Pikes Peak Area Council of Governments
Water Quality Management Plan
2010 Update

Pikes Peak Area
Council of Governments
Communities Working Together

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COMMON ABBREVIATIONS

AWT	Advanced Wastewater Treatment
BAT	Best Available Technology
BNR	Biological Nutrient Removal
BMP	Best Management Practice
CCR	Colorado Code of Regulations
CDO	Cease and Desist Order
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CMA	Colorado Mining Association
CMD	Cherokee Metropolitan District
CC&V	Cripple Creek and Victor Gold Mining Operations
CCMD	Colorado Centre Metropolitan District
CRS	Colorado Revised Statutes
CWA	Clean Water Act
CWCB	Colorado Water Conservation Board
DMG	Division of Minerals and Geology
DOW	Division of Wildlife
DRCOG	Denver Regional Council of Governments
EPA	Environmental Protection Agency
ISDS	Individual Sewage Disposal System
mgd	million gallons per day

mg/l	milligrams per liter
FHMD	Falcon Highlands Metropolitan District
JDPWRF	J.D. Phillips Water Reclamation Facility
LVWWTF	Las Vegas Street Wastewater Treatment Facility
LFMSDD	Lower Fountain Metropolitan Sewage Disposal District
MSMD	Meridian Service Metropolitan District
MLRB	Mined Land Reclamation Board
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
OWS	Onsite Wastewater System
PACOG	Pueblo Area Council of Governments
PBHMD	Paint Brush Hills Metropolitan District
PELs	Preliminary Effluent Limitations
PPACG	Pikes Peak Area Council of Governments
pCi/l	picocuries per liter
SAFB	Schriever Air Force Base
SBR	Sequencing Batch Reactor
SEO	State Engineer's Office
SFEs	Single Family Equivalents
SDWA	Safe Drinking Water Act
SU	Colorado Springs Utilities
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load

USGS	United States Geological Survey
USAFA	United States Air Force Academy
ug/l	micrograms per liter
USPWPA	Upper South Platte Watershed Protection Association
WHMD	Woodmen Hills Metropolitan District
WQCC	Water Quality Control Commission
WQDC	Water Quality Control Division
WQMA	Water Quality Management Association

GLOSSARY OF TERMS

Biosolids–The accumulated residual product resulting from processing waste materials from a wastewater and water treatment plant.

Collection System–A system of sewers used to collect wastewater and convey the wastewater by gravity or pressure flow to a common point.

Design Capacity–"The rated capacity (capability) of a proposed treatment plant at which it can meet the preliminary effluent limitations assigned by the CDPHE or, for an interceptor sewer or lift station, the peak hourly flow that the facility is capable of conveying. For a proposed treatment plant, the proposed design capacity is comprised of two components, the hydraulic capacity and the organic loading capacity. The organic loading capacity shall be given in pounds or tons of 5-day biochemical oxygen demand (BOD_5) per day that the treatment plant is able to treat. The proposed design capacity will generally be expressed as a maximum monthly average or another capacity measure where deemed appropriate by the division. For facilities also considered in accordance with the Guidelines on Individual Sewage Disposal Systems, the proposed design capacity shall be the average daily flow, at full occupancy, prior to the application of the 150 percent design flow factor required by those guidelines." (Definition from CDPHE Regulation #22, Site Location and Design Approval Regulations)

Governmental Agencies–Departments, divisions, or other units of state government; special districts, water conservation districts, metropolitan water districts, conservancy districts, irrigation districts, municipal corporations, counties, cities and other political subdivisions; the United States or any agency thereof; and any agency, commission ,or authority established pursuant to an interstate compact or agreement.

Groundwaters–Subsurface waters that are or can be brought to the surface of the ground or to surface waters through wells, springs, seeps, or other discharge areas.

Individual Sewage Disposal System (ISDS)–An absorption system of any size or flow, or a system or facility for collecting, storing, treating, neutralizing, stabilizing, or disposing of sewage that is not part of or connected to a sewage treatment works. An ISDS with a design hydraulic capacity equal to or greater than 2,000 gpd is considered to be a domestic wastewater treatment works. (Definition from CDPHE Regulation #22, Site Location and Design Approval Regulations)

Management Agency–Any public agency designated for wastewater management responsibilities in a certified areawide water quality Mmanagement plan prepared under Section 208 of the federal Clean Water Act. Such designation shall be considered final only upon the agency's acceptance of its responsibilities as outlined in the appropriate 208 Plan.

Nonpoint Source (NPS)–A diffused pollution source that is not regulated as a point source, including but not limited to sources that are often associated with agriculture, inactive or abandoned mining, or silviculture. Nonpoint source pollution does not emanate from a discernable, confined, and discrete conveyance (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition, or percolation.

Onsite Wastewater System (OWS)–See definition under ISDS

Point Source–Any discernable, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged. "Point source" does not include agricultural stormwater discharges and return flows from irrigated agriculture.

Regional Project–A water quality management system that will combine and/or eliminate one or more existing treatment works or water quality management systems. An intergovernmental agreement or contract shall be signed or a resolution adopted by the project participants of the regional project.

Silviculture–The entire lifecycle of a forest from its original seeding through growing, thinning, fertilization, and harvesting.

State Waters–Any and all surface and subsurface waters that are contained in or flow through this state; does not include waters in sewage systems, waters in treatment works or disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed.

Water Quality Management Plan–The plan for managing the water quality, including consideration of the relationship of water quality to land and water resources and uses, on an areawide basis, for each planning area designated pursuant to Sections 208(a) and 303(e) and 319 of the federal Clean Water Act.

Wastewater Treatment Plant - An arrangement of devices and structures for treating, neutralizing, stabilizing, or disposing of domestic wastewater, industrial wastes, and biosolids. A domestic wastewater treatment plant is one type (or element) of domestic wastewater treatment works. The

term "domestic wastewater treatment plant" does not include industrial wastewater treatment plants or complexes whose primary function is the treatment of industrial wastes, notwithstanding the fact that human wastes generated incidentally to the industrial process are treated therein (Definition from CDPHE Regulation #22, Site Location and Design Approval Regulations).

Wastewater Treatment Works - A system or facility for treating, neutralizing, stabilizing, or disposing of domestic wastewater which system or facility has a designed capacity to receive two thousand gallons of domestic wastewater per day or more. The term "domestic wastewater treatment works" also includes appurtenances to such system or facility such as outfall sewers and pumping stations and to equipment related to such appurtenances. The term "domestic wastewater treatment works" does not include industrial wastewater treatment plants or complexes whose primary function is the treatment of industrial wastes, notwithstanding the fact that human wastes generated incidentally to the industrial process are treated therein (Definition from CDPHE Regulation #22, Site Location and Design Approval Regulations).

Watershed–A geographical area in which activities may significantly impact a water body (or segment of concern) or an underlying aquifer. There are several considerations in defining the geographical scope of a watershed: hydrology, political boundaries, uses to be protected, nature of the water quality problem, manageability, available resources, and public interest.

Watershed Protection Approach–An integrated, holistic strategy to protect or attain the desired beneficial uses within a watershed, including protection of human health and aquatic ecosystems.

I. Executive Summary

The Pikes Peak Area Council of Governments (PPACG) is required under federal and state statutes to develop a Water Quality Management Plan (208 Plan) that recommends future policies and technical strategies for each of the five watersheds within the Pikes Peak region – El Paso, Teller, and Park counties. The 208 Plan recognizes that each watershed is uniquely different and that water quality problems can be both diffuse and site-specific.

The 2010 208 Plan supersedes the previous update of the 208 Plan that was completed in 2003 and amended in 2007. The format and structure of the 208 Plan has remained unchanged between 2003 and 2010 and is still broken down into five watersheds to describe site-specific information. The changes in the 2010 208 Plan update include but are not limited to:

- changes to the population projections;
- revisions to the regional policies;
- a revised water quality assessment that identifies the major water quality issues for each watershed;
- a revised description of the point source dischargers and a point source summary sheet for each watershed;
- updates to the nonpoint source assessment; and
- revised conclusions and recommendations for each watershed.

Water quality improvements that have been recognized as a result of implementation of the 2003 208 Plan include:

- changes to site applications to address specific water quality issues and concerns as identified in the 208 Plan;
- implementation of recommendations aimed at improving water quality, including changes to local regulations and policies that affect water quality, studies to assess sources of water quality impairment, and further coordination between cites and counties; and

- improved regional collaboration to identify future needs and ensure that water quality will not be impacted as a result of future decisions.

Development Process

This plan was developed by PPACG with the assistance of PPACG's Water Quality Management Committee (WQMC). The WQMC consists of representatives of special districts and military installations involved with water quality management, along with local governments located within El Paso, Teller, and Park counties. During monthly meetings, members reviewed and made recommendations regarding information to be incorporated into the 208 Plan.

Uses of 208 Plan

A regional approach is important to protecting water quality because it involves multiple groups and individuals and recognizes that geographic impacts to problems are not isolated. The importance of providing and promoting regional dialogue, discussion, and solutions is evident by the numerous watershed organizations throughout the region and state. The 208 Plan is a planning document intended to assist local, state, and federal decision makers prioritize and provide information to help guide the region in addressing water quality issues. This process helps assure that decisions made at the local and state levels are consistent with pertinent statutory and planning requirements, that information necessary for water quality decisions is adequate and up-to-date, and that agencies and associations are designated to implement the recommendations.

As such, this plan is used to:

- review site applications and discharge permits to ensure consistency with the recommendations, policies, and future needs of the region;
- educate the cities and counties and the public regarding the future wastewater needs of the region;
- provide information to planners regarding point source and nonpoint-source water quality issues and concerns, and applicable policies and strategies;
- determine if proposed state water quality standards are consistent with the policies and goals contained in the plan;

- review the status of water quality within designated areas and report on progress in meeting the local, state, and federal water quality goals as well as regional policy objectives;
- identify priorities and processes and recommend solutions for addressing water quality problems through special stream studies, including Total Maximum Daily Load (TMDL) or wasteload allocation analyses;
- identify priorities and local needs for improving or constructing wastewater facilities; and
- identify environmental, economic, and social costs and benefits of implementing portions of the 208 Plan.

Goals and Objectives

The goal of the 208 Plan is to be consistent with the Clean Water Act, which is to *restore and maintain the chemical, physical, and biological integrity of waters.* This will be accomplished through a regional and coordinated approach that serves to recognize the watersheds in the region as regional assets supporting diverse interests. To achieve this goal, five objectives were adopted as part of this plan.

1. Improve watershed health by developing and implementing strategies that improve water quality and maintain a balance between the natural environment and designated land uses.
2. Restore and maintain the designated uses of the streams and creeks to ensure protection of public health, aquatic life, agriculture, recreation, and surface and groundwater supplies.
3. Identify current and future wastewater treatment needs through a regional collaborative process and implement strategies that improve water quality.
4. Develop solutions that consider environmental, social, and economic impacts to both point and nonpoint source problems.
5. Encourage local governments, special districts, businesses, and other stakeholders within the watersheds to adopt policies and operating practices consistent with the 208 Plan.

Scope

The 2010 update of the 208 Plan follows the watershed approach initially taken in the 2003 Plan. Information and issues that overlap between watersheds are described in the beginning of the 208 Plan in the following sections: Introduction; Regional Water Quality Assessment; Regional Policies; Population Projections by District and/or Service Area; and Environmental, Social, and Economic Impacts of the Plan.

The remainder of the 208 Plan is divided into four sections corresponding to the five watersheds shown on Figure ES-1, located within the portions of the South Platte and Arkansas River basins within the Pikes Peak region:

- South Platte Headwaters/Upper South Platte Watershed
- Upper Arkansas Watershed
- Fountain Creek Watershed
- Chico Creek Watershed

The key aspects described in each of these four watersheds are:

- A description and identification of treatment facilities necessary to meet the anticipated municipal and industrial waste treatment needs of the area until 2030, including treatment level requirements;
- The establishment of construction priorities for such treatment facilities and time schedules for the initiation and completion of all treatment facilities;
- The identification of agricultural and forest management-related nonpoint sources of pollution, mine-related sources of pollution, construction activity, and the control and disposition of all residual waste disposal of pollutants on land or in subsurface excavations;
- An identification of management and operating agencies to carry out appropriate portions of the 208 Plan;
- Description of the water quality issues and concerns that are unique to each watershed;
- Recommendations for future policy and technical strategies to address water quality issues and concerns.

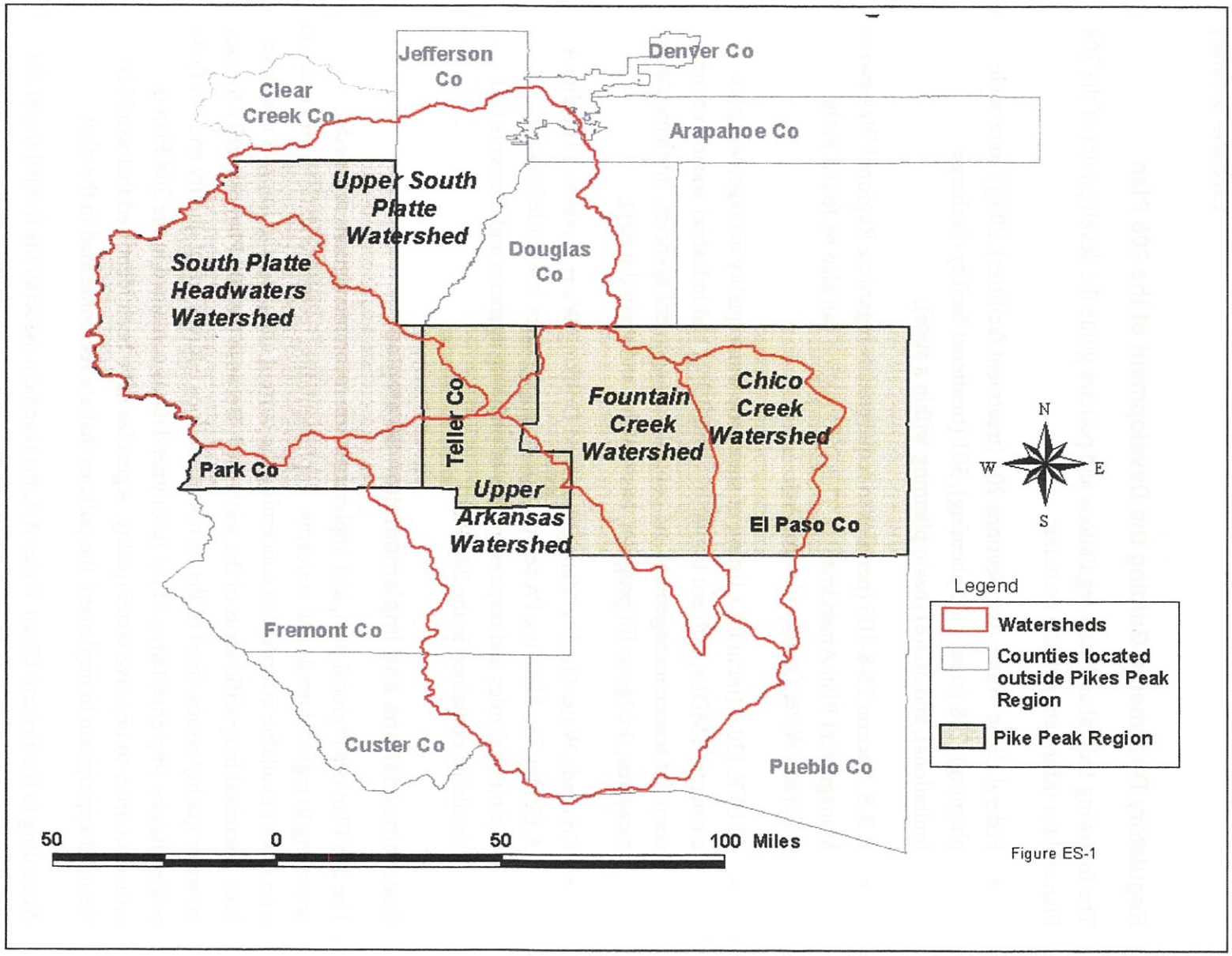

Jefferson Co
Denver Co
Clear Creek Co
Arapahoe Co
Upper South Platte Watershed
South Platte Headwaters Watershed
Douglas Co
Teller Co
Fountain Creek Watershed
Chico Creek Watershed
Park Co
Upper Arkansas Watershed
El Paso Co
Fremont Co
Custer Co
Pueblo Co
N
W
E
S
Legend
Watersheds
Counties located outside Pikes Peak Region
Pike Peak Region
50
0
50
100 Miles

Figure ES-1

Regulatory Documents Guiding the Development of the 208 Plan

The following federal and state regulations and policies guide the development of the 208 Plan and the information that it contains:

- Federal Clean Water Act: Sections 201 (treatment facilities), 205(j)(state-wide planning), 208 (area-wide planning), 301 (treatment facility discharge limitations), and 303(e) (basin planning within a state);
- C.R.S. Section 25-8-105 (pertains to requirements regarding Regional Wastewater Management Plan Amendments). This information can also be found in the Colorado Water Quality Control Act.
- 40 CFR 130.6 (includes a listing of statewide water quality management plan elements: TMDLs, effluent limitations, municipal and industrial waste treatment, nonpoint source management and control, management agencies, implementation measures, dredge or fill program, basin plans, and ground water);
- Colorado Water Quality Management and Drinking Water Protection Handbook, A Continuing Planning Processes, Commission Policy #98-2 (defines the institutional roles and responsibilities of planning agencies and elements that should be contained in the 208 Plan).

Recommendations and Implementation Strategies

The 208 Plan is a regional plan, and implementation recommendations are made according to regional needs and concerns. Implementation recommendations are based on a review of available information concerning the current and potential impacts that have been discussed in specific areas of the watershed. Because the 208 Plan primarily focuses on water quality issues, most of the recommendations address water quality and not flow-related issues. Implementation of the recommendations contained in the 208 Plan is critical in order to improve water quality. Agencies have been identified that would be the most appropriate to implement the policies that are recommended in the plan.

According to the Federal Clean Water Act, management associations formed under the 208 Plan have the authority to accept and utilize grants or other funds, and to implement the point and nonpoint features of the 208 Plan.

Challenges

The development of the 208 Plan identified the following challenges:

- Complying with possible nutrient standards for total phosphorous and total nitrogen that will be determined in June 2011 by the Colorado WQCC;
- Determining sources of E. coli contamination; and
- Conducting adequate water quality monitoring in each of the watersheds to determine future water quality problems.

Future Plan Revisions and Updates

The 208 Plan will be updated on a regular basis at least every five years. If required, amendments to the 208 Plan will occur between updates of the 208 Plan. Section 25-8-105 of the Colorado Revised Statute and the Colorado WQCC Policy #98-2 contain language regarding review and approval of amendments to the 208 Plan.

1.0 Introduction

1.1 Background

The Pikes Peak Area Council of Governments (PPACG) was designated by the Governor of the State of Colorado and the EPA in 1974 as the regional water quality management planning agency for the Pikes Peak region (Figure 1-1). This is referred to as Colorado State Management Region IV and is a three-county region containing El Paso, Teller, and Park counties. The Pikes Peak region is unique because it includes portions of two different drainage basins – South Platte and Arkansas River Basins.

As the designated water quality planning agency, PPACG is required to prepare and update a Regional Water Quality Management Plan to address regional water quality issues under Section 208 of the Federal Clean Water Act. This plan is commonly referred to as the 208 Plan and, as defined in state and federal law, it is a planning and not a regulatory document. Previous updates to the 208 Plan have been completed in 1978, 1981, 1984, 1985, 1989, 1999, and 2003, and an amendment to the 208 Plan was completed in 2007. The 2010 208 Plan update supersedes the 2003 update and reflects the dynamic nature and changing conditions in the region.

1.2 Plan Overview

The 208 Plan is used to address water quality and environmental-related issues and to recommend implementation strategies to restore impaired rivers and streams. It is developed through a regional cooperative planning effort that involves representatives from local municipalities and counties, special districts, and state and federal agencies. This process is continuous and iterative.

The 2010 update of this plan follows the watershed approach that was initially taken in the 2003 Water Quality Management Plan and includes information specific to the five watersheds located within the two river basins in the Pikes Peak Planning Region:

- Within the South Platte River basin, this includes the South Platte headwaters and the Upper South Platte watersheds, which will be discussed together due to their similarities; and

- Within the Arkansas River basin, this includes the Upper Arkansas watershed, Fountain Creek watershed, and Chico Creek watershed, which will each be discussed separately.

The watersheds located within this three-county region are extremely diverse in terms of water quality issues, geology, climate, and topography, and the information considers the diversity within and between each of the five watersheds.

All five watersheds are shown in Figure 1-2. Watershed boundaries were determined by the U. S. Geological Service (USGS) based on a national system of Hydrologic Unit Codes (HUC), which provide a common framework for delineating watersheds and their boundaries (USEPA, 1995).

Hydrologic Untie Code	Watershed Name
11020003	Fountain Creek Watershed
10190001	South Platte Headwaters Watershed
10190002	Upper South Platte Watershed
11020004	Chico Creek Watershed (no active monitoring stations)
11020002	Upper Arkansas Watershed

The watershed strategy is based on the premise that issues are more effectively resolved at a watershed level where factors affecting both upstream and downstream users can be assessed and allows integration of programs and concerns. Information and issues that overlap between watersheds are described in the Introduction; Regional Water Quality Assessment; Regional Policies; and Environmental, Social, and Economic Impacts of the Plan. Section 4, Population Projections, contains the population projections by county for each of the districts. Specific information unique to each of the watersheds is described in individual Watershed Plans, Sections 6-9, which contain:

- Introduction and overview;
- Water quality analysis;
- Point source dischargers;
- Nonpoint source assessment;
- Management activities and associations; and

- Conclusions and recommendations

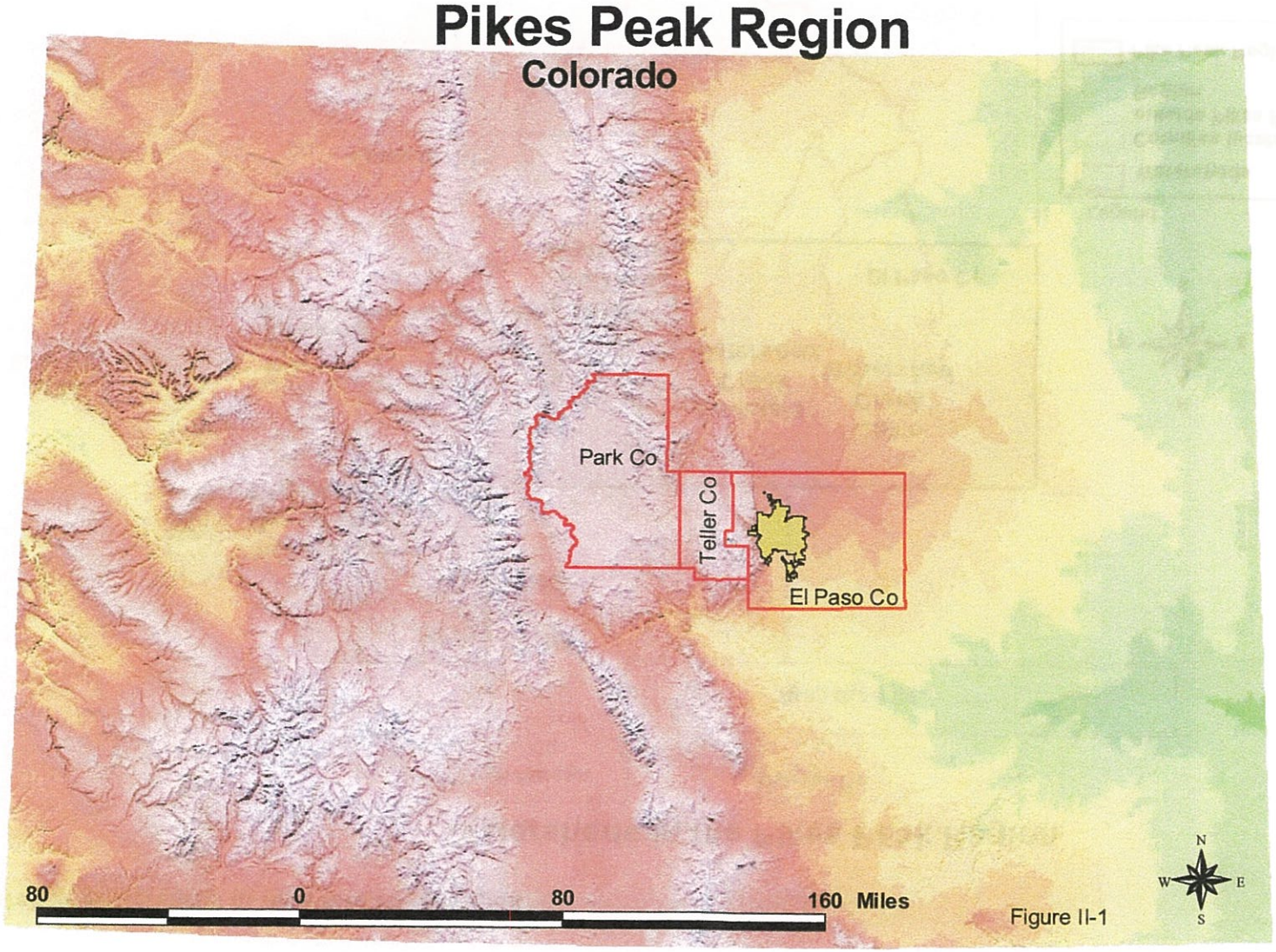
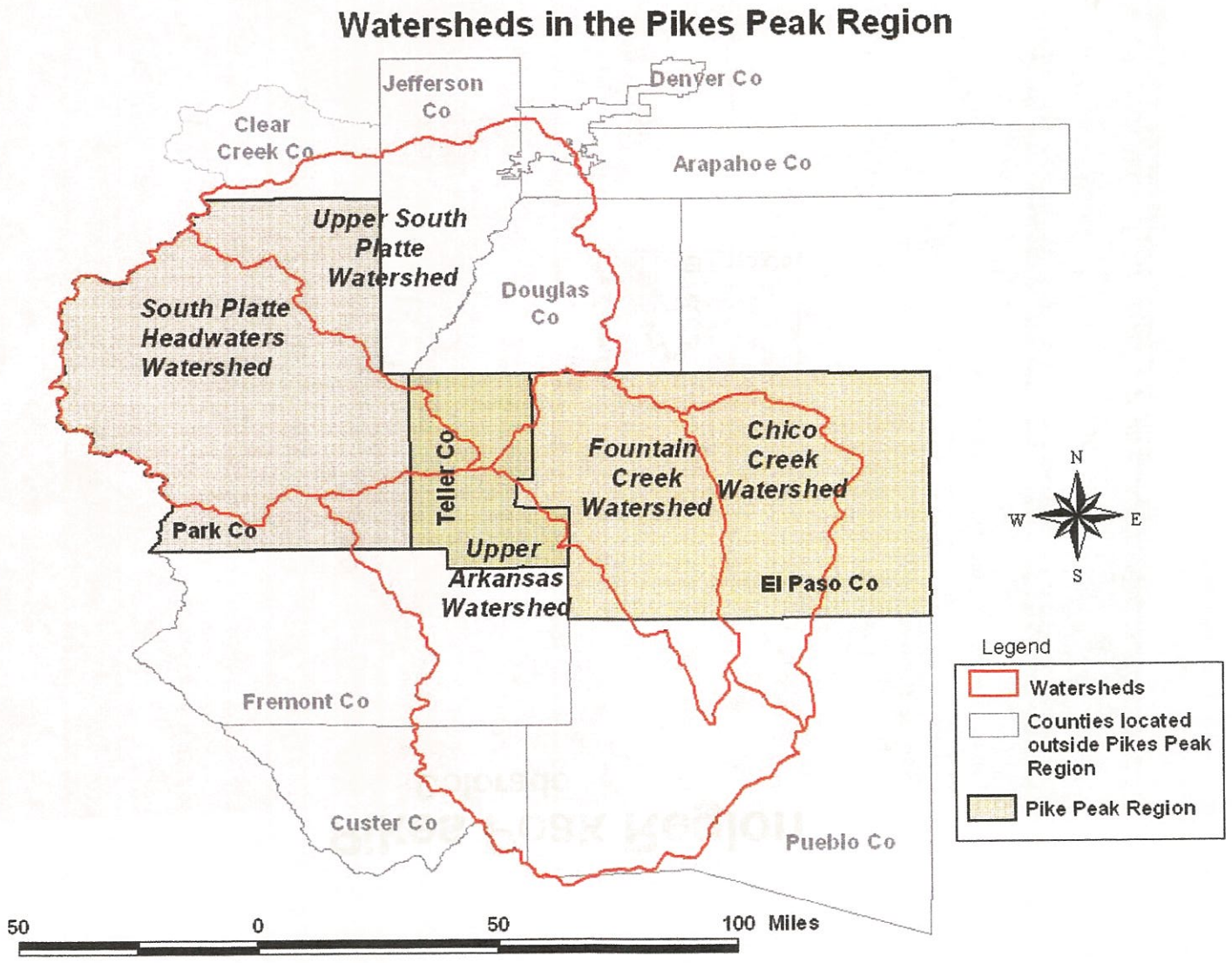

Pikes Peak Region
Colorado
Park Co
Teller Co
El Paso Co
80
0
80
160 Miles
N
W
E
S

Figure II-1

Figure1-2: Watersheds in the Pikes Peak Region



1.3 Section 208 Planning Requirements

This plan will serve to document, inform, and guide water quality-related activities based on a comprehensive understanding of the critical issues, and is being developed to be consistent with the requirements of Section 208 of the Federal Clean Water Act, which states the plans must include but not be limited to the following (CDPHE, 2006):

- The identification of treatment works necessary to meet the anticipated municipal and industrial waste treatment needs over a 20-year period, including treatment requirements, necessary wastewater collection and urban stormwater runoff systems, financial arrangements, and relationship to potential land use;
- The establishment of construction priorities for such treatment works and time schedules for initiation and completion of all treatment works;
- The identification of regulatory programs used for waste management and to manage discharge facilities;
- The period of time necessary to carry out the plan; the costs of carrying out the plan within that time; and economic, social, and environmental impact of carrying out the plan;
- Processes to identify nonpoint sources of pollution including agriculture, silviculture, mining, construction activity, the control and disposal of residual waste, and the disposal of pollutants on land or in subsurface excavations to protect ground and surface water quality; and
- The identification of management and operating agencies to carry out appropriate portions of a water quality management plan.

1.4 Uses of 208 Plan

The 208 Plan is a planning document that is intended to assist local, state, and federal decision makers prioritize and provide information that will help guide the region in addressing water quality issues. As such, this plan is used to:

- Review site applications and discharge permits to ensure consistency with the recommendations, policies, and future needs of the region;
- Educate the cities and counties and the public regarding the future wastewater needs of the region;
- Provide information to planners regarding point source and nonpoint source water quality issues and concerns and applicable policies and strategies.

1.5 Goals and Objectives

The goal of the 208 Plan is to be consistent with the Clean Water Act which is to *restore and maintain the chemical, physical and biological integrity of waters.* This will be accomplished through a regional and coordinated approach that serves to recognize the watersheds in the region as regional assets supporting diverse interests. To achieve this goal, five objectives were adopted as part of this plan:

1. Improve watershed health by developing and implementing strategies that improve water quality and maintain a balance between the natural environment and designated land uses.
2. Restore and maintain the designated uses of the streams and creeks to ensure protection of public health, aquatic life, recreation, and surface and groundwater supplies.
3. Identify current and future wastewater treatment needs through a regional collaborative process, and implement strategies that improve water quality.
4. Develop solutions that consider environmental, social, and economic impacts to both point and nonpoint source problems
5. Encourage local governments, special districts, businesses, and other stakeholders within the watersheds to adopt policies and operating practices consistent with the 208 Plan.

1.6 Management Agency Overview

The management agency structure of the 208 Plan is critical to protection of the surface and groundwater of the region. It recognizes the existing governmental and regulatory framework and allows decisions and management at the most appropriate level of control. One requirement of the 208 Plan is to identify roles for management agencies and operating agencies that are responsible under the law as implementers of the 208 Plan.

Within the Pikes Peak region, both water quality management associations and general-purpose local governments act as water quality management agencies. Once designated by the Governor and approved by the EPA, functional responsibility for carrying out all or part of the water quality management plan is legally assigned to that entity. Most of the management agencies in the 208 Plan were established in the 1970s and are comprised of local governments and special districts. The focus of these agencies has been primarily point source issues and concerns.

The designation of management agencies establishes part of the legal basis for delegation of authorities necessary to carry out the requirements of the 208 Plan; however, the authority to make changes to the regulations rests with the Water Quality Control Commission.

1.6.1 Management Groups

The 208 Plan is broken down into the following management group structure. Organizations within each of these groups are listed in the water quality management associations and watershed planning groups chapter for each of the watersheds.

Wastewater Operating Agencies—Operating agencies own and run wastewater treatment facilities and are responsible for the control, collection, treatment, and discharge of wastewater within their district boundaries or service area boundaries. Wastewater operating agencies within the three-county boundaries will be identified within their respective watersheds. Operating agencies are responsible for specific pollution control activities and have individual National Pollution Discharge Elimination System (NPDES) discharge permits. Minor wastewater treatment plants that have design capacities of 50,000 gpd (0.05 mgd) are described in the plan but not recognized as designated operating agencies.

Management Agencies/Associations—Water Quality Management Associations and/or Agencies (WQMAs) are comprised of individual municipal governments, watershed associations and authorities, general-purpose governments, and special districts responsible for wastewater planning and activities that affect water quality. These agencies (collectively or individually) have the ability to carry out the provisions of Section 208(c)(2) of the Clean Water Act and are also responsible for review and recommendations regarding site applications and water quality issues. The current WQMAs in the Pikes Peak region primarily consist of special districts that focus on point source issues within each of their respective areas. In the absence of a designated management agency for each watershed, a county, municipality, or other management agency has been designated those powers until one is formed. The authorities given to the management agency according to the Clean Water Act are:

- Implement the point and nonpoint features of the 208 Plan;
- Manage waste water treatment works and related facilities effectively;
- Design and construct waste water treatment works and related facilities;
- Accept and utilize grants or other funds from other sources for waste treatment management processes;
- Raise revenues, including the assessment of waste treatment charges;

- Assure that each participating community pays its proportionate share of treatment costs;
- Incur short- and long-term indebtedness;
- Refuse to receive wastes from any municipality or subdivision that does not comply with the provisions of the Clean Water Act; and
- Accept industrial wastes for treatment.

The locations of the WQMAs were historically based on service area or political boundaries and therefore do not correspond with watershed or subwatershed boundaries. The basic philosophy that guided the structuring of management agencies was composed of three major elements (PPACG, 1989):

- Whenever existing management agencies can be used to properly perform a management function, they should be used.
- The provision of services at the most local level of government is considered to be, in most cases, the ideal combination of efficiency and representation of people.
- A degree of overall coordination and planning is required in order to maximize the performance of existing agencies and service providers.

Land Use Authority—This remains with the towns, cities, or counties that are responsible for oversight of water quality concerns regarding land use in their jurisdictions, unless this power has been given to a special district.

Watershed Groups and Organizations—Agencies or organizations that provide regional water quality but are not give any specific authorities under the 208 Plan. Most of the watershed groups in the region primarily address nonpoint source issues and concerns.

1.6.2 Roles and Responsibilities

PPACG

PPACG serves as a regional policy forum for the identification, discussion, and resolution of water quality management issues confronting local communities. PPACG will continue to:

- review, update, and amend the 208 Plan;
- support and participate in watershed-based water quality planning processes;
- encourage and assist local governments in developing and reviewing regulations and policies that address water quality issues;

- facilitate intergovernmental agreements that will further watershed water quality planning;
- provide technical support in development of water quality improvement projects;
- review water quality standards and state policies and regulations that affect water quality;
- assist with the development and implementation of nonpoint source and stormwater control programs conducted by local governments;
- assist designated management and operating agencies; and
- review site applications and discharge permits to assure that discharges to a stream segment are treated in accordance with the approved 208 Plan.

PPACG recognizes the pressing concerns for nonpoint source issues in the region and the need to take an active and lead role in building towards long-term solutions. PPACG is involved in many state and local nonpoint-source-related groups and activities such as the Fountain Creek Watershed Flood Control and Greenway District and the Coalition of Upper South Platte (CUSP). PPACG seeks to build public awareness of water quality management issues through public education.

The goal is to update the 208 Plan every five years, with amendments being processed on an as-needed basis but not more frequently than one every six months. The requirements to amend the 208 Plan shown in Appendix B will be made in accordance with the Federal Clean Water Act and Colorado Water Quality Act.

Water Quality Management Committee (WQMC)

Members of the WQMC assist with water quality planning issues and development of the 208 Plan and give advice and recommendations on the 208 Plan. Representation on the WQMC includes special districts, military installations, and representatives of El Paso, Teller and Park counties. WQMC members review requirements for 208 Plan amendments and propose changes to wastewater discharge permits, site applications, stream classification/standards, and any other projects impacting water quality. The Site Application Review Committee (SARC), a subcommittee of the WQMC, reviews and makes recommendations on all site applications in the Pikes Peak region. This includes new wastewater treatment facilities, expansion of existing facilities, and lift stations and interceptors.

1.7 State and Federal Regulations and Programs

Federal Clean Water Act

The Federal Clean Water Act (CWA) was originally enacted in 1972, with amendments in 1977, 1981, and 1987, to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The 1987 amendments to the CWA authorized states to develop and implement nonpoint-source pollution management programs. This act also required states to establish water quality standards that consist of a designated use and a numerical or a narrative statement describing the maximum concentrations of various pollutants.

Under the CWA, wastewater treatment plants are required to meet specific discharge standards set by the Environmental Protection Agency (EPA) before treated effluent is discharged. Under NPDES, facilities are required to sample and monitor discharges for contaminants such as suspended solids, dissolved organic matter, bacteria, pH, residual chlorine, oil and grease, heavy metals, and cyanides to make certain that the contaminant levels are reduced to legally acceptable levels prior to discharging the wastewater. Responsibility of the NPDES Program (as stated under Section 402 of the Federal CWA), which includes review and issuance of NPDES stormwater and wastewater permits, is under the authority of the Colorado Department of Public Health and Environment (CDPHE). The issuance of these permits must be consistent with the 208 Plan.

Section 404, Dredge or Fill Permits

Section 404 of the Clean Water Act requires permits to be issued for the discharge of dredge or fill material to streams/creeks and waters of the United States. These permits are issued by the U.S. Army Corps of Engineers (Corps) and are also required if wetlands are impacted through dredge or fill material or use of heavy equipment.

The Corps can issue several different types of permits: Letter of Permission, Individual Permits, General Permits—Nationwide and Regional, Emergency Permits, and After-the-Fact Permits. PPACG reviews the individual permit and other permits that are issued for consistency with watershed plans and the 208 Plan to ensure that they do not cause water quality degradation or impacts to downstream communities. Additional recommendations are discussed in Section 3.2, Riparian and Wetland Areas.

CDPHE Regulations and Policies

The importance of the 208 Plan in addressing the regional water quality impacts is reflected in the existing state policies. The Colorado Water Quality Control Act (Section

25-8-101 through 25-8-702) provides the policy directive to conserve, protect, maintain, and improve, where necessary and reasonable, the quality of state waters.

The CDPHE is the delegated permit authority for the NPDES permit program, including wastewater and stormwater permits for all areas except federal facilities. The EPA is the permitting authority for military installation permits, which include Fort Carson and the USAF Academy, located in the Fountain Creek watershed.

The *Colorado Water Quality Management and Drinking Water Protection Handbook* (CDPHE, 2006) presents policy direction for regional water quality planning agencies and the content of Section 208 Water Quality Management Plans, as stipulated in Section 208 of the Federal Clean Water Act. Water quality planning outside of this three-county region is either the responsibility of other designated water quality planning agencies or the State of Colorado (Water Quality Control Division). PPACG works cooperatively with other organizations and COGs that border our 208 Planning Region on studies and activities within the five watersheds.

The Water Quality Control Commission is the administrative agency responsible for developing specific water quality policy in Colorado in a manner that implements the broader policies set forth by the legislature in the Colorado Water Quality Control Act. The WQCC adopts water quality classifications and standards for surface and ground waters of the state, as well as various regulations aimed at achieving compliance with those. The 208 Plan is consistent and not in conflict with state regulations and policies, including the NPDES permit program requirements.

Site Applications

As the planning agency for the region, PPACG is required to review site applications and discharge permits. The requirements for site applications are contained in CDPHE Regulation #22, Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works, and this document in addition to other CDPHE policies and guidance documents, are used in the review of site applications. This includes:

- Regulation 22 – Guidance Document; and
- Policy 96-1 – Design Criteria for Domestic Wastewater Treatment Works.

This information can be found at:

http://www.cdphe.state.co.us/wq/engineering/techhom.html

PPACG and the WQMC review all site applications and make a recommendation to the PPACG Board of Directors for action prior to review by the CDPHE. The procedures PPACG uses to review site applications are shown in Appendix A. A list of all site applications that have been reviewed and approved since the last update of the 208 Plan in 2003 are shown in Appendix D.

Statewide 208 Plan

The CDPHE is currently in the process of developing a statewide 208 Plan that will cover all areas where there is not currently a water quality management plan. The non-designated plans have not been updated for 20 or more years. Work on this plan is expected to be completed by late 2010. The development of a statewide 208 Plan will not replace the existing 208 Plans that have been developed by the designated water quality planning agencies.

Colorado Nonpoint Source Issues

The *2000 Nonpoint Source Management Program Report* is divided into six sections: Umbrella Document; Information and Education; Mining; Agriculture-Silviculture; Urban and Construction; and Hydrologic Modification. Each individual section has goals, objectives, targeting priorities, implementation recommendations, and recommended Best Management Practices if appropriate for the section. In 2005, supplemental information was provided to the program (see http://www.cdphe.state.co.us/wq/nps/index.html), and sections of the management program are currently (2010) in the process of being updated. A presentation to the WQCC is expected to be done in January 2011. Information is posted at http://www.npscolorado.com/NPSalliance.htm

The need for determining and promoting BMPs for watersheds in the Pikes Peak region will continue to be important. Selection of BMPs depends on several factors such as implementation feasibility; financial constraints; and the involvement and coordination of many parties and interests. Specific BMPs for agriculture-silviculture, mining, and development activities are discussed as part of the 2000 Nonpoint Source Management Program Report.

Source Water Assessment Program (SWAP)

The mission of SWAP is to delineate water supply source protection areas and support community-based protection, preservation, and prevention management strategies to ensure that all drinking water resources are safe. SWAP consisted of two phases:

Phase I—Establish SWAP programs in every watershed

- Delineation of source water areas
- Inventory of potential sources of contamination
- Analysis of the susceptibility of the water supply

Phase II—Protection Phase

Based on the assessment results, the protection phase can provide public water supply systems and the communities they serve with an opportunity to identify available options to address potential contamination concerns. This includes the development and implementation of protection plans.

The Integrated Source Water Assessment and Protection Plan (ISWAP) Project Plan was completed by CDPHE in August 2007 and combines elements of the Wellhead Protection Program and the Source Water Assessment Project. The purpose is to clearly identify project activities that support source water assessment and protection planning efforts.

Future activities, which are detailed further in Appendix E of the ISWAP Project Plan (CDPHE, 2007), include:

- Review of the Colorado Wellhead Protection Project;
- Continuation of the source water susceptibility analysis and release of a source water assessment report;
- Contacting local public water systems, government, watershed initiatives, and industry to discuss the applicable source water assessment reports;
- Providing grants and assistance to lead source water protection entities for the development and implementation of protection plan pilot projects.

1.8 Green Infrastructure Planning

Green infrastructure offers another strategy that may be used to reduce negative environmental impacts. The USEPA defines green infrastructure as "management approaches and technologies that utilize, enhance, and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration and reuse" (USEPA, 2008). This management approach attempts to keep stormwater onsite. It incorporates vegetation and natural resources as much as possible in development and redevelopment. Green infrastructure has a number of benefits, including reduced runoff, groundwater recharge, improved air quality, better aesthetics, reduced costs, reduced impacts on climate change, and improved water quality. Some methods include green roofs to reduce runoff from a site and bioswales within parking lots. In Section 3, Regional Policies, many of the implementation recommendations are for green infrastructure practices such as Low

Impact Development (LID) to reduce the impacts of water quality, use of reclaimed water, and other practices. Other green infrastructure planning ideas are discussed in each of the watershed-specific sections of the plan and include reassessment of current policies and practices regarding stormwater, water quality, development, and construction. Green infrastructure will continue to be more of a focus in future planning efforts.

1.9 Plan Implementation

Recommendation and implementation of policies and protection strategies require the support of all local governments and stakeholders. All recommendations contained in the 208 Plan are consistent with the goals and objectives of the Clean Water Act, Colorado Water Quality Act, and regional watershed programs. A description of the roles and responsibilities of the agencies and organizations is included in the plan.

The service area boundaries shown in the 208 Plan reflect a 20-year planning horizon and may or may not be the same as the district or jurisdictional boundaries. Potential changes to the service area boundaries are reflected in the future needs assessment of each of the watershed sections.

2.0 Regional Water Quality Assessment

2.1 Overview

This section provides a regional water quality assessment, gives an overview of water quality standards and classifications for surface water and groundwater, and describes the process for development of water quality-impaired stream segments and applicable state regulations and policies regarding water quality.

2.2 Standards and Classifications

Colorado streams are divided into individual stream segments for classification and standards identification purposes. Segmentation occurs either at some easily defined geographic point or at a point where some physical or chemical factor changes the character of the watercourse significantly.

2.2.1 Surface Water

The Water Quality Classification and Standards Rulemaking Hearings to establish basic and basin-specific standards will occur once every six years through 2016.

- Regulation No. 31: Basic Standards and Methodologies for Surface Water (CDPHE –WQCC, 2001a) was last updated in June 2010; the next rulemaking hearing is scheduled for June 2016.
- Regulation No. 32: Classification and Numeric Standards for Arkansas River Basin (CDPHE –WQCC, 2003a) was last updated in June 2007 (an additional hearing was also held in July 2008 to clarify issues regarding use protection of some stream segments in the Fountain Creek watershed); the next rulemaking hearing is scheduled for June 2013.
- Regulation No. 38: Classification and Numeric Standards for South Platte River Basin (CDPHE –WQCC, 2001b) was last updated in June 2009; the next rulemaking hearing is scheduled for June 2015.

The issues-formulation hearing occurs in November of the year preceding the rulemaking hearing, and the issues scoping hearing occurs in October two years preceding the rulemaking hearing.

Under the Clean Water Act, every state must adopt water quality standards to protect, maintain, and improve the quality of the nation's surface waters. These standards represent a level of water quality that will support the goal of "swimable/fishable" waters. Colorado's water quality standards include four major components:

- Numeric criteria set the maximum acceptable concentrations of specific pollutants in streams, lakes, and reservoirs and limit the toxicity of waste discharges to aquatic species without adversely impacting its designated uses.
- Narrative criteria describe the water quality goals for all state surface waters in a list of six general statements. Narrative criteria currently exist for sedimentation.
- Antidegradation provisions establish that beneficial uses must be maintained and protected.
- State Use classifications (CDPHE Regulation #31) consist of categories of uses for which surface waters are to be protected. Colorado recognizes the following classifications:
    - Recreation: Class E - Existing Primary Contact Use; Class P - Potential Primary Contact Use; Class N - Not Primary Contact Use; and Class U - Undetermined Use.
    - Agriculture.
    - Aquatic life protection: Class 1—Cold Water Aquatic Life, Class 1—Warm Water Aquatic Life, and Class 2—Cold and Warm Water Aquatic Life. Class 1 waters are currently capable of sustaining a wide variety of warm or cold water biota, including sensitive species and Class 2 waters are not capable of sustaining a wide variety of warm or cold water biota, due to physical habitat, water levels, or uncorrectable water quality conditions.
    - Domestic Water Supply.
    - Wetlands.

A single stream segment is usually protected for several uses. Protection of each use requires a different numeric criterion for each chemical constituent. The final standard for a water quality parameter on a segment becomes the most restrictive standard required to protect the most sensitive designated use.

Standards are designed to protect the associated classified uses of the streams; for example, a stream segment classified for Cold Water Aquatic Life Class I is expected to maintain a population of cold water fish. Such fish require relatively high dissolved oxygen (DO) concentrations year round and even higher concentrations during spawning season. A water quality standard for DO on such a segment would include a minimum numeric criterion of 6 mg/L for DO year round with a seasonal criterion of 7 mg/L for DO during the spawning season. Most criteria, such as those for metals, represent maximum allowable limits.

Stream classifications can only be downgraded if it can be demonstrated that the existing use classification is not presently being attained and cannot be attained within a twenty-year time period (Section 31.6[2][b]). A use attainability analysis must be performed to justify the downgrade.

Temporary modifications to numeric standards can be adopted if a current standard is not being met but the Water Quality Control Commission (WQCC) believes that the existing quality of a segment can be improved. Temporary modifications are re-examined at least once every three years.

PPACG will continue to assess the impacts of how changes in water quality standards get reflected in stormwater and wastewater permits.

Basic Standards

There were many changes made during the Basic Standards Rulemaking Hearing (Regulation #31) held in June 2010. Some of the most significant changes include:

- **Initiated the process for establishing discharge-specific variances**. Discharge-specific variances can be authorized based on technological infeasibility, substantial and widespread adverse social and economic impacts, or a demonstration that the negative consequences of attaining standards outweigh the benefits. The discharge-specific variance provisions will become effective January 1, 2013.
- **Adopted some modifications to the anti-degradation review process.** To determine if a water body is use-protected, the period 2000–2009 was included as one of the considerations to determine if a water body is effluent-dominated.

- **Changes to temporary modifications**. The Commission revised the conditions for granting a temporary modification to specifically address the types of situations that warrant adoption of a temporary modification. Temporary modifications provide time to resolve three types of uncertainty: 1) determine what type of criteria is necessary to protect the use; 2) determine whether the sources causing the impairment are correctable; 3) determine how additional treatment will be provided. The third condition will be repealed on 1/1/2013 by discharge-specific variance.

- **E. coli averaging**. The commission dopted an averaging period of two months to better approximate the duration of the eight-week epidemiological studies (a rolling average will not be required).

- **Changes and adoption of new metals table values**. Changes were made to aluminum, iron, mercury, molybdenum, and uranium.

- **Adopted a shoulder season for temperature standards for cold water classifications**. A similar shoulder season for warm water classifications was not adopted due to a lack of evidence.

- **Decided not to extend** the implementation date for the nonlyphenol standard, which is scheduled to go into effect January 1, 2011.

EPA

On November 23, 2009, the U.S. Environmental Protection Agency (EPA) finalized new rules intended to control stormwater for construction sites. The rule (link shown below) took effect on February 2010 and will be phased in over four years
http://www.ohioenvironmentallawblog.com/uploads/file/pre-pub_final_c_and_d_rule[1].pdf

The most significant new requirement was the imposition of numeric discharge limits from larger construction sites which the EPA announced in August 2010 that it is proposing to withdraw. In the past, the EPA required construction site owners/operators to implement best management practices (BMPs) to control stormwater runoff without monitoring or discharge limits.

The regulation is effective on February 1, 2010. After this date, all permits issued by EPA or states must incorporate the final rule requirements. All construction sites required to

obtain permit coverage must implement a range of erosion and sediment controls and pollution prevention measures.

Future Regulatory Action

Nutrient Criteria

In June 2011 the Colorado Water Quality Control Commission will be holding a hearing to consider adoption of numeric nutrient criteria for total nitrogen and total phosphorous for rivers/streams and lakes/reservoirs. These standards will be included in the basic standards, but the adoption of the standards might be delayed in the subsequent basin rulemaking hearings. The standards would not be used for adoption in the discharge-specific permit requirements until they are adopted in the individual basins. Because a proposal has not been finalized for the June 2011 hearing and the commission has not taken action, it is difficult to know what the implications will be until the standards are finalized and the implementation process is determined.

It is anticipated that almost all dischargers will be unable to meet the proposed numeric criteria for total nitrogen even if significant costly upgrades are made to the treatment plants. Although discharge-specific variances might be allowed, there is still no assurance that future advancements in technology might not be cost prohibitive to allow future standards to be met. Research still needs to be conducted to determine the feasibility and cost effectiveness of developing and implementing technologies to address nutrient criteria.

The discussion of nutrient criteria has been primarily focused on point source dischargers and it has not been determined Potential implications to stormwater permits or nonpoint source issues.

2.2.2 Groundwater

Numeric standards for groundwater are different than for surface water and are based on classifications of: Domestic Use Quality, Agriculture Use Quality, Surface Water Quality Protection, Potentially Usable Quality, and Limited Use. 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. This information is discussed in:

- Regulation No. 41: The revised Basic Standards for Groundwater (CDPHE-WQCC, 2008c), which became effective on May 31, 2008; and
- Regulation No. 42: Site Specific Standards for Groundwater (CDPHE-WQCC, 2006), which became effective on March 30, 2006.

The next rulemaking hearing for Regulation No. 41 and 42 is scheduled for October 2011. 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 Regulation No. 42 only apply to El Paso County and are:

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

Currently Onsite Wastewater Systems (OWSs) of greater than 2,000 gallons per day are required to be reviewed by CDPHE and PPACG, and usually require nitrate limits of 10 mg/l. The effluent limits are established during the CDPHE review and approval of the site application associated with these higher-flow OWSs. The CDPHE OWS Working Groups are currently evaluating if a different approach, such as a risk-based approach should be used to evaluate these systems.

Water Quality Data Collection

Water quality data is collected by several local, state and federal agencies.

- The United States Geological Survey (USGS) collects water quality data at many of the monitoring stations throughout each of the watersheds. Information is available at the following website: **http://waterdata.usgs.gov/co/nwis/rt**
- The CDPHE conducts periodic water quality monitoring; usually, more intense monitoring is usually conducted a year or so in advance of basin rulemaking Hearing.

- Municipalities and Special Districts—Cities such as Colorado Springs, which has an NPDES Phase I permit, and special districts are required to conduct water quality monitoring to remain in compliance with their NPDES permit.

2.2.4 Unregulated Pollutants

Within Colorado and throughout the United States, water quality standards currently do not exist for some water quality pollutants. As more water quality data is collected and studies are conducted, additional standards will be developed. It is difficult to determine what new standards will be in place prior to the next update of the Plan and their potential impacts. PPACG will continue to participate in working groups to assess potential trends and recommendations by the WQCD to the Colorado Water Quality Control Commission. Potential future issues include nutrients (discussed on page 2-5), emerging contaminants, and sediment.

Emerging Contaminants

Emerging contaminants (ECs) are chemicals that recently have been shown to be present in numerous water bodies throughout the United States. Some of these substances may represent a potential environmental or public health risk, although adequate data does not yet exist to determine which substances pose a risk or how significant that risk might be. ECs come from products that are used every day in our homes, farms, or businesses and include detergents, fragrances, prescription and non-prescription drugs, disinfectants, and pesticides. More information on emerging contaminants can be found at

http://toxics.usgs.gov/regional/emc/index.html

Sediment

The CDPHE does not have any regulations or standards for sediment, although Policy 98-1 (CDPHE-WQCD, 2010) provides guidance to address sediment levels and general language within the State of Colorado's Basic Standards and Methodologies for Surface Waters. Policy 98-1 applies a narrative standard to address the effects of deposited sediment on classified uses. The narrative standard states that "surface waters shall be free from substances attributable to human-caused point sources or nonpoint source discharge in amounts, concentrations or combinations which for all surface waters except wetlands can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of material which include but are not limited to anaerobic sludges, mine slurry or tailings, silt or mud" (CDPHE-WQCD, pg. 3, 2005).

Although policies currently govern sediment loads within the watersheds, in the near future this could become a more prominent numeric constraint. Studies need to be conducted to determine stable sediment threshold levels.

2.2.5 PPACG Roles and Responsibilities

Stream standards and classifications need to recognize the watersheds as regional assets supporting diverse interest and need to promote the health of the watersheds in the region. As the lead water quality planning agency, PPACG will:

- Work with stakeholders to determine if existing water quality standards and classification designations are appropriate;
- Make recommendations to the Colorado Water Quality Control Commission on proposed changes to stream classifications and standards; and
- Apply for grants or other funding mechanisms to strengthen existing policies and regulations or capital improvement projects to help achieve compliance with water quality standards.

Development of new standards and modifications to existing standards have regional planning implications, including NPDES point source permits.

2.3 305(b) Report

Section 305(b) of the Federal Clean Water Act requires states to prepare and submit a report biennially to EPA on the status of water quality within the state. In March 2010, the WQCC approved the 2010 305(b) report entitled "The status of water quality in Colorado" (CDPHE-WQCD, 2010). The report provides a means for states to report to EPA and Congress on the quality of their waters, the status of water quality management programs, the environmental impacts, and the social and economic costs and benefits associated with achieving the objectives of the Clean Water Act. The report can be found at: http://www.cdphe.state.co.us/op/wqcc/AAH/305b/Finaldraft305b.pdf

2.4 2010 303(d) List and Total Maximum Daily Loads (Regulation #93) and 2010 303(d) Monitoring and Evaluation List (Regulation #94)

Background

Section 303(d) of the Federal Clean Water Act requires states to submit to the EPA a list of waters that do not or may not meet water quality standards. This is used to set

pollution abatement program priorities and must be done for stream segments where technology based controls for point sources and controls for nonpoint sources are not able to meet the standards. The 303(d) list identifies priority waters requiring that a Total Maximum Daily Loads (TMDLs) process be initiated. A TMDL process is a mechanism to allocate pollutant loads, or potential pollutant loads, among all identified sources in a manner that the combined discharges do not cause the water quality standards for a given water body to be exceeded under existing and future conditions. To control the pollutant levels, NPDES permits are issued and administered by the CDPHE through the WQCD. TMDLs are not required for a water body unless that watershed appears on the 303(d) list and are only required for those parameters for which the water body is listed.

Water bodies are considered impaired if they do not meet the water quality uses and standards assigned to them. The listing and delisting criteria are contained in the Year 2008 303(d) listing methodology. All 2010 303(d) segments specific to each watershed are listed in the corresponding water quality analysis section for each watershed. A map identifying the location of each of these stream segments is included in the Water Quality Analysis Sections for each of the watersheds.

Stream segments that lacked sufficient information to determine the source of pollution, but where there are still concerns with attaining water quality standards, were placed on the Monitoring and Evaluation portion of the state's 303(d) list. This regulation identifies water bodies that may have water quality problems but where uncertainties within various evaluation criteria necessitate further evaluation. A determination as to whether or not these waters are to be considered impaired will be made within 10 years after their placement on the Monitoring and Evaluation List. The 2010 303(d) Monitoring and Evaluation List (Regulation #94) has been combined with the 303 (d) List (Regulation #93) into one table.

Once a segment is listed on the 303(d) list, a TMDL is required to be developed. If all sources of pollution are identified and treated and if sampling shows that concentrations are below the established stream standards, then the segment can be de-listed.

TMDL Development

The five steps in TMDL development are:

1. Select the pollutant to consider,
2. Estimate the assimilative capacity of the water body,
3. Identify the contribution of that pollutant from all significant sources,

4. Analyze the information to determine the total allowable pollutant load, and
5. Allocate (within a margin of safety) the allowable pollution among the sources so that water quality standards can be achieved.

TMDL Implementation

Implementation of the TMDL requires participation from all the stakeholders. The point source wasteload allocation portion of the TMDL can be implemented through effluent limits in the NPDES Discharge Permits. Nonpoint sources are implemented through BMPs and other voluntary or locally enacted controls which target a specific reduction in pollutant loading.

The PPACG regional planning process recognizes that TMDL implementation requires significant stakeholder involvement in collecting and evaluating information and making recommendations. It is anticipated that existing and future water quality management associations and watershed groups will evaluate water quality issues in streams; the need for additional and/or special monitoring; water quality standards; effects of NPDES discharge standards; and will participate in the collection of water quality data. This has been highly successful and effective in the Fountain Creek Watershed, where concerns by the stakeholders and improvements in technology have improved water quality. Activities that are being conducted regarding TMDL implementation are discussed in the water quality sections for each watershed.

PPACG serves as a representative on several work groups to discuss and propose changes to state regulations. These changes can influence planning and regulatory requirements. The long-range calendar of updated policies and regulations can be found at http://www.cdphe.state.co.us/op/wqcc/StatutesRegsPolicies/wqreg.html.

TMDL implementation requires complete water quality characterization to determine specific sources that need to be targeted so water quality improvements can be made in a cost-effective manner. For many stream segments, there is a lack of sufficient water quality data to assess the specific sources to target. Stream segments will continue to be assessed to differentiate between natural and anthropogenic sources.

3.0 Regional Policies

One of the requirements of the 208 Plan (40 CFR, Part 130.6 and Policy 98-2) is to recommend strategies and solutions to address point and nonpoint source problems that will protect public health and the environment. This section describes seven regional policy statements for issues that have been identified as affecting water quality in the region and is intended to provide a common and consistent basis to approach water quality planning and decision making in the region. Each issue contains 1) a policy statement; 2) a description of the purpose and importance; 3) a summary of current applicable local, state, and federal regulations and policies; 4) objectives of the policy; and 5) implementation recommendations. The policy statements are designed to guide and promote integrated solutions within each watershed to improve water quality in the region. It will primarily be the responsibility of PPACG, wastewater operating agencies and management agencies/associations, watershed groups, and governmental entities to implement the recommendations and integrate them into future planning efforts.

Specific technical recommendations are also made in each of the individual watershed sections, Sections 6-9. The seven issues addressed are:

1. Land Use Planning and Development
2. Riparian and Wetland Areas
3. Source Water Protection for Public Water Supplies
4. Flooding and Stormwater and Management
5. Agriculture and Silviculture
6. Wastewater Treatment Facilities
7. Onsite Wastewater Systems

Implementation recommendations discussed in this section are applicable to all watersheds, although some recommendations are already being implemented. Recommendations contained in each section are consistent with federal and state regulations regarding water quality and focus on direct and indirect impacts to water quality. Projects should be reviewed for consistency and conformity with these recommendations. Specific recommendations unique to each of the individual watersheds are contained in each of the watershed-specific sections.

