

CHAPTER FOURTEEN

MITIGATION + MONITORING

Transportation planning and decision making, including project selection, must integrate and coordinate land use, water quality, and natural resource concerns.



Pikes Peak Area
Council of Governments

Communities Working Together

CHAPTER FOURTEEN

mitigation + monitoring

Preserving the high quality of life in the Pikes Peak region requires maintaining or enhancing communities and ecosystems while also accommodating growth and development. PPACG aspires to accomplish this by being as deliberate in developing coordinated and collaborative mitigation activities as we are in developing transportation projects. With this in mind, PPACG collaborates with local governments, non-profit organizations, and state and federal resource and regulatory agencies to mitigate adverse impacts of transportation projects. Collaboration among transportation planning, economic development, land development, and wildlife conservation efforts is critical because the impacts of policies will cut across all of these individual efforts. A desired outcome of the PPACG collaboration process is that transportation planning and decision making, including project selection, integrates and coordinates land use, water quality, 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.

In the context of a regional transportation plan, mitigation means the broad strategies, policies, programs, and actions that serve to help avoid, minimize, mitigate, or remediate impacts to the human and natural environments associated with the implementation of the regional transportation plan. The resources identified in *Chapter 2: Regional Setting*, summarize general issues related to potential direct, indirect, or cumulative impacts of transportation investments within the region. Recommendations are presented for each.

Due to the number and types of mitigation, not all of them are specifically 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. This process will identify issues and concerns that can be addressed proactively and can then be mitigated or incorporated into projects in a manner that both informs and reinforces other planning efforts in the region.

The federal requirement to incorporate mitigation into regional transportation plans means that this effort is not a one-time event that results in a single discrete output. Instead, it requires a continuous, cooperative and comprehensive process that is responsive to the momentum and cyclical nature of needs and priorities. Therefore, the data gathering and public sector capacity-building activities should focus on analytical, participatory, and political requirements that capture lessons from effective processes. This requires building inter-agency relationships, and building and maintaining a complete database of information.

There is only one federal source of funding directed by the PPACG Board to this effort: STP-Metro funds. Local, state, and federal officials have access to other funds, but they are in very tight supply.

FEDERAL REQUIREMENT

As part 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 Moving Ahead for Progress in the 21st Century Act requires a more consistent consideration of environmental issues at all stages of the transportation project development process, especially during long-range planning. Environmental mitigation strategies and activities are regional in scope and may not address potential project-level impacts. Changes in MAP-21 do not alter how the National Environmental Policy Act relates to a long-range transportation plan. The requirements to the precursor to MAP-21, SAFETEA-LU have been incorporated into MAP-21. The approach to the environmental principles contained in MAP-21 that US DOT will adhere to are found in [this document](#).

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. It is much more difficult to mitigate a negative impact if there isn't agreement on what con-

stitutes a negative impact. PPACG uses a collaborative planning process that identifies and adapts to conditions based on modeling, monitoring, and other research and analysis efforts. A desire of this is to add value to other planning and mitigation efforts and reinforce their effectiveness. The details regarding mitigation needs for transportation projects are discussed in the Integrated Regional Mitigation Plan (IRMP) found in Appendix K.

MONITORING REGIONAL INDICATORS

Using a common set of performance measures, or indicators, among agencies makes those indicators much more meaningful and useful. These measures should focus on the current status and on-going trends of resources. It is imperative that these indicators are developed cooperatively with partner agencies. Monitoring changes in key indicators not only provides information on whether a strategy or plan is delivering desired outcomes, but also assists in the early identification of unintended impacts.

This plan recognizes that transportation is not a single isolated component, but must be integrated with other projects. Some of the relevant local and regional projects in the Pikes Peak region include:

- Area Agency on Aging 2016–2019 Four-Year Plan
- [Colorado Springs 2015–2019 Five-Year Consolidated Housing Plan](#)
- [The Sustainable Fort Carson Plan](#)
- [The Pikes Peak Region Quality of Life Indicators Report](#)
- [Looking to Our Future – Pikes Peak Region 2030](#)
- [Fountain Creek Corridor Master Plan](#)

CONTEXT-SENSITIVE SOLUTIONS

Context Sensitive Solutions are 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 flexible 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 Context Sensitive Solutions to the planning and design of a transportation project can make the difference between a successful project valued by the community and an embattled project that could take years to complete. There are many definitions of Context Sensitive Solutions, 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
- Incorporate aesthetics as an integral part of good design

An effective Context Sensitive Solutions approach to transportation planning and project development will typically include:

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

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

PPACG Integrated Regional Mitigation Plan

In 2013, PPACG undertook an effort to establish a framework for developing an Integrated Regional Mitigation Plan (IRMP) for the Pikes Peak region and associated watersheds (Appendix K). The concept is to build off previous efforts, such as the draft Green Infrastructure Plan and the Peak to Prairie Plan, and use “advance mitigation” concepts to collaboratively find and fund the best regional mitigation projects, before some resources become threatened from development. Ecosystem banking is one concept that exhibits some promise to effectively accomplish this. Ecosystem banking is the preservation, enhancement, restoration or creation of a wetland, stream, or habitat conservation area which compensates for expected adverse impacts to similar nearby ecosystems. The goal is to replace or enhance the functions and values of the habitats that would be adversely affected by a proposed activity.

The IRMP contains the biological and land-use impacts resulting from transportation project implementation, and recommends funding some types of projects in the Regional Transportation Plan. This mitigation plan is included as Appendix K. The plan:

- Develops a standard methodology to spatially and temporally determine

biological impacts from development and transportation projects

- Develops a standard, easy-to-use mapping platform to display environmental impact locations and compatibility
- Provides the foundation for the potential future development of an ecosystem banking project
- Develops screening tables that show the environmental risk associated with each transportation project included in the RTP. These screening tables will be standardized for assessment of all projects in the future.

PPACG uses adaptive planning process concepts to keep the evaluation flexible and better able to adjust to dynamic conditions. This process allows on-going evaluation and reevaluation of how social, economic, and ecological indicators are directly or indirectly changed by multiple real-world decisions, including transportation investment. It requires establishing the existing context, undertaking the needed analyses, involving the appropriate stakeholders, informing decision-makers, and continuously monitoring and evaluating key indicators, with repeated iterations through the process to improve both the process and the outcome. The use of partnerships for cumulative mitigation to ameliorate cumulative impacts is core to this process.

The mitigation plan addresses the long-term mitigation needs associated with transportation projects. The mitigation database consists of transportation, socio-cultural, environmental (specifics about conservation targets such as wildlife, plants, and habitats), and external (consisting of related projects being proposed by other agencies) project data. The IRMP will provide a dynamic process linking specific projects to their expected impacts and potential places that can provide the necessary mitigation. Interventions identified may include partnering with other agencies to fund their projects in existing conservation areas that need restoration, planned conservation areas that need funding, and other priority conservation areas that need acquisition and/or restoration.

The IRMP includes federally listed and candidate species that are legally required to be included in the mitigation plan, and also includes:

- Critically imperiled species: five or fewer known occurrences across their entire range
- Imperiled species: 20 or fewer known occurrences across their entire range
- Vulnerable species and riparian and wetland communities: 100 or fewer known occurrences across their entire range.

