION

Natural Setting

Climate

The Pikes Peak Region is known for its cool summer weather, high percentage of clear sunny days and relatively dry climate. The meteorological classification of the area is an alpine dessert with about 250 days of sunshine per year. The temperatures within the region varies from highs of over a 100° in the summer to winter lows of 30° below zero at the higher elevations. The annual mean temperature in the Pikes Peak Region is approximately 48.5°. The mountain-plains climate is characterized by periodic high winds called Chinook winds. These warm, dry winds tend to moderate winter temperatures and facilitate snow melt. In the summertime, vigorous thunderstorms produce cloudbursts, lightning and hail. In fact, the Pikes Peak Region is one of the most active lightning strike areas in the United States. The region also experiences a low relative humidity, and wide ranges in temperature between sun and shade, between day and night, and sometimes from day to day.

Within the region the precipitation varies considerably because of elevation and major wind currents. Winter storms, typically from the northwest, tend to lose their snow to the west making for a dry winter climate. Heavy snowfall from these storms accounts for roughly one fourth of the annual precipitation while late spring and summer showers account for the rest. The annual precipitation for the region is between 15 and 16 inches. Failure of the spring-summer precipitation results in periodic drought years. In 2007, the City of Colorado Springs enacted lawn water restrictions due to an unusually low precipitation period. Given these circumstances, the availability of water is a limiting factor which has escalated in importance as the human population and associated water demands in the region have increased. Table 11-2 illustrates the monthly minimum, maximum, and average temperatures and the monthly precipitation for the region.

TABLE 11-2: MONTHLY CLIMATE AND WEATHER INDICATORS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Temperature	28.8	32.0	37.3	46.4	55.4	65.0	70.8	68.3	60.4	49.9	37.8	29.8	48.5
Maximum Temperature	41.4	44.6	50.0	59.8	68.7	79.0	84.4	81.3	73.6	63.5	50.7	42.2	61.6
Minimum Temperature	16.1	19.3	24.6	33.0	42.1	51.1	57.1	55.2	47.1	36.3	24.9	17.4	35.4
Precipitation (Inches)	0.3	0.4	0.9	1.2	2.1	2.2	2.9	3.0	1.3	0.8	0.5	0.5	16.2

Source: www.climate-zone.com

Geology and Paleontology

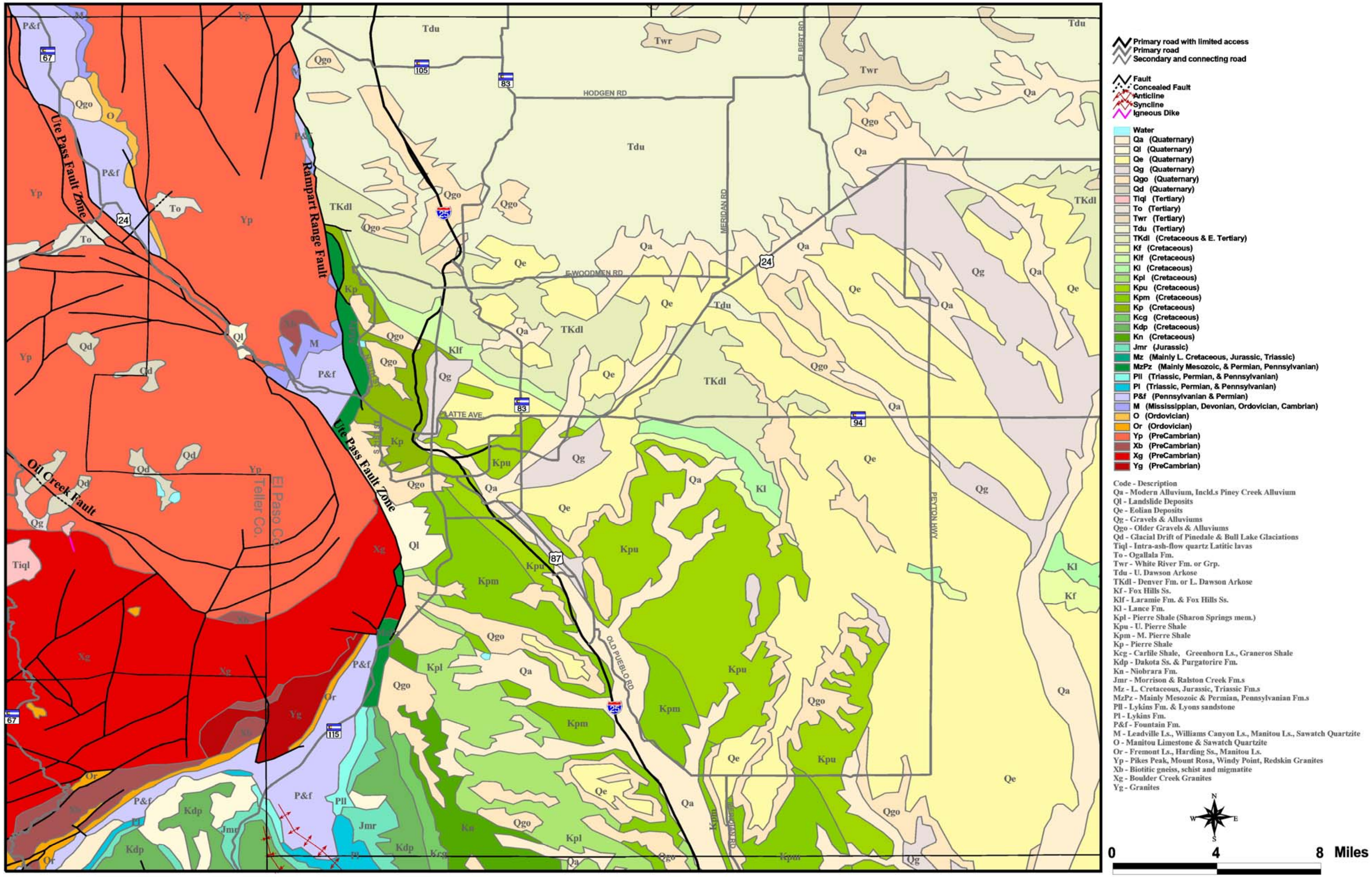
Physiographically, the Pikes Peak Region is characterized by gently sloping plains to the east and mountain ranges and basins to the west. The eastern plain contains generally level to rolling prairie broken by occasional hills and bluffs with the lowest point reaching 5,095 feet. Elevations dramatically increase towards the west where the plains meet the Front Range of the Rocky Mountain chain. At the highest elevation of 14,110 feet, Pikes Peak dominates the western portion of the Pikes Peak Region.

The geological past of the Pikes Peak Region is as varied as the landscape today. Within a billion years, the region has been at one time or another part of a massive ocean, covered by boggy swamps, and sculpted by vast glaciers. The Pikes Peak massive itself was formed by a series of alternating mountain-building forces and erosion. As Pikes Peak and the Front Range mountains rose, the overlying sedimentary rocks were tilted upward. These upturned sediments span millions of years of geological time, from the Precambrian Era through the Quaternary Period (see Figure 11-2), and are perfectly illustrated in the unusual red rock formations at the Garden of the Gods and Red Rock Canyon. These rocks get their red color from the oxidizing iron in the mix of sediments eroded from the Ancestral Rocky Mountains. Embedded in these rocks are fossil remains such as the footprints of the giant herbivore iguanodon that show the life of past geological periods.

The stresses of mountain building also brought episodes of stretching, faulting, and volcanism. Major faults, like the Ute Pass and Rampart Range faults, transported older Precambrian rocks to the surface over younger sedimentary rock resulting in the disappearance of titled sediments here and there. After a third and final uplift, further erosion, and sculpting from alpine glaciers, Pikes Peak reached its present formation. The never-ending process of mountain-building and erosion has left examples of exposed geology throughout the region in such dramatic forms as hogbacks, spires, hoodoos, and monoclines. It has also left marks of past life such as fossilized fish bones or the scooped depressions made by early Utes to grind grains. The oldest rocks in the Pikes Peak Region are schist, gneiss, and quartzite dating from the Precambrian Era. Pikes Peak itself consists mostly of Pikes Peak granite. This granite, generally pinkish in color, consists of interlocking crystals of quartz and feldspar.

This Page Left Intentionally Blank

FIGURE 11-2: GEOLOGY



This Page Left Intentionally Blank

Landscape and Vegetation

Soils and Mineral Resources

Soil types are easily distinguished by their location and the geologic formations present at those locations. There are four dominant soil types located geographically: those formed from Pikes Peak to the west, the foothills to the north, the plains to the east, and the valley to the south. Table 11-3 shows the soil characteristics, description, erosion and runoff susceptibility, slope and average precipitation for each of these areas. Figure 11-3 shows the different soil types in the region (as classified by the U.S. Department of Agriculture) and Table 11-4 identifies the soil types on the map.

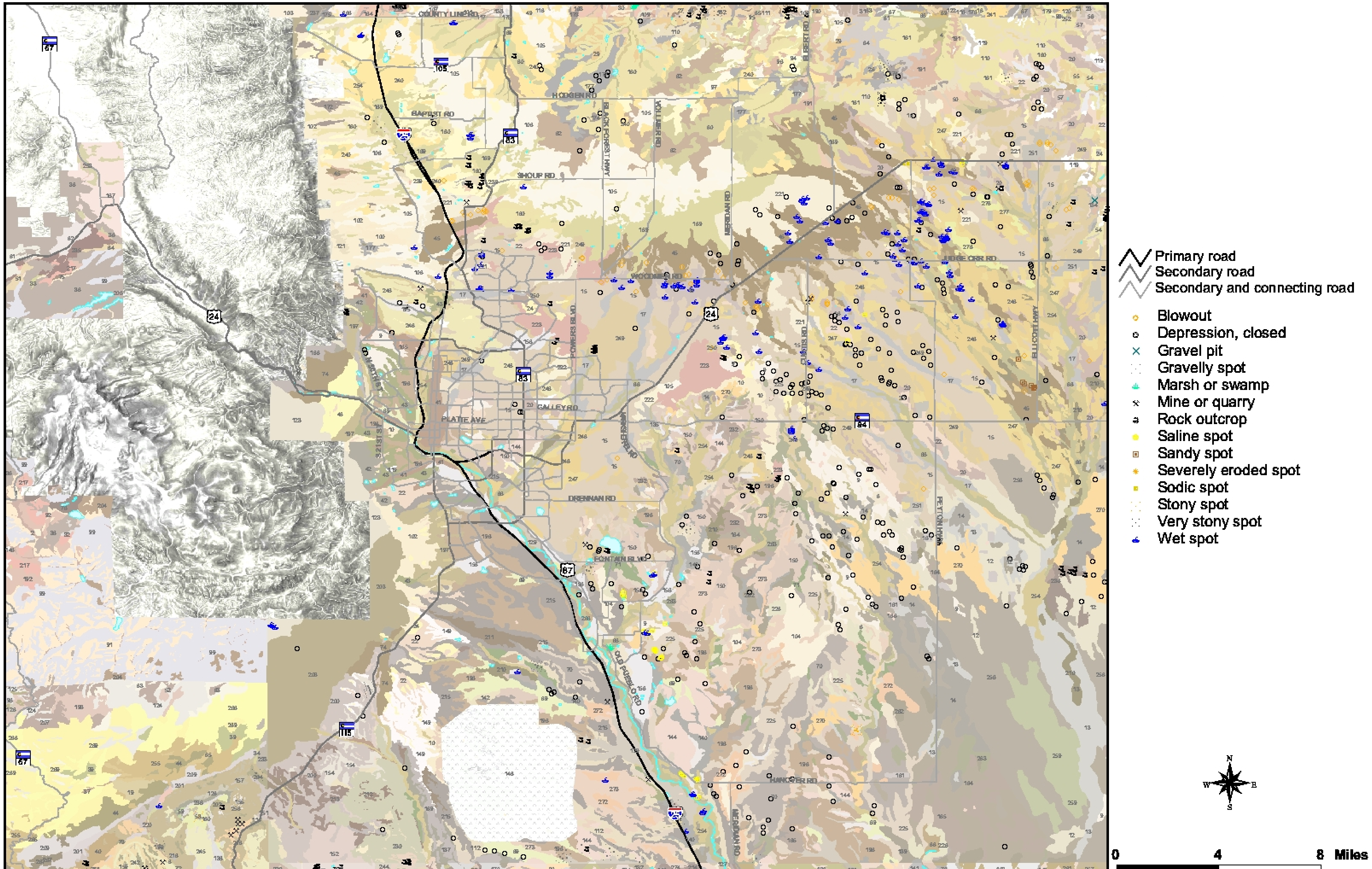
TABLE 11-3: SOIL CHARACTERISTICS SUMMARY

	Pikes Peak-West	Foothills-North	Colorado Springs area and Plains to the East	Valley-South
Soil Characteristics	Shallow, gravelly soils derived from Pikes Peak Granite	Moderately deep, coarse sand derived from layers of sandstone	Deep sands deposited by wind	Shallow and moderately deep, derived from shale
Soil Description	Shallow and poorly developed	Moderately deep to sandstone bedrock with some areas exposed to the surface	Deep, well developed, existing on gentle slopes, high sand content combined with high wind (from plains) result in high wind erodibility	Clays in this area expand and contract with changes in moisture content, therefore shrink-swell is a major management concern
Erosion Susceptibility	High	Moderate	Low	Moderate – High
Runoff Susceptibility	Rapid	Medium	Slow	Moderate – Rapid
Elevation	7000-14000 feet	6800-7700 feet	6000-7000 feet	4600-6100 feet
Slope	25-90%	1-40%	1-20%	3-25%
Average Precipitation	22 inches	18 inches	15 inches	13 inches
Geographic Extent	Present in the quadrant extending from the confluence of Fountain Creek and Monument Creek north and west approximately along the Creek boundaries	Present in the quadrant extending from the confluence of Fountain Creek and Monument Creek north and east approximately along the Creek boundaries	Present in the quadrant extending from the confluence of Fountain Creek and Monument Creek south and east approx. along the Creek boundaries	Present in the quadrant extending from the confluence of Fountain Creek and Monument Creek south and west approximately along the Creek boundaries

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, and El Paso County Service Center Staff

This Page Left Intentionally Blank

FIGURE 11-3: SOIL



This Page Left Intentionally Blank

TABLE 11-4: USDA SOIL TYPES

1 - Adderton loam, 2 to 6 % slopes
2 - Adderton-Cryaquolls complex, 0 to 6 % slopes
3 - Adena-Manvel loams
4 - Alamosa loam, 1 to 3 % slopes
5 - Apishapa silty clay
6 - Aquic Ustifluvents
7 - Arvada-Keyner association
8 - Ascalon sandy loam, 1 to 3 % slopes
9 - Ascalon sandy loam, 3 to 9 % slopes
10 - Badland
11 - Bankard sand
12 - Bijou loamy sand, 1 to 8 % slopes
13 - Bijou sandy loam, 1 to 3 % slopes
14 - Bijou sandy loam, 3 to 8 % slopes
15 - Blakeland loamy sand, 1 to 9 % slopes
16 - Blakeland-Fluvaquentic Haplaquolls
17 - Blendon sandy loam, 0 to 3 % slopes
18 - Bluerim-Peyton sandy loams, 8 to 20 % slopes
19 - Boyle very gravelly sandy loam, 10 to 40 % slopes
20 - Bresser sandy loam, 0 to 3 % slopes
21 - Bresser sandy loam, 0 to 4 % slopes
22 - Bresser sandy loam, 3 to 5 % slopes
23 - Bresser sandy loam, 4 to 8 % slopes
24 - Bresser sandy loam, 5 to 9 % slopes
25 - Bresser-Stapleton sandy loams, 8 to 25 % slopes
26 - Bresser-Truckton sandy loams, 8 to 25 % slopes
27 - Brussett loam, 0 to 4 % slopes
28 - Brussett loam, 1 to 3 % slopes
29 - Brussett loam, 3 to 5 % slopes
30 - Brussett loam, 3 to 9 % slopes
31 - Brussett loam, 4 to 8 % slopes
32 - Bushpark-Rock outcrop complex, 40 to 60 % slopes
33 - Bushpark-Seitz association, 15 to 50 % slopes
34 - Cascajo variant gravelly sandy loam, 5 to 12 % slopes
35 - Cascajo very gravelly sandy loam, 5 to 25 % slopes
36 - Cascajo-Shale outcrop complex, 5 to 30 % slopes
37 - Casvare-Teaspoon complex, 20 to 50 % slopes
38 - Catamount-Guffey complex, 15 to 40 % slopes
39 - Cathedral-Rock outcrop complex, 45 to 80 % slopes
40 - Cerrillos gravelly sandy loam, 3 to 8 % slopes
41 - Chaseville gravelly sandy loam, 1 to 8 % slopes
42 - Chaseville gravelly sandy loam, 8 to 40 % slopes
43 - Chaseville-Midway complex
44 - Coaldale very gravelly sandy loam, 20 to 45 % slopes
45 - Columbine gravelly sandy loam, 0 to 3 % slopes
46 - Coni loam, 4 to 15 % slopes
47 - Coni rocky loam, 3 to 100 % slopes
48 - Connerton-Rock outcrop complex, 8 to 90 % slopes
49 - Crowfoot-Tomah sandy loams, 5 to 25 % slopes
50 - Cruckton sandy loam, 1 to 9 % slopes
51 - Cryaquolls, 0 to 3 % slopes
52 - Cumulic Cryaquolls, 2 to 5 % slopes
53 - Curecanti variant extremely cobbly loam, 8 to 20 % slopes, very stony
54 - Cushman loam, 1 to 5 % slopes
55 - Cushman loam, 5 to 15 % slopes
56 - Cushman-Ascalon complex, 4 to 15 % slopes
57 - Cushman-Kutch complex, 3 to 12 % slopes
58 - Cushman-Kutch complex, 8 to 25 % slopes
59 - Dumps and Pits
60 - Elbeth sandy loam, 3 to 8 % slopes
61 - Elbeth sandy loam, 4 to 8 % slopes
62 - Elbeth sandy loam, 8 to 15 % slopes
63 - Elbeth-Kettle complex, 8 to 25 % slopes
64 - Elbeth-Pring complex, 5 to 30 % slopes
65 - Ellicott loamy coarse sand, 0 to 4 % slopes
66 - Ellicott loamy coarse sand, 0 to 5 % slopes
67 - Englewood clay loam, 0 to 4 % slopes
68 - Fluvaquentic Haplaquolls, nearly level
69 - Fluvaquents, nearly level*
70 - Fort Collins loam, 0 to 3 % slopes
71 - Fort Collins loam, 3 to 8 % slopes
72 - Fort Collins loam, cool, 0 to 2 % slopes
73 - Fort Collins loam, cool, 2 to 5 % slopes
74 - Fortwingate-Rock outcrop complex, 15 to 60 % slopes
75 - Fourmile very gravelly coarse sandy loam, 3 to 20 % slopes
76 - Fris cobbly loam, 20 to 50 % slopes
77 - Garber gravelly sandy loam, 5 to 30 % slopes
78 - Gilcrest complex, 3 to 6 % slopes
79 - Gilcrest sandy loam, 0 to 2 % slopes
80 - Glenberg-Haverson complex
81 - Goth gravelly loam, 8 to 40 % slopes
82 - Goth-Cowd association, 8 to 25 % slopes
83 - Granile-Guffey very gravelly sandy loams, 25 to 50 % slopes
84 - Guffey-Herbman association, 5 to 50 % slopes
85 - Haploborolls, very stony-Rock outcrop complex, 40 to 90 % slopes
86 - Haplustolls, loamy, nearly level*
87 - Haplustolls, moderately coarse, nearly level*
88 - Haverson silt loam
89 - Heldt clay loam, 0 to 3 % slopes
90 - Heldt silty clay loam, 2 to 6 % slopes
91 - Herbman gravelly sandy loam, 5 to 55 % slopes
92 - Histic Cryaquolls, 0 to 1 % slopes
93 - Holderness loam, 0 to 4 % slopes
94 - Holderness loam, 1 to 5 % slopes
95 - Holderness loam, 4 to 8 % slopes
96 - Holderness loam, 5 to 8 % slopes
97 - Holderness loam, 8 to 15 % slopes
98 - Hoodle loam, 5 to 20 % slopes
99 - Ivywild-Catamount complex, 30 to 70 % slopes
100 - Jarre gravelly sandy loam, 1 to 8 % slopes
101 - Jarre-Brussett association
102 - Jarre-Tecolote complex, 8 to 65 % slopes
103 - Juget rocky complex, 20 to 65 % slopes
104 - Keith silt loam, 0 to 3 % slopes
105 - Kettle gravelly loamy sand, 3 to 8 % slopes
106 - Kettle gravelly loamy sand, 8 to 40 % slopes
107 - Kettle loamy sand, 5 to 25 % slopes
108 - Kettle loamy sand, 8 to 15 % slopes
109 - Kettle-Falcon complex, 9 to 65 % slopes
110 - Kettle-Rock outcrop complex
111 - Kettle-Rock outcrop complex, 15 to 65 % slopes
112 - Kim loam, 1 to 8 % slopes
113 - Kim loam, 3 to 8 % slopes
114 - Kim loam, cool, 3 to 8 % slopes
115 - Kim-Shingle complex, 3 to 20 % slopes
116 - Kippen and Pring soils, 1 to 12 % slopes, eroded
117 - Kippen loamy sand, 1 to 20 % slopes
118 - Kutch clay loam, 0 to 4 % slopes
119 - Kutch clay loam, 3 to 5 % slopes
120 - Kutch clay loam, 4 to 8 % slopes
121 - Kutch clay loam, 5 to 20 % slopes
122 - Kutch-Louviers complex, 8 to 25 % slopes
123 - Kutler-Broadmoor-Rock outcrop complex, 25 to 90 % slopes
124 - Lakehelen-Rock outcrop complex, 45 to 80 % slopes
125 - Larand very gravelly fine sandy loam, 10 to 40 % slopes
126 - Larkson stony loam, 5 to 20 % slopes
127 - Las Animas fine sandy loam
128 - Libeg extremely cobbly sandy loam, 10 to 20 % slopes
129 - Limon clay, 0 to 3 % slopes
130 - Limon silty clay loam, 0 to 2 % slopes
131 - Limon silty clay, 0 to 2 % slopes
132 - Limon silty clay, 0 to 5 % slopes,gullied
133 - Loamy wet alluvial land
134 - Louviers cobbly clay loam, 5 to 40 % slopes
135 - Louviers silty clay loam, 3 to 18 % slopes
136 - Louviers-Travessilla complex, 20 to 50 % slopes
137 - Manvel loam, 3 to 9 % slopes
138 - Manvel silt loam, 1 to 5 % slopes
139 - Manzanola clay loam, 0 to 1 % slopes
140 - Manzanola clay loam, 1 to 3 % slopes
141 - Manzanola clay loam, 2 to 9 % slopes
142 - Manzanola clay loam, 3 to 9 % slopes
143 - Manzanola silty clay loam, 0 to 2 % slopes
144 - Midway clay loam, 3 to 25 % slopes
145 - Midway-Shale outcrop complex, 1 to 9 % slopes
146 - Military impact area, unsurveyed
147 - Mine spoils
148 - Mined land
149 - Nederland cobbly sandy loam, 9 to 25 % slopes
150 - Nelson-Tassel fine sandy loams, 3 to 18 % slopes
151 - Neville fine sandy loam, 3 to 8 % slopes
152 - Neville fine sandy loam, 3 to 9 % slopes
153 - Neville sandy loam, 3 to 9 % slopes
154 - Neville-Rednun complex, 3 to 9 % slopes
155 - Nunn clay loam, 0 to 2 % slopes
156 - Nunn clay loam, 0 to 3 % slopes
157 - Nunn clay loam, 2 to 8 % slopes
158 - Nunn clay loam, 4 to 8 % slopes
159 - Nunn loam, 2 to 5 % slopes
160 - Nunn stony loam, 3 to 8 % slopes
161 - Olney and Vona soils, eroded
162 - Olney loamy sand
163 - Olney sandy loam
164 - Olney sandy loam, 0 to 3 % slopes
165 - Olney sandy loam, 3 to 5 % slopes
166 - Otero gravelly sandy loam, 3 to 9 % slopes
167 - Otero sandy loam, 1 to 5 % slopes
168 - Paunsaugunt-Rock outcrop complex, 15 to 65 % slopes
169 - Penrose-Manvel complex, 3 to 45 % slopes
170 - Penrose-Minnequa complex, 1 to 15 % slopes
171 - Penrose-Rock outcrop complex, 25 to 65 % slopes
172 - Perrypark gravelly sandy loam, 3 to 9 % slopes
173 - Peyton sandy loam, 1 to 3 % slopes
174 - Peyton sandy loam, 1 to 5 % slopes
175 - Peyton sandy loam, 3 to 9 % slopes
176 - Peyton sandy loam, 4 to 8 % slopes
177 - Peyton sandy loam, 5 to 9 % slopes
178 - Peyton sandy loam, wet, 1 to 5 % slopes
179 - Peyton-Elbeth sandy loams, 8 to 25 % slopes
180 - Peyton-Pring complex, 3 to 8 % slopes
181 - Peyton-Pring complex, 8 to 15 % slopes
182 - Peyton-Pring complex, 8 to 25 % slopes
183 - Peyton-Pring-Crowfoot complex, 3 to 15 % slopes, eroded
184 - Peyton-Pring-Crowfoot sandy loams, 5 to 25 % slopes
185 - Pits, gravel
186 - Playas
187 - Plome-Pimsby-Pimsby north slopes complex, 5 to 40 % slopes
188 - Pring and Kippen gravelly sandy loams, 1 to 25 % slopes
189 - Pring coarse sandy loam, 3 to 8 % slopes
190 - Pring coarse sandy loam, 4 to 8 % slopes
191 - Pring coarse sandy loam, 8 to 15 % slopes
192 - Qaunder-Bushpark very gravelly loams, 5 to 40 % slopes
193 - Raleigh-Rock outcrop complex, 15 to 40 % slopes
194 - Razor clay loam
195 - Razor clay loam, 3 to 9 % slopes
196 - Razor clay, eroded
197 - Razor stony clay loam, 5 to 15 % slopes
198 - Razor-Midway complex
199 - Riverwash
200 - Rizozo-Neville complex, 3 to 30 % slopes
201 - Rizozo-Rock outcrop complex, 15 to 45 % slopes
202 - Rock outcrop
203 - Rock outcrop-Coldcreek-Tolman complex, 9 to 90 % slopes
204 - Rock outcrop-Herbman complex, 20 to 70 % slopes
205 - Rocky Ford silty clay loam, 0 to 1 % slopes
206 - Rocky Ford silty clay loam, wet
207 - Rogert very gravelly sandy loam, warm, 15 to 40 % slopes
208 - Rogert-Rock outcrop complex, 20 to 60 % slopes
209 - Roygorge very gravelly sandy clay loam, 25 to 50 % slopes
210 - Sampson loam, 0 to 3 % slopes
211 - Satanta loam, 0 to 3 % slopes
212 - Satanta loam, 3 to 5 % slopes
213 - Satanta-Neville complex, 3 to 8 % slopes
214 - Schamber gravelly sandy loam, 5 to 25 % slopes
215 - Schamber-Razor complex, 8 to 50 % slopes
216 - Sedillo cobbly sandy loam, 4 to 25 % slopes
217 - Seitz very gravelly loam, 20 to 50 % slopes
218 - Shanta loam, 0 to 3 % slopes
219 - Shingle silty clay loam, 1 to 9 % slopes
220 - Shrine loam, 2 to 8 % slopes
221 - Stapleton sandy loam, 3 to 8 % slopes
222 - Stapleton sandy loam, 8 to 15 % slopes
223 - Stapleton-Bernal sandy loams, 3 to 20 % slopes
224 - Stoneham loam
225 - Stoneham sandy loam, 3 to 8 % slopes
226 - Stoneham sandy loam, 8 to 15 % slopes
227 - Stony rough land
228 - Stony steep land, cold
229 - Stroupe extremely stony loam, 9 to 25 % slopes
230 - Stroupe-Travessilla-Rock outcrop complex, 9 to 90 % slopes
231 - Table Mountain association
232 - Tassel fine sandy loam, 3 to 18 % slopes
233 - Teaspoon very gravelly sandy loam, 15 to 45 % slopes
234 - Tecolote very gravelly sandy loam, 15 to 40 % slopes
235 - Tellura-Seitz complex, 10 to 30 % slopes
236 - Terry sandy loam, 1 to 8 % slopes
237 - Tinytown-Cheeseman complex, 5 to 30 % slopes
238 - Tolex-Larkson complex, warm, 25 to 50 % slopes
239 - Tomah-Crowfoot complex, 8 to 15 % slopes
240 - Tomah-Crowfoot loamy sands, 3 to 8 % slopes
241 - Torriorthents-Rock outcrop complex, steep
242 - Travessilla channery loam, 5 to 20 % slopes
243 - Travessilla sandy loam, 1 to 9 % slopes
244 - Travessilla-Rock outcrop complex, 30 to 90 % slopes
245 - Travessilla-Rock outcrop complex, 5 to 50 % slopes
246 - Travessilla-Rock outcrop complex, 8 to 90 % slopes
247 - Truckton loamy sand, 1 to 9 % slopes
248 - Truckton sandy loam, 0 to 3 % slopes
249 - Truckton sandy loam, 3 to 9 % slopes
250 - Truckton-Blakeland complex, 9 to 20 % slopes
251 - Truckton-Bresser complex, eroded
252 - Truckton-Renohill complex, 8 to 25 % slopes
253 - Typic Haplustolls, 3 to 8 % slopes
254 - Ustic Torrifluvents, loamy
255 - Ustic Torriorthents, bouldery-Rock outcrop complex, 35 to 90 % slopes
256 - Ustic Torriorthents-Sedillo complex, 15 to 40 % slopes
257 - Valent loamy sand
258 - Valent sand, 1 to 9 % slopes
259 - Valent sand, 9 to 20 % slopes
260 - Vona loamy sand
261 - Vona sandy loam
262 - Vona sandy loam, 1 to 3 % slopes
263 - Vona sandy loam, 3 to 9 % slopes
264 - Wages loam, 2 to 9 % slopes
265 - Wahatoya-Tolex complex, 25 to 55 % slopes
266 - Water
267 - Wesix very channery loam, 5 to 40 % slopes
268 - Wetmore-Bundo, dry-Rock outcrop complex, 35 to 75 % slopes
269 - Wetmore-Rock outcrop complex, 40 to 80 % slopes
270 - Wigton loamy sand, 1 to 8 % slopes
271 - Wiley loam, cool, 2 to 6 % slopes
272 - Wiley silt loam, 1 to 3 % slopes
273 - Wiley silt loam, 3 to 9 % slopes
274 - Wiley-Kim loams
275 - Wormser silt loam
276 - Yoder gravelly sandy loam, 1 to 8 % slopes
277 - Yoder gravelly sandy loam, 8 to 25 % slopes

This Page Left Intentionally Blank

Vegetation

Vegetation impacts from a highway improvement project have ecological and aesthetic implications. Several vegetation-related issues are the focus of specific federal and state legislation including noxious weeds, wetlands and wildlife habitat. Re-vegetation of disturbed surfaces is an important erosion-control measure for water quality purposes. Vegetation communities within the area are highly influenced by existing interstates, roads and urban development. Vegetation communities included in the study area are:

TABLE 11-5: COMMUNITY VEGETATION TYPES

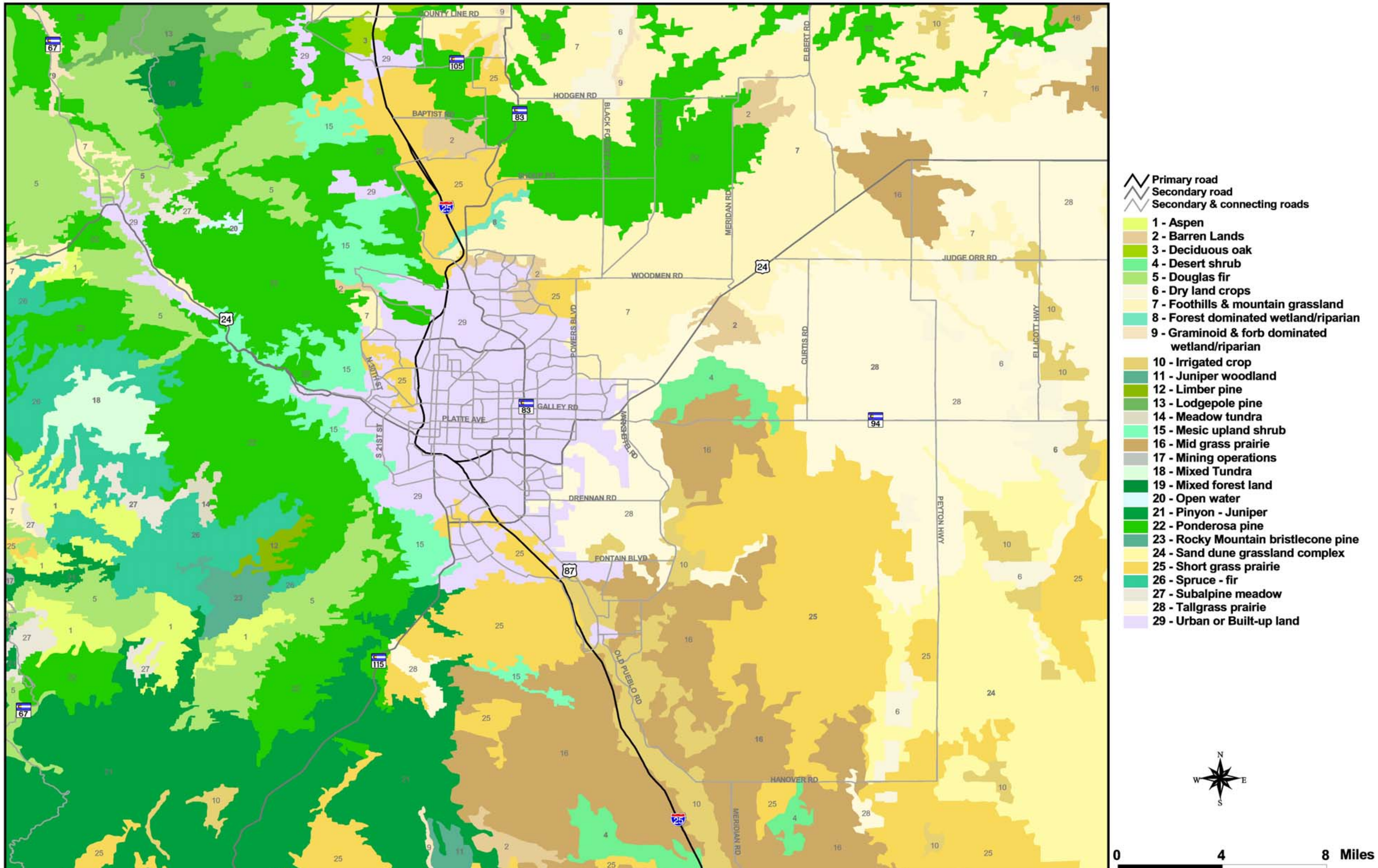
Vegetation Habitat	Description
Agricultural	Consist of dryland crop or irrigated cropland. Winter wheat is the major dryland crop, while corn, alfalfa and sugar beets are the main irrigated crops.
Grassland	Consist of short, mid-, tall- or mixed grass prairie. The animals that live in the grasslands are black-tailed prairie dogs, pronghorn sheep, swift fox, jackrabbits, lizards, and snakes.
Riparian Woodland	Consist of two types: lowland riparian and foothills.
Pinyon-Juniper Woodland	Consists of evergreen woodland situated at a higher elevation than grassland vegetation and below montane forest and shrub (from 4,500 to 7,500 ft.)
Montane Shrubland	These shrublands are generally the transition state between grasslands and forested area and occur in the lower foothills. Consist of several different vegetative associations, dominated by Gambel Oak
Montane Forest	Primarily in the western section and is home to bats, chipmunks, squirrels, martins, elk, mule deer, and many types of birds.
Urban/Built-Up Area	These lands include major cities small towns, suburban residential areas, and rural residential areas. Vegetation does occur in these areas along with different types of wildlife.