3.1 Land Use Planning and Development

Policy Statement

The surface and groundwaters of the region shall be protected from development and design practices that could cause significant degradation[1] of existing water quality or impair the designated uses of the streams; those currently not in compliance will be brought into compliance as soon as it is technically and financially feasible.

Purpose and Importance

The purpose of this policy is to ensure that a balance exists between the protection of water quality and land use (specifically development and design practices) and to minimize potential conflicts between the two. Individuals exercising their private property rights should not endanger public health and welfare and the right to enjoy and use common natural resources such as high-quality water and aquatic life.

Land use practices have impacts on water quality. The water pollutants of concern with respect to land use practices include sediment, nutrients, animal wastes, heavy metals, petroleum products, salts, pesticides, temperature, Biological Oxygen Demand (BOD), and the loss of natural protection against these pollutants (such as loss of wetlands and riparian vegetation). These pollutants are nonpoint source in origin (i.e., they typically enter the waterbody via diffuse runoff) and involve a wide variety of landowners, both urban and rural.

Generally it is more cost effective to prevent water quality impacts through proper planning practices than to treat water quality impacts. This recognition is important because limited funds are available in the prevention and treatment of water quality impacts. The most effective way of addressing land use impacts on water quality is through the development, consistent application, and enforcement of local regulations and incentives to minimize water quality problems from runoff. Most of the implementation recommendations consist of Best Management Practices (BMPs), both structural and nonstructural. BMPs prevent or minimize the entry of pollutants into the region's ground and surface waters. No single BMP can be applied to all situations and

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[1] The definition of "significant degradation" is that used in the *Basic Standards and Methodologies for Surface Waters* regulation of the Water Quality Control Commission (5 CRR 1002-8, 3.1.8 [3][c]).

all BMP options require a careful site assessment prior to implementation. Provisions of this policy should be implemented as deemed locally appropriate through adoption and enforcement of development review procedures, and through financial or other incentives.

Summary of Policies and Practices

All local governments require a complete drainage plan for new developments. The requirements of each drainage plan differ, and although there are no state requirements (Colorado Revised Statutes do authorize municipalities and counties to consider such requirements), most drainage plans consider on- and off-site drainage improvements, assume full development of any proposed development upstream, and place all costs of improvements on the developer.

Strategies to improve land use planning and development practices and improve water quality should be considered by cities and counties. This includes adoption and implementation of low-impact development practices (LID), adopting smart growth principles, and promoting green infrastructure, energy star housing, and LEED criteria for nonresidential structures. Cities and counties also require specific setbacks—although the distance differs in each community—from streams and wetlands.

Objectives

The objectives of the policy are:

- To minimize site disturbance on lands adjacent to surface waters, wetlands, and riparian environments in order to protect water quality;
- To ensure that activities such as development, mineral extraction, solid waste disposal, agriculture, and all other land use practices do not cause significant deterioration of water quality or significantly disturb the region's surface and groundwaters;
- To minimize the creation of new impervious cover throughout the region to enable continued groundwater contribution to streamflow during low flow conditions, and to minimize flooding impacts from increased stormwater runoff;
- To advise local governments in guiding future growth and development activities to areas where impacts on water quality will be minimized and/or controllable;
- To enhance public knowledge of the importance of maintaining vegetative cover, and to develop policies such as streamside setbacks, which restrict certain types of development in order to protect and/or enhance water quality;

- To advise local governments where current and possibly future areas of high erosion, sedimentation, and degraded water quality exist; and
- To develop and recommend methods to stabilize streambeds and banks, protect against flooding (or against flood damages), and restore and maintain stream health.

Implementation Recommendations

The following implementation steps are recommended:

- Local governments should adopt horizontal building setbacks from all stream channels, floodplains, wetlands, and other riparian areas. These setbacks should consider the following: soil permeability and erodibility (soil type); slope; cover conditions; intensity of adjacent land use; quality of existing riparian habitat; and threatened and endangered species.
- Siting and construction of roads and highways should be done in a manner that considers and minimizes water quality impacts.
- Modification of stream channel cross-sections and encroachment should be accomplished in a manner that prevents negative stream channel impacts upstream and downstream after modification.
- Minimization and disconnection of impervious surfaces created by construction of parking lots, buildings, roads, vegetation, and soil removal and by other development activities are recommended to ensure groundwater recharge and to reduce the amount of runoff and pollutants. The greatest restrictions on impervious cover are recommended for groundwater recharge areas of regional importance and areas of high precipitation where groundwater recharge will have the highest contribution to groundwater supplies and surface water base flows.
- Local governments should coordinate with the Colorado Division of Wildlife in the assessment of site-specific and cumulative impacts of subdivision development on aquatic and wildlife habitats. These assessments should be used to minimize impacts to the aquatic environment and related habitats. Efforts to protect water quality provide additional benefits to wildlife, such as habitat protection.
- Local governments should identify floodplains, geologic hazard areas, wildlife habitats, wetlands, riparian areas, and significant agricultural lands and should recommend areas in need of protection.

- Identify and promote land use and development best management practices (BMP) that mitigate negative impacts to water quality.
- Preserve open space and agriculture with a coherent system of conservation easements.
- Remove regulatory barriers and provide selective incentives for low-impact development, sustainable design, and green building to improve water quality and compliance with water quality standards.
- Develop watershed-wide criteria, regulations, and policies as appropriate to each jurisdiction, to ensure water quality protection.
- Work with counties and cities to determine potential water quality impacts and concerns of proposed projects.

3.2 Riparian and Wetland Areas

Policy Statement

Riparian areas and wetlands should be protected from degradation of water quality or activities that impair their function.

Purpose and Importance

The purpose of this policy is to promote the protection of wetlands and to recognize their importance in watershed health. Wetlands and riparian areas are critical to the support and diversity of many flora and fauna; they stabilize stream banks and act as a buffer strip to reduce stormwater runoff and reduce damage from erosion, sedimentation, and flooding. Properly located and designed wetlands can also help increase property values and tourism and can provide environmental education opportunities. Wetlands and riparian areas are critical to consider in reducing water volume because they act as energy and water absorbers by spreading out and diffusing fast-flowing floodwaters, thus mitigating and minimizing the amount of damage. They act as natural filtration devices to trap harmful water quality pollutants and sediments, and they improve water quality. There are four different categories of wetlands present throughout the watersheds in the three-county Region—peatlands, marshes, wet meadows, and riparian.

Summary of Regulations and Policies

Section 404 of the Clean Water Act regulates the discharge or placement of dredged or fill material into waters and wetlands of the United States. Activities that may be regulated under Section 404 include infrastructure development, draining or filling of

wetlands, channel and waterway modification, maintenance and repairs, and construction of dams or levees for water resource development. The program is administered by the U.S. Army Corps of Engineers (ACOE) with review by other federal agencies.

Pursuant to Section 404(e) of the Clean Water Act, the ACOE has the authority to issue general permits on a nationwide basis for any category of activity involving discharges of dredged or fill material if the activities in that category are similar in nature and have minimal adverse environmental effects, individually or cumulatively. Nationwide permits (NWPs) are a type of general permit issued by the ACOE and are designed to authorize, with little or no delay or paperwork, certain activities having minimal individual or cumulative adverse effects on the environment (see 33 CFR 330.1 for policies concerning NWPs).

There are several other federal statutes that may be applicable to wetlands and wetlands creation. These include the Clean Water Act, National Environmental Policy Act, Endangered Species Act, and wetland banking programs. Related state statutes that may apply include Colorado groundwater law and potential water rights issues.

Objectives

The objectives of the policy are to:

- Provide a coordinated regional approach regarding the review of 401 and 404 permits for filling or other wise altering wetlands.
- Compare information with existing plans and information concerning high riparian and wetland habitats. Activities occurring in designated areas should be reviewed and coordinated with other agencies.
- Prepare and release a comprehensive inventory and assessment of all wetland and riparian areas in each of the watersheds contained in the three-county region.
- Develop a pilot project using an existing wetland to demonstrate the ability of wetlands to filter pollutants.

Implementation Recommendations

The following implementation steps are recommended:

- Critical stream environment zones, floodplains, wetlands, and riparian areas should be protected through zoning or acquired through conservation easements, land exchanges, transfer of development rights, or similar resource protection techniques.

- Wetlands disturbance should be minimized. 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 local comprehensive and watershed plans to determine potential impacts to streams, critical riparian and wetland areas; and the potential to cause erosion and sedimentation problems.
- Develop and distribute a plan for each watershed that includes prioritized opportunities for protecting, enhancing, and creating new riparian and wetlands areas along with their associated functions.
- Inventory existing wetland and riparian areas, and evaluate their conditions and functionality, and list their desired future conditions and functionality.
- Encourage development of projects that use reclaimed water to restore or enhance riparian vegetation.

3.3 Source Water Protection for Public Water Supplies

Policy Statement

The surface and groundwaters of the region shall be protected from potential threats, such as pesticides, fertilizers, road de-icing, and other contaminants to ensure that water supply sources are not contaminated.

Purpose and Importance

This policy is to promote protection and prevent possible future impairments caused by improper use and over-application of chemicals and the improper locating of septic systems. These problems can cause high nutrient levels in the groundwater, degrade surface water quality, and cause exceedances of water quality standards so drinking water is unsafe. Management of these activities must be addressed at many levels and involves cooperation between local governments; landowners; and domestic, municipal, and industrial water and wastewater treatment plants.

Summary of Regulations and Policies

CDPHE has completed a source water assessment for all special districts that are drinking water providers in Colorado. The reports for all the districts are listed by county (El Paso, Teller, and Park counties) and are available at:

http://www.cdphe.state.co.us/wq/sw/swapreports/swapreports.html

The purpose of these reports is to assess potential susceptibility of each public drinking water source to contamination and to develop recommendations for protective actions that can be taken to protect these sources. No statutory authority has been given to CDPHE to force the adoption or implementation of source water protection measures. Implementation authority will remain the responsibility of local governments. Regulations and policies that influence source water protection include activities related to stormwater, Individual Sewage Disposal Systems and agriculture (fertilizer use, livestock management, pest management, and irrigation).

Other source water protection concerns are improperly maintained and functioning septic systems that can have source water and drinking water implications. Each county heath department has Onsite Wastewater Systems (OWS) regulations that discuss the setback requirements and other information pertaining to OWS. The OWS setbacks from wells range from 100 to 300 feet. Some counties are in the process of conducting studies to determine potential water quality implications from improperly maintained septic systems.

Objectives

The objectives of the policy are to:

- Encourage the appropriate amount, scheduling, and application of pesticide, fertilizer, and road de-icing and friction applications to protect the region's water quality.
- Encourage proper storage, transportation, and handling, both during normal and emergency operations, of pesticides, fertilizers, road sanding materials, and hazardous chemicals used in the region.
- Provide ongoing education and maintenance regarding septic systems and adherence to county ISDS regulations regarding appropriate setbacks for septic system installation.

Implementation Recommendations

The following implementation steps are recommended:

- Education efforts should be encouraged in cooperation with the Natural Resources Conservation Service and State Extension Service to inform the public and other users of fertilizers and pesticides concerning the appropriate use, and alternatives to the use, of these materials.
- Application of road de-icing and friction materials should be conducted throughout the region in accordance with the following recommendations:
    - Sanding materials and chemical application rates should be the minimum necessary to obtain safe and efficient operation of streets, roads, and highways. Sanding materials should be removed as soon as possible to prevent pollution of both watersheds and airsheds, and applied only when snow and ice cannot be removed by blading, plowing, or when mitigated by sanding.
    - Measures should be taken to minimize and mitigate the use of sand and chemicals especially in and adjacent to environmentally sensitive areas including streams, lakes, ponds, wetlands, aquifer recharge areas, and flood-prone areas.
- Local governments should enact regulations to require that public storage and handling of hazardous materials be conducted in accordance with the following general guidelines:
    - All materials should be kept in appropriate containers and/or under cover, well protected from precipitation and stormwater flows.
    - All storage areas should be kept clean of spilled material.
    - Handling and moving of materials should be limited as much as possible.
    - Hazardous materials should not be stored on potential aquifer recharge areas, unstable slopes, flood-prone areas, and other geologic hazard areas.
    - Storage, handling, and transporting of large amounts of hazardous materials should be tracked and monitored throughout the region by the local fire departments or designated emergency response providers.
- Entities that depend on ground and surface waters for domestic water supplies should develop appropriate protection programs, such as a wellhead or surface water protection program, pursuant to Section 1428 of the Safe Drinking Water Act.

- Municipalities should evaluate the need to develop a watershed ordinance to protect water supply sources.
- The communities and solid waste disposal facilities in the region should encourage responsible disposal of household hazardous wastes (oil, paint, acids, pesticides, etc.), waste minimization, and source reduction programs, through public education and outreach.

3.4 Stormwater and Urban Runoff

Policy Statement

Minimize water quality degradation caused by stormwater and urban runoff and provide technical assistance to local governments to fulfill NPDES stormwater permit requirements.

Purpose and Importance

The effective management of stormwater and urban runoff is critical due to their potential to affect stream water quality, riparian zone habitat and wetlands, flood conveyance capacity, and sediment loading and transport. Hydrologic impacts from urbanization can cause water quality problems and degradation, increased temperature, and sedimentation, which can have a corresponding effect on aquatic habitat.

NPDES Phase I and II practices are discussed in more detail in the nonpoint source section of each watershed. The 208 Plan supports the ongoing efforts by cities and counties in maintenance of their NPDES permits. A list of cities and counties required to have NPDES permits is shown below:

Table 3-1: Cities and Counties Required to have NPDES Permits

	Chico Creek Watershed	Fountain Creek Watershed	Upper Arkansas Watershed	South Platte/Upper South Platte Watershed
NPDES Phase I	None	City of Colorado Springs	None	None
NPDES Phase II	None	El Paso County, Manitou Springs, Fountain, Monument, Fort Carson, USAF Academy, City and County of Pueblo[1]	None	None

[1]The City and County of Pueblo are not within the PPACG Planning Area

Summary of Policies and Regulations

Although not all communities have specific criteria regarding detention, its importance is mentioned in their planning policies. There are no specific federal or state laws or regulations mandating stormwater detention. However, state statutes require counties to adopt subdivision regulations requiring developers to submit maps and plans (where applicable) for facilities to control stormwater in excess of historic runoff levels. Counties are also required by state statute to include provisions governing standards and technical procedures applicable to storm drainage systems and detention facilities in their subdivision regulations. Similar requirements do not extend to municipalities.

All governments require an erosion control plan that outlines methods for reducing soil erosion during construction and grading of land. All governments have some policy addressing erosion control, but the level of requirements varies across the watershed. General requirements include an erosion control plan to be approved prior to the commencement of construction. More specific policies address requirements for temporary and permanent sediment control facilities, protection of land cover for long construction periods, and security required until construction is completed and inspected.

Industrial facilities, including most manufacturers, mining, transportation facilities, power plants, landfills, wastewater treatment plants, and recyclers that discharge water, must be covered by a state stormwater discharge permit.

Within the region, some counties and cities have developed a stormwater utility or enterprise to meet the need of improving the quality of streams and creeks and prevent flooding. Most of the stormwater utilities and enterprises require residents to pay a tax or fee based on the amount of impervious surface area. While no state or federal laws or regulations mandate the establishment of stormwater utilities, several state statutes do grant the authority to establish local improvement districts, and give direction to local governments seeking to create stormwater utilities.

In some municipalities and counties, the costs are offset for the developer only if regional facilities are constructed as part of the development. Jurisdictional drainage planning for new development is authorized under CRS, pertaining to county and municipal planning and zoning.

Objectives

The objectives of the policy are:

- To promote water quality as an important consideration in making decisions on the location and extent of areas to be served by public and private facilities and services.
- To maintain and improve existing structural controls and encourage the use of nonstructural controls such as stormwater quality control planning, landscaping and vegetative practices, and general education programs in managing stormwater.
- Adoption of stormwater management policies based on benchmark principles developed by the Center for Watershed Protection.
- Use Low Impact Development (LID) techniques to reduce peak flows and runoff volume to stabilize channel forming flows.

Implementation Recommendations

For areas that are not covered under a current NPDES permit, the 208 Plan recommends the implementation of the following strategies to ensure consistency with the stormwater and urban runoff policy statement:

- Stormwater detention, retention ponds, or other BMPs should be required to minimize flooding, maximize infiltration, and minimize water quality impacts from impervious surface contaminants. Common structural BMPs used are: stormwater detention and retention ponds, methods to minimize directly connected impervious surface areas, and irrigated grass buffer strips. Common nonstructural BMPs used are: stormwater quality-control planning, adoption of criteria and standards, illicit discharge controls, and general education programs.
- Direct discharge of stormwater to a lake, stream, or drainage way should be minimized.
- Erosion and sedimentation control plans should be required for areas of one acre or larger and should show proper measures for controlling erosion and reducing sedimentation. These plans, when required, should be completed (unless waived by the Water Quality Control Commission) prior to the start of any work and include all proposed excavation, filling, and grade work for improvements

- Where the potential for water quality impacts exist, the following requirements should be applied to any land use activity (some of these practices are currently being applied or partially applied by some of the cities and counties in the region).
    - Disturbance management and revegetation plans should be developed when necessary and should include details of vegetation disturbance (schedule, area involved, equipment to be used, etc.) and a description of all measures to be taken during and following disturbance to minimize water quality impacts, including monitoring to determine effectiveness of the measures taken.
    - Timing of disturbance: whenever possible, disturbances should be planned to occur at those times of the year when water quality impacts will be minimized. For example, disturbances immediately prior to or during the winter season may require more mitigation before the site can be revegetated.
    - Area controls: consideration should be given to limiting the area of disturbance which occurs at any one time, particularly in locations where water quality impacts may be severe, such as on moderate to steep slopes having soils with low permeability.
    - Equipment: methods for vegetation disturbance should be selected to minimize water quality impacts.
    - Stabilization during disturbance: soil erosion controls and protection of surface waters should occur promptly after vegetation disturbance.
    - Monitoring during disturbance: regular inspections should be made of a disturbed site to ensure that the operation is in conformance with grading and erosion control and that water quality impacts are being controlled to the maximum extent practicable.
    - Post-disturbance monitoring: inspections of the disturbed site after completion of the operation are necessary to ensure that measures to control water quality impacts are effective and to determine if remedial actions are required.
    - Financial assurances should be secured to ensure that erosion control plans, including prompt and successful revegetation of disturbed areas, are implemented.
    - Building restrictions on slopes greater than 30% should be considered as a means of limiting the water quality impacts of soil disturbance (e.g. Colorado Springs Hillside Area Overlay Zone District 2.504).

3.5 Agriculture and Silviculture

Policy Statement

Agriculture and silviculture activities should prevent degradation of water quality and ensure the long-term viability and natural succession of the system.

Purpose and Importance

Agriculture and silviculture includes the cultivation of cropland (including grains, vegetables, and orchards), raising of livestock, and harvesting of forest products. The primary pollutant issues from agriculture are related to sediment, salinity, and fertilizers. Over-application of fertilizers to cropland may lead to increased nitrate levels in groundwater and nutrient-enriched surface runoff.

Silviculture plays an important role in ecosystem health by maintaining the number of trees, thus reducing the severity of forest fires. This is especially important in areas that are in and border Forest Service and Bureau Land Management land where fuels reduction activities are critical.

Objectives

The objectives of the policy are to:

- Encourage the minimization of agricultural pollutants entering streams.
- Recognize and protect irrigated agriculture as an important groundwater recharge mechanism for sustaining stream flows during critical low-flow periods.
- Recognize forest management practices that minimize fire fuel buildup and control wildfires, diseases, and insect infestations as a viable long-term water quality management strategy.
- Ensure compatibility of investment policies for public facilities with other environmental protection programs (e.g. floodplain protection).

Implementation Recommendations

The following implementation steps are recommended:

- Forests should be thinned and maintained to prevent and reduce the severity of forest fires in the future.
- Best Management Practices (BMPs) for agricultural activities are recommended to minimize water quality impacts from these activities. These are discussed in the Colorado Nonpoint Source Management Plan (2000), which is in the process of

being updated and should be completed in 2010:
http://www.cdphe.state.co.us/wq/nps/2000MgtProg/2000agsilprog.pdf

Another good resource for agriculture groundwater protection programs is the "Agricultural Chemicals and Groundwater Protection Program," which is a joint program involving the Colorado Department of Agriculture, Colorado State University Extension, and CDPHE:

http://www.colorado.gov/cs/Satellite/Agriculture-Main/CDAG/1167928159328

3.6 Wastewater Treatment Facilities

Policy Statement

Decisions to locate wastewater treatment systems, interceptors, and lift stations will be made in a manner that protects water quality and recognizes the protection of floodplains, geologic hazard areas, wildlife habitats, wetlands, and agricultural land.

Purpose and Importance

The purpose of this policy is to ensure that public facilities are located and constructed with consideration for minimizing water quality impacts, while recognizing financial limitations. The communities of the region have been extremely supportive of protecting water quality through the funding of well-constructed, -operated, -and maintained water and wastewater treatment facilities. Careful planning of public infrastructure is needed to assure that maximum public benefit is attained with available funds.

PPACG supports necessary public wastewater treatment infrastructure needs as stated in the 208 Plan and supports implementation and funding of public wastewater collection and treatment needs as identified in the point source sections of each of the watersheds. PPACG will assist the designated management agencies with any technical assistance that is necessary.

If it is economically feasible, wastewater service will be provided in regional and subregional publicly owned wastewater treatment facilities, and smaller privately owned facilities will be avoided. The potential negative impacts from smaller wastewater treatment facilities are:

- Reliability;
- Disposal of industrial wastes and sludge; and
- Potential cost of technology that will be required to meet stream standards.

Summary of Regulations and Policies

Federal and state regulatory requirements have strengthened compliance of wastewater discharge facilities. The goal of the 1972 legislation of the Clean Water Act was the "restoration and maintenance of the chemical, physical and biological integrity of the Nation's waters." This act established regulatory requirements for wastewater dischargers that have been amended and updated. Control strategies are required to achieve these standards if they are not being met. Specific numeric standards are established by CDPHE based on the water quality classifications and standards of the creeks that the facilities discharge to.

The review of site applications must conform to and be consistent with PPACG's 208 Plan and CDPHE Regulation No. 22, Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works. Two documents used in the review of site applications are:

- CDPHE Regulation No. 22, Guidance Document, Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works; and
- CDPHE Policy 96-1, Design Criteria in the Review of Wastewater Treatment Facilities.

These documents can be found at:

http://www.cdphe.state.co.us/wq/engineering/techhom.html.

The health departments of El Paso, Teller, and Park counties each have Individual Sewage Disposal System (ISDS)/Onsite Wastewater System (OWS) regulations that are applicable for septic systems that are 2000 gallons per day or greater. The CDPHE also has ISDS regulations that are in the process of being updated and should be completed in 2010.

Objectives

The objectives of the policy are to:

- Ensure adequate treatment facilities to collect, treat, and dispose of anticipated types and quantities of wastewater;
- Ensure that the discharge of any water pollutants from wastewater treatment facilities, industrial or commercial processing activities, or mine waste tailings ponds meets the assigned conditions of its discharge permit so as to comply with stream standards as established by the Colorado Water Quality Control Commission;

- Ensure that issuance of new permits and modified permits are consistent with the information contained in the 208 Plan;
- Support and encourage local governments and water providers to implement strategies and promote programs that encourage increasing the use of non-potable water, including the reuse of properly treated wastewater, increasing wise use of water, and requiring long-term water conservation efforts;
- Ensure that development of solid waste disposal sites, including residuals from wastewater treatment, is conducted in accordance with sound conservation practices, giving consideration to potential pollution problems inherent in proposed sites;
- Ensure the waste load allocations for point source discharges are met throughout the region through upgrading of existing treatment facilities and planning and construction of new facilities as required;
- Recommend regional cooperation, when deemed cost-effective and when practical alternatives exist, to avoid the proliferation of individual wastewater treatment facilities and/or wastewater treatment agencies;
- Ensure that wastewater treatment facilities are properly operated and maintained by a certified and responsible operating entity.

Implementation Recommendations

The following implementation steps are recommended:

- All site applications for the region, prior to being submitted to CDPHE, will include a coordinated review by the Water Quality Management Committee, PPACG staff, and appropriate management agencies within the watershed. The site application will be reviewed against the 208 Plan, CDPHE Regulation 22, and other appropriate local and state regulations and policies.
- PPACG staff will review proposed changes to applicable CDPHE water quality standards, regulations, or policies affecting the review of site applications and discharge permits.
- OWS greater than 2,000 gallons per day should connect to a designated management agency's wastewater system if it is economically and technically feasible. OWS systems of less than 2,000 gallons per day that serve homes or small businesses should be encouraged to connect to a designated agency's system when it becomes accessible and continue to be reviewed by the local county health department where it will be constructed.

- Lift stations must provide enough emergency storage capacity at peak flow for the specific entity to respond to an emergency situation, and either fix the problem or remove the wastewater through trucks.
- Municipalities, counties, utilities, and other water providers should promote local water conservation and use of non-potable water by supporting appropriate educational efforts and ordinances. Support further research to determine strategies that have been found to be effective in other cities and counties.
- Where site conditions require wastewater collection and central treatment, efforts should be made to consolidate treatment plants. Consideration, however, needs to be given to protection of instream flows, wastewater reuse opportunities, and water rights obligations. Every effort should be made to consolidate management agencies and special district boundaries where possible and financially feasible. At a minimum, proper long-term operation and maintenance should be provided by a responsible operating entity.
- Full compliance with the Colorado Operator Certification Act should be required. The state should emphasize the legal responsibility of the plant owner and should support the plant operator with timely repairs and reimbursement for operations. The state should promptly begin enforcement actions for chronic poor operation of treatment facilities.
- Biosolids generated by municipal and industrial wastewater treatment plants should be managed in accordance with applicable state or federal permits and Certificates of Designation.
- Encourage the reuse of biosolids as a primary application on crop and pasture land, land reclamation sites, nurseries, commercial landscapes, and re-use of treatment plant effluent. Efforts to beneficially use biosolids should be supported by local governments where financially feasible.

3.7 Individual Sewage Disposal System (ISDS)

Policy Statement

Individual Sewage Disposal Systems (ISDSs) should be located in a manner that protects groundwater and surface water quality and recognizes geological constraints; and should be properly operated and maintained.

Summary of Regulations and Policies

The CDPHE WQCD regulates the discharge of wastewater from all septic systems with design capacities greater than 2,000 gpd. PPACG is also required to review the site applications for these systems and make recommendations to CDPHE prior to their review. The health departments of El Paso, Teller, and Park counties each have ISDS Regulations that are applicable for septic systems of less than 2,000 gpd and are required to be approved by the local health department. These regulations are adopted pursuant to the State of Colorado Board of Health ISDS Guidelines and Sections 25-10-104 of the C.R.S. These regulations establish minimum standards for the location, construction, performance, installation, and alteration of ISDS systems

Article 10 Title 25 of the Individual Sewage Disposal System Act is in the process of being updated (July 2010). Seven working groups have been meeting to discuss changes. The seven groups are: 1) Training and Certification; 2) Graywater; 3) Transfer of Title, Use Permits, and Maintenance; 4) Funding-Fees; 5) Septage Management; and 6) Performance-Based Design and Regulation. The potential implications from recommendations made from these working groups will be evaluated once this study is complete.

CDPHE Policy Number 6 provides guidance on multiple ISDS under a single common ownership that have greater than 2,000 gpd.

Objectives

The objectives of this policy are to:

- Ensure proper operation and maintenance of the ISDS;
- Ensure that systems are installed by a certified installer; and
- Ensure that surface water and groundwater quality are being protected.

Implementation Recommendations

The following implementation steps are recommended:

- Make certain that all site applications for wastewater systems that are over 2,000 gallons per day have been reviewed and are consistent with applicable county and state ISDS regulations;
- Require an analysis of costs associated with hookup to a central wastewater treatment facility;
- Ensure that the system will be properly operated and maintained and that it will not exceed the maximum treatment capacity if future growth is planned;

- Require thorough state, regional, and local reviews of all proposed subsurface disposal systems. These systems are a growing problem in the region, and with reduced federal funding for centralized facilities, these ISDSs are likely to see increased use.
- Make sure location, depth, installation, operation and maintenance of systems and other information is put into a central database tracking system.

4.0 Population Projections

This section presents a summary of population projections for each of the three counties: El Paso, Teller, and Park. Each of the counties is divided into special districts (towns and cities are also identified if they are the wastewater service provider), and current and projected population estimates are based on the service area boundary (i.e., all the population contributing wastewater to the wastewater treatment plant or facility). Population estimates used in this update were done for the current population (2010) and for 2015, 2020, 2025, and 2030. Population estimates were acquired directly from the special district whenever possible and either based on: a) the number of taps multiplied by the number of Single Family Equivalents (SFEs), which range from 2.4 to 2.9; or b) the average hydraulic loading rate for the facility divided by a population equivalent (PE) of 80 to 120 gpd, depending on the district.

The population projections for the counties were based on state demographer data, available from the Colorado Department of Local Affairs (DOLA) and were updated in October 2009. These projections are based on the latest economic data and do change over time. At the time this report was being prepared, there were no data available from the 2010 census. Based on the data collected through the 2010 census, current population and future projections will change and be adjusted. The implications of the population projections are discussed in each of the individual watershed sections. Anticipating future growth in the region reinforces the importance of understanding the correlation between growth and watershed health. Tables 4-1 through 4-3 list the population projections for the counties and the dischargers. Population projections for the districts do not include individuals serviced through septic systems, usually located in the unincorporated areas of the counties and outside of district boundaries.

4.1 El Paso County

Table 4-1 shows the population projections for El Paso County. The large urban areas of El Paso County are located within the Fountain Creek Watershed. Included in these projections are services that Colorado Springs Utilities will provide to areas outside of the city limits: City of Manitou Springs, Peterson Air Force Base, Garden Valley, and Stratmoor Hills.

Given the rapid growth of the unincorporated areas surrounding the City of Colorado Springs, Colorado Springs' share of the regional population is expected to drop from 69%

to 63% by 2030. Most of the Colorado Springs Utilities Service Area corresponds to the City of Colorado Springs. Fountain's population has grown an average of 7% per year since 2000, and growth is expected to continue with the influx of additional troops at Fort Carson. Most of the city's commercial growth is at the northern end of the City.

4.2 Teller County

Table 4-2 shows Teller County population projections. Teller County is within two drainage basins, South Platte River and the Arkansas River Basin. The fastest growing area of Teller County is projected to be the unincorporated portion of the county, which is largely serviced through septic systems.

4.3 Park County

Table 4-3 shows Park County population projections. The greatest anticipated source of growth in Park County is in the residential market. The Bailey area leads the county in proposed development, but the Alma and Fairplay areas are increasing in popularity for full-time residents (commuters and retirees). Additionally, the South Park area is becoming a popular location of residential choice.

Table 4-3 shows that currently about 94% of Park County residents live in unincorporated (outside of Alma or Fairplay) portions of the county. By 2020, this area is expected to grow to nearly 98%. Unincorporated communities that have seen the most growth include Bailey, Shawnee, and Pine Junction. According to Park County's Strategic Master Plan, high-density development will only be allowed in rural areas; the five areas that have been identified are Grant, Shawnee, Bailey, Crow Hill, and Pine Junction.

Table 4-1: El Paso County Population Projections by District and/or Service Area

	Current	2015	2020	2025	2030
Will-O-Wisp Metro District	260	260	275	275	275
Colorado Springs Utilities	438,464	468,868	499,594	528,903	558,642
Academy Water & Sanitation District	850	850	900	900	900
Upper Monument Creek Regional WWTF	11,100	17,590	21,120	24,075	25,920
Tri-Lakes WWTF	15,954	15,954	17,500	17,500	17,500
U.S. Air Force Academy	9,000	9,000	9,000	9,000	9,000
Cherokee Metro District [1]	25,725	26,350	26,975	27,600	27,600
Schriever Air Force Base [2]	1,775	2,168	2,562	2,956	3,271
Cheyenne Mtn. Estates/ Broadmoor Park	350	350	350	350	350
Meridan Service Metropolitan District	20,960	26,600	26,600	26,600	26,600
Fort Carson (includes people living on post and civilian contractors)	30,000	35,000	35,000	35,000	35,000
Fountain Sanitation District	20,335	23,570	25,900	28,030	30,120
Colorado Centre Metropolitan District	2,240	3,066	3,770	4,470	5,170
Security Sanitation District	18,200	20,000	22,000	24,000	27,000
Widefield Water & Sanitation District	20,258	27,469	37,185	46,647	56,158
Sunset's Ellicott Springs	290	700	1,220	1,740	2,680
Woodmen Hills Metro District Service Area [3]	6,900	10,800	18,100	26,600	35,100
Woodmen Hills Metropolitan District [4]	6,300	7,160	7,860	9,300	11,000
Paint Brush Hills Metropolitan District [4]	2,300	2,600	2,900	3,200	3,500
Town of Calhan	750	750	750	750	750
Walden Corporation	600	600	700	700	700
Lower Fountain Metropolitan Sewage Disposal District [5]	13,000	17,075	20,110	22,940	25,730
El Paso County Population (Projections from DOLA, 2009)	**623,314**	**673,324**	**735,428**	**798,541**	**861,971**

Notes: [1] Population estimate based on expected equivalent taps times 2.6 population per tap.

[2] The contributing population for the Lower Fountain Metropolitan Sewage Disposal District includes all of the Colorado Centre Metropolitan District and a portion of the Fountain Sanitation District population.

[3] The service area population served by the Black Squirrel Creek WWTF includes Cherokee Metropolitan District, Schriever Air Force Base, and portions of Meridian Service Metropolitan District.

[4] Population equivalents have been projected on the basis of 80 gallons per capita per day.

[5] Woodmen Hills Metropolitan District Service Area includes Woodmen Hills Metropolitan District, Falcon Highlands Metropolitan District, 4-Way Ranch Metropolitan District, and Sterling Ranch. Population estimate based on expected equivalent taps times 2.6 population per tap.

Table 4-2:
Teller County Population Projections by District and/or Service Area

	Current	2015	2020	2025	2030
Florissant Water & Sanitation District	395	395	420	420	420
City of Woodland Park	7,900	10,400	11,400	12,100	12,400
Teller County Wastewater Utility	2,152	2,152	2,152	2,152	2,152
City of Cripple Creek	1,900	2,200	2,500	2,500	2,500
City of Victor	442	482	522	562	602
Teller County Population (Projections from DOLA, 2009)	**22,915**	**25,399**	**28,308**	**31,040**	**33,510**

Table 4-3:
Park County Population Projections by District and/or Service Area

	Current	2015	2020	2025	2030
Town of Alma	285	310	335	335	335
Fairplay Sanitation District	1,200	1,300	1,400	1,400	1,400
Bailey Water & Sanitation District	250	250	280	280	280
Park County Population (Projections from DOLA, 2009)	**17,704**	**21,381**	**27,046**	**32,910**	**37,487**

4.4 Conclusions

Populations for the three counties are expected to increase but at a decreasing rate to year 2030. El Paso and Teller counties are projected to grow at approximately 1.5% and Park County by about 2.5% per year through 2030. Most population growth in Park and Teller counties is taking place in unincorporated areas. The current and proposed wastewater treatment facilities discussed under the Future Needs Assessment for each watershed are expected to be sufficient to service population projections through the year 2030. El Paso, Park, and Teller counties, as well as their respective municipalities, are growing more rapidly than most other areas of Colorado and the United States. The impacts of this considerable growth will be evident in the increasing demand on resources and utilities.

5.0 Environmental, Social, and Economic Impacts of the Plan

Overview

Federal and state law requires that implementation of the recommendations made in this Plan consider environmental, social, and economic impacts. In minimizing potential impacts, the following criteria are considered:

- Meet the needs of the current residents without compromising the quality of life in future generations.
- Maintain economic growth while maintaining or improving water quality, 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.

Implementation of the recommendations requires taking a larger regional perspective, looking at past trends and current activities, and considering how future activities might affect the region. By looking at projects on a watershed scale, it is easier to determine the direct, indirect, and cumulative impacts of existing and proposed projects. This plan recognizes that the recommendations to mitigate and prevent future problems have both positive and unintended negative effects.

Environmental, social, and economic impacts are usually not considered in developing standards but are considered in implementation of standards and discharge permit requirements. It is critical to recognize the intended and unintended consequences of recommendations during planning and prior to implementation because it could influence project design and potential mitigation actions. An assessment of future needs should consider potential economic, social, and environmental implications for compliance with new water quality standards.

5.1 Environmental Impacts

The overall intent of this plan is to maintain and improve the existing quality of the watershed's streams and lakes while accommodating growth and development. Improvement in water quality is critical in degraded stream segments, which are unable to support the full range of potential uses. Each of the plan's recommendations is aimed towards these objectives, which are consistent with the goal of Section 208 of the Federal Clean Water Act. Environmental impacts may occur upon implementation of the plan

either as a result of adoption of the recommended controls on new potential sources of water quality degradation (preventative strategies) or as a result of recommended cleanup activities.

Impact Discussion

Recommendations target the unique problems identified in each of the five watersheds. Implementation of the recommendations will require either: a) greater enforcement of existing regulations, b) development of new regulations, or c) changes to existing regulations. Potential *negative impacts* due to modifications to existing wastewater treatment facilities that would be necessary to meet future standards include:

- increased energy consumption;
- land use impacts;
- increased cost; and
- short-term impacts from noise, dust, soil disturbance, and traffic due to construction.

Positive impacts include:

- improvement and maintenance of water quality in streams;
- protection and enhancement of aquatic life in fishery resources;
- maintaining plant species and composition;
- re-establishing and maintaining ecological processes across the landscape;
- protection of wetlands and riparian areas; and
- Reestablishing hydrologic regimes and processes on a watershed scale.

In addition to point source controls, nonpoint source prevention strategies will continue to be implemented in order to meet the objectives of the Clean Water Act. These policies address water quality degradation, urban runoff, construction activities, agriculture activities, use of chemicals, fill in of wetlands, and degradation of riparian areas.

5.2 Social and Economic Impacts

This plan is intended to serve the population projected by local governments within each of the corresponding five watersheds.

Impact Discussion

Protection and enhancement of the environment is a key element towards economic diversification and the provision of a stable economic community for residents of the

region. Many examples of the potential for economic diversification relate to the protection and enhancement of water quality, such as tourism and recreation.

Potential *negative impacts* of implementing the plan include:

- increased development costs associated with protecting water quality; and
- increased costs to customers through higher utility rates or increased taxes.

Positive impacts of implementing this plan include:

- 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;
- maintaining and/or establishing viewsheds; and
- increased opportunities for local economic development.

5.3 Water Rights

The 208 Plan is not intended to address water resource issues but does recognize the challenges that many districts and utilities face. A major impact that many districts are facing is the ability to acquire new water, maximize existing water rights, and continue conservation efforts. In some areas this has been accomplished through development of additional recharge systems, purchasing of additional wells, etc.

6.0 South Platte Headwaters and Upper South Platte Watersheds

6.1 Introduction and Overview

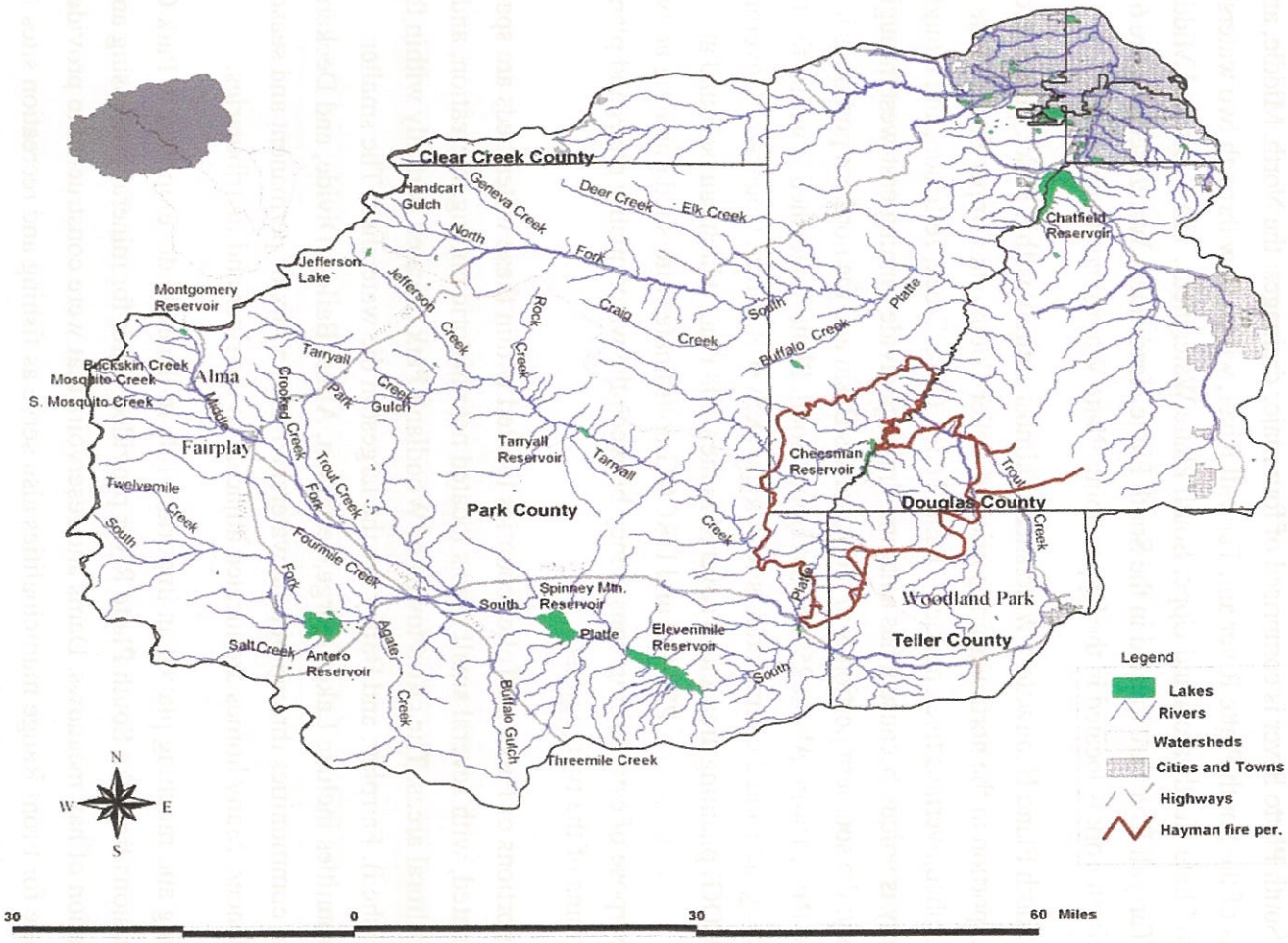
The South Platte River is comprised of four major drainages: the North, Middle, and South Forks of the South Platte River and Tarryall River, which flow through two watersheds—South Platte Headwaters and Upper South Platte Watersheds. The South and Middle Forks and Tarryall River are located in the South Platte Headwaters Watershed (Figure 6-1) and the North Fork is located in the Upper South Platte Watershed (Figure 6-1).

The South Platte Headwaters Watershed is almost entirely within Park County, except for a small portion in the northwestern portion of Teller County; the Upper South Platte Watershed overlaps five counties—Park, Teller, Clear Creek, Jefferson, and Douglas. Teller County is unique because it has a natural drainage divide running east-west through the county: the southern portion is in the Arkansas Basin and the northern portion is in the South Platte River Basin. About 25% of the Upper South Platte Watershed is within the PPACG planning area and the remainder is within the Denver Regional Council of Governments (DRCOG) planning area and is covered in their 208 Plan, which can be found at http://www.drcog.org. PPACG and DRCOG coordinate watershed planning activities for the purpose of establishing consistency between the water quality plans and planning programs of the two regions.

The portions of Park and Teller counties located within these watersheds are sparsely populated, with several small towns located near historic mining, recreation, and agricultural areas. The cities/towns of Woodland Park (located partially within the watershed), Fairplay, and Bailey are the largest in the watershed. The smaller communities include Lake George, Jefferson, Alma, Bailey, Divide, and Deckers. Many of the communities throughout the watershed have a mix of permanent and seasonal residences. Many homes are located adjacent to the river and its tributaries.

Mining and ranching played an important role in the early development in Park County. Diversions from the South Platte River provided water for mineral processing and irrigation of hay meadows. Dams and reservoirs that were constructed to provide water storage for Front Range municipalities also serve as fishing and recreation sites for Park County residents and visitors.

Figure 6-1: South Platte and Upper South Platte Watershed Reference Map



- Montgomery Reservoir above Alma is storage for Colorado Springs.
- Antero Reservoir and 11-Mile Reservoir along the South Platte are storage for Denver Water Department.
- Jefferson Lake and Spinney Mountain Reservoir provide storage for Aurora.
- Tarryall Reservoir is operated by the Division of Wildlife and is used for fishing.

The Park County Strategic Master Plan was completed in 2001 and provides guiding principles and strategies toward a future that includes development that respects the natural characteristics and landscape so critical to the image of Park County (Clarion Associates, 2001). The Master Plan contains several guiding principles regarding Growth Management, Natural/Cultural Resources and Environmental Hazards, Open Lands and Agricultural Lands, and Infrastructure/Public Services, which will directly and indirectly affect water resource and quality issues in the future. Guiding principles are also given for each of the five subareas: 1) Bailey/Pine Junction/Crow Hill/Shawnee/Grant; 2) Fairplay/Alma/Jefferson/Como; 3) Hartsel; 4) Lake George; and 5) Guffey.

6.1.2 Land Use Description

Land ownership within the watershed is mostly public parcels. The U.S. Department of Agriculture (USDA) Forest Service is the largest landowner within the basin, owning 51% of the land. The Forest Service manages the Pike National Forest, which covers roughly a 1400-square-mile area of the watershed. National Forest Service lands are managed in accordance with the Land and Resource Management Plan for the Pike and San Isabel National Forests, and the Comanche and Cimarron National Grasslands approved in November 1984. The 1984 Plan is in the process of being updated and should be completed in 2010or 2011, and it will result in a stand-alone Pike and San Isabel National Forests Land Management Plan.

The second largest public landowner is the State of Colorado, managing approximately 155 square miles. The Bureau of Land Management (BLM) manages 98 square miles. Other significant public land owners include the National Park Service (Florissant Fossil Beds National Monument), Denver Water Department, and the City of Aurora. Private landholdings make up the remainder (41%) of the land ownership within the basin.

Mountain biking, camping, skiing, hiking, and fishing are the primary tourist activities in the area, but snowmobiling and the use of off-road vehicles are growing rapidly. The number of people enjoying these activities is increasing yearly with Highway 285 becoming congested during the weekends. In addition to vehicular emissions, the heavy use of the county for tourism is adversely affecting the water quality through erosion

from overuse of unsurfaced roads, backcountry trails, campgrounds, and reservoirs. South Park is recognized for its trout waters: over 50 miles of public streams are designated as Gold Medal trout water by the Colorado Division of Wildlife. Several historic ranches have been secured for limited public fly-fishing. There may come a time when permits will be needed to preserve some of these areas for everyone to use.

The Park County Land Use Regulations were updated in 2005, and additional revisions were made in 2008 and February 2009. The land use regulations were revised to make them easier to understand and to cut out redundant and useless sections. The regulations include governing water and wastewater, wildlife habitat, zoning, and subdivision use regulations. The regulations can be found at: http://www.parkco.us/lurs.htm.

The Land Use Regulations recognize and attempt to implement the goals, objectives, and polices of Park County as contained in the Park County Strategic Master Plan (Park County, 2001). This plan can be found at: http://www.parkco.us/strategic_mp.htm. Conceptually, a master plan is a guide to develop, rather than an instrument to control, land use; thus, the master plan is only one source of comprehensive planning and is by express state law and statute advisory only. Some important components of the plan include:

- Provide for protection of the public health, safety, welfare, comfort, convenience, and prosperity of the residents and the cultural environment.
- Provide for balanced, orderly growth patterns and efficient, phased government services to accommodate existing and future residents.
- Preserve and promote the value of property, protect the tax base of Park County, and respect the property rights of citizens.

6.1.3 Population and Socioeconomic Characteristics

According to the Census 2000 (Census 2010 was not completed in time to report), Park County had 14,523 residents. Population forecasting conducted by the Department of Local Affairs, available at www.dola.state.co.us (2009) showed that:

- Because many portions of Park County consist of national forest and state-owned lands, significant growth will not occur in certain areas.
- The growth in the municipalities can be attributed to their proximity to metropolitan areas.
- The Alma/Fairplay area is expected to grow significantly over the long term because is an affordable place to live for employees of Summit County's resorts.

- Lake George has become an attractive place to live for retirees and the semi-retired, due to its lower elevation and milder climate.

6.1.3 Overview of Watershed Issues and Activities

The high-priority watershed issues that have been identified include:

- Agriculture—where livestock grazing is a concern in the southwestern portion of the county and especially near riparian areas and streams. Cattle are being fenced out in certain areas to perform stream restoration projects.
- Erosion—prevalent throughout the watershed, but especially in the east and southwestern portion and areas that were impacted by the Hayman wildfire.
- Mine discharges and runoff—many of the water quality problems are from historic mining activities. Examples of these are in Mosquito Creek, South Mosquito Creek, and Geneva Creek.
- Wildfires—Wildfires have caused severe damage in the watershed. Restoration efforts are still ongoing and are being coordinated by the Coalition of Upper South Platte (CUSP) with the U.S. Forest Service; local fire departments; Park, Jefferson, Teller and Douglas counties; and NRCS.
- Wetlands—Wetland conservation efforts are being concentrated on the South and Middle Forks of the South Platte River and the Tarryall River Corridor. Park County, Colorado Open Lands, The Nature Conservancy, and other agencies are working on acquiring conservation easements to help private landowners keep their natural and agriculture resources intact in the future.

6.1.4 Summary of Major Planning Efforts

Major planning efforts that have been completed in the watershed include:

- Park County Strategic Master Plan (Clarion Associates, 2002);
- Upper South Platte River Conservation Project;
- Revised Land Use Regulations (2005);
- USGS Water Resource Investigations Report 07-5220 (USGS, 2007);
- South Park Basin Legacy Project;
- Park County Inventory of Critical Biological Resources (CNHP, 2001);
- Coalition for the Upper South Platte Strategic Watershed Plan (2001) and updates to Community Wildfire Protection Plans and implementation of fire prevention and reduction treatment across a five county area including El Paso, Teller and Park Counties through ARRA funding received in 2009.

6.2 Water Quality Characterization

Surface water and groundwater quality problems in the South Platte watersheds are due to historic water diversion, agricultural practices, mining activities in Park County, and unique geological formations that contain natural heavy metals (iron, copper, manganese, zinc) and radium-rich minerals. Drinking-water source protection programs and TMDL studies largely affect water quality planning issues within this area.

6.2.1 Standards and Classification

Regulation No. 38: Classification and Numeric Standards for South Platte River Basin (CDPHE –WQCC, 2009b), last updated in June 2009, identifies the surface water segments and corresponding standards for the South Platte and Upper South Platte Watersheds (Table 6-1). The stream segments within Regulation 38 that are within the Upper South Platte are Upper South Platte Segments 1a, 1b, 2a, 2b, 2c, 3, 4, 5a, and 5b. Most of the proposed changes to these segments were updates based on changes adopted in the basic standards and revisions to the segment descriptions to separate lakes from the streams.

Issues that might affect the South Platte Basin as part of the next rulemaking hearing are:

- More restrictive ammonia standards;
- Temperature standards; and
- Nutrient standards.

6.2.2 Surface Water

Several municipalities depend on Park and Teller counties for their water supply. Residents in Teller and Park counties primarily depend on groundwater and not surface water as the primary component to the total water supply. Woodland Park and Alma, along with the smaller communities of Grant, Camp Alexander, Camp Santa Maria, Insmont, Glen Isle Lodge, Mooredale, Shawnee, and Eastbrook are the only entities that utilize surface water as a component of the total water supply. The cities of Denver, Aurora, and Colorado Springs also depend extensively on this for surface water. As growth continues along the Front Range, the evaluation of water supply alternatives in Park County will probably increase.

Table 6-1 2010 SP & USP Section 303(d) List and Monitoring and Evaluation List

Segment	Segment Description	Affected Portion	Monitoring & Evaluation List	Impairment	Pri.
COSPUS02a	Tributaries to S. Platte R, source of S. & M. Forks to Tarryall Creek	Twin Creek		Sediment	L
COSPUS02a	Tributaries to S. Platte River, source to Tarryall Creek	Salt Creek d/s of N. Fork on USFS Land and Twin Creek on USFS Land	Temperature		
COSPUS02b	Mosquito Creek from S. Mosquito Creek to Middle Fork of the South Platte River	All	-	Cd	H
COSPUS02c	South Mosquito Creek from the confluence with Mosquito Creek and No Name Creek from source to confluence with Mosquito Creek	No Name Creek	-	Cd, Zn	H
COSPUS03	Tributaries to S. Platte River, Tarryall Creek to N. Fk. S. Platte R	Trout Creek and tributaries on USFS property		Sediment	M
COSPUS03	Tributaries to S. Platte River, Tarryall Creek to N. Fk. S. Platte R	1) Pine Creek; 2) Fourmile Creek		1) As; 2) Fe,(trec), As, Hg	H
COSPUS03	Tributaries to S. Platte River, Tarryall Creek to N. Fk. S. Platte River	1) Hawkins Gulch; 2) Horse Creek; 3) West Creek; 4) Goose Creek; and 5) Trail and Wigwam Creeks; 6) Portions of Pine Creek and Sugar Creek on USFS Land	Parameters are based on Number id used for Affected Portion: 1) Cd, Se; 2) D.O, Fe (trec); 3) As, Hg; 4) D.O. and 5) Fe (trec); 6) Sediment		
COSPUS04	N. Fk. S. Platte River & tributaries, source to S. Platte R	Hall Valley area to Geneva Ck		pH	H
COSPUS04	N. Fk. S. Platte River & tributaries, source to S. Platte R	Kenosha Creek	sediment		
COSPUS05a	Geneva Creek, Scott Gomer Creek to N. Fork S. Platte River	all	Cd		
COSPUS05b	Mainstem Geneva Creek, Scott Gomer Creek to N. Fork S. Platte River	all		Cd	H

Figure 6-2: South Platte and Upper South Platte Stream Locations

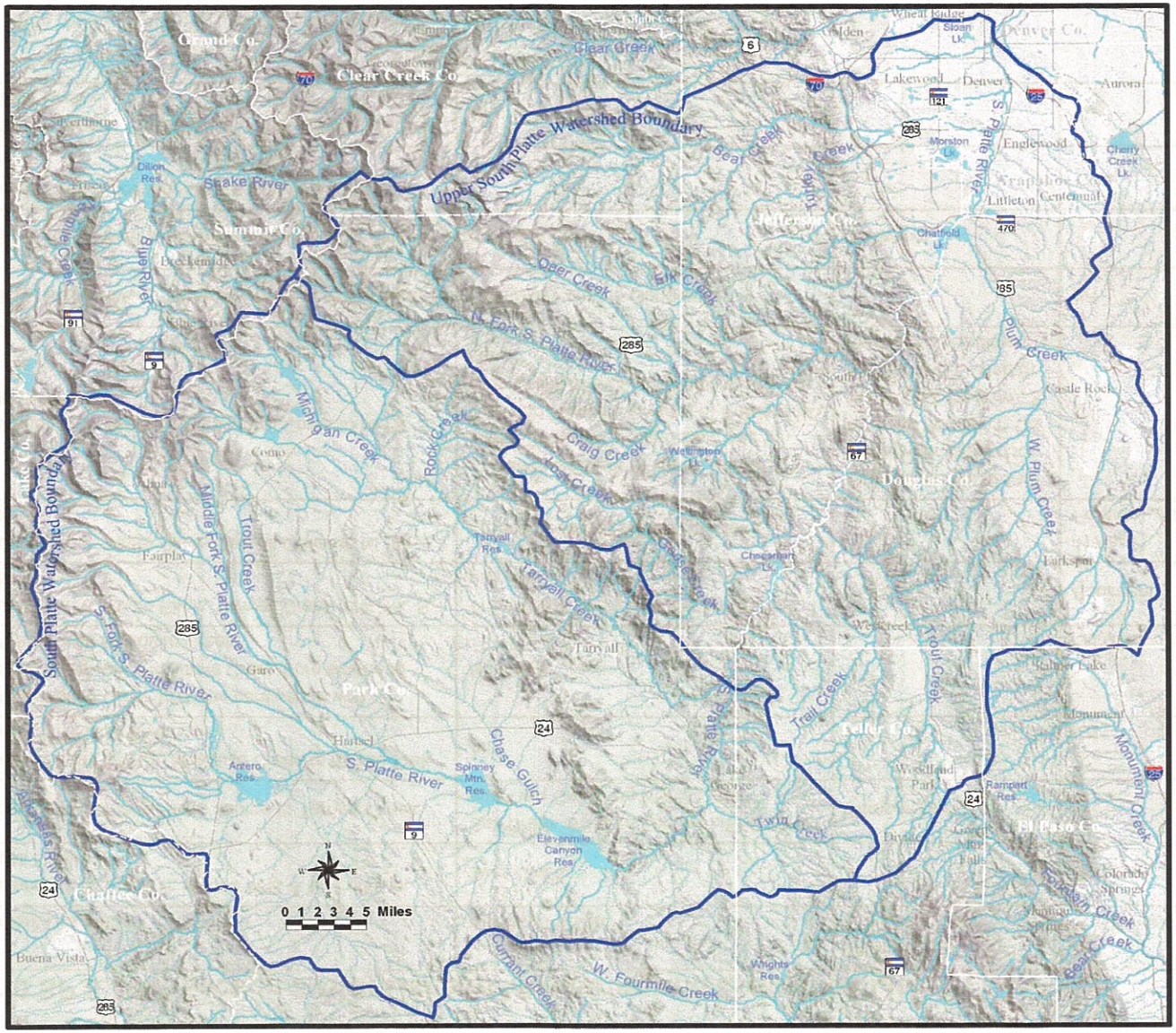


Table 6-2: Water Quality Standards for Stream Segments in the Park and Teller Counties Portions of South Platte/ Upper South Platte Watersheds

	Stream Segment Description	Desig	Classifications	Physical & Biological	Inorganic (mg/l)		Metals (ug/l)		
1a	Mainstem of the South Plane River from the source of the South and Middle Forks to a point immediately above the confluence with the North Fork of the South Platte		Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
1b	All tributaries to the South Platte River, including lakes, reservoirs and wetlands within the Lost Creek and Mt. Evans Wilderness Areas	OW	Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
2a	All tributaries to the South Platte River, including lakes, reservoirs and wetlands from the headwaters of the South and Middle Forks to a point immediately below the confluence with Tarryall Creek except for specific listings in Segment 1b, 2b, and c		Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
2b	Mainstem of Mosquito Creek from the confluence with South Mosquito Creek to its confluence with the Middle Fork of the South Platte River.	UP	Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ch)=220

	Stream Segment Description	Desig	Classifications	Physical & Biological	Inorganic (mg/l)		Metals (ug/l)		
2c	South Mosquito Creek from the source to confluence with Mosquito Creek and No Name	UP	Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ch)=TVS
3	All tributaries to the South Platte River, including all lakes, reservoirs and wetlands from a point immediately below the confluence with Tarryall Creek to a point immediately above the confluence with the North Fork of the South Plane River, except for specific listings in Segment 1 b.		Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
4	Mainstem of the North Fork of the South Platte River, including all tributaries, lakes, reservoirs and wetlands from the source to the confluence with the South Platte River, except for specific listings in Segments Ib, 5a. 5b, and 5c.		Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
5a.	Mainstem of Geneva Creek from the source to the confluence with Scott Gomer Creek.		Aq Life Cold 1 Recreation E Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 3.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 N02=0.05	As(ac)=340 As(ch)=7.6 (Trec) Cd(ch)=2 CrIII(ch)=100 CrVI(ac/ch)=25 Cu(ch)=18(dis)	Fe(ch)=1200 Pb(ch)=4 Mn(ch)=530(dis) Hg(ch)=0.05 Ni(ch)=50	Se(ch)=4.6 Ag(ch)=1 Zn(ch)=1909(dis)

	Stream Segment Description	Desig	Classifications	Physical & Biological	Inorganic (mg/l)		Metals (ug/l)		
5b.	Mainstem of Geneva Creek from the confluence with Scott Gomer Creek to the confluence with the North Fork of the South Platte River; all tributaries of Geneva Creek including lakes, reservoirs, and wetlands from source to confluence with the North Fork of the South Platte River.		Aq Life Cold 1 Recreation E Water Supply Agriculture	T=TVS(CS-I) C D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5 - 9.0 E.Coli=126/100 ml	NH3(ac/ch)=TVS Cl2(ac)=0.019 Cl2(ch)=0.011	CN=0.005S=0.002 B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(Tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS

Approved TMDLs

Table 6-3 is a list of TMDLs that have been approved or are in progress in the PPACG portion of the Upper South Platte /South Platte Watersheds. More information can be found at http://www.cdphe.state.co.us

Table 6-3: Approved TMDLs in the South Platte/Upper South Platte Watersheds

Segment #	Affected Portion	Pollutant	Date
COSPUS02b	Mosquito Creek	Cd, Pb, Zn	2000
COSPUS02C	South Mosquito Creek	Cd, Fe, Mn, Zn	2000
COSPUS01a	Mainstem of South Platte River, Source to North Fork of the South Platte River	Sediment	2002
COSPUS03	Trout Creek and tributaries on National Forest lands	Sediment	2008
COSPUS04	North Fork South Platte River, Hall Valley to Geneva Creek	Cu	2008
COSPUS05a	Geneva Creek above Scott Gomer Creek	Cd, Cu, Mn and Zn	2010
COSPUS05b	Geneva Creek to N. Fork South Platte River	Cu and Zn	2008
COSPUS05b	Geneva Creek to N. Fork South Platte River	Cd	2010

COSPUS02b and COSPUS02C

A TMDL was approved for Mosquito Creek Segment 2b (all segments) for Cd, Pb, and Zn, and South Mosquito Creek Segment 2c (downstream of London Mine) for Cd, Fe, Mn, and Zn. The TMDL document is an assessment of the loading to Mosquito Creek and South Mosquito Creek from the London Mine Extension Tunnel (Extension Tunnel), London Mine Water Tunnel (Water Tunnel), and the nonpoint source area contributing to these streams.