Typical approaches to mitigation are limited to avoiding and minimizing impacts and mitigating unavoidable impacts at the project site. Enhancing or

restoring existing habitats off-site often proves more effective than creating new habitats. Discussions with stakeholders have also revealed that it may be more valuable to the region to mitigate impacts to one resource by improving a different, more valuable or critical resource. This is known as out-of-kind mitigation. The IRMP specifically allows for off-site and out-of-kind mitigation in order to best meet the overall needs of the region. Mitigation for rare plants must often occur in the places where these plants already exist.

Combining multiple mitigation projects into one site may prove more beneficial than completing disconnected individual projects. When users of the advance mitigation planning system evaluated potential mitigation areas, connectivity played a role in choosing the most beneficial area from the available options. Priority areas identified in the State Wildlife Action Plan also served as attractors for conservation areas.

The mapping tools on the PPACG website provide an efficient tool for depicting valuable mitigation locations, and also those with additional value such as water quality, recreational and storm water benefits. These maps and the impact database will be updated periodically.

TYPES AND LOCATIONS FOR MITIGATION

Discussions with resource agencies have led PPACG to consider off-site and out-of-kind compensatory mitigation for some impacts. This “banking” 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 additional future impacts.

PPACG collected information on current and planned mitigation projects from multiple federal, state and local agencies in order to create shared opportunities for environmental restoration projects and the opportunity to pool financial and other resources. Mapping was used to identify priority locations for environmental restoration and habitat improvement. These ecologically-sensitive and priority locations were overlaid on proposed projects to show which offer the greatest benefits. The project-specific mitigation location and impacts are discussed in the IRMP (Appendix K).

Natural Setting

Geology and Paleontology

The geology and topography of the region makes for impressive landscapes, but its inherent nature also makes it susceptible to risks and hazards. 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. The City of Colorado Springs requires developers to address geologic hazards on any proposed site and to engineer ways to mitigate those hazards.

The Colorado Geological Survey's regional landslide-susceptibility map 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 mining 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, re-vegetation, and slope stabilization. This will create opportunities for partnering with transportation mitigation projects. 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.

Banning Lewis Ranch is a key archaeological site in eastern Colorado Springs. The Palmer Land Trust is working to conserve portions of the ranch. Two million years of geological history from about 67 to 65 million years ago are preserved at Banning Lewis Ranch, including the most recent of five mass extinctions when an asteroid hit Mexico, ending the time of dinosaurs. Several hundred feet of rock, covering a million years' time, are filled with dinosaur and plant fossils and, above the extinction line, with the fossils of mammals.

At this location, there is a great opportunity to intermix ecological conservation with archaeological conservation and new development. There is the opportunity to capitalize on the unique ecological, archaeological and paleontological assets using innovative development and include conservation and recreation amenities.

Information on other locations of paleontological sites is not available to the general public in order to better protect these resources. Interested parties should cooperate with Colorado's State Historic Preservation Office or with natural history museums to establish proper mitigation.

Recommendations

- A paleontological assessment/literature review of known sites and a field review for fossil remains should be conducted prior to any transportation construction projects or maintenance activities.
- All geologic units with paleontological potential should be identified and protected for scientific study and public education.

- The integrated all-hazards mitigation plan should be updated regularly to identify critical areas that need to be addressed in the future.

Climate and Precipitation

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

Climate is indirectly affected by development patterns that influence travel behavior. Combustion of motor vehicle fuel emits carbon dioxide, a greenhouse gas that may trap heat within the atmosphere. With the current level of greenhouse gases, the atmosphere may warm and temperatures and sea levels may rise over the next 50 years. In the Pikes Peak region, there could be an increase in the occurrence of extreme weather events such as droughts and floods. There may be increased incidences of extreme weather, including heat waves, cold snaps, wind, and severe storms. Creating a transportation system that is resilient to these events includes providing more redundant mobility systems, creating additional transportation choices, constructing larger floodways under bridges, reducing vehicle travel, and decreasing fuel use per trip. This includes decreasing traffic congestion and increasing the occupancy of vehicles.

Climate can also influence air quality, which was evident in 2014 when ozone levels were their lowest in over a decade. This was partially a result of a noticeably wetter summer, as well as temperatures being 2 to 3 degrees cooler than 2013 and 4 to 6 degrees cooler than 2012.

Chapter 2, Table 2-2 shows monthly temperature and precipitation averages for the past 30 years for our region. This will help provide a better understanding of what type of restoration projects are suitable in different locations.

Recommendations

- Assess temporal and spatial differences in precipitation and temperature in the region to determine any anomalies in climate patterns. Precipitation can also affect areas of mitigation, type of vegetation, and mitigation recommendations.
- Determine if climate patterns will affect transportation projects, road conditions, and recommendations for future projects.
- Construct/maintain infrastructure to accommodate more extreme weather events.

Landscape and Vegetation

Soils and Mineral Resources

Of the nearly 200 soils found within the area, only two are useful as potential restoration soils. The Fluvaquentic Haplaquolls (**Figure 14-1**) is a hydric soil 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. The information on Fluvaquentic Haplaquolls soils will be combined with other information from other resource reports to pinpoint specific areas suitable for restoration.

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
- Accessible to monitoring

Soils not selected for potential restoration projects:

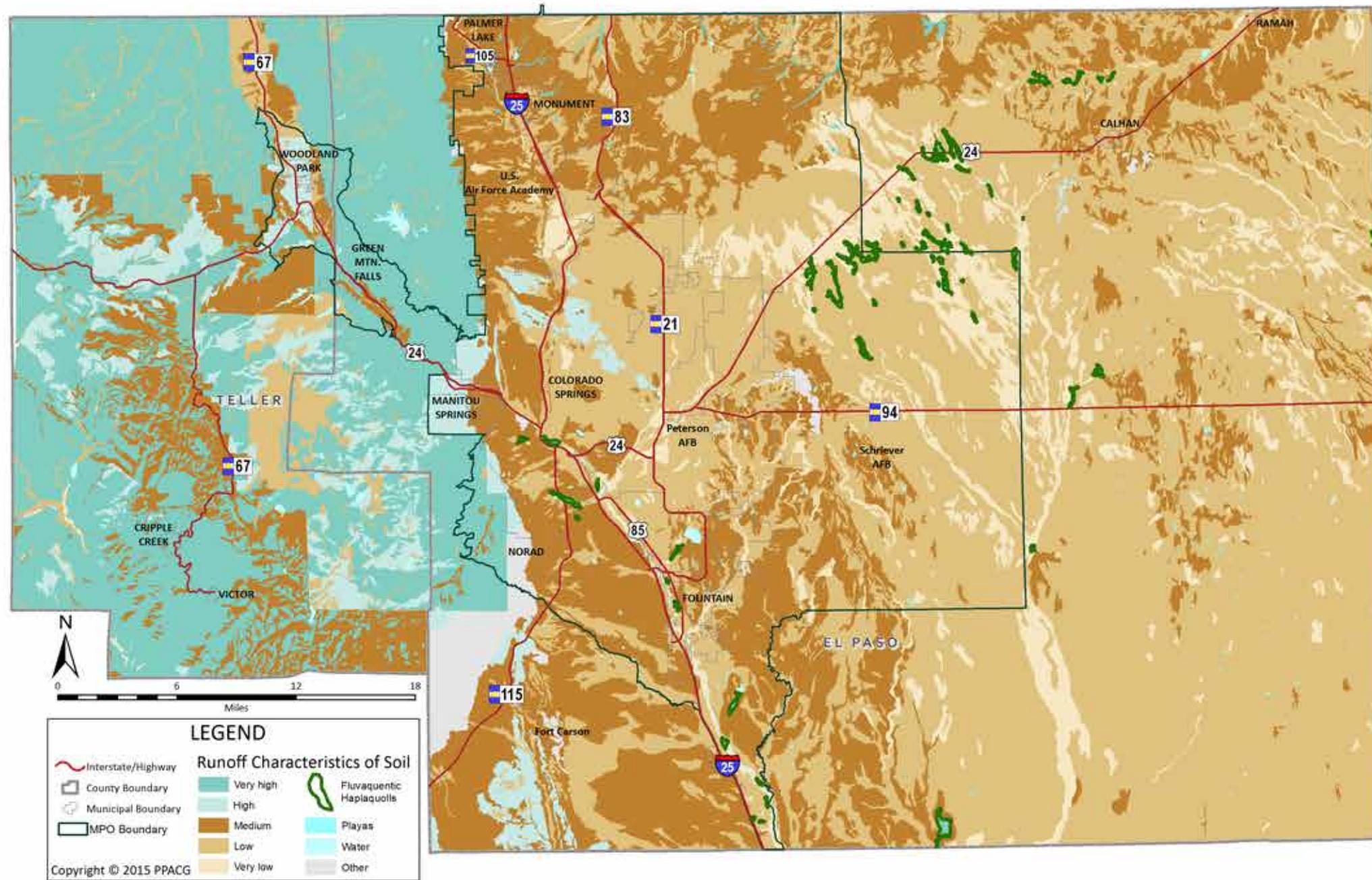
- Generally occur in cold climates
- Do not have consistent hydrology
- Have shallow depths to bedrock or contain exposed bedrock
- Are located on steep slopes
- Lack close proximity to riparian areas

Plants selected for restoration activities should be based on the characteristics of the soils. Native plants that can tolerate salinity, such as western wheat grass, should be selected for restoration activities. 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.

Recommendations

- Develop a list of best mitigation locations. These are areas where Fluvaquentic Haplaquolls (**Figure 14-1**) soils are present, which include terraces, marshes and swales, and floodplain steps.
- Both transportation and development projects should avoid locations where there are restoration opportunities available on these soils.

Figure 14-1. Hydric Soils



Vegetation

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

- Revegetating affected areas to replicate or enhance native vegetative communities
- Planting native trees in proximity to locations where trees are removed
- Minimizing construction disturbances by implementing best management practices
- Enhancing and restoring the existing conditions of the local vegetative communities
- Re-establishing and maintaining fundamental structures and ecological processes across landscape;
- Surveying areas that are impacted by road widening to minimize the potential disturbance

Potential vegetation mitigation locations are closely tied to the type of wildlife they support. The Colorado Natural Heritage Program designates Potential Conservation Areas that help sustain rare, diverse, and/or significant ecological processes. It is critical to avoid bisecting these areas or, if a road already bisects an area, to take steps to increase connectedness, such as increasing bridge width and culvert height to accommodate motility. Key areas are listed in **Table 14-1** and shown in **Figure 14-2**. These conservation areas are also shown on the mapping tool at the PPACG website. 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.
- USDA/USFS Research Natural Areas, the Forest Service Research Natural Areas (RNAs) network protects some of the finest examples of natural ecosystems for the purposes of scientific study and education and for maintenance of biological diversity. Two Research Natural Areas in our region are Hurricane Canyon (located in El Paso County in Pike National Forest) and Saddle Mountain (located in Teller County), which together encompass about 1,000 acres. Hurricane Canyon is located on the east slope of the Front Range and is an example of the original montane forests, and Saddle Mountain includes a large area of high-quality montane grassland that has not been grazed by domestic livestock since 1951.

- Colorado Open Lands and the Nature Conservancy have established conservation easements as part of the Peak to Prairie Project. These groups focus on properties in southern El Paso County and northern Pueblo County along Fountain Creek
- Palmer Land Trust, Colorado Division of Wildlife and Great Outdoors Colorado have been working on the Pikes Peak Conservation Corridor (PPCC). The PPCC is a block of ecologically sensitive public and private lands that frame the north slope of “America’s Mountain” between Woodland Park and Di-

vide, Colorado. In 2012, 6,000 acres of land on Pikes Peak’s north face was protected for conservation with completion of the last major phase of the Palmer Land Trust Scenic Conservation Corridor.

Wetlands

Under the Clean Water Act and Interagency Wetlands Policy Act, the Colorado Department of Transportation 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 through either restoration or creation of wetlands. CDOT uses the following best management practices, 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 of 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.