Source: Section 4.0, Wildlife, ACOE Fountain Creek Watershed Study Report (2006)

These vegetation types are described in more detail in the Army Corps of Engineers (ACOE) (2006) Report and are shown in Figure 11-4.

This Page Left Intentionally Blank

FIGURE 11-4: VEGETATION



This Page Left Intentionally Blank

Wetlands

Wetlands are defined as land where water saturation is the dominant factor determining soil development, the hydrology of the area, and the types of plants and animals living in these areas. Wetlands have a direct effect on the types of plant and animal communities living in and around the environment. Wetlands are an extremely important habitat for many species, including birds, reptiles, and amphibians, as well as providing a food and water source for many of the mammals which live in the riparian woodlands. They are also an important link in migratory corridors.

Wetlands are essential biological resources that provide many ecological services. They are integral in recharging groundwater supply, alleviating stress on land from flooding, controlling erosion, improving water quality, and are an important habitat for wildlife, including endangered species. These benefits can have more important impacts in developed areas where the contributions of wetlands services are greatly needed.

The Fountain Creek Watershed currently has 9,336 acres of wetlands (ACOE, 2006). The majority of this is in the Colorado Springs area, but there are vital areas outside too. Wetlands are described according to the four distinct sub-watershed boundaries shown in Figure 11-5. Table 11-6 shows a wetlands inventory, current and historic wetland types based on the four sub-watershed boundaries.

- **MONUMENT CREEK SUB-WATERSHED** has a total of 2,041 acres of wetlands. The wetlands in this area are generally healthy and support a diverse wildlife habitat, which provide many services for the surrounding areas.

- **FOUNTAIN CREEK SUB-WATERSHED** with a total of 276 acres of wetlands is comparatively small to the amount of wetlands in the other three watersheds. This is primarily due to the fact that the terrain is very rocky.

- **COLORADO SPRINGS COMPOSITE SUB-WATERSHED** has the largest area of wetlands with 3,950 acres of wetlands. This area, although it has the most wetland area, is also the most highly developed. Many of the historical wetlands of this area have dried up due to changes in stream flow. The areas of wetlands that are degraded provide little ecological benefit, but there are still some areas which are providing ecological services and creating wildlife habitat. This sub-watershed also holds the greatest potential for wetland restoration.

- **LOWER FOUNTAIN CREEK SUB-WATERSHED** has the second largest areas of wetlands of the four sub-watersheds with an area of 3,069 acres. Because there is less development in this watershed, some of the wetlands retain their health, but the changing in water flow has also affected the quality of some of the wetlands in this area.

FIGURE 11-5: FOUNTAIN CREEK SUB WATERSHED

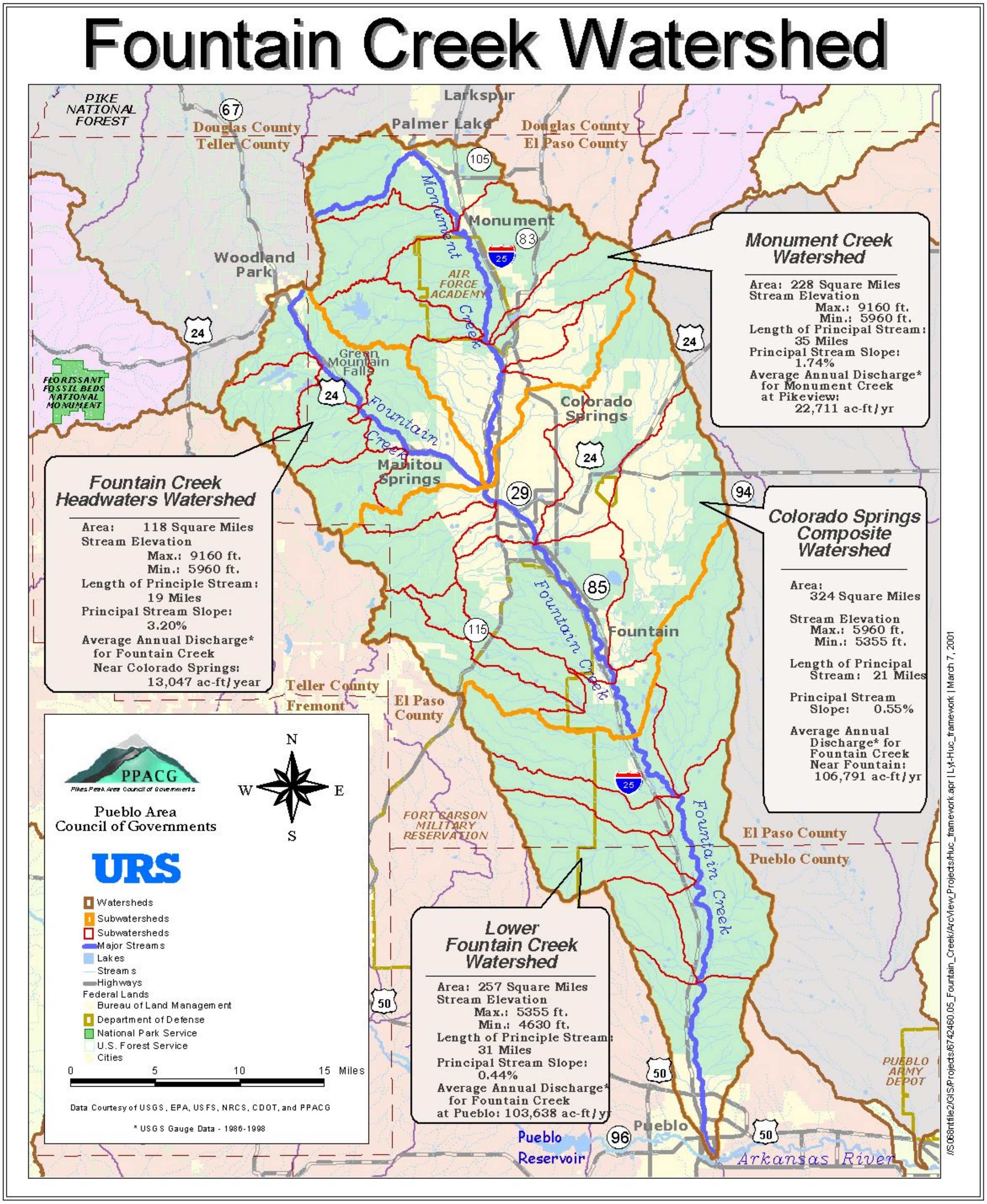


TABLE 11-6: WETLAND INVENTORY

Sub-Watershed	Amount of Wetlands (acres)							
	Historic Wetland Type [1]				Current Wetland Type [1]			
	PEM	PSS	PFO	Total	PEM	PSS	PFO	Total
Monument Creek	329	389	32	**750**	1,393	648	0	**2,041**
Fountain Creek Headwater	149	147	0	**296**	192	84	0	**276**
Colorado Springs Composite	155	454	493	**1,102**	3,818	132	0	**3,950**
Lower Fountain Creek	599	2,073	517	**3,189**	2,954	115	0	**3,069**
Total	**1,232**	**3,063**	**1,042**	**5,337**	**8,357**	**979**	**0**	**9,336**

Source: Section 3.0, Wetlands, ACOE Fountain Creek Watershed Study Report (2006).

[1] According to Cowardin et al (1979), plaustrine emergent is PEM, plaustrine scrubshrub is PSS and plaustrine forested is PFO.

Hazardous Materials and Solid Waste

Information provided below is based on a search of federal and state databases for hazardous materials that was conducted for the ACOE (2006) Watershed Report. This included a description of each database that lists addresses of known underground storage tanks (USTs), leaking USTs, landfills, hazardous waste generation or treatment, storage and disposal facilities, and subsurface contamination. A summary of that information is presented below. The goal is to have facilities that have known and documented environmental conditions that may negatively impact the watershed.

There are approximately 5,000 sites listed on the database within the area., of which using the criteria listed above, 71 sites were deemed by professional opinion as the facilities that would have the most negative environmental impact (ACOE, 2006). These are shown on Figure 11-6 and included:

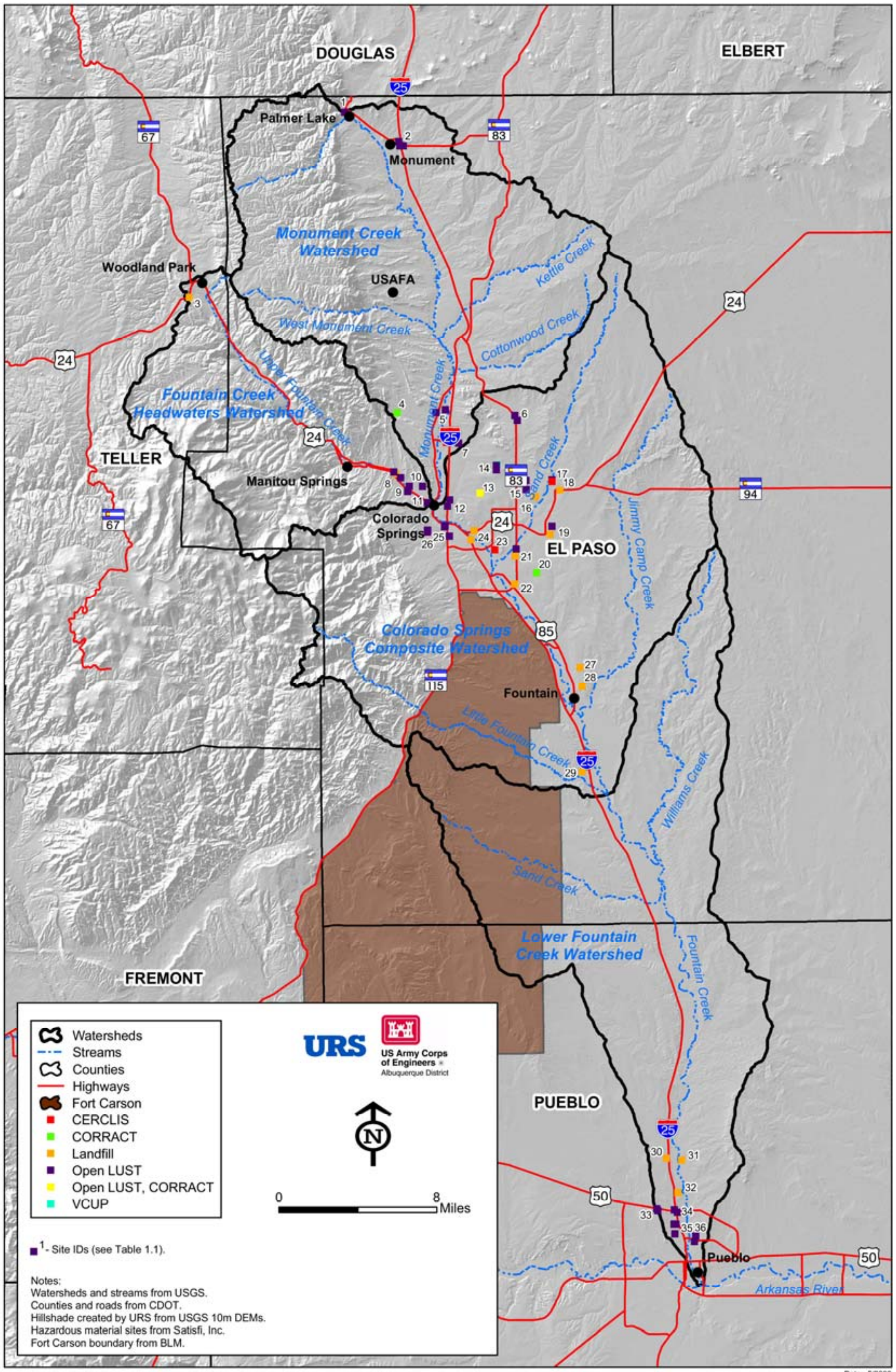
- **43 open Leaking Underground Storage Tanks (LUST) sites –** described as facilities, usually service stations, with aboveground or underground storage tank leaks of petroleum products. Potential impacts include impacts on surrounding soils and groundwater.

- **21 Landfills –** includes solid waste facilities that have received permits from the state, and may be currently in use or closed.

- **3 Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) sites –** sites being assessed by the EPA for possible inclusion on the National Priority List. These sites include the Fillmore and Cascade PCE Plume, High Quality Circuits and the Galley Road Dump Site.

- **3 Corrective Action (CORRACT) sites –** this includes sites that have hazardous waste violations, often involving contamination of soil or groundwater. These sites include the Ingersoll-Rand Security and Safety facility, Hewlett-Packard and the Lory-Oil Company.

FIGURE 11-6: HAZARDOUS MATERIALS



Seismic Zones and Topographic Impacts

The level of seismicity in Colorado has been characterized as being low to moderate due in part to the lack of adequate seismographic coverage in the state, and a number of sizable earthquakes which have occurred in the historical or more recent record. The largest known historical earthquake in Colorado was on November 8, 1982 which had an estimated magnitude of 6.6 and was located in north-central Colorado. Earthquakes in Colorado are induced by disposal of waste fluids and secondary oil-recovery in western Colorado. A swarm of earthquakes, including one of magnitude 4.6, occurred near Trinidad in the fall of 2001 (closest and largest known earthquake to Colorado Springs).

The MPO boundaries cover a diverse terrain and elevations can range from 14,100 feet at the summit of Pikes Peak to 4,600 feet in Pueblo. The natural topographic limitations set by steep terrain can have a large impact on potential transportation projects, both in terms or financial and environmental impact.

Biological Resources

Wildlife Species, Viewing Areas and Crossings

The study area supports a high diversity of wildlife that inhabits one or more of the available habitats. These include:

- **BIG GAME –** these are managed by Colorado Division of Wildlife (CDOW) for seasonal hunting. These include hoofed animals such as mule deer, white-tailed deer, pronghorn, American Elk, Bighorn or Mountain Sheep, Black Bear and Mountain Lion.

- **SMALL OR MEDIUM SIZED CARNIVORES –** Medium-sized animals known to inhabit the study area include carnivores such as bobcat, coyote, red fox, swift fox, gray fox, and raccoon, short-tailed and long-tailed weasels, mink, ringtail and skunk.

- **SMALL MAMMALS –** Small mammals inhabiting the study area include bats, rabbits, hares, rodents and shrews.

- **BIRDS –** The most common bird species in the study area are the American Robin, the Mourning dove, the Western Meadowlark, and the Lark Bunting.

Wildlife crossings can be an effective method to ensure both animal and human well-being. Automobile collisions with wildlife are not only fatal for the animal, but to the passengers of the automobile as well.

Threatened and Endangered Species

The 2035 Regional Transportation Plan will have an effect on many of these habitats, and with that is the potential for harming threatened and endangered species. These species fall under the special status designated by federal and state governments. Table 11-7 identifies the threatened and endangered species in the area that are currently present or at one time used the watershed for their habitat, and there are potential restoration opportunities. Sub-watershed boundaries referenced in the Table are shown in Figure 11-5.

Of special note is the Preble's Meadow Jumping Mouse, whose only native habitat is the boundary between the Great Plains and Rocky Mountain in Colorado and Wyoming. New and existing transportation projects are shown to negatively affect the Preble's Meadow Jumping Mouse's territory. Habitat fragmentation is a serious concern as roadways and bridges create artificial boundaries.

TABLE 11-7: THREATENED AND ENDANGERED SPECIES

Common Name	Scientific Name	Federal Status	State Status	Sub-Watersheds				Occurrence and Habitat
				MC	UFC	CSC	LFC	
FISH								
Arkansas Darter	*Etheostoma cragini*	C	T	*	*	X	X	
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	T	T		X			
Pallid Sturgeon	*Scaphirhynchus albus*	E	--	*	*	*	*	Downstream
BIRDS								
Bald Eagle	*Haliaeetus leusoephalus*	T	T		X	X	X	Winter foraging in riparian areas
Burrowing Owl	*Athene cunicularia*	--	T			X	X	Shortgrass prairie
Interior Least Tern	*Sterna sntillarum athalassos*	E	E	*	*	*	*	Migratory, habitats downstream
Lesser Prairie Chicken	*Tympanuchus pallidicinctus*	C	T					Winter presence in grasslands
Mexican Spotted Owl	*Strix occidentalis lucida*	T	T	X	X	X		Montaine forest, woodlands
Piping plover	*Charadrius melodus*	T	T					Habitats downstream
Whooping Crane	*Grus americana*	E	E					Old migratory corridor
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	C	--		X	X	X	Possibility of being present
MAMMALS								
Black-footed ferret	*Mustela nigripes*	E	E					Old habitat

Common Name	Scientific Name	Federal Status	State Status	Sub-Watersheds				Occurrence and Habitat
				MC	UFC	CSC	LFC	
Canada Lynx	*Lynx Canadensis*	T	E					Re-introduced, alpine
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	T	X	X	X	X	Riparian areas and grasslands
PLANTS								
Colorado Butterfly Plant	*Gaura neomexicana ssp. coloradensis*	T	--	X		X	X	Floodplains and prairies
Slender moonwort	*Botrychium lineare*	C	--		X			
Ute ladies'-tresses	*Spiranthes diluvalis*	T	--		X			Wetlands

Source: Section 5.0, Threatened & endangered Species, ACOE Watershed Study (2006)

T/E = Threatened/Endangered C = Candidate for federal listing X = Species habitat occurs in region

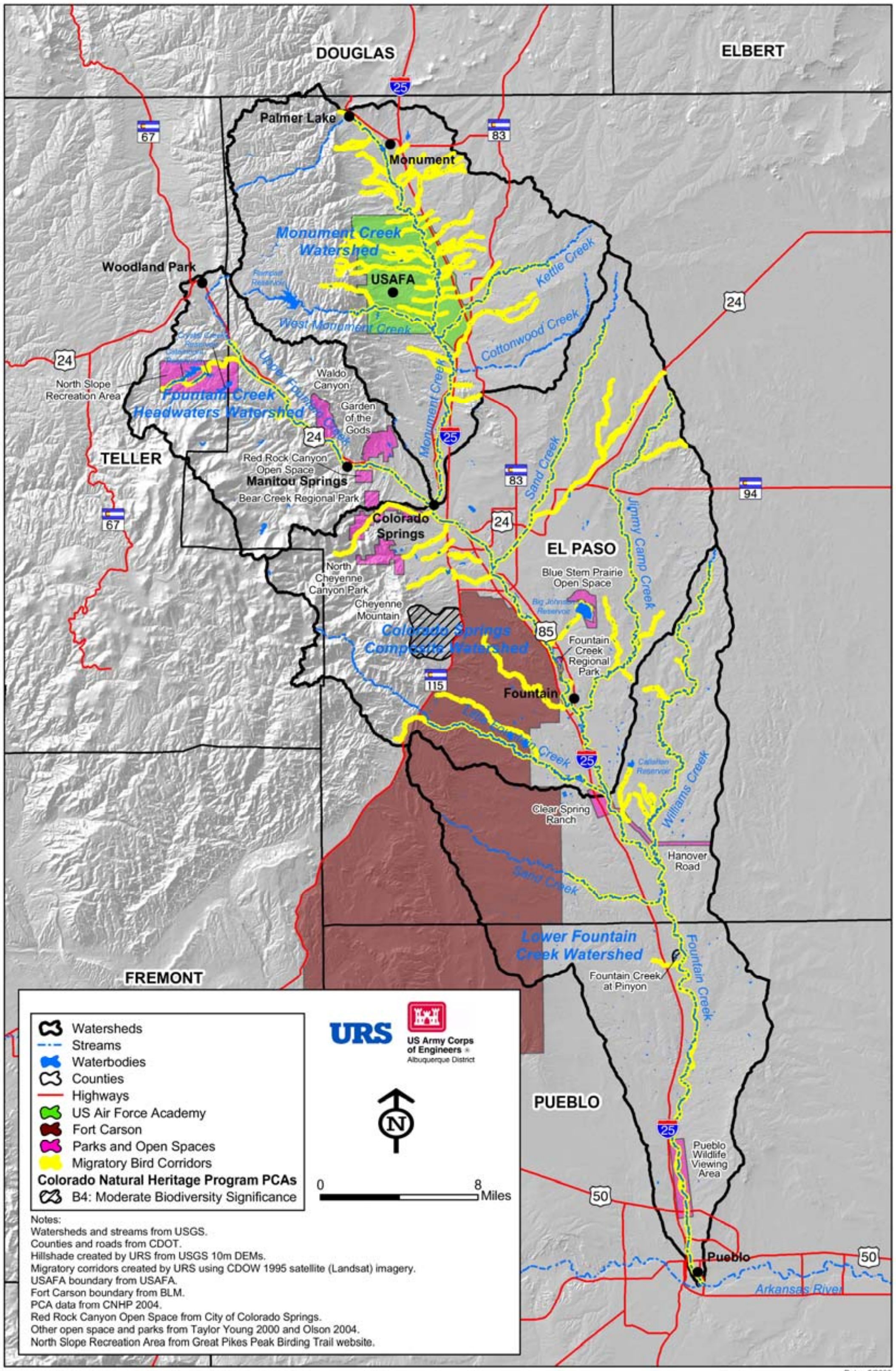
** = Projects may affect species' habitat downstream*

Migratory Populations

Waterways, specifically those along the mountains are crucial habitats for migrating animals and help their ability to travel long or short distances depending on the species. Most of the migrating species of concern are bird species and birds migrate for a variety of reasons. Figure 11-7 shows the Migratory Bird Corridors and Stopovers. The primary reason is food availability, but they also migrate to find mates or proper nesting grounds and material. Studies have shown that it is not critical for migrating birds to have a safe corridor to travel through, just that they have a safe habitat on either side. However, recent studies have shown that there are more than one species of bird which need protected migratory corridors in order to have a successful migration.

Other migrating animals include reptiles, amphibians, birds, and some mammals. Development, including roads, is the largest inhibitor to reptile and amphibian migration, along with nearby water sources. For birds, migration patters can vary, and the timing of different birds can be very different depending on the type of bird, and where they are traveling from. Migrating birds generally utilize wetlands and grasslands to stop on their routes, and impacts on these areas may greatly affect the species. Nearly all birds are protected under the Migratory Bird Treaty Act, a federal act administered by the United States Fish & Wildlife Service (USFWS) which prohibits disturbance or destruction to an active nest, nesting birds, or their eggs or young. This applies to all birds (including raptors), except non-native species including house sparrow, European starling, rock dove and game birds.

FIGURE 11-7: MIGRATORY BIRD CORRIDORS AND STOPOVER SITE



Invasive Species

Invasive species may have negative impacts upon crops, native plant communities, livestock, and the management of natural or agricultural systems. Federal and State of Colorado regulations address the noxious weed problem. One example is the Colorado Noxious Weed Act (CRS, Title 35, Article 5.5). CDOT is one of the agencies specifically tasked with responsibilities for noxious weed management. The eleven noxious weed species reported by each county in the region in 2004 to the Colorado Department of Agriculture (CDA) are (these are included on the 40 listed on the CDA state noxious weed list): Chinese clematis; Diffuse knapweed; Hoary cress; Leafy spurge; Orange hawkweed; Perennial pepperwood; Russian knapweed; Russian olive; Saltcedar; Spotted knapweed; and Yellow toadflax.

Saltcedar is an important noxious weed in Pueblo and southern El Paso counties and can create dense monocultures on riverbanks, and transpire larger amounts of water than the displaced natural wetland.

The typical floodplain along Fountain Creek in Pueblo and southern El Paso counties contains many areas invaded by both Saltcedar and Russian olive. Saltcedar was observed at eight locations in southern El Paso County during field visits including five in the Colorado Springs Region and three in Northern Pueblo County. The CDA show Russian olive along Fountain Creek only in Pueblo County, however field observations show it extending into southern El Paso County similar to Saltcedar. Locations are shown in the Table 11-8 based on the sub-watershed boundaries found on Figure 11-5. Figures 11-8 and 11-9 show the location of some of the more common Invasive Plants.