The target for this TMDL is decreased monthly loads of dissolved zinc from the water tunnel and decreased monthly loads of dissolved cadmium, dissolved manganese, and dissolved iron from the London Mine extension tunnel into South Mosquito Creek. The required reduction in loads from the tunnel was determined from mass calculations for each of the five metals (Cd, Fe, Pb, Mn, Zn). The TMDL has been implemented in the form of discharge permit conditions for dissolved metals.

COSPUS01A

The water quality targets for this TMDL are:

- Improve management practices for 7.5 miles of combined county and National Forest System roads;
- Close 2.0 miles of road;
- Reduce percentage of instream substrate composed of fines (< 8 mm) to 30% at Corral Creek crossing.

COSPUS03

The water quality targets for this TMDL are:

- Pebble count: > 73% of expected condition
- Embeddedness: >73% of expected condition
- Biological condition: >51% of expected condition

As part of the TMDL that was developed, an analysis of nutrient concentrations is being conducted by the CDPHE, USFS, and other agencies.

COSPUS04

This area was identified by the division as impaired on all the 303(d) lists since the list was first prepared in 1992. This area covers approximately 11.2 square miles and is primarily owned by the U.S. Forest Service and private interests. This area has a long history of mining, especially in the upper reaches of the valley. Flow in Handcart Gulch is composed of low pH, poor-quality groundwater from numerous visible and subsurface steeps and carries a considerable load of dissolved metals to the North Fork. The TMDL is calculated using low flows necessary to attain the chronic copper standards. The main sources of copper targets are from the Missouri Mine and Handcart Gulch. Natural attenuation has and continues to remediate effects from the naturally occurring acid rock drainage in the basin.

Water-Quality-Impaired Stream Segments

Most of the segments identified in Table 6-1 on the 2010 303(d) List and the Monitoring and Evaluation List are due to historic mining activities and sediment. This does not include stream sections in the Denver Regional Council of Governments (DRCOG) planning area, which are discussed in DRCOG's Clean Water Plan (DRCOG, 2003).

Water Quality Analysis

There has been very little surface water quality data collected in Park County by the USGS or other agencies since the last update of the 208 Plan in 2003. The focus has been on the South Platte in the Denver area and downstream from Denver. Groundwater quality data has been collected in Park County and is discussed in the groundwater quality section.

Results of the water quality assessment conducted as part of the previous 2003 208 Plan update indicate that water quality is good except for localized problem areas that are primarily a result of historic mining activities and improper grazing activities. These problems were described in the Surface Water Stream Section. This water quality analysis will primarily examine the issues of most concern in Park County: nutrients; fires and post fire flooding; physical properties; and metals and other trace elements.

Nutrients

Stream segments are currently being evaluated for the potential development of stream standards for total phosphorous and total nitrogen. The CDPHE (2009) is analyzing discrete samples from several stream segments for total phosphorous and total nitrogen concentrations in preparation of determining nutrient standards.

Nitrogen and ortho phosphate are the primary nutrient concerns in Park County. Elevated nutrient levels which can degrade aquatic habitat, accelerate algae growth, and are toxic to fish (in the form of unionized ammonia) may be caused by sources such as wastewater discharges, seepage from septic systems, and fertilizers. Nitrate concentrations have been found to be typically higher in urban and built-up areas than in rangeland and forested areas. Nitrite was not detected and most unionized ammonia concentrations were less than the state chronic standard of 0.02 mg/l; all nitrate concentrations were less than the in-stream standard of 10 mg/l (USGS, 2001).

Fires and Post-Fire Flooding

Water quality impacts from forest fires include flooding, erosion, and an increase in the amount of bedload and suspended sediment that is transported. The amount of runoff and erosion rates depend on the intensity of the storms and the effectiveness of the rehabilitation practices that are taking place. The Forest Service is monitoring the implementation of the treatment processes that have taken place.

Physical Properties

Based on the 2003 update of the 208 Plan, most dissolved oxygen concentrations were at acceptable levels, above in-stream standards of 6.0 mg/l. Dissolved oxygen concentrations below the standard were measured downstream of Antero Reservoir and may be a result of water released from the bottom of the reservoir. Most pH levels were between 6.5 - 9.0, and almost all of the levels less than 6.5 occurred in the North Fork, which is upstream of Geneva Creek and Handcart Gulch. Specific conductance, which is an indirect measure of dissolved solids, was highest along the mainstem of the South Platte River, Handcart Gulch, and Trout Creek.

Phosphorous Loading

Phosphorous loads in the South Platte River Basin are extremely important due to the limits that have been placed on the Chatfield Reservoir from the South Platte River Basin.

Metals and Other Trace Elements

Based on data available during the 2003 update, water quality standards for total and dissolved selenium, total arsenic, boron, and total and dissolved manganese have not been exceeded. Standards have been exceeded for dissolved chromium, iron, and manganese and for total iron and mercury. Most of the mercury concentrations were equal to the reporting limit so there is not any strong evidence of mercury exceedances. Metals such as aluminum, barium, iron, and manganese are abundant in the types of igneous and sedimentary rocks found in Park County.

Total iron and dissolved manganese were found to be the highest in areas where abandoned mines were present. This includes the Mosquito Creek Basin and parts of the North Fork Basin (primarily Handcart Gulch and Geneva Creek Basin). Large zinc concentrations primarily occurred in the Mosquito Creek Basin and in Geneva Creek. Large total iron concentrations also occurred along the lower North Fork South Platte River near Bailey, but are probably a result of streamflow transport from the upper North Fork.

There are high copper concentrations in Hall Valley where the North Fork of the South Platte begins and also adjacent to Handcart Gulch. This is attributed to copper leaching into the groundwater from the acidic rock and the historic mining activities. The concentrations are too high to support fish populations (Fairplay Flume, 2009).

Suspended Sediment

Most of the suspended sediment data that is available is from Geneva Creek or on Badger Creek. Collection of additional suspended sediment data will be critical as future segments in the South Platte Basin that are currently on the 2010 303(d) Monitoring and Evaluation list.

6.2.3 Groundwater

Overview

Many streams and lakes in Colorado are sustained during dry periods by inflow from groundwater. During wetter periods, aquifers may be recharged from water in the same streams and lakes. It is this connection between surface water and groundwater that forms the understanding of the impacts one source might have on the other. There is increasing reliance on groundwater, especially during recent drought periods, for purposes where surface water is used, thus requiring more monitoring and control emphasis to now be directed toward its preservation. In many areas such as Bailey, residents have to drill deeper wells and are noticing that water levels in the wells are much lower due to the decrease in aquifer recharge from below-average precipitation levels. This can also lead to increased concentrations of groundwater contamination because of less dilution. The specific water quality impacts due to the drought on residents who rely on groundwater wells still needs to be assessed.

Park and Teller counties share similar geologic characteristics and problems and rely heavily on groundwater as a source of drinking water for residents in both the incorporated and unincorporated areas. Alma and Woodland Park are two major cities/towns that utilize a surface water collection system and groundwater pumping to meet their drinking water needs. This is of particular concern since there has been an increase in population in both Park and Teller counties that will cause an increase in the level of groundwater withdrawals.

Groundwater Monitoring

The eight-fold increase in population in Park County between 1970 and 2000 has resulted in an increased demand on water resources, as well as increased groundwater contamination. The Phase I monitoring effort was completed by a cooperative effort between USGS, Park County, and Center of Colorado Water Conservation District. This effort indicated that:

- Limited groundwater-quality data suggests that groundwater contamination may be occurring in some aquifers and may be associated with population growth and increased on-site wastewater systems; and
- Broad-scale geographic and seasonal distribution of current groundwater quantity and quality are not available.

The Park County Strategic Master Plan (Clarion Associates, 2001) stipulates a need to protect the existing groundwater resources.

Oil and Gas Exploration and Production

Recently it has been estimated that there might be one trillion cubic feet of natural gas in South Park. The exploration process within the Apache Creek Sandstone, Niiobrara Formation, and Dakota Sandstone are at depths ranging from 7,610 to 10,400 feet. The major issues are associated with the production process where hydraulic fracturing is required. The potential impacts associated with the development of several hundred production wells are the concentrations of fracturing chemical that have been correlated with degradation to groundwater quality. Any releases of natural gas into the groundwater zones may cause impacts to groundwater as well.

Any production activities should be thoroughly scrutinized for there effects to groundwater and surface water associated with drilling and site development issues, such as but not limited to, stormwater, chemical storage and hazardous chemical use. Currently, Park County has a set of oil and gas regulations to help address related groundwater quality issues.

Water Quality

To assess groundwater quality, data was collected by the USGS (2001) from 180 wells, and additional data was collected on nitrate levels by the Park County Department of Health and Environment (PCDHE) and the U.S. Forest Service. Most of the wells were sampled for physical properties (water temperature, dissolved oxygen, pH, specific conductance), major ions, nutrients, and trace elements, and about one-half were sampled for bacteria. There are no site-specific water quality classifications and standards for groundwater within the Upper South Platte Watershed according to Regulation No. 42 (CDPHE-WQCC, 2002).

The highlights from this report are summarized below.

Major ions and dissolved solids

- About 90% of all chloride concentrations in groundwater were at least one order of magnitude lower than the U.S. EPA drinking water standard of 250 mg/l, and no concentrations exceeded the standard.
- In eight of 144 wells, sulfate concentrations were higher than the drinking water standard of 250 mg/l. This occurred primarily in wells completed in sedimentary and volcanic rock aquifers.
- Fluoride was detected at every well in concentrations ranging from 0.1 to 5.6 mg/l. About 10% of the wells exceeded the U.S. EPA drinking water standard of 4.0 mg/l. Nearly all of the wells that exceeded 2 mg/l were located in crystalline rock aquifers (composed of Pikes Peak Granite). These rock formations are primarily found on the eastern edge of central Park County north of Bailey.

Nutrients

Most nitrate concentrations in groundwater were less than federal drinking water standards of 10 mg/l. Numerous wells in Harris Park and Shawnee were also found to have high dissolved-nitrate levels, a possible indication of septic contamination.

Radon & Uranium

Studies show that there are naturally occurring high levels of radon in the groundwater. Currently there is no federally enforced drinking water standards for radon. "Proposed regulations, however, do suggest a maximum contaminant level of 300 picocuries per liter (pCi/L) and an alternative maximum contaminant level of 4,000 pCi/L contingent on other mitigating remedial activities to reduce radon levels in indoor air. Radon concentrations in about 91 percent of groundwater samples were greater than or equal to 300 pCi/L, and about 25 percent had radon concentrations greater than or equal to 4,000 pCi/L" (USGS Scientific Investigations Report 2007-5220). A median radon concentration of 4,200 pCi/l for samples from 16 wells located east of Fairplay was higher than the national average concentration of 350 pCi/l. In Woodland Park, combined radium 226 and 228 are the primary problems.

Large deposits of uranium have been located in South Park, and there has been great concern expressed over uranium mining in South Park and potential water quality impacts. One of the major problems with uranium mining is that the tailings contain uranium decay products. Water from the tailings, especially if left in large ponds or impoundments, can leach heavy metals into the groundwater. Any activities involving the mining of radioactive

material in Park County should be thoroughly scrutinized for their effects on the groundwater before mining is done. Currently, there is no uranium mining taking place.

Metals

Park County has evaluated the drinking water supply and quality impairment in the town of Hartsel. Hartsel is located in a mineral-rich area. It is not yet known exactly what contaminants are involved, although heavy metals (high iron) concentrations have been documented. As a result, some residents have installed in-house treatment systems. These were provided by the City of Aurora in direct response to groundwater diversions by Aurora. Also, the water table is dropping in the area, decreasing the availability and quality of the water and causing residents to have to drill deeper, sometimes as deep as 500 feet

6.3 Point Source Dischargers

6.3.1 Overview

Within the portions of Park and Teller counties in the South Platte Headwaters and Upper South Platte, there are currently six major (> 0.05 mgd) discharging wastewater treatment facilities described in Table 6-4 and shown in Figure 6-3. Service area boundaries are only shown for major facilities. Table 6-5 lists the minor discharging facilities (< 0.05 mgd) and Table 6-6 lists the only industrial discharging facility.

Table 6-4: South Platte and Upper South Platte Discharge Locations Major Facilities (> 0.05 mgd)

Discharge	Permit No.	Location	Mgmt. Area	Design Capacity (mgd)	Existing Load (mgd)
Town of Alma	CO-0035769	Middle Fork of the South Platte River	Park	0.117	0.041
Fairplay Sanitation District	CO-0040088	Middle Fork of the South Platte River	Park	0.3	0.1
Florissant Water and Sanitation District	CO-0041416	Twin Creek, 0.25 mile west of Florissant along Highway 24	Teller	0.057	0.020
Bailey Water and Sanitation District	CO-0020605	North Fork of South Platte River	Park	0.075	0.03
Will-O-Wisp	CO-0041521	Wisp Creek	Park	0.06	0.025
City of Woodland Park	CO-0043214	Trout Creek, west of treatment facility	Teller	0.893	0.59

Table 6-5: South Platte and Upper South Platte Discharge Locations—Minor Facilities (< 0.05 mgd)

Waste Water Treatment Plant	Permit No.	Discharge Location	Mgmt. Area	Design Capacity (mgd)	Existing Load (mgd)
Deer Creek Metropolitan District	(Site app approved 12/21/2005)	Deer Creek (trib. of the North Fork of SP River)	Park	0.012	Data not available
Camp Santa Maria	COX-660040 (exp 10/31/2010)	Discharge to groundwater from lagoons	Park	Data not available	Data not available
Quaker Ridge Camp	CO-0044199 (Permit exp date 8/31/2009)	Discharge to groundwater via soil absorption field	Teller	0.011	Data not available
Camp Shady Brook	CO-0045993	Discharge to groundwater	Teller	Data not available	Data not available
Lost Valley Ranch	CO-0046710	Discharge to groundwater	Park	Data not available	Data not available
Camp Alexander – Boy Scouts of America	COG-588036 (Permit exp date 5/31/2010)	South Platte River (Segment 1a)	Teller	0.012	Data not available
Platte Canyon School District[1]	COG-588108 (Site app approved 6/30/2007)	North Fork of the South Platte River	Teller	0.019	Data not available
Teller County Wastewater Utility	CO-0044211 (Permit exp date 3/30/2012)	Rule Creek	Teller	0.035	0.033

[1]Treatment process is two septic systems followed by three-stage lagoon (approved 2007). BOD and suspended solid violations occurred in the last two quarters of 2009 (EPA enforcement and compliance history).

Table 6-6: South Platte and Upper South Platte Discharge Locations Industrial Facilities

Waste Water Treatment Plant	Permit No.	Discharge Location	Location	Facility Type
London Mine LLC	CO-0038334 (Permit exp date 1/31/2011)	South Mosquito Creek	Park	Hardrock Mining: Mine Dewatering

6.3.2 Future Needs Assessment

There has been no recent expansion of wastewater treatment plants, and no future upgrades are expected to meet the population growth in Alma and Bailey. Fairplay Sanitation District just built a new wastewater treatment plant which became fully operational in 2009. Florissant Water and Sanitation District is researching process upgrades to meet effluent ammonia requirements. Bailey is expecting to meet the needs through 2045 and is working on plans to improve sludge handling capabilities and control of the treatment process. Presently Will-O-Wisp is designed for a much larger flow than is currently produced (about 20% of capacity). Anticipated population growth and piping surplus wastewater from neighboring Pine Junction in Jefferson County will hopefully augment Will-O-Wisp's flow. The City of Woodland Park is planning and engineering a plant expansion expected to be constructed in 2011 to 2013.

Continued growth is expected in unincorporated areas throughout Teller and Park counties and depending on the location of the housing tracts, it is uncertain if central wastewater treatment service will be possible or if ISDSs will be necessary. However, if the need for future central wastewater treatment facilities arises in Park County, it should be limited to the five subareas identified in the Park County Strategic Master Plan (Clarion Associates, 2001), which are Bailey, Fairplay/Alma, Hartsel, Lake George, and Guffey. To minimize the number of septic systems and possible water-quality impacts, future growth in the Hartsel, Lake George, and Guffey areas (areas where wastewater treatment plants currently do not exist) will be evaluated to determine the need for a central wastewater treatment plant.

Town of Alma

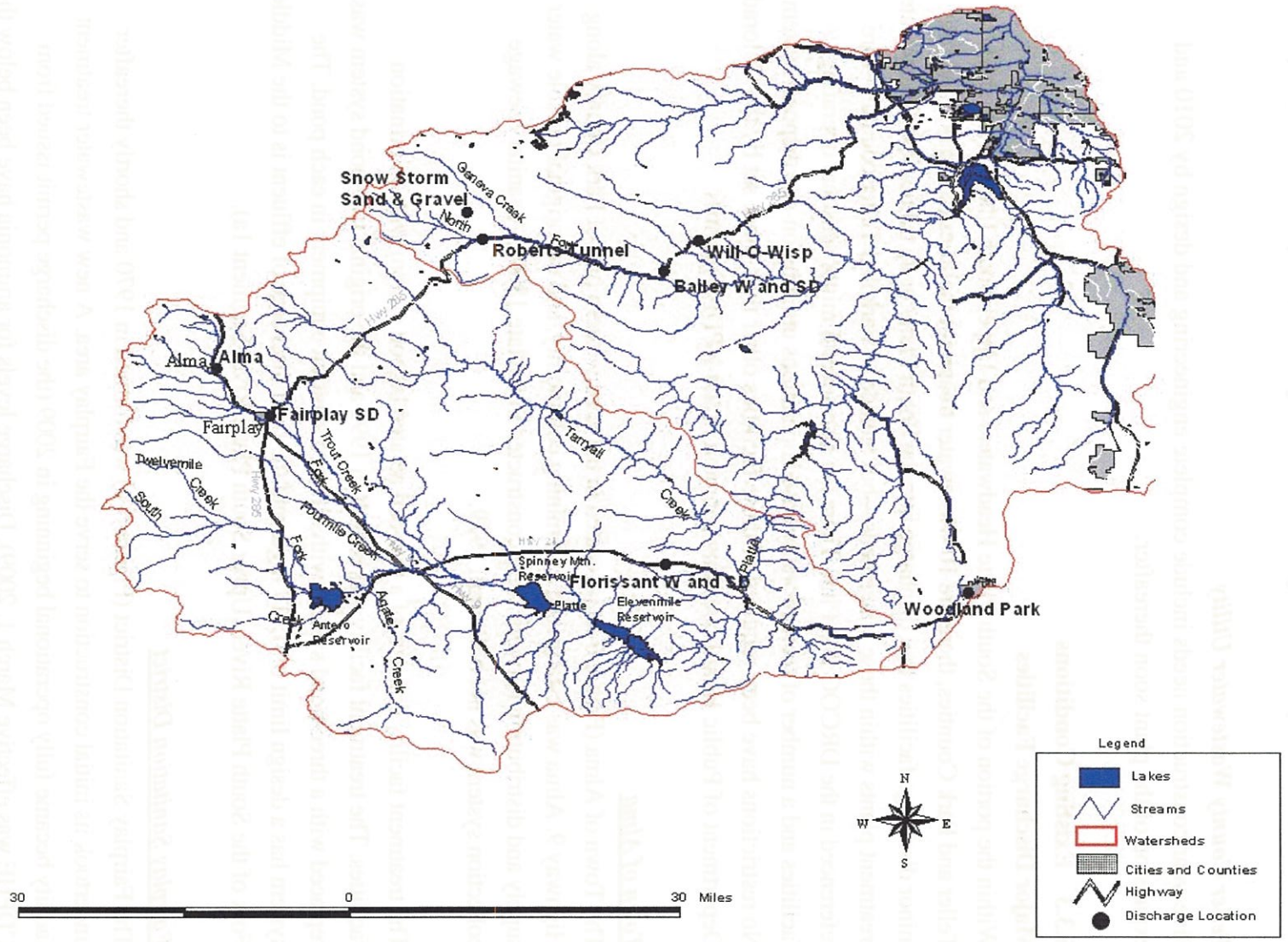
More stringent phosphorous and ammonia levels will require that modifications and upgrades be made to the Town of Alma Wastewater Treatment Plant. The types of modifications and upgrades have not been determined but could include a digestor.

Florissant Water & Sanitation District

Five-year construction needs include process improvements for winter ammonia reduction, and cell improvements to relieve ice-caused damage to baffles.

South Platte: Point Source Dischargers

Figure 6-3: South Platte and Upper South Platte Point Source Discharge Locations



City of Woodland Park

Five-year construction needs include engineering and design that is underway for a plant expansion to be constructed in 2010–2013. This plant expansion will serve a population of about 14,000 with plant loadings of about 1.2 mgd and 3,900 pounds BOD_5/day.

Teller County Wastewater Utility

Five-year construction needs include complete engineering and design by 2010 and expansion of the plant soon thereafter.

6.3.3 Existing Conditions

Major Discharge Facilities

Within the portion of the South Platte Headwaters and Upper South Platte Watersheds in Teller and Park Counties, there are 10 wastewater treatment facilities (six major and four minor discharge facilities that discharge into the South Platte or its tributaries). Wastewater treatment plants within these watersheds—but outside of Park and Teller counties—are referenced in the DRCOG 208 Plan. There are also several minor seasonal operating facilities and a number of recreationally based operations utilizing on-site disposal systems. No restrictions have been required of these facilities other than those set by the Colorado Department of Public Health and Environment in the NPDES permits.

Town of Alma

The Town of Alma (Figure 6-4) is located in the northwestern part of Park County along Highway 9. Alma was established as a mining community, and the original potable water supply and distribution network were constructed in the late 1800s. A sanitary sewage collection system was not built until 1979.

The treatment facility consists of a two-cell aerated lagoon system with chlorination facilities. The treatment facility was rebuilt in 1992 and the original two-pond system was replaced with a three-pond system with diffused aeration equipment in each pond. The system has a design limit of 0.117 mgd, and the final discharge of effluent is to the Middle Fork of the South Platte River (Upper South Platte River Segment 1a).

Fairplay Sanitation District

The Fairplay Sanitation District (Figure 6-4) was formed in 1970 and shortly thereafter undertook its initial construction to serve the Fairplay area. A new wastewater treatment facility became fully operational beginning in 2009 (the discharge permit issued from CDPHE was effective March 1, 2009). Discharge levels for ammonia have been below the permitted limits. The waste sludge pond was completed in the spring of 2009. The facility discharges to the Middle Fork of the South Platte River (Upper South Platte River Segment

1a). There is also a lift station on the south side of the Platte River that serves the mobile-home park and businesses on that side of the river.

Florissant Water and Sanitation District

The Florissant Water and Sanitation District (Figure 6-5) was created in 1979 to provide water and sanitary sewer service within the district boundaries. The operating system consists of a three-cell lagoon system with aeration of the first two cells. Chlorination is used to reduce fecal coliform and ammonia concentrations to levels that do not negatively affect the existing stream uses of Twin Creek. Dechlorination is used to reduce the effluent residual chlorine levels prior to discharge. The system went into service and operation in the early spring of 1988, and this system now receives 18,500 GPD. Florissant, as part of their permit compliance schedule, has recently completed addressing seepage rates from their lagoon system. The facility discharges to Twin Creek (Upper South Platte River Segment 2a) about 0.25 miles west of Florissant.

Bailey Water and Sanitation District

The Bailey Water and Sanitation District (Figure 6-6) was formed in 1969 to provide sanitary sewer service to the Town of Bailey. Prior to this time, residents and businesses in Bailey had individual sewage disposal systems (ISDS). In 1969, a sanitary sewer collection system was installed along with an extended aeration sewage treatment facility. The sewage treatment facility installed in 1969 did not have adequate capacity and could not meet NPDES permit limitations. Thus, in 1979, a used plant including its equipment was purchased and transported to Bailey. The new facility used the polishing pond of the original facility as an aerated lagoon. The expanded facility also added a mechanical aeration basin and tertiary treatment facilities, which included a chemical mixing basin, sludge settling basin, and a multimedia filter. The district upgraded the WWTP in 1992. Improvements to the plant included a new decant system, a new control system, and a cover for the reactor basin. These upgrades have resulted in a marked improvement in the quality of effluent discharged by the plant ,and the district has not had any violations of their discharge permit. Plans are presently being implemented to improve sludge handling capability and to improve the control of the treatment process. In 2002, the District received $115,000 in grants/low-interest funds to upgrade the operation of its facility and construct a new sewage digestor (a covered cement pond) that breaks down the effluent prior to discharge. This work was completed in March 2004. The facility discharges to the North Fork of the South Platte River (Upper South Platte River Segment 4).

Will-O-Wisp Metropolitan

The Will-O-Wisp Metropolitan District (Figure 6-6) is a planned-unit development in the northeast part of the Park County. Its location is approximately 1,000 feet west of the Jefferson County line. The district's wastewater treatment facility has been operational since

January 1988, and the present flow is 0.025 mgd, about 20% of capacity. This facility is of high quality but is designed for a much larger flow than is produced by the current population; thus, it is underloaded and is not operating as efficiently as it might. The facility discharges into Wisp Creek (Upper South Platte River Segment 4) and all monitoring results indicate discharges are well below required state levels.

A downturn in the real estate market in the late 1980s and early 1990s resulted in no growth to the community. The Will-O-Wisp Metropolitan District declared Chapter 11 bankruptcy and operates under a reorganization plan. With the upturn in the real estate market in 1995 and 1996, the district has grown to 107 homes which are located in Filing One. The original plan projected population for the entire development at 2,747. Projected population is dependent upon development of the remaining four filings, and community growth hinges on the current developer; however, piping surplus wastewater from neighboring Pine Junction in Jefferson County to augment Will-O-Wisp's flow is a possible solution to its under-utilization problem.

City of Woodland Park

The City of Woodland Park (Figure 6-7) provides wastewater treatment for the city, some surrounding areas, and Teller County Water and Sanitation District No. 1. The city is located on a saddle from which gravity wastewater flow naturally splits into north and south drainage basins. All wastewater is treated in an advanced treatment plant located in the north basin adjacent to Trout Creek. Wastewater from the south basin is pumped to the north basin using a 600-gallon-per-minute pump station, 10-inch force main and a 12- to 24-inch interceptor sewer. Two small (88 and 182 gpm) pump stations serve small areas immediately south of the main south lift station.

The Woodland Park wastewater plant discharges to Trout Creek (Upper South Platte River Segment 4), a tributary to the South Platte River, which are both protected as cold water fisheries. Ammonia removal requirements strongly influenced the plant's design and its current operation.

Woodland Park's wastewater plant was designed for a flow of 0.893 mgd. The current service population is 8,800 and the current peak monthly flow is only 0.63 mgd, but organic loading has prompted the city to initiate planning and designing of a plant expansion. The expanded plant will serve a population of 14,000 with a 1.2 mgd capacity.

Minor Discharging Facilities

Teller County Wastewater Utility (servicing Divide)

In April 1995, the Teller County Board of Commissioners established, by resolution, the Teller County Wastewater Utility, which services Divide. The utility is directed by a board of directors and is managed by a utility manager.

Currently, the Teller County Wastewater Treatment Facility is operated by the City of Woodland Park's Utilities Department, and billing administration is done by Divide Water Providers, Inc. Wastewater sludge is treated through a contractual agreement with the City of Woodland Park at the city's treatment facility. Future expansion of the plant and the collection system will be based on development in the area. At this time, there are over 1,000 preliminary or platted lots within the current service area. The system produces approximately 0.030 mgd of sewage for treatment. The discharge is to Rule Creek (Upper South Platte River Segment 4), immediately east of the treatment plant.

Platte Canyon School District

The treatment process includes a three-stage lagoon system consisting of aeration, followed by a polishing pond and chlorine disinfection. The peak hydraulic design capacity is 0.019 mgd, and it has an organic capacity of 50 lbs/BOD5 day.

Deer Creek Metropolitan District

The Deer Creek Metropolitan District WWTF was approved in 2003 and is located immediately north of Highway 285, approximately two miles north of Bailey in Park County. It provides service to the Deer Creek subdivision, a 21.68-acre site that primarily consists of commercial developments, a grocery store, retail stores, restaurants, and banks. The design capacity is 0.0125 mgd; discharge is to Deer Creek, a tributary of the mainstem of the North Fork of the South Platte River.

Camp Alexander

Camp Alexander has permit limits for BOD and Total Suspended solids (30-day average/7-day average) which are 30/45 and for E. coli which are 6,000/12,000.

6.3.5 Industrial Facilities

Snow Storm Sand and Gravel

The Snow Storm placer deposit is located midway between Alma and Fairplay along the Middle Fork of the South Platte River. M & M Mining Company was sold to Zigan Sand & Gravel Company and then to the Snow Storm Sand and Gravel Company. The discharge permit is currently inactive. The historic operation of the mine included hydraulic and dredge workings. A 1940s floating wash plant is still currently on site. In 1989, M&M Mining Company submitted a site application for a fresh-water holding pond, a screening plant, two sluices, two settling canals, and a multi-acre main recycling settling pond. The Snow Storm Sand & Gravel Mine is permitted under the state's general permit for placer mining operations, which also includes provisions for stormwater discharge. The mine was originally permitted to discharge to the Middle Fork of the South Platte River, but under normal circumstances there is no discharge.

The final plot was approved in May 2003 for Glacier Ridge Subdivision, located adjacent to

the mining company. This is a 322-acre subdivison that contains 62 residential lots and seven acres of open space. The recommendations made by Park County staff were to restore the well water quality and initiate advanced treatment for the septic systems, at least 200 feet from wells.

London Mine LLC

The London Mine Tunnel is located about 12 miles northwest of Fairplay. Hardrock mining is done for gold and silver ore. Both Mosquito and South Mosquito Creeks are water-quality impaired for zinc and will require a total maximum daily load (TMDL). Historically, zinc concentrations in South Mosquito Creek ranged from 110 µg/L to 749 µg/L, and 95 µg/L to 750 µg/L in Mosquito Creek. The chronic zinc table value standards for South Mosquito Creek and Mosquito Creek are 250 µg/L and 110 µg/L, respectively.The London Mine Tunnel is used for mine dewatering and requires an industrial stormwater permit. The permit expires January 31, 2011.

London Water Tunnel

The Colorado Discharge Permit (CO-0038334) for London Water Tunnel, which was constructed in 1918, is for the outfall from the final settling pond. This is approximately one mile above South Mosquito Creek's confluence with Mosquito Creek. The discharge from the final settling pond is in the range of 1.0 to 1.5 mgd from a 2.0-million-gallon settling pond constructed in 1988. The discharge from the final settling pond where it enters South Mosquito Creek is generally lower in mineral content than the creek. The permit for the water tunnel currently has seasonal metals effluent limitations based on the temporary modifications of water quality standards. Discharge from the final settling pond is tested and reported as required by the permit. Since 1991, there has been no mining conducted in the water tunnel. This permit contains specific standards for metals. During all four quarters of 2009, the water tunnel had effluent violations for dissolved cadmium and dissolved zinc.

Extension Tunnel

A permit (CO-0045209) has also been issued for the effluent from the extension tunnel. The extension tunnel water is collected at the tunnel entrance via a small corrugated plastic pipe to an unnamed creek. This discharge point is several hundred feet above the confluence of the unnamed creek and South Mosquito Creek. During several quarters of 2009, the extension tunnel had effluent violations for dissolved cadmium, dissolved zinc, total suspended solids, and pH (EPA Enforcement and Compliance History).

The London Extension Tunnel has not been reclaimed, and various treatment options are still being considered. This erosion substantially increased the sediment and metals loading in Mosquito Creek. As part of a 319 Nonpoint Source project in 1998, tailings were consolidated, regraded and revegetated. Drainage channels also were excavated around the

tailings in the lower valley. In 1998, a neutralizing system, diversion ditches, and settling pond spillway were built by the Division of Minerals and Geology. Sediment loads during storm events were demonstrably lower than pre-319 project conditions.

Major Point Source Service Area Maps

A summary of point source data is presented in Table 6-7, which shows information obtained from the treatment facilities. Service area maps show projected service area boundaries for each facility previously described. The background of these maps is Google Earth satellite imagery which was last updated in September 2005. Major point source discharge locations are shown on the service area maps.

	Upper South Platte Segment COSPUS01a		USP Segment COSPUS02a	Upper South Plate Segment COSPUS04		
	Town of Alma	Fairplay Sanitation District	Florissant Water & Sanitation District	City of Woodland Park	Will-O-Wisp	Bailey Water & Sanitation District
NPDES Permit #	CO-0035769	CO-0040088	CO-0041416	CO-0043214	CO-0041521	COG-588056
Permit Expiration Date	5/30/2010	Not issued	6/30/2010	5/31/2014	8/31/2009	6/31/2010
Flow (MGD)	0.117	0.300	0.057	0.893	0.060	0.075
Existing Load (MGD)	0.041	0.10	0.019	0.69	0.025	0.03
Year at 80% Design	2020	2020	2025	2015	2025	2025
Year at 95% Design	2025	2025	2030	2021	2030	2030
Organic (lbs/day BOD_5)	111	880	162	1,955	138	125
Existing Load (lbs/day BOD_5)	73	200		1,740	Not Available	29
Year at 80% Design	2020	2020	2020	2010	Not Available	2025
Year at 95% Design	2025	2025	2025	2013	Not Available	2030
30-day avg / 7-day avg						
BOD	30 / 45	30 / 45	30 / 45	30 / 45	30 / 45	30 / 45
Total Suspended Solids	75 / 110	75 / 110	75 / 110	30 / 45	30 / 45	30 / 45
Fecal Coliforms, #/100 ml	4,140 / 8,280	5,339 / 10,678	NA	NA	200 / 400	6,000 / 12,000
E. coli	NA	2,000 / 4,000	1,248 / 2,496	126 / 252	NA	NA
Total Residual Chlorine, mg/l [1]	N/A / 0.083	0.298 / NA	Report / 0.05	N/A / 0.019	0.0042 /0.0054	Report / 0.5
Total ammmonia as N, mg/l, 30-day avg / daily max						
January	26.8 / Report	17 / Report	10.3 / Report[1]	5.3 / NA	2.7 / Report	25 / 25
February	Report / Report	18 / Report	11.5 / Report	5.3 / NA	1.8 / Report	25 / 25
March	Report / Report	13 / Report	9.1 / Report	5.3 / NA	3.4 / Report	25 / 25
April	Report / Report	19 / Report	6.6 / Report	5.3 / NA	2.7 / Report	25 / 25
May	18.1 / Report	24 / Report	6.5 / Report	8.2 / NA	1.8 / Report	25 / 25
June	Report / Report	Report / Report	16.3 / Report	8.2 / NA	3.4 / Report	25 / 25
July	Report / Report	19 / Report	7.6 / Report	8.2 / NA	7.7 / Report	25 / 25
Aug	Report / Report	20 / Report	6.0 / report	5.9 / NA	2.7 / Report	25 / 25
Sept	Report / Report	16 / Reporrt	4.9 / Report	5.9 / NA	2.0 / Report	25 / 25
October	Report / Report	26 / Report		5.9 / NA	7.7 / Report	25 / 25
November	Report / Report	24 / Report	13.5 / Report	5.3 / NA	3.1 / Report	25 / 25
December	Report / Report	18 / Report	3.3 / Report	5.3 / NA	3.8 / Report	25 / 25
Metals (conc in ug/l), 30-day avg / daily max						
Chromium III Dissolved	555.7 / 72.3	NA	NA	NA	NA	NA
Copper, PD	13.1 / 8.7	NA	NA	NA	NA	NA
Nickel, PD	456.3 / 50.7	NA	NA	NA	NA	NA
Zinc, PD	114.2 / 115.1	NA	NA	NA	NA	NA
Silver, PD	1.93 / 0.07	NA	NA	NA	NA	NA
Cadmium, PD	3.58 / 2.19	NA	NA	NA	NA	NA
Manganese, PD	2956 / 1633	NA	NA	NA	NA	NA

Footntoes

[1] **Ammonia limits will apply once construction is completed (Report only during construction)**

Table 6-7: South Platte and Upper South Platte Discharge NPDES Permit Information

Figure 6-4: Alma and Fairplay Sanitation District Service Area

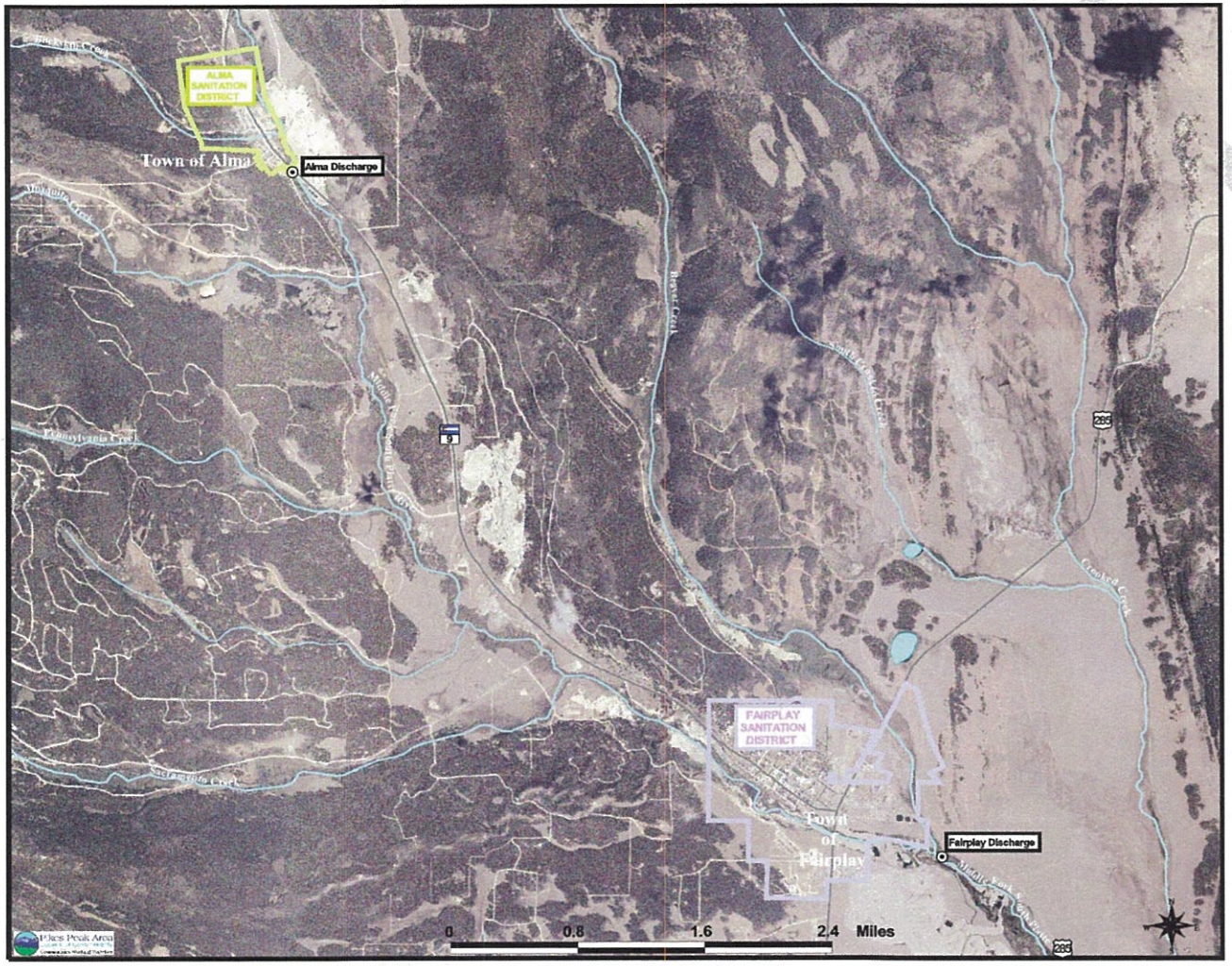


Figure 6-5: Florissant Sanitation District Boundaries

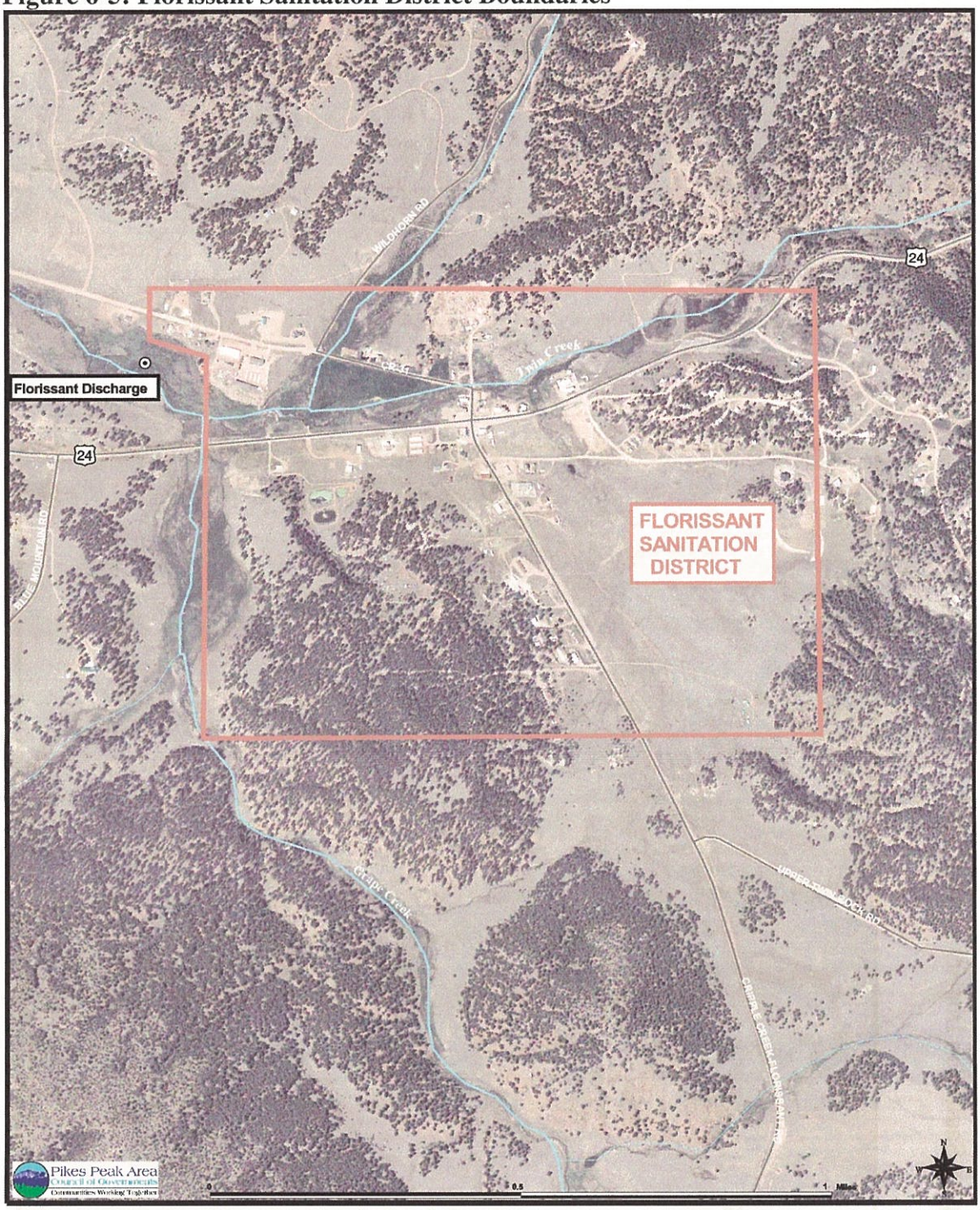


Figure 6-6: Bailey and Will-O-Wisp Sanitation District Service Area

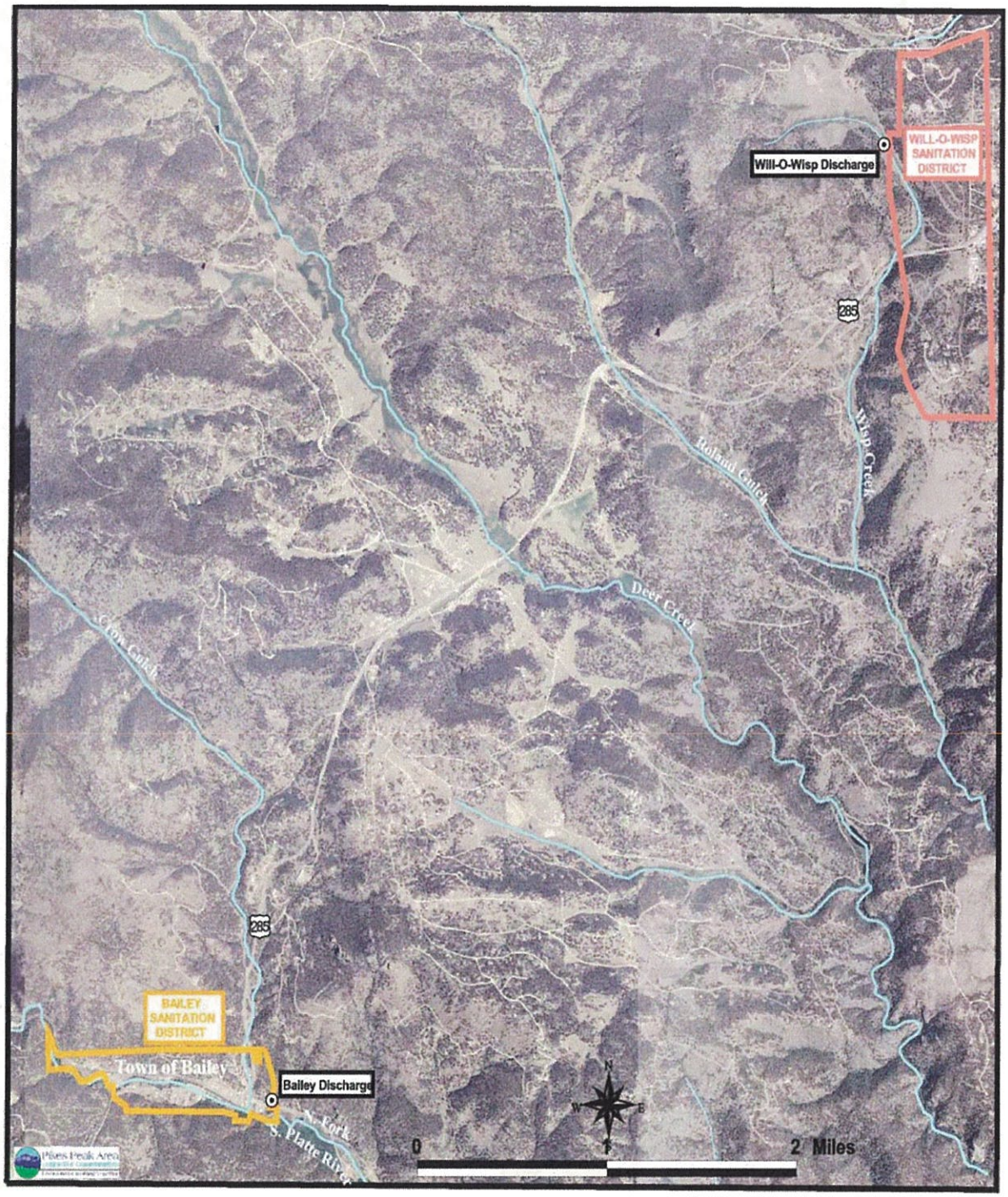
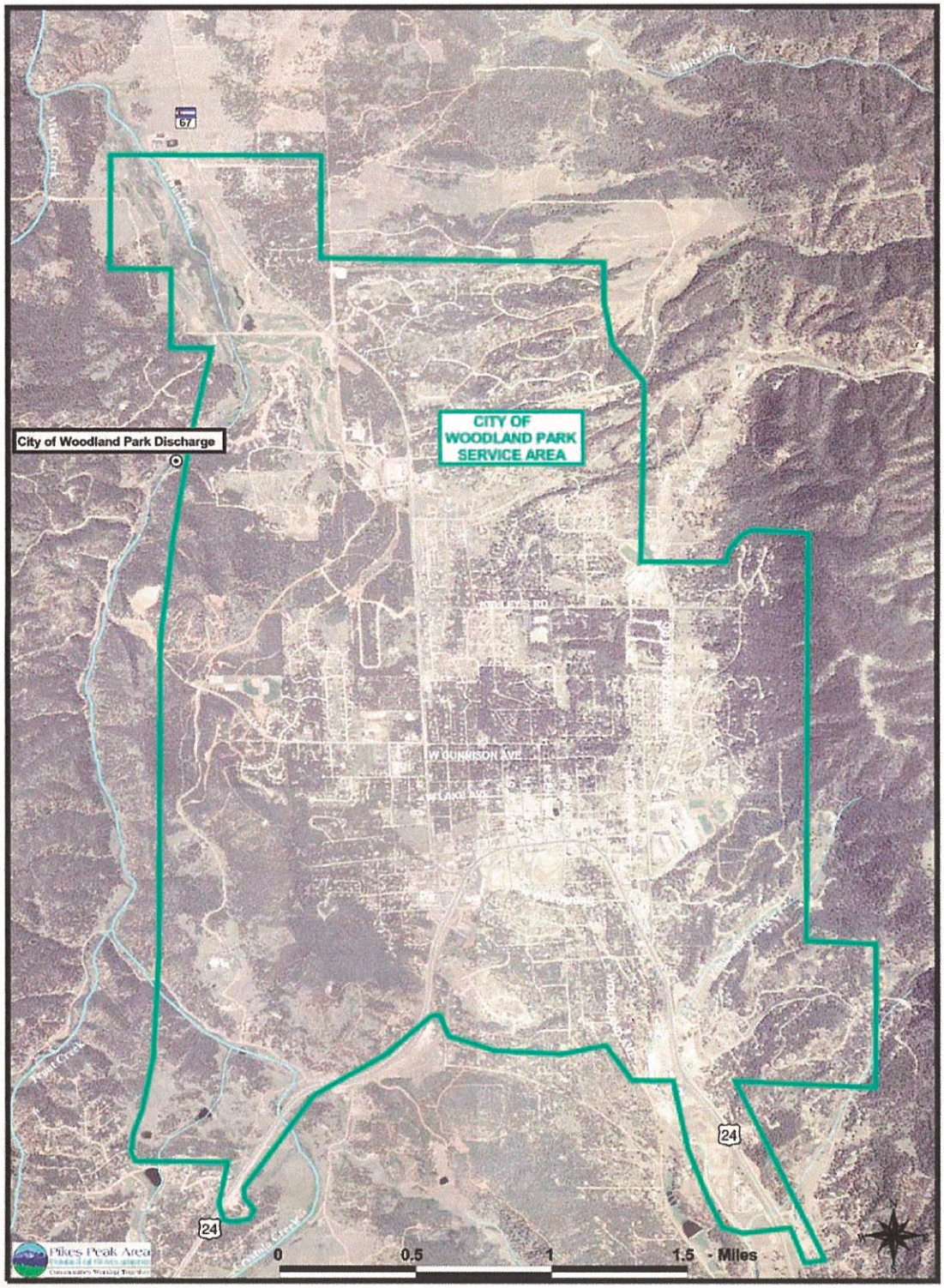


Figure 6-7: City of Woodland Park Service Area



6.4 Nonpoint Source Assessment

Nonpoint source pollution is defined as a degradation of water quality from diffuse sources. This section will cover the affects on groundwater and surface water from agriculture-silviculture, hydrologic modification, land disposal, solid water disposal, construction, urban runoff, resource extraction, ISDS, and recreation.

6.4.1 Agriculture and Silviculture

There is very limited agriculture in Park County. In the eastern portion of the watershed, agricultural lands consist primarily of riparian and mountain grasslands which are situated on private lands along the river. The total number of acres being farmed or ranched decreased by 30% from 1987 to 1997, from about 400,090 acres in 1987 to 311,182 acres in 1997 (Clarion Associates, 2001). These areas are used primarily for livestock grazing and a minor amount for hay production. Fertilizer runoff from hay meadows and pesticide runoff from noxious weed spraying are potential sources of pollution in the county, but there is no documentation of the problem from these sources. The Conservation Districts and the Natural Resource Conservation Service are encouraged to continue their educational efforts to promote effective utilization of these products without damaging the receiving waters. Some Best Management Practices (BMPs) that have been found effective in minimizing the amount of erosion include grazing management techniques and strategies such as rotational grazing, deferred grazing, proper grazing use, critical area treatment, sediment basins, and grade stabilization structures (CDPHE-WQCD, 2000).

Erosion in riparian areas from overgrazing continues to be a problem on private and public lands. Many ranchers have instituted conservation measures such as rotation and deferment to decrease the erosion; however, a problem still exists in some areas such as Spring Creek. Erosion also occurs through activities such as building roads. BMPs suggest the use of vegetation and/or structures in-stream and on immediately adjacent areas of streams, or construction of channels to stabilize and protect against erosion.

Silviculture is the practice of caring for forests with respect to the human objective. This is extremely important in the South Platte and Upper South Platte Watersheds due to the number of fires that have occurred recently within the region. Silviculture imitates a natural change—such as a beetle infestation or fire —and these methods can be effective at reducing the severity and possibility of fire in the future.

Wildfires

Due to the drought, wildfires have been an increasing concern in this region. During the past nine years, there have been four major wildfires and numerous smaller wildfires within the watershed. Major fires include:

- June 2000, Hi Meadows Fire, south of Bailey, burned about 11,000 acres
- April 2002, Snaking Fire, near Bailey, burned about 2,500 acres
- May 2002, Schoonover Fire, Deckers, burned about 4,000 acres
- June 2002, Hayman Fire, burned about 137,000 acres within Park, Teller, Douglas, and Jefferson Counties

Approximately half the acres consumed in these fires were within the Pike National Forest. Rehabilitation efforts are continuing to be conducted by the Pike National Forest and the Coalition for the Upper South Platte (CUSP) to minimize erosion that is caused by heavy rains, which can create flash floods. As experienced after the Buffalo Creek fire in 1996, this can result in heavy sediment and high pH readings. This is especially important since the Upper South Platte is a source of drinking water for the Denver Metro area. Erosion could also affect the aquatic habitat in several of the streams and creeks. High sediment levels in the creek can lead to sediment build-up in Cheesman and other reservoirs, can cause a reduction in the amount of water storage, and can require costly strategies to remove the sediment. The US Forest Service and CUSP are using techniques that include seeding, planting trees, trenching to slow down and divert water, and constructing temporary dams or placing straw bales in gullies to promote rehabilitation and restoration of the land. In spite of these ongoing efforts, areas of the watershed at high to moderate intensity are still vulnerable to intense erosion, as witnessed in Teller and Douglas counties in 2007 and Douglas and Jefferson counties in 2009.

Due to continued risk of fire in the watershed, the US Forest Service and Colorado State Forest Service have designated the Upper South Platte Watershed as a red zone (an area highly susceptible to large-scale, catastrophic fires). Over 21% of the watershed's mountain forest has been lost to catastrophic fires since 1996 (USPWPA, 2001a). Community wildfire protection plans have been adopted by Teller and Park counties, and they are working with the US Forest Service, CSFS, CUSP, and local fire protection districts to mitigate fuels.

Hayman Fire Restoration

Hayman Fire restoration efforts in 2010 and 2011 will focus on watershed restoration in four creeks between Woodland Park and Cheesman Reservoir—Horse Creek, Trout

Creek, West Creek, and Trial Creek. Since the fire in 2002, these creeks have had high sediment loading from areas upstream that have been washed out. The work will include stream stabilization, riparian and upland vegetation, wildlife enhancement, and reconstruction or relocation of trails and roads.

Conservation Easements

Conservation easements have become an important tool in Park County and other communities to preserve areas for future protection. Some important conservation easements have occurred since the last update of the plan in 2003, which include:

- Tarryall Creek Ranch east of Como, which will include 2.7 miles of Tarryall Creek. It is anticipated that the management plan will be complete by the fall or winter of 2010 and the area open to the public by summer of 2011.
- Several other private conservation easements in the Tarryall Creek corridor designed to protect elk migration routes and big and small game habitat.

6.4.2 Hydrologic Modification

Hydrologic modification in Park County has historically taken place for irrigation of agricultural land. However, most of the agricultural water rights have been bought by Front Range municipalities, which are using hydrologic modification to provide drinking water. The effects of the diversions and reservoirs on the water chemistry of the stream basins have not been documented. This has become an extremely critical issue recently because of the drought.

Streamflow in the basin is driven by snowmelt, with the majority of the runoff volume occurring in the late spring/early summer. Low flow for these streams happens in the late fall and winter, and most rainfall runoff in the basin comes from summer convective storms and upslope rainstorms. The natural flow regime has been modified over the past 150 years due to irrigation, water diversions, introduction of transmountain water, and water storage reservoirs.

Transbasin Diversions

Denver Water's Roberts Tunnel and Aurora's Otero Pipeline are the two major transbasin imports into the Upper South Platte River. The Roberts Tunnel delivers water from the Lake Dillon collection system to the North Fork of the South Platte just upstream of Grant, Colorado. The City of Aurora imports water from the Homestake Project and other Colorado and Arkansas water supplies via the Otero Pipeline into Spinney Reservoir. Aurora and the City of Colorado Springs equally own the Otero Pipeline. Roberts Tunnel

is discussed in Section 6.3, South Platte and Upper South Platte Point Source Discharge Facilities.

Other transbasin imports include the Boreas Pass Ditch and Colorado Springs Blue River Tunnel. Both of these are minor inputs into the Upper South Platte River. Colorado Springs will usually take Blue River water via a pipeline but can release water into the South Platte.

The City of Aurora lost the conjunctive use case. This project would have pumped groundwater from the South Park aquifer for use by the City of Aurora to maintain its existing needs and to meet future needs. However, Park County continues to meet with Aurora on possible options in the future to transfer water. Aurora, Denver, and Park County may share the cost of hiring an engineering firm to assess Park County's future water needs and to identify possible storage sites (*Fairplay Flume,* 2003). The future storage needs of Aurora are 35,000–40,000 acre feet; Denver needs 80,000 acre feet and Park County needs 1,000–1,500 acre feet.

Roberts Tunnel

The Roberts Tunnel, owned and operated by the Denver Water Department, diverts high quality water from Dillon Reservoir in Summit County and discharges it into the North Fork of the South Platte as part of its water supply for the Denver area. The Roberts Tunnel brings about 23% of Denver's water from Lake Dillon to the North Fork. A 1985 agreement between Summit County and the Denver Board of Water Commissioners allows tertiary treated effluent from wastewater treatment facilities discharging to Dillon Reservoir to be discharged directly to the Roberts Tunnel when Denver is transporting a minimum of 50 cubic feet per second through the tunnel.

The Snake River Wastewater Treatment Plant, owned and operated by Summit County, has received approval from the Northwest Colorado Council of Governments for the potential future direct discharge to the Roberts Tunnel. Northwest Council of Governments' water quality and quantity efforts are involved in Technical Assistance (TA) programs dealing with water resource development and water quality protection. They are currently involved in water quality with regard to phosphorous load allocations from the Roberts Tunnel; regulations that might indirectly affect Park County land use; and setbacks to ISDS. Under the CDPHE WQCC, Division Reservoir Control Regulation (Regulation #71, 2007), the Snake River WWTP is allowed a phosphorus discharge of 340 lbs/year.

Residents of Park County are very concerned about potential water-quality degradation to the North Fork South Platte. Communities in Park County that utilize the South Platte as a

water supply include Grant, Santa Maria, Bailey, Insmont, Mooredale, Glen Isle, Shawnee, and Eastbrook.

Reservoirs

Reservoirs are a major factor in the modified hydrology regime. The principal reservoirs in the Upper South Platte Basin are Antero, Eleven Mile, Cheesman, Spinney Mountain, Tarryall, and Strontia Springs. Denver Water owns and operates Antero, Eleven Mile, and Cheesman reservoirs. The City of Aurora owns and operates Spinney Mountain Reservoir. Denver and Aurora jointly operate Strontia Springs Reservoir. Taryall Reservoir is owned and maintained by the DOW. Other reservoirs include, but are not limited to, Jefferson Lake, Wellington Lake, Montgomery, and Lake George.

Invasive aquatic species have become a major concern for reservoirs in the watershed. Zebra and quagga mussels have been found in the state, and DOW is concerned that these may be transported to reservoirs in the watershed. During 2010, the DOW employed seasonal employees at the reservoirs to inspect all boats entering and leaving the lakes for transport of invasive species.

Wetlands and Peatlands

Other areas that have experienced the effects from hydrologic modifications include the peat fens and wetlands. Wetlands and peat fens provide important wildlife habitat and water filtration functions. Park County has some unique peat fens with species not found anywhere else in the continental United States. The unique beneficial water-quality features of these fens are discussed in the water quality analysis section of this report. The High Creek Fen has been nationally recognized for its unique species and has been acquired by the Nature Conservancy. Unfortunately, some of the lesser fens have been mined and have suffered irreversible damage to their filtering capacity. A report entitled *An Evaluation of the Effects of Peat Mining on Wetlands in Park County, Colorado* was completed in February 1990. In addition, an inventory of the calcareous fens was completed (Johnson, 1998; Johnson, 1996) and is described in more detail in the Surface Water Section for the South Platte Basin.

The Colorado Natural Heritage Program (CNHP) completed the Park County Inventory of Critical Biological Resources in April 2001. CNHP uses a multidisciplinary team of scientists and information managers to gather information on rare, threatened, and endangered species and significant plant communities in Colorado. Scientists study life history, status, and location of the species; information is entered into the Biological and

Conservation Data System and then mapped using GIS technology. The final job is to rank the most sensitive or imperiled Potential Conservation Areas (PCA).

In Park County, the CNHP team identified 35 PCAs that are home to over 115 rare or imperiled plant species, animal species, or significant planning communities. Nine recommendations were made for protecting Park County's biological resources.

South Park is one of only a few areas in Colorado designated as a state wetlands focus area by the Colorado Wetlands Initiative Program, administered by the Colorado Division of Wildlife. The South Park Wetlands Focus Area Committee has secured over $7 million for conservation easements since 1999. High Creek Fen, located in South Park, is one of the most biologically diverse fens known in the Southern Rocky Mountains and contains more rare plant species than any other wetland known in Colorado. The Nature Conservancy owns about 1,200 acres of High Creek Fen and plans to purchase about 560 acres of high-quality wetlands and 4,500 acres of uplands in the High Creek Basin. The goal of the wetlands initiative in South Park is to ensure that these predominately natural wetlands are protected (Division of Wildlife, Wetlands Initiative, http://wildlife.state.co.us). The wetlands initiative, with the support of private landowners and the county, is expected to protect 7,350 acres. Teller County, in association with CUSP, has applied for grants from EPA and GOCO to complete a CNHP assessment in 2010 or 2011.