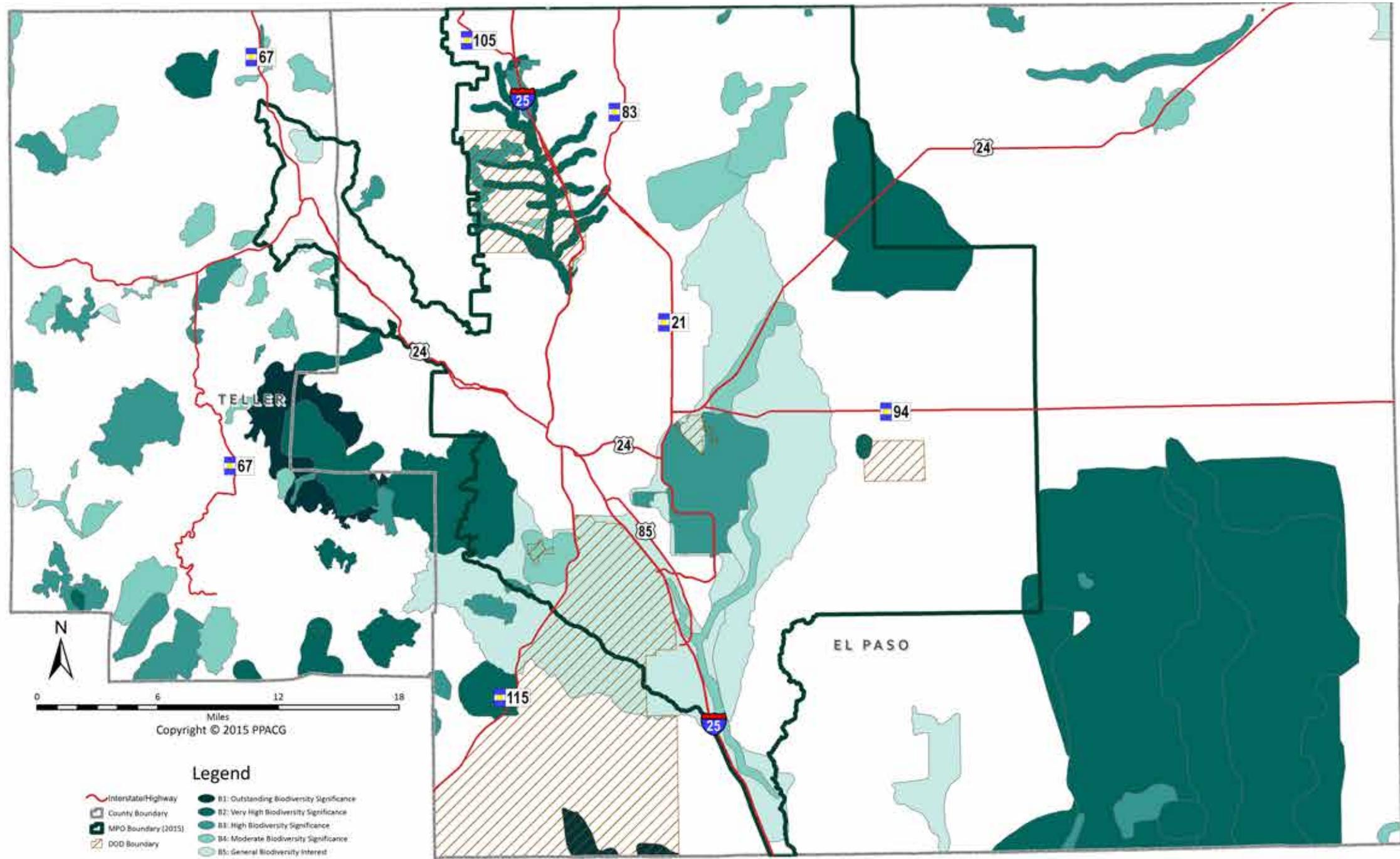
Cities and counties also have requirements for construction activities around wetlands. Discharge of water directly into streams from cofferdams or new channel construction is prohibited. Direct impacts to wetlands are typically offset by compensatory mitigation due to regulatory requirements (Section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

Generally, the Fountain Creek area provides the greatest opportunity for the restoration of

Table 14-1. 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
Rare Plants of the Chalk Barrens	Severy Creek	Air Force Academy Oak Foothills	Halfway Picnic Ground	Crystola Creek at Aqueduct
	Cheyenne Cañyon	Colorado Springs Airport	Cheyenne Mountain	Fountain Creek
	Cascade Creek East	Blue Mountain to Phantom Canyon	Fountain and Jimmy Camp Creeks	Fountain Creek Springs at Pinon
	Aiken Canyon	Almagre Mountain	Sand Creek Ridge	Hanover Road
	Chico Basin Short-grass Prarie	Bohart Playas	Blue Springs	Whit Gulch
	Jude Orr Road	The Craggs	Midway Prairie	Widefield Fountain
	Schriever Pass	Central Arkansas Playas	Catamount Creek	
	South Slope	Chico Creek	Cave of the Winds	
	Signal Roack Sand-hills	Monument South-east	Crystola	
		Table Rock	Pine Drive	
		West Kiowa Creek at Elbert	Pineries at Black Forest	
			South Catamount Creek	
			Upper Crystola Creek	

Figure 14-2. Potential Conservation Areas



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.

As shown in **Figure 14-3**, the southern portion of El Paso County and northern Pueblo County represent 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, and sedimentation. Preserving both the hubs of habitat and also the links between these habitats shown in **Figure 14-3**, the Pikes Peak Region Draft Green Infrastructure Plan, is critical to long-term successful conservation.

Recommendations

- In a highly collaborative effort, revisit the Peak to Prairie Project, in conjunction with a full Green Infrastructure Plan to coordinate the multiple on-going mitigation efforts in this area.
- 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, or if disturbance is unavoidable, use 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.
- Section 401 and 404 permits should be reviewed for consistency with regional plans to determine potential impacts to critical areas.
- Work with local planning departments to clarify and improve existing standards, regulations, and guidelines for development in and around wetland areas based on professional recommendations of wetland scientists.
- Hire a wetlands professional to determine locations for successful wetland creation and protection. Initial work was completed by the Fountain Creek Vision Task Force in 2007.
- Explore opportunities to create ecosystem banks, especially along Fountain Creek.

Hazardous Materials and Solid Waste

Although groundwater and surface water have 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, 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 and 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 sites are open leaking underground storage tanks that are currently being remediated under direction by the State of Colorado. Corrective Action and Comprehensive Environmental Response, Compensation and Liability Information Systems sites (see Figure 2-8) and some 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 Environmental Site Assessment will have to be conducted.

Recommendations

- Refine/update location information on sites with potentially hazardous materials.
- Conduct further monitoring of hazardous materials and solid waste facilities to determine impacts.

Seismic and Extreme Weather Impacts

There is increasing awareness regarding the effects of extreme weather and seismic events on transportation projects. Creating a resilient transportation system that can adjust to disasters is a new effort from the Colorado Resiliency and Recovery Office.

Recommendations

- Determine seismic zone areas and assess impacts on transportation projects.
- Avoid building transportation projects in areas that have a high probability of disaster occurrence.
- Adjust the design of projects to make them resilient if there is a probability

of disaster occurrence.

- Deal with broader effects of ground shaking and associated effects such as landslides or undermining on structures.
- Increase the seismic station coverage in the region to get a complete picture of the seismicity in Colorado and make detailed geologic site investigations. Areas where active faults are located are good possibilities for open space or agriculture uses, which would have minimal possible impacts on transportation projects adjacent to such areas.
- Develop maps showing a variety of hazards, including expansive soils, highly channelized flood zones, landslides, unstable slopes, and areas with mine subsidence risk.