Table 11-8: Observations of Noxious Weeds

Common Name	Observations in Sub-Watersheds			
	MC	FCH	CSC	LFC
	(out of 8 sites)	(out of 5 sites)	(out of 12 sites)	(out of 12 sites)
Diffuse knapweed	4	0	0	1
Leafy spurge	0	0	1	1
Perennial pepperwood	0	0	1	5
Russian olive	1	0	8	8
Saltcedar	0	0	5	10
Spotted knapweed	2	1	1	0
Yellow toadflax	3	0	0	0
Canada thistle	8	3	8	10
Munk thistle	4	1	0	1
Bull thistle	2	0	0	0
Bouncingbet	0	2	1	0
Scotch thistle	0	0	1	1

Source: Section 3.0, Wetlands, ACOE Fountain Creek Watershed Study Report (2006)

FIGURE 11-8: INVASIVE PLANTS–SALTCEDAR AND DIFFUSE KNAPWEED

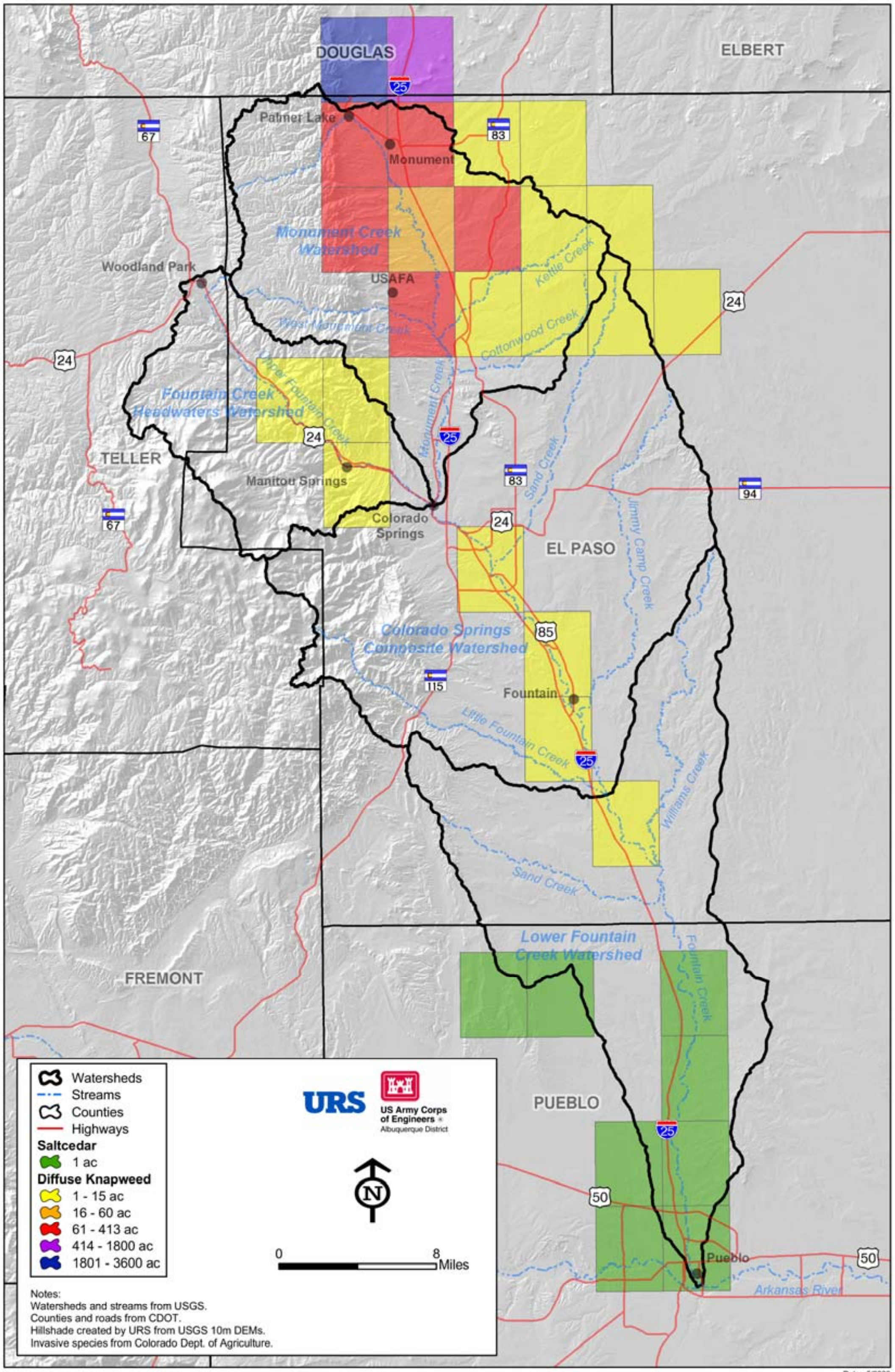
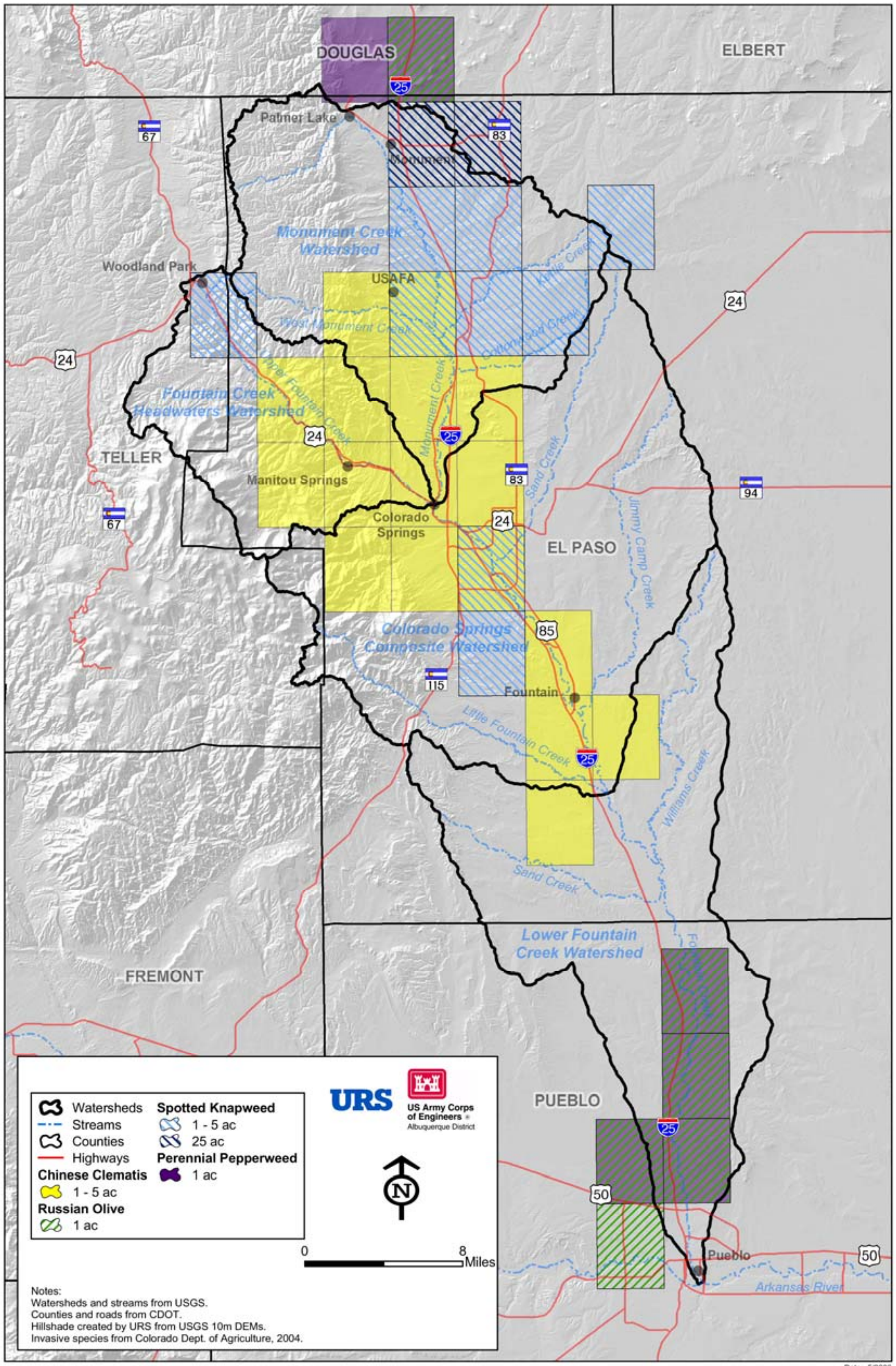


FIGURE 11-9: INVASIVE PLANTS – SECOND FIGURE



Surface Water and Groundwater Issues

Stormwater Runoff and Impervious Surfaces

When looking at the effects of road improvement on the water quality, several important factors must be examined. Due to the nature of a watershed, these issues are all closely related. The construction and improvement of roads results in drastic increases of the amount of impervious surface areas, which has many effects on the watershed. The increase in impervious surfaces creates more surface run-off, increasing the amount of sediment and chemicals that run into the waterways, as well as increasing the amount of water in streams, which could lead to channelization and flooding. Even though they are closely related, each issue will be addressed separately so that each specific issue can be reviewed and mitigation opportunities can be explored.

The quantity of water in a stream varies seasonally depending on the amount of precipitation and upstream flow, but is very important to the health of the stream. As outlined in the Fountain Creek Watershed Plan, there are three distinct flows in the Monument and Fountain Creeks: base flow, snowmelt, and summer flow.

- Base flow usually occurs from late September until mid-April and flows are fairly consistent, without much fluctuation.

- Snowmelt begins in mid-April and lasts until mid June and flows are significantly higher and peak around mid-May, with April and May usually being the highest precipitation months.

- Summer flow begins in mid-June and lasts until the end of September and is usually highly variable due to afternoon and evening thunderstorms.

Increased flows may lead to channelization, which in-cuts the banks of the stream and contributes to habitat loss as well as increased incidence for flooding. Stream morphology can also change dramatically due to streamflow and deposition, and the more water there is, the more dramatic effects that water can have on the quantity of the stream. Decreased flows can greatly reduce habitat and are indicators that the habitat is being affected in some way. Also, with a low level of water in a stream, there is less water for pollutants to be diluted in, so the concentrations of pollutants are higher, therefore having more effect.

Because the largest controlling factor for water quantity is precipitation, the trends in precipitation must be understood to be able to correctly interpret the trends in overall water quantity. Generally, precipitation has been increasing gradually, but this increase has been seen only in the spring months, and is not necessarily the result of other seasonal changes. The USGS reports that the highest stream flow data ever recorded occurred during the period between 1994 and 1997. But, starting in 1977, the average annual flows have been increasing at all gauging sites, but not at the same rate. These changing rates have been attributed to the changes in land use the watershed has undergone, increasing the impermeable surface rates as well as the general overland flow, putting more water into the streams.

Imperviousness occurs when there are too many impenetrable surfaces and as a result, precipitation cannot flow into the ground through surface pores. Impervious surfaces are mainly caused by roofs and asphalt and concrete surfaces specifically from the transportation system. Too much surface runoff can have detrimental effects on watersheds, causing an increase in erosion, sedimentation, increase in flood prone areas due to altered stream flow, and the prevention of refilling the natural underground water system because of the overland flow instead of infiltration. These changes to the flow of water can result in serious transformations in the shape and integrity of streams and will cause them to lose their ecological value to the system.

The imperviousness of the land will be changed by the 2035 Regional Transportation Plan by increasing the amount of concrete and asphalt and therefore increasing the amount of runoff into the rivers. Table 11-9 shows the current and future amount of impervious surface area in each of the sub-watersheds.

TABLE 11-9: CURRENT AND FUTURE IMPERVIOUS SURFACE AREA

	Code Id	Square Miles	% Impervious Surface Area		Difference
			Current	Future	
Fountain Creek Headwaters					
Upper Fountain Composite	FC1	26	8.0	9.0	**1.0**
Reservoirs Composite	FC2	18	5.0	5.0	0.0
Manitou Reservoir Composite	FC3	18	1.0	1.0	0.0
Garden of the Gods Composite	FC4	39	14.0	14.0	0.0
Ruxton Creek	FC5	18	1.0	1.0	0.0
Monument Creek					
North Monument Creek	MC1	43	9.0	12.0	**3.0**
Beaver Creek	MC2	27	2.0	2.0	0.0
Monument Creek Headwaters	MC3	56	9.0	16.0	**7.0**
West Monument Creek	MC4	24	5.0	5.0	0.0
Kettle Creek	MC5	17	9.0	17.0	**8.0**
Lower Monument Composite	MC6	44	39.0	42.0	**3.0**
Cottonwood Creek	MC7	18	29.0	44.0	**15.0**
Colorado Springs Composite					
Cheyenne Creek	CSC1	25	6.0	6.0	0.0
Colorado Springs Composite	CSC2	45	45.0	45.0	0.0
Upper Little Fountain Creek	CSC3	27	1.0	2.0	**1.0**
Rock Creek	CSC4	20	5.0	5.0	0.0
Cheyenne Mountain Composite	CSC5	62	26.0	28.0	**2.0**
Sand Creek	CSC6	59	27.0	43.0	**16.0**
Jimmy Camp Creek	CSC7	69	7.0	37.0	**30.0**
Little Fountain Bottom Composite	CSC8	17	10.0	18.0	**8.0**
Lower Fountain Creek					
Racetrack Composite	LFC1	41	6.0	6.0	0.0

	Code Id	Square Miles	% Impervious Surface Area		Difference
			Current	Future	
Lower Sand Creek	LFC2	17	5.0	5.0	0.0
Young Hollow	LFC3	38	1.0	1.0	0.0
Williams Creek	LFC4	50	1.0	1.0	0.0
Pinon Composite	LFC5	53	1.0	1.0	0.0
Steele Hollow	LFC6	18	1.0	1.0	0.0
Bragdon Composite	LFC7	40	8.0	19.0	**11.0**

Source: Fountain Creek Watershed: Impervious Surface Area and Watershed Health Analysis (PPACG, 2005)

The effects of this imperviousness specifically on waterways will be the effect it has on the streams. Table 11-10 outlines the general conditions of streams at different levels of imperviousness. Figure 11-10 shows current levels of impervious surface area and Figure 11-11 future levels of impervious surface area. The different classification levels outline the characteristics of the stream and the resulting objectives and enforcements that should be put into effect.

TABLE 11-10: STREAM SYSTEM CHANGES FROM IMPERVIOUS SURFACE AREA

Urban Stream Classification	Sensitive (0-10% Impervious)	Impacted (11-25% Impervious)	Non-Supporting (26 –60% Impervious)
Channel Stability	Stable	Unstable	Highly Unstable
Water Quality	Good	Fair	Fair-Poor
Stream Biodiversity	Good-Excellent	Fair-Good	Poor
Resource Objective	Protect biodiversity and channel stability	Maintain critical elements of stream quality	Minimize downstream pollutant loads
Water Quality Objectives	Sediment and temperature	Nutrient and metal loads	Control bacteria
Land Use Objectives	Watershed-wide impervious cover limits	Site impervious cover limits	Additional infill and redevelopment encouraged
Monitoring And Enforcement	GIS monitoring of impervious cover	GIS monitoring of impervious cover	Pollutant load modeling
Riparian Buffers	Widest buffer network	Average buffer width	Greenways

FIGURE 11-10: FOUNTAIN CREEK SUBWATERSHED ANALYSIS: CURRENT IMPERVIOUS SURFACE AREA

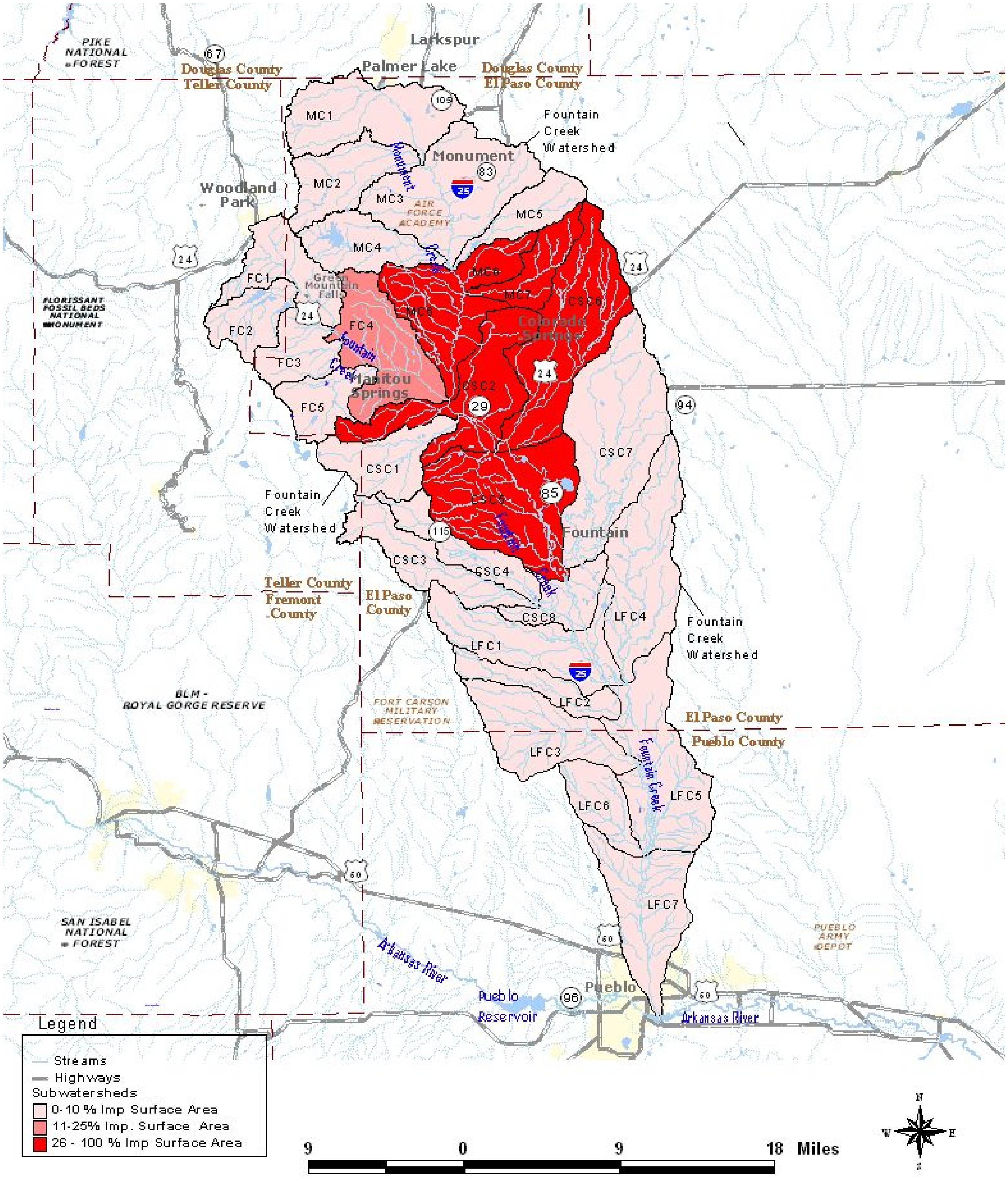


FIGURE 11-11: FOUNTAIN CREEK SUBWATERSHED ANALYSIS: FUTURE IMPERVIOUS SURFACE AREA

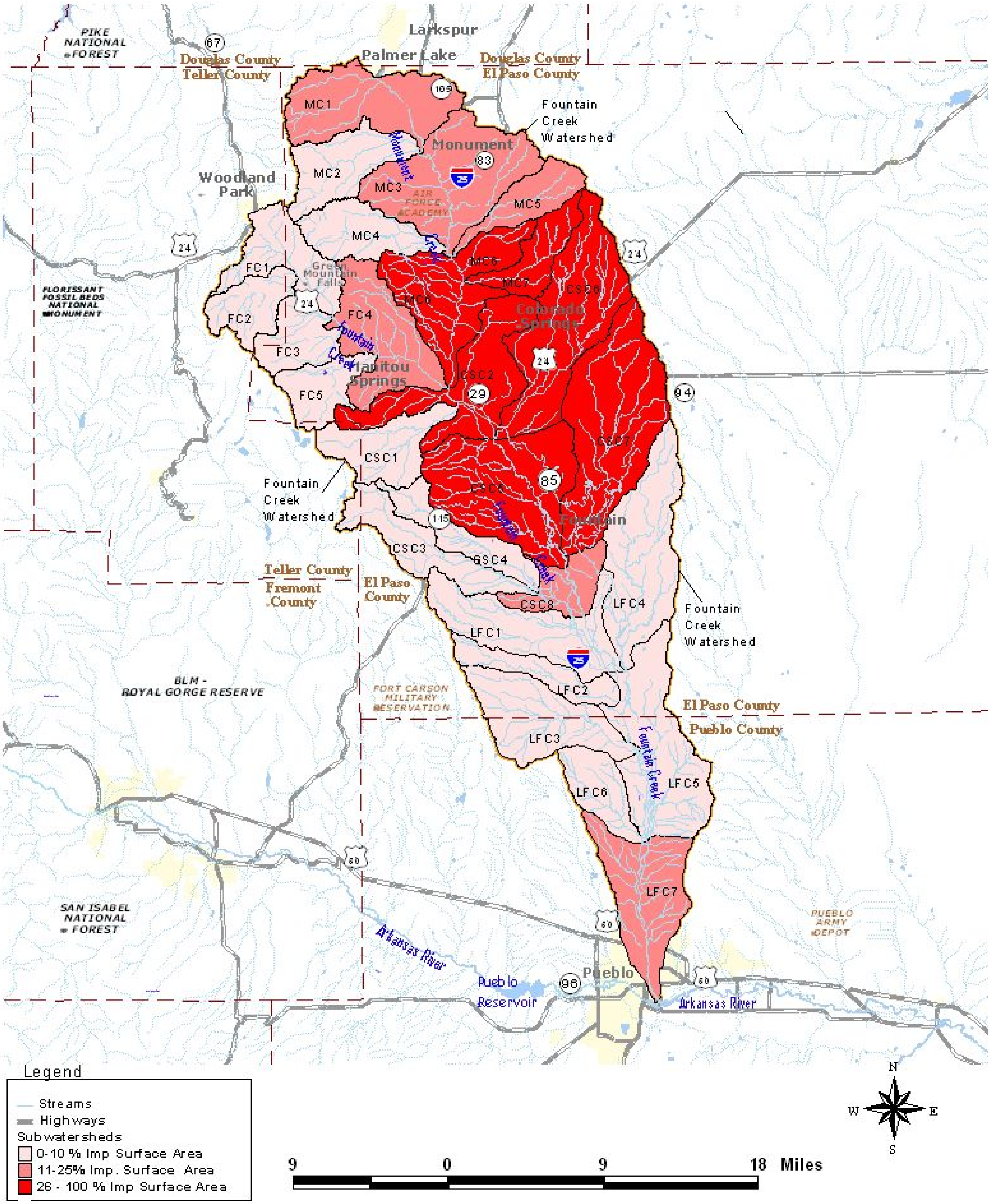


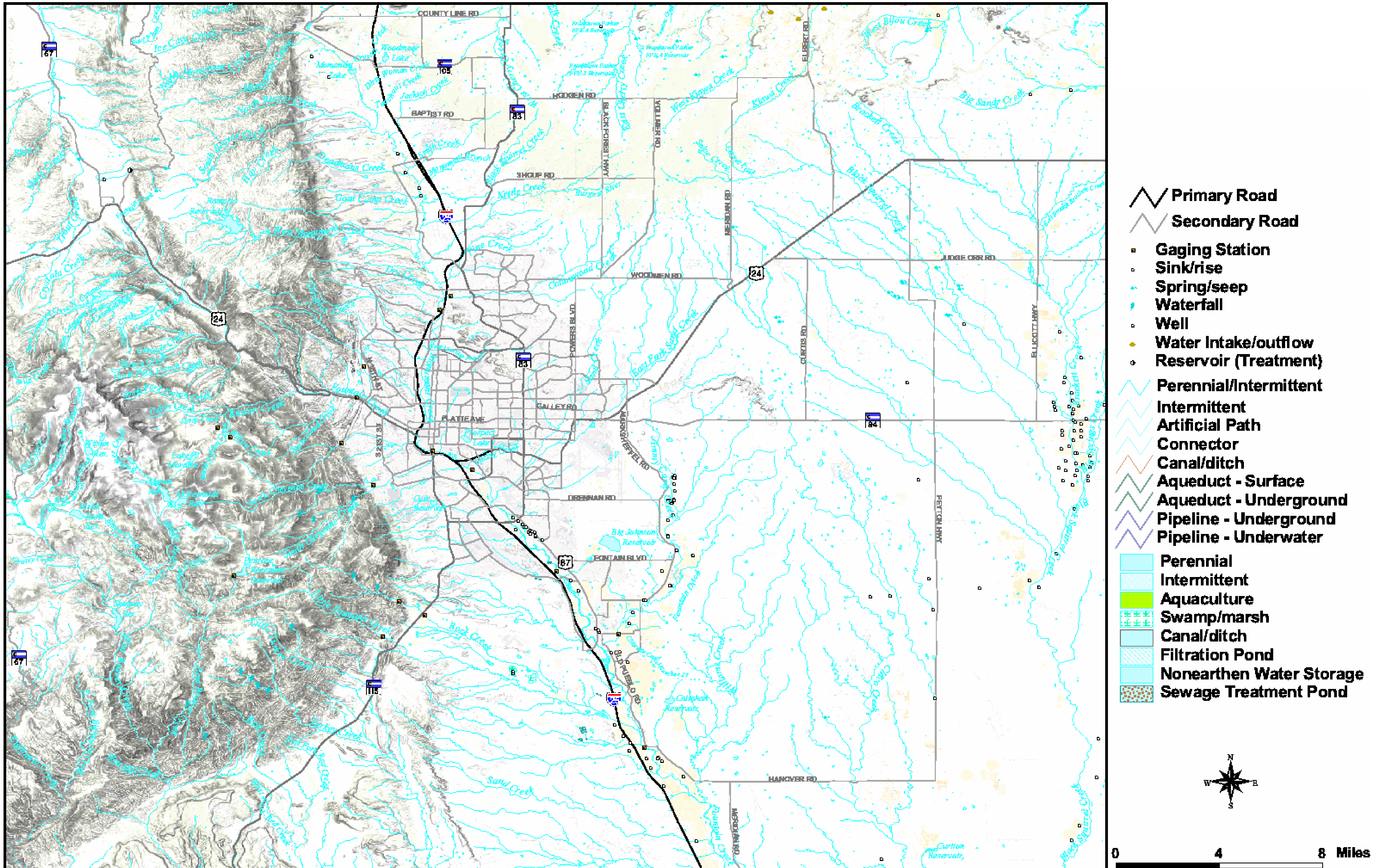
Table 11-11 shows changes in Impervious Surface Area. The amount of sensitive watersheds is greatly reduced, while both impacted and non-supporting watersheds are projected to increase.

TABLE 11-11: CURRENT AND FUTURE IMPERVIOUS SURFACE AREA CLASSIFICATIONS

	Current	Future
Sensitive (0 – 10%)	21	15
Impacted (11 – 25%)	1	6
Non-Supporting (26 – 100%)	5	6

This Page Left Intentionally Blank

FIGURE 11-12: HYDROLOGY



This Page Left Intentionally Blank

Erosion and Sedimentation

Erosion in the Colorado Springs area has been increasing since the start of development and settlement. The increase in impermeable surfaces leads to a decrease in the amount of water infiltration down into the soil, causing more water to run-off. This is problematic in the Fountain Creek Watershed where the soils are primarily sandy, and erode easily with released sediment. The sediment loads in streams have been shown to increase the flow of sediment by ten times (tons per cubic foot-second) than would have occurred during an average stream flow. Small particulate matter and pollution can run off the roads, accumulate in the waterways, and have adverse effects on the ecosystem. When it runs into the rivers, the sediment can create higher loads for the streams, making them deeper, wider, faster moving, and harder for species to live in. Sediment can also fill in cracks between rocks, greatly reducing the amount of habitat for native species to live and lay their eggs.

Also, with increased water movement across the land the chance of road washout increases which can destroy bridges and lessen the strength of the foundation of roads, putting the long-term usage of the roads into question. Erosion occurring in an uncontrolled or unmanaged system can result in exacerbated stream bank deterioration; channel instability; loss of agricultural, residential, industrial or private property; loss of infrastructure; and increased sediment loads to downstream reaches. Because sediment has been outlined to be a big problem in water quality, this issue needs to be addressed.

Flooding and Floodplain Impacts

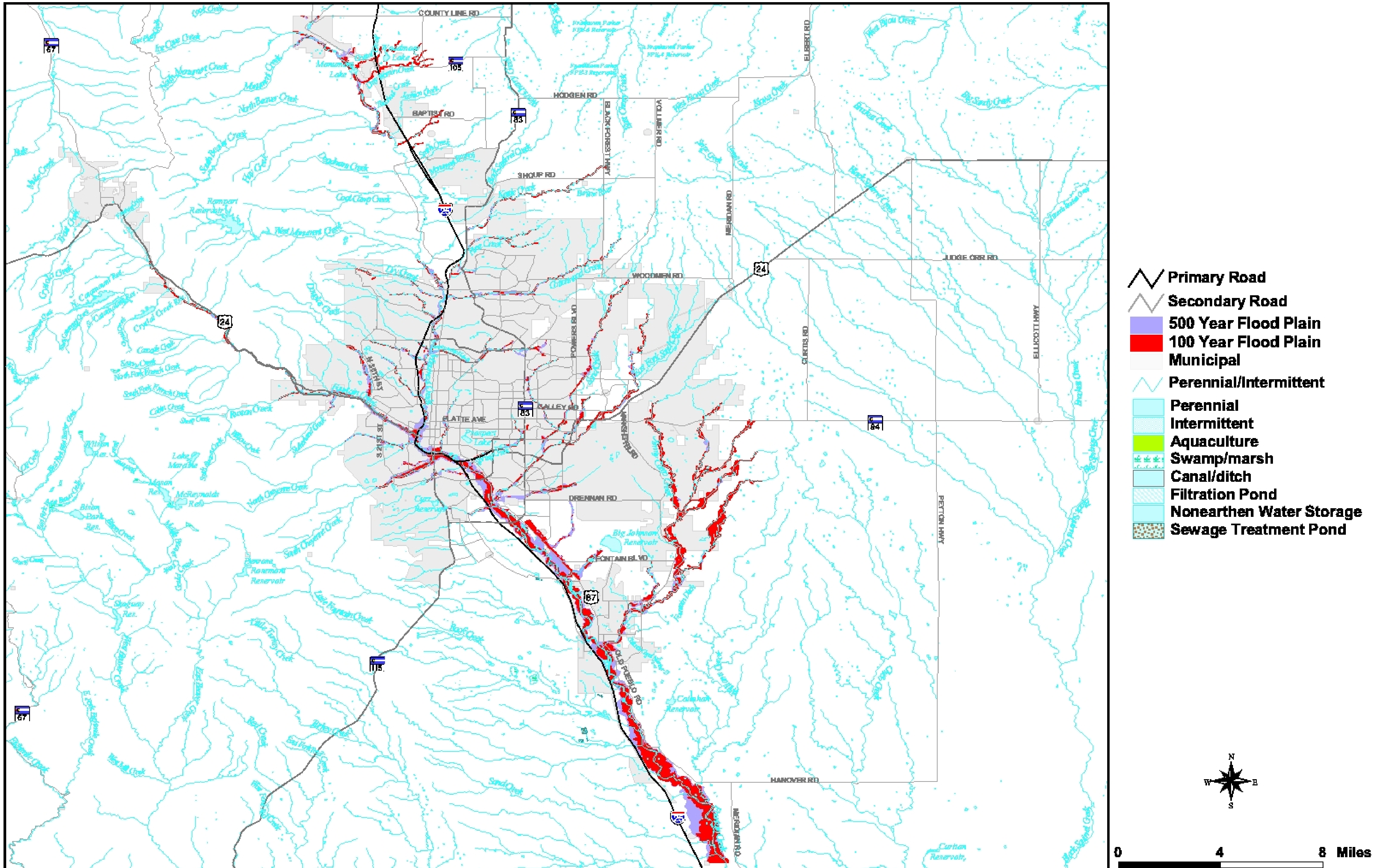
A floodplain is an area of land around a body of water, particularly rivers or streams that are normally dry, but fill with water during a flood event. Roads and development can have a significant effect on floodplains and the land surrounding them. Roads alter the natural pathways of water flowing over the floodplain to reach the body of water. Also, because the development of roads increases the impermeable surfaces of the land, there is a higher amount of run-off, and therefore flooding is more likely to occur. Less water is being infiltrated into the land, which has other serious effects. The chances of flooding may also be increased by the loss of channel capacity from sedimentation.

Floodplain encroachment has become a large problem. The increase in development of floodplains has led to channel floodway zones becoming constrained, which makes potential floods have higher peaks and they will progress downstream with rapid speed.

The 2035 Plan contains some encroachment on the current floodplains, but not much more than is already significantly encroached by the current transportation system. Figure 11-13 shows the 100 and 500 year Federal Emergency Management Association (FEMA) designated floodplain boundaries. The main concern is the increase in impermeable surfaces and the resulting increase in surface run-off. Below is the summary of the five largest stream flow events.

This Page Left Intentionally Blank

FIGURE 11-13: FLOOD PLAIN HAZARDS



Pikes Peak Area Council of Governments
Communities Working Together

This Page Left Intentionally Blank

TABLE 11-12: FIVE LARGEST STREAMFLOW EVENTS

Date	Peak Instantaneous Stream Flow (in ft^3/s)	Recurrence Interval Exceeded	Streamflow at Recurrence Interval (in ft^3/s)	Flow Period	General Storm Location Within Watershed	Reported Precipitation (in inches)
06/17/1965	47,000	200 yr	45,750	Snowmelt	NE C. Springs	14
05/30/1935	35,000	50 yr	30,060	Snowmelt	NE C. Springs	18
06/04/1921	34,000	50 yr	30,060	Snowmelt	n/a	n/a
04/30/1999	18,900	10 yr	15,750	Snowmelt	C. Springs	10
07/10/1945	17,800	10 yr	15,750	Summer	n/a	n/a

Source: Stogner, 2000

Water Quality

Water quality is extremely important to the health of the land, the ecosystem, and human usage. Having good water quality makes it usable for drinking, recreation, crop irrigation, industry, and wildlife and habitat preservation. Water quality is greatly affected by both point and non-source point polluters.

Typically, water quality issues are attributed to point-source polluters such as factories or wastewater treatment plants. But, significant pollutants come from non-point sources such as roads. Roads have a very high impact on the quality of the surrounding waterways, specifically because of the construction of new roads, the maintenance and upkeep of old roads, and the vehicles driving on roads. The main pollutants entering the system from roadways that are of concern are the sediment, total dissolved solids (TDS) from salts used for de-icing, and possibly more heavy metals such as zinc, cadmium, arsenic, nickel, copper, iron, lead, manganese, and others. These pollutants in the ecosystem can have serious effects on the local habitats and also the groundwater pools.

According to the National Research Council, Americans dump between 8 million to 12 million tons of salt on our roads per year. Some of the effects are:

- Salt slowly kills trees, especially white pines, and other roadside plants. The loss of indigenous plants and trees on roadsides allows hardier salt-tolerant species to take over.
- Elk, moose, and sheep eat road salt causing "salt toxicosis" where they lose their fear of vehicles and humans, causing many fatal encounters.

- Salt corrodes metals like automobile brake linings, frames, and bumpers, and can cause cosmetic corrosion. To prevent this corrosion, automakers spend almost $4 billion per year.

- Salt can penetrate concrete to corrode the reinforcing rods causing damage to bridges, roads and cracked pavement.

For the Pikes Peak Region, specific water standards are measured to determine the health of the waterways. These are:

- **NUTRIENTS** (Total phosphorous, Nitrite, Nitrate, Ammonia) - generally from agriculture. This can cause an overgrowth of aquatic plants and algae, causing the amount of oxygen in the water to decrease, causing eutrophication of the waterways, which fewer species can live in.

- **SOLIDS** (Total Suspended Solids, Total Dissolved Solids and Settleable Solids) - generally caused by erosion of the surrounding soils. These various forms of solids can affect the amount of light reaching aquatic plants, cover fish spawning and animal habitat, and reduce the food supply for small organisms.