Park County Peatlands

Park County's peatlands have been subjected to a number of significant types of disturbances since the area was settled in the 1800s. Historically, ditching was probably the most important disturbance to the peatlands. Ditching was undertaken to dry the peatlands so they could be converted to agriculture. While the ditching and draining of peatlands still occurs, currently the most significant threat to these sites is peat mining. Peat is a partially decomposed plant material that has accumulated over the centuries. It is extracted from these sites primarily for use in agriculture and home gardens, but it is also sometimes removed to create ponds or to expose underlying mineral deposits.

Peatlands comprise a small but important part of Colorado's natural lands and are often associated with rare or imperiled wetlands known as fens. These wetlands provide unique and irreplaceable habitat for a number of rare plants and perform many important environmental functions.

An additional concern for water quality planners is that, after mining, operators are required to perform little or no site reclamation or restoration. This runs counter to ore-mine regulations, which require operators to perform extensive site restoration upon cessation of

mining activity. This policy is mainly a bureaucratic artifact because wetland decisions fall primarily under the jurisdiction of the US Army Corps of Engineers, rather than under state or federal mining agencies. Although peat miners are not subject to a consistent policy with regard to site reclamation, governmental managers should be prepared with a reclamation strategy because many of these sites reside on public lands.

South Park Heritage Resource Area (SPHRA) Study

South Park was designated a National Heritage Area on March 30, 2009. The designation was part of an Omnibus Public Lands Management Act, and now this area is one of 49 National Heritage Areas across the country and only one of three in Colorado. Before the County can apply for grants, it must develop a 10-year master plan. This designation is expected to enhance tourism and provide access to federal funding. The same process utilized in South Park will be used for Tarryall Creek, where future restoration and protection options are now being developed for areas along the Creek. A report exploring these options, *Tarryall Creek Restoration Overview Report* (2002), has already been completed.

The purpose of the *South Park Heritage Resource Area Study*, conducted in 1996, was to identify key resources that express South Park's heritage through time. The study area was located in the 900 square-mile basin of South Park (Figure 6-8) and included surrounding upland areas, the Mosquito Range, the Tarryall Range, and the Thirty-Nine-Mile Mountain Volcanic area. In this study, South Park was identified as having more "fens" than any other region in the continental United States and over 50,000 acres of wetlands (Shapins Associates, 1996).

Priority actions were developed to build support for heritage conservation, to help traditional industries remain in production, and to conserve heritage resources having the highest value and greatest impact potential. The study contains strategies that provide a basis for future efforts such as partnership building, cooperative planning, tourism management, resource conservation, environmental education, and resource interpretation. This effort was the first step towards acquiring conservation easements and retaining high-priority ranchlands as productive agriculture areas.

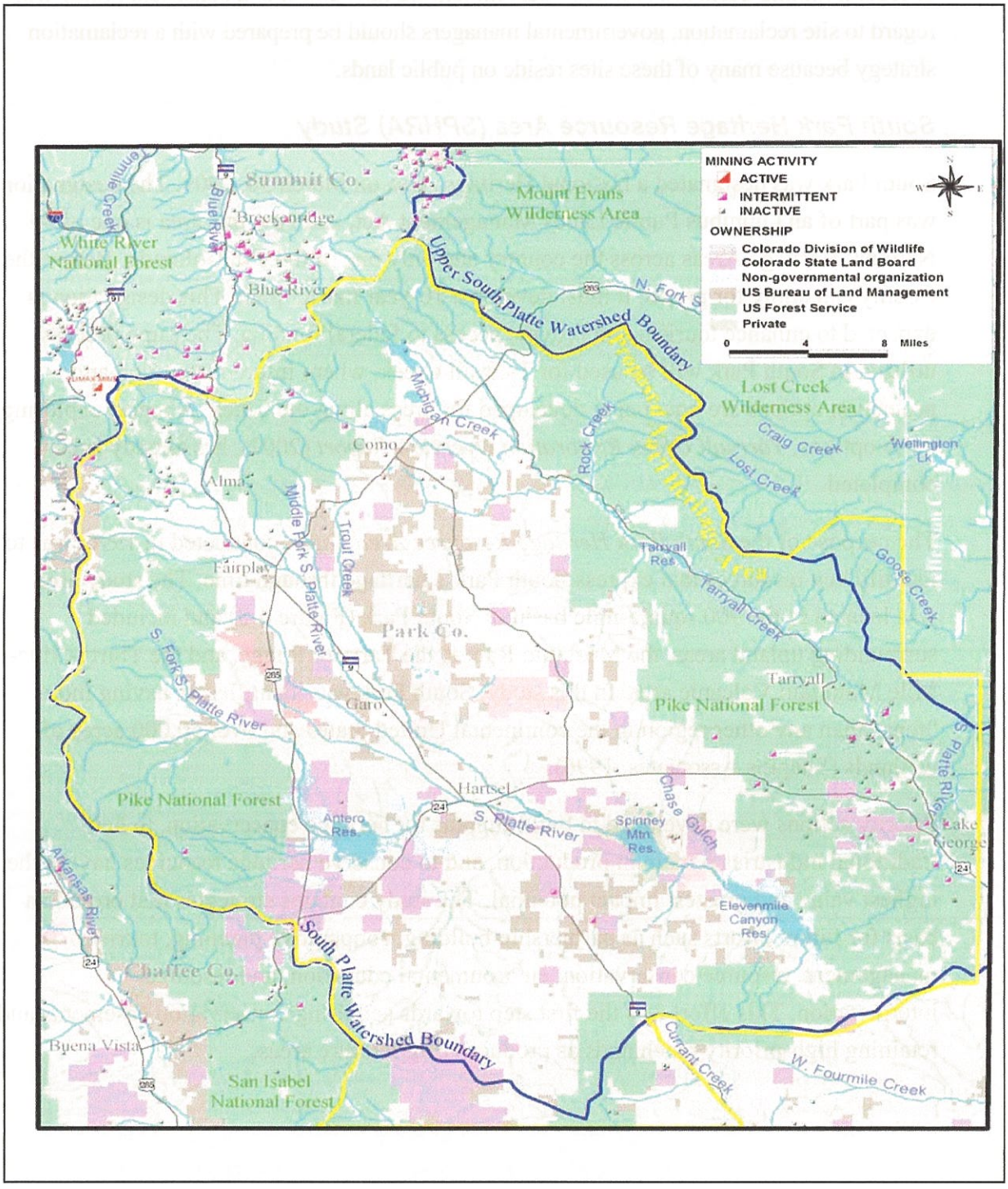


Figure 6-8: South Park Resource Heritage Area Boundary and Mining Locations

Development of Conservation Easements

The Heritage Resource Study provided the impetus for conserving the highest priority property in South Park (Wahl-Coleman Ranch) in 1999. Following this, Park County received an EPA Regional Geographic Initiatives Grant in 2000 to initiate the Upper South Platte River Conservation Planning Project. This Plan targeted stream corridor properties that contain significant agricultural, riparian, and/or wetland resources. In 2001, Park County received grants to purchase conservation easements of four ranch properties which will protect 7,500 acres of prime habitat and eight miles of stream corridor.

In December 2002, Park County was awarded grants by GOCO ($3.5 million) for the long-term conservation and restoration of South Park's outstanding natural resources, including river corridors, rare wetlands, and working cattle ranches. The project involved more then 16 participating landowners, to ensure the conservation of more than 13,000 acres and over 28 miles of stream corridor. The funds were used to purchase conservation easements (acquire the rights to develop land, but do not actually purchase the land) on targeted properties that have wetland and riparian habitats in South Park. The funds provided stewardship endowments for the easements along the South Fork of the South Platte River, Fourmile Creek, and Agate Creek. The lands included in this study are wetland and upland habitats that support rare or imperiled species. Among the resources preserved are one of the largest concentrations of rare or imperiled plant communities in the lower 48 states and the most Gold Medal trout water in Colorado *(Fairplay Flume,* 2002).

6.4.3 Solid Waste Disposal

The primary method for solid waste disposal in the county is the use of transfer stations. The designated transfer stations collect solid waste for transport to landfills outside of the county. No landfills are expected to be built in Park County in the near future. Illegal dumping into ditches and ravines is a problem in the county. Most of the transfer stations collect recyclable glass, newspaper, aluminum, plastic, magazines, and office paper. The recycling of these items results in a reduced load to the landfills. Waste lagoons in Park County consist of municipal or animal waste lagoons or mine ponds. It is not known how many, if any, of these are potential threats to the groundwater near them.

6.4.4 Construction

Nonpoint source pollution from road and residential construction includes erosion and pesticide runoff. Erosion and weed control plans are required for these activities. State of Colorado highway crews currently apply pesticides to control noxious weeds along the state highways and on county roads, and it is believed that there is little degradation to the water quality from this activity. The road maintenance, however, is increasing the sediment loads in some area streams.

High density and an increase in the number of residential lots in Park and Teller Counties will make nonpoint sources, such as urban runoff and contamination of groundwater, issues to contend with in the future.

Land Use

Park County recently completed making major revisions to their Land Use Regulations (http://www.co.park.co.us/lurs.htm). Revisions to the land use codes address some of the major current and probable future anthropogenic impacts to surface water and groundwater quality. Major changes that could improve water quality management in the future are:

- Floodplain setbacks that are 100 feet in all zones for new lots and will be measured from the middle points of the streams.
- Wetlands protection —a 50-foot setback in wetland areas
- Developers must be able to prove availability of surface water for a central water supply.
- Requirements for drainage control.
- Requirements for Erosion and Sedimentation Control Plan.
- Requirements for wildfire mitigation.

1041 permits

Requests for 1041 permits have increased in Park County, especially wildlife habitat, water, and wastewater permits. These permits are designed to facilitate identification, designation, and administration of matters of state and local interest that are beyond the scope of traditional zoning or subdivision regulations. One of the purposes of requiring these permits is to ensure that the environmental impacts of new development are considered and mitigated. Through 1041 permits, local governments can designate areas of state interest, which include mineral areas; natural hazard areas; areas containing historical, natural or archeological resources of statewide importance; and areas around

key facilities (airports, public utility facilities, and mass-transit terminals). However, a developer does not have to agree on any conditions imposed in a 1041 permit.

6.4.5 Urban Runoff

Roadside erosion is also a serious problem in the more developed areas of the eastern section of the watershed. Increased potential for soil erosion occurs in areas of high human activity. When the soil's protective vegetative cover or topsoil is disturbed, on-site productivity is reduced and water quality is degraded by sedimentation. The amount of sediment, oils, and solvents that are released through urban runoff will increase as commercial and residential development continues in the two counties. Recent NPDES Phase II Stormwater Regulations have not affected Park or Teller counties or any of the municipalities within them.

6.4.6 Recreation

Mountain biking, camping, skiing, hiking, and fishing are the primary tourism activities in the area, but snowmobiling and use of off-road vehicles are growing rapidly. The number of people enjoying these activities is increasing yearly, with Highway 285 becoming congested during the weekends. In addition to vehicular emissions, the heavy use of the counties for tourism is adversely affecting the water quality through erosion from overuse of unsurfaced roads, backcountry trails, campgrounds, and reservoirs. There may come a time when permits are needed to preserve some of these areas for everyone to use. Many of the abandoned logging roads become heavily used by tourists, resulting in washboard conditions, large ruts, and erosion.

6.4.7 Resource Extraction

Historically, lode mining for gold played a big role in Park County, but operations have shifted towards surface mining of sand and gravel and other raw materials. Currently, there is a sand and gravel operation along the Middle Fork of the South Platte. Past mining activities that have degraded portions of the South Platte River include Geneva Creek in Platte Canyon, Mosquito Creek, and South Mosquito Creek near Fairplay; Tarryall Creek and Buckskin Creek near Alma; and the headwaters of the South Fork in the southwest section of the county. The impact of these mining activities is further discussed in the water quality analysis section.

Abandoned mines and tailings are the primary sources of elevated metals in streams with natural mineral seeps as secondary sources. In general, surface water is greatly affected by resource extraction while aquifers are not. Natural geologic conditions can also cause

low pH levels, and some metals are transported in the streams in the dissolved phase because of the low pH. As the pH of the water rises, the metals become attached to suspended sediment and travel further downstream until they are deposited along the riverbanks. The dissolved species are a primary indicator of potential drinking water problems, especially when shallow wells are drilled within these areas. In general, waters with high dissolved-metal species tend to be devoid of aquatic life because of acute toxicity and can pose long-term problems for aquatic life.

Alma American Milling Corporation

The American Mill was a precious metals mill that produced gold, silver, lead, copper, and zinc concentrates from ore. During operation, approximately 200 tons of ore were processed daily. Its effluent discharged into Mosquito Creek. Due to market conditions, the mill has been shut down since 1984. The mill has been removed and its holding pond filled and leveled off. Although issued a discharge permit in 1993, the mill will remain closed indefinitely.

Montgomery Mill

Natural revegetation occurred at some of the historic mill tailings at the Montgomery Mill site (also referred to as Alma/Betts in some documents). However, metals were being leached from nonvegetated tailings on the south side of the valley by water flowing over and through the tailings. In 1991, the nonvegetated tailings were moved from the valley to an area above the water table and adjacent to the remains of the old Alma/Betts Mill. The tailings were then covered with soil from the site and revegetated in 1992. Partial funding for these activities came from the 319 Nonpoint Source Grant with in-kind services provided by Park County and the Division of Wildlife (DOW), Trout Unlimited, and the Park County Mining Association. The results of this work can be found in the Preliminary Assessment, London Mines/Mosquito Creek Basin (CDPHE – HMWCD, 1998).

London Mill

Erosion of the London Mill tailings has contributed sediment to South Mosquito Creek. Drainage through the nine-acre tailings flowed through three ditches that were eroded in places to a depth of 20 feet. In addition, wind erosion has moved the tailings downstream. To reclaim the area, the slope of the tailings piles was decreased to minimize erosion. The drainage flow was channeled into a settling pond before discharge into South Mosquito Creek. The entire area was covered with soil and revegetated in 1992.

Buckskin Gulch

The Mined Land Reclamation Division performed water quality sampling and analysis on the Buckskin Gulch mine drainage (draining Red Amphitheater just above Buckskin Gulch Road) during the summer of 1990. The lab analysis indicated elevated levels of zinc, manganese, aluminum, and strontium. Water quality at the Alma intake two miles downstream of Red Amphitheater is within acceptable limits. Subsequent assessment indicated that the metals were of natural origin, resulting from erosion of the Amphitheater itself.

6.4.8 Onsite Wastewater Systems (OWS)

Wastewater generated in densely populated areas is primarily treated at municipal wastewater treatment plants (WWTPs); however, septic systems are used in rural areas where wastewater treatment systems are not economically feasible. Septic systems have the potential to contaminate groundwater and surface water, either through percolation of wastewater through the soil into groundwater, which recharges surface water, or by surface runoff. If septic systems are improperly designed or installed in soils unsuitable for the disposal of wastewater, nitrate can leach into groundwater and can seep into nearby surface waters. Surface water contamination from septic systems can also occur by system failure. When a septic system fails, the capacity of the soil to absorb effluent is exceeded and waste moves to the soil surface, where it can be carried to surface water via overland flow. However, if septic tanks are not immediately adjacent to surface water, the potential for nitrate to leach into the surface water is minimal.

A major concern of septic systems is that high density in one area can lead to ineffective treatment. Small parcel sizes cause septic systems to be placed closer together and increase the possibility of groundwater contamination. Depending on the underlying soil, effluent can move faster or slower down to the groundwater, as is evident in southeastern portions of the watershed.

For the majority of Park County citizens, OWS is the method used for disposal. Between 1991–2002, Park County issued an average of 500 permits a year, and between 2002–2008, Park County issued 300 permits a year. Inadequate systems may be affecting groundwater, particularly in the northeastern and northwestern portions of the county where rapid growth is occurring (Park County Strategic Plan). Regulations governing OWS were approved in 1997, are in the process of being updated, and should be completed by 20110. Park County has two full-time inspectors who are conducting OWS as well as non-community groundwater inspections.

Many of the current systems are designed by engineering firms. These systems appear to be an effective means of sewage treatment on lots that are 3–5 acres or larger. Inadequate systems may be affecting groundwater in the county, particularly in the northeastern and northwestern sections, which have experienced phenomenal growth in the 1990s. The Park County Environmental Health Department collected samples in 1997 that indicated elevated nitrate concentrations in the northeastern section of the county around Bailey. Additional testing is being conducted as part of a groundwater quality study that was initiated in 2001 and completed in 2004.

There is evidence that implies many homes constructed as summer homes and converted to year-round homes may have inadequate systems. The higher density of small developed lots, especially the 0.25 to 1 acre lots, combined with an inadequate distance between the leach field and household wells in fractured rock areas, may be stressing the soil's absorption capacity and contributing to a degradation of groundwater in some areas. However, tertiary treatments are being used in a majority of these situations in hopes of reducing some of these known effects.

Education regarding ISDS is becoming critical as the vast majority of the new citizens of Park County are people who have never lived in a rural setting before. The Park County Environmental Health Department releases information in pamphlets, newspapers, and a website explaining the need for proper disposal, testing, and monitoring of an ISDS. Many of these new residents do not realize the damage that can occur to an ISDS from disposal of household cleansers, and paint and overuse of dishwashers and garbage disposals. They also may be unaware of the need for testing, monitoring, and ongoing maintenance. In addition to testing and monitoring, most do not realize that the systems need ongoing maintenance. Owners of new systems currently receive a fact sheet from the Environmental Health Department, and with the assistance with the local real estate organizations, new owners of older homes also receive this educational material.

Teller and Park counties have both adopted regulations that require a 200-foot separation between a septic system and a well. This helps minimize the amount of contamination and will dilute the effluent before it gets picked up in the well. Setbacks are required to be 50 feet from wetlands and 50 feet from an irrigation ditch.

USGS in cooperation with Park County has conducted a water quality study (2001–2004) to determine the effects on groundwater quality of residential development and the corresponding increase in the number of ISDSs on groundwater quality. The data collected indicates that recharge from ISDS effluent has affected local groundwater systems. Concentrations of constituents associated with ISDS effluent are low, and

drinking water quality is good throughout the county. There are some correlations between geology, lot sizes, and year of ISDS installation. In general, groundwater quality was least affected by IDSDs in areas with average lot sizes greater than five acres and most affected in areas with average lot sizes of less than one acre. As time passes, recharges for ISDSs may become a larger part of groundwater resources with increased concentrations of constituents associated with ISDS effluent are likely to increase in groundwater.

6.5 Water Quality Management Associations and Watershed-Based Groups

This section discusses wastewater operating agencies, management agencies/associations, and watershed groups/organizations in the Upper South Platte and South Platte Watersheds.

6.5.1 Wastewater Operating Agencies

The following organizations are recognized as wastewater operating agencies within the South Platte/Upper South Platte Watershed. These agencies are responsible for controlling all aspects of the collection, treatment, and discharge of sewage or any industrial concerns within their company's sphere of operation. Each of these operating agencies is discussed in further detail in Section 6.3, South Platte and Upper South Platte Point Source Dischargers.

- Alma Sanitation District/Town of Alma
- Fairplay Sanitation District/Town of Fairplay
- Florissant Water and Sanitation District
- Bailey Water and Sanitation District
- Will-O-Wisp
- City of Woodland Park

6.5.2 Management Agencies/Associations

A management agency currently does not exist but is recommended to be formed for the South Platte/Upper South Platte Watershed. The management agency should cover the boundaries of the South Platte/Upper South Platte within Park and Teller counties.

Teller and Park Counties

Teller and Park counties have their own individual environmental health departments that process septic system permits and regulate water quality, solid waste, and other environmental health concerns.

Chatfield Basin Authority

The Chatfield Basin Authority is the water quality management agency for Chatfield Basin. The Chatfield Reservoir watershed, although not located in Park County, is

downstream of the Upper South Platte River Watershed. The authority has developed a phosphorus load allocation system for wastewater treatment plants and nonpoint sources within the Chatfield basin.

Sources of phosphorus that are upstream of Strontia Springs Reservoir have been identified as base-load or background sources and are included in this allocation. As stated in the Chatfield Reservoir Control Regulation (Regulation #73, effective 3/30/2009), of the total annual 59,000-pound phosphorus load for Chatfield Reservoir, the Upper South Platte River Watershed is allocated a total of 17,930 pounds per year. This allocation accounts for all point and nonpoint sources combined, including the 88 pounds per year that originates in Summit County and is discharged into the Roberts Tunnel.

6.5.3 Watershed Groups/Organizations

Coalition for the Upper South Platte

The Coalition for the Upper South Platte (CUSP) was formed in 1998 to serve as a forum for stakeholder discussions and recommendations regarding water quality and aquatic habitat issues in the watershed. CUSP is active in water quality concerns and protection strategies but has only an advisory role with no regulatory authority. CUSP is involved in coordinating the recovery effort from the Hayman Fire and has received a prestigious National Fire Plan 2003 Award for their work. This group was recognized for "excellence in rehabilitation and restoration as well as their excellence in community assistance." As of 2009, CUSP has 10 employees.

CUSP is comprised of individuals from government, businesses, nonprofit organizations, and the general public. Steering Committee members represent major landowners or water management entities in the watershed. The main function of CUSP, as outlined in their Memorandum of Understanding, is to:

- Develop a public involvement strategy;
- Identify the beneficial uses for the river and the respective contaminants of concern and potential pollutant sources;
- Prioritize water quality concerns to focus management and protection strategies and achieve the most benefit at the lowest cost;
- Identify alternative management strategies to mitigate water quality impacts;

- Coordinate long-term water quality monitoring by identifying existing water quality monitoring efforts and coordinating these programs to avoid possible redundancy.

CUSP has developed a strategic plan in 2001 to guide their activities. They work on forest health, fire rehabilitation, river restoration, riparian and other habitat projects, trail projects, environmental education, invasive species control and eradication, mine issues, and monitoring. More information can be found at: http://www.uppersouthplatte.org/

6.5.4 Other Groups

Water Conservancy Districts

There are two water conservancy districts within Park County: the Upper South Platte Water Conservancy District and the Center of Colorado Water Conservancy District (CCWCD). These districts are responsible for managing the water resources of Park County. "These districts use a small portion of the property tax revenues to purchase water and storage rights as a sustainable County resource. The Districts also provide legal defense against unwise and harmful appropriation attempts on water rights in Park County. Augmentation water for commercial development can be purchased from and managed by the Districts. Additionally, the Park County Land and Water Trust Fund enabled by a 1 percent sales tax also helps to buy and preserve County wetlands and set up conservation easements as open space for wildlife, environmental and visual enhancement'' (Gary Minke, Park County Water Preservation Council). Among the activities that CCWCD is currently involved with include developing adequate storage sites for water they are acquiring and investigating options to raise money to build additional storage facilities.

North Fork/South Platte River Association

The North Fork/South Platte River Association is a grassroots group of stakeholders formed in 2009 that is striving to improve and maintain the management of the river's riparian habitat, channel habitat, water quality, and in-stream flows through collaboration of local organizations, mine reclamation, and community education. The impetus for the formation of the group was the high copper levels in Hall Valley. More information can be found at: http://northforkfoundation.com/

6.6 Conclusions & Recommendations

6.6.1 Conclusions

The most prevalent impacts to the watershed that have been identified are erosion, wildfires, livestock, and mine runoff. Based on a review of the South Platte and Upper South Platte Watersheds:

- Historic and current water quality problems are primarily a result of legacy mining activities, and future water quality problems are expected to reflect the shift in the economic base from mining to tourism and agriculture.
- Water quality information is very sparse, making it difficult to understand the severity of problems and issues and to establish trends. If water quality information were more complete, problems in the watershed could be better understood and dealt with more effectively.
- The priority issues that need to be addressed are agriculture, fire, land use and development, mining, recreation, transportation, water rights, water system operations, and weeds.
- The low-priority issues are solid/hazardous waste, spills/illegal dumps, stormwater runoff and underground storage tanks.
- Land ownership within the watershed is primarily by federal and state agencies. The Forest Service is the largest land manager, overseeing 51% of the land.
- Most of the growth that has occurred and is expected to occur is in the unincorporated portions of Park County.
- Population increases in Park County and Front Range communities have caused an increase in demand for groundwater and surface water, which could have future impacts on water quality.
- The existing capacity at most wastewater treatment plants will be sufficient to meet needs through at least 2025.
- Drinking water quality in Park County is good except for some small minor exceptions.

6.6.2 Recommendations

The recommendations listed below require funding opportunities such as grants and contributions from other organizations.

Table 6-8: Summary of Recommendations

Location	Primary Problems	Recommendations [1,2]
Middle Fork of the South Platte	*Historic mining activities; Potential Recreational and Urban and Construction impacts.*	Implementation of Mining BMPs (includes possible reclamation work); Water quality data collection upstream and around Alma.
South Mosquitoe Creek and Mosquitoe Creek	*Historic mining - Montogomery Mill, London Mill, London Extension Tunnel, Buckskin Gulch*	Mining BMPs; TMDL has been developed and should be continued to be implemented.
Trout Creek	*Nutrients*	Assess nutrient concerns
Mainstem of the South Platte	*Hayman wildfire damage; Heavily loggged; Erosion (extensive work has already been conducted to address these concerns).*	Evaluate effects of fire on existing TMDL; Fire restoration; Agriculture BMPs; further research into erosion problems in sheep creek; Public outreach.
Tarryall Creek	*Poor agriculture practices*	Implementation of Agriculture BMPs; Public outreach; Conservation easements have been developed over past several years; Collection of suspended sediment data.
North Fork of the South Platte	*Acid mine drainage especially from abandoned/inactive mines around Geneva Creek; movement of tailings*	Mining BMPs (includes possible reclamation work).
Badger Creek	*Poor grazing practices*	Outreach efforts with landowners; Agriculture BMPs;
Three Mile Creek	*Poor Grazing Practices*	Agriculture BMPs; outreach efforts
Peatlands	*Peat mining*	Seek funding for identification; further studies; monioring;

Notes:

[1] Possble mining BMPs, listed in the 2000 Colorado NPS Management Program are through Hydrologic Controls such as Diversion ditches, mine water removal and consolidation of stream diversions, bulkhead seals, and revegetation; and through passive treatment such as settling ponds, sulfate reducing wetlands, aeration, dilution, and land application.

[2] Possible Agriculture BMPs, listed in the 2000 Colorado NPS Managment Program are soil stabilization of grazing lands, grazing management, soil stabilization in riparian areas, irrigation water management and nutrient management.

Total Maximum Daily Loads (TMDLs)

Assist in the review and evaluation of TMDLs for stream sections currently listed on the 303d list and implementation of TMDLs that have already been developed.

The TMDL previously developed for the mainstem of the South Platte should be reviewed for fire impacts since it was completed right before the Hayman Fire.

Surface Water and Groundwater

Continue monitoring local phosphorous loading. This includes future monitoring and sampling at the East Portal of Roberts Tunnel for phosphorous.

Work with the USGS to update the previous streamflow and water quality data report which analyzed water quality conditions based on 1962–1998 data (Water Resource Investigation Report 01-4034).

Develop a report to petition the EPA to designate the South Park Aquifer as a source water protection area according to http://www.epa.gov/region8/water/solesource.html. The report should be based on the EPA Sole Source Aquifer Designation Petitioner Guidance, which provides procedures and criteria for proposing aquifer boundaries, determining whether an aquifer is the sole or principal source of drinking water, and evaluating alternative sources of drinking water.

Work with the USGS, Park County, and interested stakeholders to improve the existing surface water- and groundwater-monitoring network. The surface water monitoring program should evaluate:

- Presence of natural background levels and pollutants related to historic mining activities in the Middle Fork and its tributaries and the North Fork and its tributaries, including a location at the point of exit from Roberts Tunnel at the North Fork of the South Platte;
- Presence of dissolved uranium, radium 221, radium 228;
- Future locations for water quality monitoring stations.

Develop baseline groundwater quality conditions prior to any oil and gas drilling or uranium mining.

Assess the need to develop well-head protection zones and plans for residential areas that rely on groundwater as a source of drinking water. This should be based on development

patterns and a review of the USGS Groundwater Report (2007). Areas that should be considered in this analysis are the groundwater supply intake for Camp ID-RA-HA-JE, Campground of the Rockies Association, Deer Creek Elementary School, Platte Canyon High School, Florissant Fossil Beds National Monument, Town of Fairplay, and areas that rely on the South Park aquifer. This should include a review of the CDPHE Source Water Assessment Protection Plans that have been developed.

Assess available data to evaluate the need for mitigation systems to reduce radon levels.

Agriculture

Continue to work with the ranching community to develop sustainable practices, and planning and implementation, including developing fencing for riparian areas. Implement BMPs to reduce water quality impact from agriculture activities.

Suspended Sediment

Collect additional suspended sediment data on tributaries to the South Platte River and North Fork of the South Platte River. This will provide critical information to evaluate those segments currently listed on the 2010 303(d) List and/or Monitoring and Evaluation List.

Mechanisms such as BMPs should be researched to address current and potential future sources of sediment in areas identified in the 208 Plan: Badger Creek; Sheep Creek; stream corridors on BLM and State Land Board property where there are grazing allotments; and South Fork, Middle Fork, and North Fork of the South Platte.

Silviculture

Controlled burns should be used to clear excessive ground debris, encourage new growth, and decrease the severity of wildfires. Controlled burns also decrease erosion and protect water quality. These actions are especially critical given the number of wildfires that have occurred over the past several years.

Implement forest management BMPs (CNPSC, 2002), such as proper timber harvesting, woodland thinning or pruning for tree health, and recreation area management strategies. Work with the state and federal forest service agencies and universities to integrate research, monitoring, and management.

Continue watershed restoration efforts in areas affected by the Schooner and Hayman fires.

Peatlands

Investigations should be conducted to determine the effects of mining on peatlands and how it effects downstream and reservoir water quality. Information should also be collected on hydrologic behavior, monitoring, preservation, and protection.

Mining

The impact of the mining activities and reclamation work east of Alma should be evaluated to determine what, if any, additional BMPs or reclamation strategies might be needed. Similarly, other stretches of the Middle Fork of the South Platte that are impacted by past or current mining activities should have appropriate entities identified in order to evaluate the needs and implement appropriate BMPs and reclamation efforts.

Transportation

Identify BMPs for proposed new road construction and maintenance, determine if existing roads have water quality impacts, and develop mitigation strategies.
Minimize the use of de-icers such as methylene chloride except where necessary, and minimize the use of sand except at locations where it is absolutely necessary for safety concerns.

Stormwater Runoff

Minimize the effects of stormwater runoff passing through municipal, commercial, and residential development areas and, if necessary, implement BMPs to mitigate adverse affects before runoff discharges into local streams. This is especially critical in the more urban areas such as Fairplay, Alma, Bailey, etc. The promulgation of NPDES Phase II regulations currently does not affect Park or Teller Counties but could in the future.

Onsite Wastewater Systems (OWS)

Produce and mail educational material to new homeowners on the proper operation and maintenance of septic systems and on opportunities to be involved in groundwater monitoring.

Encourage cluster development and the strategic placement of residential structures in order to protect wetlands and wildlife/habitat corridors.
Data from the USGS (2007) indicates that OWS density and year of installation are related to groundwater quality. An electronic database should be developed to track

ISDS installation and maintenance that contains installation date, maintenance, problems/issues, and soil stratigraphy. This information, along with recommendations made through the CDPHE OWS Working Groups, should be assessed to determine if it is reflected in current county OWS regulations.

Water Quality Management Association

Formation of a WQMA is still recommended in the South Platte River Basin. The specific responsibilities of the WQMA and the participants are outlined in the 208 Plan. The CUSP is actively involved in water quality concerns and protection strategies but has no regulatory authority. A strategic plan has been developed by the CUSP that outlines the critical importance of addressing the current and future problems and issues in the watershed.

The formation of the South Platte WQMA should be a cooperative effort based on the overlapping jurisdictions within the region. This could be accomplished through the coordinated efforts of the Upper South Platte Water Conservancy District, the Central Colorado Water Conservancy District, and the Park County Land and Water Trust Fund Board. The Trust Fund Board is a seven-member advisory to the County Commissioners. It was created in 1997 and is charged with the preservation, protection, acquisition, improvement, and maintenance of water resources in Park County. The South Platte WQMA could consist of the entities listed below and act as the designated management agency for the watershed. PPACG should assist in the development and support of the water quality management agency and provide technical and administrative assistance to the management agency when formed.

The proposed South Platte WQMA should include:

- Park County Board of Commissioners
- Teller County Board of Commissioners
- Upper South Platte Water Conservancy District
- Central Colorado Water Conservancy District
- Town of Fairplay
- Fairplay Sanitation District
- Town of Alma
- Bailey Water and Sanitation District
- Will-O-Wisp Metropolitan District
- City of Woodland Park

- Florissant Sanitation District
- Divide Water & Sanitation District
- Teller County Water and Sanitation District
- Federal Land Management Agencies
- State Land Board

The WQMA should assume the following responsibilities and include the following functions:

- Assure that point and nonpoint water quality concerns in the watershed are being evaluated;
- Assure that water quality planning in new developments in the watershed is consistent with the 208 Water Quality Management Plan;
- Recommend or encourage consolidation of wastewater facilities and operation and maintenance functions among entities in the watershed where appropriate;
- Work on water quality planning issues such as source water protection programs and Total Maximum Daily Load (TMDL) allocation studies;
- Become actively involved in the overlapping watershed issues and coordinate with the Water Resource Management Advisory Committee (WRMAC) in the DRCOG region and the Northwest Council of Government;
- Review proposed changes to the existing stream-monitoring network;
- Review and comment on discharge permits;
- Develop a fee structure to ensure participation in water-quality-related projects such as new or additional monitoring stations.

Coalition of Upper South Platte (CUSP)

The Coalition of Upper South Platte should continue its work to assist in the implementation of a watershed protection plan and target application of resources for water quality protection of the South Platte Watershed. The specific goals, strategies, and objectives of CUSP are listed in their *Strategic Plan* (USPWPA, 2001). With its resources, CUSP may be able to assist a WQMA by providing staff support.

7.0 Upper Arkansas Watershed

7.1 Introduction and Overview

The Upper Arkansas Watershed (Figure 7-1) is the single largest watershed in the Arkansas River Basin and only a fraction, about 15%, is within the Pikes Peak region, mostly in Teller County. Section 7.0 will focus on the Teller County portion of the Upper Arkansas Watershed.

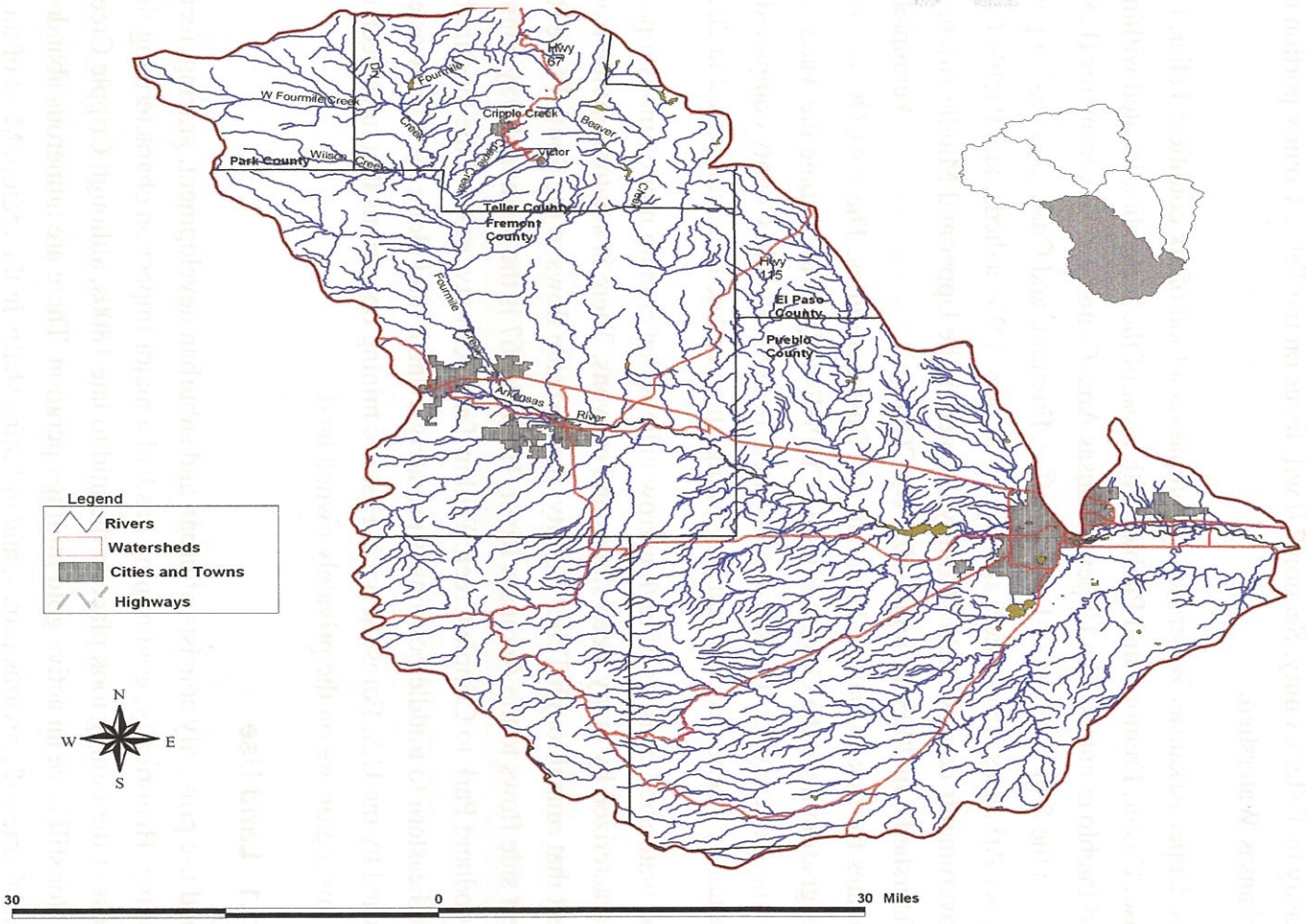
The Upper Arkansas Watershed encompasses a total of six counties: Teller, Park, El Paso, Custer, Fremont, and Pueblo, with most of the watershed located within Fremont and Pueblo counties. The Upper Arkansas Area Council of Governments (UACOG) covers the four counties of Lake, Chaffee, Fremont, and Custer, located in portions of the Upper Arkansas Headwaters and Upper Arkansas Watersheds; and Pueblo Council of Governments covers Pueblo County, located in the Upper and Middle Arkansas Watersheds. In 2003 through 2005, UACOG (http://www.uawc.org/) completed 208 Plan updates for Lake, Chaffee, Fremont, and Custer counties. The UACOG is seeking designation from the Governor to the CDPHE–WQCC to become the water quality-planning agency for this four-county area. In 1989, Pueblo County completed a 208 Plan update for Pueblo County and is working on an update to be completed in 2011 or 2012.

The watershed consists of high narrow valleys that contain mountainous topography characterized by many steep slopes and canyons. There is a natural divide from east to west that runs through Teller County; the east side flows to the South Platte River and the west side flows to the Arkansas River. Highway 67 is the main highway connecting Woodland Park to Cripple Creek. Within Teller County, most of the land in the southeastern to middle portions is privately owned; land along the southwestern portion is owned by the U.S. Forest Service. Historic mining operations that have been conducted in this region are on the privately owned land.

7.1.1 Land Use

Land use primarily consists of urban and suburban development, grazing, recreation, and mining. Historically, gold mining has had a major impact on characterizing this region. Most of the mining took place in the mid to late 1800s, although Cripple Creek and Victor still have an active gold mining operation. There are numerous abandoned cabins, head frames of previous mines, and old mine shafts in the region. Most of the historic mines are located in what is now Cripple Creek and Victor's current permitted

Figure 7-1: Upper Arkansas Watershed Reference Map



boundary area. It is expected that gold mining will continue to economically drive the county and the communities of Cripple Creek and Victor. Near Cripple Creek and Victor, there are interpretive sites and trails that show and explain the 1890s gold mines. Recreational uses of the land include motorized and nonmotorized vehicles.

7.1.2 Population and Socioeconomic Characteristics

Teller County has about 21,000 residents; about 6,000 reside within the section of the county that is located in Upper Arkansas Watershed. Of the 6,000 residents, Cripple Creek and Victor are the two largest municipalities within the Upper Arkansas Watershed and have a combined population of 1,560 people (DOLA, 2001). The mining history of Teller County is extremely important for tourism in Cripple Creek and Victor. Based on a report by David Bamberger and Associates (March 2008) as part of the proposed four-year permit extension of the CC&V Gold Mining Company, the mine employs 350 workers, of which 194 people live in Teller County. Teller County also receives property and sales tax from CC&V Company.

Teller County faces the challenges brought about by rapid growth and the demand to preserve the natural habitat that continues to draw residents and tourism to the area as it has done for over 100 years. It is expected that tourism, retirees, and more basic industries will continue to increase the population of Teller County. However, limitations such as adequate water supplies still remain. High demands and build-out of small lots have been apparent in Cripple Creek Estates, Colorado Mountain Estates, and Rainbow Valley.

7.1.3 Characterization of Watershed Issues

Water quality issues primarily revolve around:

- Expansion of CC&V Gold Mining Company;
- Groundwater supply and water quality issues that have also been a problem as identified by TST (2001) (primary causes are from septic systems);
- Impacts from population growth;
- Stormwater runoff, which has not been a major problem in either Cripple Creek or Victor, but as these cities grow, a stormwater program may need to be developed.

7.2 Water Quality Characterization

Surface water and groundwater quality degradation are important to examine because both are sources of drinking water for the county and municipalities. Most residents that live outside an urban area rely on groundwater from wells, while the primary source of drinking water for residents within Cripple Creek and Victor are central distribution systems that rely on surface water.

7.2.1 Standards and Classifications

The state-classified stream sections within the Teller County portion of the Upper Arkansas Watershed are listed in Table 7-1.

7.2.2 Surface Water

Delisted Stream Segments

Within Teller County the following stream segments have been de-listed. Currently, there are no approved TMDLs in the Teller County portion of the Upper Arkansas Watershed.

Table 7-1: Delisted Stream Segments

WBID	NAME	ACTION	Date
COARUA21	Cripple Creek	Fe delisted	2000
COARUA22	Arequa Gulch	Fe, Mn, Zn delisted	2000
COARUA21	Cripple Creek	Mn delisted	2002
COARUA22	Arequa Gulch	pH, Al, CN delisted	2002

Water-Quality-Impaired Stream Segments

There are no segments listed on the 2010 303d list and one segment listed on the 303d Monitoring & Evaluation list for the Teller County portion of the Upper Arkansas Watershed.

Table 7-2: 2010 303d list and 303d Monitoring and Evaluation List

Segment	Segment Description	Affection Portion	303d Mon & Evaluation List	303d List
COARUA20	Fourmile Creek and tributaries, Cripple Creek to Arkansas River	North Fork Wilson Creek below Independence Mine	As, Cu	

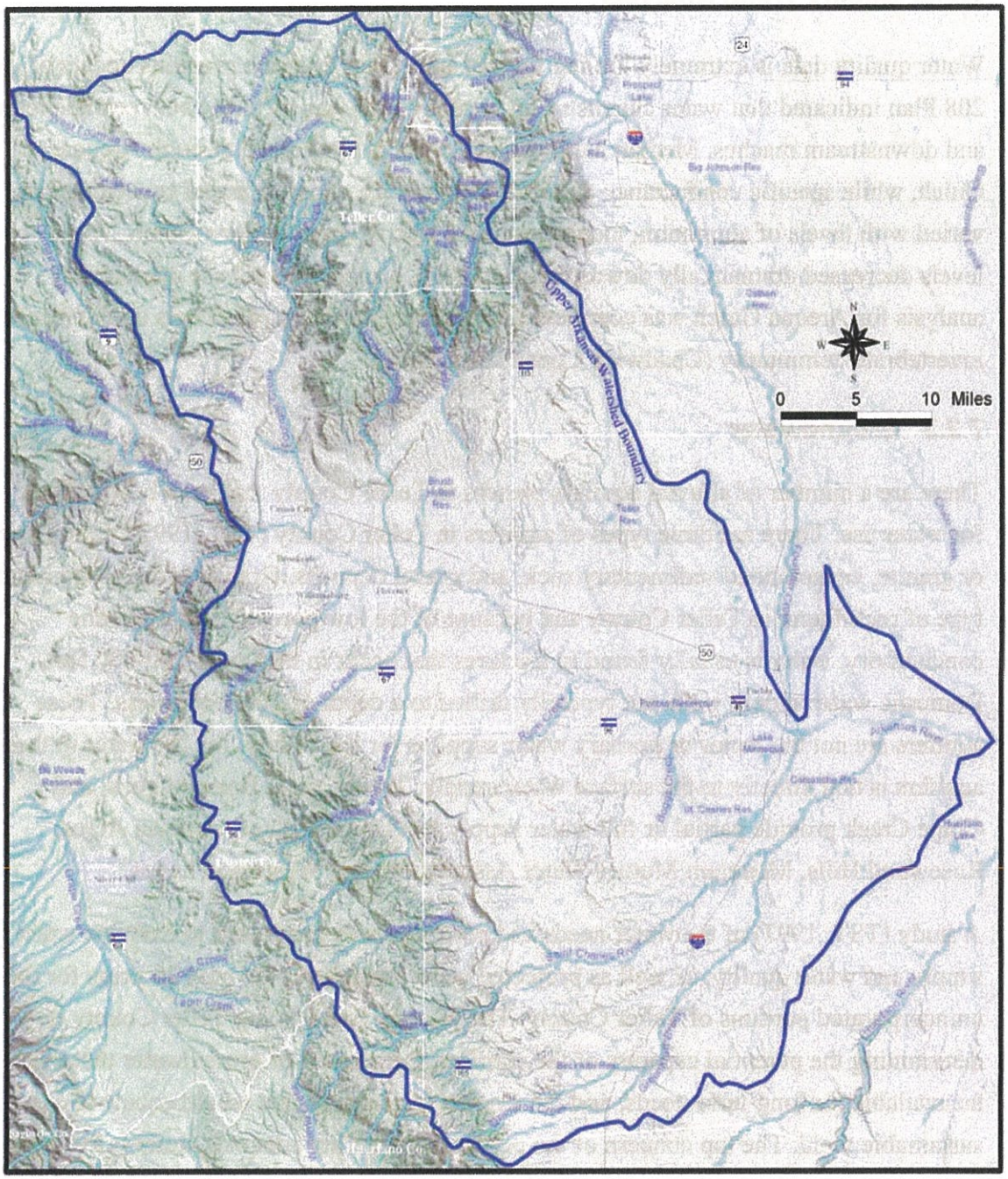
Table 7-3: Upper Arkansas Stream Classifications and Water Quality Standards

	Stream Segment Description	Desig	Classifications	Physical & Biological	Inorganic (mg/l)		Metals (ug/l)		
18	Mainstem of Currant Creek (Park County), including all tributaries, wetlands, lakes, and reservoirs, from the source to the confluence with Tallahassee Creek, except for the specific listings in 17a, 17b, and 17c.		Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac/ch)=TVS CL2(ac)=0.019 CL2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO2= 0.05 NO3= 10 Cl= 250 SO4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
19	Mainstem of Fourmile Creek, including all tributaries, wetlands, lakes, and reservoirs, from the source immediately above the confluence with Cripple Creek.		Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac/ch)=TVS CL2(ac)=0.019 CL2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO2= 0.5 NO3= 10 Cl= 250 SO4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
20	Mainstem of Fourmile Creek, including all tributaries, wetlands, lakes, and reservoirs, from immediately above the confluence with Cripple Creek to the confluence with the Arkansas River, except for the specific listing to segment 23.		Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac/ch)=TVS CL2(ac)=0.019 CL2(ch)=0.011	CN=0.005 S=0.002 B= 0.75 NO2= 0.05 SO4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=100(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)*	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
21 a	Mainstem of Cripple Creek from the source to a point 1.5 miles upstream of the confluence with Fourmile Creek.		Aq Life Cold 2 Recreation E Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac)=TVS(sa) NH3(ch)=TVS(ela) CL2(ac)=0.019 CL2(ch)=0.011	CN=0.005 S=0.002 B= 0.75 NO2= 0.05	As(ac)=340 As(ch)=100 (Trec) Cd(ac)=TVS Cd(ch)=TVS CrIII(ac)=100(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS

21 b	Mainstem of Cripple Creek from a point 1.5 miles upstream to the confluence with Fourmile Creek		Aq Life Cold 2 Recreation E Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac)=TVS(sa) NH3(ch)=TVS(ela) CL2(ac)=0.019 CL2(ch)=0.011	CN=0.005 S=0.002 B= 0.75 NO2= 0.05	As(ac)=340 As(ch)=100 (Trec) Cd(ac/ch)=TVS CrIII(ch)=100(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS
22 a	Mainstem of Arequa Gulch from the source to the confluence with Cripple Creek	UP	Aq Life Cold 2 Recreation N Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.0-9.0 E.Coli= 630/100ml	NH3(ac/ch)=TVS CL2(ac)=0.019 CL2(ch)=0.011	CN=0.005 S=0.002 B= 0.75 NO2= 0.05	Al(ac/ch)=11,000 As(ac)=340 As(ch)=100 (Trec) Cd(ac/ch)=TVS CrIII(ch)=100(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac)=5903 Mn(ch)=3674 Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac)=3500 Zn(ch)=600
22 b	Squaw Gulch from the source to the confluence with Cripple Creek	UP	Aq Life Cold 2 Recreation N Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 630/100ml	CN=0.02 NO2=10 NO3=100	B=5.0	As(ch)=200 (Trec) Cd(ch)=50 (Trec) CrIII(ch)=100(Trec) CrVI(ac/ch)=TVS	Cu(ch)=500 (trec) Pb(ch)=100 (trec) Hg(ch)=0.01(tot) Se(ch)=50 (trec)	Zn(ch)=25000 (trec)
23	Mainstem of Wilson Creek (Teller County) from the source to the confluence with Fourmile Creek		Aq Life Cold 2 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac/ch)=TVS CL2(ac)=0.019 CL2(ch)=0.011 CN=0.005 S=0.002	B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02-10 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50 (Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Cu(ac/ch)=TVS Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
24	Mainstem of East and West Beaver Creeks, including all tributaries, wetlands, lakes, reservoirs, from the source to the confluence with Beaver Creek; mainstem of Beaver Creek from the source to the point of diversion to Brush Hollow Reservoir		Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac/ch)=TVS CL2(ac)=0.019 CL2(ch)=0.011 CN=0.005 S=0.002	B=0.75 N02=0.05 N03=10 Cl=250 S04=WS	As(ac)=340 As(ch)=0.02(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50 (Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS

Note: No temporary modifications exist

Figure 7-2: Upper Arkansas Watershed Stream Locations



Water Quality Trend Analysis

Water quality data is extremely limited for this area. Data from the previous update of the 208 Plan indicated that water chemistry in Arequa Gulch was different between upstream and downstream reaches. Median hardness as well as pH increased through Arequa Gulch, while specific conductance decreased slightly. In addition, metal concentrations varied with levels of aluminum, manganese, and zinc in upper Arequa Gulch. These levels decreased dramatically downstream. In 2001, a supplemental use attainability analysis for Arequa Gulch was completed, with an emphasis on pH effects on the macro invertebrate community (Chadwick Consultants, 2001).

7.2.3 Groundwater

There are a number of alluvial aquifers present in Teller County that have been utilized for water use. There are three types of aquifers in Teller County (TST, 1997): crystalline or granite, consolidated sedimentary rock, and gravel deposits. Granite is the predominate type of rock found in Teller County and because of the low porosity and hydraulic conductivity, water is usually found in fractures that occur in the upper 500-600 feet. Domestic water supply wells are typically drilled to a depth of 200 feet or less. These aquifers are not the major or primary water supplies for the county, but the water in these aquifers is tied directly to the surface water supply. Trout Creek, Beaver Creek, and Grape Creek provide partial or full water supply for Alpine Village, Arabian Acres, Rosewood Hills, Mountain Mutual Water Association, and Westwood Lakes.

A study (TST, 1997) of the water needs and resources was conducted to examine water supply and water quality, as well as projected water needs over the next 20 years for the unincorporated portions of Teller County. The primary issue facing Teller County is determining the potential capacity of the aquifers, the amount of groundwater that might be available for long-term needs, and the amount of recharge that would equate to a sustainable yield. The top concern of the public was whether adequate water is available to supply the rapid growth occurring in the county.

The heaviest concentrations of homes are in the Woodland Park and Divide areas, Cripple Creek, Victor, Florissant Northwest, and Colorado Mountain Estates. Heavier concentrations of houses have caused a trend towards smaller lots, which has caused an increase in groundwater withdrawal and the number of septic systems. However, if

existing county or state regulations prevent construction of wells and septic systems, alternative solutions such as connection to a central water supply or wastewater treatment facility will need to be addressed.

A second phase of the TST study (originally initiated in 1997) that focused on the connection between the wells and the future water supply was completed in June 2001 (TST, 2001). It concluded that Teller County has plenty of water, but water quality is in jeopardy unless there are stronger regulations on septic tanks. The majority of homes in Teller County rely upon wells and septic systems for their water supply and wastewater disposal. A follow-up study was conducted by the Teller County Health Department in 2001 to conduct more water quality monitoring throughout the county to study the problem. In conjunction with this study, a public education program is being conducted to inform residents on how to protect groundwater from wastewater contamination.

Current Teller County subdivision requirements call for minimum 10-acre lots. The study recommended that larger residential lot requirements and new residential waste treatment technologies be considered and that more water quality data be collected. Surface water rights in Teller County are fully appropriated, so future growth will have to depend on groundwater.

Possible suggestions from the TST (2001) and Teller County Health Department Study (2001) to resolve existing and potential water quality problems include:

- Collect extensive water quality data;
- Develop a program for testing and assessment of existing septic systems to determine if they are working adequately;
- Develop a county-wide database that contains the age, design, location, and date of last servicing for each system;
- Develop a central new wastewater treatment plant and/or minimize the need for smaller septic systems by creating larger septic systems that serve multiple houses rather than individual houses;
- Develop a county-wide, comprehensive groundwater protection plan.

Teller County is working on the implementation of many of these recommendations.

Teller County Drinking Water Testing

In 2007, the Teller County Health Department received a grant to analyze groundwater throughout Teller County for the presence of nitrates as well as other constituents. Nitrates were used because they are an indicator of potential environmental contamination, including onsite wastewater treatment (septic systems), as well as other sources.

7.3 Point Source Dischargers

7.3.1 Overview

The Teller County portion of the watershed has two municipal dischargers one industrial discharger shown in Tables 7-4 and 7-5 and Figure 7-3.

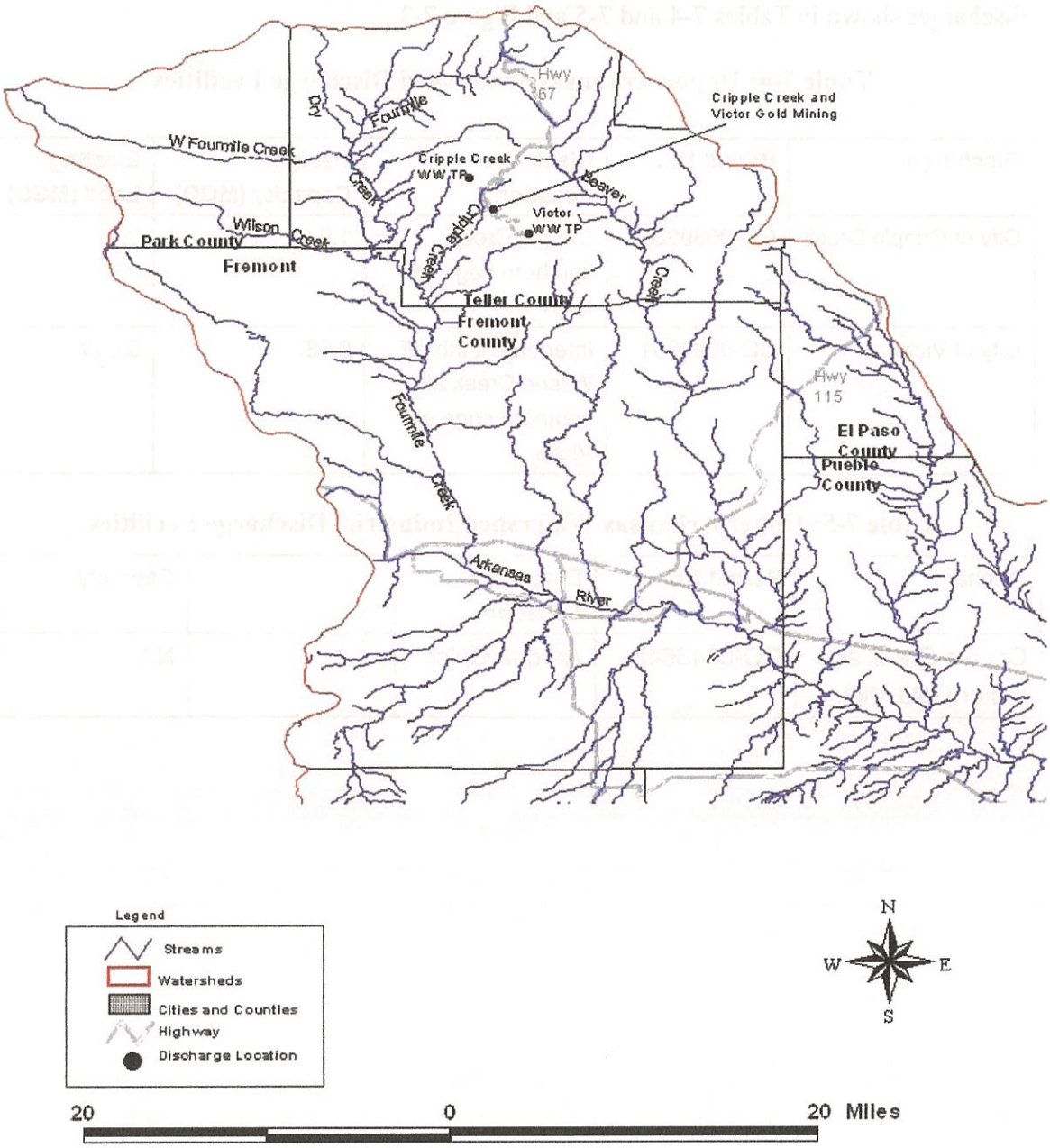
Table 7-4: Upper Arkansas Watershed Discharge Facilities

Discharge	Permit No.	Discharge Location	Design Capacity (MGD)	Existing Load (MGD)
City of Cripple Creek	CO-0039900	Cripple Creek, southern edge of town	1.0	0.41
City of Victor	CO-0024201	Intermittent trib. of Wilson Creek at southern edge of Victor	0.087	0.049

Table 7-5: Upper Arkansas Watershed Industrial Discharge Facilities

Discharge	Permit No.	Discharge Location		Capacity
Cripple Creek and Victor Gold Mining	CO-0043648	Arequa Gulch		NA

Figure 7-3: Upper Arkansas Watershed Point Source Discharge Locations



7.3.2 Future Needs Assessment

City of Cripple Creek and Victor

Within the City of Cripple Creek service area, a lift station was approved in 2001 to provide service for Phase I of a proposed development. The City of Cripple Creek is expected to upgrade the wastewater treatment plant in phased construction to meet demands past the year 2010. Along with this are the replacement of sewer lines, construction of new influent interceptors and chemical feed-headworks modification, and sludge transfer/removal.

Growth in the City of Victor is expected to be minimal, and no new construction is expected to be necessary. Future needs include a new UV Disinfection System; two aluminum covers for the biosolids; and headworks screen. The wastewater treatment plant will consist of two aeration basins constructed in the former lagoons, referred to as cell no. 2 and cell no. 3. These aeration basins, no. 1 and no. 2, are equipped with submerged fine-bubble-diffused air operating in an extended aeration type of process. The design and operation of the activated sludge system is to accomplish a significant degree of nitrification in order to meet very stringent ammonia effluent limits for the plant. The city plans to cooperate with the Pikes Peak Mining Company for beneficial use of the biosolids in reclamation of disturbed areas in the mining district.

Cripple Creek and Victor Gold Mining Company

Cripple Creek and Victor Gold Mining Company has received approval from the State of Colorado and Teller County to extend its permit which originally expired in 2012, to 2016. When the current permit expires in 2012, the valley leach facility will be at capacity, and there is an opportunity to extend the leach facility to the west. The proposed mine life extension includes extending the mining areas to the north and east to increase the mine life an additional four years. All of the proposed mining activity is on land privately owned by CC&V, zoned by Teller County for mining activities, and within the current permit boundaries established by State of Colorado and Teller County permits. CC&V have also submitted a rehabilitation plan to Teller County and the state that will follow the expansion of the North Cresson area of the mine and include a 42-acre hillside which is visible from Cripple Creek's Heritage Center. Information regarding the timeline and the permit extension can be found at http://www.ccvgoldmining.com/.

7.3.3 Industrial

The only industrial discharge facility in the Teller County portion of the watershed is the Cripple Creek and Victor Gold Mining Company (CC&V).

The Cripple Creek and Victor Gold Mining Company

Background

The Cresson Project water quality is regulated by two separate agencies.

- Groundwater is regulated by the Division of Reclamation, Mining, and Safety (DRMS), with permits filed for each of the monitoring systems (groundwater wells) with the State Engineer's Office.
- Surface Water and Storm Water are regulated by the Water Quality Control Division (WQCD).

Required groundwater monitoring and specific parameters to be monitored are approved by the DRMS, and groundwater monitoring results are reported to the DRMS on a quarterly basis. Inspection of that program is completed by the DRMS.

In addition, there are four active WQCD permits as part of the Cresson Project: Permit CO-0024562 (Carlton Tunnel), Permit CO-0043648 (Arequa Gulch), Permit CO-0046540 (Fourmile Creek Springs), and Permit COR-040000 (stormwater discharges are controlled through the general permit). Monitoring and specific parameters to be monitored as part of the Cresson Project are approved by the WQCD.