Biological Resources and Issues

Wildlife Species, Viewing Areas, and Crossings

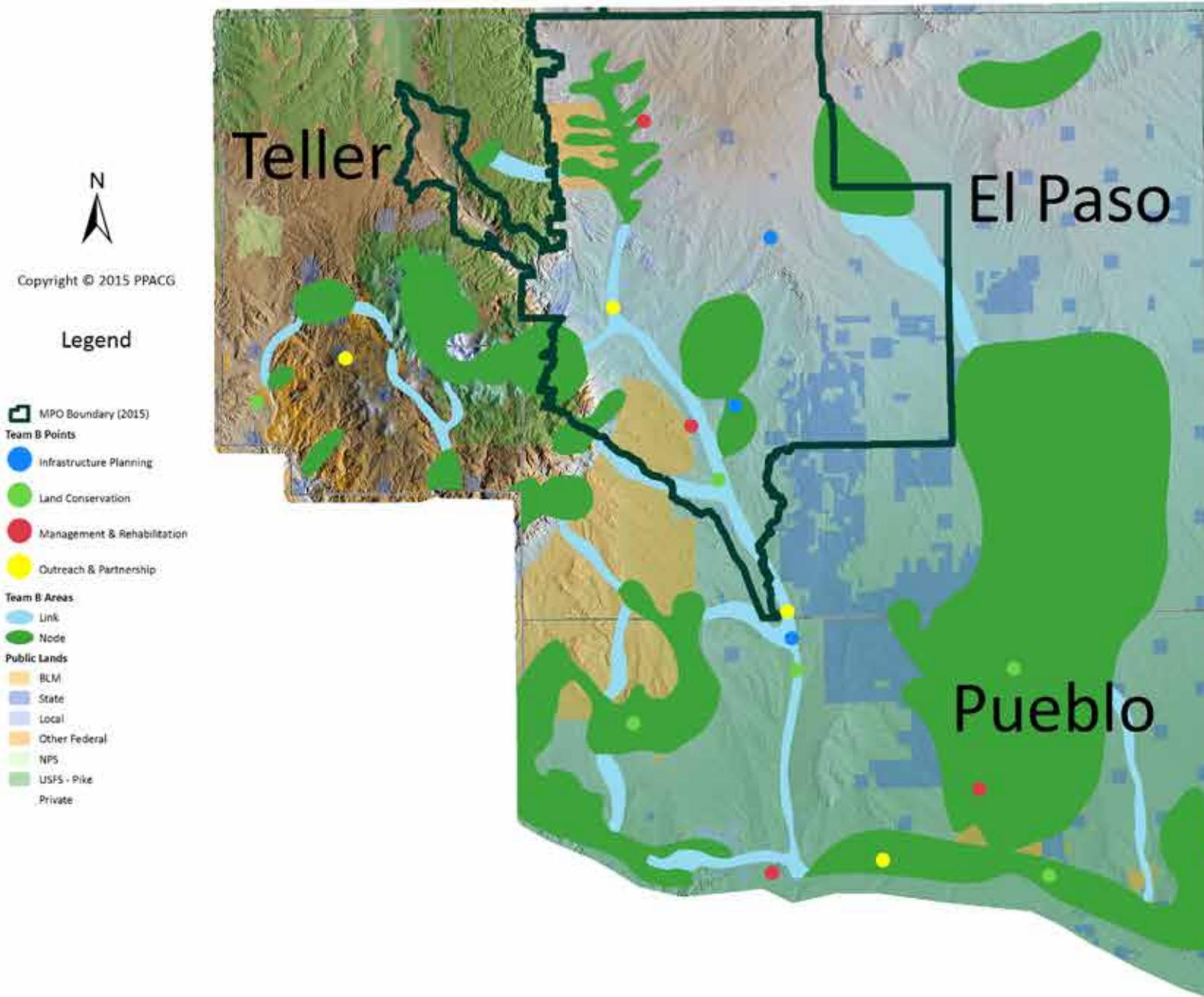
Avoiding having wildlife cross roads is beneficial to both the wildlife and to the people in cars that may impact that wildlife. Strategies for protecting wildlife species also serve to connect habitats.

Recommendations

- Install signs that warn drivers of potential wildlife on the road.
- Install beacons that are activated when animals approach a roadway. This option is best for less-used roads with seasonal migratory crossing.
- Culvert-type underpasses: Principally designed for water movement, these can be easily adapted as wildlife crossings. These work extremely well when paired with efforts to make infrastructure more resilient to extreme weather situations.
- Bridge extensions, open-span bridges: Where bridges already exist, animals may pass underneath along the low-terrain or riparian corridor. Incorporating a more open design into new and rehabilitated bridges is simple and encourages wildlife to use their preexisting migration routes, which may limit habitat fragmentation, especially in the potential conservation areas shown in **Figure 14-2**.
- Wildlife overpasses consist of natural-habitat vegetation and seem like a natural extension of the terrain. These are especially effective in high-terrain areas where there is a large amount of roadkill or where fragmentation has already occurred, such as U.S. 24 through Ute Pass.

These sites, shown in **Figure 14-4**, have been identified by Colorado State Parks, the Colorado Natural Heritage Program, wildlife viewing guides, local nature societies, and field experts as areas to observe wildlife and preserve

Figure 14-3. Pikes Peak Region Initial Draft Green Infrastructure Plan



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.

Threatened and Endangered Species

Protection of threatened and endangered species is primarily governed by federal and state regulations. Mitigation strategies are largely specific to the areas and species of concern.

Recommendations

- Preserve and protect detailed habitat ranges for threatened or endangered 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.
- Create wildlife crossings, especially where roadway bridges and culverts are already needed.
- Reduce habitat fragmentation, especially in potential conservation areas.
- Limit construction times to those appropriate for hibernation/migration.
- Establish/restore habitats as reserves or other protected wildlife areas.
- Conduct monitoring to assure that disturbance areas do not exceed permitted amounts.

Migratory Populations

Most migrations, regardless of species, occur on 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.

Primary migratory corridors are along main rivers and streams and are most concentrated to the north of the city, where significant development is expected 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.

Recommendations

- Maintain/refine the Natureserve Vista habitat impact model.

- Local jurisdictions should map all weed species within the region and develop long-term maintenance to control weed propagation and re-establish native vegetation.

Surface Water and Groundwater Issues

Stormwater Runoff and Flooding

Imperviousness is an issue anywhere the natural ground surface is altered. Parking lots, roads, and buildings all interfere with natural filtration processes. All new developments require the building of new roads, and 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 allow the water to enter the ground at a nearby site. Possible mitigation strategies are shown in **Table 14-2**.

The City of Colorado Springs completed their [drainage criteria manual](#), which was adopted in 2014. The revised regulation provides for:

- Low-impact design in new developments
- Detention ponds designed to be multipurpose and more natural
- Smaller ponds that will be less costly and more effective in capturing stormwater;
- Consideration of downstream impacts

Given that the Moving Forward 2040 Regional Transportation Plan will increase the amount of impervious surfaces, several management strategies can be used to reduce the impacts of impervious surfaces on waterways. The state of Colorado has developed a Non-point Source Management Program to reduce the amount of pollutants in the waterways. This program suggests many best management practices to help manage the construction and runoff of roads and reduce pollution in a feasible, economically viable way. The Colorado Department of Transportation has adopted an erosion control manual for all highway and road construction projects. The main point of this BMP is to protect areas that provide important water quality benefits that are susceptible to erosion or sediment loss to limit land disturbance. The manual also contains inspection and general maintenance guidelines to maintain the erosion and sediment release from a construction site. See **Table 14-2** for a few examples. (The full text can be found in Colorado’s Non-point Source Management Program.)

Recommendations

- Develop a multi-jurisdictional Green Infrastructure Plan built on previous efforts.
- Restrict development on currently identified floodplains 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 percent reliable.
- Develop a funding mechanism to fund short- and long-term stormwater infrastructure needs.
- Use stormwater-quality best management practices: The state recommends building grass swales and buffer strips, constructing wetlands, extending dry ponds and wet detention ponds, and making infiltration basins.
- Improved gutter systems would help manage stormwater and runoff. These can replace groundwater if constructed correctly, and reduce the amount of overland flow and debris that is picked up by the flowing water.