- **SELENIUM –** caused by leaching in the soil and irrigation cycles. Selenium has an effect on fish and other aquatic species, affecting their tissue composition.

- **METALS** (Copper, iron, lead, zinc, selenium, iron, magnesium) - byproducts of mining and construction can leach hazardous materials into the waterways, and can pose a serious risk to water quality and ecosystem health.

- **BACTERIA** (E. Coli and Fecal coliform) - a bacteria commonly found in the human and animal gastrointestinal tracts.

These indicators are all measurable and helpful in determining the quality of water in the Fountain Creek Watershed. Table 11-13 shows the pollutants, as outlined by the EPA in the Colorado Section 303d list. Of greatest concern for this region are E. Coli and Selenium.

The primary monitoring systems for these substances are the 22 active USGS monitoring systems on major rivers and tributaries in this watershed. The specific sources of selenium and sediment are unknown, and there are no direct connection between selenium and roads, but there is significant data between sediment and road construction. Both the sediment and selenium impairments make for impaired waterways, and the effects of polluted waters and the effect of the 2035 RTP will have on these waters should be taken seriously because they are so important for the health of the environment.

TABLE 11-13: WATER QUALITY IMPAIRED STREAM SEGMENTS

WBID	Segment Description	Classification	2006 303 d Impairment	Priority	Water Quality Trends		
					Down	Stable	Upward
COARFO01	Mainstream of Fountain Creek, including all tributaries, lakes and wetlands, reservoirs, from the source to confluence with Monument Creek	Aquatic Life Cold 1 Recreation 1a Water Supply Agriculture	E. coli, Se	H/L	Fluoride	Sulfate	Iron, Manganese, Colifom
COARFO02a	Mainstream of Fountain Creek from the confluence with Monument Creek to above the State Highway 47 bridge.	Aquatic Life Warm 2 Recreation 1a Water Supply Agriculture	E. coli	H	Fecal Coliform	Sulfate	Selenium
COARFO02b	Mainstream of Fountain Creek from above the State Highway 47 bridge to the confluence with the Arkansas River	Aquatic Life Warm 2 Recreation 1a Water Supply Agriculture	Se	L	Selenium, Sulfate	Manganese	Iron, Fluoride, Coliform
COARFO03	Tributaries to Fountain Creek which are in USFS or AFA Lands, from the confluence with Monument Creek to the confluence with the Arkansas River, except the main stem of Monument Creek in the AFA Lands.	Aquatic Life Cold 1 Recreation 1a Water Supply Agriculture					
COARFO04	All tributaries to Fountain Creek not on USFS or AFA lands, from confluence with Monument Creek to confluence with Arkansas River.	Aquatic Life Warm 2 Recreation 1a Agriculture					

WBID	Segment Description	Classification	2006 303 d Impairment	Priority	Water Quality Trends		
					Down	Stable	Upward
COARFO05	Marshland on Nash Property; Jimmy Creek from irrigation div. to FC; and unnamed tributary from boundary of Fort Carson to FC.	Aquatic Life Warm 2 Recreation 2 Agriculture					
COARFO06	Mainstream of Monument Creek, from the boundary of National Forest lands to the confluence with Fountain Creek.	Aquatic Life Warm 2 Recreation 1a Water Supply Agriculture	Se	L	Iron, Manganese, Fluoride	Sulfate, Coliform	
COARFO07a	Pikeview Reservoirs, Willow Springs Pond #1, Willow Springs Pond #2.	Aquatic Life Warm 2 Recreation 1b Water Supply Agriculture	PCE	M			
COARFO07b	Prospect Lake, Quill Lake, Monument Lake.	Aquatic Life Warm 2 Recreation 1a Agriculture					

E. coli

E. Coli is a bacteria commonly found in the human and animal gastrointestinal tracts. It is a good indicator of the levels of other illness-causing bacteria and pathogens in the waterway. Upper Fountain Creek (Segment 1) and the mainstem of Fountain Creek to the Highway 47 bridge in Pueblo are listed currently on the 303d list as impaired for E.Coli (i.e., the mean concentrations are above the 126 CFU/100 ml stream standard for E. Coli.). Peaks in E. Coli concentrations are seen in Monument and Fountain Creek and are usually higher during the spring through fall when runoff is higher and lower during the winter (low flow) when stream flow is lower.

Selenium

Selenium is a naturally occurring, semi-metallic trace element found in bedrock, soils, water and living organisms. Selenium is most commonly found in Cretaceous and Tertiary marine sedimentary rocks. Selenium can impact livestock, birds and fish. Levels of selenium in the Fountain Creek Watershed vary – there was a significant increase through 2002 and a decrease after 2002. Every Fountain Creek tributary is enriched with selenium.

Groundwater

Groundwater is an essential part of the water system. Most subterranean aquifers are connected with aboveground streams and lakes. Such a connection is referred to as the *hyporheic zone*. About 22,000 wells have been drilled into various aquifers in eastern and northern El Paso County, the second highest number of any county in Colorado. Residents in El Paso County get groundwater from two possible sources:

- People that live in the northern portion of El Paso County, including Black Forest, generally tap the shallowest aquifer in the Denver Basin, a geologic formation that extends to Greeley.

- The Denver Basin, made up of four aquifers overlaying one another. These aquifers recharge so slowly that they are considered a non-renewable supply.

Declines in the water table are being shown throughout the region. Population growth in the region has caused a dramatic increase in the number of well permit applications.

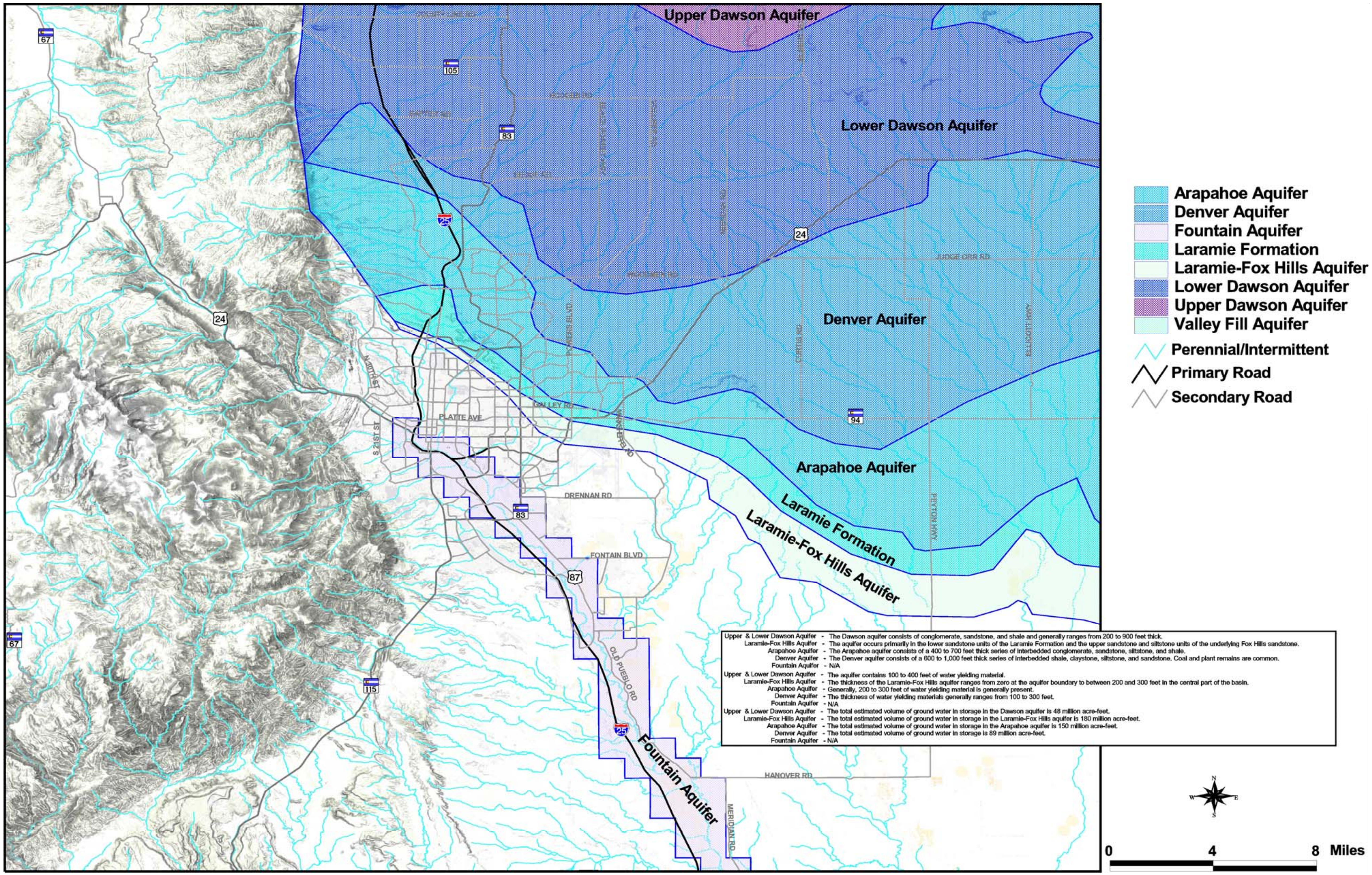
Numeric standards for groundwater are different than surface water and are based on classifications of Domestic Use-Quality, Agriculture Use-Quality, Surface Water Quality Protection, Potentially Usable Quality and Limited Use and Quality. Standards are established to protect classified uses. An “Interim Narrative Standard” is used for all groundwater in which standards have not already been assigned in the state. The two regulation governing groundwater standards are Regulation No. 41: The Revised Basic Standards for Groundwater and Regulation No. 42: Site Specific Standards for Groundwater. The purpose of these regulations is to apply Regulation No. 41 to specific groundwaters in Colorado, and to adopt interim narrative standards to protect these groundwaters prior to the adoption of use classifications and numeric standards for specific areas. The specific areas covered in this Regulation No. 42 that are within this region are:

- Fountain/Security/Stratmoor Hills/Widefield Wellfields
- Upper Black Squirrel Creek Alluvial Aquifer
- Upper Cherry Creek and Denver Basin Alluvial Aquifers
- Woodmoor W&S District Wellfield

These aquifers are shown in Figure 11-14.

This Page Left Intentionally Blank

FIGURE 11-14: AQUIFERS



This Page Left Intentionally Blank

Cultural Resources

Historic and Archaeological Resources

The effects of road building and transportation infrastructure improvements are not limited solely to classic environmental concerns, but in fact spread into a region's cultural legacy. Many historic objects and archaeological sites may be disturbed or destroyed by transportation expansion. Theses artifacts are resources which help define the individuality of the region and provide a context for understanding its cultural and physical heritage.

Identification and agreement for preservation are keys to successfully protecting historic resources. The National Historic Preservation Act (NHPA) assures that effects on historic resources be realized in the planning stages of projects. The act not only includes immediately recognizable features such as buildings and walls, but also archaeological artifact sites, particularly those pertaining to Native Americans, which may be uncovered as a project goes forth. Figure 11-15 identifies all locations within the MPO area for historic and archaeological preservation.

History Timeline

THE EARLY YEARS	
12,000 Years Ago	Early hunters roam the plains and follow the flanks of the Front Range. Geologists discover evidence of stone hearths and fire rings left by nomadic hunters in Garden of the Gods, circa 1300 B.C.
Unknown –1870s	While no tribe makes the Pikes Peak Region its permanent home, several Indian tribes frequent the area following the seasonal migrations of their food supply. The Mountain Indians, or Utes, dominate the mountain and foothill regions while the Plains Indians, namely the Cheyennes and Arapohoes, gather in the plains to the east. Other tribes that frequent the area include the Kiowas, Sioux, Comanches, Pawnees, and Apaches.
AGE OF EXPLORATION	
1500s-1700s	France and Spain send explorers to the Pikes Peak Region naming rivers and mountains as they search for gold. Both countries alternate claiming the region. The Spanish introduce the horse to the Indians which provide the regional tribes greater mobility. Intertribal Indian warfare and conflict between the Spanish and the French continue throughout the 18th century.
1803	President Jefferson purchases the "Louisiana Territory" from France which includes the eastern and central portions of Colorado.
1806	Zebulon Pike, an army officer, becomes the first U.S. explorer to come into the Pikes Peak Region to map the southern part of the Rockies and investigate the strength of Spanish strongholds. He is the first man to document the sighting of Pikes Peak which now bears his name, but is unsuccessful at reaching its summit.
1820	Dr. Edwin James, a botanist who accompanies Major Long on his expedition to continue the exploration of the Louisiana Purchase, becomes the first man to successfully climb Pikes Peak. To honor James, Major Long names the mountain James Peak on his expedition map. Unfortunately for James, the name would not last long. Also during this expedition, James collects the first blue columbine known to science. The columbine would later become Colorado's official state flower.

AGE OF EXPLORATION	
1821	The remainder of Colorado's territory passes from Spain to Mexico following Mexico's independence.
1842-1845	General John C. Fremont, a lieutenant in the Corps of Topographical Engineers, becomes the last of the famous explorers to reach the Pikes Peak Region. Fremont, sometimes called "the Pathfinder," consistently refers to Pikes Peak in his accounts, thus cementing the mountain's name. The real pathfinders of the region, the trappers, make it easy for the explorers by sharing the easiest passes, the best fording places along the rivers, and the most desirable watering holes. One of Fremont's scouts on his 1842 expedition includes the legendary Kit Carson. In his lifetime, Carson is credited as being a trapper, scout, hunter, guide, Indian agent, and soldier.
1846	The United States declares war on Mexico.
1848	The Treaty of Guadalupe Hidalgo marks the end of the Mexican War and cedes the remaining portions of the Colorado territory to the United States.
1858	Gold is discovered along Cherry Creek and in South Park along the Front Range. Gold hunters rush into the area and the slogan "Pikes Peak or Bust" is coined. Mining camps are established and the narrow gauge railway system, which can maneuver over treacherous passes to deliver men and supplies to the gold mining camps, is invented. Julia Anne Holmes becomes the first woman to climb Pikes Peak. For the trip, she wears the reform dress of the suffragettes, the "bloomer" outfit.
1859	Colorado City becomes the first permanent settlement in the Pikes Peak Region.
TERRITORY DAYS	
1861	The Colorado Territory, with boundaries the same as today's state, is established by Congress with Colorado City as its capital. Due to primitive living conditions in Colorado City, the capital is moved to Denver less than six months later. El Paso County is created in the same year. Given the Spanish name of "the pass," El Paso County refers to Ute Pass west of Colorado Springs.
1862	The Homestead Act of 1862 brings new settlers into the area seeking land ownership for farming and ranching purposes. The fertile land along Fountain and Monument Creeks is converted to agriculture for the production of wheat, oats, and corn. After the end of the Civil War in 1865, a tremendous burst of railroad building springs up across the plains which further boosts the flow of settlers to the Pikes Peak Region.
1860s-1870s	Indian Wars – fighting breaks out over land rights between white settlers and the Arapahoes, Cheyennes, and later the Utes. By 1881, after continued skirmishes and even massacres by the U.S. Cavalry, the Indian title to the Pikes Peak Region is extinguished and the remaining tribes forced onto reservations. Adding to the Indians' demise is the mass extermination of the plains buffalo, a vital resource for all tribes. The population of the buffalo is estimated to be over 75 million as late as 1850. By the mid 1880s, almost every single buffalo is killed, either hunted for food or shot for sport by white settlers, trappers, and traders.
1871	General William Jackson Palmer founds the Fountain Colony that is quickly renamed Colorado Springs. A stake-driving ceremony at the corner of Pikes Peak and Cascade Avenues commemorates the occasion. General Palmer links Colorado Springs with Denver via his own railroad, the Denver and Rio Grande, and publicizes the city as a health resort of quality and gentility, far different from the rough frontier towns of the day. General Palmer helps design the city's layout and ensures its attraction with broad avenues, ample streets, and the planting of more than 600 cottonwood trees. The influx of English pioneers would later earn Colorado Springs the nickname of "Little London."
1872	The City of Colorado Springs is incorporated.
1874	Colorado College is founded by General Palmer.

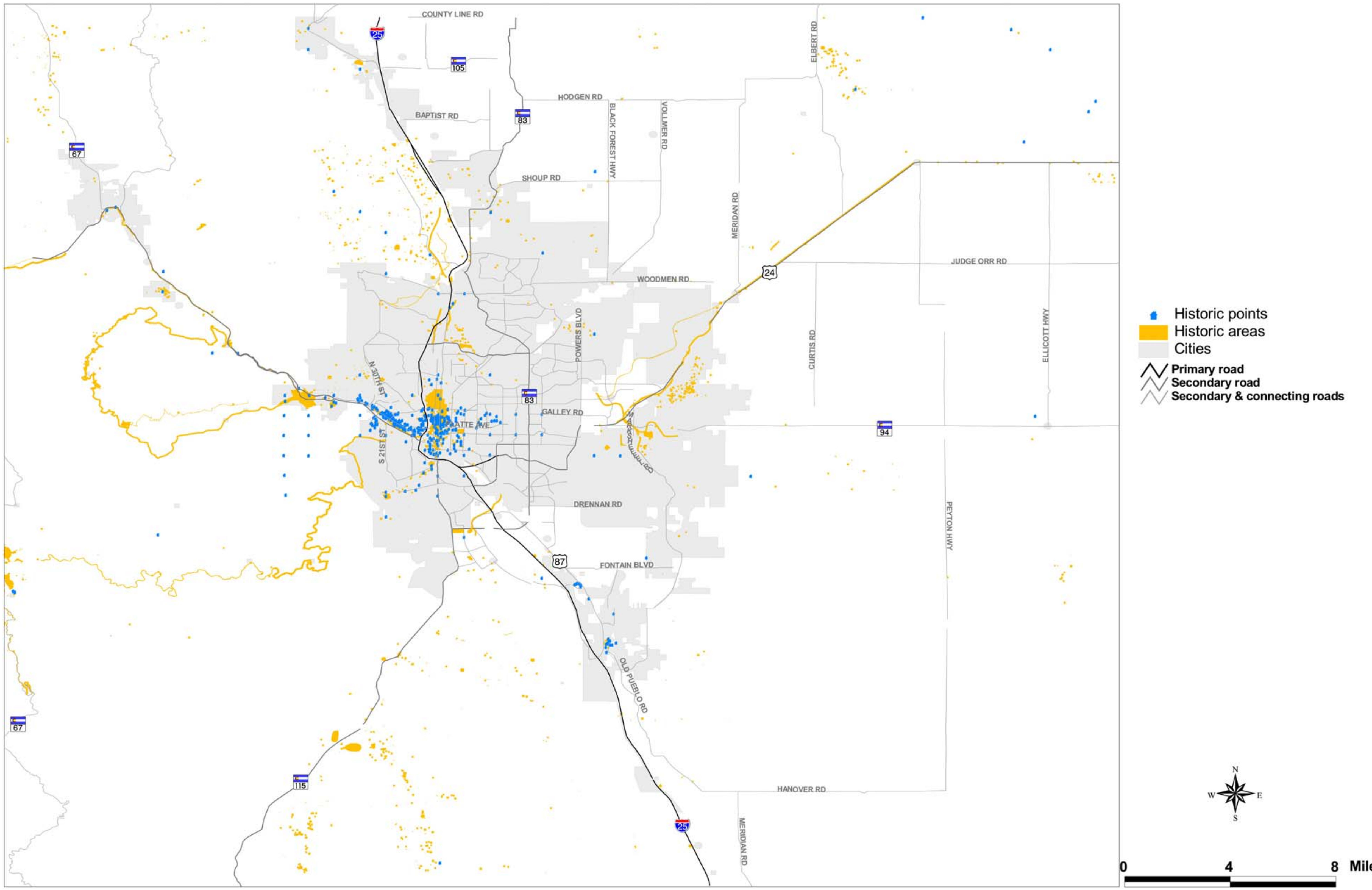
TERRITORY DAYS	
1876	Colorado achieves statehood during the U.S. Centennial earning the motto of "The Centennial State."
1879	The Town of Monument is incorporated.
1880	The U.S. census for 1880 gives the population for El Paso County as 7,949.
1883	Within just a few years of founding the city, General Palmer opens his flagship resort, the Antlers Hotel, in 1883. When the Antlers Hotel burns down in 1898, General Palmer rebuilds a lavish second hotel on the same site in 1901. That hotel is razed in 1964 and is replaced by a third hotel in 1967, which still bears the Antlers name, but is now owned by the Hilton Hotel chain. The first standard gauge railroad, the Colorado Midland Railway, is incorporated. Originally projected to run between Colorado Springs and Salt Lake City, Utah, the line only made it as far as Grand Junction, Colorado.
1888	The City of Manitou Springs is incorporated.
1889	The Town of Palmer Lake is incorporated.
THE GOLD RUSH	
1890s	Bob Womack, a prospector, discovers gold in Cripple Creek in 1890. News of his find attracts thousands to the region and spawns a number of millionaires. In just one year the north end of Colorado Springs is nicknamed "Millionaire's Row" due to the great number of mansions that line the streets. Notable among these wealthy men is Winfield Scott Stratton, a carpenter, who finds fortune in Cripple Creek when his mine, the Independence, strikes a huge vein of gold. In 1899 Stratton sells the Independence for $10 million. Contrary to the customary habits of most overnight millionaires, Stratton distributes much of his fortune locally. Some of Stratton's contributions include building an economical trolley line for the citizenry, financing the Short Line Railroad (between Colorado Springs and Cripple Creek), and establishing the Myron Stratton Home, a house for the elderly and children in need.
1891	The first cog train reaches the summit of Pikes Peak. The City of Woodland Park is incorporated.
1895	The first edition of *America, the Beautiful* is printed. Katherine Lee Bates penned the poem after a trip to the top of Pikes Peak in the summer of 1893.
1899	The western portion of El Paso County is broken off to create Teller County.
1900	The population of El Paso County reaches 31,602 and the population for Teller County reaches 29,002. During the height of the Gold Rush, the populations of Cripple Creek and Victor exceed that of Colorado Springs.

TUBERCULOSIS AND TOURISM	
1901-1920	With its natural scenic beauty, mineral waters, and dry and sunny climate, the Pikes Peak Region becomes a popular recuperation destination for tuberculosis (TB) patients prompting the construction of large sanatoria and health resorts. Notable sanatoria include the St. Francis Hospital and the Glockner Tuberculosis Sanatorium (now Penrose-St. Francis Hospital), the Union Printers Home, the Modern Woodmen Sanatorium, and the crown jewel of TB facilities, the Cragmor Sanatorium. Built as a self-contained community, the Cragmor is an open sanatorium allowing private physicians, not just resident physicians, to have their patients admitted and treated. These sanatoria are not the only thing that attracts travelers to the area. Tourism becomes the leading industry in the Pikes Peak Region. Booklets touting the many attractions and scenic beauty of the region are published. Some of the major attractions include the cog railroad line up to Pikes Peak, Cave of the Winds, Manitou Cliff Dwellings, and Garden of the Gods.
1903	The City of Fountain is incorporated.
1905	General Palmer completes Glen Eyrie, an estate patterned after the elegant castles in Europe. The estate includes a manor house and surrounding buildings, a dairy farm, landscaped gardens, elaborate horse stables and farmlands on 225 acres of crags, canyons, and meadows. The estate is built for Palmer's wife, nicknamed "Queen," and the canyon where Glen Eyrie lies is called Queens Canyon.
1907	General Palmer donates Palmer Park to the City of Colorado Springs. From 1871 till his death in 1909, General Palmer will donate more than 2,000 acres of parks.
1909	The children of Charles Elliott Perkins deed the 480-acre Garden of the Gods to the City of Colorado Springs. In so doing, the Perkin's heirs honor their father's wish that the park remain "free to all the world."
1915-1916	The popularity of the automobile increases tourism in the Pikes Peak Region. New roads are built and existing ones improved. At this time, Spencer Penrose builds the Pikes Peak Toll Highway, which allows automobile travel to the top of Pikes Peak. He also establishes the Pikes Peak Hill Climb, the second oldest auto race in America. Penrose, an influential entrepreneur, had made his fortune by capitalizing on gold and copper mining claims during the beginning of the gold rush.
1917	The U.S. switches to silver for its coinage. This marks the end of the gold boom. Fred Barr completes the 13-mile trail up Pikes Peak that now bears his name.
1918	Spencer Penrose opens the landmark Broadmoor Hotel in 1918. At a cost of $3 million, the hotel is designed by the same architect that drafted Grand Central Station in New York City.
1920	The population of El Paso County is 44,027 with Colorado Springs at around 30,000. The population of Teller County is 6,696, a considerable drop from twenty years ago.
1926	The Cheyenne Mountain Zoo is founded by Spencer Penrose. A year earlier, Penrose built the Cheyenne Mountain Highway which facilitated travel to the zoo as well as the Broadmoor Hotel.
1927	The Colorado Springs Airport, consisting of two short gravel runways on 640 acres of grassland, begins operations.
1935	The Memorial Day Flood of 1935 devastates the area. Every stream in the Pikes Peak Region overflows, several people are killed, and property damage is estimated to be in the millions.
1937	Spencer Penrose sets up and endows the El Pomar Foundation, a charitable trust designed to "assist, encourage and promote the general well-being of the inhabitants of the State of Colorado."

THE MILITARY INDUSTRY	
1942	Camp Carson is established south of Colorado Springs. Camp Carson started with just 30,000 soldiers on 60,000 acres of land. It is named in honor of Kit Carson, the legendary frontiersman. During World War II, the camp holds over 9,000 prisoners of war. Previously known as the Colorado Springs Army Air Base, Peterson Field is established in May, 1942. Located at the site of the Colorado Springs Municipal Airport, Peterson Field is originally used for heavy bomber combat crew training and fighter pilot training.
1950	El Paso County numbers 74,523 people and Teller County numbers 2,754 people.
1951	ENT Air Force Base is established. It had been the Colorado Springs Tent Camp from 1943 to 1949.
1953	The Navigators, a faith ministry, purchase Glen Eyrie Castle in 1953 and own it to this day.
1954	Camp Carson is declared a permanent post and renamed Fort Carson. That same year, the Secretary of the Air Force announces the selection of the permanent site of the United States Air Force Academy, seven miles north of Colorado Springs.
1958	The North American Air Defense Command (NORAD) is founded through an agreement signed between the U.S. and Canada. The U.S. Air Force Academy opens its facilities to over 1,000 cadets.
THE SPACE AGE	
1960s-1980s	The Pikes Peak Region feels the impact of the Space Age industry. Aerospace products, aircraft instruments, computers, electronics, solar energy, and other industries settle in the region. Notable among these defense contractors and high tech companies are Kaman Sciences (now ITT Industries), Hewlett-Packard, LSI Logic Corporation, Quantum Corporation, and SRC Computers. SRC Computers is founded by Seymour R. Cray, the legendary computer architect known as the “father of supercomputing.”
1963	NORAD’s underground facility is built inside Cheyenne Mountain. It is also around this time the extension of NORAD’s mission into space led to a name change, the North American Aerospace Defense Command.
1965	The flood of 1965 causes significant damage to Colorado Springs and severe damage farther downstream. Many bridges wash away isolating the Broadmoor Hotel from the rest of Colorado Springs.
1976	ENT Air Force Base closes. Peterson Field is reclassified and upgraded to Peterson Air Force Base.
1977	Focus on the Family, an evangelical political group, is founded by Dr. James Dobson. It was at this time that Colorado Springs city leaders began recruiting evangelical organizations to the region as an economic development strategy.
1978	Built on the former home of ENT Air Force Base, the United States Olympic Training Center opens and becomes the official administrative headquarters of the United States Olympic Committee.
1979	The ProRodeo Hall of Fame and Museum of the American Cowboy opens and the United States Figure Skating Association National Headquarters and Hall of Fame moves to Colorado Springs.
1980	The population of El Paso County is 309,424 and the population of Teller County is 8,034.
1983	Groundbreaking takes place for the Falcon Air Force Station (AFS), the Air Force’s primary satellite control facility.
1984	Ted Haggard founds New Life Church. Over the years the church will grow into a megachurch with 14,000 members, and Haggard will go on to become President of the National Association of Evangelicals, until resigning amid scandal in 2007.

THE SPACE AGE	
1988	Falcon AFS is re-designated Falcon Air Force Base (AFB). Banning-Lewis Ranch, just over 21,000 acres, is annexed by Colorado Springs.
1990	Voters approve small-stakes gambling in historic gold mining towns such as Cripple Creek.
1994	The Colorado Springs Municipal Airport opens a new 16-gate terminal building at a cost of $140 million.
1998	Falcon AFB is renamed Schriever AFB in honor of General Bernard Schriever, a pioneer in the development of the nation's ballistic missile program.
1999	The flood of 1999 washes out bridges and utility lines, and causes wastewater system backups in Colorado Springs resulting in the declaration of federal flood disaster areas across the region.
2004	The first phase of development begins at Banning-Lewis Ranch.
2005	The population of El Paso County reaches 565,350 and the population of Teller County grows to 22,346. The Department of Defense announces 10,000 new troops for Fort Carson.
2006	NORAD announces its day-to-day operations will be consolidated at Peterson Air Force Base and the facility at Cheyenne Mountain will be kept only as a backup in "warm standby."

FIGURE 11-15: HISTORIC PRESERVATION LOCATIONS



This Page Left Intentionally Blank

Prehistoric Cultural Sequence

Prehistoric and Historic Cultural Sequences *(Excerpt from Fort Carson Transformation Environmental Impact Statement Attachment F.1: Prehistoric and Historic Cultural Sequences at Fort Carson provided by Fort Carson Directorate of Environmental Compliance and Management, Cultural Resources Program).*

Three general stages of prehistory have been delineated for southeastern Colorado: the Paleoindian, Archaic, and Late Prehistoric. An earlier stage, the Pre-Clovis, has been proposed, but direct evidence of this stage in the region is lacking. The Paleoindian, Archaic, and Late Prehistoric stages in southeastern Colorado are each subdivided into three periods. These periods represent specific changes or innovations in the material culture of prehistoric peoples that suggest broader changes in environmental conditions and/or political and socio-economic structure. These periods span from approximately 11,500 Before Present (B.P.) to 275 B.P.

Paleoindian 11,500-7,800 B.P.

The Paleoindian (11,500-7,800 B.P.) represents the earliest stage of cultural evolution in the archeological record of southeastern Colorado. This stage in southeastern Colorado is commonly divided into three periods based on diagnostic projectile points.

Clovis Period (11,500-10,950 B.P.)
The Clovis Period (11,500-10,950 B.P.), the earliest Paleoindian manifestation, has been delineated based on findings of large, fluted lanceolate spear points and prismatic blades, blade cores, and blade tools. The latter were most likely used as knives, scrapers, and core/choppers. These characteristic artifacts have been found in association with the remains of mammoth, horse, and other Pleistocene fauna suggesting economies were hunting-focused. The Hahn site represents the only site of this age in southeastern Colorado.

Folsom Period (10,950-10,250 B.P.)
The Folsom Period (10,950-10,250 B.P.) has been delineated based on fluted points found in association with extinct *Bison bison antiquitus*, as well as pronghorn, hare, wolf, fox, coyote, and turtle. The period coincided with early Holocene warming that saw the extinction of many large Pleistocene mammals. Besides fluted points, other Folsom period tools included knives, gravers, spokeshaves, scrapers, cores, drills, burin-like implements, choppers, abrading stones, awls, beads, and needles. There is some evidence for the processing of vegetal products and for the grinding of pigments.

Plano Period (10,250-7,800 B.P.)
The Plano Period (10,250-7,800 B.P.) comprises several complexes characterized by different flake styles of lanceolate projectile points. Complexes include Midland, Agate Basin, Hell Gap, Alberta, Cody, Frederick, and Lusk. These complexes are thought to reflect a cultural continuum with adaptive modifications resulting in tool variability. An increasingly complex lifestyle is indicated by the presence of more varied tool kits, including a variety of stone and bone tools. The presence of milling stones indicates a greater emphasis on processing plants. A great variety of kill, processing, and camp sites also occur, some with evidence suggestive of religious practices.

Evidence of Plano occupation in southeastern Colorado is plentiful. In the Pikes Peak area, two Cody complex projectile points and two unidentified Plano projectile points fragments have been recorded as surface finds.