Currently, monitoring results for CO-0024562, CO-0043648, and CO-0046540 are reported to the WQCD on a monthly basis. Inspection of those permits is completed by the WQCD on an annual basis. There two required annual inspections of the facilities by CC&V and an annual inspection completed by a third-party consultant. All these results are included in the annual report submitted to the WQCD. DRMS also includes an inspection of the stormwater features within the active mine area when at the site and at least once a year reviews of the Stormwater Control features external to the active mine area, with results included within the Inspection Reports completed by DRMS.

The Cripple Creek and Victor (CC&V) Gold Mine (Figure 7-5), Colorado's largest gold mine, discharges (CO-0043648) to Arequa Gulch, tributary to Cripple Creek (Upper Arkansas River Segment 2a). In addition to the discharge points included in permit CO-

0043648, there are several other types of discharges and permits associated with the Cripple Creek and Victor Gold Mining operation. Most of the historic mines are not located within what is not CC&V's permit boundary area.

Several historic drainage tunnels traverse the pit area at depths of 1,000 to 3,000 feet below the ground surface. Discharge from the Carlton tunnel is addressed through the Carlton Tunnel permit. The Roosevelt Tunnel is not owned by CC&V, and discharge from the Roosevelt Tunnel is regulated separately by CDPHE-WQCD. Other historic drainage tunnels in the mining district are located at elevations higher than these two tunnels and are generally dry.

There are three monitoring stations on Cripple Creek that were established by the CC&V Gold Mining Company (Figure 7-4).

CC-01 Just downstream of the City of Cripple Creek, this site was located approximately 2.6 km (8,800 ft) upstream of the confluence with Arequa Gulch.

CC-02 This site was located approximately 1.6 km (5,280 ft) downstream of Site CC-01 and 1 km (3,526 ft) upstream of the confluence with Arequa Gulch. This site is downstream of Squaw Gulch, an intermittent drainage with limited aquatic life potential (CEC 1998).

CC-03 This site was located approximately 0.2 km (686 ft) downstream of the confluence with Arequa Gulch.

There are three monitoring stations on Arequa Gulch (a small tributary to Cripple Creek) that were established by the CC&V Gold Mining Company (Figure 7-4).

AG-01.5 This site is located on upper Arequa Gulch approximately 70 m down gradient of the Valley Leach Facility for the Cresson Project.

AG-PB Located on Arequa Gulch at the mine permit boundary, this site is approximately 0.7 km (2,300 ft) downstream of Site AG-01.5 and is an aquatic life monitoring station. AG-PB was established following discussions at the WQCC hearing to help define downstream trends in the biota of Arequa Gulch.

AG-02 This site is located on lower Arequa Gulch approximately 1.2 km (4,100 ft) downstream of Site AG-01.5 and 0.2 km (700 ft) upstream of the confluence with Cripple Creek. Given the considerable changes in chemistry between AG-01.5 and AG-02 (CEC 1998), this site functionally serves as an "on-stream reference site."

One monitoring station has also been established by the USGS on Fourmile Creek, immediately below the confluence with Cripple Creek and Fourmile Creek.

CC&V is required to comply with:

- Division of Minerals and Geology groundwater criteria as measured by water quality samples taken quarterly from a series of wells at the Cresson Project; and
- CDPS permits for Arequa Gulch and the Carlton Tunnel.

7.3.4 Municipal

There are two municipal discharge facilities located within the Upper Arkansas Watershed portion of Teller County: Cripple Creek and Victor.

City of Cripple Creek

The City of Cripple Creek WWTP (Figure 7- 5) has a rated capacity of 1.0 mgd and is currently loading at approximately 0.4 mgd. The maximum hydraulic capacity is 1.35 mgd with further potential to upgrade to 1.75 mgd. The facility discharges to Cripple Creek (Upper Arkansas River Segment 21).

The expansion and upgrading to the city's wastewater treatment plant has been required by change in the economic development of the community. Since the legalization of limited stakes gambling within the corporate limits of Cripple Creek, a significant amount of commercial development has occurred.

City of Victor

The City of Victor's WWTP (Figure 7-5) was designed for a maximum average daily flow of 0.087 mgd. The plant's efficiency is expected to be 91% for BOD and TSS removal. The flow first travels through a comminutor that grinds rags into small pieces. It then travels through a grit chamber that removes 95% of the grit larger than 59 mesh and 85% of the grit larger than 70 mesh. Sludge then enters the extended aeration basin where it is mixed with return-activated sludge to stabilize the BOD. From there it flows to the secondary or final

clarifier, with a surface area of 380 square feet. Return sludge is handled with one of two screw pumps that run continuously, and waste-activated sludge is drawn from the RAS pipeline with a positive displacement diaphragm pump controlled by a timer set by the operator. The clarifier effluent flows through an ultraviolet radiation tank for disinfection and discharge to an intermittent tributary of Wilson Creek (Upper Arkansas River Segment 23).

Major Point Source Service Area Maps

A summary of point source data is presented in Table 7-6, which shows information obtained from the treatment facilities. Service area maps show projected service area boundaries for each facility previously described. The background of these maps is Google Earth satellite imagery, which was last updated in 2005. Major point source discharge locations are shown on the service area maps.

Table 7-6: Upper Arkansas Watershed NPDES Permit Information

Discharge Segment	Upper Arkansas River Segment COARUA21	Upper Arkansas River Segment COARUA23
Facility	City of Cripple Creek	City of Victor
NPDES Permit #	CO-0039900	CO-0040088
Permit Expiration Date	6/31/2006	Permit in process of being issued for new plant
Flow (MGD)	1.00	0.087
Existing Load (MGD)	0.41	0.049
Year at 80% Design	2015	2015
Year at 85% Design	2018	2018
Organic (lbs/day BOD_5)	1,977	183
Existing Load (lbs/day BOD_5)	570	70
Year at 80% Design	2018	2015
Year at 95% Design	2021	2018
30-day avg / 7-day avg		
BOD	30 / 45	30 / 45
Total Suspended Solids	30 / 45	30 / 45
Fecal Coliforms, #/100 ml	2,808 / 5,616	876 / 1,752
E. coli	NA	NA
Total Residual Chlorine, mg/l (reported as 30 day avg/daily max)	0.014 / 0.026	NA / 0.016
Total ammmonia as N, mg/l, 30-day avg / daily max		
January	16 / NA	6 / NA
February	16 / NA	6 / NA
March	16 / NA	4 / NA
April	21 / NA	4 / NA
May	21 / NA	2 / NA
June	12 / NA	2 / NA
July	12 / NA	2 / NA
Aug	12 / NA	2 / NA
Sept	12 / NA	2 / NA
October	14 / NA	2 / NA
November	14 / NA	4 / NA
December	14 / NA	6 / NA

Figure 7-4: Cripple Creek and Victor Gold Mining Monitoring Stations

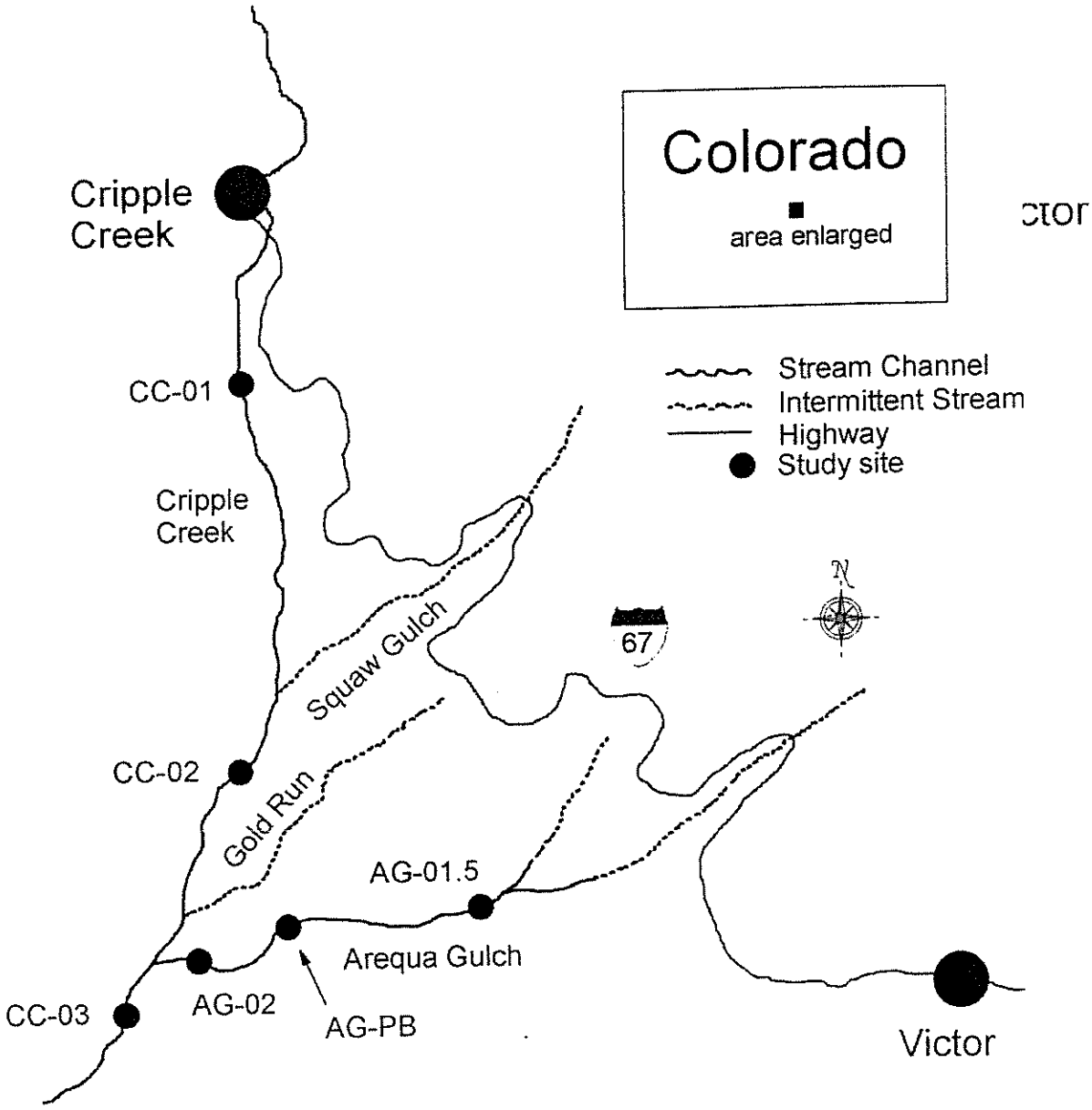
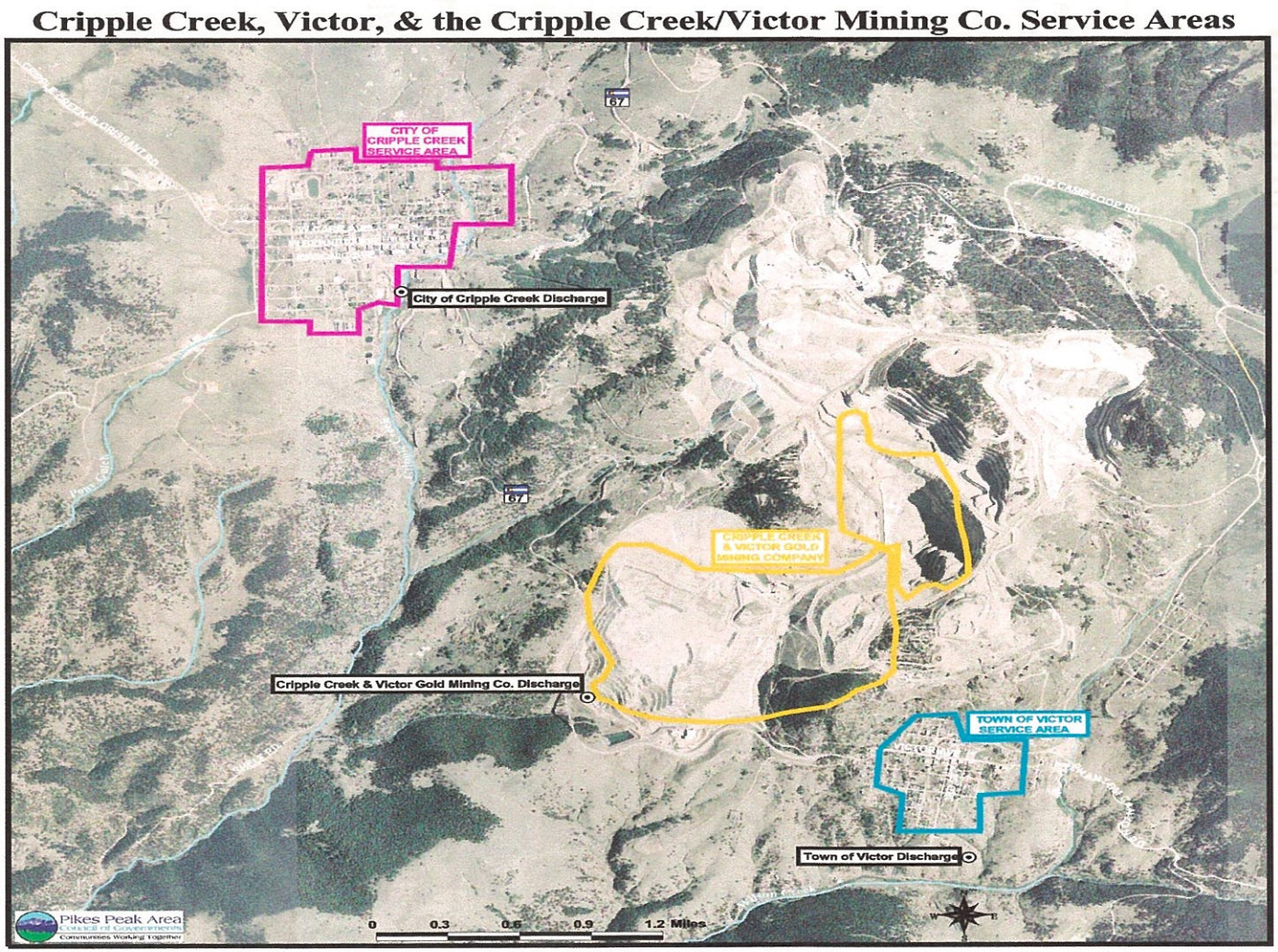


Figure 7-5: Cripple Creek and Victor Service Area and Cripple Creek and Victor Mining Company



7.4 Nonpoint Source Assessment

The two biggest nonpoint source issues within the Teller County portion of the watershed are:

- Resource Extraction
- Onsite Wastewater Systems (OWS)

7.4.1 Resource Extraction

The primary resource extraction area within this watershed is the Cripple Creek and Victor Gold Mining operation. Current operations focus on the Cresson Mine, an active mine that produces gold from the Cresson deposit and is located within the heart of the Cripple Creek Mining District. By 1990, CC&V discovered a reserve of over 81 metric tons of gold contained within the Cresson deposit. In 2002, CC&V completed an expansion of the Cresson Mine that included expansion of the size and depth and two additional surface mines. Other main features of this project are the zero-discharge Valley Leach Facility (VLF) (constructed in the Arequa Gulch drainage), the Minerals Beneficiation Facility and Process Buildings, the Arequa Gulch Overburden Storage Area (constructed upstream of the VLF), and the Squaw Gulch Overburden Storage Area (located at the headwaters of Squaw Gulch).

Rock from the mine is separated into economically recoverable gold (ore) and uneconomic rock (overburden). To remove the gold from the ore, ore is spread in 35-foot layers on the double- and triple-lined VLF and a dilute sodium cyanide solution is applied using agriculture drip irrigation tubes. The sodium cyanide solution dissolves the gold and other metals to form their metal compounds in a solution. The solution is collected and pumped out of the Valley Leaching Facility to the Absorption Desorption Recovery (ADR) facility and is passed through activated carbon to remove the gold cyanide compound. The gold cyanide compound is further processed and refined to produce a gold silver ore, which is then shipped off-site and refined into bullion. Overburden is placed in storage areas that are designed and constructed for geotechnical stability and stormwater runoff control. Each overburden storage area has a specific Colorado Division of Minerals and Geology approved reclamation plan and reclamation financial warranty.

The VLF is designed with three layers of liners in solution storage areas (one clay liner and two synthetic liners with leachate collection), and a minimum of two layers of liners (one clay and one synthetic liner) exist under all areas of the VLF. CC&V holds CDPS

discharge permit No. 0043648 for any naturally occurring groundwater or spring flows from beneath the VLF that are released into Arequa Gulch through designed and constructed underdrains. Groundwater or spring flows from beneath the facility must be allowed to exit to assure geotechnical stability.

The Overburden Storage areas are managed under the Stormwater Permit. All of CC&V's point source and nonpoint source discharges are addressed under the CDPS permit system or the Stormwater Permit System.

The State Division of Minerals and Geology is responsible for the protection of groundwater within the mine site area and, in cooperation with the permittee, has developed a groundwater monitoring program that is intended to control any groundwater contamination that might be caused by this project.

CC&V reclaims and revegetates areas as soon as mining activities have been completed. Reclamation is conducted concurrently with mining rather than leaving all reclamation until the end of the mine life. To date, reclamation efforts have focused on the Squaw Gulch Overburden Storage reclamation above Cripple Creek, the Arequa Gulch Overburden Storage Area reclamation, and reclamation of historically mined areas around the property.

Standard reclamation techniques are used, including the salvage and stockpiling of topsoil or growth medium, the use of native grasses and woody species, and the collection of woody species seed locally adapted to high altitude and dry climates for use in growing seedlings in a contract nursery for future transplants.

Historic mining and abandoned mine drainage (AMD) activities in Teller County have impacted water quality and are a potential threat to human and ecosystem health.There are many abandoned hard rock mines on public and private property in Teller County. Some of these are identified in the Colorado State Office Mine Land Reclamation Plan FY2007–2013

http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION_/aml/aml_strategic_plan.Par.71847.File.dat/AMLStrategicPlan%20Colorado.pdf

The second highest priority watershed impacted by abandoned mines on public lands includes the Upper Arkansas Watershed (this includes several mines located in the Upper Arkansas Watershed outside of Teller County). These watershed were prioritized by assessment undertaken by the WQCD in 2000 and 2004. A list of some of the historic mines in Teller County is available at http://www.victorcolorado.com/stcfgnews.htm.

7.4.2 Onsite Wastewater Systems (OWSs)

Teller County, due to its alpine setting and unique geologic setting, presents several problematic issues with regard to Onsite Wastewater Systems. These problems are the result of very low temperatures experienced in winter, deeper levels of ground freezing, rapidly draining soils, and low level permeability bedrock (TST, 2001).

Teller County has existing regulations governing the lot sizes that are suitable for installation and use of OWSs and individual wells. This is addressed in the 200-foot setback requirement between a well and an OWS system. These setbacks also have an effect on the minimum lot size. TST (2001) concluded that continued reliance on ISDS, barring future technological changes that significantly advance the effectiveness and the ease of use for such systems, will result in continued degradation of water quality. The remediation of groundwater already contaminated by OWS operations will be extremely difficult and expensive to accomplish. The type of contamination and the rate of degradation are usually controlled by the lot sizing and the density of the subdivision. There have been several subdivisions in Teller County (Forest Glen, Navajo Mountain Mesa, and Highland Lakes) that have reported high nitrate levels in the groundwater, and this could be caused by septic system contamination.

More information regarding the reports that were completed for Teller County regarding groundwater supply and the effects of septic systems on water quality can be found under the Water Quality Analysis Section of the Upper Arkansas Watershed.

7.5 Wastewater Management/Operating Agencies and Watershed-Based Organizations

7.5.1 Wastewater Operating Agencies

The following organizations are recognized as wastewater operating agencies within the Upper Arkansas Watershed. These agencies are responsible for controlling all aspects of the collection, treatment, and discharge of sewage or industrial concern within their company's sphere of operation.

- Cripple Creek and Victor Gold Mining
- City of Cripple Creek
- City of Victor

7.5.2 Management Agencies/Associations

Teller County Water Quality Management Association

The Teller County Water Quality Management Association is the only existing WQMA within the Upper Arkansas Watershed. Members of this association are within Teller County and primarily in the Upper Arkansas Watershed. Members are from the southern portion (Cripple Creek, Victor, Cripple Creek & Victor Gold Mining Company) and western portion (City of Divide) of Teller County. Other organizations represented include water and sanitation districts, Teller County Health Department, and the Natural Resources Conservation Service.

The Teller County WQMA was formed in 1977 under a Joint Exercise of Powers agreement between the City of Victor, City of Woodland Park, and Teller County. The association continues to meet on an as-needed basis. Because this WQMA covers the portion of the Upper Arkansas Watershed in the Pikes Peak region, no other WQMA are recommended.

7.5.3 Watershed Groups/Organizations

There are no existing watershed groups or organizations in the Teller County portion of the Upper Arkansas Watershed. For portions of the Upper Arkansas Watershed outside of Teller County, please go to Upper Arkansas Council of Governments (http://www.uaacog.com/)

7.6 Conclusions and Recommendations

7.6.1 Conclusions

Teller County represents a small portion of the Upper Arkansas Watershed and is primarily rural. Conclusions drawn from a review of the Upper Arkansas Watershed include the following:

- Expansion of the Cripple Creek and Victor Gold Mining operation will require water quality monitoring to determine continued permit compliance.
- ISDSs in Teller County represent both a near-term and a long-term threat to groundwater quality.
- Groundwater is the major source of drinking water for the county, and water quality degradation is a major concern.
- Based on historical trends, most of the growth is expected to occur in the unincorporated portions of Teller County.
- Due to the presence of large areas of national forest and state parks, development in certain areas will be negligible.
- Activities potentially affecting water quality include unmanaged historic mine sites.

7.6.2 Recommendations

These recommendations are specific to the Upper Arkansas Watershed; general recommendations are listed in Section 3, Policy Evaluation.

Groundwater Quality Monitoring

- Conduct a comprehensive groundwater quality study and develop a countywide, comprehensive groundwater protection plan.

Onsite Wastewater Systems

- Develop a program for testing and assessing existing septic systems to determine if existing systems are working adequately, and develop a county-wide database that contains the age, design, location, and date of last servicing for the systems.

8.0 Fountain Creek Watershed

8.1 Introduction and Overview

The Fountain Creek Watershed (Figure 8-1) is about 930 square miles and is located in the western portion of El Paso County and the northwestern portion of Pueblo County. This area is classified as a semi-arid environment. The two primary creeks in the watershed are Monument Creek and Fountain Creek, which flow into the Arkansas River. About 85% of the drinking water (supplied by Colorado Springs Utilities) is from transbasin diversions. The creek and alluvial aquifer wells tributary to Monument and Fountain Creeks do provide a small source of drinking water for Colorado Springs and are a source of irrigation for more than 100 farmers and ranchers. Fountain Creek alluvial wells provide more than half of the water supply to Security, Widefield, Fountain, and Stratmoor Hills. The Fountain Creek Watershed is one of numerous watersheds within the Arkansas River Basin and contains about 13% of the total population of Colorado. It contains two of the largest metropolitan areas along the Front Range: Colorado Springs and Pueblo (CDPHE-WQCD, 2002a).

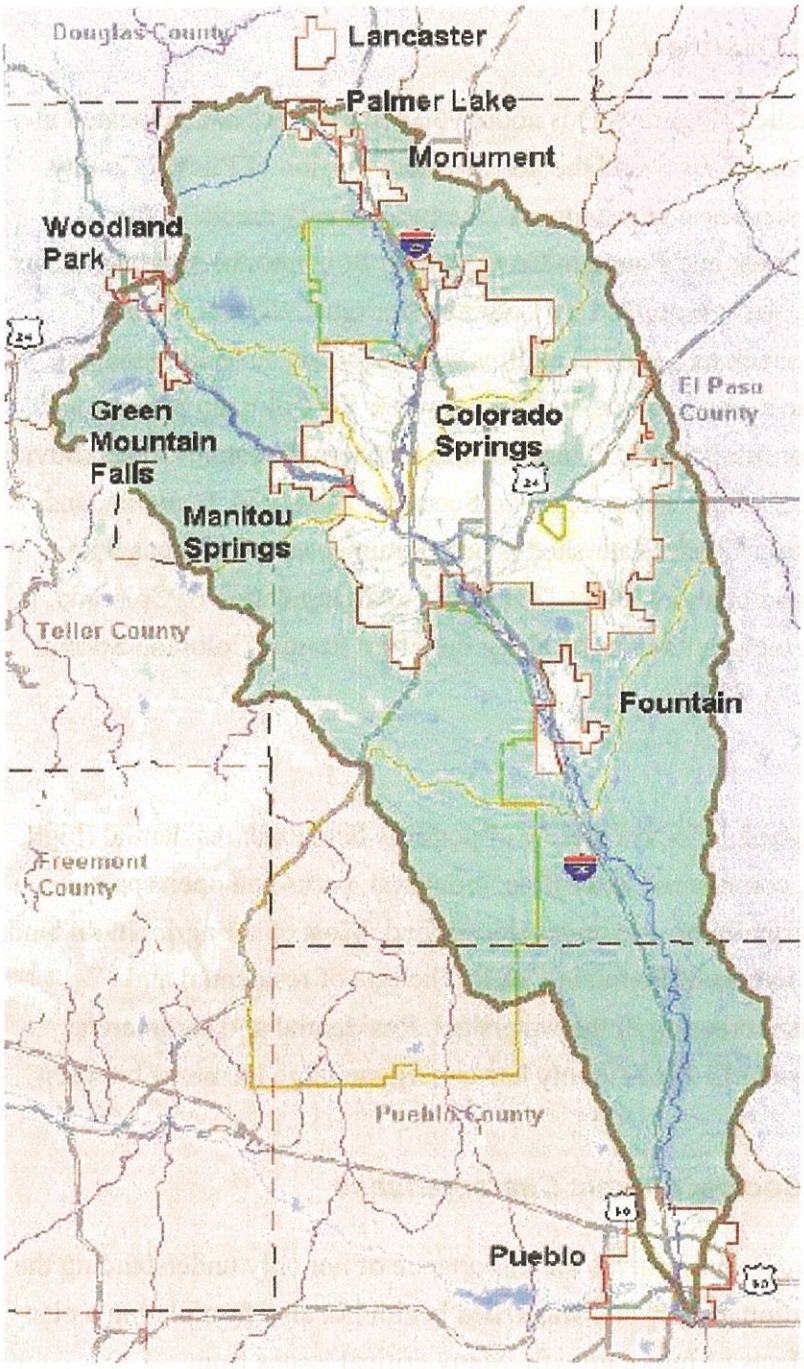
8.1.1 Land Use

The Fountain Creek Watershed reflects a variety of possible land uses: residential (high, medium, and low density), commercial and office, industrial, parks and open space, schools and institutions, agricultural, and undeveloped land. Most of the agricultural land is located along the lower portion of Fountain Creek. The rate of residential and commercial development is increasing in the watershed. Residential and commercial development in unincorporated El Paso County has undergone large increases between 2002 and 2007.

8.1.2 Population and Socioeconomic Characteristics

Anticipated growth in the region reinforces the importance of not only understanding the correlation between population growth and watershed health but also formulating a plan to minimize the adverse effects of future growth. Many critical issues from

Figure 8-1: Fountain Creek Watershed Reference Map



transbasin diversion rates to impervious cover and resulting stormwater runoff rates are reflections of regional population dynamics. Population projections serve as the basis for determining the amount of water necessary to meet the forecasted demand for 20 to 40 years.

8.1.3 Characterization of Watershed Issues

The primary issues that have to be addressed in the Fountain Creek Watershed are water quality, erosion, sedimentation, and flooding. However, the importance of each of these issues is different throughout the watershed and is based upon the different physical processes operating in the watershed, the management practices in use, and the technical strategies being applied.

It has become evident that as the Fountain Creek Watershed becomes increasingly urbanized, problems and issues associated with the main streams draining the basin have become more common. Erosion, sedimentation, and flooding problems have highlighted the need to understand the consequences of development activities in the watershed. These activities that alter the basic parameters most affecting channel changes and controlling erosion and sedimentation problems in the Fountain Creek Watershed, all of which are interrelated, include:

- Increased baseflow discharge;
- Increased sediment supply and transport;
- Floodplain encroachment by development;
- Channel realignment; and
- Channel bank protection and grade control

8.1.4 Overview of Watershed Activities

Several ongoing efforts at technical and policy levels are trying to address the problems and issues within the Fountain Creek Watershed. An activity matrix has been developed (available at www.fountain-crk.org) that lists the goals, activities, and status of all ongoing projects dealing with drainage, flood mitigation, planning, regulatory policies, transmountain diversions, public education, and modeling (GIS and remote sensing). Some of the primary activities since the last update of the 208 Plan are:

- Completion of a Fountain Creek Watershed Strategic Action Plan, which assesses the current conditions and strategies for water quality and sedimentation, land use planning and development, flooding and stormwater management, municipal

water supplies and return flows, recreation, wetlands, wildlife, agriculture, outreach, and funding/coordination. This report consists of a series of individual reports and was completed in December 2008. For each recommendation, a lead agency and a time frame is given.

- Development of an Army Corps of Engineers Watershed Study. The study started in 2003 and a final report was completed in December 2008. The four principal products of this study are:
    - Environmental baseline report, which contains detailed information on hydrology, hydraulics, geomorphology, soils, threatened and endangered species, fish, wetlands, wildlife migratory corridors, and other information;
    - GIS database of all the electronic data and information that was collected;
    - Specific technical strategies that focused on ecosystem restoration projects, flood risk reduction projects, and channel stability projects (a total of 46 potential projects were evaluated);
    - General recommendations that primarily address policies that would directly or indirectly effect erosion, sedimentation, and flooding (seventeen general recommendations were made).

  The formulation and analysis of alternative solutions to the problems identified in the ACOE Watershed Study will be conducted through separate projects that will require a sponsor, a feasibility cost-sharing agreement, and an intergovernmental agreement.
- Fountain Creek Corridor Master Plan, which focuses on the mainstem of Fountain Creek.
- Fountain Creek Watershed Greenway and Flood Control District was created in 2009 by the Colorado State Legislature. The district is discussed further in Section 8.5 (Water Quality Management Associations and Watershed Planning Groups).

8.2 Water Quality Characterization

8.2.1 Standards and Classification

The surface water segments for the Fountain Creek Watershed (located in the Arkansas River Basin) are shown in Table 8-1 and Figure 8-2. Regulation No. 32: Classification and Numeric Standards for the Arkansas River Basin (CDPHE –WQCC, 2007) was last updated in 2007 (minor modification were made in 2009); the next rulemaking hearing is scheduled for 2013.

8.2.2 Surface Water

The standards and classifications are shown in Table 8-1.

Issues and Concerns

The development of nutrient standards could lead to listing of stream segments in the watershed as water-quality impaired for total phosphorous and/or total nitrogen.

Approved TMDLs

There are no approved TMDLs for the Fountain Creek Watershed.

Water Quality Impaired Stream Segments

On the 2010 303d list, *E. coli* is listed as a high priority for Monument Creek and the Upper and mainstem of Fountain Creek. Selenium is listed as a low priority for Upper Fountain Creek (upstream from the confluence with Monument Creek), the mainstem of Fountain Creek from the Highway 47 bridge in Pueblo to the confluence with the Arkansas River, and Monument Creek. Sediment has also been identified on the 303d Monitoring and Evaluation list as a concern on Fourmile Creek, a tributary to Fountain Creek. More information regarding the 303(d) list can be found at http://www.cdphe.state.co.us/wq/Assessment/TMDL/tmdlmain.html.

Table 8-1: Fountain Creek Watershed Stream Classifications and Water Quality Standards

	Stream Segment Description	Desig	Class	Physical & Biological	Inorganic (mg/l)		Metals (ug/l)		
1a	Mainstem of Fountain Creek, including all tributaries, lakes, and reservoirs, from the source to a point immediately above the confluence with Monument Creek, except for specific listings in segment 1b.		Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 0.05 NO_3= 10 Cl= 250 SO_4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
1b	Severy Creek and all tributaries from the source to a point just upstream of where US Forest Service Road 330 crosses the stream.	OW	Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 0.05 NO_3= 10 Cl= 250 SO_4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS
2a	Mainstem of Fountain Creek from a point immediately above the confluence with Monument Creek to a point immediately above the State Highway 47 bridge.		Aq Life Warm 2 Recreation E Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 1.0 NO_3= 10 Cl= 250 SO_4= 330	As(ac)=340 As(ch)=0.02-10 (Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)**	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac)=TVS Se(ch)=8 Ag(ac/ch)=TVS Zn(ac/ch)=TVS
2b	Mainstem of Fountain Creek from a point immediately above the State Highway 47 bridge to the confluence with the Arkansas River.		Aq Life Warm 2 Recreation E Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 1.0 NO_3= 10 Cl= 250 SO_4= 485	As(ac)=340 As(ch)=0.02-10 (Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=5280 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac)=42.3 Se(ch)=28.1 Ag(ac/ch)=TVS Zn(ac/ch)=TVS

3a	All tributaries to Fountain Creek that are within the boundaries of national forest or Air Force Academy lands, including all wetlands, lakes, and reservoirs, from a point immediately above the confluence with Monument Creek to the confluence with the Arkansas River, except for the mainstem of Monument Creek in the Air Force Academy lands and for specific listings in segment 3b.		Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 0.05 NO_3= 10 Cl= 250 SO_4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS (tr) Zn(ac/ch)=TVS
3b	Bear Creek and all tributaries from the source to a point upstream of GPS coordinates N3847682, W 10454917 (this location is at elevation 8,200 feet above sea level at a 250-degree angle and 3,000 feet from the trailhead of the Mount Buckhorn Trail off High Drive.	OW	Aq Life Cold 1 Recreation E Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)= 7.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 0.05 NO_3= 10 Cl= 250 SO_4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS (tr) Zn(ac/ch)=TVS
4	All tributaries to Fountain Creek that are not within the boundaries of national forest or Air Force Academy lands, including all wetlands, lakes, and reservoirs, from a point immediately above the confluence with Monument Creek to the confluence with the Arkansas River, except for the specific listings in segments 5,6,7a, and 7b.		Aq Life Warm 2 Recreation E Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	CN=0.2 NO_2(ac/ch)=10 NO3(ac/ch)=100	B= 0.75	As(ch)=0.02 (Trec) Be(ch)=100(trec) Cd(ch)=10 (trec) CrIII(ac)=100(Trec)	CrVI(ch)=100 (trec) Cu(ch)=200 (trec) Pb(ch)=100 (trec)	Ni(ch)= 200 (trec) Se(ch)=20 (trec) Zn(ch)=2000 (trec)
5	Marshland on Nash Property (60 acres at 103030 Old Pueblo Road, El Paso County) located in Section 28 T16S R65W; Jimmy Camp Creek from the irrigation diversion east of Old Pueblo Road to its confluence with Fountain Creek; unnamed tributary from the boundary of Fort Carson to the confluence with Fountain Creek; located in S1/2. SW1/4, Section 6 and N1/2, NW1/4, Section 7, T16S, R65W.		Aq Life Cold 2 Recreation E Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011	CN=0.005 S=0.002 B= 0.75 NO_2= 0.05	As(ch)=100 (trec) As(ac)=340 Cd(ac/ch)=TVS CrIII(ac/ch)=50TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01 (tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS

6	Mainstem of Monument Creek from the boundary of national forest lands to the confluence with Fountain Creek.		Aq Life Warm 2 Recreation E Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005	B= 0.75 NO_2= 0.05 NO_3= 10 Cl= 250 SO_4= 329	As(ac)=340 As(ch)=0.02-10 (Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1430 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS
7a	Pikeview Reservoir, Willow Springs Pond #1, and Willow Springs Pond #2	UP	Aq Life Warm 2 Recreation P Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 205/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 0.05 NO_3= 10 SO_4= WS	As(ac)=340 As(ch)=0.02 (Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS (dis) Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS (dis)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS
7b	Prospect Lake, Quail Lake, Monument Lake	UP	Aq Life Warm 2 Recreation E Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH_3(ac/ch)=TVS CL_2(ac)=0.019 CL_2(ch)=0.011 CN=0.005 S=0.002	B= 0.75 NO_2= 1.0	As(ac)=340 As(ch)=7.6 (Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000 (trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS (dis) Hg(ch)=0.01 (tot)	Hg(ch)=0.01 (tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS

Segment 1a: Temporary modification (type iii): Se(ch)=8.7 ; expiration date: 12/31/2012

Segment 2a: Temporary modification: NH_3(ac/ch)=TVS (old); expiration date: 12/31/2012; Type(iii):Cu(ac/ch)= current condition; expiration date: 12/31/09

Segment 6: Temporary modification (type iii): Cu(ac/ch)= current condition; expiration date: 12/31/09; NH3(ac/ch)=TVS (old) (type i); expiration date:12/31/2011

Segment 7a: Water + fish standards apply

Segment 7b: Fish ingestion standards apply

Figure 8-2: Fountain Creek Watershed Stream Locations

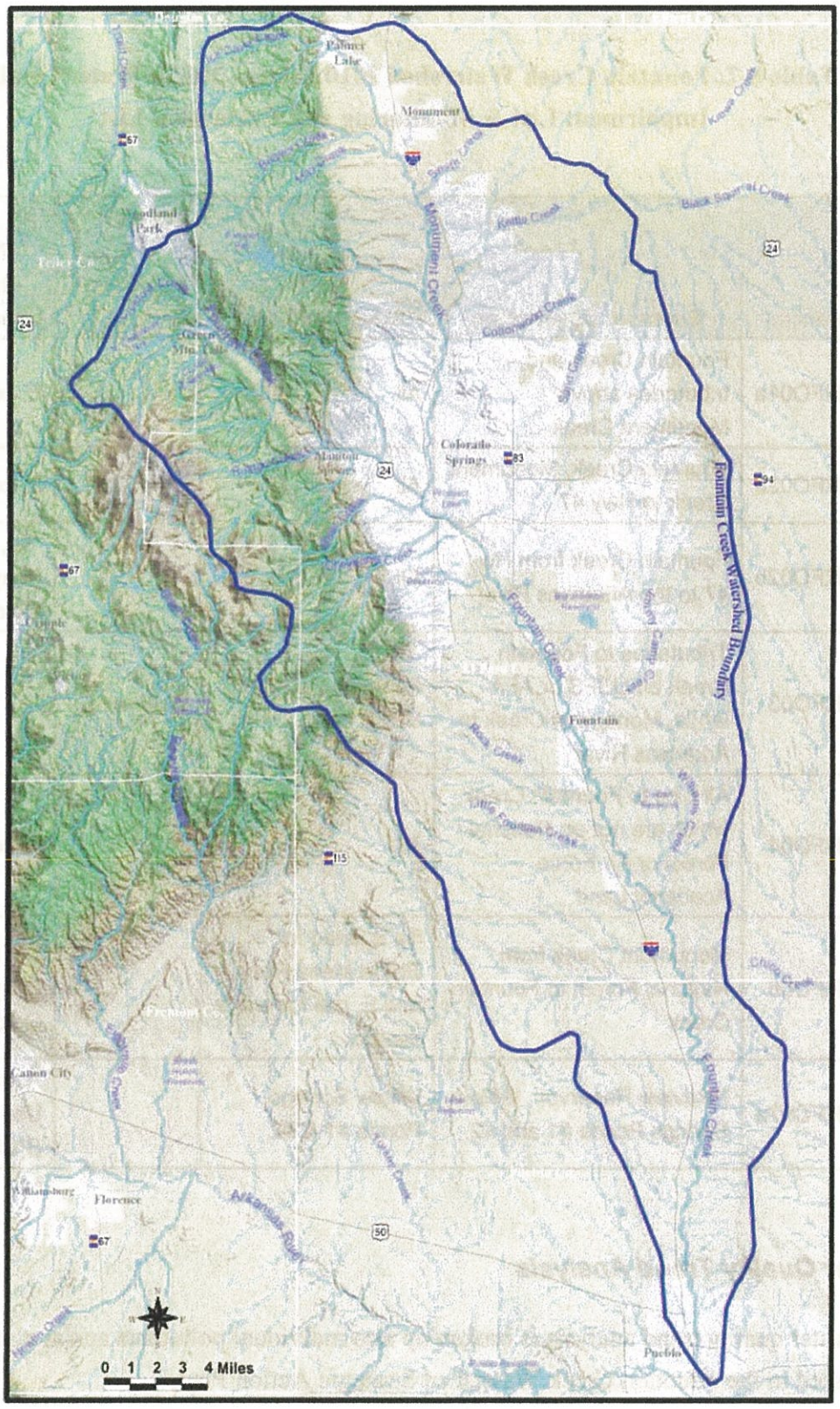


Table 8-2: Fountain Creek Watershed 2010 Section 303(d) Water Quality Impairment List & Monitoring and Evaluation List

Segment	Segment Description	Affected Portion	Monitoring & Evaluation List	Water Quality Impairment	Pri.
COARFO01a	Fountain Creek and tributaries above Monument Creek	All		E. coli, Se	H/L
COARFO02a	Fountain Creek, Monument Creek to Hwy 47	All		E. coli	H
COARFO02b	Fountain Creek from Hwy 47 to the Arkansas River	All		Se, E. coli (May–October)	L
COARFO03	Tributaries to Fountain Creek on USFS or AFA lands, Monument Creek to Arkansas River	Fourmile Creek on USFS Land	Sediment		
COARFO04	All tribs to Fountain Creek, which are not on National Forest or Air Force Academy Land	All		E. coli	
COARFO06	Monument Creek from National Forest to Fountain Creek	Se is listed for Below Mesa Road and E. coli for entire section.		Se, E. coli (May - October)	L
COARFO07a	Pikeview Reservoir, Willow Springs Ponds #1 and #2	Willow Springs Ponds #1 & #2		Aquatic Life Use (PCE FCA)	M

Water Quality Trend Analysis

The water quality trend analysis is broken up into individual pollutants and is also discussed in the Fountain Creek Watershed Strategic Action Plan.

Bacteria

Bacteria are very small, single-celled life forms that exist everywhere. There are many different types of bacteria, and some types can cause illness in people. Two types of bacteria, fecal coliforms and *E. coli* (a specific type of fecal coliform bacteria), are used to monitor the possible presence of disease-causing organisms in surface waters. These bacteria, called indicator bacteria, are present in high numbers in the intestines of humans. Wildlife (deer, elk, ducks, geese), livestock (cattle, horses), and domestic animals (dogs, cats) also carry *E. coli* and fecal coliform bacteria. This is true for both healthy people and animals and for those that are ill. Pathogenic microorganisms that can cause human disease may be present where levels of indicator bacteria are high. As a result, it might be unsafe to swim or wade in Fountain Creek when levels of indicator bacteria are high, although it is difficult to determine if high levels of bacteria directly cause an individual to become sick.

The standards for Recreation Class E waters are 126 *E. coli* bacteria per 100 milliliters of water. The U.S. Environmental Protection Agency estimates that at these levels, for each 1,000 people exposed, eight may become ill. Monitoring conducted by the Pueblo City/County Health Department show that bacteria frequently exceed water quality standards in Fountain Creek, especially in the summer and after storms. Indicator bacteria also occur in sediments in Fountain Creek, but because there are no water quality standards for bacteria in sediments, it is difficult to say whether the bacterial numbers in Fountain Creek sediments are unusually high. The amount of bacteria that exists in sediment is difficult to determine because it is impossible to capture all the bacteria in the sediment, and it is difficult to get accurate and consistent measurements. More work needs to be conducted in order to determine the amount of *E. coli* in the bed material to determine potential health effects. Unfortunately, most studies regarding the amount of *E. coli* present in sediments have been limited to beaches (http://www.utoledo.edu/as/lec/pdfs/ecoli.pdf).

Bacteria levels in water appear to be directly related to flows and water temperature. When flows are high, such as after a summer storm, higher bacteria levels are found in Fountain Creek during and for a few days after the storm. Sources of bacteria could include storm runoff from urban areas, raw sewage spills, failing onsite wastewater systems, wildlife (deer, elk, geese), livestock (cattle, horses, pigs, poultry), and runoff from farms, ranches, and open areas. Two separate studies have been conducted on

different stretches of Fountain Creek through the use of microbial source tracking methods (using DNA from *E. coli* bacteria) to determine whether E. coli sources are from people or animals. By identifying the main sources of bacteria, it may be possible to reduce bacteria levels in Fountain Creek so that standards are attained.

- Colorado State University-Pueblo in cooperation with the Lower Ark River Conservancy District conducted a study that primarily focused on the mainstem of Fountain Creek. The study (sampling and analysis) was completed in 2010, and the results appear to be inconclusive but the report is still being developed and will probably not be released until January 2011.
- A cooperative study between the USGS, Colorado Springs Utilities, the City of Colorado Springs, and the Colorado Department of Public Health and Environment was completed in 2009 on Upper Fountain Creek from Green Mountain Falls to the confluence of Fountain Creek and Monument Creek to identify sources of E. coli. Birds were identified as a probable source of fecal contamination, which was validated and supported through water quality testing of nitrogen, phosphorous, and contaminants commonly found in wastewater. It was found that human contamination was not the major cause of fecal contamination which was also supported through other lines of evidence, in particular the lack of wastewater-associated chemicals.

Selenium

Selenium is a natural element. There is an unusually large amount of selenium in the Pueblo County portion of the Fountain Creek watershed, substantially more than is found in most areas. High concentrations of selenium are found in the bedrock and soils underlying Fountain Creek and its tributaries. Selenium is picked up by surface water and groundwater as it flows over or through the soils and bedrock, resulting in increased amounts of selenium in the water. Because of these factors, Fountain Creek between the Pinõn Road crossing and the Arkansas River consistently exceeds the water quality standard.

When animals eat, they take in materials like selenium from the environment. Unlike other substances, the selenium that is not used as a nutrient does not pass out of the body. Instead, excess selenium is stored in body tissues. This is called "bioaccumulation." High levels of selenium in body tissue can cause birth defects in fish and birds. Water quality standards in Fountain Creek were established to protect fish and other wildlife, and the high levels of selenium in lower Fountain Creek are potentially harmful to fish, insects,

and birds that nest and feed along the creek. Fish studied in 2005 and 2006 at several locations in Fountain Creek, in the Arkansas River, and in other tributaries in the Arkansas Basin showed no evidence of birth defects due to selenium. This study found that numbers and types of fish and aquatic insects were lower at a site in the Wildhorse Creek basin where the selenium concentrations were highest. No effects on fish health or on fish or insect populations caused by selenium were found to occur in the locations studied on Fountain Creek.

In 2007, the selenium standard was changed to the naturally occurring selenium concentration in the creek, based on the results of studies that demonstrate that natural, geological sources are the principal sources of selenium in portions of Segment 2b of Fountain Creek (Highway 47 Bridge to Confluence of Fountain Creek and Arkansas River).

Selenium is listed on Segment 6, Monument Creek, of the 2010 303(d) List for the portion of Monument Creek below Mesa Road, because this area is not meeting the chronic standard. A Monument Creek Selenium Study was performed by Colorado Springs Utilities in 2004–2005 to evaluate the levels of selenium in Monument Creek and investigate potential sources of selenium. The WQCD reviewed the data gathered during this study and other efforts, and determined that the reach of Monument Creek from Palmer Lake to the confluence with Fountain Creek was meeting the standard except for a small section below Mesa Road. It is possible that future discharges from the J.D. Phillips facility may reduce the concentrations of selenium in Monument Creek below Mesa Road to acceptable levels.

Total Dissolved Solids

Total dissolved solids (TDS) and salinity are measures of the amount of salts dissolved in water. Electrical conductivity is an indirect measure of the amount of salts in water. The Sodium Absorption Ratio (SAR) is a specific measure of how salt might harm plant growth. High TDS impairs crop growth and can cause salts to build up in soil so that the soil will no longer support crops. High TDS creates "hard" drinking water and can create an undesirable taste in drinking water. There is no numeric water quality standard in Colorado for TDS for either irrigation or for drinking water. However, the WQCD has developed guidance regarding SAR and TDS effluent limits in discharge permits: http://www.cdphe.state.co.us/wq/PermitsUnit/POLICYGUIDANCEFACTSHEETS/policyandguidance/WQP24AGPolicy.pdf.

The Water Quality Control Commission recognizes that excessive salinity and TDS levels can be detrimental to the water use classifications. The commission has established salinity standards for the Colorado River Basin but not for other waters, and the commission has not developed control practices for salinity or TDS. The State of Kansas has expressed concern regarding TDS levels in the Arkansas River.

Nutrients

The term "nutrients" includes different forms of phosphorus and nitrogen that can act as fertilizers to stimulate the growth of algae and other aquatic plants in water bodies. Algae growth can cause several types of problems, especially in lakes, including unsightliness, unpleasant taste in drinking water, and fish kills. Fish kills can be caused by the decay of dead algae that consumes oxygen needed by fish to live. Nutrient impacts may not be seen where the nutrients enter the river but may occur at downstream locations such as lakes and reservoirs where nutrients build up in non-flowing waters. Colorado has not yet adopted standards for nutrients. However, the U.S. Environmental Protection Agency is pressing states to adopt nutrient standards at the earliest possible time, and Colorado has begun the process. Limiting the amount of nutrients entering rivers will require significant changes in many activities including fertilizing lawns and agricultural fields, irrigating lawns and agricultural fields, and managing livestock wastes, as well as controlling runoff from cities and adding new processes for treating wastewater.

Phosphorous is not directly harmful to humans and animals, but it can stimulate toxic algae blooms or oxygen depletion. Nitrate can be harmful at high levels to humans and animals. The drinking water limit for nitrate, a form of nitrogen, is 10 milligrams per liter. Planting or maintaining vegetation along the riverbanks and controlling urban runoff can help to reduce the level of nutrients in the river. Additionally, there are agricultural management methods such as matching fertilizer to crop needs, keeping runoff from manure out of the river, and reducing erosion that reduces nutrient levels. Ammonia, another form of nitrogen, is also a nutrient and can be harmful to fish. Colorado adopted new ammonia standards in 2007 based on the EPA standards. The new ammonia standards for warm-water streams are significantly lower than the old standards.

Based on very limited data sets from the EPA's STORET database, both nitrogen and phosphorus appear to be significantly higher in Fountain Creek than in the Arkansas River. There is not sufficient data to quantify various source contributions, but in general, depending on locale, the relatively elevated concentrations of nitrogen and phosphorous in lower Fountain Creek are largely due to wastewater treatment facility discharge.

However, elevated nitrogen and phosphorous concentrations also occur as a result of storm runoff and below the City of Fountain also could be due to agriculture return flow.

Sediment

Flow conditions combined with other factors (e.g., geology, stream modification, etc.) result in increased erosion and sediment transport. As the creek is trying to re-establish equilibrium and adjust for these additional flows, it alters its meander pattern and promotes increased bank erosion and down-cutting of the creek bed, which are all evident processes currently taking place within Fountain Creek and its tributaries.

Organics

There are numeric standards for 19 organic parameters that have been adopted as basic standards applicable to all waters of the region. These standards are designed to protect the waters of the state regardless of the use classifications because they describe the fundamental conditions that all waters must meet to be suitable for any use. These standards are shown in Regulation No. 31: Basic Standards and Methodologies for surface water.

Mercury

Mercury is becoming an increasing pollutant of concern. A substantial amount of research has tied air pollution fallout from coal-fired power plants to mercury in the runoff.

8.2.3 Monitoring Network

Within the Fountain Creek Watershed, there are 14 active USGS monitoring stations located primarily on Fountain and Monument creeks and major tributaries. These stations measure different types of water quality parameters, such as flow, biological nutrients, organics, inorganics, physical properties, radiochemicals, and sediment. A link to the USGS monitoring stations and water quality, streamflow and groundwater data can be found at **http://co.water.usgs.gov/.**

8.2.4 Groundwater

Denver Basin Bedrock Aquifers

The Denver Basin Bedrock Aquifers consist of four bedrock aquifers (USGS, 1988) which in descending order from the surface are: Dawson aquifer, Denver aquifer, Arapahoe aquifer, and Laramie-Fox Hills aquifer. Most of the water contained in the

upper aquifers and near the basin boundaries is considered to be tributary to surface water sources. The Denver groundwater basin underlies a 6,700-square-mile area (including part of Fountain Creek and Black Squirrel Creek Watershed) that includes the northern half of El Paso County.

The communities in Northern El Paso County such as Monument, Palmer Lake, Ellicott, Peyton, and Black Forest have wells in either the Dawson or Denver aquifers. Palmer Lake draws most of its water from Monument Creek but also has two wells in the Denver aquifer. Monument has nine wells that supply drinking water and six of the nine are in one of the alluvial or Denver/Dawson aquifers. These communities primarily utilize the wells in the shallowest portions of the aquifer (alluvial aquifer) for drinking water sources. Triview, Forest Lakes, Donala, Pleasant View, and Sun Hills also get all or part of their drinking water from the Dawson/Denver aquifers. To protect public groundwater supplies from contamination, well-head protection programs have been developed by the Town of Monument with assistance from the Colorado Water Quality Control Division.

Widefield Alluvial Aquifer

The shallow, unconfined alluvial aquifer is located adjacent to Fountain Creek in southwestern El Paso County between Colorado Springs and Widefield. Water quality in the aquifer can be variable due to variability in the sources of aquifer recharge. The two primary ongoing water quality problems associated with the Widefield alluvial aquifer are Schlage Lock and Electro Energy (formerly referred to as Eagle Picher prior to being purchased in 2003). For both these facilities, the CDPHE is responsible for enforcing the hazardous waste regulations in the state of Colorado. Both Schlage Lock and Eagle Picher are currently operating remediation systems and monitoring groundwater.

Schlage Lock

Schlage Lock Co. is conducting ongoing clean-up activities to remove perchloroethene (PCE) from the soil and groundwater at its facility and from groundwater offsite. PCE was used as a cleaning solvent by Schlage in the late 1970s. They are continuing to run a series of treatment facilities along a 3.5-mile portion of the Widefield Aquifer for at least the next decade. This also includes a plant at Bradley Road to remove the PCE from groundwater intercepted at the Schlage Lock plant site boundary. The plume is about one mile wide and five miles long.

Clean up of the Schlage Lock Company property includes the following strategies to stop the continued movement of PCE away from the property: soil vapor extraction, air

sparging, in-well sparging and stripping systems, and onsite boundary control system. More information on Schlage Lock can be found at: http://www.cdphe.state.co.us/hm/schlage.htm#role.

Eagle Picher

Eagle Picher is a manufacturer of nickel cadmium batteries, which are primarily used for military and aerospace applications. A release from onsite surface impoundments of industrial wastewater was detected during groundwater sampling in 1984. Groundwater monitoring has shown that fluoride and arsenic exceed the state groundwater standards and pH exceeds the secondary drinking water standard beneath the site and immediately downgradient. Nitrate also exceeds the groundwater standard and has been found beneath the site and 7,000 feet downgradient (Eagle Picher, 2001). This nitrate plume is contained within the existing Schlage Lock PCE plume.

Fountain Creek Valley Alluvial Aquifer

The Widefield Alluvial Aquifer and Fountain Creek Alluvial Aquifers are considered separate. The alluvial aquifer in the Fountain Creek Valley is the primary municipal water supply for El Paso County and the communities of Stratmoor Hills, Fountain, and Security/Widefield and is used as a supplementary supply for the City of Colorado Springs (USGS, 1995). Classifications of the confined and unconfined groundwater in the specified area are domestic and agriculture use quality. Concentrations of dissolved nitrate have exceeded the federal drinking water maximum concentration of 10 mg/l in several areas of the aquifer. There have been limited studies since the 2003 update of the 208 Plan assessing the groundwater quality of this alluvial aquifer.

Monument Creek and Fountain Creek, which flow into the Arkansas River. About 85% of the drinking water (supplied by Colorado Springs Utilities) is from transbasin diversions. The creek and alluvial aquifer wells tributary to Monument and Fountain Creeks do provide a small source of drinking water for Colorado Springs and are a source of irrigation for more than 100 farmers and ranchers. Fountain Creek alluvial wells provide more than half of the water supply to Security, Widefield, Fountain, and Stratmoor Hills. The Fountain Creek Watershed is one of numerous watersheds within the Arkansas River Basin and contains about 13% of the total population of Colorado. It contains two of the largest metropolitan areas along the Front Range: Colorado Springs and Pueblo (CDPHE-WQCD, 2002a).

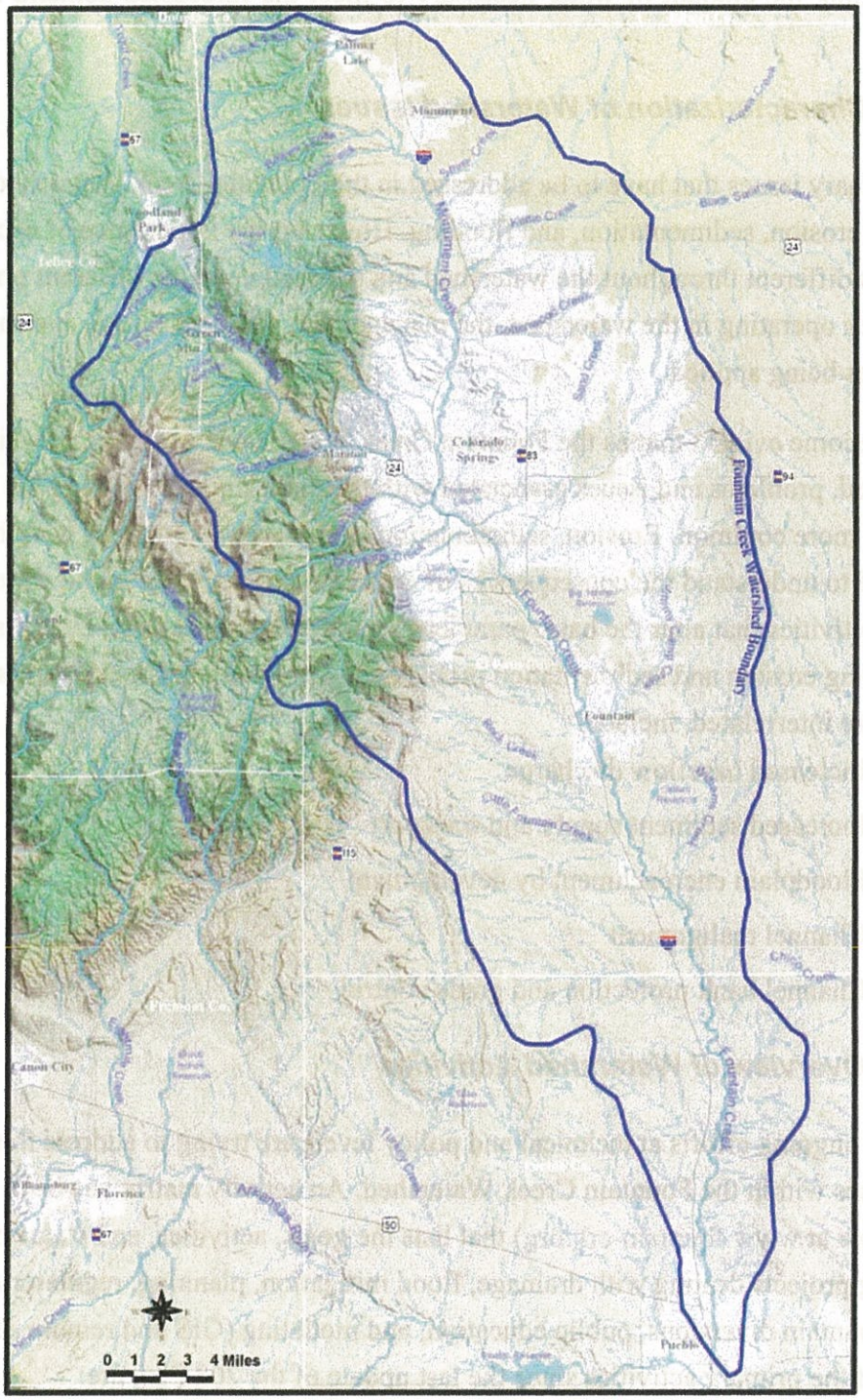
8.1.1 Land Use

The Fountain Creek Watershed reflects a variety of possible land uses: residential (high, medium, and low density), commercial and office, industrial, parks and open space, schools and institutions, agricultural, and undeveloped land. Most of the agricultural land is located along the lower portion of Fountain Creek. The rate of residential and commercial development is increasing in the watershed. Residential and commercial development in unincorporated El Paso County has undergone large increases between 2002 and 2007.

8.1.2 Population and Socioeconomic Characteristics

Anticipated growth in the region reinforces the importance of not only understanding the correlation between population growth and watershed health but also formulating a plan to minimize the adverse effects of future growth. Many critical issues—from

Figure 8-2: Fountain Creek Watershed Stream Locations



transbasin diversion rates to impervious cover and resulting stormwater runoff rates—are reflections of regional population dynamics. Population projections serve as the basis for determining the amount of water necessary to meet the forecasted demand for 20 to 40 years.

8.1.3 Characterization of Watershed Issues

The primary issues that have to be addressed in the Fountain Creek Watershed are water quality, erosion, sedimentation, and flooding. However, the importance of each of these issues is different throughout the watershed and is based upon the different physical processes operating in the watershed, the management practices in use, and the technical strategies being applied.

It has become evident that as the Fountain Creek Watershed becomes increasingly urbanized, problems and issues associated with the main streams draining the basin have become more common. Erosion, sedimentation, and flooding problems have highlighted the need to understand the consequences of development activities in the watershed. These activities that alter the basic parameters most affecting channel changes and controlling erosion and sedimentation problems in the Fountain Creek Watershed, all of which are interrelated, include:

- Increased baseflow discharge
- Increased sediment supply and transport
- Floodplain encroachment by development
- Channel realignment
- Channel bank protection and grade control

8.1.4 Overview of Watershed Activities

Several ongoing efforts at technical and policy levels are trying to address the problems and issues within the Fountain Creek Watershed. An activity matrix has been developed (available at www.fountain-crk.org) that lists the goals, activities, and status of all ongoing projects dealing with drainage, flood mitigation, planning, regulatory policies, transmountain diversions, public education, and modeling (GIS and remote sensing). Some of the primary activities since the last update of the 208 Plan are:

- Completion of a Fountain Creek Watershed Strategic Action Plan, which assesses the current conditions and strategies for water quality and sedimentation, land use planning and development, flooding and stormwater management, municipal

water supplies and return flows, recreation, wetlands, wildlife, agriculture, outreach, and funding/coordination. This report consists of a series of individual reports and was completed in December 2008. For each recommendation, a lead agency and a time frame is given.