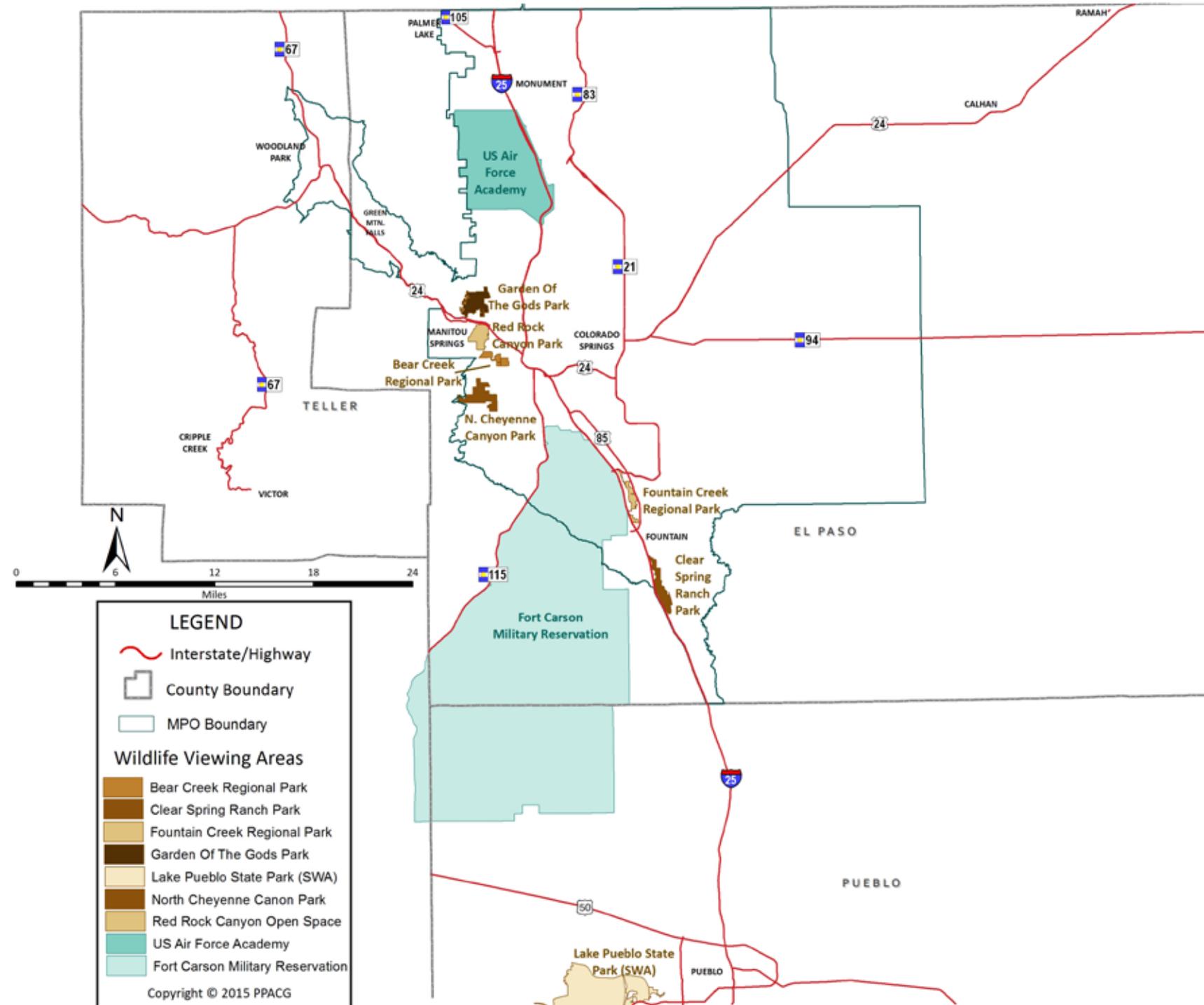
Erosion and Sedimentation

A broad range of potential watershed management practices are designed to mitigate past and future problems, controlling nonpoint-source pollution, protecting water quality and riparian habitats, mitigating floods, and maintaining stream stability. The Colorado Department of Transportation has developed an Erosion Control and Stormwater Quality Guide that includes guidelines for the application, use limitations, design, construction, and maintenance of best management practices for erosion and sediment control, water quality, and stormwater quality management.

Table 14-2. Best Management Practices

Erosion and Sediment Control BMPs	Stormwater Quality Management BMPs
Seeding and Mulching	Grass Swales Grass Buffer Strips Constructed Wetlands Extended Dry Ponds Wet Detention Ponds Infiltration Basins
Surface Roughening	
Erosion Bales and Silt Fence	
Berms, Diversions, and Check Dams	
Inlet and Outlet Protection	
Slope Drains	
Erosion Control Blankets	
Channel Linings	
Sediment Traps	
Sediment Basins	

Figure 14-4. Wildlife Viewing Areas



Water Quality

Water quality is extremely important to land health, ecosystem health, and human usage, and is greatly affected by both point and non-source point pollutants. Good water quality is usable for wildlife and habitat preservation, recreation, drinking water supply, crop irrigation, and industry. Successful mitigation will be accomplished using a regional and coordinated approach that recognizes creeks and streams as regional assets supporting diverse interests.

PPACG is developing a Watershed Based Plan for the Fountain Creek Watershed. This project started in early 2015, and will address the EPA's required nine essential elements. This study prioritizes the areas needing evaluation and assesses the potential effectiveness of best management practices to remediate segments listed as water-quality impaired for E. coli. The study will present solutions for reducing nonpoint source pollutant loadings that contribute to water-quality impairments and outline how these solutions can be implemented.

Table 14-3. Overview of Water Quality Issues

Topic	Issue/Implication
Arsenic	Arsenic standards for streams identified for drinking water and fish consumption use could decrease significantly in the near future. Such a decrease could require treatment of groundwater from construction dewatering before discharge into these segments.
Copper	There is the opportunity to develop alternate standards for copper where such standards could provide relief compared to the current hardness-based limits.
E. coli	Numerous streams are listed as impaired for E. coli. If these streams are not delisted, dischargers could receive more stringent limits.
Nutrients	Colorado's nutrient standards, especially nitrogen, are so low that they are currently technologically infeasible without going to drinking-water levels of treatment (reverse osmosis). Identification of alternate, site-specific options to these stringent values is imperative to balance the cost/benefit.
Selenium/ Sulfate	Naturally occurring levels of selenium exceed the current standard, and lower standards are expected in the near future.
Temperature	Temperature standards could drive dischargers to install effluent cooling, such as chillers or cooling towers.
Resegmentation	Stream segmentation may not be representative and could result in standards that are overly stringent. The Commission directed AFCURE to resolve resegmentation issues in the Fountain Creek Basin.

In May 2014, Arkansas Fountain Coalition for Urban River Evaluation ([AF CURE](#)), an association of 11 independent wastewater discharging entities located in El Paso and Pueblo counties, developed a [Water Quality White Paper](#). A description of the water quality issues and concerns discussed in the water quality white paper are shown on **Table 14-3**. This documents, informs, and guides water quality-related activities based on a comprehensive and agreed-upon understanding of the critical issues. It summarizes the needs and costs for water-quality-related issues that need to be addressed in our region. Although this is a planning document that is intended to assist AF CURE members with addressing water quality issues, it can also be used by other agencies to inform their processes.