Archaic 7,800-1,850 B.P.

The beginning of the Archaic Stage (7,800-1,850 B.P.) marks another turning point in the natural environment with the onset of the Altithermal climatic episode, a prolonged early Holocene period of general warming and drying in western North America. The Archaic Stage represents a shift from economies geared toward big game hunting to more generalized hunting and gathering. More importance was placed on wild plant foods like *Chenoams*, and the procurement of game became more diversified, with large and small mammals like rabbits and gophers represented. Ground stone implements became common and are the predominant artifact class at many Archaic sites. Lithic tool assemblages exhibit more variability, and many artifacts reflect specialized local adaptation.

Based on changes in projectile point morphology, the Archaic stage has been divided into Early, Middle, and Late periods. Archaic projectile points are nearly all stemmed and are not as delicately flaked as those of the earlier Paleoindian stage. Generally, Archaic complexes in the region have been poorly defined.

Early Archaic Period (7,800-5,000 B.P.)

The Early Archaic Period (7,800-5,000 B.P.) reflects human adaptations to a hotter and drier climate. In response to this drastic climate change, southeastern Colorado may have become partially depopulated, with some groups possibly relocating to the relatively cooler and wetter foothill and mountain regions.

In southeastern Colorado, Early Archaic projectile points have been reported from nine sites. In the Pikes Peak area, a component of the Gooseberry Shelter site has been radiocarbon-dated to the Early Archaic. The lack of Early Archaic remains results from either a cultural hiatus, brought on by drought, or poor site preservation resulting from natural geologic processes.

Middle Archaic Period (5,000-3,000 B.P.)

The Middle Archaic Period (5,000-3,000 B.P.) witnessed a widespread reversion to more mesic climatic conditions following the Altithermal event. Middle Archaic sites indicate broad spectrum adaptations by hunter-gatherers to plains, basin/valley, foothills, and montane environments. Sites display evidence of diverse resource procurement. Remains of large and small mammals, birds, reptiles, and shellfish occur, as do seeds of numerous wild plants. Hearths are common and spaced-stone circles also appear. Characteristic projectile points of this period include large, basally concave or indented points such as McKean, Duncan, Hanna, and Mallory types. Other artifacts include formalized manos and grinding slabs, bifaces, scrapers, drills, spokeshaves, bone awls, and hammerstones.

In southeastern Colorado, one Middle Archaic site has been excavated revealing mixed levels of Duncan, McKean, and Hanna projectile points. In the Pikes Peak area, components of the Recon John Shelter site, the Gooseberry Shelter, and the Two Deer Shelter have been radiocarbon-dated to the Middle Archaic.

Late Archaic Period (3,000-1,850 B.P.)
The Late Archaic Period (3,500-1,800 B.P.) saw the continued specialization in subsistence practices, and maize probably first spread into the region at this time. Evidence of communal bison procurement is abundant for this period and suggests the development of complex intergroup cooperation in conjunction with population growth. In southeastern Colorado, Late Archaic sites are much more common than Middle Archaic sites. Diagnostic projectile points of the period include basal corner-notched types like Ellis, Garza, Marcos, Shumla, Williams, Palmillas, Ensor, Edgewood, and Yarbrough.

In the Pikes Peak area, Late Archaic components have been discovered at many locations, including a number with Middle Archaic components, such as the Recon John Shelter, the Gooseberry Shelter, and the Two Deer Shelter.

Late Prehistoric 1,850-275 B.P.

The Late Prehistoric Stage (1,850-275 BP) observed important changes in subsistence patterns, artifact complexes, and demographics on the southern Plains. The beginning of the stage coincides with innovations like the bow and arrow, ceramics, and permanent or semi-permanent houses. The use of cultigens reached a significant level during this time, though few pollen or macrobotanical samples attest to this change in southeastern Colorado. The final centuries of the Late Prehistoric Stage reflect the effects of European incursions, including both direct intrusions by Europeans and diffusion and spread of material goods of European origin by indigenous groups.

Developmental Period (1,850-950 B.P.)
The Developmental Period (1,850-950 B.P.) corresponds with what has traditionally been referred to by archeologists as the Plains Woodland Period or the Early Ceramic Period. At this time, cordmarked and plain pottery, small corner-notched arrow points, circular slab masonry architecture and some agriculture first appeared.

Ground stone tools are more common than chipped stone in this period. This suggests that vegetal materials, possibly including maize, and other cultigens probably constituted larger portions of the human diet. Faunal remains from excavated sites indicate that animals like deer and antelope were exploited, as well as small animals like cottontail rabbits and prairie dogs. Aquatic species like fish, frogs, and fresh water mussels were also consumed.

Developmental Period sites are much more numerous in the region than those of earlier periods. It has been noted that this increase in the number of recorded sites could be the result of improved site visibility due to the presence of architectural features. Observed site types include circular masonry architecture, rock shelters, brush and hide shelters with circular rock foundations, and open camps.

Diversification Period (900-500 B.P.)
The Diversification Period (900-500 B.P.), also termed the Middle Ceramic, marks the local variant of the Plains Village tradition. It is subdivided into the Sopris (900 to 750 B.P.) and Apishapa Phases (900 to 500 B.P.) in southeastern Colorado. Sites of the Sopris phase have never been found in the Pikes Peak area and will receive little discussion here.

There is little doubt that subsistence practices during the Diversification Period were geared more toward horticulture than those of the Developmental Period. However, floral and faunal evidence from Diversification sites still indicates that hunting and gathering predominated and that horticulture was supplemental. The degree to which architectural developments are reflective of permanent habitation is also uncertain. Where surface architecture is common, it is difficult to envision permanent habitation and a horticultural subsistence base, due to the marked absence of substantial middens.

Cultigens have been recovered from excavations on Diversification Period sites. Maize has been recovered from many rockshelters in the region and maize pollen has been recovered from open architectural sites along the major rivers of southeast Colorado.
Deer and antelope remains are common on Apishapa Phase sites, but bison bones are rarely encountered. Communal hunting of ungulates is portrayed in rock art of this time period with human figures portrayed herding or chasing quadrupeds.

Technologically, the most distinctive lithic characteristic of the period is the small triangular projectile point, either unnotched Fresno or side-notched Washita. Ceramics are also varied, but generally consist of cord-marked, globular, or conoidal jars. Bone artifacts are common and include awls, fleshers, wrenches, and beads. Ground stone includes manos, metates, and shaft abraders.

Protohistoric Period (500-275 B.P.)
The Protohistoric Period (500-275 B.P) extends from roughly 1450 A.D. to 1725 A.D. The earliest European incursions into the region occurred during the first half of the sixteenth century, and the material cultures of indigenous populations were altered significantly over the course of the ensuing three centuries. Three principal indigenous groups entered southeastern Colorado during this period. In chronological order of appearance, they are the Apache, Comanche, and Cheyenne-Arapaho. In addition, southeastern Colorado was on the margin of Ute territory throughout Protohistoric times.

The Protohistoric Period marks the start of the Plains Nomad Tradition. Material remains include metal artifacts, micaceous pottery, Pueblo pottery, chipped glass artifacts, and side-notched points. Most sites from this period are tipi encampments found along canyon heads though some earth ovens have been found. Spanish expeditions onto the southern Plains reported groups of nomadic bison hunters that also subsisted on corn, other large and small game, native plant seeds, greens and tubers, mussels and fish.

Historic Cultural Sequence

Within southern Colorado, the initial European contact occurred mid 16th century. The Late Prehistoric aboriginal way of life probably changed little until the Spanish began settling in the region. The transition between the Protohistoric to the Historic begins around A.D. 1725. Though there is a paucity of ethnographic and historical data for the region, records document aboriginal/European contact beginning with Fray Marcos DeNiza’s expedition of 1539.

Archaeologically, the recognition of Historic Indian sites in the region has been rare. Because of this, only the European cultural history will be discussed.

Spanish Period (A.D. 1540 – A.D. 1822)

Initial European exploration into southeastern Colorado was associated with Spanish colonialism. In 1539, Viceroy Medoza sent Fray Marcos DeNiza to investigate the "Seven Cities of Cibola" described by Cabeza DeVaca. In 1540, Francisco Coronado led another large expedition in search of the Seven Cities as far north as south-central Kansas. Though neither of these expeditions actually crossed into Colorado, the entire region became part of the territory claimed by Spain in the New World.

The migration of the Utes and Comanches was part of a broader pattern of rapidly shifting tribal territories, a pattern which had begun before the Spaniards reached the region and continued into the late-nineteenth century. The Uto-Aztecan speaking Ute Indians may have been the first historic tribe to enter Colorado when they migrated southeastward from the Great Basin. Following herds of bison, and because of ameliorating climatic conditions, Apaches entered the area from the north by the beginning of the 16th century. The Navajos and Apaches conducted both trade and warfare with the older pueblo groups further to the south. By the 1660s, the Apaches had become a mounted military threat to the Pueblos and the Spanish. The Utes also had horses in the 1700s and they too began to raid villages.

In the 1700s, French traders operating on the northern Plains and along the Mississippi River began to trade goods and arms to the various Indian groups including members of the Pawnee family and the Comanche. These enemies of the Apache pushed back across the southern Plains, and along with the Utes who had guns at this time, established military dominance. This is because the semi-sedentary Apache were tied to crops on a seasonal basis and their more mobile, and better equipped, adversaries could pattern their locations and dominate cavalry warfare. In 1704, the Comanches began to raid Spanish settlements. Competition between Comanches and Utes for the upper Arkansas River basin eventually led to general warfare between those former allies, with the remaining Apaches allied with the Utes.

The Spanish military pattern at this time was one of infantry and cavalry and expeditions into the southern Plains as a show of force. To control the Indians of the southern Plains, and to assess French influence in the area, Spanish leaders dispatched a party led by Antonio de Valverde in 1717 and Pedro de Villasur in 1729. On the Platte River of Nebraska, Villasur's party was attacked by the Pawnee and was the last Spanish expedition across eastern Colorado until 1779.

In the 1770s, Comanche and Apache raiding parties terrorized the edge of the Spanish frontier. To combat these attacks, Governor Juan Bautista de Anza led an army of 600 solders, militiamen, and Indian allies against the Comanche. This Spanish victory initiated lasting peace with the Comanche in 1786. This new alliance led not only to the demise of the Apache on the Plains, but began the *Comanchero* period (1786 to 1860) where the Spanish, New Mexicans, and Comanche came together for trading on the southern plains.

The French threat to the Spanish in the southern Plains disappeared in 1763. Napoleon, in the early 1800s, needed money to support the French Empire elsewhere, and came to an agreement with Spain to return the former French colony of Louisiana to France. In 1803, in one of the greatest land deals of its time, France sold the recently secured Louisiana to the United States. The boundaries of the Louisiana, largely disputed by Spain, but claimed by the United States included the land extending west from the Mississippi River to the Rocky Mountains and the Rio Grande. It was not until 1819 that the Adams-Onis Treaty would establish the Arkansas River as the northern boundary of Spanish New Mexico.

President Jefferson did not waste any time in procuring federal funding for scientific expeditions to explore the natural resources, and to gain knowledge of the Indians, and the transportation routes of this uncharted territory. One of the first explorations, the renowned Lewis and Clark Expedition (1803-1806), explored the area along the Missouri River and the Northwest region. Two later expeditions that followed are directly associated with the Pikes Peak area. The expedition of Captain Zebulon Pike (1806) explored the geography, natural history, and topography of the lands in the southwest portion of the newly acquired territory, leading Pike up the Arkansas River Valley into Colorado. The entourage of twenty-two men split into two groups, one to seek the headwaters of the Red River, and the other along the Arkansas River. During this expedition Pike would observe the mountain peak that bears his name today. Pike and three other men continued northwest in an attempt to climb the peak looming on the horizon, an attempt that proved unsuccessful. After the official boundaries of Louisiana were established, Long's expedition (1820) would explore the western mountains in search of the source of the Platte River, returning by way of the Arkansas and Red Rivers. Three of the men in Long's expedition would be the first Americans to climb what Long referred to as James' Peak, but would forever be referred to by the public as Pike's Peak.

Fur trappers and traders were among the first Euro-Americans to venture forth in this unknown land, exploring the region in the process of economic enterprise. Trading and trapping networks had been in place by the early 19th century, and while private parties of New Mexico traders were encouraged by Spanish authorities to travel north and east to trade with the Indians, American traders were not always welcomed.

Mexican Period (A.D. 1822 – A.D. 1848)

The Mexican Period coincides with much of the early American presence in the Colorado territory. In the spring of 1821, Spain granted Mexico independence as addressed in General Agustin de Iturbide's publication of the *Plan of Iguala*. Aware of the advantages that trading with the United States could bring, New Mexico eagerly sought the business of American traders from the northern frontier. Establishment of a viable fur trade in the region brought about exploration of previous sections of unknown territory, thus expanding geographical knowledge of the mountain west.

As the door opened for trade in New Mexico, the price of furs was rising in the United States, which brought with it a renewed interest in the fur trade. In 1823, Mexican soldiers warned trappers there were laws against foreigners trapping beavers in Mexican waters. American trappers did not easily give up the rich trapping areas in New Mexico, and many found ways around the law like smuggling furs by alternative routes, or by obtaining Mexican citizenship. Many American trappers, however, moved on, as early as 1827, into the Rocky Mountains to work the mountain streams for beaver. The “golden era of beaver trapping” dates between 1828 and 1833. The demand for beaver fur fell from favor in the early 1830s, replaced by the demand for the hide of the American bison, which lasted close to three decades.

The success of the fur trade brought about the construction of many trading posts inside the United States territory north of New Mexico. Entrepreneurs such as William and Charles Bent and John Gantt established trading posts along the Upper Arkansas River between 1821 and 1835. The most successful trading post was Bent’s Fort, established in the early 1830s by the Bent, St. Vrain and Company on the north side of the Arkansas River. The location of the fort encouraged initial attempts of the first permanent settlements in the region.

As the fur trade waned in the late 1830s, many trading posts continued to serve as supply stops along established trails and trade routes. Agricultural settlement of the region coincided in conjunction with fur trading activities. As the fur trade became less lucrative many fur traders gave up their roaming lives and some, with Spanish or Indian wives, settled down to farm. Corn and other produce of these farms found a ready market at the fur trading posts. While trappers probably worked the streams throughout the Pikes Peak area, their temporary campsites most likely have been lost through natural processes or latter human interaction with the land. The most well-known campsite called Jimmy’s Camp was located on Jimmy Camp Creek approximately eight miles east of present day downtown Colorado Springs.

The Arkansas River was the international boundary of the Louisiana Territory from 1819 to 1848. To promote settlement in Mexico’s northern frontier, the Mexican government issued a series of land grants between 1833 and 1843 to individuals for the development of towns and natural resources. Before the establishment of any permanent Mexican settlements, the land grants transferred to the United States in 1848 after the war with Mexico. Humble farmers raised families, tilled the soil with crude wooden plows, dug irrigation ditches, and raised crops of wheat, corn, and beans. These small Hispanic communities were the first permanent agricultural settlements in Colorado. By 1860, more than 2,000 emigrants had settled in the area establishing at least forty irrigation ditches.

American Frontier (A.D. 1849 - A.D. 1858)

The Mexican War officially ended in 1848, with the Treaty of Guadalupe Hidalgo. The United States annexed the Mexico territory from Texas to the Pacific Ocean, from the Rio Grande to the forty-second parallel, the present American Southwest, including the area of Colorado south of the Arkansas River. The postwar period brought several significant changes resulting in permanent occupation of the region. American population in Colorado increased as a direct result of gold and silver mining and emigrants seeking fortunes through mineral prospecting in California, or settling on farms or ranches in Utah and Oregon. While wagon wheels continued to furrow deeply along the Santa Fe Trail, the rush to gold fields and cattle drive routes contributed to the emergence of formal communication and transportation systems, linking frontier posts and villages. Frontier building increased hostilities between emigrants and the indigenous tribes eventually resulting in systematic removal of the Indians as early as the 1860s.

Enthusiastic reports brought back by Lewis and Clark in 1806 of the fertile valleys of Oregon, and the Fremont expeditions (1842, 1843 and 1844) returning with maps of the major trails over the mountains to Oregon and California territories, encouraged many emigrants to head west. The Fremont expedition of 1842 employed the seasoned frontiersman Kit Carson as their guide to survey the area between the Missouri River and South Pass for passable routes and sites for the development of military posts. Bent's Fort established in the 1830s continued to serve as a portal from which many expeditions and emigrants began their journey into the western frontier.

Originally, emigrants made the journey west in search of land to establish farms and ranches. The discovery of gold in 1848 on a ranch belonging to John Sutter in California altered the purpose, and demographics of those traveling west changed. By 1849, the gold rush brought many seekers of fortune over the Great American Desert and the Rocky Mountains. While the Pikes Peak area is not located along the most frequently traveled Oregon Trail that took emigrants through central Wyoming, or the Overland Trail through northeastern Colorado and southern Wyoming, important "feeder" trails of the Oregon Trail did traverse through the immediate area. A number of exploration parties traveled along the Fountain Creek route: George Ruxton (1847), the Sumner Kansas Territory Survey (1857), and the Hayden Geological Survey (1873). The Cherokee Trail may have originated as early as 1849 with the Evans party of 124 gold prospectors, including 15 Cherokee Indians, on their way to the gold fields north of Denver. The trail followed along Fountain and Jimmy Camp Creeks to the headwaters of the South Platte drainage, then north to Denver. The trail became a frequently used thoroughfare after 1858, as news spread quickly through the Kansas and Missouri frontiers of the discovery of gold in the Pikes Peak area. Following the path of the gold prospectors, came freight wagons with needed supplies to outfit and feed those seeking their fortunes.

Settlement, along with the appearance of smallpox, increased tensions between Native Americans and emigrants. Indian hostilities often caused abandonment of early settlements and ranches before the decade of the 1850s closed, and prior to the 1858 Colorado gold rush. Indian populations adapted to the limited presence of American traders and fur trappers, but became more agitated as Americans began to extensively travel through and settle in the Colorado Territory. The Treaty of Fort Laramie established in 1851 between the United States government and nine Plains tribes allowed Americans the right to build forts and roads within the tribal territories. The tribal territories agreed upon in the treaty set aside eastern Colorado from the Arkansas River to the North Platte River in Wyoming for the Cheyenne and Arapahoe. The central Rockies and the western slope was the land of the Ute, who resisted the gradual emigration of Hispanic American groups from New Mexico into the San Luis Valley.

Increased traffic along the Santa Fe Trail and the establishment of the cattle drive routes in the new territory created further problems with Native American populations. In 1861, under pressure from the U.S. Government and white settlers, the Cheyenne and Arapahoe surrendered in the Treaty of Fort Wise the bulk of their land, which included the heart of their hunting lands at the base of the mountains. While most of the Cheyenne peace chiefs, lead by White Antelope and Black Kettle, supported the agreement, many of the young men and members of the warrior society claimed they had not agreed to the cessation of their land. The amount of game necessary to support the tribes was not plentiful enough on the fraction of the land north of the Arkansas allotted to the tribes. Stealing livestock from farms and ranches became a way to supplement the lack of game.

In the spring of 1864, Cheyenne and Arapahoe Indians began raiding isolated ranches, running off horses, and antagonizing detachments of cavalry primed for action after a long winter. Reprisals by the military led to a series of events that culminated in the Sand Creek Massacre of 1864. William Bent, associated through marriage with a Cheyenne woman and his trade relationship with the Cheyenne from the 1830s – 1840s, helped open negotiations for a new treaty in late 1865. However, intensive raiding of settlers continued into 1867. A major military campaign occurred in the winter of 1868-1869, resulting in the Treaty of Medicine Lodge, where most of the Southern Cheyenne and Arapaho agreed to relocate to a reservation in Oklahoma.

Colorado Territory

The formation of the Colorado Territory coincided with the onset of the Civil War in 1861. Geographically the newly established territory included portions of western Kansas and Nebraska, eastern Utah, and northern New Mexico. However, due to political infighting, the prospect of attaining actual statehood was less and less attractive to many Coloradans. From 1868 to the approach of the presidential election of 1876, Colorado statehood was a dead issue. Then, with the national elections fast approaching, President Grant promised Colorado statehood in return for three Republican electoral votes. The proclamation was issued on August 1, 1876, and that fall Hayes defeated Tilden by a one-vote margin.

By 1860, the population of Colorado had expanded to almost 35,000, with 82.4% of the working force employed in mineral extraction. The Colorado Territory gold rush was short lived with the primary gold deposits in the Leadville district depleted by 1863, and the mining industry entered a depressed phase lasting through the 1860s. By the 1870s, the work force employed in the mining industry had dropped to 12.5%, a dramatic change from the 82.4% indicated in the 1860s census. Most prospectors eventually left, some turned to agriculture, and some stayed on to bolster new communities.

Settlement and Development Period (A.D. 1858 – A.D. 1929)

The Pikes Peak area would greatly expand as a result of the gold rush of 1858, bringing with it population and economic fluctuations. The demand for fresh meat in mining camps played a role in the development of the Colorado cattle industry which developed gradually beginning in 1860. The Civil War, depletion of readily accessible minerals, the difficulty in transportation and the transportation of goods, and growing conflicts between settlers and native tribes tempered growth between the mid-to late-1860s. With the cessation of Indian hostilities in 1868, development of better transportation alternatives and communication mechanisms, settlement gradually increased within the region. Resurgence in population and community development resulted from the mining industry in Leadville in the 1870s and the discovery of large gold deposits in Cripple Creek in the 1890s.

The discovery of gold in 1858 in the mountains near present day Denver and in Leadville (1859) brought approximately 100,000 gold-seekers to Colorado in 1859, where they spread like wild fire up the South Platte into the upper reaches of the Arkansas River drainage to pan for gold. Not all emigrants came to seek fortune by panning for gold, but rather they took advantage of the needs of those who did. Thousands of would-be miners eventually stayed and became ranchers and farmers. Towns and villages emerged out of the wilderness in the late 1850s. A few communities developed to serve as supply points and agricultural centers such as Colorado City. Colorado City was located along the foot of the mountains on trails that lead to gold mines in South Park. Attributes of the city – the scenery, fresh mountain air, and fertile soil near streams – made settling in the area favorable.

Colorado City received its name because it was located along the natural gateway leading to the upper branches of the Colorado River. By 1860, the population of Colorado City had reached 1,000; many were merchants and forwarders. In a marketing campaign in May 1860, Colorado City advertised free access to the South Park Mines, abundant agricultural resources, medicinal springs, and inspiring views of the Garden of the Gods. From 1861 to 1862, Colorado City briefly held the distinction as capital of the Colorado Territory. The growth of Colorado City would go through a period of decline as the mining industry entered a depressed phase in 1863. By the end of the decade, Colorado City was virtually deserted.

The cattle industry in Colorado Territory developed as a direct result of the 1859 gold rush. Prior to the gold rush, ranches were located at widely scattered locations. In 1860, the cattle industry found its official beginnings in Colorado when the Lovell and Reed Cattle Company brought Texas longhorn cattle to the area. Over the summer, cattle grazed, until sold in small packs to resident ranchers or for butchering. Many small ranches, established as early as 1860, continued to grow, and their success encouraged the establishment of others between 1869 and 1872. The home ranch or ranch headquarters often was located on a stream with at least semi-permanent water, and the cattle would graze the adjacent public domain land.

Agricultural settlement in the area was limited almost entirely to raising stock because of the rough and arid landscape and the lack of surface water. The term "settlement" does not accurately apply to occupation and use of the area until at least 1880. Scattered and usually isolated ranches were established throughout the region the early 1870s, but most of the southern and eastern portions of the area were hinterland ranges for ranches. Virtually all of the territory remained unfenced range, and therefore used as common range by the ranchers.

Colorado's cattle industry was growing, with an estimated 147,000 cattle in 1867. As early as 1868, El Paso County stock growers held meetings to discuss concerns that Texas cattle traveling through the region could transport tick fever and other diseases that would endanger Colorado herds, and possibly affect the efforts of selective breeding to improve range stock. Petitions passed against the importation of Texas cattle, and armed men soon turned back Texas herds entering the Colorado Range, causing the search for ranges and slaughterhouses further north that welcomed Texas longhorns.

The route of trail drives probably changed somewhat depending upon the time of year and condition of the grass and streams. Some Texas herds possibly trailed through Fountain Creek on a trail reportedly used in the 1870s and 1880s until fencing and railroad construction made the overland cattle drive unprofitable and unnecessary. After the Union Pacific Railroad was built through Wyoming in 1868-1869 a vast opportunity for ranching opened up on the Central and Northern Plains, and primary cattle drives moved eastward away from the Pikes Peak area. With the arrival of railroad service, ranchers shipped most of their stock by rail from Colorado Springs, Fountain, or Pueblo. However, the high cost of shipping led several members of the association to drive herds of cattle overland to Kansas City. The last trail drive from the Pikes Peak area probably occurred in the early 1880s.

Stagecoach lines were one of the first modes of transportation to provide passenger and mail service to supply stations and gold camps. Stagecoach and mail service between Denver and Santa Fe in the 1860s was irregular. The line apparently ran "…from Denver…through Russellville, Jimmy's Camp, the Fountaine and Jenk's Ranch; then" left "over the hill to the Arkansas near the mouth of the Huerfano…." Several stage stations were located near the eastern boundary of the Fort Carson. The Widefield Stage Station was about two miles south of the present junction of Colorado Highway 83 and U.S. 85. The Fountain Stage Station was on the southern edge of the present city limits of Fountain, on the north bank of Jimmy Camp Creek.

In the 1870s, sporadic new gold and silver strikes were discovered in the mountains west of the region nearest the Pikes Peak area. The Union Pacific Railroad completed its mainline through Cheyenne, Wyoming in 1868, and the transcontinental link by 1869. When Coloradans learned the Union Pacific would not be extending a line to Denver, citizens with financial backing built the Denver Pacific Railroad in 1870, with a line extending from Denver to Cheyenne, where it connected with the transcontinental line of the Union Pacific. The Kansas Pacific Railroad completed its line from St. Louis to Denver that same year. As these two railroad lines reached completion, W.A.H. Loveland began building the Colorado Central Railroad, which extended out of Denver to Golden and on to the mines on Clear Creek. By 1871, the Denver and Rio Grande Railroad (DRG), directed by General William Palmer, began building a line southward, reaching Colorado Springs on October 21, 1871. The DRG extended its line south, east of Fountain Creek reaching Pueblo on June 15, 1872, eliminating the stage line along that route.

During the late nineteenth century Euro-American interests came to control and dominate southeast Colorado. Several factors contributed to the intensive settlement of the plains in the area by the early twentieth century, including the passage of the Enlarged Homestead Act of 1909 and the Stock Raising Act of 1916. Methods of dryland farming also improved, and new wheat strains better adapted to arid environments were introduced. World War I was a major factor in the spread of dryland agriculture in the region, as the United States became an important exporter of wheat and corn to Europe. This period resulted in significant changes for southeastern Colorado, rivaling the gold rush era in terms of demographic effects.

The railroad stimulated growth in the Pikes Peak Region and in areas on the Front Range. The mining industry in the 1870s also significantly affected the area, resulting in the establishment of several towns and rural railroad stations. Colorado Springs, originally Fountain Colony, established by General William Jackson Palmer in 1871 near the nearly abandoned town of Colorado City, was located on the new Denver and Rio Grande Western route from Denver to Pueblo. By 1879, the population of Colorado Springs had grown to about 5,000 people, and included members of Fountain Colony, a Quaker agricultural colony within the environs of the township. Recreation and tourism greatly influenced the early development of Colorado Springs, however the 1890 gold strikes in Cripple Creek expanded economic and societal development as it became an important ore-smelting center.

When the Denver and Rio Grande Railroad built its mainline south of Colorado Springs through the mouth of Jimmy Camp Creek in 1872, the town/siding of Fountain was probably established. Various sources seem to confuse the Fountain community with Fountain City, a precursor to Pueblo established in 1859, and Fountain Colony at Colorado Springs. Early settlement around Fountain relied on irrigation, and the community became a farming and stock shipping center. In 1888, the town had a population of around 200 persons, but in that year a runaway train struck rail cars filled with naphtha and blasting powder in the Fountain switchyard destroying most of the town. The town was rebuilt and remains a small farming center.

Unlike other areas of the Plains, the Pikes Peak area did not have distinct homestead settlement periods. Sizable ranches prior to the 1940s involved a combination of purchasing land claims and filing claims on available land. Generally, later homesteaders, often limited to marginal land, characteristically claimed land under laws requiring a period of residence and improvement. The number of land entries rose dramatically from the 1860s to the end of the 1880s. After a quieter decade of the 1890s, land entries jumped to a peak during 1900-1909. Homesteading remained strong in the 1910s and 1920s, with a large drop off in the 1930s.

Sixty percent of all land entries occurred between 1900 and 1929. This corresponds with the prime homestead period on the Plains when the government encouraged the establishment of family farms and dryland agriculture. Laws that encouraged dryland farming and the system's inappropriateness are demonstrated in the number of failing land entries. The high volume of land entries in the 1920s, when climate and the economy of the region made any agricultural existence difficult, may be attributable to inertia from the preceding decades and/or attempts by previous claimants to obtain sufficient land to make a living.

By the early 1870s sawmills were producing milled lumber in the area called "The Pinery" near Colorado Springs. Milled lumber could also be obtained at the railroad sidings along Fountain Creek. Most settlement structures were probably simple wood frame buildings, but some true sod, adobe brick, and mortared stone masonry buildings are known to have been constructed in the region in the early settlement period. Mounding of clay material around some foundations indicates either that superstructures were partially composed of earthen materials (or insulated with stacked sod) or, more likely, the roofs were covered with earth or sod. Ethnic reflections in settlement architecture are apparently rare in the region, other than the ephemeral association of adobe with Mexican Americans. Regional urban stylistic preferences during the period 1865 to 1920 tended toward "Western Victorian" forms and decorations, but rural structures in the region were characteristically utilitarian in design with little if any ornamentation.

Community Resources

Socio-Economics

The frequency and type of transportation of people and goods is fundamentally interconnected to how their economic and social activities are distributed. The demand for transportation rises in proportion to increases in population, employment, and socio-economic conditions. Following is a look at the existing socio-economic conditions in El Paso and Teller Counties through 2005.

Forecasting estimates through 2035 for both counties are included in the Small Area Forecast (Chapter Five).

Population

El Paso County grew at a pace above the state average during the early part of the 1990's due to the influx of manufacturing and aerospace companies, and continued attractiveness to religious organizations. The county saw a slower growth rate during the second half of the 1990's, below the state average, as the economy began to cool and the county started to head into the recession of the early 2000's. The City of Colorado Springs is the largest municipality in El Paso County with a population in 2005 of 384,876. Although most of the growth that occurred recently in El Paso County was in Colorado Springs, the future forecasts suggest that more growth is expected in the unincorporated areas of El Paso County. Table 11-14 shows the populations of the cities and towns of El Paso County.

TABLE 11-14: EL PASO POPULATION BY MUNICIPALITY AS A PERCENTAGE OF COUNTY

Entity	2005 Population	Percent of County
Calhan	889	0.16%
Colorado Springs	384,876	68.08%
Fountain	19,470	3.44%
Green Mountain Falls	866	0.15%
Manitou Springs	5,324	0.94%
Monument	4,510	0.80%
Palmer Lake	2,397	0.42%
Ramah	120	0.02%
Unincorporated	146,898	25.98%
El Paso County	565,350	100.00%

Source: July 2005 State Demography Estimates

Teller County had population growth above the state average between 1990 and 2000, but grew more slowly than the state between 2000 and 2005. A significant amount of growth in Teller County can be traced to the Woodland Park area. The City of Woodland Park is home to a number of residents who commute to Colorado Springs for employment. The strong growth is expected to continue in the coming years. Table 11-15 shows the populations of the city and towns of Teller County. Green Mountain Falls is only partially located in Teller County, with a significant portion located in El Paso County. Woodland Park is the only incorporated area experiencing appreciable growth, however this growth is occurring at a moderate pace and most of the county's population will continue to be concentrated in the unincorporated areas of the county.