- Development of an Army Corps of Engineers Watershed Study. The study started in 2003 and a final report was completed in December 2008. The four principal products of this study are:
    - Environmental baseline report, which contains detailed information on hydrology, hydraulics, geomorphology, soils, threatened and endangered species, fish, wetlands, wildlife migratory corridors, and other information;
    - GIS database of all the electronic data and information that was collected;
    - Specific technical strategies that focused on ecosystem restoration projects, flood risk reduction projects, and channel stability projects (a total of 46 potential projects were evaluated);
    - General recommendations that primarily address policies that would directly or indirectly effect erosion, sedimentation, and flooding (seventeen general recommendations were made).

  The formulation and analysis of alternative solutions to the problems identified in the ACOE Watershed Study will be conducted through separate projects that will require a sponsor, a feasibility cost-sharing agreement, and an intergovernmental agreement.
- Fountain Creek Corridor Master Plan, which focuses on the mainstem of Fountain Creek.
- Fountain Creek Watershed Greenway and Flood Control District was created in 2009 by the Colorado State Legislature. The district is discussed further in Section 8.5 (Water Quality Management Associations and Watershed Planning Groups).

8.3 Point Source Dischargers

8.3.1 Overview

Fountain Creek Watershed currently has 13 major (discharge > 0.05 mgd) wastewater treatment plant dischargers, shown on Table 8-3 and Figure 8-3, which primarily discharge either to Fountain or Monument Creeks and tributaries. Colorado Springs Utilities (SU) operates the largest discharge facilities in the watershed.

Table 8-3: Fountain Creek Watershed Discharge Locations Major Facilities (> 0.05 mgd)

Waste Water Treatment Plant	Permit No.	Discharge Location	Mgmt. Area	Design Capacity (mgd)	Existing Load (as of Aug 2009) (mgd)
Colorado Springs Utilities Las Vegas Facility	CO-0026735	Fountain Creek Segment 2a-via Fountain Mutual irrigation channel	MM	65.0 (Jan and Feb) /75.0 (Remainder of year)	36.6
Colorado Springs Utilities J.D. Phillips Facility	CO-0046850	Monument Creek south of Pikeview Reservoir	MM	20	6.6
Academy Water and Sanitation District	COG-589020	Smith Creek at southern edge of treatment facility	UM	0.116	0.05
Upper Monument Creek Regional WWTF (Donala Water and Sanitation District, Forest Lakes and Triview Metropolitan Districts)	CO-0042030	Monument Creek at southwest corner of service area	UM	1.750	0.8
Monument, Palmer Lake and Woodmoor Water and/or Sanitation District	CO-0020435	Monument Creek at southern edge of Tri-Lakes service area	UM	4.2	1.38
United States Air Force Academy	CO-0020974	Academy's effluent recycle system	UM	2.2	1.4
Cherokee Metropolitan District	CO-0024457	East fork of Sand Creek west of north entrance to PAFB	LF	2.0	1.45
Tri-Lakes WWTF (Cheyenne Mountain Estates-Broadmoor Park)	CO---34274	Intermittent tributary of Fountain Creek about 0.5 miles upstream of Hwy 115.	LF	0.06	0.03
Fort Carson	CO-0021181	Clover Ditch about 1 mile upstream from Fountain Creek confluence	LF	3.0 (application to re-rate to 4.0)	1.2
Fountain Sanitation District	CO-0020532	Fountain Creek, southern edge of treatment facility	LF	1.908	1.25
Security Sanitation District	CO-0024392	Fountain Creek, upstream from Carson Blvd. bridge	LF	2.4	1.27
Widefield Water and Sanitation District	CO-0021067	Fountain Creek, 0.25 miles downstream from Colorado Hwy 16. bridge	LF	2.5	1.4
Lower Fountain MSDD	Pending	Trib. of Fountain Creek; 1.8 miles from mainstem; Will begin in 2011	LF	2.5	0

Figure 8-3: Fountain Creek Watershed Point Source Discharge Locations

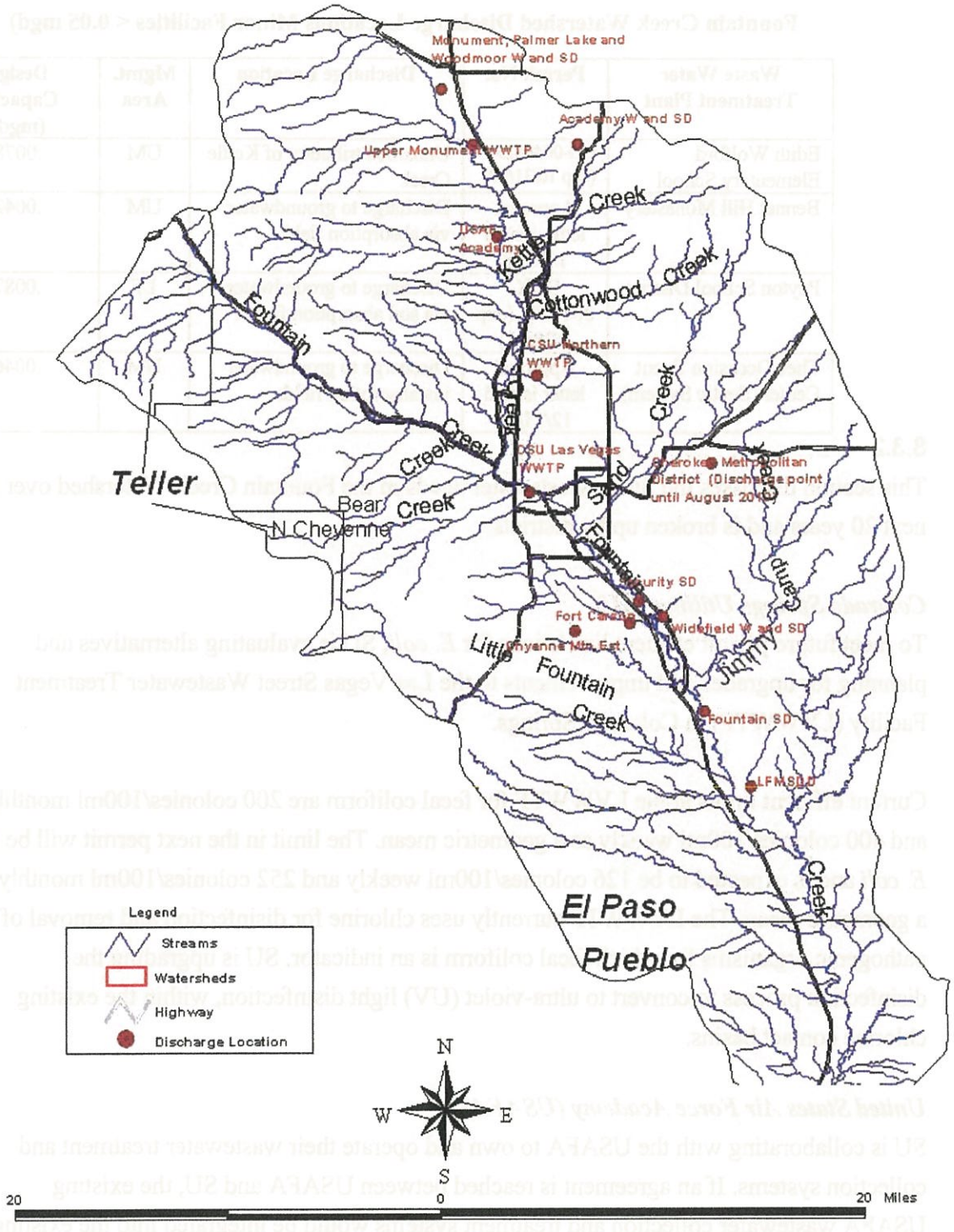


Table 8-6 shows the minor (< 0.05 mgd) discharge facilities (both surface water and groundwater).

Table 8-4

Fountain Creek Watershed Discharge Locations Minor Facilities < 0.05 mgd)

Waste Water Treatment Plant	Permit No.	Discharge Location	Mgmt. Area	Design Capacity (mgd)
Edith Wolford Elementary School	CO-0046825 (exp 10/31/09)	Unnamed tributary of Kettle Creek	UM	.0078
Bennet Hill Monastery	Approval letter issued 1/31/08	Discharge to groundwater via absorption field	UM	.0042
Peyton School District	COX-0047201 (exp 2/28/11)	Discharge to groundwater via soil absorption fields	LF	.0087
Thee Occasion Event Center (Septic System)	Approval letter issued 12/15/06	Discharge to groundwater via absorption fields	UM	.0046

8.3.2

This section discusses the future wastewater needs in the Fountain Creek Watershed over the next 20 years and is broken up by districts.

Colorado Springs Utilities (SU)

To meet future permit effluent limitations for *E. coli*, SU is evaluating alternatives and planning for upgrades and improvements to the Las Vegas Street Wastewater Treatment Facility (LVWWTF) in Colorado Springs.

Current effluent limits at the LVWWTF for fecal coliform are 200 colonies/100ml monthly and 400 colonies/100ml weekly as a geometric mean. The limit in the next permit will be for *E. coli* and is expected to be 126 colonies/100ml weekly and 252 colonies/100ml monthly as a geometric mean. The LVWWTF currently uses chlorine for disinfection and removal of pathogenic organisms for which fecal coliform is an indicator. SU is upgrading the disinfection process to convert to ultra-violet (UV) light disinfection, within the existing chlorine contact basins.

United States Air Force Academy (USAFA)

SU is collaborating with the USAFA to own and operate their wastewater treatment and collection systems. If an agreement is reached between USAFA and SU, the existing USAFA wastewater collection and treatment systems would be integrated into the existing SU systems. Future options for wastewater management include a wastewater pipeline or interceptor from the USAFA to the J.D. Phillips Water Reclamation (JDPWRF), plus the

decommissioning of the USAFA wastewater treatment plant and a return non-potable pipeline to provide irrigation water for the USAFA. Additional options include new gravity pipelines and the potential to decommission one or more lift stations.

Proposed lift stations and interceptors

A new lift station and possibly an interceptor near Fillmore Street will be installed after 2014 and another in the Black Squirrel drainage basin after 2012.

Academy Water and Sanitation District

The NPDES permit for Academy W&SD expires October 30, 2010, and there will be new changes in the permit after renewal in 2010. Ammonia standards will probably be included in the new permit, which would require modifications to the existing lagoon system and perhaps a new treatment plant to adequately remove the ammonia.

Options the USAFA is evaluating include:

- Modifications to the existing aerated lagoon treatment system so the treatment plant would be compliant with ammonia standards.
- Connection to Upper Monument WWTP—The existing lagoon system of Academy W & SD would be replaced with a lift station and all wastewater would be treated at the Upper Monument WWTP. Abandonment of the lagoon system would take place after the lift station is completed.
- Connection to SU.

Fort Carson

Fort Carson is experiencing significant growth in facilities and personnel as a result of Base Realignment and Closure (BRAC) and Grow the Army (GTA) initiatives. As a result there will be a need to upgrade and expand the utility infrastructure in the cantonment area and Butts Army Air Field area. Design work is already underway to incrementally increase the rated capacity of the wastewater treatment facility. When this project is completed, the capacity of the plant will be sufficient to handle the projected growth. Impacts related to future requirements of the Clean Water Act and Colorado Water Quality Control Commission regulations cannot be predicted at this time.

Widefield Water and Sanitation District

The overall plant capacity will handle expected five-year growth. Possible upgrades and replacements to enhance current operations include: 1) Replacement of disinfection equipment; 2) upgrades of aerobic digestion facility; 3) addition of operations center; and 4) potential sludge de-watering facility. The Peaceful Valley Interceptor will be extended

during the five-year or ten-year outlook and two lift stations with gravity sewer line will be abandoned. Some expenditures are developer funded, however district capital improvements in the five-year outlook are expected to total roughly $3,600,000 in 2008 dollars.

It is estimated that the District will need to begin planning for plant expansion between 2012 and 2013 with the need of having expanded capacity online between 2016 and 2018. The plant is plumbed for 5.0 mgd and already has several processes that are built to accommodate expansion to 5.0 mgd. This is expected to include: additional equipment in headworks (already has 5.0 mgd hydraulic capacity); additional primary clarifiers; expansion of aeration basins or process conversion; addition of de-nitrification recycle if required (anoxic zones are already constructed), one additional final clarifier, conversion of disinfection to UV and addition of plant water system, double aerobic digestion/sludge handling capacity, and other upgrades in minor processes. Equalization facilities will also be necessary in the next five to ten years.

Within the next five years a re-rating of the organic capacity (this would not require physical construction) might be needed. There is a substantial discrepancy between the rated organic capacity and actual organic capacity. The actual organic load capacity is actually understated and noted so in the discharge permit.

At this time, the 20-year plan does not anticipate major expansions beyond 5.0 MGD plant capacity. However line extensions and plant upgrades would be expected in order to keep pace with changing discharge requirements. No accurate capital cost estimates other than annual allocations for beyond the 10-year outlook have been made.

Upper Monument Creek Regional WWTF

Expansion may be necessary by end of 2022. Other plant improvements may be necessary to address future effluent limits for nutrients and metals.

Cherokee Metropolitan District

Estimated five-year construction needs include:

- Completion of construction of new WWTP south of Ellicott; and
- Completion of construction of pump stations to divert wastewater to new Black Squirrel Wastewater Treatment Facility for treatment and use for aquifer recharge.

These issues are discussed in more detail in the Chico Creek Watershed Future Needs Assessment.

Fountain Sanitation District

Estimated five-year construction needs include:

- Continued implementation of the Wastewater Collection System Master Plan;
- Continued update of sewer use regulations, and design and construction regulation;
- Evaluate wastewater treatment facility capability improvements to address future effluent limits for nutrients and metals. Construction will be beyond the next five years;
- Finalize and implement biosolids management plan; and
- Continue implementation of District's financial management plan.

Security Sanitation District

Estimated five-year construction needs include:

- Design, permit, and construct full activated sludge process with processes to address nitrogen control;
- New digester gas handling system; and
- Added treatment for digester gas reuse.

Lower Fountain Metropolitan Sewage Disposal District

Estimated five-year construction needs include:

- Completion of construction of wastewater treatment facility and interceptor sewer;
- Continue regional planning with Colorado Springs Utilities.
- Provide service to existing and new members of the District.

8.3.3 Industrial

Colorado Springs Utilities (SU)

Springs Utilities maintains an approved industrial pretreatment program, which administers technically based local limits (incorporated into Colorado Springs City ordinances). The continued implementation of this program provides additional assurance that the water quality standards of Fountain Creek Segment 2 will be protected. Local limits for several pollutants have been developed (arsenic, cadmium, chromium, copper, lead, fluoride, mercury, nickel, zinc, selenium, and silver) in addition to narrative prohibitions against numerous additional wastes and wastewaters. The pretreatment program also oversees septic waste haulers and miscellaneous point source discharges to the wastewater collection system. The 2009 average industrial flows into SU total 2,340,668 gpd with 39,405 gpd being discharged to the JDPWRF and 2,301,263 discharging to the LVWWTF. The largest dischargers and their approximate average process flow (gpd) are: Atmel (two

buildings, 1280 and 1350): 1,164,308; Martin Drake Power Plant: 507,334; Sno-White Linen Services: 151,659; Sinton Dairy Foods Company, Inc.: 139,147; dPix: LLC; 107.

Industrial dischargers are also currently made to the Security Sanitation District and Tri-Lakes WWTF Systems. The Security Sanitation District has an approved pretreatment program and receives nonresidential wastewater from Schlage Lock Company and Eagle Picher Technologies. Schlage Lock Company is a categorical industry discharging treated electroplating wastewater to the district. Eagle Picher Technologies discharges groundwater remediation wastewater from its facility. The district has recently terminated an industrial discharge permit for Mobile Energy Products, a special battery manufacturer that has ceased operations in the district.

The Tri-Lakes WWTF receives treated industrial wastewater from Synthes Corporation, a metal finisher and electroplater that manufactures medical implant devises. The Tri-Lakes WWTF has a pretreatment program implemented through the sewer regulations of its joint use districts.

8.3.4 Utilities and Districts—Current Operations

Fountain Creek Watershed has the most dischargers and site application requests for expansion, lift stations, and modifications to existing facilities of any of the five watersheds in the Pikes Peak region.

Colorado Springs Utilities (SU)

SU owns and operates two WWTPs—Las Vegas Wastewater Treatment Plant (LVWWTP) and J.D. Phillips Water Reclamation Facility (JDPWRF), which are described in more detail below.

SU's Las Vegas Street Wastewater Treatment Plant

The SU's LVWWTP (Figure 8-4) is presently rated at a capacity of 65 mgd (January – February) and 75 mgd (March – December). Treatment consists of preliminary, primary, and secondary treatment. The treatment plant has two secondary treatment processes: an advanced wastewater treatment (AWT) process and a trickling filter/solids contact (TF/SC) process. The AWT plant is a single sludge nitrification/de-nitrification activated sludge biological process where ammonia nitrogen is oxidized. The TF/SC is a biological process where carbonaceous BOD and TSS are reduced. Both processes share a common chlorine contact chamber (CCT) where disinfection and de-chlorination take place. The UV disinfection processes are being constructed within one of the parallel chlorine contact basins. A 12-mgd tertiary treatment process is also located at the Las Vegas St. Wastewater

Treatment Facility (LVWWTF). This process filters and then chlorinates plant effluent for non-potable irrigation and other reclaimed wastewater uses.

All of the liquid stream treatment currently takes place at the Las Vegas Street WWTP and the solids treatment process is located at the Clear Spring Ranch Solids Handling and Disposal Facility (CSRSHDF). Sludge is conveyed to the CSRSHDF via an 18-mile single 14" pipeline. Treatment at the facility consists of eight anaerobic digesters, nine facultative sludge basins, two supernatant lagoons, and a dedicated land disposal area of 264 acres.

Wastewater treatment services for areas outside of city limits are provided under contract to the City of Manitou Springs, Peterson Air Force Base, Garden Valley, and Stratmoor Hills.

Ongoing planning activities include: a collection system expansion which will serve newly annexed and in-fill areas; a treatment facility upgrade which will accommodate new permit limits; planning for eventual service to the Jimmy Camp Creek basin and the remainder of the Sand Creek drainage basin; analysis of data and revision of the United States Geological Survey (USGS) stream monitoring program; water resource studies; transmountain water; and long-range planning for the future. Colorado Springs has a pretreatment program for industrial discharges within its service area. The plant discharges to the mainstem of Fountain Creek (Segment 2a) via the Fountain Mutual Irrigation Canal, located about one mile downstream from the Nevada Avenue Bridge.

SU's J.D. Phillips Water Reclamation Facility

The SU J.D. Phillips Water Reclamation Facility (JDPWRF) consists of a headworks with mechanical bar screens, aerated grit removal, primary settling basins, activated sludge aeration basins, final settling basins, tertiary filtration with UV disinfection for reuse and UV disinfection for effluent not going through the reuse portion of the facility, and influent and effluent flow measuring using Parshall flumes with ultrasonic sensors.

Biosolids removed at the JDPWRF are discharged to the Monument Creek Interceptor, which leads to the headworks of the LVWWTF. Biosolids are then removed at the LVWWTF and conveyed to the CSRSHDF as described above. The plant discharges to Monument Creek (Segment 6) south of Pikeview Reservoir.

Academy Water and Sanitation District

The Academy Water and Sanitation District (Figure 8-5) has a three-cell system with a permitted design capacity of 0.116 mgd. The facility discharges to Smith Creek (Segment 3) at the southern edge of the treatment facility. Upgrades to the treatment facility were

completed in 1994 and modifications were made to the aeration system in order to increase efficiency. Improvements were made to better control the carry-over of algae from the pond system to the effluent discharge. At this time it has a limited service area and growth within the service area is not expected to exceed the upgraded plant capabilities. It is surrounded by adjacent utility agencies or areas platted for use of OWS. Since Academy W & SD is near build-out, no significant change in population is expected.

Upper Monument Creek Regional Wastewater Treatment Facility
(Donala Water & Sanitation District, Forest Lakes and Triview Metropolitan Districts)
The Donala Water & Sanitation District (Figure 8-5) operates the Upper Monument Creek Regional Wastewater Treatment Facility, and effluent from Donala and the Triview Metropolitan District flows to the plant. This plant discharges to Monument Creek (Segment 6) at the southwest corner of the service area and Gleneagle golf course (reuse).

The developments associated with Forest Lakes and Triview Metropolitan Districts completed the construction of the Upper Monument Creek Regional Wastewater Treatment Facility in 1988. The facility was commissioned in 1995 and is used by Triview and Donala and operated by the Donala Water & Sanitation District. The current flow is approximately 0.8 mgd. The facility consists of an activated sludge system with nitrification and de-nitrification in a sequencing batch reaction system. Waste solids stabilization is accomplished in aerobic digestion. In addition, an up-flow filter system for denitrification and a multimedia filtration reuse system is in operation. Biosolids are dewatered on site and hauled to a landfill. The design capacity is permitted at1.75 mgd. Subsequent upgrades and expansions will be accomplished as loading dictates to reach an ultimate build-out capacity of approximately 2.7 mgd.

Tri-Lakes Joint Use Wastewater Treatment Facility
(Monument, Palmer Lake, and Woodmoor Water and/or Sanitation Districts)
The Tri-Lakes Joint Use Wastewater Treatment Facility (Figure 8-6) is jointly owned by the Palmer Lake Sanitation District, Monument Sanitation District, and Woodmoor Water and Sanitation District. The three districts negotiated and entered into a Joint Use of Facilities Agreement on June 6, 1996. This agreement addresses issues associated with the joint operation and ownership of the facility and its treatment capacity. Monument Sanitation District owns 19.79% of the 4.2 mgdcapacity, with Palmer Lake Sanitation District owning 15.93%, and Woodmoor Water & Sanitation District owning 64.29%. The facility was renamed Tri-Lakes Wastewater Treatment Facility in 1987 to reflect its use by these three entities. The facility discharges to Monument Creek (Segment 6) at the southern edge of the Tri-Lakes service area.

On December 1, 1997, the CDPHE issued a site approval which re-rated the existing plant capacity from 1.5 to 2.8 mgd. In addition, the site approval allowed the facility to be expanded to 4.2 mgd. The expansion added a third parallel treatment plant identical to the two existing trains. The treatment facility is an advanced wastewater treatment plant that consists of an activated sludge process that includes the screening, degritting, activated sludge treatment for the removal of BOD, nitrogen, and suspended solids; clarification; and UV disinfection. The facility also aerobically digests sludge and provides sludge storage prior to ultimate land disposal. The flows presently average 1.38 mgd.

United States Air Force Academy (USAFA)

The USAFA wastewater treatment facility (Figure 8-7) consists of an oxidation ditch, filtration system, and UV disinfection. The treatment facility is permitted for a maximum throughput capacity of 1.4 mgd based on a 30-day average. The facility is designed to treat 2.2 mgd. Based on all available planning, the treatment capacity is expected to suffice for all wastewater management needs for the foreseeable future. No future treatment expansions of the facility are proposed.

A pump station directs effluent from the treatment facility to a nonpotable reservoir system for irrigation use throughout the USAFA. The USAFA's treatment facility generally achieves near-zero discharge to local tributaries and Monument Creek (Segment 6) because of wastewater reuse through the USAFA's effluent recycle system. Any discharge to Monument Creek with treated effluent could occur if the nonpotable reservoirs are full, during emergency conditions, or when facility pumps are inoperable. The Academy's EPA-issued NPDES permit imposes the same effluent limitations irrespective of whether the discharge is to the nonpotable reservoirs or Monument Creek. The permit also addresses treated wastewater irrigation management.

Cherokee Metropolitan District (CMD)

The CMD (Figure 8-8) treats municipal, commercial, and industrial wastes generated within its service area, which is located immediately north of Peterson Air Force Base. The treatment facility consists of a 2.0 mgd multi-cell aerated lagoon system followed by chlorination facilities. Effluent is discharged to Fountain Creek (Segment 2a) via the East Fork of Sand Creek, 300 yards west of the north entrance to Peterson AFB, and sludge is presently stored onsite in two lined lagoons. The relocation of the Cherokee Wastewater Treatment Facility to the Upper Black Squirrel Subwatershed is discussed under the

future needs assessment for the Chico Creek Watershed (Section 9.3.2). The Black Squirrel WWTF (BSWWTF) is expected to be on-line the third quarter of 2010. Until the BSWWTF commences operation, the existing CMD facility will discharge to the East Fork of Sand Creek, and after 2010 it will discharge to the Upper Black Squirrel alluvial aquifer. In future updates of the 208 Plan, when CMD facility no longer discharges to the Fountain Creek Watershed, it will be discussed under Point Source Dischargers in the Chico Creek Watershed.

Cheyenne Mountain Estates–Broadmoor Park (Formerly Broadmoor Village Park Properties)

The wastewater treatment facility (Figure 8-9) is active and consists of a 0.06 mgd extended aeration plant with a lined polishing pond and chlorination facility. The facility discharges to a dry gully above a drainage that ends on the Fort Carson property (Segment 4). The serviced population (about 350) is not expected to change.

United States Army/Fort Carson

Fort Carson's existing wastewater treatment facility (Figure 8-10) consists of preliminary treatment (coarse screening, aerated grit and grease removal, fine screening, flow measurement, and aerated flow equalization), secondary treatment (activated sludge aeration and secondary clarification), and tertiary treatment (filtration and ultraviolet light disinfection). The facility discharges to Clover Ditch (Segment 4) about one mile upstream of its confluence with the mainstem of Fountain Creek.

The facility was rated for 3.02 mgd but due to base population growth and construction of new facilities, design work is underway for modifications to re-rate the facility for 4.0 mgd. When this project is completed, the capacity of the plant will be sufficient to handle the projected growth. Impacts related to future requirements of the Clean Water Act and CWQCC regulations cannot be predicted at this time. The Fort Carson wastewater treatment facility receives pretreated wastewater from the adjacent industrial wastewater treatment facility, as well as sanitary and pretreated industrial wastewater from the nearby USAF Cheyenne Mountain Air Station.

Security Sanitation District

The Security Sanitation District (Figure 8-11) is in need of plant improvements for additional treatment of many parameters for the new NPDES permit. These are metals, ammonia, nitrate removal, and sludge handling. The design capacity of 2.4 mgd for the plant should be enough for build-out of the district. The current flow is about 1.27 mgd. Plans are being made for treatment system modifications to enhance treatment capability

in the exiting site. Capital improvement costs are expected to be in the range of $5–7 million. Currently, Security is in the concept and design phase, and initial phased improvements commenced in 2009. Two lift stations - River Bend development and Waterview development - are expected in Phase 2. The Waterview development has installed a 12" outfall sewer across Grinnell Blvd. and down Bradley Rd. to the existing Windmill Gulch outfall. The facility discharges to the mainstem of Fountain Creek (Segment 2a) via a discharge location 3,000 feet upstream from the Carson Boulevard Bridge.

Widefield Water and Sanitation District

The Widefield Wastewater Treatment Facility (Figure 8-11) is an activated sludge facility rated at 2.50 mgd hydraulic capacity. The plant is master-planned and partially plumbed to accommodate expansion to 5.0 mgd (the headworks can be expanded to 5.0 mgd rating with only additional "equipping"). Headworks facilities and other plant elements, including some major yard piping, have been constructed to accommodate a 5.0 mgd capacity. The site is capable of supporting additional future expansions of up to 10–12 mgd total capacity. The facility discharges to the mainstem of Fountain Creek (Segment 2a) via a discharge location about 0.25 miles downstream from the Highway 16 Bridge.

The two primary clarifier units are operated in parallel and have a total rated capacity 2.5 mgd each. Splitter box and yard piping are upsized for additional units for a total capacity of 5.0 mgd. The aeration basins consist of two parallel rectangular basins that have a total capacity of 2.5 mgd each. An anoxic zone basin is in place that could be converted to de-nitrification with addition of recycle.

Full duplication of capacity exists in final clarification, two circular units each with 2.5 mgd capacity. The current disinfection is gas chlorination with gas dechlorination. The primary and secondary sludges are blended and thickened to between 5% and 8% for digestion. Aerobic digestion occurs in three tanks with static tube mixer/aerators. Sludge storage can be accomplished in three steel tanks provided by the contracting agency providing sludge disposal.

Fountain Sanitation District

The Fountain Sanitation District (Figure 8-12) treats wastewater from the City of Fountain and surrounding areas. Wastewater is also accepted and treated from Colorado Centre Metropolitan District and the Pikes Peak International Raceway through contractual arrangements. The facility discharges to the mainstem of Fountain Creek (Segment 2a) via a discharge location at the southern edge of the treatment facility.

The wastewater treatment facility uses the extended aeration activated sludge process, which includes: screening, grit removal, secondary sedimentation, disinfection by ultraviolet radiation, post-aeration, aerobic sludge digestion, and sludge dewatering (drying beds) with on-site sludge storage for eventual off-site disposal. The facility has been designed for the maximum month average daily flow of 1.904 mgd. Influent sewers, channels, and process piping that carry full plant flow have been designed with a hydraulic capacity of 5 mgd to facilitate future expansion. In 2000, the Little Ranches Pump Station was upgraded to provide expanded capacity.

Lower Fountain Metropolitan Sewage Disposal District (LFMSDD)

The Lower Fountain Metropolitan Sewage Disposal District (Figure 8-12) is a metropolitan sewage disposal district (CRS 32-4-501 et seq) with the Colorado Centre Metropolitan District (CCMD) and the Fountain Sanitation District (FSD) as members. The CCMD consists of approximately 4,100 acres and the majority of this land—over 3,500 acres—was annexed to the City of Colorado Springs in 1989 and consequently is served by CSU. CCMD owns and operates a sewer collection and transmission system and contracts with FSD for treatment service. The CCMD will obtain treatment and interceptor sewer conveyance service from the LFMSDD when that plant commences operations in 2011.

The LFMSDD began planning for wastewater facilities in 1985. Although site approval was given for a treatment plant and interceptor and construction documents were prepared, construction of those facilities was not accomplished because development activity did not require those services at that time. The LFMSDD will serve a portion of the Jimmy Camp Creek Basin, providing interceptor sewer service and treatment service to its members from those specific service areas.

The FSD cannot accommodate wastewater treatment facility needs for build-out of its service area on its existing treatment plant site. The FSD has elected to provide that capacity through its membership in the LFMSDD, located on the property owned by the LFMSDD adjacent to and south of Birdsall Road and east of Old Pueblo Road.

Based on current and projected development in the service areas of its members, the LFMSDD plans to implement operation of a wastewater treatment facility in 2011 having a capacity of 2.5 mgd. LFMSDD will operate an activated sludge system with biological nitrogen control. Discharge will be to the drainageway downstream of Calhan Reservoir at a point approximately 1.8 miles upstream from the unnamed drainageway's confluence with the mainstem of Fountain Creek.

Major Point Source Service Area Maps

A summary of point source data is presented in Table 8-5, which shows information obtained from the treatment facilities. Service area maps show projected service area boundaries for each facility previously described. The background of these maps is Google Earth satellite imagery which was last updated in September 2005. Major point source discharge locations are shown on the service area maps.

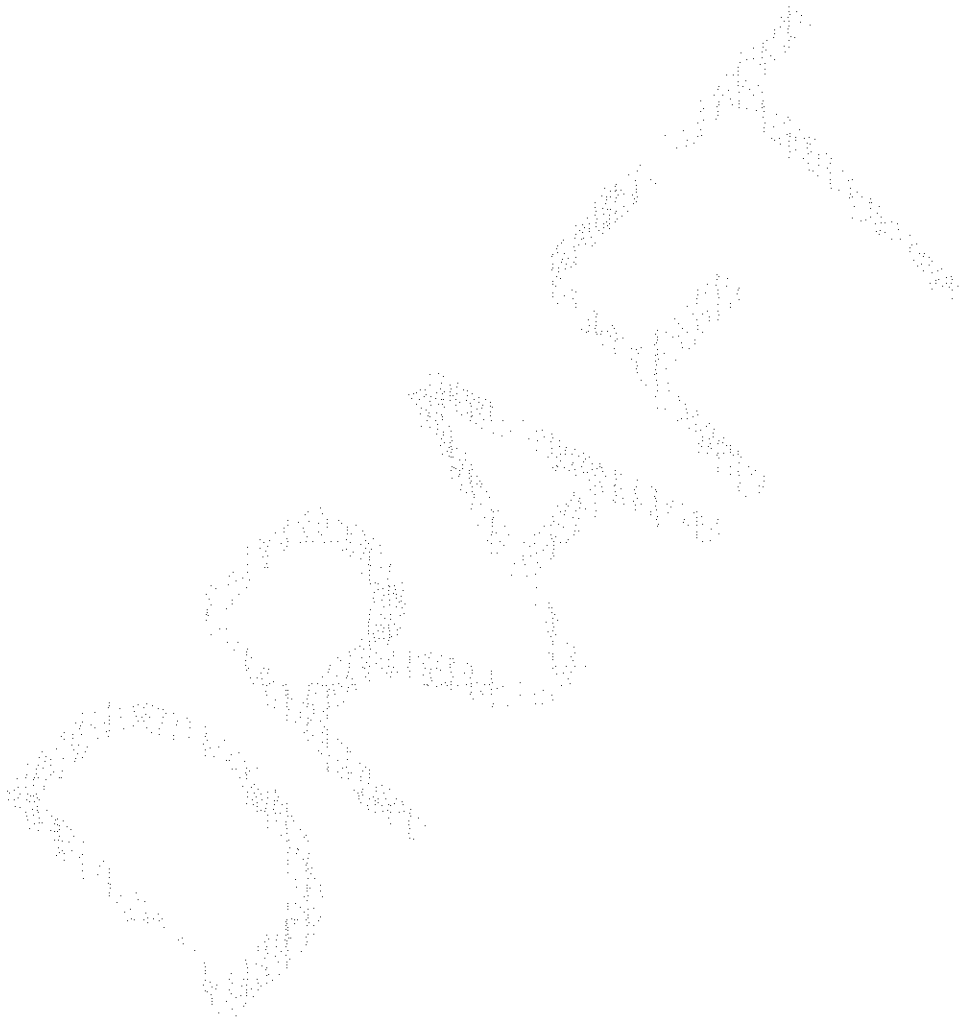


Table 8-5: Fountain Creek Watershed NPDES Information

	Fountain Creek Segment COARF002a						
	CSU Las Vegas WWTP	Cherokee Metropolitan District[3]	Fort Carson	Fountain Sanitation District	Security Sanitation District	Lower Fountain Metropolitan Sewage Disposal District	Widefield Water and Sanitation District
NPDES Permit #	CO-0026735	CO-0024457	CO-0021181	CO-0020532	CO-0024392	Permit Pending	CO-0021067
Permit Expiration Date	1/31/2011	6/30/2012	9/30/2010	1/31/2008	1/31/2008	Permit Pending	1/31/2008
Flow (MGD)	65/75 (Jan. - Feb. / March - Dec.)	2.00	4.00	1.90	2.40	2.50	2.50
Existing Load (MGD)	41.8	1.33	1.20	1.25	1.27	0.00	1.40
Year at 80% Design	2006	2010	2025	2020	2022	2020	2016
Year at 95% Design	2015	2015	2030	2025	2025	2025	2018
Organic (lbs/day BOD_5)	238,000	3,400	6,600	5,808	5,230	7,610	4,170
Existing Load (lbs/day BOD_5)	88,402	2,223	2,600	3,252	2,940	0	2,993
Year at 80% Design	2006	2010	2025	2020	2022	2020	2016
Year at 95% Design	2015	2015	2030	2025	2025	2025	2018
30-day avg / 7-day avg							
BOD or CBOD	30 / 45	25 / 40	30 / 45	25 / 40	30 / 45	30 / 40	25 / 40
Total Suspended Solids	30 / 45	75 /110	30 / 45	30 / 45	30 / 45	30 / 45	30 / 45
Fecal Coliforms, #/100 ml	200 / 400	2000 / 4000	NA	200 / 400	2,206 / 4,412	200 / 400	6,000 / 12,000
E. coli	126 / 252	NA	126/252	126 / 252	NA	NA	NA
Total Residual Chlorine, mg/l [1]	NA / 0.012	NA/ 0.5	NA	0.218 / 0.223 / NA	N/A / 0.21	N/A / 0.077	N/A / 0.077
Total ammmonia as N, mg/l 30-day avg / daily max							
January	5.3 / 10	NA	NA	Report/Report	Report/Report	**17.2 / N/A / N/A**	Report/Report
February	5.3 / 6.8	NA	13.6 / NA	Report/Report	9.8 / Report	(Note minimum 30 day	9.8 / Report
March	3.6 / 4.6	NA	12.5 / 18	25 / Report	8.6 / 12	avg in July; all other	8.6 / 12
April	4.1 / 7.0	NA	20 / NA	19 / Report	13.3 / Report	30 day avgs. greater	13.3 / Report
May	4.7 / 5.3	NA	23 / NA	12 / Report	12 / 20	than 25 mg/l; all daily	12 / 20
June	5.3 / 10.0	NA	28 / NA	20 / Report	14 / Report	max (acute limit)	14 / Report
July	4.7 / 12	NA	NA	18 / Report	16 / Report	greater than 40 mg/l	16 / Report
Aug	3.9 / 12	NA	NA	21 / Report	18 / Report	as determined by	18 / Report
Sept	3.2 / 10	NA	NA / 26	Report/ Report	22 / Report	AMTOX model prepared	22 / Report
October	5.1 / 7.2	NA	NA	21 / Report	15.2 / 15.2	by GMS Feb 2007)	15.2 / 15.2
November	4 / 8.9	NA	NA	19 / Report	24 / Report		24 / Report
December	5.2 / 10	NA	NA	20 / Report	Report / Report		Report / Report
Metals (Conc in ug/l) 30-day avg / daily max							
Copper, PD	20	Report / NA / Report (**until 4/30/2010**); 24 / NA / 38 (**beg 5/1/2010**)	Report	368 / 377	Temp Mod - Type iii (exp 12/31/2012) of 137/117, limit as of 1/1/2013 wil be 24/38	NA	24 / 38
Mercury, Total	0.011	Report / NA / Report (**until 4/30/2010**); 0.011 / NA / Report (**beg 5/1/2010**)	Report	0.2 / No acute std.	0.011/Report	NA	Report / Report
Selenium	NA	NA	Report	8. 0 / 127	5.9/19	NA	NA
Iron , TR	NA	NA	2,690	2,690 / No acute std.	NA	NA	NA

Footntoes

[1] Reported as 30-day avg / daily max

[2] Minor Wastewater Plant Provider

[3] Construction of new facility should be completed by 2010 (permit limits must be attained by April 30, 2010 at new facility)

	Fountain Creek Segment COARF004		Fountain Creek Segment COARF006			
	Academy Water and Sanitation District	Cheyenne Mountain Estates/Broadmoor Park	CSU JD phillips Water Recl Facility	Upper Monument Creek Regional WWTF	Tri Lakes WWTF	U.S. Air Force Academy
NPDES Permit #	COG-589020	COG 582000	CO-0026735	CO-0042030	CO-0020435	CO-0020974
Permit Expiration Date	10/31/2010	7/31/2004	5/31/2011	8/31/2006	12/31/2009	12/31/2005
Flow (MGD)	0.116	0.06	20	1.75	4.2	1.4
Existing Load (MGD)	0.05	0.03	4.81	0.8	1.38	0.9
Year at 80% Design	2025	2020	2025	2018	2020	2020
Year at 95% Design	2030	2025	2030	2022	2025	2025
Organic (lbs/day BOD_5)	375	100	51,374	3,553	5,600	4,386
Existing Load (lbs/day BOD_5)	220	70	0	1,167	2,317	1,900
Year at 80% Design	2010	2020	2025	2018	2020	2020
Year at 95% Design	2015	2025	2030	2022	2025	2025
30-day avg / 7-day avg						
BOD	30 / 45	30	20	25 / 40	30 / 45 / N/A	25
Total Suspended Solids	75 / 110	30	25	30 / 45	30 / 45 / N/A	10
Fecal Coliforms, #/100 ml	200 / 400	2000	30	N/A	200 / 400 /NA	N/A
E. coli	NA		140	163 / 326	NA	
Total Residual Chlorine, mg/l [1]	Report / 0.5	N/A	0.014	N/A	0.011 / NA / 0.019	N/A
Total ammmonia as N, mg/l, 30-day avg / daily max				Report till 12/1/14		
January	NA	NA	7 / 7.7	5.4 / 22.0	Report / Report	NA
February	NA	NA	7.3 / 8.8	5.4 / 22.0	Report / Report	NA
March	NA	NA	6.8 / 9.8	5.4 / 26.0	Report / Report	NA
April	NA	NA	6.2 / 12	6.9 / 35.0	Report / Report	NA
May	NA	NA	4.5 / 12	3.0 / 32.5	Report / Report	NA
June	NA	NA	4.5 / 15	3.8 / 32.5	Report / Report	NA
July	NA	NA	4.5 / 14	3.3 / 34.5	18 / NA	NA
Aug	NA	NA	4.5 / 14	2.9 / 35.5	17 / NA	NA
Sept	NA	NA	4.8 / 13	3.3 / 32.5	22 / NA	NA
October	NA	NA	5.5 / 11	3.3 / 32.5	Report / NA	NA
November	NA	NA	5.3 / 9.2	4.1 / 20.0	Report / NA	NA
December	NA	NA		5.1 / 21.0	Report / NA	NA
Metals (Conc in ug/l) 30-day avg / daily max						
Copper, PD				Report / Report	24.8 / 36.4	
Mercury, Total				Report / NA	Report / Report	
Selenium				Report / Report	Report / Report	
Iron , TR				Report / NA	Report / NA	

Footntoes

[1] Reported as 30-day avg / daily max

[2] Minor Wastewater Plant Provider

Figure 8-4: Colorado Springs Utilities Service Area

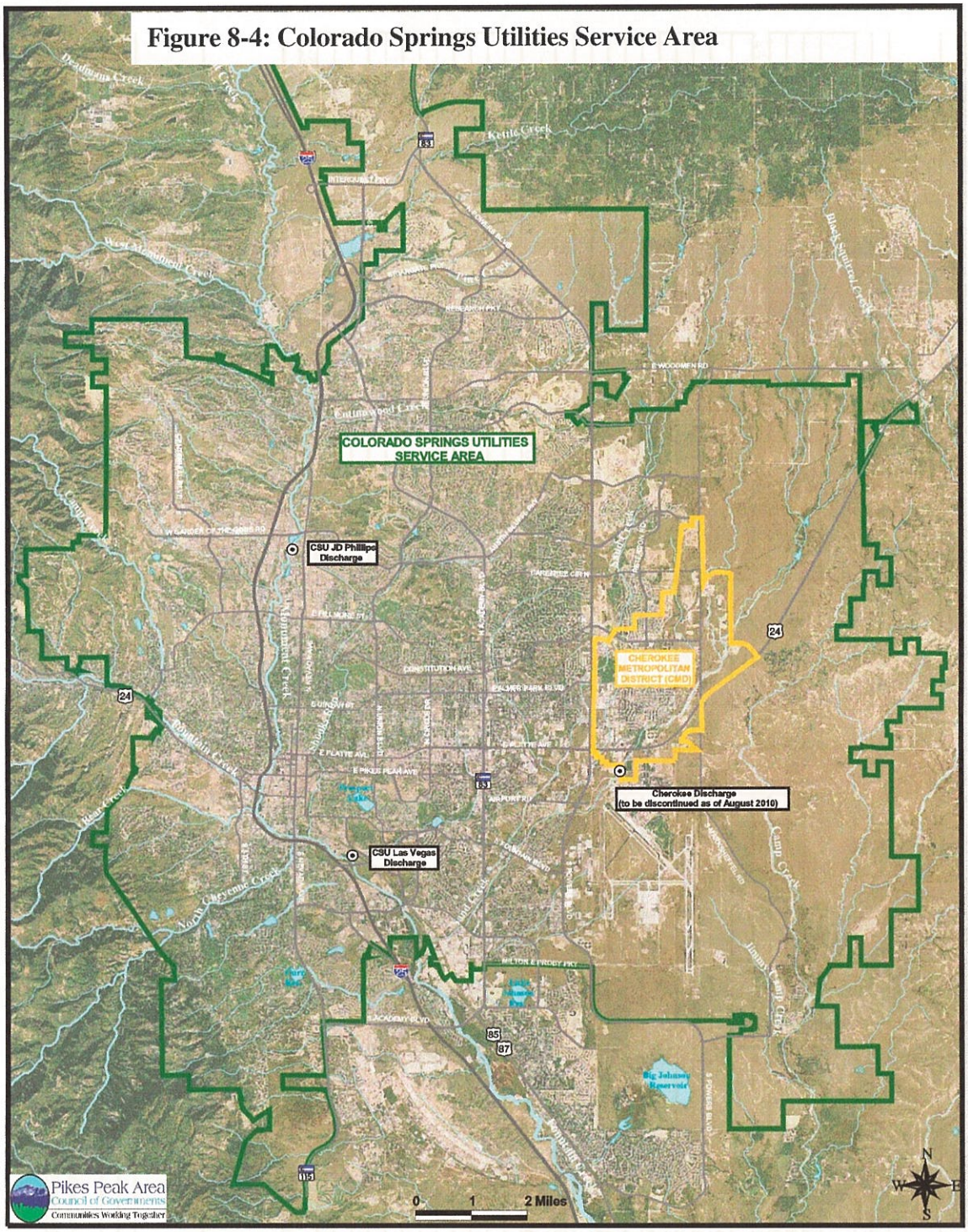


Figure 8-5: Academy Water and Sanitation District and Upper Monument Creek Regional WWTF

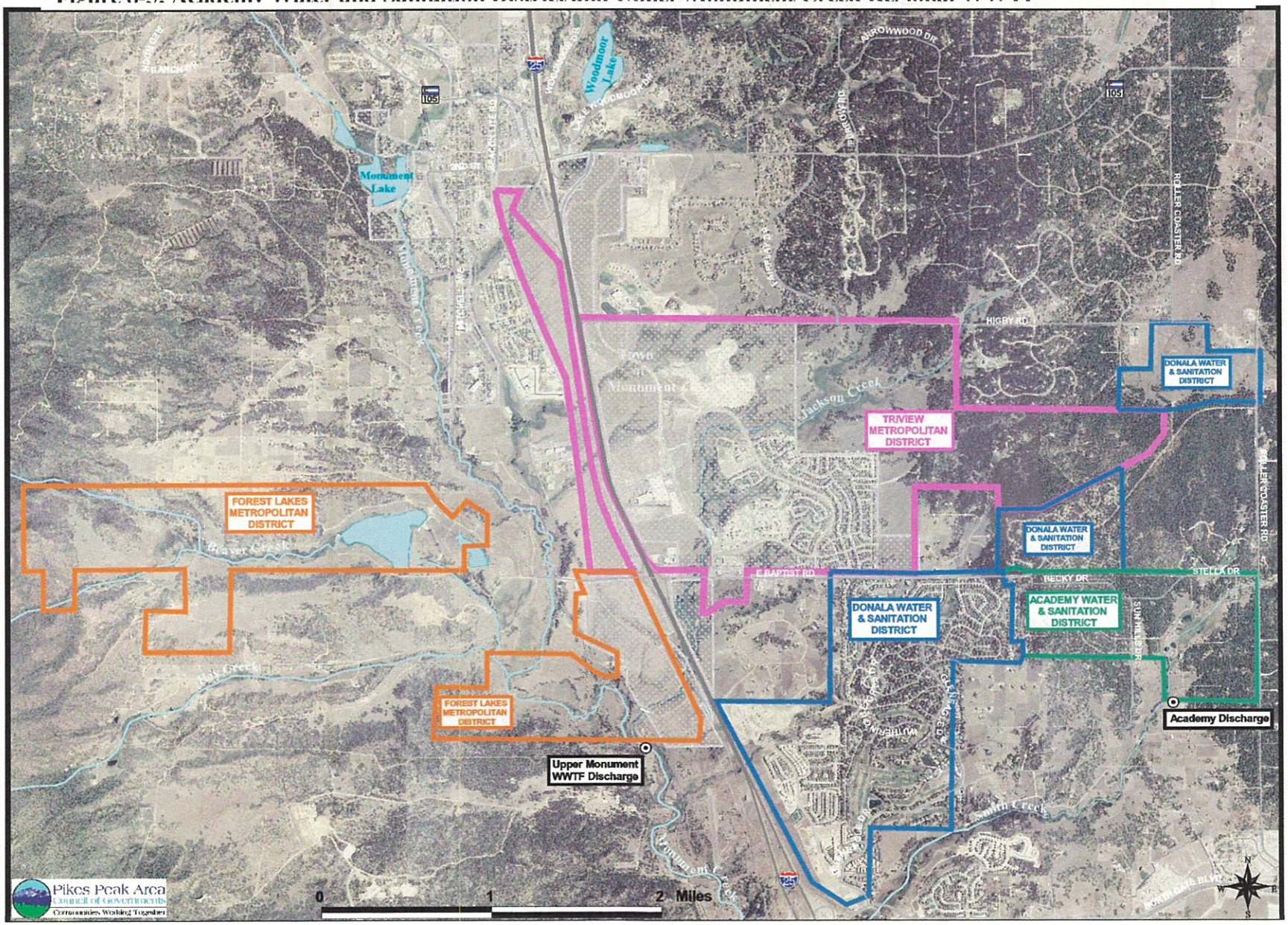


Figure 8-6: Tri Lakes Joint Use WWTF

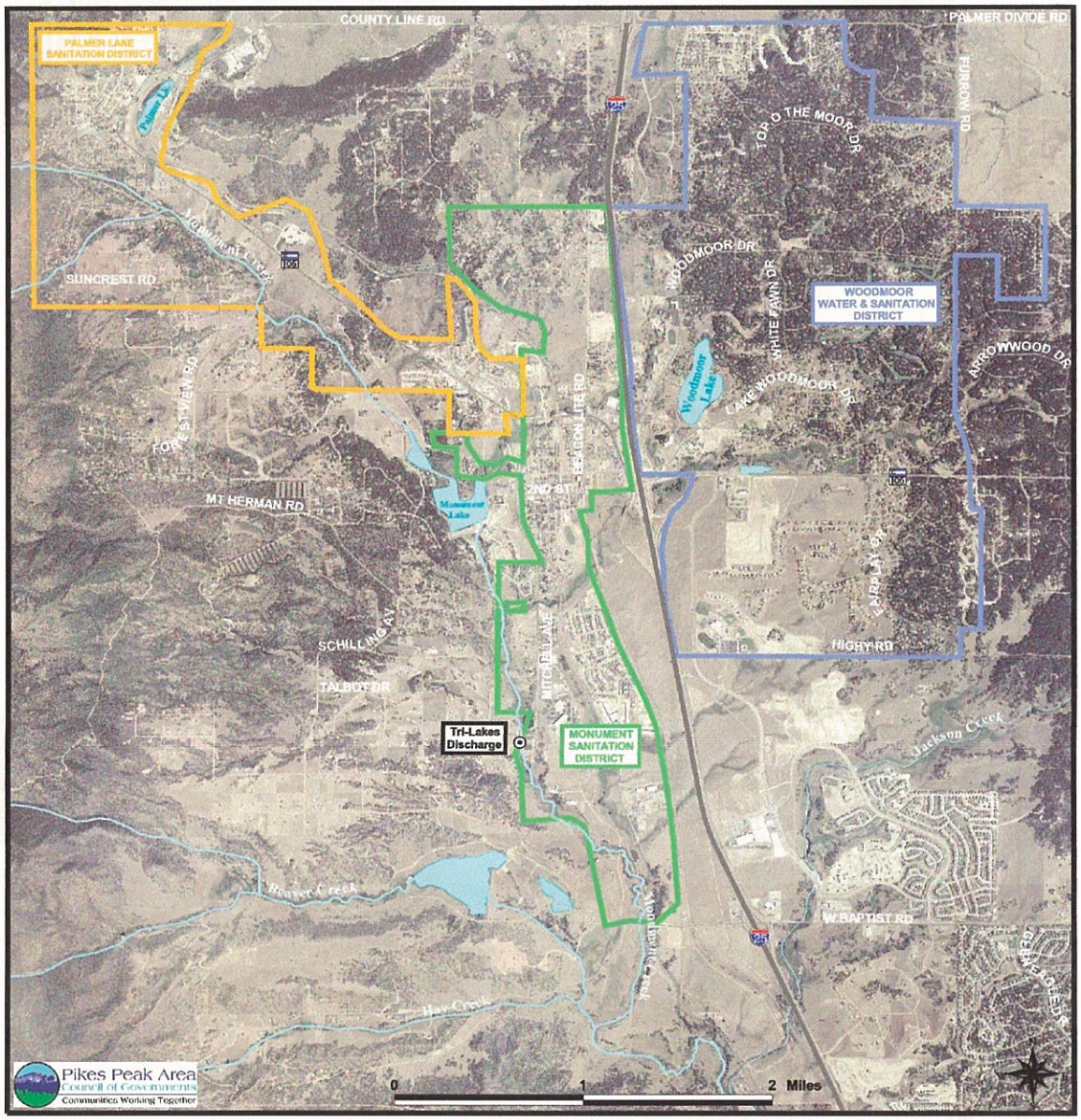


Figure 8-7: United States Air Force Academy

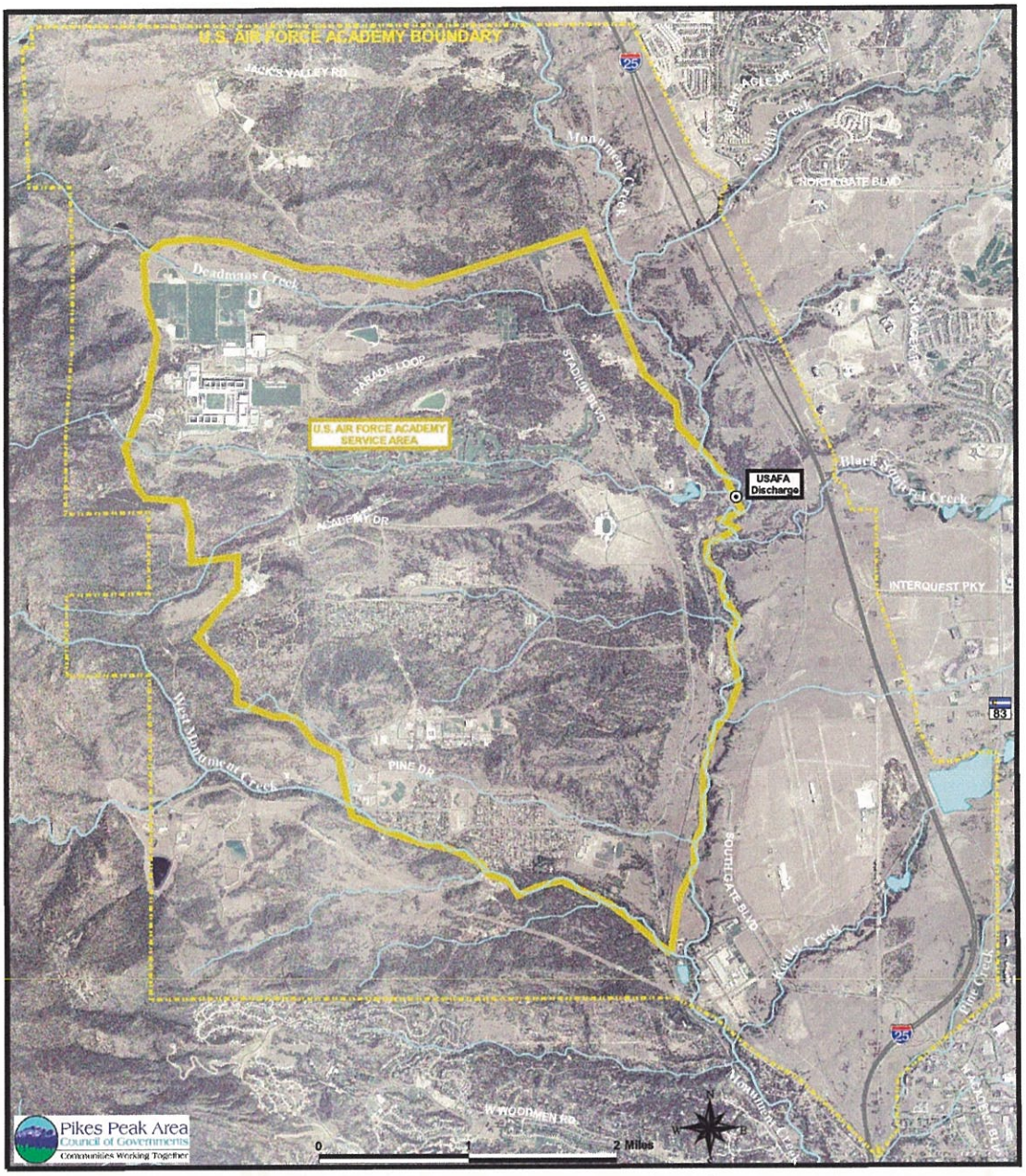


Figure 8-8: Cherokee Metropolitan District

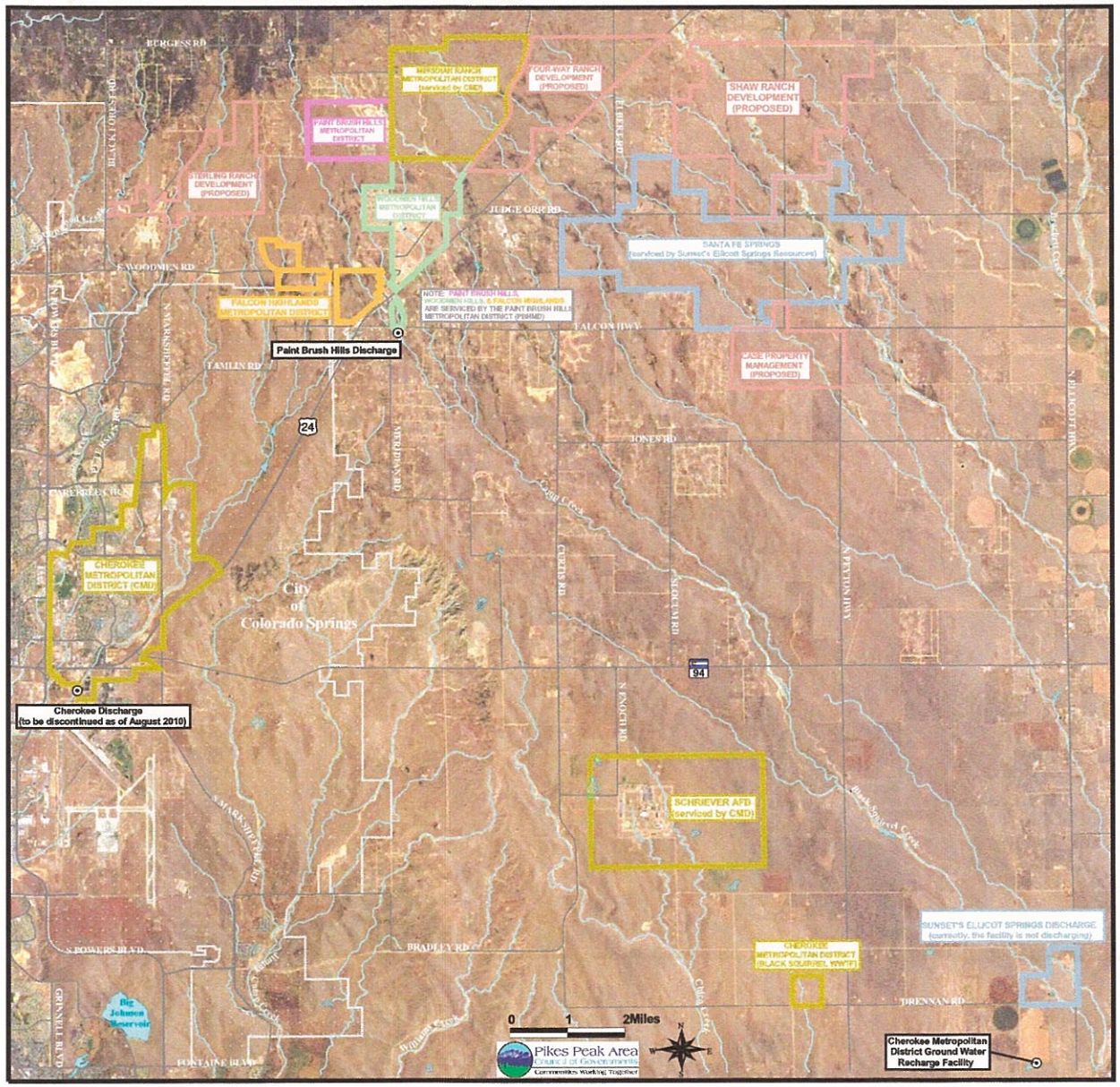


Figure 8-9: Cheyenne Mountain Estates – Broadmoor Park WWTF

Figure 8-10: Fort Carson Service Area

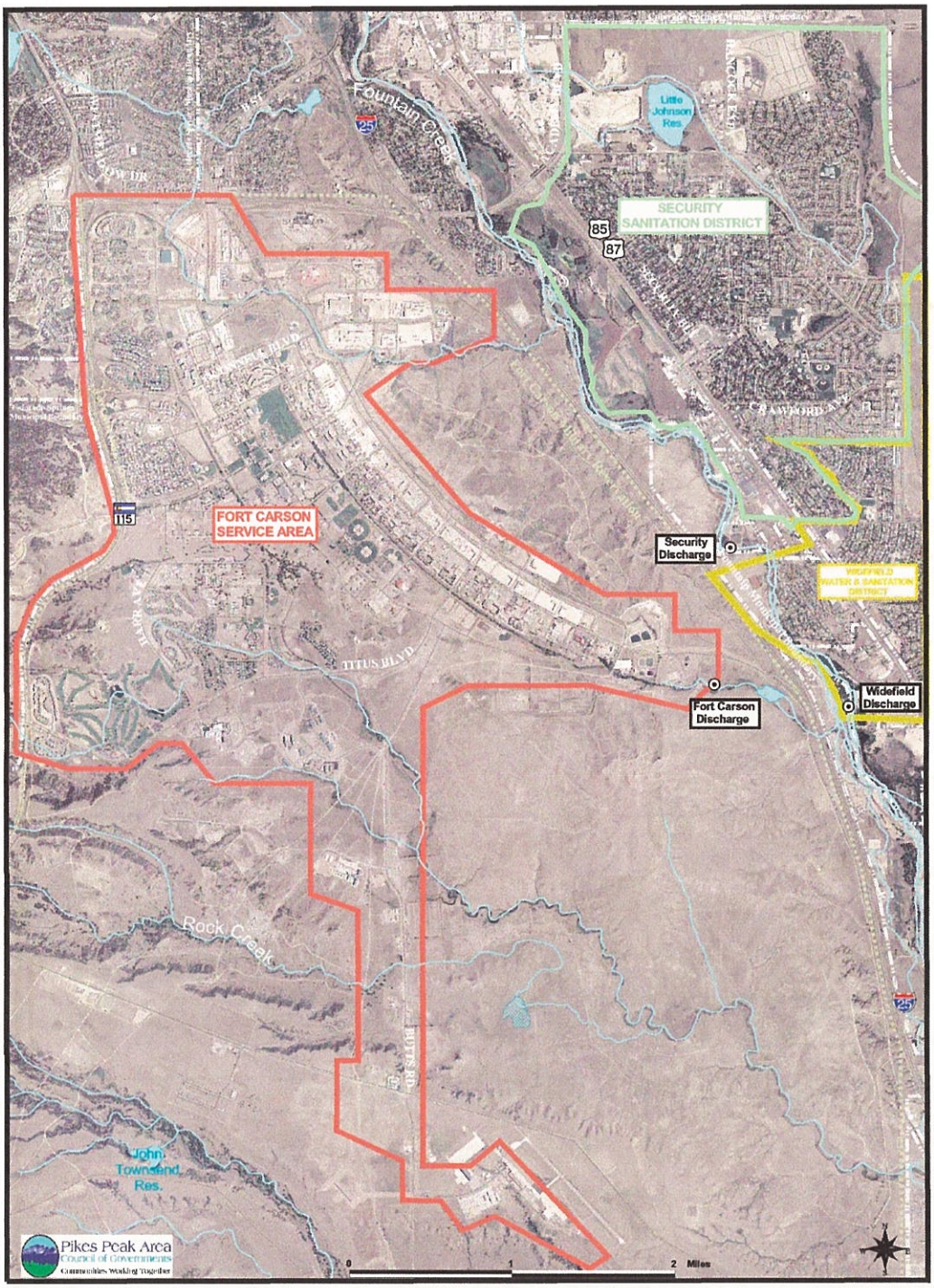


Figure 8-11: Security Sanitation District and Widefield Water and Sanitation District Service Areas