Recommendations

- Maintain/refine the N-SPECT water model. This Nonpoint Source Pollution and Erosion Comparison Tool examines potential water quality impacts from development and changed land uses/ It simulates erosion, pollution, and their accumulation in streams and rivers from overland flow.

- Evaluate the potential effects that transportation projects will have on water quality and how it might compound existing problems or create new problems.

Groundwater

Problems with 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.

During the planning stages of transportation projects, the depth to groundwater and potential susceptibility of the aquifer to groundwater contamination should be determined. Mitigation strategies can include an electric pump to drain water and keep the highway from flooding. It is important that entities that 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). In the Upper Black Squirrel Alluvial Aquifer, there are areas where the groundwater is close to the surface water and could be impacted by transportation projects.

Recommendations

- Obtain data so that transportation projects can be evaluated to determine possible impacts upon aquifers underlying the project area. Data needed includes location of Sole Source Aquifers, Wellhead Protection Areas, depth to groundwater, potential groundwater standards and classifications.

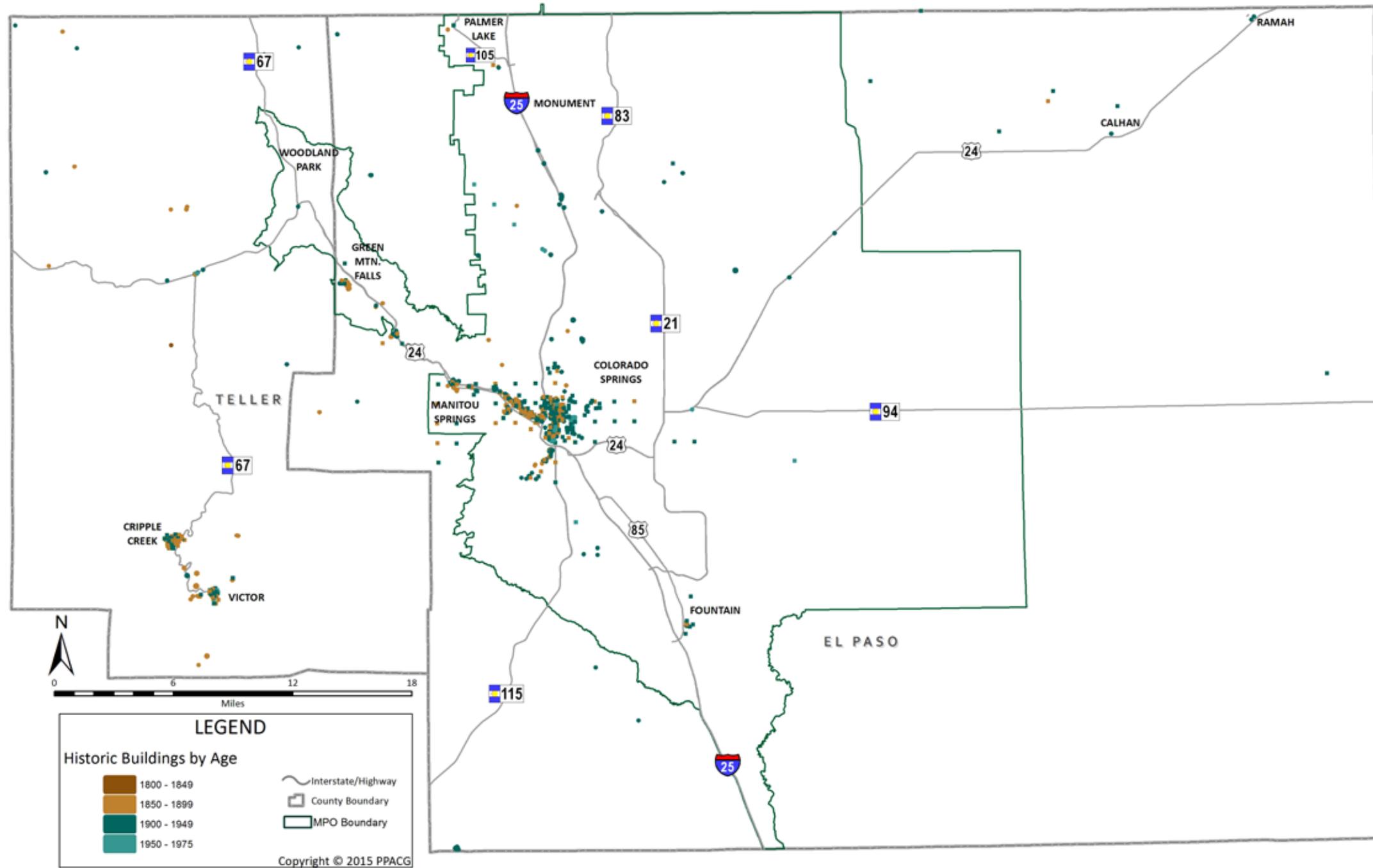
Cultural Resources

Historic and Archaeological Resources

To be considered "historic," a property must have three essential attributes, listed below:

- 1. Age:** A property must be "old enough" to be considered historic. Generally speaking, this means that a property must be at least 50 years old, although this is just a general rule of thumb. If a property has been studied by historians, architectural historians, or archaeologists and its place in history is clear, then some properties that are less than 50 years old are considered "historic." See **Figure 14-5**.
- 2. Integrity:** A property must retain its historic physical integrity. For a building, structure, landscape feature, historic site, or historic district, this means that the property must be relatively unchanged. Its essential character-defining features relative to its significance must still be present. For an archaeological site, integrity means that the site must be relatively undisturbed, with its patterns and layers of artifacts and other archaeological evidence relatively intact. For a traditional cultural property, integrity means that the site must be recognizable to today's affiliated cultural group, evidenced through tradition, and still used or revered in some way.
- 3. Significance:** Finally, and most importantly, a property must be significant to be considered historic. Significance is defined in three ways: (1) through direct association with individuals, events, activities, or developments that shaped our history or that reflect important aspects of our history; (2) by embodying the distinctive physical and spatial characteristics of an architectural style or type of building, structure, landscape, or planned environment, or a method of construction, or by embodying high artistic values or fine craftsmanship; or (3) by having the potential

Figure 14-5. Historic Buildings by Age



to yield information important to our understanding of the past through archaeological, architectural, or other physical investigation and analysis.

Preservation is typically accomplished primarily by those with a stake in the resource, whether that person or entity is in the public or private sector. Deciding which historic physical features to preserve may evolve over time. While many buildings are saved for sentimental reasons, the majority are preserved as a consequence of their 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.

Within the Metropolitan Planning Organization, there are many available resources to identify and help protect artifacts. 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 lists 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. Many buildings, bridges, mines, and railroad depots across El Paso and Teller counties are also registered historic places. Figure 2-17 identifies 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.

Recommendations

- Obtain parcel records for the region and determine which buildings will become potentially historic over the timeframe of the 2040 RTP.
- Work with the State Historic Preservation Office to develop a regional Cultural Resource Inventory.