TABLE 11-15: TELLER POPULATION BY MUNICIPALITY AS A PERCENTAGE OF COUNTY

Entity	2005 Population	Percent of County
Cripple Creek	1,071	4.79%
Green Mountain Falls	49	0.22%
Unincorporated	13,601	60.87%
Victor	443	1.98%
Woodland Park	7,182	32.14%
Teller County	22,346	100.00%

Source: July 2005 State Demography Estimates

Households and Group Quarters

In 1990 there were a total of 146,965 occupied households in El Paso County. By 2005 this number increased to 210,477 households. The majority of the county's housing units were built after 1980 and homeownership has increased steadily in the last few years. Group quarters are made up of people living in correctional institutions, nursing homes, mental (psychiatric) hospitals, juvenile and other institutions, college dormitories, military quarters, emergency shelters for homeless persons, and other non-institutional group quarters. With seniors living longer and its attractiveness to military retirees, El Paso County will see an increased need for group quarters in the future. In 2005, 75% of those in group quarters live in non-institutionalized quarters, such as college dormitories and military quarters, compared to 49% statewide. El Paso County has over 97% of the state's military group quarters population with 8,321 out of a total of 8,512 in all of Colorado. El Paso County's population, number of households, and people living in group quarters are summarized in Table 11-16.

TABLE 11-16: POPULATION, HOUSEHOLDS, GROUP QUARTERS AND HOUSEHOLD SIZE IN EL PASO COUNTY

Year	Population	Population in HH	Group Quarters	Households	Average HH Size
1970	235,972	214,409	21,563	67,581	3.17
1980	309,424	294,104	15,320	108,203	2.72
1990	397,014	381,460	15,554	146,965	2.60
2000	521,060	495,237	25,823	192,409	2.57
2005	561,825	533,323	28,502	210,477	2.59

Source: U.S. Census Bureau

Overall, Teller County has a newer housing stock when compared to the state and nation. According to the 2000 Census, Teller County had 7,993 households occupied by 20,435 people. More people living in Teller County are in the household income band between $25,000 and $99,000 than in the state, and more households own homes. Higher median ages, incomes, and families with earnings may contribute to the higher home ownership rates. Unlike El Paso County, people living in group quarters represent only 0.6% of the total population for Teller County and this proportion is projected to remain stable through the coming years. Table 11-17 summarizes the population, households, group quarters and household size in Teller County.

TABLE 11-17: POPULATION, HOUSEHOLDS, GROUP QUARTERS AND HOUSEHOLD SIZE IN TELLER COUNTY

Year	Population	Population in HH	Group Quarters	Households	Average HH Size
1970	3,316	3,281	35	1,127	2.91
1980	8,034	7,992	42	2,865	2.79
1990	12,468	12,407	61	4,754	2.61
2000	20,555	20,435	120	7,993	2.56
2005	24,041	23,894	147	9,631	2.48

Source: U.S. Census Bureau

Age Distribution

El Paso County experienced a dramatic increase in population between 1970 and 2000. In fact, every age group gained population. From 1970 to 1990, the 25-34 age group was the dominate age comprising 13.5% to 19.6% of the population. In 2000, that age group was surpassed by the 35-44 age group following the aging trend of the baby boomer generation. Even with a dominate older age group, the median age of 33 in the county (versus 34.3 in the state and 35.3 in the nation) reflects a slightly younger population. Table 11-18 tracks age group data from 1970 through 2000 and gives the percentage of the total for the given year.

TABLE 11-18: EL PASO COUNTY FOUR DECADES OF AGE DISTRIBUTION AND % OF TOTAL

Age	1970	Percent	1980	Percent	1990	Percent	2000	Percent
<5	20,872	8.8%	24,324	7.9%	33,770	8.5%	39,038	7.6%
5 - 9	24,380	10.3%	24,137	7.8%	31,581	8.0%	40,104	7.8%
10 - 14	24,950	10.6%	24,616	8.0%	28,147	7.1%	40,298	7.8%
15 - 19	22,243	9.4%	32,072	10.4%	29,031	7.3%	38,708	7.5%
20 -24	36,060	15.3%	37,957	12.3%	35,152	8.9%	38,678	7.5%
25 - 34	31,932	13.5%	57,586	18.6%	77,854	19.6%	77,145	14.9%
35 - 44	27,235	11.5%	36,859	11.9%	63,980	16.1%	91,006	17.6%
45 - 54	21,347	9.0%	28,886	9.3%	37,959	9.6%	69,241	13.4%
55 - 59	7,245	3.1%	12,474	4.0%	15,187	3.8%	21,807	4.2%
60 - 64	5,796	2.5%	9,716	3.1%	12,679	3.2%	16,117	3.1%
65 - 74	8,258	3.5%	12,564	4.1%	19,925	5.0%	25,305	4.9%
75+	5,654	2.4%	8,233	2.7%	11,749	3.0%	19,482	3.8%
Total	**235,972**		**309,424**		**397,014**		**516,929**	

Source: U.S. Census Bureau

The median age of Teller County residents was 39.4 in the 2000 census. By this measure, Teller County had an older population compared to El Paso County, the state and the nation. The higher median age reflects the older baby boomers that may have moved from El Paso County with the intent to retire in Teller County, but still commute to work. As the decade advances, they will spend more time in the rural area of Teller County as they begin to move towards retirement. Table 11-19 tracks age group data from 1970 through 2000 for Teller County and gives the percentage of the total for the given year.

TABLE 11-19: TELLER COUNTY FOUR DECADES OF AGE DISTRIBUTION AND % OF TOTAL

Age	1970	Percent	1980	Percent	1990	Percent	2000	Percent
<5	291	8.8%	558	6.9%	1,163	9.3%	1,179	5.7%
5 - 9	253	7.6%	649	8.1%	854	6.8%	1,408	6.8%
10 - 14	410	12.4%	738	9.2%	1,026	8.2%	1,706	8.3%
15 - 19	272	8.2%	697	8.7%	795	6.4%	1,512	7.4%
20 -24	174	5.2%	455	5.7%	318	2.6%	674	3.3%
25 - 34	435	13.1%	1,670	20.8%	2,174	17.4%	2,045	9.9%
35 - 44	429	12.9%	1,193	14.8%	2,860	22.9%	4,372	21.3%
45 - 54	370	11.2%	815	10.1%	1,379	11.1%	4,039	19.6%
55 - 59	168	5.1%	359	4.5%	516	4.1%	1,219	5.9%
60 - 64	163	4.9%	314	3.9%	481	3.9%	861	4.2%
65 - 74	255	7.7%	408	5.1%	583	4.7%	1,090	5.3%
75 - 84	75	2.3%	145	1.8%	249	2.0%	370	1.8%
85+	21	0.6%	33	0.4%	70	0.6%	80	0.4%
Total	**3,316**		**8,034**		**12,468**		**20,555**	

Source: U.S. Census Bureau

Employment & Income

In terms of income from wages, salaries, and proprietor income, El Paso County is dominated by the military and government sectors. In fact, the county's three largest employers are military: Fort Carson, the U.S. Air Force Academy, and Peterson Air Force Base. Colorado Spring's School District #11 and Memorial Hospital finish the top five. The State Demography Office prepares estimates of base industries by economic sector. Table 11-20 shows the Services and Government sectors continue to be the largest employers in El Paso County, followed by Wholesale and Retail Trade and Manufacturing. The Agriculture and Mining sectors show low employment, and this is likely to continue in the future as El Paso County becomes more and more urbanized. El Paso County showed strong growth during the second half of the 1990's but took a downturn between 2001 and 2003 following the national recession. In 2005, the unemployment rate was 5% and the median household income was $50,714, up from $46,844 in 2000, which exceeded the national median. The rise in income levels can be attributed to the growing number of technology-based sector companies that have located in the Colorado Springs area, over the last decade. Occupational categories such as software development, chemical engineering, aerospace engineering and bio-technology require a highly educated workforce and these occupations tend to pay higher salaries than other occupations.

TABLE 11-20: EL PASO COUNTY EMPLOYMENT BY ECONOMIC SECTOR, 2000

Economic Sector	# Employed	% of Total
Services	97,997	31.1%
Government	67,060	21.3%
Wholesale & Retail Trade	60,377	19.2%
Manufacturing	29,986	9.5%
Construction	20,787	6.6%
Finance, Insurance & Real Estate	19,553	6.2%
Transportation, Communications, Utilities	15,482	4.9%
Agriculture	3,523	1.1%
Mining & Extractive Industries	112	0.0%
Total	**314,877**	**100.0%**

Source: Colorado Department of Local Affairs

The small towns in Teller County along Ute Pass and Fountain Creek are historically associated with mining and the railroad industry. The county's intimacy with mining continues to this day as is evidenced by the Cripple Creek and Victor Mining Company. It is Teller County's fourth largest employer with over 330 employees, exclusive of contract seasonal construction workers. For every mine job, 1.9 additional permanent jobs are supported in the local region. Today, tourism is the county's biggest economic base industry and gaming is the largest source of tourism-based jobs, employing more than 600. Tourism accounts for 2,243 of the jobs in the Services Sector (see Table 11-21). The county's largest employer is the Woodland Park School District RE-2, with over 350 employees. The Midnight Rose Hotel and Casino and the Double Eagle Resorts, both gaming-related industries in Cripple Creek, are in second and third place, respectively. Seasonal and part-time positions are included in these rankings. Teller County was late to enter the recession of the early 2000's, lagging the nation by at least six months. In 2005, the unemployment rate was 5% and the median household income was $53,830, exceeding El Paso County, the state and the nation.

TABLE 11-21: TELLER COUNTY EMPLOYMENT BY ECONOMIC SECTOR, 2000

Economic Sector	# Employed	% of Total
Services	3,577	41.2%
Wholesale & Retail Trade	1,468	16.9%
Government	1,167	13.4%
Finance, Insurance & Real Estate	851	9.8%
Construction	633	7.3%
Mining & Extractive Industries	310	3.6%
Transportation, Communications, Utilities	275	3.2%
Manufacturing	251	2.9%
Agriculture	160	1.8%
Total	**8,692**	**100.0%**

Source: Colorado Department of Local Affairs

Environmental Justice

Jurisdictions should recognize that the transportation and environmental impacts within minority populations, low-income populations, or Indian tribes may be different from impacts on the general population due to a community's distinct cultural practices. Executive Order 12898, "*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*," prevents federal policies and actions from creating disproportionately high and adverse health and environmental impacts to minority and low-income populations.

In 2000, persons of minority races represented 23.8% of the population of El Paso County. Minority races include Black/African American, American Indian & Alaska Native, Asian/Pacific Islander, Other, and those persons with two or more races. Hispanic ethnicity is reported separately from racial characteristics. Approximately 58,400 El Paso County residents or 11.3% of the total county population are of Hispanic origin, considerably lower than the 17.1% proportion of the state. By contrast, minority races in Teller County only account for 7.1% of the population with nearly half or 3.5% of the residents being of Hispanic origin.

Measures of poverty are based on monetary income thresholds that vary by family size to determine who is poor. For example, a family of four would fall below the poverty level if the family's annual income was less than $17,603. In 2000, the poverty rates for El Paso County and Teller County were 8.0% and 5.4% respectively, each below the 9.3% state level. Small geographic areas where more than 20% of the population lives below the poverty level are scattered throughout the metropolitan area.

TABLE 11-22: RACE, ETHNICITY, AND POVERTY STATUS (2000)

	El Paso	Teller	Colorado
White	76.2%	92.9%	74.5%
Hispanic or Latino	11.3%	3.5%	17.1%
Black or African American	6.3%	0.5%	3.7%
American Indian and Alaska Native	0.6%	0.8%	0.7%
Asian/Pacific Islander	2.7%	0.6%	2.3%
Some other race	0.2%	0.1%	0.1%
Two or more races	3.9%	2.0%	2.8%
Total Minority Population	23.8%	7.1%	25.6%
Total Population	**516,929**	**20,555**	**4,301,261**
Poverty Rate	8.0%	5.4%	9.3%

Source: U.S. Census Bureau

Public Services and Facilities

The Pikes Peak region is serviced through multiple agencies and districts providing the basics for utilities, law enforcement, safety, education, and emergency services. A region's public services and facilities are vital components to the health, safety and welfare of its residents. The quality of these services is a direct relationship between population and the level of personnel, equipment, technology, and programming of the agency or provider. As the population in each jurisdiction within the region increases so does the demand for public services. Low taxes and increasing costs to provide services are becoming a regional problem since services funded by tax dollars tend to lag behind population growth. In addition, the annexation and/or development of land greatly affect the need for and cost of public services and facilities. Rapid growth in outlying areas can far outpace the ability of a district to construct new facilities and maintain an adequate level of service.

Land Use

Land use or landscape patterns refer to the type, size, arrangement and use of parcels of land. The arrangement of these landscape components is critical from both a biological and human perspective for sustaining quality of life. The Pikes Peak region reflects a variety of possible land uses as is evidenced by the following categories:

- Basic: industrial, schools, institutional, military, utilities, libraries, police/fire, hospitals
- Commercial: service, retail, office
- Residential Developable
- Unusable Land: parks, open space, golf courses, cemeteries, flood plains, national forest, BLM lands
- Vacant Developable: agriculture, vacant land

Figure 11-16 shows the General Land Use for the MPO. All of these land uses affect the development pattern of the region. The MPO area ranges from low density to urbanizing segments to near build-out conditions in Colorado Springs.

Neighborhoods

Neighborhoods are a fundamental part of any city or town. The homes, schools, churches, parks, and businesses which form the places where people live represent a large portion of most urbanized areas. More importantly, these neighborhoods directly contribute to the vitality of the community and to the quality of life in the urban environment. Different areas in the community can be defined as distinctly identifiable neighborhoods. Some are defined by natural or man-made features while others may be defined by characteristics such as income, race, or ethnic status. Still other neighborhoods can be identified by the age and style of their buildings. New neighborhoods tend to lack a true sense of character or atmosphere initially but a sense of character may develop as landscaping matures and residents individualize the homes in the area. It is important to protect and enhance the unique characteristics and investments made in neighborhoods in order to maintain the atmosphere of the community. In addition, it is important to add to the character of neighborhoods which lack a sense of identity through various physical improvements.

Noise and Vibration

Noise is generally defined as unwanted sound. It invades the life of citizens, both rural and urban. Unfortunately, noise is a part of modern life that for now is here to stay. Noise comes from many sources, but the most noticeable and omnipresent is that from transportation related sources. Transportation related noise mainly comes from roads and highways, but may also be caused by railroad and aviation sources. Construction, industry, and even lawn mowing are non-transport related sources of noise that are also a site-specific problem. As traffic numbers in the Pikes Peak region continue to grow, noise emanating from roadways will increase. According to one source, as vehicle miles double, noise levels will increase by 3 decibels. Noise levels in the region have been increasing at a steady rate. Noise levels will continue to do so unless mitigation strategies are examined and implemented.

Parks and Recreation

The Pikes Peak region boasts myriad recreational possibilities. Parks and other recreational sites allow for citizen's to relax, improve fitness, and admire the beauty. Lands exist at multiple levels. Federally, Pike National Forest encompasses over 1,000,000 acres and provides many opportunities to outdoor enthusiasts. At the state level, there are parks such as Cheyenne Mountain State Park as well as various game reserves. Both El Paso and Teller Counties provide many parks, both urban and rural, for the enjoyment of the general public (see Figure 11-16). County and city agencies also maintain a network of trails for use by pedestrians and bicyclists. Preservation of parks and open space conserves natural and scenic resources, provides recreational opportunities, and is a means of shaping growth.

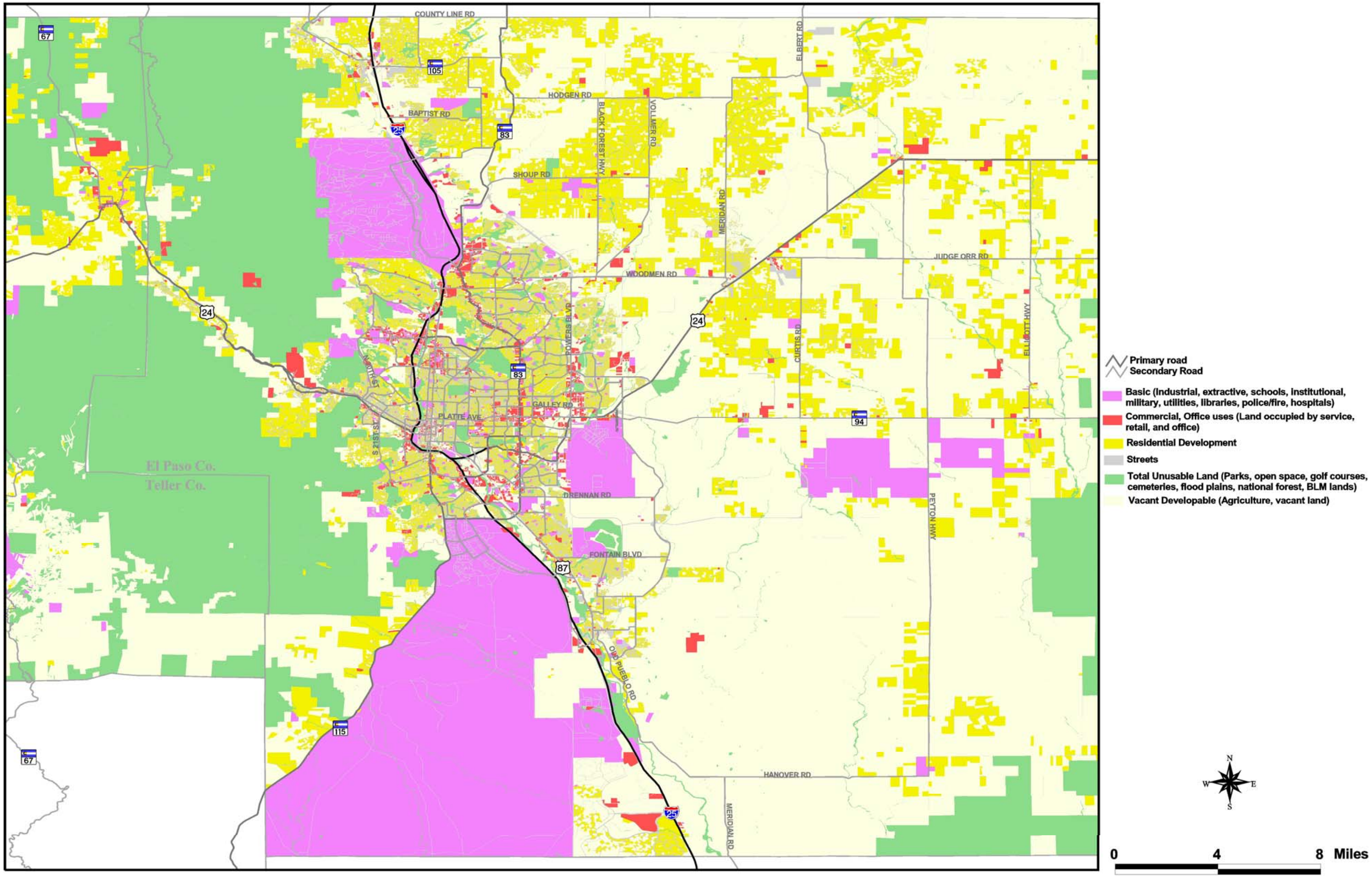
Air Quality

Air quality has been measured in the Colorado Springs area since 1970 as a result of requirements mandated by the Clean Air Act. The Clean Air Act established the requirement for cities to monitor for six criteria pollutants to be certain the amount was below the national standard. These six criteria pollutants are carbon monoxide, nitrogen dioxide, ozone, lead, particulate matter and sulfur dioxide. The pollutants which are the focus of this report include particulate matter (both PM_{10} and $PM_{2.5}$), carbon monoxide, and ozone, primarily due to of the contribution automobiles make to these pollutant levels and the effect on airshed and human health that these pollutants have. These three pollutants will be discussed below with trends and possible mitigation steps which could be taken to reduce their current levels.

Particulate Matter

Particulate matter on roadways comes from two main sources. The first is construction, and with its high rate of disturbance causes high levels of particulate matter in the air. Another, and probably the largest, cause of particulate matter in the air is from the automobiles which add dust to the air, affecting visibility and air quality. Particulate matter can also increase the effects of respiratory problems, such as asthma. There are two standards for particulate matter in the national regulations, depending on the size.

FIGURE 11-16: GENERAL LAND USE OF MPO

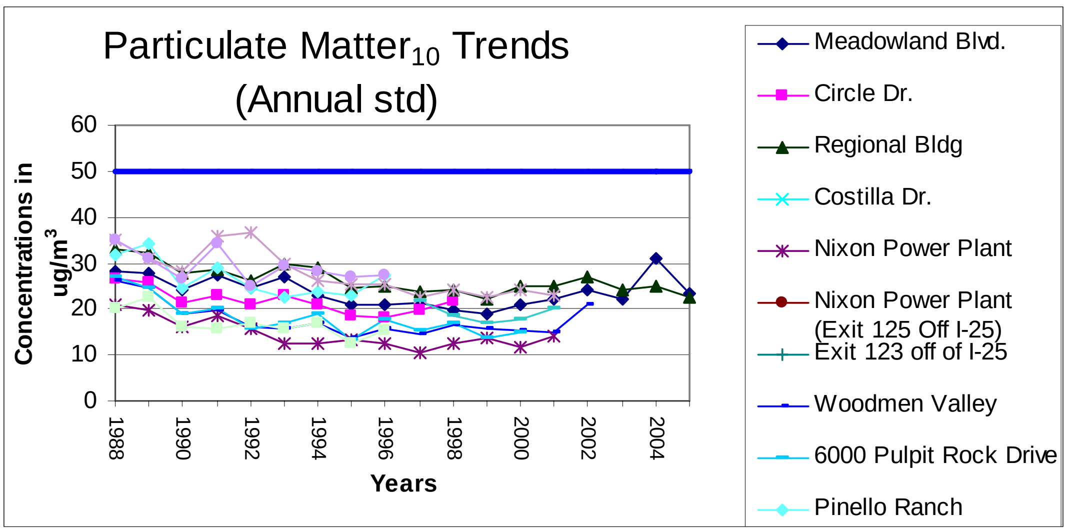


This Page Left Intentionally Blank

PM_{10}

PM_{10}, defined as particulates less than 10 micrometers in diameter, is mostly created by humans, and is most generally thought of as common dust. It can be caused by wind moving debris from unpaved roads, street sanding, construction, and wood burning. Its primary source is from roadways. Usually, PM_{10} levels are highest in winter when there is a high amount of street sanding, wood burning in fireplaces, and the layers of cold air in the atmosphere prevent the rising of warm air, trapping the pollutants close to the ground. The highest historic level of PM_{10} measured in the Colorado Springs area was a result of the street sanding during a winter storm. Figure 11-17 shows that the PM_{10} levels have been decreasing since 1988, primarily because of technological advancement in car engines, and sand being used in more strategic ways to prevent its blowing into the air.

FIGURE 11-17: PM_{10} TRENDS

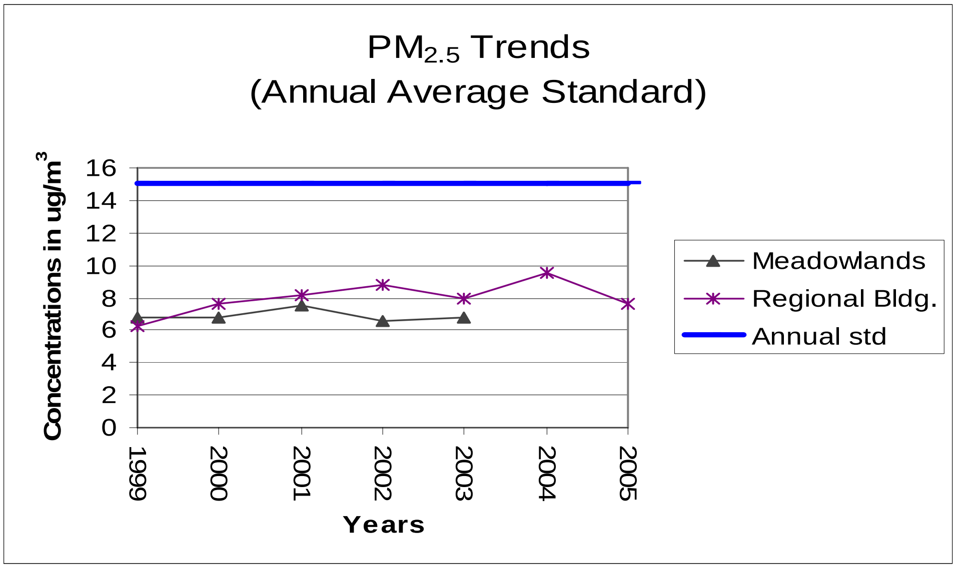


Source: PPACG, 2003b

$PM_{2.5}$

$PM_{2.5}$, defined as particulates less than 2.5 micrometers in diameter, comes from similar sources to PM_{10}, but additionally is created from combustion byproducts, restaurants, and grills. Figure 11-18 shows the current levels are below the standard.

FIGURE 11-18: $PM_{2.5}$ TRENDS

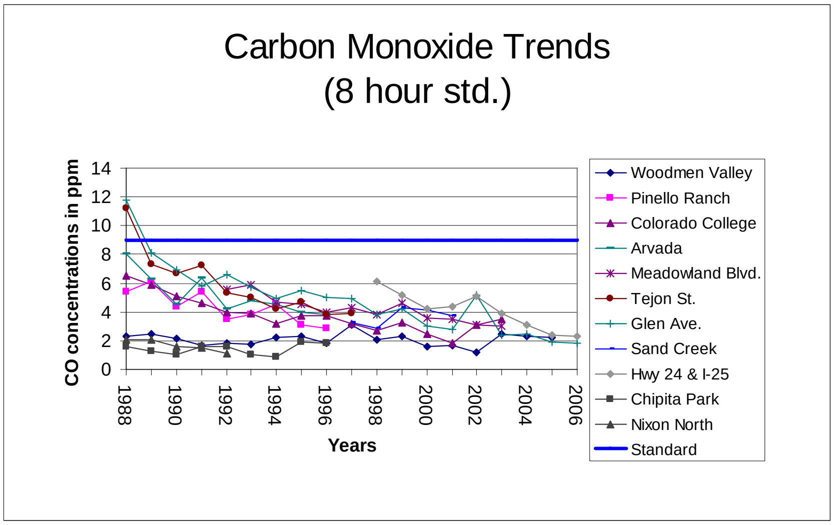


Source: PPACG, 2003b

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas which is formed from incomplete combustion of carbon-based fuels like gasoline in cars, wood in a fireplace, or coal in a power plant. Carbon monoxide concentrations are oftentimes highest in the winter months when the particles can become trapped in the atmosphere for long periods of time due to the layer of cold air, which prevents the carbon dioxide from escaping. Carbon monoxide affects health by preventing oxygen from getting to organs and tissues, including the nervous system. Motor vehicles are the predominant source of carbon monoxide emissions into the atmosphere, creating more than two-thirds of the total amount nationwide and in the Colorado Springs area. These numbers have been projected to change with increased development in the future for Colorado Springs. The population in this area is increasing, and trends show individuals driving more vehicle miles. Even though these miles will be driven in vehicles whose emissions are decreased, because of the increased quantity of cars, emissions are still expected to rise. With new development, other sources will be creating carbon monoxide including construction equipment. Figure 11-19 shows the CO 8-hour monitoring station concentration trend as compared to the 8-hour standard.

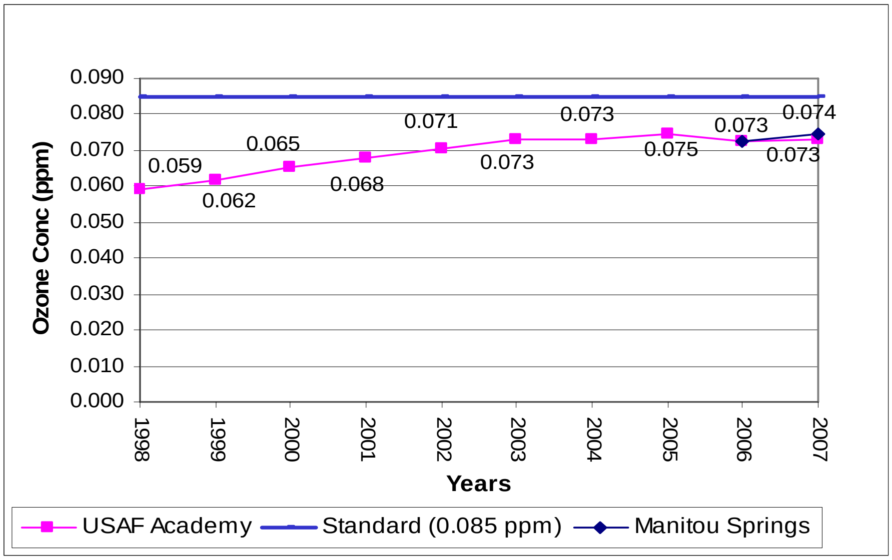
FIGURE 11-19: CARBON MONOXIDE TRENDS



Ozone

Ground level ambient ozone is a powerful pollutant which is formed from the combination of several different emissions, including hydrocarbons (volatile organic compounds – VOCs) and nitrogen oxide. Ozone can appear as brown smog above cities, can cause many health problems including respiratory infections and diseases, and can also reduce the growth and yield of plants and reduce ecosystem health. Both VOCs and nitrogen oxide are produced from vehicle emissions, emissions from power plants, industry, and chemical solvents. In 1980, Colorado Springs was in violation of the ozone standard, but has not had a violation since that instance. Recently, the trends in ozone have been rising and although they are below the national standard, the levels are rapidly approaching and will continue to rise if nothing is done. Figure 11-20 shows the three year average of the 4th Max 8-hour ozone concentrations trend as compared to the standard.

FIGURE 11-20: THREE YEAR AVERAGE OF 4TH MAX 8-HOUR OZONE CONCENTRATIONS



Source: PPACG, 2007

On June 20, 2007 EPA proposed to lower the primary health standard for ozone to a level within the range of 0.070 and 0.075 ppm. If the standard were to be between 0.070 and 0.075 ppm, based on current concentrations (0.073 ppm at U.S. Air Force Academy and 0.074 ppm at Manitou Springs), PPACG could be found to be in non-attainment which would have the following implications for transportation:

- Conformity requirements for 8-hour standard take effect one year after designation.
- Until SIP is effective, plans/programs must meet build/no-build test.
- Upon EPA adequacy finding, plans and programs must achieve VOC and NO_x emission budgets established in SIP.

Development of Attainment State Implementation Plan (SIP) which contains control measures, contingency plan, motor vehicle emissions budget.

Chapter 12: Mitigation and Monitoring of the Regional Transportation System

In the context of *Moving Forward*, environmental mitigation activities are broad strategies, policies, programs, and actions that serve to help avoid, minimize, or remediate the impacts to human and natural environments associated with the implementation of the regional transportation plan. The resource impacts identified in Chapter 11, Regional Setting, summarize general issues related to potential direct, indirect, or cumulative impacts of transportation investments within the region.

Due to the number of mitigation categories, not all of them are identified. If a category is not identified that does not mean that it is not valuable or necessary. The purpose of this effort is to encourage regional use of a coordinated adaptive planning process to identify issues that can be addressed proactively and concerns that can be mitigated or incorporated into projects in a manner that reinforces other planning efforts in the region.

The incorporation of mitigation into federally-mandated transportation planning means that this effort is not a one-time event that results in a single discrete output. Instead, it requires that the process become institutionalized and adaptive to the momentum and cyclical nature of regional needs and priorities. Therefore, the needed data gathering and public sector capacity-building should focus on analytical, participatory and political requirements that capture lessons from effective processes. This assistance needs to be sustained and focus on building inter-agency constituencies as well as public sector data and capabilities. There is only one federal source of funding for the transportation portion of this effort, STP-Metro. State and local sources can be used, but are in very tight supply.

Federal Requirement

Apart of the consultation process, the long range plan shall include a discussion of types of potential environmental mitigation activities and areas to carry out these activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. (23 CFR Part 450.322(f)(7)).

These activities shall be developed in consultation with Federal, State and tribal wildlife, land management, resource agencies and regulatory agencies. (23 CFR Part 450.322(g)).