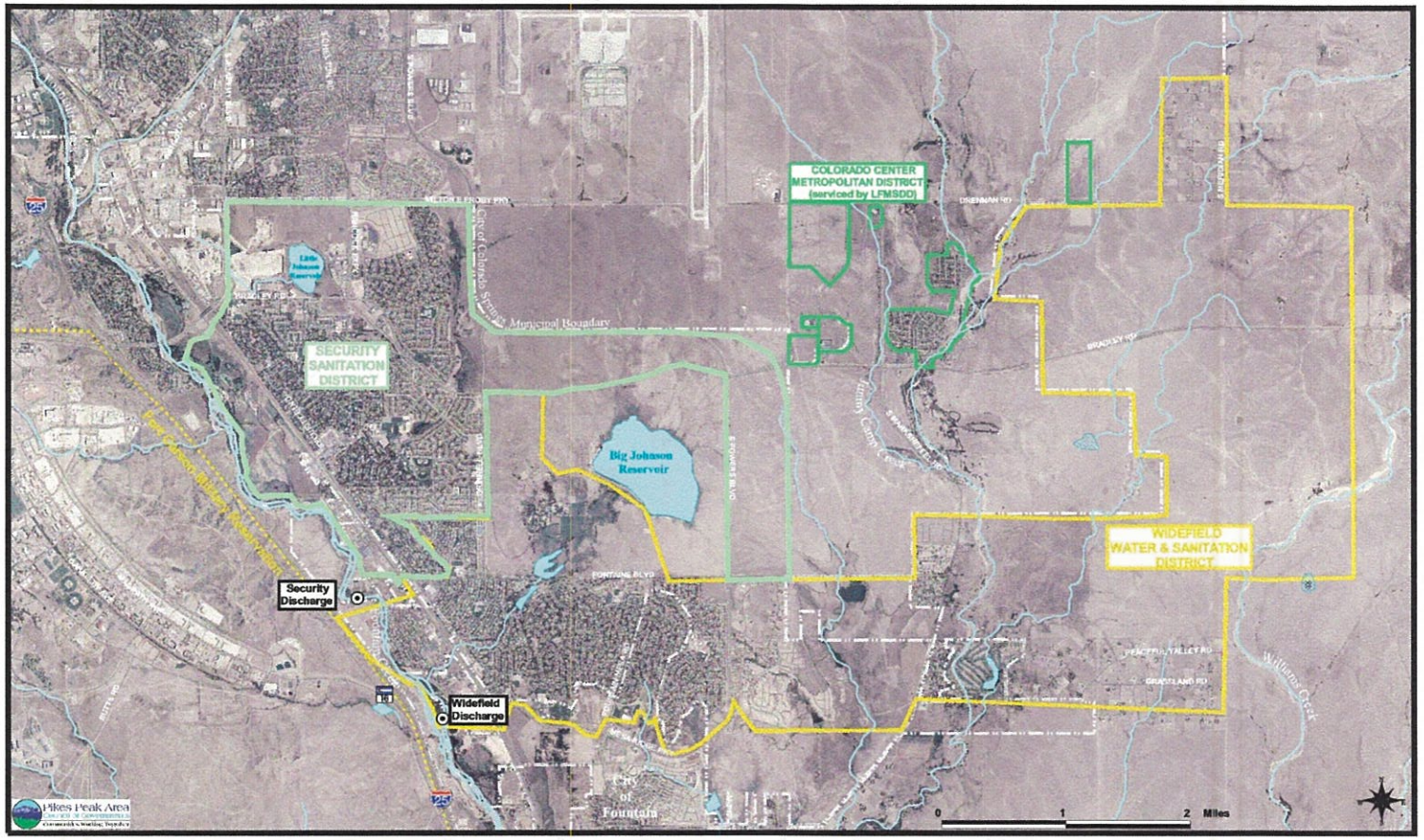
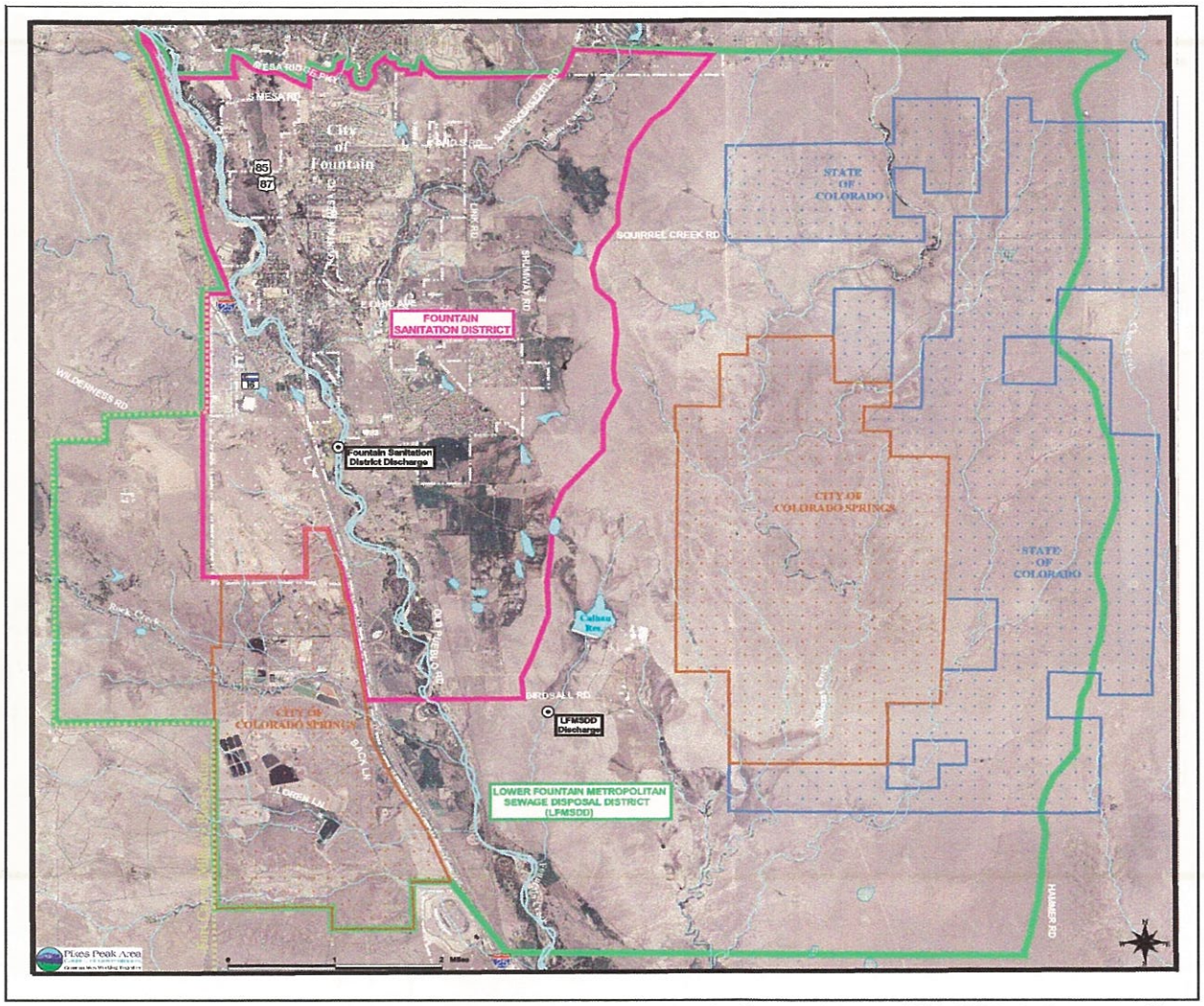


Figure 8-12: Fountain Sanitation District and Lower Fountain MSDD



Note: The portion of Colorado Centre Metropolitan District which is also serviced by LFMSDD is shown on Figure 8-11 on the previous page.

8.4 Nonpoint Source Assessment

This section will explain what the nonpoint source problems are and what is currently being done to control and mitigate their impact.

8.4.1 Agricultural Runoff

The most heavily impacted stream segments in El Paso and Pueblo Counties with respect to agricultural nonpoint source pollution are Fountain Creek Segments 2a and 2b. The two forms of agricultural nonpoint source pollution that are the most pervasive in Fountain Creek are total dissolved solids and sediment.

BMPs used to address total dissolved solids include the use of measures to increase the efficiency of irrigation water application and reduce irrigation water losses through seepage; collection and disposal of saline agricultural return flows; and desalination of drainage water from irrigated crop land. With regard to sediment, BMPs include the promotion of such techniques as contour cropping, strip cropping, field diversions, terracing, and waterway stabilization. These BMPs, along with others, are discussed in the Colorado's Nonpoint Source Management Program (CDPHE-WQCD, 2000). Future projects will look at the possibility of developing pilot projects and grants to determine the effectiveness of these programs.

8.4.2 Resource Extraction

A past extraction area in the Fountain Creek Watershed that has the potential to affect water quality is the former tailings pile for a gold refinery, referred to as Gold Hill Mesa, located just upstream from the confluence with Monument Creek. Ore from the mines in Cripple Creek and Victor were processed at this location. Gold Hill Mesa is located in Colorado Springs (El Paso County), and the Cripple Creek and Victor Gold Mining operations are located in Teller County. Gold Hill Mesa is 0.42 square miles in size and is located on the southern stream bank of Fountain Creek (Segment 1), between 8th and 21st Streets, approximately half a mile upstream from the confluence with Monument Creek, Gold Hill Mesa is being developed under an approved plan through the Colorado Voluntary Cleanup Program. The City of Colorado Springs approved a plan for a traditional neighborhood in the area with a soil cap over the tailings. Water quality monitoring performed by the USGS has identified that a source of trace elements exists between the monitoring stations located at 30th Street and 8th Street along Fountain Creek. These monitoring stations are upstream and downstream of Gold Hill Mesa, respectively.

8.4.3 Urban/Stormwater Runoff

Urban runoff can contain numerous pollutants from various sources. Driveways, streets, and parking lots are sources of oil, grease, and other materials from automobile operation and maintenance. Winter maintenance of roadways produces loadings of sand, salts, etc., that may be discharged to local streams. The desire for green lawns can result in excess fertilizer and pesticides running off and impacting water quality. Pet wastes and failing septic systems are sources of pathogens and pollutants such as nitrogen and phosphorus. Litter, debris, and occasional spills of chemicals used in commercial or industrial activities can be washed into streams.

Urban areas have greater impervious surfaces (roofs, streets, parking lots) to accommodate growth than do undeveloped areas where more infiltration into natural soils can occur. During precipitation events, flow greater than historical discharges and pollutants deposited on urban surfaces are more easily carried into streams. Historical flows in streams that have shaped channels are most often significantly increased after development and therefore new channel shapes and sizes appear in reaction to the increased quantity and energy in the stream. In addition, Fountain Creek is a highly erosive watershed and naturally carries high levels of sediment, particularly during storm events. Excessive sediments can impair streams by depositing on stream bottoms and damaging spawning habitat (reducing fish survival and growth rates), impair fish food sources, and fill in pools and habitats important to aquatic life.

NPDES (National Pollutant Discharge Elimination System) Phase I

A Municipal Separate Storm Sewer System (MS4) Permit (COS-000004) was issued to the City of Colorado Springs and became effective on October 12, 1997. The city is currently under a second reissued permit that originally expired in 2009 and has been administratively extended until the CDPHE re-issues the city's third permit. The City of Colorado Springs was the fourth city in Colorado to receive this permit, and it carries penalties of up to $27,500 per day per violation for noncompliance as a federal penalty and up to $10,000 per day per violation for state penalties. Jail terms are also possible for criminal noncompliance issues.

The goals and concepts of this permit are:

- Create an integrated citywide monitoring program;
- Document baseline stream health conditions through each of the monitoring components:

  - Develop baseline data of biological and physical integrity.
  - Document agradation/degradation of stream zones.
  - Document storm event and base flow sediment concentrations.
  - Document basin water quality data and participate in regional stormwater concerns.
- To the extent possible, evaluate impacts to the receiving waters and to tributary stream health from urban stormwater.
- Continue existing BMPs and develop new programs related to stormwater quality.
- Evaluate any changes in urban stormwater discharges that may be attributable to implementation of BMPs.

As part of the city's stormwater monitoring program, there are currently 21 locations used for water quality monitoring: six on Monument and Fountain Creeks and 15 on tributary sites.

NPDES (National Pollutant Discharge Elimination System) Phase II

In December 1999, the EPA promulgated the final Phase II NPDES stormwater regulation affecting cities/counties with populations between 10,000 and 100,000, and sites that have a maximum daily user population of at least 1,000 (Non-Standard MS4s). Permits for these communities in Colorado were initially issued in 2003. The Colorado Department of Public Health & Environment issued a General Permit for Stormwater Discharges Associated with MS4s. Phase II permits were reissued in 2008 to El Paso County, the City of Fountain, the City of Manitou Springs, the Town of Monument, the City of Pueblo, and Pueblo County. These communities, along with nonstandard (e.g., school districts and colleges) MS4 operators, are to have developed and implemented programs in six stormwater management areas:

1. Public education and outreach
2. Public participation and involvement
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction stormwater management
6. Pollution prevention/good housekeeping for municipal operations

The first Phase II permit term was March 10, 2003–March 9, 2008. The second permit term is March 10, 2008–March 9, 2013. Programs developed during the first permit term will continue with some additions and clarifications.

Drainage Criteria

The City of Colorado Springs and El Paso County *Drainage Criteria Manual* was developed in 1987 and revised in 1991 and 1994. Subdivision regulations include performance standards for drainage and erosion control, as well as the requirement that a drainage plan be submitted with final subdivision plans.

The City of Colorado Springs/El Paso County Drainage Board, consisting of seven members, acts as an advisory board to the City Council and Board of County Commissioners regarding subdivision codes and regulations relating to the drainage and control of flood and surface waters and the administration of subdivision storm drainage fees.

Drainage basin boundaries are defined throughout El Paso County. Prior to development in a basin, a Drainage Basin Planning Study (DBPS) should be completed. A DBPS identifies drainage improvements for the future needs of the entire basin and estimates the costs for common improvements. Studies should be updated on a regular basis, but due to a lack of funding, the only updates since Sand Creek Basin in 1995 are the Jimmy Camp Creek and Cottonwood Creek DBPS, which are currently ongoing. Due to the elimination of the City of Colorado Springs Stormwater Enterprise on January 1, 2010, these studies will be difficult to fund in the future.

The City/County Drainage Board, Colorado Springs City Council, and the El Paso County Commissioners must adopt each DBPS in their respective jurisdictions. A list of the Drainage Basin Planning Studies completed in El Paso County and the City of Colorado Springs is included in Appendix D of the Fountain Creek Watershed Plan (PPACG, 2003a).

As part of a DBPS, the costs of needed stormwater structures are estimated. Drainage fees are determined for each basin and collected from developers as property is platted so the costs are shared. Each jurisdiction has its own method of prorating the fees.

The city requires erosion control plans, and inspectors were hired in 2002 to monitor and enforce implementation. The county requires that a drainage report and erosion control plan be submitted with the preliminary plan. The City of Colorado Springs *Drainage*

Criteria Manual, Volume 2 (BMP Manual) became effective November 1, 2002, and addresses water quality and BMPs for development and post development. El Paso County adopted the *Engineering Criteria Manual* in 2004 and revised it with minor modifications in 2006 and 2008. Chapter 3: Drainage and Appendix I: Stormwater Quality Policy and Procedures address stormwater issues.

The City of Colorado Springs has developed specific criteria for development upstream of the U.S. Air Force Academy Property to address stormwater flows affecting the Academy. The goal is to make certain that stormwater facilities proposed for development occurring upstream of the Academy will function in conjunction with other facilities within the drainage and not increase peak flows above a specified frequency.

Streamside Overlay Ordinance

The Colorado Springs Streamside Ordinance was adopted by the Colorado Springs City Council in November 2002 and was modified in 2007. The ordinance is designed to protect the city's creeks and streams, and the ordinance regulates new developments within 100 to 200 feet of most waterways. This ordinance does not bar new development near streams but requires developments to be compatible with stream features. The ordinance precludes specific uses such as scrap yards, auto dealers, and parking garages from stream sides.

8.4.4 Construction Runoff

The two entities having the greatest concentration of storm drainage facilities and construction activity are the City of Colorado Springs and El Paso County. The potential for nonpoint source erosion-related impacts to Fountain and Monument Creeks is of particular significance based on proposed development. Major construction activity has occurred in the tributaries to Monument Creek east of the Air Force Academy, Cottonwood Creek, Sand Creek, and Jimmy Camp Creek sub-basins of the Fountain/Monument Creek drainage area. Construction runoff in these sub-basins may impact water quality in the mainstems of Monument and Fountain Creeks. Development is beginning in parts of the Black Squirrel/Chico Creek basins east of Colorado Springs.

Requirements for controlling development-related erosion in the City of Colorado Springs are covered by both policy and regulation.

- The drainage criteria require that each drainage report include erosion and sediment control plans during and after construction.

- The hillside overlay zoning ordinance, which covers areas steeper than ten percent and "sensitive areas," requires a grading plan to be submitted with the preliminary plan.
- Grading and erosion control plans are required when:
    - Any grading or construction within hillside areas (City Code, 7.3.504), or excavation or fill > 500 CY, or
    - Grading of a site with a platted acreage > 1 acre, or
    - Grading on any property with a natural slope > 8%, or
    - Any combination of the above three.

Financial assurances are required for all but the smaller sites. This requires the submission of a grading plan for review by City Engineering, which may require a bond to ensure completion.

El Paso County enforces erosion control plans and stormwater protection in unincorporated El Paso County. A performance bond is required for those items. Enforcement is also a problem with ordinances in Manitou Springs. A bond is not required and the proposed improvements are often incomplete.

Throughout the watershed, common problems that seem to hinder enforcement include requirements that are difficult to apply, and lack of staff for enforcement of operation and maintenance requirements.

8.4.5 Onsite Wastewater Systems (OWS)

Onsite Wastewater System (OWSs), also known as Individual Sewage Disposal Systems (ISDSs), include conventional septic systems and advanced treatment systems. The El Paso County Department of Health and Environment issues permits and inspects the installation of OWSs.

OWSs can provide good wastewater treatment if they are correctly designed, installed, and maintained. However, difficult soil conditions such has very rocky soils, high clay soils, or soils with a low permeability layer near the surface make the use of a conventional septic system challenging. In addition, poor maintenance, high water use, and old, undersized systems can cause OWS failure. System failure can lead to contamination of surface water and/or groundwater.

Traditionally, maintenance of an OWS has been the responsibility of the homeowner, who may not be aware of the importance and the methods of OWS protection and maintenance. The homeowner must recognize the importance of routine maintenance, especially regular septic tank pumping and not using more water than the system was designed to handle, as well as avoiding disposal of chemicals such as paint, bleach, oil, and grease through the wastewater system draining to the OWS. The importance of knowing the locations of septic tanks, leach fields, vents, and piping must be stressed, and accurate records of system maintenance must be kept.

Regular inspection of a septic system is necessary, and the ability to require system inspection, repair, or replacement may be needed by local governments in order to assure the success of BMPs programs. Several options for this are in use in other parts of the country. Small utilities can provide inspection and maintenance services. Other utilities own the OWS as well as providing services. Replacing OWSs with sewer and centralized treatment is another option. In addition, a wide range of advanced treatment systems can provide additional treatment of the septic tank effluent before discharge to the leach field.

Improved maintenance of OWSs begins with the education of homeowners concerning the limitations and basic operations of their systems. Homeowners need to be advised of the limited hydraulic capacity of an OWS and of its inability to deal effectively with certain substances such as caustic cleaning solutions and heavy loads of grease. Homeowners must know proper techniques for monitoring system performance, as well as instruction in recognizing early warning signs of system failure. El Paso County routinely issues more OWS permits per year than any other county in Colorado. It is estimated that there have been 15,000 approved onsite wastewater systems installed in El Paso County since 1966.

Communities do not have the organizational capacity to carry out a full-fledged program of education, inspection, and enforcement. PPACG is capable of providing direction for the educational elements of such a program but lacks the funding, authority, and capability to perform inspections or to undertake enforcement actions. Some homeowners who know of deficiencies in their systems are reluctant to participate in a voluntary program. Renewable OWS permits are now included in the 2007 revision of the Onsite Wastewater System Regulations and could be implemented if deemed necessary by the Board of Health.

Several alternatives have been discussed regarding the best institutional form for implementing a program of BMPs for OWS. The only general-purpose government

having jurisdiction in the area with the authority to implement a mandatory septic tank maintenance program is the El Paso County Board of Commissioners. There is a move within the CDPHE to encourage local health departments to consider developing performance-based OWS regulations in order to better protect water quality.

The El Paso County Department of Health and Environment has been in contact with the El Paso County Planning Department and is encouraged by talks of "cluster-type" residential development. This type of development could potentially have covenants that would require periodic OWS maintenance by residents. Programs that address the issues of failing onsite wastewater systems include a pilot program for licensing private firms to perform onsite wastewater system inspection, repair, and certification in lieu of the county health department; offering educational programs aimed at advising residents of water conservation and onsite wastewater systems maintenance techniques; and the temporary funding of an additional county environmental health specialist to initiate an inspection program.

El Paso County is conducting a study to determine the impacts, if any, of OWS effluent on groundwater quality, especially in the shallow alluvial aquifer in the Upper Black Squirrel drainage basin. The groundwater study results are important not only for current water users but also for the El Paso County Development Services Division, and ultimately the Board of County Commissioners, in order to make informed development decisions within these areas. Phase 1 of the study will be completed by the end of 2010. If high nitrate levels associated with OWS effluent is found, then recent revisions to the OWS regulations in El Paso County would allow for advanced treatment of onsite wastewater systems to be required if necessary to protect the health of the public. El Paso County's subdivision regulations limit the creation of new lots with OWSs to a minimum of 2.5 acres.

The CDPHE is currently in the process of OWS guideline revisions that if approved will have an impact on local health department OWS regulations. The primary focus of the guideline revisions is to establish OWS performance standards dependant on soil conditions of the site versus prescriptive standards that do not consider overall impacts on groundwater quality. All local health departments must revise their regulations within one year of the effective date of CDPHE guideline revisions.

8.4.6 Hydrologic Modification

Changes in a stream's flow regimes impact the stream's carrying capacity for sediment, increase eroding to stream banks, and affect water supply. Changes to the hydrologic regime occur through construction and operation of reservoirs and diversion ditches, check dams, riffle drop structures, and channelization of flows.

8.5 Water Quality Management Associations and Watershed Planning Groups

This section discusses wastewater operating agencies, management agencies/associations, and watershed groups/organizations in the Fountain Creek Watershed.

8.5.1 Wastewater Operating Agencies

The following organizations are recognized as wastewater operating agencies within the Fountain Creek Watershed. These agencies are responsible for controlling all aspects of the collection, treatment, and discharge of sewage or industrial concern, within their company's sphere of operation. Each of these operating agencies is discussed in further detail in Section 8.3, Fountain Creek Watershed Point Source Dischargers.

- Academy Water and Sanitation District
- Cheyenne Mountain Estates–Broadmoor Park
- Cherokee Metropolitan District
- Colorado Springs Utilities
- Fountain Sanitation District
- Fort Carson
- Lower Fountain Metropolitan Sewage Disposal District
- Security Sanitation District
- Tri-Lakes Wastewater Treatment Facility (Monument, Palmer Lake, and Woodmoor Water and Sanitation District)
- United States Air Force Academy
- Upper Monument Creek Regional Wastewater Treatment Facility (Donala Water and Sanitation District, Forest Lakes, and Triview Metropolitan Districts)
- Widefield Water and Sanitation District

8.5.2 Management Agencies/Associations

Within the Fountain Creek Watershed, there are three existing Water Quality Management Associations (WQMA):

- Upper Monument WQMA
- Mid Monument WQMA
- Lower Fountain WQMA

WQMAs were formed under a Joint Powers of Agreement, and specific authorities were given to the management associations under section 208(c)(2) of the Clean Water Act. All existing WQMAs were incorporated between 1977 and 1987. Because of this, the traditional role of the WQMAs has been in addressing point source rather than nonpoint source related problems and issues. Each WQMA has specific issues, policies, and planning activities based on the recommendations of the 208 Plan.

Upper Monument Water Quality Management Association (UMWQMA)

The Upper Monument WQMA was incorporated in December 1985 and meets bi-monthly to review and recommend actions on water quality issues pertaining to members, including the review of site applications in their area. The agency is also involved in the review of development projects, such as subdivisions that have the potential to impact water quality in its area. It is located entirely in the Monument Creek Subwatershed and borders Elbert and Douglas Counties to the north. Districts within the UMWQMA include Palmer Lake Sanitation District, Monument Sanitation District, Woodmoor Water and Sanitation District, Academy Water and Sanitation District, Donala Water and Sanitation District, Triview Metropolitan District, U.S. Air Force Academy, Town of Monument, and Town of Palmer Lake.

Mid Monument Water Quality Management Association

The Mid Monument WQMA incorporates most of the City of Colorado Springs urbanized area and is bordered by Upper Monument to the north, Lower Fountain to the south, Upper Fountain to the west, and eastern El Paso to the east. The City of Colorado Springs is the lead agency in the Mid Monument WQMA, and its relationship with other agencies is generally guided by contractual service agreements with the overlapping entities. It holds meetings on an as-needed basis.

Lower Fountain Water Quality Management Association (LFWQMA)

The Lower Fountain WQMA was incorporated in 1977 and meets monthly. This WQMA encompasses the southern portion of the Fountain Creek Watershed, which includes the mainstem of Fountain Creek. Entities within the LFWQMA include Fort Carson, Fountain Sanitation District, Security Sanitation District, Widefield Water and Sanitation District, Cherokee Metropolitan District, and the City of Fountain.

8.5.3 Watershed Groups/Organizations

Fountain Creek Watershed District

The Fountain Creek Watershed Flood Control and Greenway District (District) was established under Title 32 of the CRS. The boundaries, governance, powers, and duties of the district are established through this legislation. The district is governed by a Board of Directors consisting of a representative from El Paso County, City of Colorado Springs, City of Fountain, small municipalities in El Paso County, Pueblo County, City of Pueblo, Citizen of Pueblo County, Lower Arkansas Valley Water Conservancy District, and Community Advisory Group. A Technical Advisory Committee and Citizen Advisory Group provide input to the Board. The district is authorized to manage, administer, and fund the capital improvements necessary in the Fountain Creek Watershed to mitigate flooding, erosion, and sedimentation; address water quality issues; improve drainage; fund the protection of open space; and develop public recreation opportunities including open space. The district has land use authority in the 100-year floodplain on the mainstem of Fountain Creek, south of the City of Fountain in El Paso County, and north of the City of Pueblo in Pueblo County. Outside of this area, the District can provide input to public bodies on land use applications that have a direct or indirect impact to the watershed. The district has adopted the recommendations in the Army Corps of Engineers Study and Fountain Creek Watershed Strategic Plan. More information on these reports can be found at www.fountain–crk.org

8.5.4 Other Groups/Organizations and Authorities

El Paso County Water Authority

The El Paso County Water Authority was formed in 1997 to study groundwater quality and quantity and to explore future sources of water in the county. The El Paso County Water Authority includes municipalities and special districts located within El Paso County. The authority meets on a monthly basis and recently produced the *El Paso County Water Report* (Haleaska and Associates, 2002). The purpose of the report was to identify water demands, evaluate water sources to meet demands, identify issues in ability to meet demands, and provide recommendations to address issues.

Southeastern Colorado Water Conservancy District

(Note: the following text was taken from the website http://www.secwcd.org/.)

> The Southeastern Colorado Water Conservancy District was created under Colorado State Statutes on April 29, 1958, by the District Court of Pueblo,

Colorado, for the purpose of developing and administering the Fryingpan-Arkansas Project. The District extends along the Arkansas River from Buena Vista to Lamar, and along Fountain Creek from Colorado Springs to Pueblo, Colorado. The District consists of parts of nine counties deriving benefits from the project.

The District is the legal agency responsible for repayment of the reimbursable costs of the project. In addition to administering this repayment responsibility, the District makes supplemental water from the Fryingpan-Arkansas Project available for use by approximately 280,600 acres of irrigated land under various private and mutual ditch companies, and for use by the many municipal and domestic water suppliers who directly serve the District's approximately 600,000 constituents. The District is governed by a 15 member board representing the nine counties within the District. Each board member is appointed by the state's district court system. Director positions may also be elected if citizens petition the court for such an election. Members serve for four-year terms and are then subject to re-appointment.

Pikes Peak Regional Water Authority

(Note: The following text was taken from the authority website: http://www.pprwa.com/.)

The Pikes Peak Regional Water Authority was organized on January 10, 2007, through the adoption of an Intergovernmental Agreement executed by the members. Prior to its organization, the entity was known as the Palmer Divide Water Group. The Palmer Divide Water Group was dissolved upon the organization of the Pikes Peak Regional Water Authority. Like its predecessor, the PPRWA is a consortium of water providers serving the communities in northern El Paso County.

Members are: Cherokee Metropolitan District, Donala Water and Sanitation District, The Town of Monument, the Town of Palmer Lake, the City of Fountain, Woodmen Hills Metropolitan District, and Woodmoor Water and Sanitation District. Each of the members owns and operates water systems.

Fountain Creek Watershed Foundation

The Fountain Creek Watershed Foundation was formed as a mechanism to implement several of the recommendations made through the Fountain Creek Corridor Study, which can be found at www.fountain-crk.org

8.6 Conclusions and Recommendations

8.6.1 Conclusions

Conclusions drawn from a review of this Fountain Creek Watershed section of the 208 Plan include:

- Additional wastewater treatment needs are minimal. Sufficient capacity already exists at most of the wastewater treatment plants.
- Population trends appear to reflect an increase in growth throughout the watershed, an increase in stormwater runoff, and an increase in discharge of treated domestic wastewater.
- Solutions must incorporate a regional approach and framework such as that established though the Fountain Creek Flood Control and Greenway District.
- Primary water quality issues of concern are *E. coli* and selenium.

8.6.2 Recommendations

Implementation of recommendations contained in the Fountain Creek Watershed Strategic Action Plan (2008) (**www.fountain-crk.org**) regarding water quality, sedimentation, and stormwater runoff; flooding and flood control; land use planning; recreation; wildlife; wetlands; agriculture; municipal water supply; and return flows should be pursued. The general recommendations and project-specific recommendations regarding bank stabilization and ecosystem restoration contained in the Army Corps of Engineers Watershed Study should also be pursued.

Sedimentation

Assist in developing appropriate stabilization threshold criteria for sediment in the watershed.

Riparian and Wetland Areas

Critical stream environment zones, floodplains, wetlands, and riparian areas should be protected through zoning or development regulations or acquired through conservation easements, land exchanges, transfer of development rights, or similar resource protection techniques.

Water Quality

Develop plans to address known sources of *E. coli* and selenium and initiate studies to determine unknown sources of *E. coli* and selenium.

Onsite Wastewater Systems (OWS)

Develop maps that overlay existing soil types, topographic features, small areas for leach fields, high water tables, and areas where poor and failed septic system problems have occurred.

Evaluate a mandatory participation program regarding OWS inspection, repair, and replacement.

Develop an electronic tracking system for OWS permits that includes location, age of system, size, soil stratigraphy, and depth to groundwater.

Evaluate districts where source water protection plans should be completed.

Permit Coordination and Review

Develop a timely procedure to review work planned within the floodplain and significant wetland areas so comments and feedback can be given on possible consequences. This can be conducted as part of the Army Corps of Engineers' 401 and 404 floodplain permitting process or as a part of a jurisdiction's grading and erosion-control permitting process. This procedure could be activated for areas that have been identified as having either high erosion and instability problems or high-quality wetlands and for projects that will significantly affect creek flow rates and/or the creek route. The Army Corps of Engineers, the Regional Building Department, local governments, and Colorado Springs Utilities will work together to develop a review process to identify if issuance of a 401 and 404 permit, floodplain permit, and/or grading and erosion-control permit will impact existing high erosion and instability problems or high-quality wetlands or will significantly affect creek flow rates and/or the creek route.

Green Infrastructure

Host a Green Infrastructure (GI) workshop and develop a GI plan to develop better linkages between water quality, stormwater, transportation, and land use. By integrating disparate planning efforts, synergies can be increased and conflicts decreased between various groups and plans. Development of the plan will link different and sometimes conflicting resource issues and needs into creating solutions that benefit the entire watershed.

9.0 Chico Creek Watershed

9.1 Introduction and Overview

Chico Creek Watershed (Figure 9-1) is about 736 square miles and is located in the southeastern portion of El Paso County and the northeastern portion of Pueblo County, immediately east of the Fountain Creek Watershed. The two main subwatersheds within the Chico Creek Watershed are Upper Black Squirrel and Chico Creek. Within the Upper Black Squirrel Sub-watershed, there are many existing districts and areas that have been developed and a number of major urban developments that have been approved at the conceptual stage. Chico Creek Subwatershed consists of large farms and has several unique ecosystems. Both of these areas are included in the South Central Comprehensive Plan, which is a small area element of the El Paso County Master Plan.

9.1.1 Land Use

The Upper Black Squirrel Subwatershed is primarily a rural area that consists of existing and proposed small clusters of single-family homes, and between these clusters it is primarily rural in nature. The established subdivision and development patterns are expected to remain the same except for the possible redevelopment of certain parcels with lower density uses, especially next to major intersections. Major growth is also limited to areas where services, including roads, can be provided.

The primary land use in the Chico Creek Subwatershed is agriculture/farming followed by residential. The Colorado State Land Board is the largest single landowner in the Chico Creek Subwatershed. The Land Board owns about 215,000 acres of land (about half of the total watershed area) in the Chico Creek Basin and 260,000 acres of mineral rights. Since 1994, the Land Board has:

- Acquired 75,000 acres of shortgrass and sand sage prairie;
- Designated 90,000 acres in the Stewardship Trust; and
- Issued two 25-year leases for ranches (Chico Basin, Bohart, and Frost Ranches) encompassing over 20,000 acres that encourage educational and conservation efforts.

The major goal of these acquisitions was to assemble large contiguous properties that could be managed more effectively than the 640-acre sections of trust lands that are

typically found on the eastern plains. The two largest contiguous parcels which the Land Board owns are the Chico Basin and Bohart Ranches.

9.1.2 Population and Socioeconomic Characteristics

Growth of the Colorado Springs Metropolitan Area is causing a trend towards rural expansion into both subwatersheds. Existing and proposed development in the Upper Black Squirrel Subwatershed includes the Ellicott Springs/Sunset Village area, Ellicott School, Woodmen Hills, Santa Fe Springs, Meridian Ranch, Viewpoint Village, Springs East, Paint Brush Hills, Falcon Highlands, Falcon Hills, and other subdivisions in the Falcon area. El Paso County Planning is coordinating future planning along the Highway 94 corridor.

Within the watershed, along eastern and southern portions of the county not owned by the state, there has been a trend towards 35-acre developments. This is important since parcels of 35 acres or greater are exempt from local subdivision control and do not have specific regulations, requirements, and fees. This includes requirements to demonstrate a 300-year water supply, to have road access and appropriate building sites, and to pay fees toward school and parkland, drainage, and possibly traffic impacts.

In the Falcon/Peyton planning area, "In 1992, about 31% of the land area was made up of parcels over 640 acres, and now that size of parcel makes up only about 22% of the area. In contrast, parcels smaller than five acres made up only about 3% of the planning area in 1992, while now these parcels occupy almost 10% of the planning area. Perhaps most telling, the number of parcels under five acres in size increased by 551%. This clearly points to a trend of subdivision and urbanization." (El Paso County, 2008, p 2–48)

9.1.3 Characterization of Watershed Issues

Upper Black Squirrel Subwatershed

The primary watershed issues are associated with the trend toward urbanization or suburban development and related issues, especially in the northern portion of the Upper Black Squirrel Subwatershed. When this is coupled with lack of regulatory control on lots of 35 acres or greater, problems associated with water quality, erosion, and sedimentation can be compounded. Groundwater quality could be impacted from an increased reliance on onsite wastewater systems instead of centralized wastewater treatment. Many of the homes and communities in this area rely on groundwater, and depletion of groundwater

resources could threaten the biodiversity and availability of water in the area. An adequate supply of groundwater is critical to a healthy and sustainable system.

Chico Creek Subwatershed

In the Chico Creek Subwatershed, overgrazing and grazing along streams/creeks is an issue, although several of the ranches in this area are taking proactive steps to minimize possible impacts. Ranches in this area have developed a community-based conservation and direct marketing network that supports a diverse enterprise mix of traditional and nontraditional ranch products. Examples of this can be found at www.chicobasinranch.com.

An assessment by the Chico Basin Conservation Leadership Initiative (2002) revealed a high-quality and biologically diverse arid landscape, intrinsically valuable with a historic agricultural economy. Conclusions from the study were that the area was:

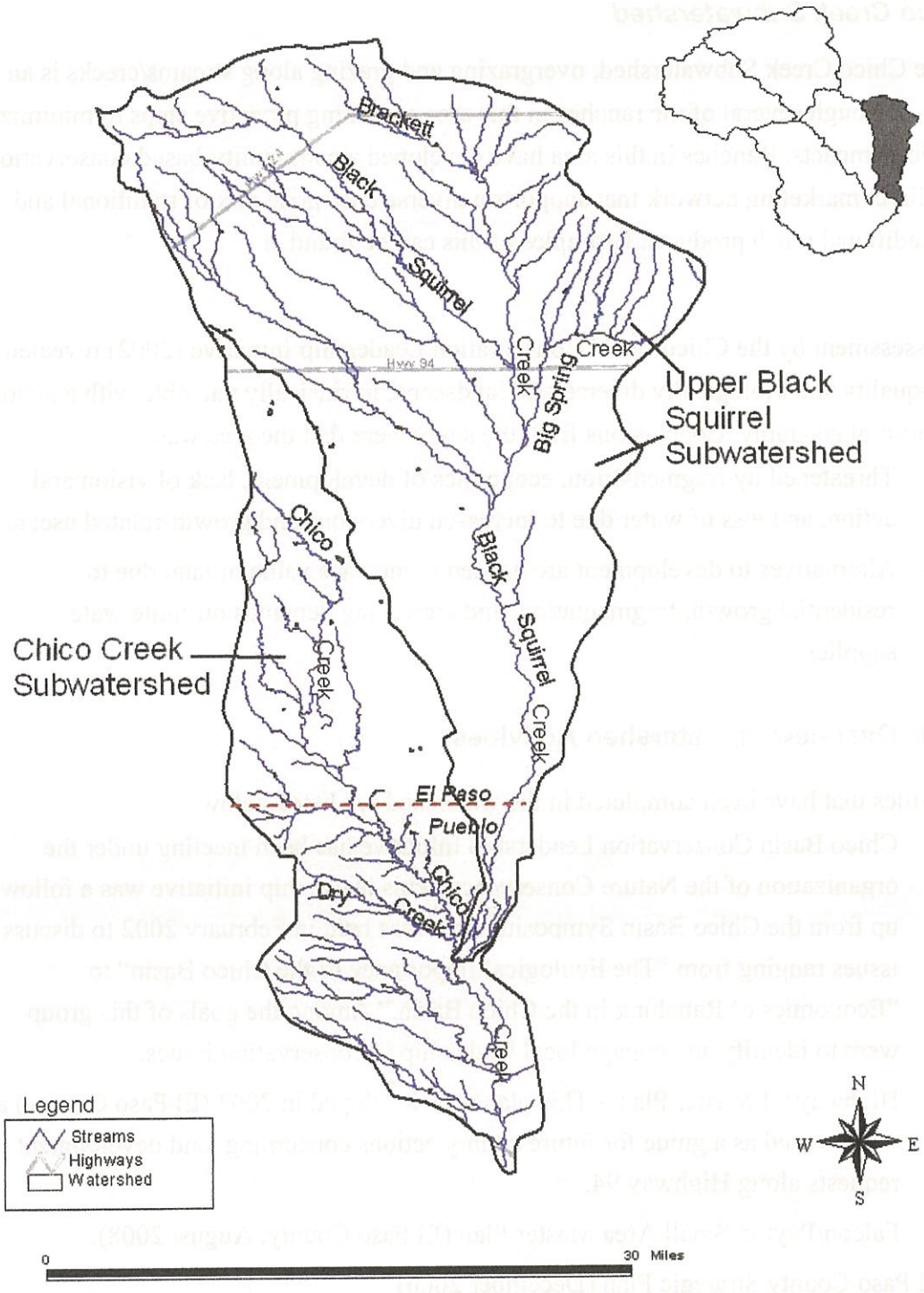
- Threatened by fragmentation, economics of development, lack of vision and action, and loss of water due to increased diversions and growth-related use; and
- Alternatives to development are needed to increase value of land due to residential growth, fragmentation, and increasing demands on finite water supplies.

9.1.4 Overview of Watershed Activities

Activities that have been completed in the watershed are listed below:

- Chico Basin Conservation Leadership Initiative has been meeting under the organization of the Nature Conservancy. This leadership initiative was a follow-up from the Chico Basin Symposium that was held in February 2002 to discuss issues ranging from "The Ecological Importance of the Chico Basin" to "Economics of Ranching in the Chico Basin." Among the goals of this group were to identify and engage local leadership in conservation issues.
- Highway 94 Master Plan—This plan was developed in 2003 (El Paso County) and will be used as a guide for future county actions concerning land development requests along Highway 94.
- Falcon/Peyton Small Area Master Plan (El Paso County, August 2008).
- El Paso County Strategic Plan (December 2006)
- El Paso County Land Development Code was updated and adopted in April 2007.

Figure 9-1: Chico Creek Watershed Reference Map



9.2 Watershed Water Quality Analysis

9.2.1 Standards and Classifications

Within the Chico Creek Watershed, there is only one stream segment - COARMA04c:

Table 9-1: Water Quality Stream Segments

	Stream Segment Description	Classifications	Physical & Biological	Inorganic (mg/l)		Metals (ug/l)
4c.	Mainstem of Chico Creek, including all tributaries, wetlands, lakes, and reservoirs, from the source to the confluence with the Arkansas River	Aq Life Warm 1 Recreation E Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 E.Coli= 126/100ml	NH3(ac/ch)=TVS CL2(ac)=0.019 CL2(ch)=0.011	CN=0.005 S=0.002 B= 0.75 NO2= 0.05	As(ac)=340 ; As(ch)=7.6 (Trec); Cd(ac/ch)=TVS; CrIII(ac/ch)=100(Trec); CrVI(ac/ch)=TVS; Cu(ac/ch)=TVS; Fe(ch)=1000 (trec); Pb(ac/ch)=TVS; Mn(ac/ch)=TVS; Hg(ch)=0.01(tot); Ni(ac/ch)=TVS; Se(ac/ch)=TVS; Ag(ac/ch)=TVS; Zn(ac/ch)=TVS
Temporary modification (type iii) : NH3(ac/ch) = Existing Quality Expiration date: 12/31/2011. Since December 2006, PBHMD has been conducting a use attainability analysis (UAA) of Middle Arkansas Segment 4c, also identified as segment COARMA04c. Preliminary UAA data analysis results indicate that the current segmentation, classification, and water quality standards may not be accurately representative of actual site-specific conditions.						

9.2.2 Surface Water

Within the Chico Creek Watershed there are two main creeks (Figure 9-2), Black Squirrel Creek, and Chico Creek.

Black Squirrel Creek originates in Black Forest in northern El Paso County and drains into Chico Creek in Pueblo County. Chico Creek then flows into the Arkansas River in Pueblo County. The upper and middle portions of Black Squirrel Creek and Chico Creek are ephemeral streams that flow only in response to thunderstorms, snowmelt, and prolonged rainfall. There is perennial flow only along the lower portions of Black Squirrel Creek and Chico Creek.

Fishery data collected by the Division of Wildlife between 1993–1998 along the lower portions of Black Squirrel Creek and Chico Creek indicate the presence of the Arkansas Darter (state endangered fish). Nine fish species were also present in this drainage, but not all were found at each site; seven of these species are native to the Arkansas River basin. The fish species were not equally abundant at all the monitoring sites. This

monitoring data indicate that this section is not impaired and the fish community is abundant, diverse, and relatively stable.

Monitoring

Because most of the stream segments in the Chico Creek Watershed are ephemeral, there are currently no monitoring stations located in the watershed. Water quality monitoring data is therefore extremely limited. Future studies should investigate the possibility of a monitoring station on Chico Creek, immediately above the confluence with the Arkansas River.

9.2.3 Regulatory listing

There are no segments within the Chico Creek watershed on the 303(d) list or the 303(d) Monitoring & Evaluation list.

9.2.4 Groundwater

Groundwater accessed through individual wells is the primary source of drinking water for residents that live in this watershed and to the east of this watershed. Because of the limits of surface water in this region (lack of year-round surface water or reservoirs), groundwater also plays a critical role in determining the type and magnitude of future growth and development. The primary concern has been groundwater in the Upper Black Squirrel alluvial aquifer, which underlays most of the Chico Creek Watershed.

Denver Basin Aquifers

The Denver bedrock aquifers discussed in section 8.2.4 are the primary sources of groundwater. Because of the nature of the strata (the confining units between the saturated beds), the Denver Basin aquifers are not considered to be a long-range, renewable source of water (El Paso County, 2008). An overview of the characteristics are provided in Table 9-2.

Table 9-2: Denver Basin General Aquifer Characteristics

Aquifer Name	Aquifer Top	Aquifer Thickness	Depletion Speed[1]	Water Treatment[2]
Dawson	Land Surface	0–450 feet	High	Normally none
Denver	0–660 feet	350–900 feet	High to Moderate	Rare
Arapahoe	380–1530 feet	500–600 feet	Mod to Low	Usually
Fox Hills	1200–2300 feet	200–340 feet	Low	Sometimes

[1] Determined by the amount of pumping past and present and with future projections

[2] In most cases, the amount of iron and manganese determines the need for treatment.

Upper Black Squirrel Alluvial Aquifer

The Upper Black Squirrel Creek alluvial aquifer underlies about 350 square miles of the Upper Black Squirrel Creek Subwatershed. This aquifer is located about 25 miles east of Colorado Springs and supplies water for domestic, agriculture, and municipal uses. The Water Quality Control Commission has assigned use classifications and water quality standards to this aquifer (CDPHE-WQCC, 2009) as shown below:

Specified Area: All unconfined groundwaters within the saturated zone underlying specified area of El Paso County.

Classification: The classifications of the unconfined ground water in the specified area are: 1) Domestic Use-Quality; and 2) Agricultural Use-Quality.

Ground Water Quality Standards: The groundwater quality standards included in Tables 1-4 of the *Basic Standards for Ground Water* (CDPHE-WQCC, 2009) are assigned to all unconfined groundwater in the specified area.

The Colorado Groundwater Commission administers water withdrawals from this aquifer, and the Upper Black Squirrel Creek Groundwater Management District that was established in 1968 by the Colorado Groundwater Commission reviews water rights applications and information concerning withdrawals for this basin. This district is authorized to adopt additional rules and regulations to help administer groundwater within their district. The boundaries of the District and the aquifer are the same.

About two-thirds of the aquifer is in El Paso County and one-third in Elbert County. The aquifer supplies most of the water for irrigation and domestic use in the basin, and since 1964, it supplies water for export to the Colorado Springs area. This alluvial aquifer is also used as a drinking water source for Cherokee Metropolitan District. Water exported by Cherokee from this aquifer is considered transbasin water and is available under the Colorado Water Law to be used to extinction. Cherokee has initiated planning,

permitting, and construction for recharging the aquifer in a manner that would augment available groundwater resources. The treatment plant was operational by September 2010.

Colorado Geological Survey Study

In January 2006, a study was conducted (Colorado Geological Survey, 2008) to investigate the recharge capacity of the aquifer. The study analyzed the magnitude and distribution of changes in water levels in ten-year increments, from 1964–2004. Highlights from this report include:

- According to the Colorado Division of Water Resources, there are 3,947 permitted wells (alluvial and bedrock wells), of which 1,200 are alluvial wells (as of May 2007).
- From 1964–1974, the amount of water removed was at least 45,300 acre feet and water levels declined by 42 feet. The rate of decline from subsequent decades slowed and well production decreased. From 1994–2004 (final decade analyzed), recharge exceeded losses with a net gain of about 1,900 acre-feet, which was probably a result of above average precipitation. The cumulative loss of groundwater in the basin is at least 60,700 acre-feet.
- Precipitation is the key resource for groundwater recharge.

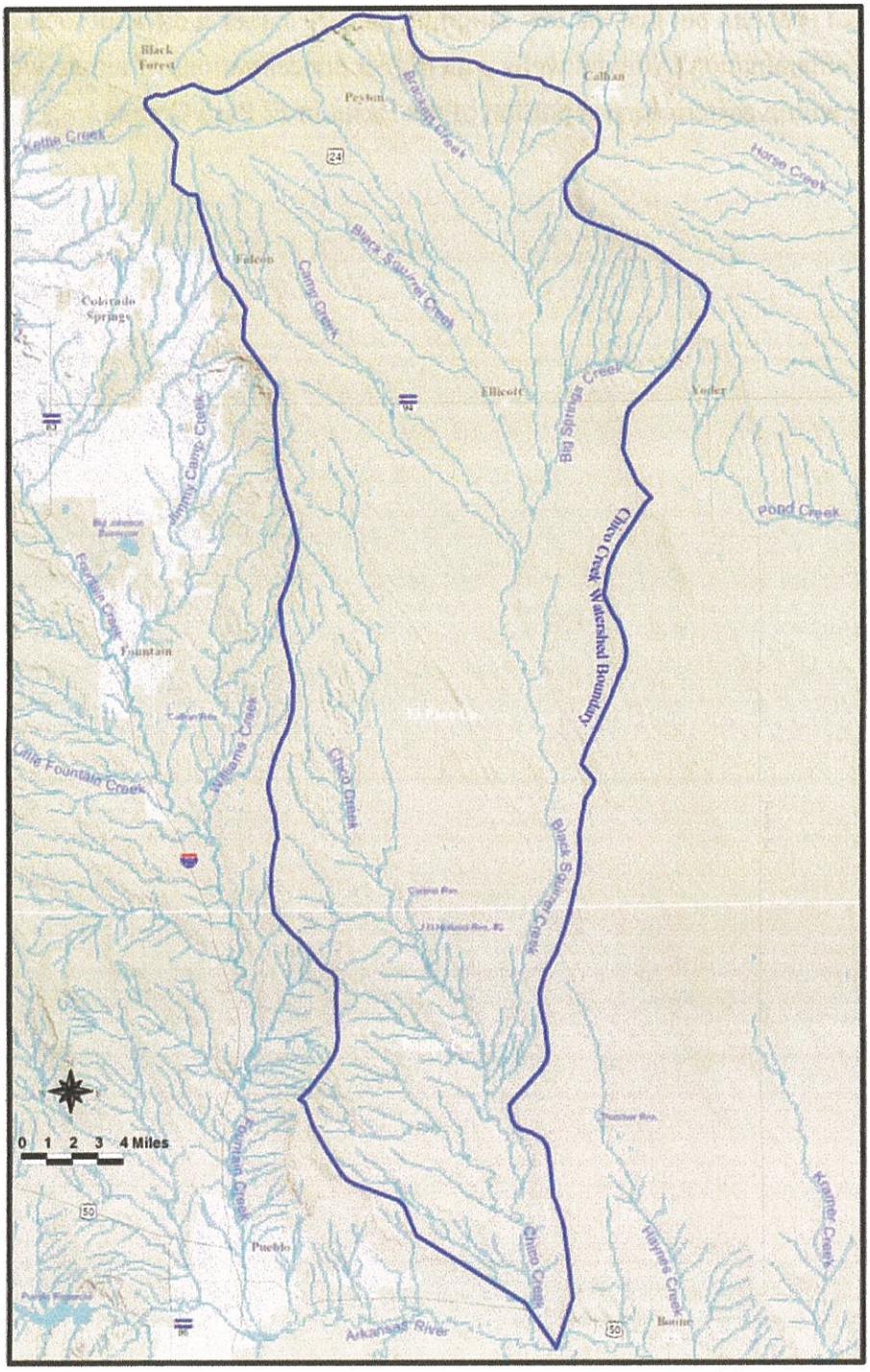
El Paso County Groundwater Contamination Committee and Study

In June 2009, El Paso County formed a Groundwater Contamination Committee to investigate water quality issues. This group was formed to develop a study to evaluate existing water quality and potential groundwater contamination to help participants make informed land use decisions. Phase I of the study is expected be completed by December 2010. El Paso County is expected to use the data and recommendations to determine if changes to policies and regulations are warranted. Phases of the scope of the study are described below:

- Phase 1 consists of literature/data review to identify data availability, data gaps, and initial land use analysis to focus on future testing and analysis and potential sources of contamination;
- Phase 2 will consist of additional data collection and analysis, conclusion, and recommendations; and
- Phase 3 includes land use analysis and development of land use recommendations.

Information from the CDPHE *Status of Water Quality Report* (2008), based on 49 wells sampled in El Paso County, concludes that groundwater contamination is not a widespread problem but that the low sampling density makes it difficult to identify site specific contamination. Alluvial wells with higher concentrations of nitrate were identified within eastern central portion of the Basin in El Paso County.

Figure 9-2: Chico Creek Watershed Stream Locations



9.3 Point Source Dischargers

9.3.1 Overview

The Chico Creek Watershed is divided into two main subwatersheds, Upper Black Squirrel and Chico Creek. There are many development projects in Upper Black Squirrel Subwatershed that are either recently completed, in the initial planning stages, or delayed due to the slowdown in economic activities and housing. Water rights issues and the ability to provide water service to these districts have and will continue to play a critical role in these developments.

Within the Upper Black Squirrel Subwatershed, both Paint Brush Hills Metropolitan District and Sunset's Ellicott Springs wastewater treatment plants are lagoon-based systems (as of 2010) and may require significant changes in their treatment process to address ammonia and nutrient effluent limitations that may be forthcoming.

The Cherokee Metropolitan District has constructed a new WWTP to relocate their current wastewater operations into this subwatershed. The district is also initiating planning to implement a northern treatment and recharge facility site north of State Highway 94 and south of the Santa Fe Springs development. This is discussed further in the Future Needs Assessment.

Sunset's Ellicott Springs has secured site application approval of a reclaimed wastewater plant to be installed to service the Santa Fe Springs development. Due to the economic slowdown, construction of this plant has not taken place, and as of May 2010 the design for this plant is on hold and has not been approved. The discharge from the facility will be utilized for irrigation purposes only and must be applied at agronomic rates. An interconnecting pipeline is installed from Santa Fe Springs to Sunset's Ellicott Springs wastewater treatment plant located near the intersection of Drennan Road and Ellicott Highway.

All wastewater treatment facilities are located in the Upper Black Squirrel Subwatershed. and there are currently no permitted facilities in the Chico Creek Subwatershed. These facilities are listed in Table 9-1 and shown Figure 9-3. No industrial discharge facilities are located in either of these subwatersheds.

There are also two wastewater treatment facilities that are located in El Paso County, but outside of the Upper Black Squirrel Subwatershed:

- Town of Calhan is located northeast of the Watershed along Highway 24; and
- Walden Corporation is located northwest of the Watershed.

Table 9-3: Chico Creek Watershed Major Point Source Discharge Facilities

Wastewater Treatment Plant	Permit No.	Discharge Location	Proposed Mgmt. Area	Design Capacity (mgd)	Existing Load (mgd)
Paint Brush Hills Wastewater Treatment Facility	CO-0047091	Unnamed tributary of Black Squirrel Creek, east of treatment plant	Upper Black Squirrel	1.3	0.94
Santa Fe Springs WWTF (Not Operational)	Not Issued	CDPHE is reviewing plant design – construction is on hold	Upper Black Squirrel	Permit Not Issued	Permit Not Issued
Cherokee Metropolitan District	Not Issued	Discharge to groundwater (eleven recharge basins have been constructed at the site)	Upper Black Squirrel	4.8	Discharge August 2010
Sunset's Ellicott Springs	COG-0047252 (Permit exp 12/31/2010)	No surface discharge; authorized to discharge to unnamed tributary of Black Squirrel Creek at southeast corner of facility	Upper Black Squirrel	0.25	0.01

Note: All point source dischargers are located in the Upper Black Squirrel Subwatershed. The future (August 2010) Cherokee Metropolitan District discharge location is shown in Figure 9-2, and the current location is shown in Figure 8-2 (Fountain Creek Watershed Point Source Discharge Section).

Highway 94 Comprehensive Plan

El Paso County completed the last update of the Highway 94 Comprehensive Plan, which was originally adopted by the El Paso County Planning Commission in 1985 and updated in July 2003. The planning area includes approximately 120 square miles–100 square miles centered around Schriever Air Force Base, and another 20 square miles centered around the Colorado Centre area. This small area plan element is used as a guide for future Board of County Commissioners' actions concerning land development requests. This document acknowledges wastewater treatment as a significant planning parameter affecting the area. The plan acknowledges pressures for urban density development along State Highway 94 and also recognizes the substantial up-front costs associated with constructing new wastewater treatment plants for such developments.

Figure 9-3: Chico Creek Watershed Point Source Discharger Facilities

The Highway 94 Plan addresses the issue by acknowledging possible development scenarios, which include:

- Connections to the Sunset Village Treatment Plant (Ellicott Springs Resources LLC), southeast of the planning area, and possible enlargement of the facility.
- Connections to the Cherokee Metropolitan District Plant, which serves Schriever Air Force Base and is in the process of relocating to the Upper Black Squirrel Subwatershed.
- Use of a "package plant" as a start-up option, although a package plant would face substantial regulatory barriers.
- Siting and construction of a new sewage treatment plant in the planning area in the same vicinity as the Sunset Plant (Ellicott Springs Resources LLC).

9.3.2 Future Needs Assessment

The future needs assessment described in this section is based on proposed growth and development that is expected to occur in the Upper Black Squirrel Subwatershed and what effects this will have on wastewater treatment plant service needs. Growth pressure has become significant within the basin. The Woodmen Hills, Meridian Ranch, Falcon Highlands, Paint Brush Hills, and other areas have experienced significant development since the 2003 update of the 208 Plan, including both residential and commercial activities. Several factors will be critical in determining future needs for this area. These factors include:

- Water resource availability: Future development must demonstrate a reliable source of water.
- Cost: Development of services should be done in the most cost-effective manner possible.
- Environmental constraints and water quality: Possible environmental constraints and ability to treat effluent according to NPDES permit standards.

1) 4-Way Metropolitan District

The 4-Way District will probably phase development and have limited taps prior to 2012. PUD zoning has been approved for the commercial and mixed-use portion of the property at Stapleton Road and Highway 24. A PUD development plan is under review. A request was recently submitted to amend the service plan for Metro District 1 and 2 to allow for an increase in the amount of authorized debt. Woodmen Hills Metropolitan District (WHMD) currently provides contractual operations services to the 4-Way Metropolitan

District for both water and wastewater. Wastewater service is expected to be expanded once a lift station is constructed in 2010.

2) Cherokee Metropolitan District

South Treatment Facility

The Cherokee Metropolitan District currently owns and operates a publicly-owned wastewater treatment plant located on the south end of its service area lying immediately north of Peterson Air Force Base. The facility is rated at 2 mgd and discharges into the East Fork of Sand Creek. The district has completed three phases of a five-phase project which will culminate in a new 4.8 mgd wastewater treatment facility located at the northeast corner of the intersection of Milne and Drennan Roads within the Upper Black Squirrel subwatershed. The district has secured site application approval on four different components of the overall project and preliminary effluent limits from the Division for a discharge to groundwater. The new facility will result in the elimination of discharge from the existing treatment facility at Sand Creek. Cell No. 1 and a small portion of Cell No. 2 will remain in active service to provide for flow equalization and pretreatment. Two lift stations operating in series will transmit the flow from that location through the district's existing 14-inch force main eastward. The remaining cells at the existing complex will be cleaned of biosolids and held in reserve for emergency storage in the event any issues arise within the interconnecting force main, interceptor sewer, or lift stations associated with the conveyance facilities from the district's current treatment plant site to the new facility site.