Community Resources

Socioeconomics

Protection of the environment is a key element in maintaining a vital regional economy. Many examples of the potential for economic diversification depend on protecting and enhancing water quality, such as tourism and recreation.

These include:

- Expansion of recreational opportunities under a system more sensitive to diverse public needs, balanced with resource conservation and watershed protection
- Regional and multi-jurisdictional watershed management that includes participation from a broad range of stakeholders, resource managers, and public officials
- Maintenance and/or establishment of viewsheds
- Increased opportunities for local economic development

Demographic and socioeconomic trends in the region not only affect the environment but also provide a base for establishing the region's 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 increased travel demand. 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.

Recommendations

- Develop a population synthesizer and move to a tour-based travel demand model in order to better determine where benefits of investments accrue.

Public Services and Facilities

Each entity within the Metropolitan Planning Organization region provides its own public services and facilities, creating varying levels of social service. A rural environment may only offer limited services, such as voluntary fire protection. Mitigating impacts to disadvantaged populations related to transportation is primarily a local jurisdiction responsibility.

Recommendations for local jurisdictions:

- Identify current and future service deficiencies and recommend action steps for improvements.
- Local jurisdictions should keep communications strong and provide regional coordination among service providers via Memorandums of Understanding

or Intergovernmental Agreements.

- Identify possible sources of future funding to provide additional facilities and increased public service.

Land Use

Due to the rapid growth described in *Chapter 5: Future Regional Development*, land use within the Metropolitan Planning Organization area is increasingly residential or commercial and decreasingly agricultural or natural. This results in a low-density, suburban and exurban land-use pattern that spreads development impacts more broadly across the region. With this development comes increased infrastructure maintenance costs, increased automobile use and increased air and water pollution.

Recommendations

- Local jurisdictions should encourage mixed-use developments and discourage developments that separate uses and increase vehicular trips.
- Local jurisdictions should try to balance the distribution of employment and residential development patterns into a mutually-supportive system to decrease reliance on automobiles 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
- 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 that each neighborhood successfully provide the uses and activities that meet the daily needs of its residents.

To achieve these goals, 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 Old North End Neighborhood association and the Organization of Westside Neighbors. An umbrella group, the Council of Neighbors and Organizations, provides a unified voice

for neighborhood and homeowner associations to participate in the decisions that affect them.

The Metropolitan Planning Area contains numerous identifiable neighborhoods with a variety of living conditions. 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.

Recommendation

- Obtain maps that show neighborhood boundaries throughout the MPO region for use in identifying needs and 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 traditional concrete or asphalt to a blend that contains the remnants of used tire rubber. For example, the Pikes Peak Highway was paved in 2012 using 1,094 tires in the asphalt. Though more expensive, the material makes the road quieter and safer and reduces friction and roadway contact, therefore reducing the noise problem. This blend has been used in several locations around Colorado Springs, including a portion of Union Boulevard.

While all streets and roads contribute to noise issues, those with higher speeds are typically the primary source of vehicle-related noise. Interstate 25 and other regional freeways and expressways are examples of such roads.

Federal laws and regulations require special technical analyses to identify and evaluate the potential noise impacts of a proposed project. Once a noise impact is identified, CDOT will evaluate feasible and reasonable noise abatement methods related to federally funded transportation projects. Traffic noise can potentially be reduced by addressing the noise source, noise path, or noise receiver.

Recommendation

- Develop/maintain a noise impact model.
- Discourage new developments immediately adjacent to existing high speed road rights-of-way.

Parks and Recreation

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 the 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. Figure 2-25 shows general land use for the region and is also available on the mapping tool available on the PPACG website. Projects that cross or may interfere with a site may occur. For example, bicycle and pedestrian paths commonly cross roadways and high levels of nonmotorized accessibility must be maintained when developing new road projects.

Section 4(f) of the USDOT Act of 1966 applies to any USDOT-funded projects that involve the use of any significant publicly-owned public park, recreation area, or wildlife and waterfowl refuge and any land from a 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 that involve the use of lands using Land and Water Conservation or Open Space Land Acquisition and Development funds for their purchase or development.

Recommendation

- Obtain map records to determine which parcels are considered 4(f) and 6(f).

Air Quality

The Pikes Peak Metropolitan Planning Area is in the final stages of carbon monoxide maintenance and is fully compliant with all current air quality standards. The most likely pollutant that the area could violate is ozone.

Ozone

On November 25, 2014, the Environmental Protection Agency proposed revising the existing ground-level ozone standard to make it more stringent. The proposal is to reduce the standard from 0.075 parts per million to a level between 0.065 to 0.070 ppm. If the standard is set in this range, the Colorado Springs Urbanized Area may be classified as a non-attainment area.

If the region is designated as a non-attainment area, strategies will be evaluated to determine the best mechanisms to bring the area into compliance. Strategies could include vehicle emission testing, addressing vehicle on-board diagnostics such as check-engine lights, or other measures. The development of emissions budgets will also be required, similar to what was done in the past for Carbon Monoxide. PPACG's Regional Transportation Plan will be required to conform to (not exceed) these emissions budgets.

Recommendation

- Use the regional travel demand model as a summer model that can be used for air-quality conformity for ozone.

SUMMARY

Individual projects in the Moving Forward 2040 Regional Transportation Plan could have a significant impact on the environment if they are not managed properly. The cumulative impacts to the region are significant and warrant a well-reasoned plan to remediate the social, economic, and ecological impacts.

Impact prevention and mitigation strategies must be fully evaluated to prevent as much harm as possible during the construction and operation of new roads. Some possible mitigation effects for the construction of new roads is to ensure that all construction is done in a way that avoids and minimizes harm. After these efforts have been done, further efforts to mitigate and remediate past harms may also be necessary.

It is also important to ensure that regulations are followed. Some stricter policies could be put into place. Alternative routes for new roads could be considered to minimize the effect on the environment—for example, not building near impaired streams or wetlands. Also, policies could be created and more funding made available for alternative forms of transportation which would reduce congestion and the need for additional lanes. These ideas have been discussed in previous sections.

A more fundamental issue is the high amount of development occurring in the fringe areas of the region, which may have many significant effects on the environment and the region in the future. More compact development with

less sprawl will protect the region's natural environment and create a host of other benefits.

Many of the projects in the transportation plan involve repairing or making improvements on already existing roads, and problems such as habitat fragmentation have already occurred. However, construction itself has an effect, and the increase in roadway area has a significant effect on the regional environment.

The overall intent of this section is to offer recommendations on how to maintain the existing high quality of the natural landscape while accommodating growth and development. Implementation of these recommendations will have social and economic costs and benefits and will attempt to:

- Meet the needs of the present without compromising the quality of life in future generations.
- Maintain economic growth while minimizing air and water pollution, repairing environmental damages of the past, producing less waste, and extending opportunities to live in a pleasant and healthy environment.
- Meet human needs by maintaining a balance between development, social equality, ecology, and economics.

This requires taking a regional perspective by looking at past trends, current activities, and how future activities might affect the region. By maintaining a regional perspective, it is easier to determine the direct, indirect, and cumulative impacts of existing and proposed projects.

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.