FEDERAL OBJECTIVES

The SAFETEA-LU requirements are designed to provide a more consistent consideration of environmental issues at all stages of the transportation planning process. The environmental mitigation strategies and activities are intended to be regional in scope, and may not address potential project-level impacts. None of the changes in SAFETEA-LU alters how the National Environmental Policy Act (NEPA) relates to a long range transportation plan.

PLANNING FOR MITIGATION

Planning in the context of complex interactions between social, economic, environmental, and political factors creates special challenges, especially when different stakeholder groups have conflicting interests. Simply put, it is much more difficult to mitigate a negative impact if there isn't agreement on what constitutes a negative impact. In the context of a voluntary Council of Governments such as PPACG, with a weak governance framework, issues require that PPACG utilize a continuous, iterative and adaptive process focused on improving information used in decision-making. The process needed to accomplish this is not a simple linear, technical process.

Instead, a planning process that identifies and adapts based on modeling, monitoring, and other research and analysis efforts adds value to other planning efforts and reinforces their effectiveness. Collaboration between different planning efforts, such as transportation planning, economic development, land-development, and wildlife conservation is critical because the impacts of policies will transect efforts.

Adaptive planning keeps evaluation processes flexible in order to better adjust to changing conditions. It is based on evaluating how social, economic, and ecological indicators are directly or indirectly changed by the real-world multitude of decisions, including transportation investment. It requires establishing the existing context, undertaking the needed analyses, involving the appropriate stakeholders, informing decision-making, and continuously monitoring and evaluating key indicators to improve both the process and the outcome.

In order for the indicators to be meaningful to different types of planning efforts a common set of metrics (indicators) focused on status and trends of resources of concern is necessary. It is imperative that these indicators are developed cooperatively with the partner agencies. Monitoring changes in key indicators not only provides information on whether a strategy or plan is delivering desired outcomes it also assists in the early identification of unintended impacts.

Development of a Green Infrastructure Plan for the Fountain Creek Watershed, especially as it relates to the Fountain Creek Vision, is the best method of bringing the diverse interest groups together to develop a concept that can be more easily funded.

MONITORING REGIONAL INDICATORS

There are two regional indicators projects underway in the Pikes Peak region. The first, the Pikes Peak Sustainability Indicators Project (PPSIP) was initiated by the Fort Carson Army Mountain Post in 2003 and Phase One was completed in 2006. The second effort, the United Way Quality of Life Indicators project, is an ongoing effort in its second year. Both are attached as Appendix K and described below.

- The PPSIP is a partnership between the Fort Carson Mountain Post and the governments, businesses and citizens of the Pikes Peak Region that host Fort Carson's primary operations. The objective of PPSIP's Phase One activity was an indicators report that provided participating governments with sufficient information, developed in a regionally collaborative manner, to determine whether the governments wished to adopt indicators as a community and/or regional management strategy, adopt indicators that are regionally consistent, and formally collaborate on regional indicators and solutions to key challenges.

- The El Paso County United Way Quality of Life Indicators project began in 2006 with more than 100 interested community leaders joining one of nine Vision Councils. Each Vision Council addresses a different functional area. The nine categories, listed below, cover a variety of areas that can be improved by providing information to improve public decision-making. The goal of the effort is to create positive action by tracking data that will help community members prioritize and make more informed decisions about where and how to invest time, talent and resources. The nine categories are:

    - Moving Around Efficiently
    - Growing a Vibrant Economy
    - Preserving the Natural Environment
    - Fostering Community Engagement
    - Keeping the Community Safe
    - Sustaining a Healthy Community
    - Promoting Social Wellbeing
    - Achieving Educational Excellence
    - Enjoying Arts, Culture, and Recreation

  "Quality of life factors are critical to a successful future. There are hundreds of examples of once desirable places to live that deteriorated because of controllable issues that local leaders did not recognize and address. By examining what makes El Paso County great, we can bring people together around the issues that count. It is easier to create broad coalitions when there are basic community goals we can all agree on."

PPACG will participate in the collection of primary data related to "Moving Around Efficiently" and utilize other indicators to inform the regional transportation planning process.

CONTEXT SENSITIVE SOLUTIONS

In 2006, PPACG adopted a Transportation Planning Principle that states the region will:

> *"Protect and enhance the environment by implementing transportation solutions that are sensitive to natural and human contexts."*

CSS is a different way to approach the planning and design of transportation projects. It is a process that balances the competing needs of many stakeholders from the earliest stages of project development. It is also flexibility in the application of design controls, guidelines and standards to design and construct a facility that is safe for all users regardless of the mode of travel they choose. Applying CSS to the planning and design of a transportation project can make the difference between a successful project valued by the community or an embattled project taking years to complete. There are many definitions of CSS but they share a common set of tenets:

- "*Balance safety, mobility, community and environmental goals in all projects;*
- *Involve the public and stakeholders early and continuously throughout the planning and project development process;*
- *Use an interdisciplinary team tailored to project needs;*
- *Address all modes of travel;*
- *Apply flexibility inherent in design standards; and*
- *Incorporate aesthetics as an integral part of good design*."

An effective CSS approach to transportation planning and project development can take many different forms, but will typically include the following key elements:

- Understanding the purpose of and need for the project;
- Stakeholder involvement at critical points in the project;
- Interdisciplinary team approach to planning and design;
- Objective evaluation of a full range of alternatives; and
- Attention to community values and qualities including environment, scenic, aesthetic, historic and natural resources, while also meeting the safety and mobility needs.

PPACG will work to implement Context Sensitive Solutions concepts at the long range plan and transportation improvement program level in the Pikes Peak Region.

TYPES AND LOCATIONS FOR MITIGATION

Discussions with resource agencies have led to PPACG considering the concept of off-site and out-of-kind compensatory mitigation in the Pikes Peak region. This concept could increase regional benefits by restoring a large resource or a complex of habitats that would accomplish other goals and avoid discontinuous mitigation sites that are surrounded by urban features and prone to anthropomorphic impacts.

A desire of the Pikes Peak Area Council of Governments is that transportation planning and decision making, including project selection, will be integrated and coordinated with land use, water, and natural resource planning and management. The identification of a full range of environmental concerns will occur early in the transportation planning and project development process. Resolution of impact mitigation concerns may emanate from development of a Green Infrastructure Plan in the Pikes Peak Region.

Natural Setting

Climate and Precipitation

It is possible for climate to influence the manner in which the region is developed. For instance, subdivisions can be designed to capture the sun and to be protected from the wind. Developments with steep street grades which face north can be a safety hazard in the winter. Climate is important for energy conservation and safety reasons and should be considered along with other physical factors in new development.

Globally, climate is indirectly affected by urban form to the degree that development patterns affect travel behavior. Combustion of motor vehicle fuel emits carbon dioxide, a greenhouse gas that helps trap heat within the atmosphere. Emissions of carbon dioxide from motor vehicles have been increasing over time, and transportation is projected to be the fastest growing source of carbon dioxide emissions of any sector. Communities in the Pikes Peak Region have agreed that global climate change is an issue of serious concern and are attempting to encourage practices that reduce greenhouse gas emissions. With the current level of greenhouse gases the atmosphere will continue to warm and temperatures and sea levels will rise over the next 50 years. Coastal cities will take the brunt of these impacts. It is likely in the Pikes Peak area that climate change will increase the occurrence of both droughts and floods. There will be increased incidences of heat waves, cold snaps, wind and severe storms. Transportation mitigation of these long-term impacts include providing more redundant mobility systems, additional transportation choices, larger floodways under bridges, reducing vehicle travel, and decreasing fuel use per trip. This includes decreasing traffic congestion and increasing the occupancy of vehicles.

Geology and Paleontology

The geology and topography of the region makes for impressive landscapes but its inherent nature also makes it susceptible to the risks and hazards that go along with it. Most of the City of Colorado Springs is built over Pierre Shale, a Cretaceous rock that is weak and prone to shrinking and swelling, especially on hillsides. Recently the City of Colorado Springs passed an ordinance requiring developers to address geologic hazards on any proposed site and to engineer ways to mitigate those hazards. The Colorado Geological Survey completed a landslide susceptibility map for the region which delineates which areas are prone to slope failure and which are not. City planners, consultants, developers, and homeowners can use this data as a tool for future development and for appropriate hazard mitigation. When exploitation of geologic resources is permitted, a proper work plan should include facets on future landscaping, future land use, erosion control, water and air quality management, revegetation, and slope stabilization. Areas of particular geologic interest and significance such as the hogbacks around Garden of the Gods or the Teepee Buttes south of Fountain should be preserved as unique, educational, land-mix features.

Prior to any transportation construction projects or maintenance activities, a paleontological assessment should be done consisting of a literature review of known sites and a field review to look for fossil remains. Information on the specific locations of paleontological sites is not available to the general public in order to protect these resources. Interested parties should instead cooperate with Colorado's State Historic Preservation Office or with natural history museums. All geologic units with paleontological potential should be identified and protected for scientific study and public education.

Landscape and Vegetation

Soils and Mineral Resources

Of the nearly 200 soils found within the area only 2 were identified as potential restoration soils. The Fluvaquentic Haplaquolls (Map Unit 29) and Apishaps Silt Clay (Map Unit Ap) are hydric soils located on terraces and the higher portions of floodplains with continual sources of groundwater supply. Due to landscape positions, these soils are elevated out of the immediate floodplain and are consequently not as prone to water erosion. These soils also readily support riparian vegetation. Soils not selected for potential restoration projects generally occur in cold climates, do not have consistent hydrology, have shallow depths to bedrock or contain exposed bedrock, are located on steep slopes and lack close proximity to riparian areas.

Plants such as western wheat grass which can tolerate salinity should be selected for restoration activities containing Apishapa Silt Clay soils. Plants selected for restoration activities should be based on the characteristics of these two soils. Soils that should be avoided in potential restoration activities generally do not have consistent hydrology, have shallow depths to bedrock or contain exposed bedrock, are located on steep slopes, lack close proximity to riparian corridors or are located in the middle of floodplains.

The best mitigation locations are areas where the two above-mentioned soils are present which include terraces, marshes and swales and floodplain steps. Transportation projects should avoid locations where restoration opportunities are available on these soils. Important characteristics of these soils include the ability to support wetland or riparian vegetation, have continual source of hydrology, not prone to water or wind erosion, close proximity to riparian areas and are easily accessible. The information on Fluvaquentic Haplaquolls and Apishaps Silt Clay soils will be combined with other information from other resource reports to pin-point specific areas suitable for restoration.

Vegetation

Vegetation impacts from transportation projects can have direct impacts on the ecological health of an area and cumulative impacts to wildlife and other issues. In addressing vegetation, mitigation strategies include:

- Re-vegetating impacted areas to replicate or enhance native vegetative communities.
- Plant native trees where feasible in proximity to locations where trees are removed.
- Minimize construction disturbances by implementing best management practices.
- Enhancing and restoring the existing conditions of the local vegetative communities.
- Fundamental structures and ecological processes will be reestablished and maintained across landscape.
- Areas that are impacted by road widening activity should be surveyed to minimize the potential disturbance.

Potential vegetation mitigation locations are closely tied to the type of wildlife that they are able to support. Colorado Natural Heritage Program (CNHP) designates Potential Conservation Areas (PCAs) which are areas that can provide habitat and ecological processes upon which a species or community depends for its continued existence**.** CNHP ranks PCAs according to their biodiversity significance. Of the 22 PCAs located in the study area, two are outstanding significance (B1), three are very high significance (B2), three are of high significance (B3), seven of moderate significance (B4), and seven of general significance (B5). These are listed in the Table 12-1 and shown in Figure 12-1.

Other potential conservation areas include those designated by:

- Colorado State Parks as natural areas because they consist of native plant communities, habitat for rare plants or animals, geologic formations or processes, and paleontological locations.

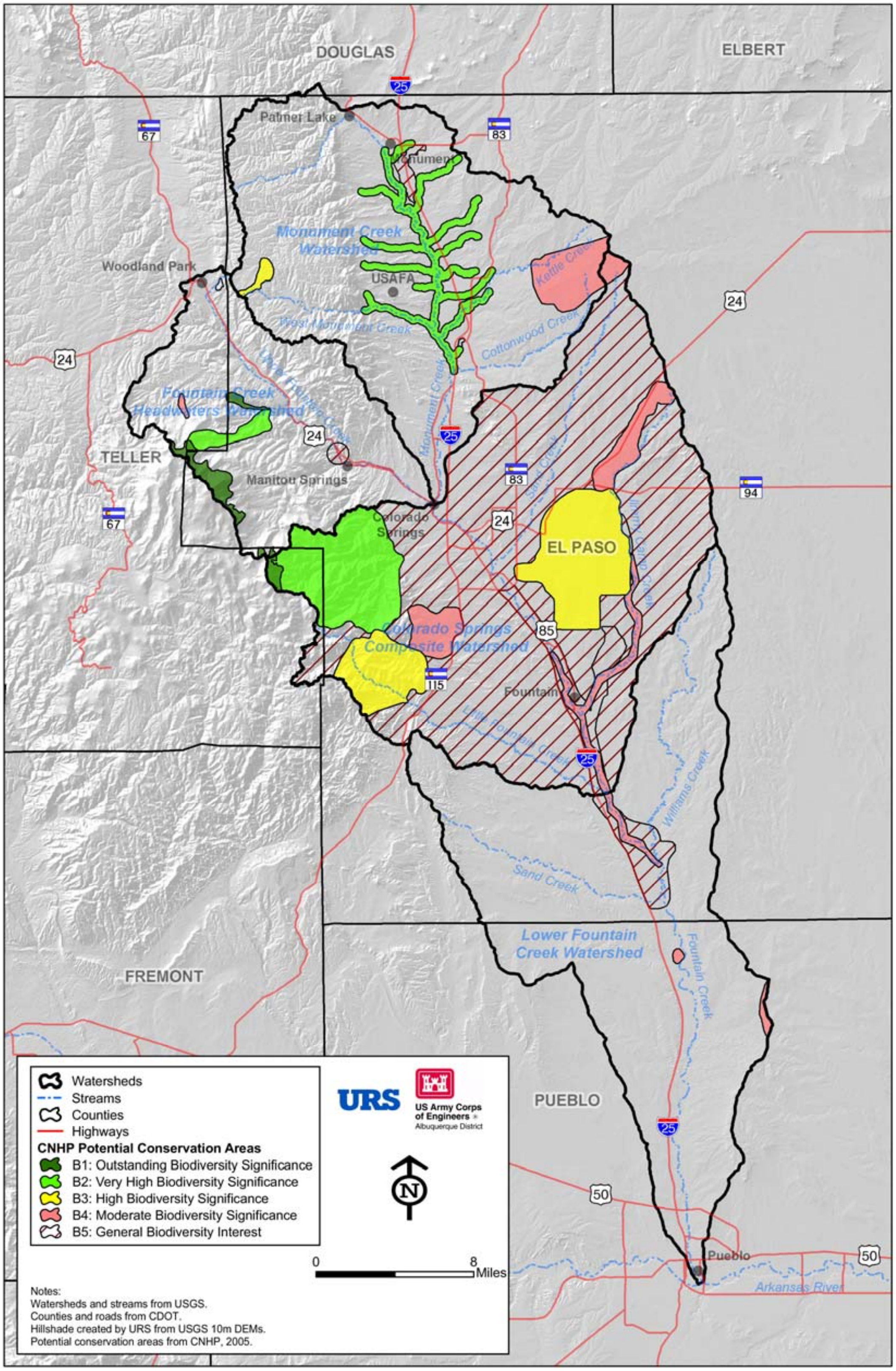
- Areas identified by USDA/USFS as Research Natural Areas (RNAs) where the primary management is for non-manipulative research. Two areas considered as RNAs are Gray Black Peak which encompasses 2,100 acres of ponderosa pine, mixed conifer and oak shrubland and Crystal Creek which is a 1,029 hectares montane forest habitat.

- Areas considered for conservation easements as part of the Colorado Open Lands and the Nature Conservancy Peak to Prairie Project which focuses on properties in southern El Paso County and Northern Pueblo County.

TABLE 12-1: POTENTIAL CONSERVATION AREAS

B1 Outstanding Significance	B2 Very High Significance	B3 High Significance	B4 Moderate Significance	B5 General Significance
Pikes Peak	Monument Creek	Farish Recreation Area	La Foret	I-25 Shamrock
Cascade Creek East	Severy Creek	Blue Mountain	Halfway Campground Site	Monument Southeast
	Cheyenne Canyon	Colorado Springs Airport	Cheyenne Mountain	Cave of the Winds
			Fountain and Jimmy Camp Creeks	Woodland Park
			Sand Creek Ridge	Fountain Creek
			Fountain Creek at Pinon	Widefield Mountain
			Midway Prairie	Marksheffel Road

FIGURE 12-1: POTENTIAL CONSERVATION AREAS



Wetlands

Wetlands (and riparian areas) are critical to the support and diversity of many flora and fauna, stabilize streambanks and act as a buffer strip to reduce stormwater runoff and reduce damage from erosion, sedimentation and flooding. Wetlands and riparian areas are critical to consider in reducing water volume because they act as energy and water absorbers, by spreading out fast flowing floodwaters, mitigating and minimizing the amount of damage. They act as a natural filtration devices to trap harmful water quality pollutants and sediments, and improve water quality. There are four different categories of wetlands present throughout the watersheds in the Pikes Peak Region – peatlands, marshes, wet meadows and riparian.

Under the CWA (Clean Water Act) and IWPA, the CDOT must demonstrate that all measures were taken to first avoid and then minimize impacts to wetlands to the fullest extent practicable. Unavoidable impacts are mitigated by way of wetland compensation through either restoration or creation of wetlands. CDOT uses the following Best Management Practices (BMPs) which are requirements of Section 107.25 of the Standard Specifications for Road and Bridge Construction to limit temporary impacts to wetlands:

- Construction, staging, fill material, equipment, etc. should be located outside of wetlands and riparian areas and at a minimum 15 meters outside of the high water mark.
- All practicable efforts should be used to avoid and minimize in-stream work.
- All measures should be taken to avoid excess application and introduction of chemicals.
- Geotextile fabrics shall be placed over existing wetland areas located within work areas.
- Temporary fencing should be installed in areas around the project area to protect wetlands and riparian areas.

Cities and counties also have requirements for construction activities around wetlands. Discharge of water directly into the streams from cofferdams or new channel construction is prohibited. Direct impacts to wetlands are typically offset by compensatory mitigation due to regulatory requirements in Section 401 and 404 of the Clean Water Act.

Implementation recommendations listed in PPACG’s (2004) Water Quality Management (208) Plan to consider are:

- Protect critical stream environmental zones, floodplains, wetlands and riparian areas through zoning, acquired through conservation easements, land exchanges and development of transfer rights.

- Minimize wetlands disturbance and if disturbance is unavoidable, mitigation measures, such as preventing direct runoff, detention or infiltration of site runoff, and construction of new wetlands or enhancement of existing "poor quality" wetlands should be employed to achieve no net loss of wetlands.

- Plans for public or private infrastructure and investments should avoid floodplains, wetlands, riparian areas, steep erodible slopes, and geologic hazard areas to the maximum extent practicable (MEP).

- Section 401 and 404 permits should be reviewed for consistency with Regional Plans to determine potential impacts to critical areas.

Table 12-1 and Figure 12-1 shows PCAs which represent habitat that helps sustain rare, diverse, and/or significant ecological processes. Generally, the Colorado Springs area provides the greatest opportunity for the restoration of wetland/riparian areas. Many of the wetlands are in need of preservation due to high development pressure. Specific mitigation locations depend on many factors, such as the type of construction activity, vegetation type, health of the wetland area and if it is a wetland creation or wetland enhancement project.

The southern portion of El Paso County and Northern Pueblo County represent some of the greatest opportunities for the preservation of large quality wetland and riparian areas. One example of this is large plains cottonwood complexes along Fountain Creek, mixed with wetlands. Monument Creek Sub-Watershed also has smaller high quality wetlands ideal for preservation at the edge of rural areas that are being pressured by development. The criteria for high restoration potential include some level of undisturbed areas combined with a relatively large undeveloped area. Disturbance could include weed infestation, erosion, sedimentation, etc.

Hazardous Materials and Solid Waste

Although groundwater and surface water has been impacted by hazardous materials in numerous areas, the majority of these areas are currently being remediated. More information could be determined through a Phase I Environmental Site Assessment (ESA) which would include site visits, interviews with property owners, contact with state and local environmental agencies, and the review of historical sources such as historical aerial photographs, and historical topographic maps. This analysis will lead to a better understanding of any potential hazardous materials which will allow recommendations on any necessary remediation activities.

Many hazardous material facilities in the region have been cleaned up and have received “no further action” or “closure” status from the State of Colorado. Many of the remaining sties are open Leaking Underground Storage Tanks (LUSTs) that are currently being remediated under direction by the State of Colorado. The Corrective Action (CORRACT) and Comprehensive Environmental Response, Compensation and Liability Information Systems (CERCLIS) sites and some of the landfills are also currently undergoing soil and/or groundwater remediation. Although groundwater and surface water have been impacted by hazardous materials in numerous areas, the majority of the areas are currently being remediated. To more precisely determine impacts a Phase I ESA will have to be conducted.

Seismic Zones and Topographic Impacts

Improvements are constantly being made regarding the effects of seismic activity on transportation projects. Mitigation strategies regarding seismic zones include:

- Determine seismic zone areas and assess impacts on transportation projects
- Avoid building transportation projects or any type of activity in areas that have a high probability of seismic activity.
- Dealing with broader effects of ground shaking on actual structures and on preventing associated effects such as landslides.

Increase the seismic station coverage in Colorado, including a location at Colorado Springs to get a complete picture of the seismicity in Colorado. This will include detailed geologic site investigations. Areas where active faults are located are good possibilities for areas such as open space or agriculture uses which would have minimal possible impacts to transportation projects adjacent to such areas.

Maps showing a variety of hazards, including expansive soils, landslides, unstable slopes, and areas with mine subsidence risk can be viewed at: http://web.uccs.edu/geogenvs/Hazards/ Viewing these maps will allow a more precise determination of both natural hazards and potential topographic impacts.

Biological Resources and Issues

Wildlife Species, Viewing Areas and Crossings

Strategies for protection of wildlife species are also connected with wildlife habitat/vegetation. There are various types of conventional and non-conventional wildlife crossings:

- **SIMPLE SIGNS**: signs that warn the driver of potential wildlife on the road. This is the most common and least expensive, but still dangerous, method.

- **VARIABLE MESSAGE SIGNS (VMS):** similar to above, but only activated when needed. This option is best for less used roads with known seasonal migratory crossing.

- **CULVERT TYPE UNDERPASSES**: their principal design was for water movement, but can be easily adaptable as wildlife crossings. Culverts range from small to large sizes, but depending on the wildlife in focus, they are not always the right solution.

- **BRIDGE EXTENSIONS, OPEN-SPAN BRIDGES**: Where bridges already exist, animals may pass underneath along the low-terrain or riparian corridor. Incorporating this design into new and existing bridges is simple and encourages wildlife to use their preexisting migration routes which may limit habitat fragmentation.

- **WILDLIFE OVERPASSES**: While usually found in rural settings, an overpass provides the ideal crossing from the wildlife point of view. Typically the overpass consists of natural habitat vegetation and will seem as a natural extension of the terrain.

Sites have been identified by Colorado State Parks, Colorado Natural Heritage program (CNHP), wildlife viewing guides, local nature societies, and field experts as areas to observe wildlife and preserve as high quality wildlife habitat. These areas are currently protected as part of the Pike National Forest, city and county open space or parkland, or are on military bases and are subject to federal regulations. The wildlife viewing areas are: US Air Force Academy, Waldo Canyon Trail, Garden of the Gods, Bear Creek Regional Park, Red Rock Canyon Park, North Cheyenne Canyon Park, Fountain Creek Regional Park, Clear Springs Ranch, Fort Carson Military Installation, and Pueblo Area Wildlife Viewing Area. The locations of theses areas are shown on Figure 3-2, Important Wildlife Areas.

Major wildlife crossings exist within the urban area and at the boundary of developed and undeveloped land. Many species habitats currently are crossed by highways and roads. These include Highway 24 between 31st street west to Manitou Canyon, Highway 24, just south of Woodland Park, and Highway 115, from Colorado Springs to the El Paso County line.

Threatened and Endangered Species

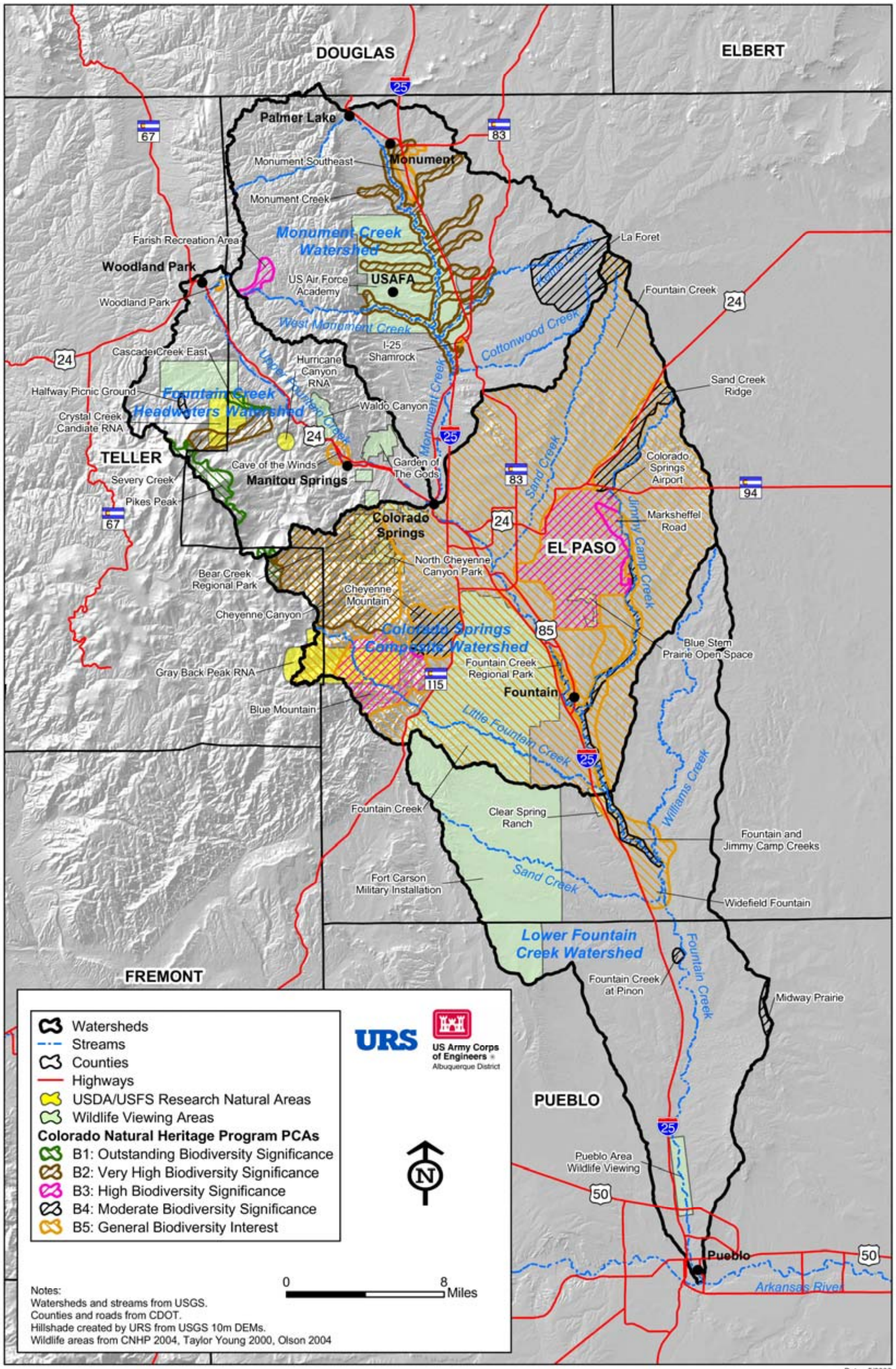
Protection of Threatened and Endangered Species are primarily governed by federal and state Regulations. Mitigation strategies are largely specific to the areas of concern and include:

- Creating wildlife crossings;
- Reducing habitat fragmentation;
- Limiting construction times to those appropriate for hibernation/migration;
- Establishing/restoring habitats as reserves or other protected wildlife areas; and
- Conduct monitoring to assure that disturbance areas do not exceed permitted amounts.

Federal Regulations include the Endangered Species Act (62 FR 27978, 1996). The purpose is to conserve and recover species in danger of extinction, and to cover the habitats and ecosystems these species depend upon. This is done by listing the species as either endangered or threatened. In the MPO there are, as shown in Table 2-6, 2 fish, 5 birds, 3 mammals, and 3 plants listed as threatened or endangered.

Locations are dependent on the species of concern. Targeting the detailed habitat ranges for the threatened or endangered species is essential to properly combating the issue and protecting the species. Of particular concern in this region is the Preble's Meadow Jumping Mouse which is known to be present in the I-25 corridor.

FIGURE 12-2: IMPORTANT WILDLIFE AREAS



Preble's Meadow Jumping Mouse

Suitable habitat for the Preble's Meadow Jumping Mouse is typically a dense combination of grasses, forbs, and shrubs and it hibernates near these riparian areas, usually from September or October to May. The western boundary is limited to below 7,600 feet. Preble's populations occur along Monument Creek and its tributaries, including West Monument, Teachout, Jackson, Beaver, Kettle, Cottonwood and Pine creeks. One of the most stable populations was discovered on the U.S. Air Force Academy (USAFA) property. The USAFA developed an Integrated Natural Resource Management Plan and a Conservation Plan and Agreement to improve and maintain habitat. The primary issues considered necessary to preserve the mouse are isolation of populations, habitat preservation, and potential for catastrophic events. Block Clearance Areas have also been established by the United States Fish and Wildlife Service in areas where the mouse habitat does not exist. Potential impacts from transportation projects include highway and bridge construction, destruction of habitat, and forming barriers to movement.

Migratory Populations

Most migrations, regardless of species, occur at predictable annual cycles. Timing transportation projects to reduce impact is a simple method for ensuring safety of migratory species. Also, for land animals, it is necessary to protect migration corridors and provide effective ways to pass through development and avoid road crossing.

The primary migratory corridors are along the main rivers and streams, and are most concentrated to the north of the city, where a lot of development is going to occur. These areas need to be looked at closely and carefully to examine the potential of habitat destruction by road building and development.

Invasive Species

To slow or reverse the proliferation of noxious weeds in the state, Colorado's governor issued Executive Order D006-99 requiring various agencies to develop weed management plans. Mitigation strategies include: implementation of a noxious weed management plan that incorporates appropriate methods developed for areas of ground disturbance.

CDOT has developed a standard protocol for weed management associated with highway projects which includes:

- Mapping of all weed species within a project area;
- Long term maintenance to control weed propagation;
- Re-establishment of native vegetation; and
- Weed eradication methods.

Surface Water and Groundwater Issues

Stormwater Runoff and Impervious Surfaces

Imperviousness is an issue anywhere the natural ground surface is altered. Parking lots, roads, and buildings all interfere with natural filtration processes. Focused attention should be given to anywhere new roadways are planned to be constructed. The greatest percentage increase in impervious surface area will occur in the Jimmy Camp Creek and Sand Creek sub-watersheds and then Cottonwood Creek. Development trends in the north and to the east of the city of Colorado Springs are reaffirmed by these projections. Along with the increase in building of new developments comes the building of new roads in all the areas where construction projects are planned. All of these projects will dramatically increase the amount of impervious surfaces.

Identification of key filtration areas is necessary to reduce the issues that arise from imperviousness. At sites where infiltration must be preserved, stormwater ponds are a possible solution. Stormwater ponds collect runoff from roadways and other impervious surfaces and still allow the water to enter the ground, although at a nearby site. Possible mitigation strategies are shown in Table 12-1.

Given that the 2035 Regional Transportation Plan will increase the amount of impervious surfaces as well as the resulting effects, there are several management strategies which can be put into place to reduce the impacts of impervious surfaces onto the waterways. The first strategies are to put improvements right into the plans. The state of Colorado has developed a Non-point Source Management program to reduce the amount of pollutants in the waterways. In this, they suggest many BMPs, to help manage the construction and runoff of roads to reduce pollution in a feasible, economically viable way. It will be important to consider these BMPs when constructing and managing the 2035 Regional Transportation Plan, as they will help to maintain the health of the waterways. Below are a few examples (the full text can be found in Colorado's Non-point Source Management Program):

- **IMPROVED GUTTER SYSTEM** - many projects already have this incorporated, but an improved gutter system would help manage stormwater and runoff. It could ideally replace ground water if constructed correctly, and it would also reduce the amount of overland flow and the amount of debris that is picked up by the flowing water.

- **HIGHWAY AND ROAD CONSTRUCTION** - the Colorado Department of Transportation has adopted an erosion control manual for all highway and road construction projects. The main points of the BMP are to protect areas that provide important water quality benefits that are susceptible to erosion or sediment loss to limit land disturbance. There are also inspection and general maintenance outlines to maintain the erosion and sediment release from a construction site.

- **STORMWATER QUALITY BMP** - For improving the quality of stormwater, the state recommends building grass swales and buffer strips, constructing wetlands, extending dry ponds and wet detention ponds, and making infiltration basins. These methods would improve the quality of storm water being released into the waterways, including storm runoff from roadways, so this BMP should be looked into.

TABLE 12-2: BEST MANAGEMENT PRACTICES

Erosion and Sediment Control BMP's	Stormwater Quality Management BMP's
1. Seeding and Mulching	11. Grass Swales
2. Surface Roughening	12. Grass Buffer Strips
3. Erosion Bales and Silt Fence	13. Constructed Wetlands
4. Berms, Diversions and Check Dams	14. Extended Dry Ponds
5. Inlet and Outlet Protection	15. Wet Detention Ponds
6. Slope Drains	16. Infiltration Basins
7. Erosion Control Blankets	
8. Channel Linings	
9. Sediment Traps	
10. Sediment Basins	

From the Colorado Non-point Source Management System, 2000

Erosion and Sedimentation

There is a broad range of potential watershed management practices designed to mitigate past and future problems based upon best management practices (BMPs). These are discussed in the previous section. When properly installed and maintained, BMPs play an important role in controlling non-point source pollution, thereby protecting water quality and riparian habitats, mitigating floods and maintaining stream stability. Several BMP manuals have been developed at national, regional and local levels.

- The Colorado Department of Transportation (CDOT) has developed an Erosion Control and Stormwater Quality Guide. Guidelines are given for the application, use limitations, design, construction, and maintenance of BMPs for erosion and sediment control, water quality and stormwater quality management.

- The City of Colorado Springs adopted the Drainage Criteria Manual, Volume 2, Stormwater Quality Policies, Procedures, and Best Management Practices (BMPs) for compliance with NPDES Phase I regulations. El Paso County has adopted similar measures to ensure compliance with the NPDES Phase II requirements.

Erosion is the primary concern for most of the headwater streams while sedimentation is a priority for many of the sections in the mainstem of Fountain Creek. Channel stability problems identified through the ACOE as preliminary recommendations are:

- **LIMIT SEDIMENT SOURCES** - Sand Creek; Cottonwood Creek, Eastern Tribs – Pine Creek, Black Squirrel Creek, Middle Trib, Monument Branch, Black Forest, Jackson Creek

- **PROTECT INFRASTRUCTURE** - Sand Creek, Cottonwood Creek, Pine Creek, Fountain Creek – Fountain Valley Park to Clear Springs Ranch, Fountain Creek – Monument Creek Confluence to Sand Creek Confluence and Monument Creek

- **STABILIZE STREAMS WITH CHANGED HYDROLOGY** - Monument Branch, Upper Cottonwood Creek – Above Rangewood, Teachout Creek, Elkhorn Creek, Black Squirrel Creek, Jackson Creek

- **PROTECT STREAMS WITH UNCHANGED HYDROLOGY** - Jimmy Camp Creek, East Fork Sand Creek – Above Constitution and Beaver Creek

Further information can be found in the ACOE recommendations found on the Fountain Creek Watershed website (www.fountain-crk.org)

Flooding and Floodplain Impacts

Restricting development on currently identified floodplains is an obvious strategy to minimize flood damage. Flooding is a natural event that is difficult to control. Flood control devices, such as levies, are an option, but are not always 100% reliable. Where projects cross onto existing floodplains, potential damage may be expected. Potential areas identified through the ACOE Watershed Study for flood risk reduction are: Pueblo Levee, Dam above Pueblo, Highway 24 Corridor (including Manitou Springs), Fountain/Monument Confluence to City Limits, Old Pueblo Road Corridor, Numerous Bridge Over toppings, Upper Monument Creek and Cheyenne Creek

Water Quality

Water quality is extremely important to the health of the land, the ecosystem, and human usage and is greatly affected by both point and non-source point polluters. Having good water quality makes it usable for wildlife and habitat preservation, recreation, drinking water supply, crop irrigation, and industry.

There are several segments on the 303d list for impairments of E. coli and Selenium, and they are closely watched for sediment loads. All of the projects must look at the potential effects to comply with the federally regulated standards and not add to the problem of more pollution in these waterways which affect the whole environment. Transportation projects will increase the pollutant loading to stream and riparian areas. Without mitigation strategies, the effect of pollutant loading over time may cause loss of ecosystem health and diversity.

Bacteria

Potential sources of high indicator bacteria levels include raw sewage spills, storm runoff from urban areas, and runoff from non-urban areas. Studies are currently underway for the purpose of using DNA analysis to determine whether *E. coli* bacteria come predominantly from human or from animal sources. Wildlife, livestock, and domestic animals also carry *E. coli* and fecal coliform bacteria, and discharge them into the environment. Identifying the predominant source(s) of bacteria may make it possible to devise control strategies that efficiently target bacteriological sources to reduce levels of indicator bacteria in Fountain Creek so that compliance with water quality standards is consistently attained.

Selenium

It is difficult for regulatory programs to mitigate natural sources of pollutants and there are no formulated specific strategies to address selenium. Transportation projects are not anticipated to contribute to the existing Selenium problems.

Groundwater

Problems to transportation projects due to groundwater have occurred in the past. Heaves and cracks caused by heavy rains in 1999 and two undiscovered springs under the highway delayed construction of a rebuilt freeway between Fillmore and Bijou Streets. Groundwater caused the soil to be too wet when the concrete was poured.

Increased pumping is lowering the water table dramatically. Mitigation strategies can include an electric pump to drain water and keep the highway from flooding. It is important that entities, which depend on ground and surface waters for domestic water supplies, should develop appropriate protection programs, such as a wellhead protection program pursuant to Section 1428 of the Safe Drinking Water Act, or a watershed protection program pursuant to CRS 31-15-707(l)(b).

Cultural Resources

Historic and Archaeological Resources

Preservation is accomplished primarily by those with a stake in the resource, whether that person or entity be in the public or private sector. Deciding which historic physical feature to preserve may evolve over time. While many buildings are saved for sentimental reasons, the majority are preserved as a consequence of its economic viability. Other considerations for preservation include the relative significance of the identified historic resource, its attraction to tourists and visitors, its promotion as a tool for education and enjoyment, and its formal contribution to the quality of life in the region.

The identification and preservation of archaeological resources is equally as important. As growth continues, all parties must be sure that agreements are in place with local, or once local, Native American tribes. Such formalized agreements often include specifications for actions upon discovering artifacts or grave sites. Cooperation between all parties involved and having an understanding of proper action guarantees that both sides will see their goals realized.

Within the MPO, there are many available resources whose objective is to identify and help protect these artifacts of the past. The City of Colorado Springs maintains the Historic Preservation Board for the purposes of assisting the city with projects that involve historic resources. The National Register of Historic Places, created under NHPA, is another facet to preservation. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture. Currently there are six National Historic Districts within the MPO area, including Old Colorado City, the North End, and downtown Manitou Springs. Many buildings, bridges, mines, and railroad depots across El Paso and Teller Counties are also registered historic places. Figure 3-15 identifies all locations within the MPO area for historic and archaeological preservation. Specific locations of archaeological sites are not available to the general public in order to protect these resources.

Community Resources

Socio-Economics

Protection and enhancement of the environment is a key element in economic diversification and the provision of a stable economic community for residents of the Pikes Peak region. Many examples of the potential for economic diversification relate to the protection and enhancement of water quality, such as tourism and recreation. This includes:

- expansion of recreational opportunities under a system more sensitive to diverse public needs, balanced with needs to conserve resources and protect the watershed;
- management of the watershed under the auspices of regional and multi-jurisdictional planning efforts that include participation from a broad range of stakeholders, resource managers, and public officials;
- maintenance and/or establishment of viewsheds; and
- increased opportunities for local economic development.

In addition to its influence on the environment, the demographic and socio-economic trends also help provide a base for establishing the region’s future transportation vision. Expanding population, employment, and urban area size typically result in the need for increased transportation facilities and services. Changes in population alter travel patterns. An increase in the number of households or an increase in income results in an increase in the number of vehicle trips. Social patterns can determine travel characteristics as well. With new construction or increased traffic congestion, homes or businesses could be displaced and ethnically homogeneous neighborhoods could be divided. To address such negative impacts, more efficient utilization of transportation facilities is important to meet the increased travel demand. These improved transportation facilities and services are required to alleviate congestion, to maintain acceptable air quality, and to provide for the general safety and welfare of the community.

Public Services and Facilities

Each entity within the MPO region provides its own public services and facilities creating situations where different levels of service abound. While an urbanized area may offer obligatory services, a rural environment may only offer limited services such as voluntary fire protection. To meet the expected increase in demand for pubic services and facilities throughout the Pikes

Peak region, each jurisdiction should identify current and future deficiencies and recommend action steps for successfully implementing required improvements. In addition, each jurisdiction should keep communications strong and provide regional coordination among service providers via Memorandums of Understanding or Intergovernmental Agreements. Finally, each jurisdiction should work on identifying possible sources of future funding to provide additional facilities and increased public service to their area.

Land Use

Due to the rapid growth described in Chapter 5, Future Regional Development, the land use within the MPO area is increasingly residential or commercial and decreasingly agricultural or natural. This results in a low density, suburban and ex-urban land use pattern which spreads development impacts more broadly across the region. With this development come increased automobile use, increased air and water pollution. To reduce these negative effects, local jurisdictions should encourage mixed-use developments and discourage developments that separate uses and necessitate vehicular trips. Balancing the distribution of employment and residential opportunities and land-use patterns that are mutually supportive of an intermodal transportation system can decrease reliance on an automobile and reduce congestion.

Neighborhoods

Roads have a particular impact on the landscape, fragmenting natural areas and neighborhoods. Effects of highways and roads on neighborhoods include loss of landmarks, degraded neighborhood identity, loss of community cohesion, interruption of traffic flow within neighborhoods, and increased noise. It is important, therefore, to recognize the central importance of all neighborhoods by continually improving the community's stewardship of its natural setting and strengthening the quality of a development's visual character and appearance. It is also important a neighborhood successfully integrates the uses and activities that meet the daily needs of its residents. To achieve this goal, many neighborhoods have formed active organizations to allow residents of different areas to get together to express common concerns and opinions. Examples of such groups include the North End Homeowners Association and the Organization of Westside Neighbors. An umbrella group, the Council of Neighborhood Organizations, provides a unified voice for these neighborhoods to participate in the decisions that affect them.

The MPO area contains a number of identifiable neighborhoods with a variety of living conditions that add to its character. There are neighborhoods in older but well maintained areas like the Broadmoor and there are neighborhoods in newer areas like Briargate. For the most part, new neighborhoods in the MPO area are located in the outlying areas to the north and east of the region, far from the downtown district. Use of Community Impact Assessment measures can help determine mitigation of neighborhood impacts.

Noise and Vibration

Typical noise dampening solutions involve the construction of a barrier surrounding the source of the problem. Highway sound walls are an effective manner in which to decrease the annoyance and risks to houses and businesses next to high-speed roadways. Pavement type can also be changed from the traditional concrete or asphalt for a blend that contains the remnants of used tire rubber. The rubber reduces friction and roadway contact, therefore reducing the noise problem. Also, new housing developments should not be encouraged directly adjacent to current rights-of-way.

While all streets and roads contribute to the issue, those with higher speeds are typically the source of vehicle-related noise. Interstate 25 and other regional freeways and expressways are examples of such roads. New developments allow the chance to mitigate the issue before the problem is out of hand whereas already developed areas prevent a challenge.

Federal laws and regulations require that it is necessary to undertake special technical analyses to identify and evaluate the potential noise impacts a project will involve. Once a noise impact is identified, CDOT will evaluate feasible and reasonable noise abatement methods to reduce traffic noise impacts. Traffic noise can potentially be reduced by addressing the noise source, noise path or noise receiver.

Parks and Recreation

A community must clearly recognize the trade-offs between providing adequate open space and allocating resources to other needs. When developing projects, coordinators should ensure that transportation developments do not interfere with the existing park system and should be encouraged to continue to reserve lands for future recreational use. Park and open space design should meet a wide range of recreational needs, preserve important natural features, use native landscaping materials, and incorporate multi-use facilities. All parks and open spaces should be well-maintained and remain functionally and physically attractive.

Recreation sites exist throughout the transportation planning region. The majority of parkland acreage within the region is in its natural state such as Garden of the Gods or Palmer Park while the rest can be found in community parks, neighborhoods parks, golf courses, and bicycle and pedestrian pathways. Projects that cross or may interfere with a site may occur. For example, bicycle and pedestrian paths commonly cross roadways and may need to be rerouted or detoured depending on the project.

Section 4(f) of the USDOT Act of 1966 applies to any USDOT funded project which involves the use of any significant publicly owned public park, recreation area, or wildlife and waterfowl refuge and any land from an historic site of national, state or local significance. Special environmental analyses are required to determine if there is a feasible or prudent alternative to taking the proposed action involving the use of the 4(f) property. In addition, the project sponsor must demonstrate that all possible planning to minimize harm has occurred. These measures to minimize harm, which include mitigation, will be documented in the 4(f) evaluation.

Section 6(f) of the Land and Water Conservation Fund Act of 1965 applies to any USDOT funded projects which involve the use of lands which have Land and Water Conservation (LAWCON) or Open Space Land Acquisition and Development (OSLAD) funds involved in their purchase or development.

Air Quality

Particulate Matter

Particulate Matter is both naturally occurring and is created from road dust, automobile and diesel engine exhaust, soot, and sulfates and nitrates from combustion sources. Mitigation strategies include:

- Create and implement a Diesel Emission Control Program;
- Research and require improved street sanding and cleaning techniques;
- Encourage alternate transportation (public transit, bikes, etc.);
- Create and implement controls on wood burning;
- Pollution prevention programs; and
- Create and implement stationary source control policy.

No mitigation locations are recommended due to a lack of data and because current concentrations are significantly below the standard.

Carbon Monoxide

As Section 2 from the Regional Setting discusses, mobile source emissions and emissions from cars and trucks are one of the largest sources of carbon monoxide emissions in the region. Mitigation strategies include:

- Encourage burning of cleaner fuels;
- Reduce vehicle miles traveled;
- Encourage alternate transportation (public transit, bikes, etc.);
- Reduce congestion and improve traffic flow; and
- Improve land use and transportation planning.

No mitigation locations are recommended due to a lack of modeling data and because current concentrations are significantly below the standard.

Ozone

PPACG initiated a voluntary effort to reduce ozone concentrations in the summer of 2007 which included:

- Develop a PPACG web page regarding ozone strategies;
- Update Ozone Pollution pamphlet;

- Contact individual gasoline suppliers and encourage them to continue delivering voluntarily lower Reid Vapor Pressure (RVP) fuel; and
- Distribute "Stop At the Click" Stickers.

On June 20, 2007 EPA proposed to lower the primary health standard for ozone to a level within the range of 0.070 and 0.075 ppm. A final recommendation will be issued by March 2008. This is further explained in Attachment 3, EPA Revised Ozone Standard Fact Sheet. If the standard were to be between 0.070 and 0.075 ppm, based on current concentrations (0.073 ppm at U.S. Air Force Academy and 0.074 ppm at Manitou Springs), PPACG could be found to be in non-attainment and would implement mandatory regulations. This would require development of a State Implementation Plan for ozone and establishment of VOC and NO_x emission budgets. Possible strategies, based on what is being considered in Denver are:

- High Emitter Vehicle Scrappage Program
- Inspection/maintenance Program that would focus on hydrocarbons and nitrogen oxide
- Adoption of a lower Reid Vapor Pressure gas
- Colorado Clean Car Program
- Create policies to control vehicle idling
- Encourage alternate transportation (public transit, bikes, etc.)

Further research, including dispersion modeling, needs to be conducted to determine potential mitigation locations. Because ozone is a regional pollutant it is difficult to pinpoint precise locations so strategies would be implemented either statewide or locally.

Summary

The 2035 Regional Transportation Plan could have a large effect on the environment if projects are not managed properly. Because of this, pollution prevention and mitigation strategies must be fully evaluated to prevent as much harm as possible. Some possible mitigation effects for the construction of new roads is to ensure that all construction is done in a way which promotes erosion control, and apply best management practices to target runoff and prevent any unnecessary run-off in these loose granite areas. Another concern for pollution control in this watershed is it is currently on the monitoring 303d list for the EPA for impairments of E. coli and Selenium, and is closely watched for sediment loads. All of the projects must look at the potential effects to comply with the federally regulated standards and not add to the problem of more pollution in these waterways which affect the whole environment.

It is also important to make certain regulations are being followed. Some stricter policies could be put into place to make sure this is happening. Also, alternative routes could be considered to build in places which would not affect water quality, for example not building near impaired streams or wetlands. Also, policies could be created and more money could be directed to improve public transportation to take more traffic off of the roads and reduce the need for quite as much. These have been discussed in previous sections.

A more fundamental problem with the transportation plan is that it reflects the high amount of development occurring in the urbanizing areas, and this development will have many significant effects on the environment and the region as whole in the future. A more sustainable city planning with less sprawl would create significant improvements for the environment and greatly reduce the planned amount of impervious surfaces.

Many of the projects in the transportation plan are repairing or making improvements on already existing roads, and many issues related to problems like habitat fragmentation have already occurred. However, construction itself has an effect and the increase in roadway area also has a big effect on the environment and the region.

The overall intent of this Section is to maintain the existing high quality of the natural landscape while accommodating growth and development. Implementation of the recommendations made in this Section will have social and economic costs and benefits and will consider the importance to:

- Meet the needs of the present without compromising the quality of life in future generations;

- Maintain economic growth while minimizing air quality and water quality pollution, repairing environmental damages of the past, producing less waste, and extending opportunities to live in a pleasant and healthy environment; and

- Meet human needs by maintaining a balance between development, social equality, ecology, and economics.

This requires taking a larger regional perspective, looking at past trends, current activities and how future activities might affect the region. Through a regional perspective, it is easier to determine the direct, indirect and cumulative impacts of existing and proposed projects. This Section recognizes that the recommendations made to mitigate and prevent future problems have positive and negative effects.

Implementation of the recommendations in this Plan will be accomplished through the recommended use of policies and strategies that target the unique problems throughout the planning region. Implementation of the recommendations could require greater enforcement and development and refinement of new and existing regulations.

The *negative impacts* in implementation of the recommendations include:

- Land use impacts;
- Community and neighborhood impacts;
- Temporary local construction impacts on noise, dust, soil disturbance, and traffic; and
- Increased levels of regulation and development costs associated with protecting water quality.

Positive impacts include:

- Maintenance of water quality in streams;
- Protection of aquatic life in fishery resources;
- Maintenance and composition of plant species;
- Maintenance of ecological processes across the landscape; and
- Protection of wetlands and riparian areas.

Policies need to address water quality degradation; urban runoff; construction activities; agriculture activities; use of chemicals; fill in of wetlands and degradation of riparian areas.

CHAPTER 13: AIR QUALITY CONFORMITY

The Pikes Peak Area Council of Governments has been designated as the Metropolitan Planning Organization (MPO) for transportation planning in the Colorado Springs Urbanizing Area. One of the responsibilities of an MPO in an air quality maintenance area is making an air quality conformity determination for regional long-range transportation plans and transportation improvement programs.

The United States Environmental Protection Agency (EPA) and the United States Department of Transportation have jointly developed "Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 U.S.C. or the Federal Transit Act," commonly called the transportation conformity rule. Conformity ensures that transportation plans, programs, and projects will not produce new air quality violations, worsen existing violations, or delay timely attainment or maintenance of national ambient air quality standards. The conformity determination of the *2035 Regional Transportation Plan* is based on these criteria.

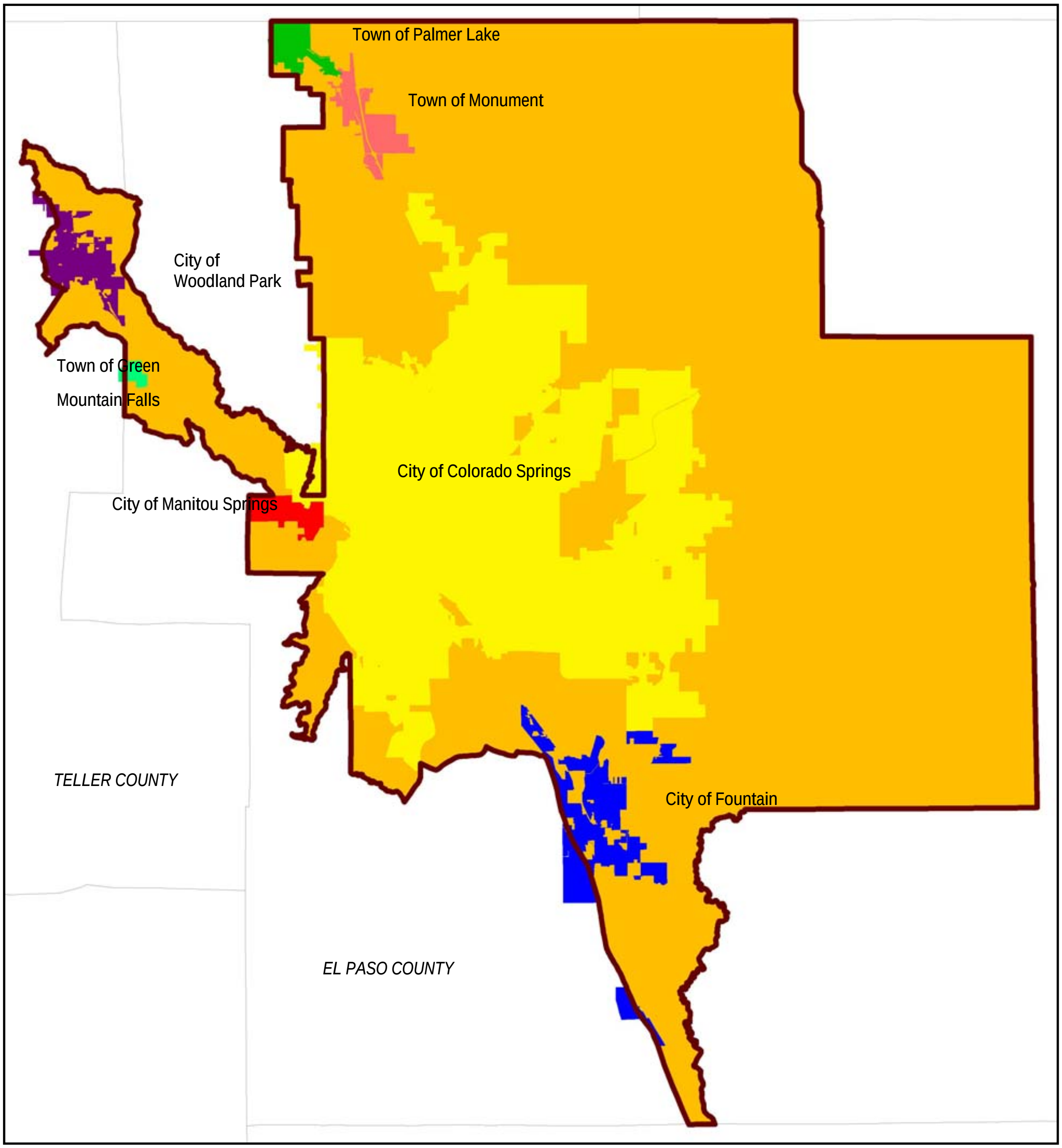
The EPA reclassified the Colorado Springs area as a maintenance area for carbon monoxide in October 1999. The area will remain a maintenance area until 2019 at which time it will be redesignated an attainment area if no violations of the National Ambient Air Quality Standards have occurred. The maintenance area has been defined as the same as the transportation planning area shown in Figure 13-1.

CONFORMITY CRITERIA

The Clean Air Act Amendments of 1990 (CAAA) require all conformity determinations to be "based on the most recent estimates of emissions, and such estimates shall be based on the most recent population, employment, travel and congestion estimates as determined by the Metropolitan Planning Organization..."

Travel demand modeling for the metropolitan area is developed by PPACG using the best methodology available. The travel demand forecasts and the regional air quality analyses described herein are based on the population and employment forecasts developed by PPACG and documented in the "Small Area Forecast 2005-2035". The small area forecast was approved by the PPACG Board of Directors on July 11, 2007 and represents the most current forecasts for small area population and employment for this region. The base year for the forecast is 2005 and the forecasting methodology made use of the 2000 Census data.

FIGURE 13-1: COLORADO SPRINGS METROPOLITAN PLANNING AREA



Projects identified in the *2008-2013 TIP* come from the approved, and conforming, *2035 Regional Transportation Plan*, the current long-range transportation plan. To determine whether the *2035 Plan* and the *2008-2013 TIP* are in conformity with the CAAA and the *Carbon Monoxide Maintenance Plan for the Colorado Springs Attainment/Maintenance Area*, the projects in the transportation plan and TIP must contribute, as a whole, to a reduction in future carbon monoxide emissions. The carbon monoxide emissions from on-road mobile sources in the future must be less than the carbon monoxide emissions budget established in the maintenance plan. The maintenance plan was amended in December 2003 to end the inspection and maintenance program and to revise the emissions budget from 270 to 531 tons/day using *Mobile 6.2*. The U.S. Environmental Protection Agency approved the *Maintenance Plan* revisions and new emissions budget on November 8, 2004.

The emissions budget was derived in the maintenance plan by taking the difference between the attainment year (1990) total emissions and the projected 2015 total emissions, and then subtracting one ton. One ton is subtracted because the safety margin plus the 2015 total emissions cannot equal the 1990 emissions. This difference is the “safety margin”, and the safety margin was added to the 2015 future year mobile sources emissions to determine the budget.

PPACG significantly revised its travel demand model in 2006 and 2007. The model was re-calibrated in November 2007 using number of lanes, speeds and traffic counts from 2005. Although the transit module of the model was not completed before the conformity determination was conducted, the mode split module did function and reduced the number of auto trips based on PPACG’s 2002 regional travel survey.

In preparing model networks for travel demand forecasting, base year and analysis year scenarios were identified. The base year scenario for the *2035 Regional Transportation Plan* and the *2008-2013 TIP* is 2005 and it consists of the transportation system and programs that existed at the end of 2005. The analysis year scenarios for 2015, 2025 and 2035 comprise the future transportation systems that will result from the implementation of the proposed TIP, the long-range transportation plan, and other expected regionally significant projects. The analysis year scenarios include all of the projects in the base year scenario and new projects programmed for completion by the end of the analysis years 2015, 2025 and 2035. These projects are identified in the memo included in this appendix.

The transportation networks for the 2005, 2015, 2025 and 2035 analysis years were submitted to the Colorado Department of Public Health and Environment's Air Pollution Control Division (APCD) and the Colorado Department of Transportation for review of the transportation demand modeling and *Mobile 6.2* analysis. Required input for the *Mobile 6.2* model was provided by APCD except for the vehicle miles traveled (VMT) and average speed by roadway classification and land-use type provided by PPACG. The roadway functional classification for the transportation model is divided into seven categories: freeway, expressway, major arterial, minor arterial, collector, centroid connector, and ramps. Land-use used to be divided into five categories: central business district (CBD), CBD fringe, residential, outlying business district, and rural. An analysis by the APCD determined there were no differences in emissions based on area type in the Colorado Springs area and consequently this attribute was dropped from the transportation model networks.

No emissions credit is being taken for the inspection and maintenance program that ended in December 2006. No emissions credit is being claimed for Congestions Mitigation and Air Quality Improvement (CMAQ) projects.

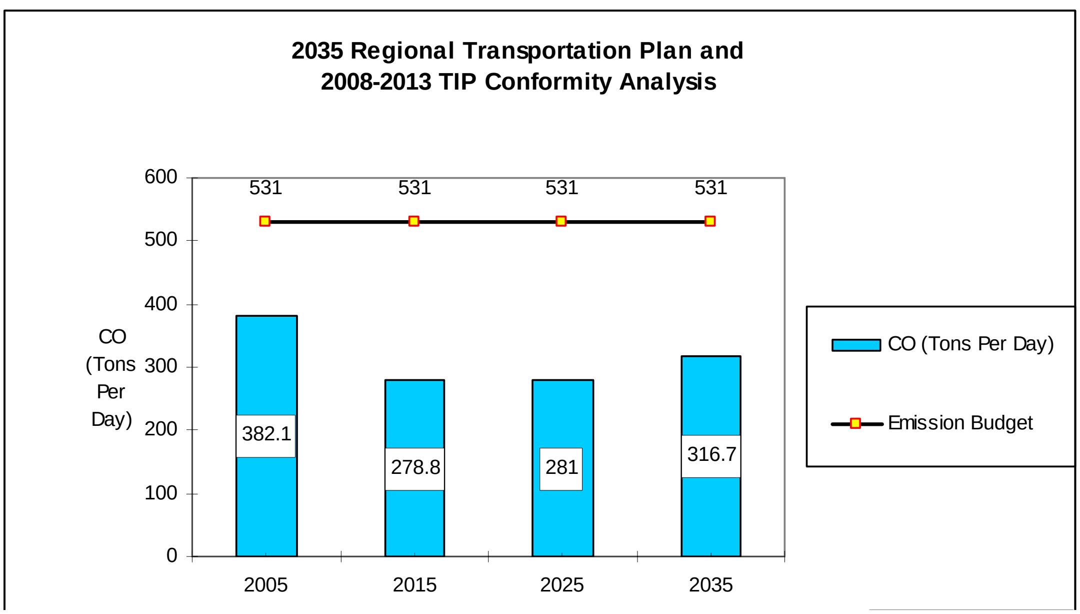
An interagency consultation meeting with representatives from the U.S. Environmental Protection Agency, Federal Highways Administration, the Colorado Department of Public Health and Environment, the Colorado Department of Transportation and the Pikes Peak Area Council of Governments was held on February 21, 2008. The purpose of the meeting was to review the data, assumptions and modeling used in the proposed conformity determination.

A summary of the results is shown in Table 13-1 and Figure 13-2. More detailed transportation and air emission modeling results are also included in Appendix A.

TABLE 13-1: 2035 REGIONAL TRANSPORTATION PLAN AND 2008-2013 TRANSPORTATION IMPROVEMENT PROGRAM MOBILE 6.2 RESULTS

Year	VMT	CO Emissions
2005	11,820,546 VMT/day	382.1 tons/day
2015	15,389,916 VMT/day	278.8 tons/day
2025	18,704,576 VMT/day	281.0 tons/day
2035	22,091,367 VMT/day	316.7 tons/day

FIGURE 13-2: CARBON MONOXIDE EMISSIONS, 2005 - 2035



CONFORMITY FINDING

The analysis indicates projected carbon monoxide emissions will be lower than the established emissions budget of 531 tons/day in each of the analysis years. Therefore the emission test is passed. All other requirements of both the Federal conformity regulation and Colorado's conformity regulation, Regulation 10, including fiscal constraint and latest planning assumptions, have also been met.

At its regular meeting on March 12, 2008, the Board of Directors of the Pikes Peak Area Council of Governments determined the 2035 Regional Transportation Plan and the FY 2008-2013 Transportation Improvement Program do conform to the Clean Air Act Amendments of 1990 and the Carbon Monoxide Maintenance Plan for the Colorado Springs Attainment/Maintenance Area. A copy of the resolution can be found in Appendix M.