The district constructed a 14-inch polyvinylchloride (PVC) force main extending from its current wastewater treatment facility to the Schriever Air Force Base in 2000. A lift station was sited on the south side of Schriever Air Force Base (SAFB). In the interim period, prior to the installation of a new treatment plant, all SAFB wastewater is conveyed by means of the lift station and the 14-inch force main to the existing Cherokee Wastewater Treatment Plant. The interconnecting force main was oversized so that it has adequate capacity to allow Cherokee to transmit its raw wastewater through it. Cherokee will install a lift station at their existing WWTP site together with a second lift station sited near the intersection of Franceville Coal Mine Road and State Highway 94 to convey all of Cherokee's raw wastewater to a new WWTP site north of Drennan Road and 2.8 miles east of SAFB.

The new plant is programmed to treat all wastewater generated within the Cherokee Metropolitan District's service area, including its contract user, the SAFB. Cherokee also has an intergovernmental agreement (IGA) with the Meridian Service Metropolitan District (MSMD). MSMD can enter into an IGA with other districts to share capacity. A 16-inch diameter, 6.5-mile-long pipeline has been constructed by MSMD extending from the Falcon area interconnecting to Cherokee's existing pipeline that currently services the SAFB. This main will be used to convey MSMD's and their contract user's wastewater to Cherokee. The needs of the Cherokee Metropolitan District's primary service area are projected to total 2.6 mgd together with a projected loading from Meridian Ranch and their contract users of 2.2 mgd. The capacity of the new facility will be 4.8 mgd.
The district's new southern WWTP facility will discharge to a 20-inch-diameter pipeline that extends to its recharge facilities. The district has acquired a 70-acre parcel lying northeast of the intersection of Bar 10 and Henderson Roads in eastern El Paso County. This location represents what was determined to be the optimum recharge location for constructing aquifer recharge facilities in the lower part of the basin. Eleven recharge basins have been constructed at that site. Each basin is equipped with automated valving to allow for alternate dosing of the basins to optimize recharge and facility performance. The district has completed the construction of the 24-inch interceptor extending from the lift station site located south of SAFB extending to the new wastewater treatment plant site. The 20-inch nonpotable line has been constructed from the WWTP site to the recharge site. The recharge basins have been constructed at the recharge site.

Construction began in June 2008 and was completed in August 2010. A subsequent project will be undertaken that will include the removal of the lift station at SAFB and its installation at Cherokee's Sand Creek WWTP site together with the installation of a new lift station at Franceville Coal Mine Road and State Highway 94 to operate in series with the lift station at the treatment plant site.

This schedule works in harmony with the district's compliance schedule contained in their current WWTP's discharge permit which calls for the ultimate decommissioning of the existing facility and the construction of the new replacement facility. In 2005, the district submitted a replacement plan to the State Engineer's office for review. The subsequent questions generated by the State Engineer's office have been addressed by the district with the resubmission of additional documentation on the replacement plan in March 2008. The overall approach being pursued by the district is to utilize their transbasin water, which is available for use to extinction in such a manner that they can perpetuate the underlying base water supply to their constituents.

North Treatment Facility

Cherokee, together with various other districts and organizations, has come to recognize the need to recharge the Upper Black Squirrel Creek alluvial aquifer in a manner that will enable it to sustain long-term water production. Cherokee has received various requests for wastewater service from developments occurring within the northern portion of the basin. The district's southern treatment facility and associated recharge complex have been designed to optimize recharging the southern portion of the basin near the district's southern well field. The southern treatment facility has been master planned such that it can be cost-effectively expanded from 4.8 to 9.6 mgd; however, only a reasonable amount of recharge water can be effectively utilized at the southern end of the designated basin. The need exists to install similar recharge facilities in the northern reaches of the basin. This has led to Cherokee planning for a northern treatment facility together with associated recharge facilities that will effectively recharge the northern portion of the basin in the vicinity of the district's northern well field. The final site for the WWTF has not been defined. The district anticipates purchasing, as it did at the southern facility, a quarter section of ground within which the facility will be constructed near the center to provide for an adequate buffer from future development. At this time the facility is expected to occur near the intersection of Peyton Highway and East Garrett Road. The facility will be similar in nature to the southern facility and have its discharge authorized for a discharge to groundwater. Such an approach is different than the proposed Santa Fe Springs facility, which will only be allowed to irrigate at agronomic rates, thus effectively eliminating any recharge of the underlying aquifer. The initial proposed capacity of the first phase of construction of Cherokee's northern facility is preliminarily estimated to be 2.4 mgd. It is projected to be in service in 2012. Cherokee will own, operate, and maintain the facility. It will enter into formal IGAs with various metropolitan districts to provide wastewater treatment service.

3) Sunset's Ellicott Springs (formerly known as Sunset WWTP)

As of 2010, plans for phase one construction of the Santa Fe Springs Wastewater Reclamation facility near Falcon Hwy and Peyton Hwy are on hold. The long-term plans are to construct an approximately 10.5-mile pipeline that will connect the new facility in the northern part of the basin to the existing Ellicott Springs WWTP near Ellicott Hwy and Drennan Road (see Figure 9-2).

Over the coming 20 years, the expansion and schedule will be timed in accordance with discharge permit requirements and growth. By 2010, when the Sunset's Ellicott Springs

facility comes up for discharge permit renewal, Ellicott Springs plans to construct the facilities necessary to land-apply the treated and disinfected effluent at the agronomic rate to agricultural lands, which will satisfy the ammonia standard. Currently Sunset's Ellicott Springs does not discharge as it is operating at approximately 15% of capacity. It is expected that Ellicott Town Center and Ellicott Springs Development subdivisions will gain market traction in the coming five years and will need to discharge rather than land apply. An engineering study, design work, and financing plan are currently in the works for that facility upgrade and modification.

The 15" sewer outfall line that currently serves the Ellicott School District and will eventually serve Ellicott Town Center (Viewpoint Village and Springs East Village) will be extended in 2010 and become a backbone collection line for the middle part of the basin. This collection line could serve many of the proposed subdivisions in the basin's midsection.

The facility anticipates running collection lines north and northeast to collect from Santa Fe Springs and from other developments in the basin to the north. The Santa Fe Facility has been located for gravity flows. The facility has a large portfolio of groundwater resources capable of serving all current and future customers and is working to secure pipeline location and renewable surface water delivery that will terminate in the Upper Black Squirrel Subwatershed.

This facility is operating under a compliance schedule contained within its discharge permit, which requires a demonstrated plan to meet forthcoming effluent ammonia and metal limitations within the permit. Planning and ultimate implementation is to be demonstrated whereby a revised or new facility can be shown to meet the forthcoming ammonia and metal effluent limits. Depending on the proposed improvements that are chosen, this could cost $1,636,000. The nature of the compliance schedule requirements suggests that the facility will need to be replaced with a mechanical facility if it is to be maintained at that location.

Santa Fe Springs Wastewater Treatment Facility

Sunset's Ellicott Springs new Santa Fe Springs Wastewater Treatment and Reclamation facility will serve Santa Fe Springs and is working on agreements with other developers and metro districts. The plant is a design-build facility and will be built in phases to accommodate growth. It can be upgraded for additional capacity with 12 months' notice. This plant will be capable of storing reclaimed wastewater for residential irrigation.

Although Sunset's Ellicott Springs has received site application approval for 0.5 mgd, construction of the facility has been temporarily delayed due to economic slowdown. The wastewater treatment facility must be constructed under CDPHE Regulation No. 84. This approach eliminated the need to obtain preliminary effluents as all discharges from the facility are to be applied in the form of irrigation water at agronomic rates. The district has developed contracts for the connection of the interconnecting line to Sunset's Ellicott Springs WWTP together with the installation of a pretreatment grinder and aerated grit chamber at Santa Fe Springs prior to discharge into the interconnecting sewer line. The actual wastewater treatment plant is to be constructed as a second phase. It will require the installation of a large detention facility to hold discharged water over the winter period for use as irrigation during the summer/irrigation months. Based upon the nature of the permit secured for the facility, it is not allowed to have either a surface water discharge or to permit any of its irrigation water to percolate into the underlying soil. It is the intent to convey all solids to Sunset's Ellicott Springs WWTP.

4) Falcon Highlands Metropolitan District (FHMD)

The FHMD is allocated adequate taps to fully build out their service area. Their number of 752 equivalent taps will probably take five to 10 years to fully build out. Woodmen Hills Metro District (WHMD) currently provides for the sewer service to the FHMD. WHMD operates the wastewater system in Falcon Heights and provides for treatment services.

5) High Plains Ranch (Case property south of Santa Fe Springs)

The metro district would provide water via the Sage Water Users Association, and wastewater service has not been resolved. A sketch plan for the property was subsequently approved in 2008.

6) Meridian Service Metropolitan District (MSMD)

Service to MSMD is currently provided by Cherokee Metropolitan District through an IGA that MSMD has with Cherokee. MSMD also has 0.100 mgd capacity in the PBHMD plant.

7) Paint Brush Hills Metropolitan District (PBHMD)

PBHMD provides water and wastewater, among other services, to a residential/commercial service area of approximately 1100 acres near Falcon, including the recent inclusion of the 160-acre State Land Board parcel (Red Sky Ranch). The inclusion of an additional 600+ acres (Elkhorn Estates II) is in process. The district

currently serves approximately 700 SFEs in the neighborhood of Falcon Hills plus Falcon Middle School and Grace Community Church. PBHMD's current population is approximately 3,000, including middle school attendance. Current build-out estimates for PBHMD's future residential, commercial, and school services range from 1,750 to 3,500 SFEs.

PBHMD operates its own wastewater collection system, with one lift station serving most of the service area. Wastewater treatment is provided at the Paint Brush Hills Wastewater Treatment Facility (WWTF). The WWTF is co-owned by PBHMD and WHMD and is located on land within the boundaries of Meridian Service Metropolitan District (MSMD).

An engineering alternatives analysis (EAA) has been completed for the WWTF to evaluate the options for future plant upgrades, reflecting the expectation that nutrient limitations on the effluent would be applied at some point in the future. Potential alternatives include modification of the existing lagoons for nitrification, addition of a tertiary nitrification process, conversion of the lagoons to an activated sludge process, replacement of the lagoon system with a mechanical wastewater treatment plant, and abandoning the existing facility to reroute the flows to a different wastewater treatment plant. The EAA also considered public impacts, discharge permit liability, capital costs, and operation and maintenance costs, among other factors. In short, the existing lagoon treatment system currently lacks the capability to meet future changes in effluent discharge limits for ammonia and/or nutrients, and the EAA recommended a step-by-step conversion of the plant to a sequencing batch reactor (SBR) facility should a major plant upgrade become necessary in the future.

In June 2007, PBHMD was granted a Type iii Temporary Modification by the Water Quality Control Commission due to the uncertainty of the appropriate classification for the unnamed tributary that receives the WWTF effluent, as well as due to the uncertainty of what ammonia standards were appropriate for the receiving segment (Arkansas River Basin, Middle Arkansas River Sub-basin, Stream Segment 4c, also identified as segment COARMA04c). Until its expiration on December 31, 2011, the Temporary Modification establishes "existing quality" as the required water quality compliance requirement. PBHMD's discharge permit, issued in mid-2006, was subsequently amended and all references to ammonia standards were removed on the basis of the Temporary Modification. A use attainability analysis (UAA) of the receiving stream is in progress to scientifically ascertain the most appropriate use classifications and ammonia water

quality standards. Preliminary UAA data suggests that the current segmentation, classification, and water quality standards may not be accurately representative of actual site-specific conditions.

At present, it is unknown whether or not permit renewal, which is possible as early as June 2011, will include ammonia limitations or other limitations that might require significant modifications to the WWTF. If nutrient limitations are added, compliance will not be required prior to the new permit's expiration date.

Five-Year Plan

MSMD has an intergovernmental agreement with Cherokee to share the capital costs and operation and maintenance costs associated with the construction of Cherokee's new Black Squirrel Wastewater Treatment Facility. By mid-2010, MSMD plans to divert its wastewater flows to this new plant; however, MSMD will continue to claim its 500-tap capacity in the Paint Brush Hills WWTF.

If both PBHMD and WHMD continue wastewater treatment service at the Paint Brush Hills WWTF, plant expansion will most likely be required. Both districts are currently revisiting their needs and options, although joint efforts are somewhat limited by the current legal dispute described in 9.3.3: Paint Brush Hills Wastewater Treatment Facility. Short-term modification may or may not include expansion of the plant and/or a full treatment plant upgrade to a non-lagoon-based system.

An alternative to any future modifications of the WWTF possibly includes its abandonment, rerouting all wastewater flows to the new Cherokee Metropolitan District WWTP. At present, both PBHMD and WHMD would need to arrange for the use of a portion of the treatment capacity owned by MSMD in the new Black Squirrel Wastewater Treatment Facility and MSMD's conveyance lines. When and if the terms of any agreement are offered, the PBHMD and WHMD can compare them to the other viable alternatives, including other possible partnerships at other plant sites.

The wastewater flows within the PBHMD service area are projected to remain relatively constant over the next two years, with a gradual increase over the next five years. Planning for additional WWTF capacity will continue primarily in anticipation of current and future growth scenarios, in addition to the possibility of more stringent future permit discharge limitations. As explained elsewhere in this report, it is unknown whether or not the plant's new discharge permit will include ammonia limitations and/or require

significant modifications to the WWTF. At present, PBHMD does not anticipate the need for additional plant capacity within the next five years.

Twenty-Year Plan

As a result of the 2009 CPE's findings of limited plant capacity as described in 9.3.3, PBHMD is in the process of revisiting its 20-year plan. Current PBHMD build-out conditions estimate build-out wastewater flow totaling approximately 0.7 mgd. At present, WHMD has exceeded its plant capacity and is considering a plant expansion. Over the next 20 years, expansion and upgrades of the Paint Brush Hills WWTF will be planned, scheduled, and carried out in accordance with discharge permit requirements and growth.

8) Rock Springs Ranch

A PUD development plan for rural residential development has been approved. A metro district was formed (Rock Springs Ranch Metropolitan District) to provide central water service. Onsite wastewater systems are proposed for the approved residential area. A preliminary plan and final plat for the first residential filing are under review, along with approvals of location for the central water tank and water treatment facility. The developer envisions urban, mixed-use development in the area in the future, at which time sewer service issues will need to be addressed.

9) Santa Fe Springs

A sketch plan was approved and PUD zoning was established on a portion of the property. No lots were platted. Bankruptcy occurred in 2008 and ownership is now fragmented. There has been an inquiry regarding amendment of the sketch plan to allow a change in phasing, but no application has been submitted. El Paso County staff is not aware of any new developments regarding provision of water and wastewater services. As of May 2010, the design plans for the wastewater treatment plant have not been approved by the WQCD, and the construction of the wastewater treatment plant to service Santa Fe Springs has been put on hold. The WWTF is discussed further under Sunset's Ellicott Springs.

10) Shaw Ranch

A sketch plan was submitted to El Paso County, and the county provided comments. There has been no resubmittal. Provision of water and wastewater services still needs to be addressed.

11) Sterling Ranch

A sketch plan was approved in 2008. PUD zoning and preliminary subdivision applications are now under review for a portion of the property. The developer initiated formation of a metro district in 2008 (Sterling Ranch Metropolitan District), but the request has not proceeded to Board of Commissioners hearing or election. The area has an agreement with WHMD to provide for operation and maintenance of their future sewer system as well as treatment needs. Sterling Ranch construction will probably not start until 2011 or later.

12) Woodmen Hills Metropolitan District (WHMD)

WHMD is the largest and most developed service district in the Falcon area and has created contractual arrangements and relationships with several other newer and/or smaller districts and service areas within the Falcon area to provide a more regional basis of sewer service. They are studying options as to how and where to expand and/or develop wastewater treatment capacity. The current site is probably the easiest site to expand but is in a highly developed area and requires a great deal of pumping for most sewer service.

WHMD is working with PBHMD to complete the following wastewater system upgrade: addition of Pond 3A, which will address immediate treatment needs to meet current effluent limitations and provide adequate capacity through the duration of the current discharge permit. Some expenditures are developer-funded, however district capital improvements in the one-year outlook total roughly $500,000 in 2009 dollars.

Five-Year Plan

The district is conducting planning and engineering for an expected plant upgrade in roughly 2012. The discharge permit renewal could require more stringent ammonia limits. Planning is underway to construct between 1.5 mgd and 2.0 mgd of treatment capacity through one of the following options:

- Conversion to activated sludge at the existing site with a recycle and anoxic zone if de-nitrification is required.
- New IFAS plant at existing site
- New SBR plant at existing site.
- Any of the above plant options at an alternate site. (Two alternates are under study, 4-Way Ranch or south of Woodmen Hills, which would eliminate several lift stations.)

Another option that is being considered is a transitional plant that would be a combination of a new expandable 1.0 mgd advanced facility alongside the existing lagoon system, which could be phased out. This allows a bridging between needed plant hydraulic capacity, expected ammonia standards, and resolution of regional partnership issues.

The 2009 dollar projection of the plant expansion is between $7,000,000 and $12,300,000. Depending on the option selected, lift stations will be needed at 4-Way Ranch and Sterling Ranch. WHMD will also have to address capacity issues at its existing station if the existing site or a northern alternative is selected.

Twenty-Year Plan

It is expected that the new facility constructed in the five-year plan will need expansion to 3.0 mgd at a point roughly 10 to 15 years in the future. Wherever the new facility is constructed, it will be master-planned for easy expansion expecting that ultimate area-wide capacity needs will be 3.0 mgd or greater. Growth in the service area is expected to remain slow for the next two to three years, ratcheting up to a rapid pace in the years between 2013 and 2016 then settling into a slower pace and slowing in roughly 2025.

9.3.3 Existing Conditions

1) Cherokee Metropolitan District

The current wastewater system of Cherokee Metropolitan District is discussed in Section 8.3, Fountain Creek Watershed. Cherokee provides wastewater service to SAFB through a lift station and associated force main to its existing Sand Creek WWTP. Upon the reversal of flow in that line, conveying Cherokee's wastewater to the east, the CMD lift station at SAFB will be removed. SAFB's wastewater will enter a 24-inch gravity interceptor sewer installed by Cherokee. The base for the first time is constructing on-site housing. By the end of 2009, 242 units had been constructed.

2) Sunset's Ellicott Springs Wastewater Treatment Plant

The Wastewater Treatment Plant (Figure 9-4), located approximately six miles south of Ellicott, services portions of the Upper Black Squirrel Subwatershed, which includes the Sunset Village development and Ellicott School District (connected to Ellicott Springs Resources in 2002), just north of Drennan Road. Ellicott has service commitments to serve Ellicott Springs development, Viewpoint Village and Estates, Springs East Village, and Santa Fe Springs through the Santa Fe Springs WWTP approved in 2008.

In January 2002, the Ellicott WWTP completed an upgrade to a permitted capacity of 250,000 gpd, discharging to an unnamed tributary of Black Squirrel Creek. The WWTP consists of a three-cell aerated lagoon system with chlorine disinfection.

3) Paint Brush Hills Wastewater Treatment Facility

The PBHMD Wastewater Treatment Facility (WWTF) (Figure 9-4) is co-owned by PBHMD and WHMD and is located on land owned by MSMD. Plant capacity equivalent to 500 SFEs has been reserved, and such service provided to MSMD in exchange for the perpetual land lease. Although the facility is currently operated by WHMD, the CDPHE Colorado Discharge Permit System (CDPS) permit number CO-0047091, effective June 1, 2006, was issued to PBHMD. The permit had one minor modification in 2006 and was amended three times, most recently in September 2009. At present, PBHMD's discharge permit contains no references to ammonia standards as the result of a temporary modification received in 2007, described in Section 9.3.2. The WWTF discharges to an unnamed tributary of Black Squirrel Creek (Middle Arkansas Segment 4c), and the discharge permit rates the facility with a hydraulic capacity of 1.3 mgd.

The WWTF treats wastewater from multiple entities, including PBHMD, WHMD, MSMD, and FHMD, in addition to several area schools and businesses. Both PBHMD and WHMD have contractual arrangements to serve additional entities. All of the wastewater collected in the districts' service areas and through their various service agreements is municipal and mostly residential, with minimal commercial and no industrial contributions.

A "Notice of Violation/Cease and Desist Order (NOV/CDO)" was issued to PBHMD in May 2009 as a result of operational noncompliance, specifically violations of the permitted effluent limits. As part of the corrective action, the NOV/CDO required the implementation of dechlorination as a final process. As noted above, the discharge limits will change for Escherichia coli and dechlorination effective January 1, 2011. A disinfection modifications project is scheduled to be completed by July 2010 to meet this timeline.

In August 2009, a Comprehensive Performance Evaluation (CPE) determined that the WWTF's functional capacity was 0.61 mgd, less than 50% of its 1.3 mgd permitted capacity. Plant data for 2007–08 shows an average influent flow of 0.67 mgd, and a maximum month influent flow of 0.94 mgd. A 0.33 mgd gap was identified between the WWTF's functional capacity and its maximum influent flow. In addition to this

operational performance limitation, the CPE also identified challenges with the plant's managerial and financial systems.

A subsequent Composite Correction Program (CCP) identified three alternatives for bridging the current capacity gap and ensuring the plant's return to compliance. As recommended, current projects include the rehabilitation of Pond 3 to place it back in service and the diversion of influent to the new Black Squirrel WWTF. Both of these efforts will help bridge the gap between the current influent stream and the plant's functional capacity. Additional remediation measures may be required to maintain compliance with the discharge limitations.

At present, there is active litigation between the joint owners of this facility, following a claim filed by WHMD against PBHMD. The dispute concerns the allocation of plant capacity, the sharing of costs at the plant, and the relationships the parties anticipate or have executed with various other entities. At a minimum, the intergovernmental agreement between PBHMD and WHMD requires clarification and updating.

Major Point Source Service Area Maps

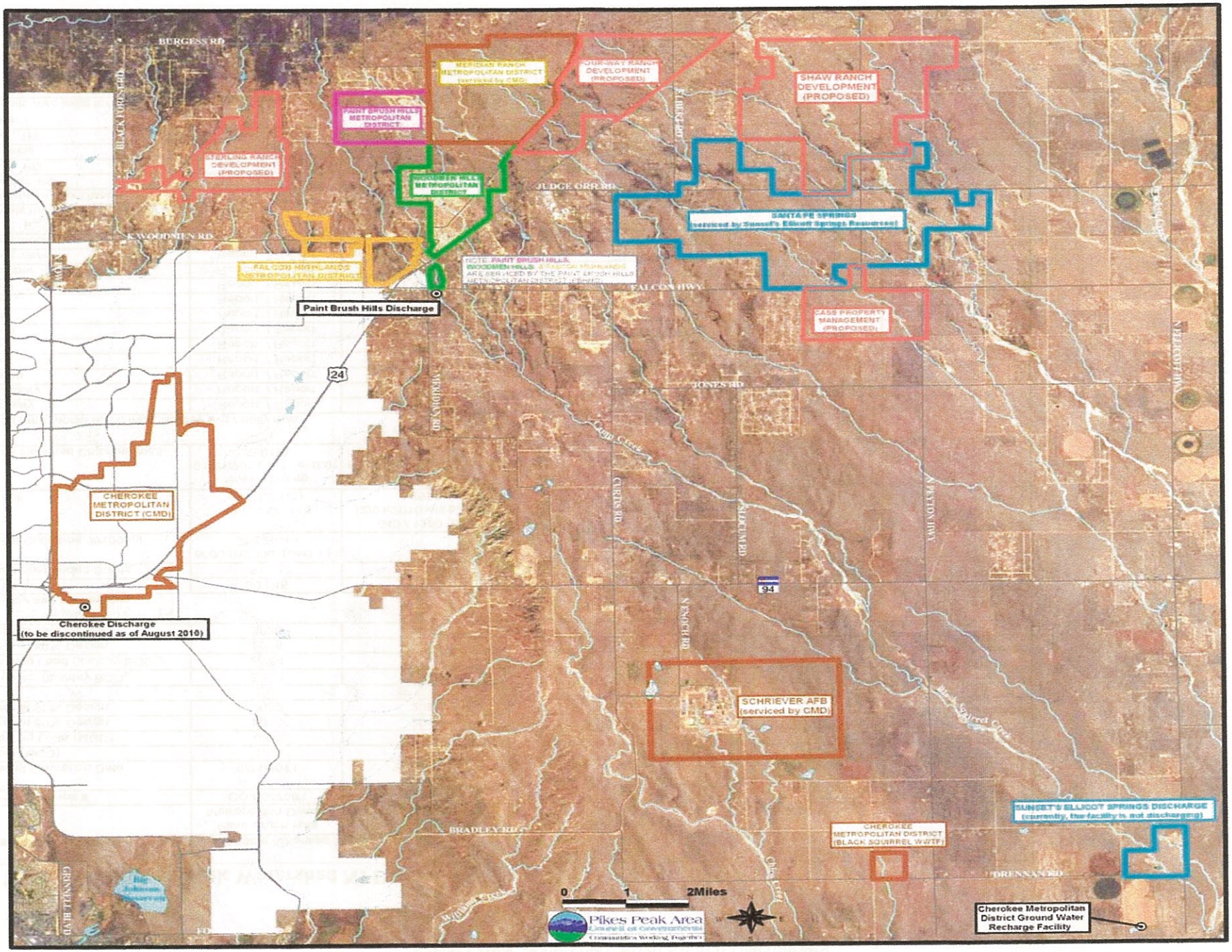
A summary of point source data is presented in Table 9-4, which shows information obtained from the treatment facilities. Service area maps show projected service area boundaries for each facility previously described. The background of these maps is Google Earth satellite imagery, which was updated in September 2005. Major point source discharge locations are shown on the service area maps.

Table 9-4: Chico Creek Watershed NPDES

Discharge Segment	Middle Arkansas Segment COARMA04c		Discharge to Groundwater	Cherry Creek Watershed	Big Sandy Creek Watershed
	Paint Brush Hills Metropolitan District	Sunset's Ellicott Springs	Cherokee Metropolitan District[1]	Walden Corporation	Town of Calhan
NPDES Permit #	CO-0047091	CO-0047252	CO-0024457	CO-0041921	COG--0582015
Permit Expiration Date	5/31/2011	12/31/2010	PEL's to Groundwater (Issues 8/2006)	11/30/2003	10/31/2010
Flow (MGD)	1.30	0.25	0	0.11	0.80
Existing Load (MGD)	0.94	0.01	0	0.03	0.05
Year at 80% Design	2015	2015	2020	2020	2020
Year at 95% Design	2020	2020	2025	2025	2025
Organic (lbs/day BOD_5)	3,470	2,168	0	230	170
Existing Load (lbs/day BOD_5)	2,784		0	41	85
Year at 80% Design	2015	2012	2020	2020	2020
Year at 95% Design	2020	2015	2025	2025	2025
30-day avg / 7-day avg					
BOD	30 / 45	30 / 45 /	30 / 45		
Total Suspended Solids	75 / 110	75 / 110			
Fecal Coliforms, #/100 ml	6000 / 12000 (until 12 / 31 / 2010)				
E. coli	126 / 252 beg 01/01/2011)	640 / 1280 (beg 12/01/2010 will be 126 / 252)			
Total Residual Chlorine, mg/l	N/A / 0.5 (beg 01/01/2011 will be 0.01 /0.019)	N/A / 0.5 (beg 12/01/2010 will be 0.01 / 0.019)			
Total ammmonia as N, mg/l, 30-day avg / daily max					
January	Report / Report	6.3 / 12.0			
February	Report / Report	5.1 / 11.0			
March	Report / Report	2.9 / 6.8			
April	Report / Report	1.8 / 5.4			
May	Report / Report	1.7 / 6.8			
June	Report / Report	1.9 / 9.2			
July	Report / Report	1.3 / 7.9			
Aug	Report / Report	1.1 / 6.3			
Sept	Report / Report	1.4 / 7.1			
October	Report / Report	2.5 / 9.7			
November	Report / Report	3.6 / 10.0			
December	Report / Report	3.8 / 8.6			
Metals (conc in ug/l), 30-day avg / daily max					
Chromium Hex Dissolved	Report / Report		0.1 (30-day avg, total)		
Copper, PD	Report / Report				
Lead, PD	Report / Report		0.05 (30-day avg)		
Cyanide	NA / Report		0.2 (30-day avg)		
Iron , TR	Report / NA		0.3 (30-day avg, TD))		

Note:

[1] Limits also exist for nitrate (10, daily max); sulfate (250, 30-day avg); and chloride (250, 30-day avg). Based on PELs developed for groundwater.


BURGESS RD
BLACK FORD RD
MERIDIAN RANCH METROPOLITAN DISTRICT (serviced by CMD)
FOUR-WAY RANCH DEVELOPMENT (PROPOSED)
SHAW RANCH DEVELOPMENT (PROPOSED)
PAINT BRUSH HILLS METROPOLITAN DISTRICT
STERLING RANCH DEVELOPMENT (PROPOSED)
WOODMEN HILLS METROPOLITAN DISTRICT
JUDGE ORR RD
SANTA FE SPRINGS (serviced by Sunset's Ellicott Springs Resources)
K WOODMEN RD
FALCON HIGHLANDS METROPOLITAN DISTRICT
NOTE: PAINT BRUSH HILLS, WOODMEN HILLS & FALCON HIGHLANDS ARE SERVICED BY THE PAINT BRUSH HILLS METROPOLITAN DISTRICT (PBHMD)
FALCON HWY
Paint Brush Hills Discharge
CASS PROPERTY MANAGEMENT (PROPOSED)
24
MERIDIAN RD
JONES RD
Camp Creek
CHEROKEE METROPOLITAN DISTRICT (CMD)
CURTIS RD
SLOCUM RD
N PEYTON HWY
94
N ELLICOTT HWY
Cherokee Discharge (to be discontinued as of August 2010)
N ENOCH RD
SCHRIEVER AFB (serviced by CMD)
Black Squirrel Creek
SUNSET'S ELLICOT SPRINGS DISCHARGE (currently, the facility is not discharging)
CHEROKEE METROPOLITAN DISTRICT (BLACK SQUIRREL WWTF)
BRADLEY RD
DRENNAN RD
GRINNELL BLVD
Williams Creek
Chico Creek
0 1 2Miles
Pikes Peak Area
Cherokee Metropolitan District Ground Water Recharge Facility

9.4 Nonpoint Source Assessment

The Chico Creek Watershed covers about 736 square miles and about 37 square miles are in crop production. Most of the land that is owned by the state is used for livestock rangeland. The primary nonpoint source issue of concern in this region is from increasing urbanization in El Paso County.

The five biggest nonpoint source issues are:

- Livestock and grazing;
- Agriculture;
- Natural resource management;
- Onsite Wastewater Systems (OWS); and
- Urban and construction activities.

9.4.3 Livestock and Grazing

Most of the livestock and grazing is currently within the Chico Creek Basin and is limited to the two main ranches, Bohart and Chico Basin. The Chico Basin Ranch is a working cattle ranch on the high prairie and is owned by the State of Colorado. It is leased by Duke and Janet Phillips and their family for a 25-year term that began November 1, 1999. Its sprawling ranges of shortgrass and sand sage prairie, spring-fed lakes, meandering creeks, and hidden pools are home to a diverse wildlife population of birds, pronghorn, deer, fish, prairie dogs, coyote, badgers, and more. The Chico Basin Ranch is dedicated to the enhancement and preservation of the natural world and western heritage. The mission of the ranch is to create a working model that views the ranch as an ecological resource base. This base supports a complementary mix of enterprises that emphasize sustainability, innovative management, and diversification as the keys to economic and ecological viability.

9.4.2 Agriculture

There currently appears to be limited agriculture activities, and potential sources of agriculture contamination include:

- Pesticides and fertilizer storage, mixing, loading, and inappropriate application practices;
- Back-siphoned agriculture chemicals (application of agriculture chemicals through irrigation systems is regulated by the Colorado Department of Agriculture

(http://www.colorado.gov/cs/Satellite/Agriculture-Main/CDAG/1167928162806), and their rules require that backflow prevention be installed and inspected;

- Animal waste stockpiles or lagoons; and
- Daily barn wastes.

9.4.3 Natural Resource Management

Some of the problem statements identified through the Chico Basin Conservation Leadership Initiative (2002), which focused on concerns and issues in the Chico Creek Subwatershed, are:

- Growth; fragmentation; encroachment impacts to the land, ecosystems, plants and animals.
- Ecological and economical viability of Basin without water.
- Proper management and mitigation.
- Economics of land development and options and opportunities to generate dollars to develop land and develop a vision and action to change economics.
- Lack of knowledge/understanding and ability to value the area.

9.4.4 Onsite Wastewater Systems (OWS)

Onsite wastewater systems effluent is the most common water quality concern in rural areas that do not rely on central wastewater services. This is largely a result of OWSS that are improperly installed or poorly maintained and may cause bacterial and chemical contamination. Groundwater contamination is especially important because of the number of groundwater wells in the area that are utilized for drinking water. Because Fountain Creek and Chico Creek Watersheds are within El Paso County, the OWS issues associated with the Chico Creek Watershed are included in the Nonpoint Source Assessment Section of the Fountain Creek Watershed (Section 8.4).

9.4.5 Urban and Construction Activities

Urban and construction activities that are planned in the watershed, especially in the Upper Black Squirrel Creek Drainage, could have the following effects if not closely monitored:

- New development can decrease the recharge rates of the aquifers by replacing pervious surfaces with impervious surfaces.

- Impervious surfaces can lead to increased stormwater runoff and increased velocity.
- Impacts to riparian and wetland areas.
- Pollutants such as oil and grease in stormwater runoff from urban activities.

9.5 Management Associations and Watershed Groups

This section discusses wastewater operating agencies, management agencies/associations, and watershed groups/organizations in the Chico Creek Watershed.

9.5.1 Wastewater Operating Agencies

The following organizations are recognized as wastewater operating agencies within the Chico Creek Watershed. These agencies are responsible for controlling all aspects of the collection, treatment, and discharge of sewage or industrial concern, within their company's sphere of operation. Each of these operating agencies is discussed in further detail in Section 9.3, Chico Creek Watershed Point Source Dischargers.

- 4-Way Metropolitan District
- Sunset's Ellicott Springs
- Paint Brush Hills Metropolitan District
- Cherokee Metropolitan District
- Falcon Highlands Metropolitan District
- Meridian Service Metropolitan District
- Woodmen Hills Metropolitan District

PPACG also recognizes wastewater operating agencies located outside of the Chico Creek Watershed but within El Paso County

9.5.2 Management Agencies/Associations

No association currently exists in the Chico Creek Watershed. Due to the future growth in the Upper Black Squirrel Subwatershed, formation of the Upper Black Squirrel Water Quality Management Association (WQMA) is recommended. This association would include portions of the two previous associations, Eastern El Paso and High Plains, which were recommended for formation in the 1999 208 Plan Update. This association will be based on the boundaries of the Upper Black Squirrel Subwatershed.

Due to the limited number and size of communities outside of the watershed but still within El Paso County, it is also recommended that this association review site applications from entities adjacent to the watershed, including the towns of Calhan and Ramah and the Colorado Centre Metropolitan District.

Until a WQMA is formed, this area will continue to have all its site applications for new or modified wastewater facilities or interceptors reviewed by the Lower Fountain WQMA before being submitted to PPACG.

Cherry Creek Watershed Authority

The Cherry Creek Watershed Authority was formed to determine appropriate phosphorous loading into the Cherry Creek Reservoir. Phosphorus loading in Cherry Creek Reservoir is a prime concern of many agencies. Planning activities relating to the reduction of phosphorus loading in the reservoir have occurred through the local master-planning group (Cherry Creek Basin Authority), the regional planning agency (Denver Regional Council of Governments), and the CDPHE. Following rigorous work to provide an equitable plan to allocate phosphorus loading in the entire Cherry Creek basin, the Colorado Water Quality Control Commission adopted "Regulations for Control of Water Quality in Cherry Creek Reservoir." Although El Paso County is located in a small portion of the Cherry Creek basin, due to the lack of urban density developments and a nondischarging wastewater treatment plant facility, this regulation does not contain a phosphorous allocation for El Paso County.

El Paso County

El Paso County is a statutory government and has its own individual environmental health department and processes septic system permits, regulating water quality, solid waste and other environmental health concerns. The county must assure adequate water supplies are available to support approved development and in approving the plans for Title 32 Special Districts and land use approvals for related facilities.

9.5.3 Groups/Organizations

Upper Black Squirrel Creek Groundwater Management District

This district was established in 1968 by the Colorado Groundwater Commission to review water rights applications and information concerning withdrawals for this basin. This district is authorized to adopt additional rules and regulations to help administer groundwater within their district. The boundaries of this district generally correspond to the natural limits of the surface water drainage basin down to the southerly extent of Squirrel Creek Road. A copy of the rules of this district is available at http://water.state.co.us/cgwc/rules-regs/UpperBlackSquirrelCreek.pdf.

Chico Basin Conservation Leadership Initiative

A Chico Creek Watershed group met several times in 2002 to talk about concerns and issues in the Chico Creek Subwatershed. This group is no longer meeting. It was composed of representatives from the El Paso County Planning Department, Natural Resource Conservation Service, the Nature Conservancy, Chico Basin Ranch, and Central Colorado Conservation District.

9.6 Conclusions and Recommendations

9.6.1 Conclusions

The Chico Creek Watershed is unique because portions of the watershed are still relatively undisturbed, but, because of its proximity to Colorado Springs and other metropolitan areas, this is expected to change. Most of the growth projected in this watershed is located in the northern portion.

Conclusions drawn from a review of the information contained in the plan include:

- Chico Creek Subwatershed is primarily rural, but several developments are proposed in the northern portion of the Upper Black Squirrel Subwatershed. This development is expected to increase wastewater needs.
- The primary source of drinking water is from groundwater wells that tap into the Upper Black Squirrel Creek alluvial aquifer.
- The Chico Creek Subwatershed is a large, biologically diverse area with large tracts of state school trust and federal-owned land. The subwatershed has historically sustained an agricultural economy but is now threatened by fragmentation, development, and loss of water due to increased diversions and growth-related uses.

9.6.2 Recommendations

Continue the El Paso County Groundwater contamination study (2009). Assess and evaluate recommendations made through that study for implementation.

Evaluate the need and the funding possibilities of locating a water quality and streamflow monitoring station on Chico Creek (immediately above the confluence with the Arkansas River) and/or Black Squirrel Creek. The upper and middle portions of Black Squirrel Creek and Chico Creek are ephemeral streams; there is perennial flow only along the lower portions of Black Squirrel Creek and Chico Creek.

Source Water Protection

Evaluate possible locations and needs for a well-head protection program in the Upper Black Squirrel Subwatershed. Recommendations and information collected through the CDPHE Source Water Assessment Protection effort should be used in this evaluation. This will become a critical issue to address with the increased growth and reliance on the alluvial aquifer as a source of domestic water supply.

Stormwater and Urban Runoff

Stormwater detention, retention ponds, or other BMPs should be utilized to minimize flooding, maximize infiltration, and minimize water quality impacts from impervious surface contaminants. Detention ponds should also be designed as an amenity for development projects and other purposes.

Watershed Plan

Evaluate the need to develop a watershed plan for the Chico Creek Watershed based on the EPA's nine watershed planning elements.

Onsite Wastewater Systems (OWS)

The conclusions and recommendation developed through the CDPHE ISDS workgroup (available in 2010) should be reviewed to determine if the concerns are adequately reflected in the current El Paso County ISDS Regulations (2008). The possibility of increased nutrient loading into surface water or groundwater should be assessed, especially in critical areas where poor soils and high water tables contribute to septic system failure. This analysis will help evaluate if residential and commercial property should be connected to a central wastewater service.

A map should be prepared that indicates areas where OWSs should not be located. The map should show the following components:

- Location of OWSs and monitoring and drinking-water wells within El Paso County;
- Location of failed OWSs;
- Facts influencing the design and location of OWSs.

Similar recommendations are also made for Park and Teller Counties.

Wastewater Treatment Plants

Evaluate the possibility of future wastewater treatment plants and expansion of existing wastewater treatment plants in areas of existing and projected growth and proximity to areas currently served by OWSs.

Water Quality Management Association

An Upper Black Squirrel WQMA should be formed to serve the Upper Black Squirrel Subwatershed, based on the boundaries of the Upper Black Squirrel Subwatershed, shown in Figure 9-1. This is critical because of the significant current growth and

planned future growth in this watershed and the effects that this will have on current and future wastewater services provided in the area. The Upper Black Squirrel WQMA would have authority to review all site applications for new or modified wastewater facilities or interceptors. Currently, these are being reviewed by the Lower Fountain or Upper Monument WQMA. The WQMA should be established with the cooperation of the Lower and Upper Monument WQMA, and the initial members should consist of:

- 4-Way Metropolitan District
- Sunset's Ellicott Springs
- Paint Brush Hills Metropolitan District
- Cherokee Metropolitan District (*Due to service area boundaries and legal ties, Cherokee is also a member of the Lower Fountain WQMA.*)
- Ellicott School District
- Falcon Highlands Metropolitan District
- Meridian Service Metropolitan District
- Woodmen Hills Metropolitan District (*Currently a member of the Lower Fountain WQMA but will change when Upper Black Squirrel WQMA is formed.*)
- El Paso County Board of Commissioners

Future proposed districts or developments impacting the watershed should also be reviewed to be included in this list. Once this WQMA is established, it will also be responsible for review and coordination of permits affecting areas immediately outside the watershed such as the towns of Calhan and Ramah.

Until a WQMA is established, the Lower Fountain WQMA will be responsible to review any site applications in this area.

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Appendix A

Site Application Review Process

PPACG staff and the Water Quality Management Committee (WQMC) review site applications and recommend acceptance or rejection to the PPACG Board of Directors, which is responsible for signing the site application. This review helps the Colorado Department of Public Health, Water Quality Control Division (CDPHE-WQCD) determine if they should approve or deny a site application and potential requirements of the applicant. PPACG and the CDPHE require that site applications be consistent with the latest revision of the Water Quality Management (208) Plan. In some cases the applicant may request to revise the 208 Plan prior to submitting the site application. All 208 Plan amendments will be reviewed separately and processed according to Appendix B, *Water Quality Management Plan Amendment Procedure*.

A site application is required for the following reasons:

- Construction of a new domestic wastewater treatment plant; or
- Construction or expansion of a lift station or interceptor; or
- Modification/expansion of an existing wastewater treatment plant; or
- Request to amend a previous site approval (lift station, interceptor, or wastewater treatment plant).

Each of the four site application tracts has a different set of criteria that must be addressed and will require certain signatures before it is submitted to the CDPHE-WQCD. In the table below, each of the four site application tracts are shown along with the signatures that are required.

For each of the four different tracks, a site application checklist and site application form is available through PPACG. The requirements, stated in CDPHE Regulation 22, can be downloaded from www.cdphe.state.co.us and are available at PPACG.

Table A-1: Site Application Review Signatories

Signatures	New WWTP	Construction or expansion of lift station or interceptor	Mod./exp. to existing WWTP	Amendment to previous site approval[3]
Water Quality Management Agency[1]	YES	YES (review only)[4]	YES	Yes (review and comment only)
Water Quality Planning Agency	YES	YES	YES	Yes (review and comment only)
City or Town[1]	YES	YES	YES	Yes (review and comment only)
County[2]	YES	YES	YES	Yes (review and comment only)
Local Health Authority	YES		YES	Yes (review and comment only)

[1]If located within the jurisdictional boundary of city or town (contact planning department), signature is required.

[2]If located within the boundaries of the city or town, county signature is not required, but if it is located outside of jurisdictional boundaries of city or town in the unincorporated portion of county, then a county signature is required.

[3]Copies of site application must be provided as well as the date on which the site application was transmitted to each entity. These entities shall be allowed 15 working days from receipt of the request to comment directly to the WQCD. PPACG will forward the site application to members of the SARC and chairman of the designated management agency. Amendments to a previous site approval include re-rating of plant capacity, lift stations and interceptors.

[4]Must be reviewed by management agency prior to being submitted to PPACG, but signature not required.

After the local review process is complete and all the required signatures are obtained, the site application is sent to the CDPHE-WQCD. The local and CDPHE-WQCD review process usually takes about six months.

Site Application Review Process

Provided below is a summary of the process that is required before the PPACG Board of Directors will review and either approve or not approve the site application. The headings below correspond to the signatories shown in Table A-1.

Prior to submitting a site application, please contact the PPACG Environmental Program Manager at (719) 471-7080 x109 to determine if the location of the proposed site application is within the boundaries of an existing or proposed Water Quality Management Agency (WQMA). The WQMA will review the site application and, if required, sign-off on the site application (for new wastewater treatment plants and modifications/expansion to existing plants) prior to submission to PPACG for review by the Site Application Review Committee (SARC).

Water Quality Management Agency

There are four water quality management agencies:

- *Upper Monument Water Quality Management Association* – covers the northern Pportion of the Monument basin.
- *Mid Monument Water Quality Management Association* – primarily covers the City of Colorado Springs and includes the City of Colorado Springs, Garden Valley Water and Sanitation District, and the City of Manitou Springs.
- *Lower Fountain Water Quality Management Association* – covers lower Fountain (not including Pueblo County) and includes Fort Carson, Fountain, Security, Widefield and Cherokee Sanitation District.
- *Teller County Water Quality Management Association* – covers Teller County

Water Quality Planning Agency (PPACG)

PPACG Review Process

About 45 days is required for an applicant to go through the PPACG review process. To get on the agenda, please contact the PPACG Environmental Program Manager at (719) 471-7080 x109. There are three steps involved in the PPACG review process.

1. **Site Application Review Committee (SARC)** meetings are arranged after a site application has been submitted. At least two weeks lead-time is necessary to allow for time to set up the meeting and to give members enough time to review the application. It is the responsibility of the applicant to send copies of the complete site application package to all members of the SARC (please contact the Environmental Program Coordinator at 719-471-7080 x109). The SARC conducts a thorough review of the site application to make sure that it addresses all the regulatory requirements in CDPHE Section 22. The applicant should have

someone present at this meeting to address all technical questions that members might have.

2. The **Water Quality Management Committee (WQMC)** meets on the fourth Tuesday of every month at 1:30 and reviews the comments made by the SARC and responses from the applicant. The applicant is required to have all responses and comments made by the SARC to the Environmental Program Manager by the third Monday of every month so these comments can be included in the packet of information distributed to the WQMC members for review. The WQMC makes a recommendation to the PPACG Board of Directors regarding approval or disapproval of the site application.

3. The **PPACG Board of Directors** meets on the second Wednesday of every month at 9:00 a.m. and the Chairman has the approval to sign the application on behalf of the Water Quality Planning Agency. An original copy of the site application must be provided to the PPACG Environmental Program Manager prior to this meeting for signature. This item is usually placed on the consent calendar, and someone should be available to answer any questions from Board members.

City or Town (if site is inside boundary)

If the location of the proposed facility is within the jurisdictional boundaries of a city or town, facility approval will require the review and signature from someone of behalf of that entity. This is usually someone from the Planning Department but can be different for each entity. Please contact the PPACG Environmental Program Manager at 471-7080 x109 if you are uncertain who should sign the site application.

County (if site is outside municipal boundary)

Descriptions and contact information for each of the three counties is shown below:

- El Paso County Planning: El Paso County Planning has a 45-day lead requirement to get applications placed on their agenda. The El Paso County Planning Department meets on the third Tuesday of the month at 9:00, and the El Paso County Commissioners meet the second and fourth Thursday at 9:00. El Paso County Planning requires the signature of the Water Quality Management Planning Agency (PPACG) before submitting the application to them.

- Teller County Planning: Teller County Planning Commission usually meets on the second Tuesday of the month at 7:00 p.m. in the Woodland Park City Council Chambers. Please call the Teller County Planning Department at (719) 687-5260 for more information.
- Park County Planning: Please call the Park County Planning Department at (719) 836-4279 for more information.

Local Health Authority

Applications for construction of a new domestic wastewater treatment plant will require the signature of the Health Department for the respective area. The telephone numbers for each of the three local health authorities are listed below.

- Teller County Environmental Health Department: (719) 687-5250
- Park County Health Authority: (719) 836-4265
- El Paso County Health Authority: (719) 578-3131

Appendix B

PPACG Water Quality Management Plan Amendment Process

The 208 Plan details the regional considerations for protection of water quality. In so doing, it projects growth and development trends in the area and establishes a rational plan for accommodating growth. A plan objective is to avoid unacceptable adverse environmental impacts which might be caused by allowing wastewater services to be provided through numerous entities for facilities in an uncoordinated fashion. The Regional Plan amendment process is designed to maintain flexibility in the plan so that unanticipated events can be accommodated when it is shown to be in the best interests of the region. These events include site approvals for new facilities and service area boundary changes. For site approvals, the Site Approval Application Review Process must be pursued in conjunction with the plan amendment process.

When new domestic wastewater treatment works (i.e. treatment facilities, lift stations, or interceptors) are proposed which are not identified in the Regional Plan or when expansions or modifications of existing facilities are proposed which would allow them to serve a greater population than that specified by the Regional Plan, State regulations indicate that the Regional Plan should be amended to incorporate those proposed facility changes before Site Approval can be granted. Amendment of the Regional Plan adds time to the site approval process, but the added time can be minimized by expeditious pursuit of a plan amendment as soon as possible prior to submission of the site approval application.

Also, any significant modification of the service area boundaries of an existing Operations Agency or any formation of a new Operations Agency requires an amendment of the Regional Plan. A new agency must be listed as a designated Operations Agency, and the service area boundaries must be consistent with what is delineated in the Regional Plan in order for review and approval of siting of new wastewater collection and treatment facilities according to State Regulations.

The following Regional Plan amendment process details the criteria for determining whether a given project would require no amendment, a minor amendment, or a major amendment, and it presents the amendment procedure. An applicant should be aware of this procedure and the supplemental information and processing time it requires.

A. Determination of Amendment Requirement

1. PPACG Staff and the WQMC will review the information and make a recommendation to the PPACG Board if an amendment is necessary.

2. The PPACG Board has the final responsibility of determining the plan amendment requirements.

B. Basis for Determination

1. No plan amendment will be necessary if the proposed project is in conformance with the Regional Plan.

2. A plan amendment will not normally be required when:

   a. The project proposes changes in treatment process for improving water quality that do not increase the capacity of the treatment plant.

   b. The project is a pumping station to serve an area that is within the approved service area of the applying Operations Agency, with the population to be served already included in the Regional Plan projections.

   c. The project proposes a minor adjustment in service area boundaries involving less than 10 acres.

3. A minor amendment will normally be deemed necessary if the proposed project involves providing sewage service which meets one of the following:

   a. The amount of sewage generated and served through a treatment facility, pump station, or interceptor is outside of the service area and is less than 50,000 gpd (population equivalent of 667 people based on 75 gpcd).

   b. The addition of more than 10 but less than 160 acres to a service area.

   c. The addition of an area to a defined service area that does not cause an increase of projected population greater than 667 people.

Minor amendments are changes for which water quality impacts or major conflicts are not anticipated and must be agreed upon by the Management Agency, PPACG, and the State Water Quality Control Division.

4. An amendment will be considered major if it involves a proposal to serve a new area, development of a new wastewater treatment plant or provide increased capacity more than that stated above for a minor amendment. These major amendments warrant the highest level of attention and priority as stated in the "Continuing Planning Process for Water Quality Management in Colorado" adopted by the State Water Quality Control Commission.

C. Amendment Procedure

1. Upon initial submittal of a 208 Plan amendment to the PPACG for review, a determination of whether the application is complete will be made, generally within 15 days of submittal. Those deemed incomplete will be returned to the applicant.

2. Once an application is found to be complete, the decision on whether a plan amendment is necessary and whether it is major or minor will be made. If an amendment is required, it will be drafted by PPACG within 30 days.

3. During the next 30 days the draft amendment will be circulated by PPACG to the project sponsor, applicant Management Agency, local jurisdiction planning and health departments, other potentially affected management and operations agencies; and comments will be requested.

4. For a minor amendment the PPACG will decide whether to approve it within 30 days of submittal.

5. For a major amendment, the PPACG will schedule a public hearing at its next meeting and decide whether to approve the proposal.

6. Approved plan amendments will be submitted to the Water Quality Control Division (WQCD) for their concurrence.

D. Project Information Necessary for Amendment

The following list of information must be submitted for a project (where applicable) to allow determination of whether a plan amendment is necessary and to permit preparation and processing of the amendment. Most of this required information is also necessary to process a site approval application. (See list included in Site Approval Process.)

1. Location of the proposed facility, geographical area it is intended to serve by specific delineation of projected service area boundaries on a map, and the existing population of the proposed service area and the 10 and 20 year population projections.

2. Design hydraulic and organic loading capacity of the proposed facility and the expected initial flows and loadings and the projected flows and loading in 10 and 20 years.

3. The names of existing sewer service entities within 5 miles of the proposed service area and facility, a map indicating their boundaries, and direction of gravity flow from the proposed area.

4. Estimated construction costs for the proposed facility, and an estimate of the cost differential between building the proposed facility and the least costly alternative for connecting to an existing facility including a map indicating construction required to accomplish any such connection.

5. A letter from all existing sanitation districts or other sewer service entities within 5 miles stating the feasibility of providing service to the service area and the justification for not connecting to an existing facility where feasible.

6. Identification of other permittees discharging to the same receiving water body and downstream discharges on main streams and any effect the proposed discharge would have on any of them.

7. Proximity to the nearest domestic drinking water source or diversion down gradient from the discharge.

8. Proposed permit effluent limits as developed by the Water Quality Control Division of the State Department of Health for any discharge.

9. Analysis of treatment alternatives considered and a detailed justification for choosing the proposed alternative in terms of surface and/or groundwater quality and other environmental impacts and economic and institutional considerations.

10. Institutional arrangements such as contract and/or covenant terms for all users. This must include Articles of Incorporation and By-laws for homeowners groups to include powers and authority to insure proper operation and maintenance of the facility for its projected life.

11. Management capabilities for controlling the wastewater throughout and maintaining treatment within the capacity limitations of the facility on a continuous long-term basis. This would include user contracts, operating agreements, pretreatment requirements, etc.

12. Potential for water reuse including water rights limitation and any water augmentation plan.

13. Present population and flow commitments of existing facilities to which the development will connect.

14. An indication as to how this project relates to existing and envisioned facilities and the needs of a regional service area for the entire drainage basin.

15. For service area additions, a map delineating the additional area requested and a report on the reasons that this area would best be served by the entity requesting the expansion of their service area.

Appendix C
Site Application Approval Summary 2003 - 2010

	Site Application	Type	Agency	Capacity	County
2003 Site Application Summary					
1	Northern Water Reclamation Facility	WWTF	CSU	30 mgd	El Paso
2	JL Ranch Wastewater Pump Station	P/S	CSU	840,654 gpd	El Paso
3	Talon Hill at Northgate Wastewater Pump Station	P/S	CSU	92,050 gpd	El Paso
4	Deer Creek Metropolitan District	WWTF	DCMD	12, 500 gpd	Park
5	Las Vegas Wastewater Treatment Plant	modify/expansion, tertiary treatment, non-portable reuse treatment	CSU		El Paso
6	Forest Lakes Metropolitan District	2 L/S	FLMD	467 sfrl	El Paso
2004 Site Application Summary					
7	Edith Wolford Elementary School	WWTF	Academy SD 20	7,785 gpd	El Paso
8	Falcon Lift Station	L/S	MSMD		El Paso
9	Greenland Preserve Wastewater Pump Station	P/S	WWSD	13,040 gpd	El Paso
10	Jimmy Camp Creek Lift Station	L/S	WWSD	0.77 mgd	El Paso
11	Bison Ridge Wastewater Lift Station	L/S	CSU	374,000 gpd	El Paso
12	Trails End Monument Lift Station	L/S	MWSD	109,00 gpd	El Paso
2005 Site Application Summary					
13	Peyton High School Septic System	S/S	Peyton SD 23	400 people	El Paso
14	Santa Fe Springs Wastewater Reclamation Facility	WWRF	Sunset Metro District	1,334,100 gpd	El Paso
15	Upper Monument Creek Regional Wastewater Treatment Facility	Expansion	Donala	1,750,000 gpd	El Paso
16	"Thee" Occasion Event Center Onsite Septic System	S/S	Thee Occasion Event Center	4,600 gpd	El Paso
17	Cherokee Metro District - New Wastewater Treatment Plant, Lift Stations and Interceptor	WWTP, L/S, Interceptor	Cherokee Metro District	4.8 mgd	El Paso

	Site Application	Type	Agency	Capacity	County
2006 Site Application Summary					
18	Falcon Highlands Lift Station	L/S	Falcon Highlands Metro District	64,000 gpd	El Paso
19	Fountain Sanitation District Wastewater Treatment Facility	Expansion	FSDWWTF	1.91 mgd	El Paso
20	Northgate Smith Creek Wastewater Pump Station	P/S	Donala	13,000 gpd	El Paso
21	Wal-Mart Lift Station & Southside Lift Station Expansion	L/S	Woodland Park	31, 840 gpd	El Paso
22	Cowperwood SAIC Lift Station	L/S	Cherokee Metro District	12,400 gpd	El Paso
23	Riverbend Crossing Lift Station	L/S	Security Sanitation District	93,000 gpd	El Paso
2007 Site Application Summary					
24	Colorado Springs Airport Wastewater Pump Station	P/S	LVWWTF	880 gpm	El Paso
25	Fairplay Sanitation District Wastewater Treatment Plant	WWTP	Fairplay Sanitation District	0.4 mgd	Park
26	Falcon Highlands Reuse Wastewater Treatment Facility	WWTF	Falcon Highlands Metro District	30,000 gpd	El Paso
27	Platte Canyon School District Wastewater Treatment Plant	WWTP	Platte Canyon School District	19,000 gpd	Park
28	Benet Hill Monastery Wastewater Treatment Facility	WWTF	Benet Hill Monastery	6,246 gpd	El Paso
2008 Site Application Summary					
29	Willow Springs Ranch Sewer Lift Station	L/S	Tri Lakes WWTP	95,000 gpd	El Paso

2009 Site Application Summary					
30	Fort Carson WWTP	Expansion	Fort Carson	3.02 mgd to 4.0 mgd	El Paso
31	Widefield Water and Sanitation District - Mesa Ridge Parkway Force Main Relocation	Force Main Relocation	Widefield Water and Sanitation District	N/A	El Paso
32	Shining Mountain Wastewater Lift Station	L/S	City of Woodland Park		Teller
33	Lower Fountain Metropolitan Sewage Disposal Diestrict (LFMSDD) Interceptor	WWTP, L/S, Interceptor	LFMSDD	N/A	El Paso
2010 Site Application Summary					
34	Wakonda Hills Lift Station	L/S	Monument Sanitation District		El Paso

Appendix D
Cost Estimate

Entity	Description	Project Cost
Upper Arkansas Watershed (Section 7)		
City of Victor	New UV Disinfection System; Head works screen; and Finishing pond for effluent.	$500,000
Fountain Creek Watershed (Section 8)		
Widefield Water and Sanitation District	Plant Expansion; expanding the Jimmy Camp Lift Station and extension of additional force main capacity	$12,300,000
Chico Creek Watershed (Section 9)		
Cherokee Metropolitan District	Wastewater interconnecting piping and lift station will cost approximately	$8,000,000
Sunset's Ellicott Springs	New Wastewater Treatment Plant; Collection/Interceptor Construction/ Rehabilitation; reuse facility	$4,393,000
Sunset's Ellicott Springs	Construction of Santa Fe Springs Facility	$1,500,000
Woodmen Hills Metropolitan District	Plant Expansion	$10,000,000

Appendix E
Summary of 2010 208 Plan Public Comments

Below is a summary of the public comments that have been received so far during the public comment period. During the first and second week of September, public meetings were held in Colorado Springs, Woodland Park, and Fairplay. Comments included: 1) Spelling, syntax, and grammar changes; 2) Clarifications of existing information; and 3) Concerns regarding oil and gas drilling and uranium mining in South Park and potential effects on water quality. Editorial comments that required spelling, syntax, or grammar changes were not included in the list of comments below. Identical and similar comments were included once and not multiple times. Comments are shown in italics and responses are shown in regular text.

An electronic copy of the 208 Plan is available at:
http://www.ppacg.org/downloads/Environment/Water-Quality/
The footer of the revised version will show as 9/28/2010 and reflect changes that were made during the public review and comment period.

Comment: *Several spelling, syntax, and grammar mistakes were identified throughout the Plan.*

Response: All identified spelling, grammar, and syntax errors were fixed.

Comment: *Some of the information in the water quality standards stream segments and water quality impaired stream segment lists needs to be updated.*

Response: All tables identifying water quality impairments and stream standards were checked with tables on the Colorado Department of Public Health and Environment website and any corrections that needed to be made were made.

Comment: *The wording and tense in part of the Fountain Creek chapter makes it sound as if there is one or more ongoing E. Coli water quality studies, but I thought that effort had wrapped up several months ago. Is a new study indeed taking place now?*

Response: The tenses are incorrect. The E. coli study that was conducted by the USGS on Upper Fountain Creek has been completed. There was also a separate study conducted by CSU-Pueblo in cooperation with the Lower Arkansas River Conservancy District which primarily focused on the main stem of Fountain Creek. The study (sampling and analysis) has been completed and the results appear to be inconclusive, but the Report is still being developed and it will probably not be out for another six months. Corrections to the information were made on page 8-11.

Comment: *At the bottom of the Fountain Creek chapter, there is this statement: "Develop a Green Infrastructure Plan to develop better linkages between water quality, stormwater, transportation and land use." What is Green Infrastructure, how would its implementation create "better linkages" in the manner stated, what would it take to develop such a plan, and is there an estimate of what that would cost?*

Response: The Green Infrastructure Plan (GI) is also discussed in PPACG's Regional Transportation Plan to help meet the federal requirement of mitigation planning. Green infrastructure is defined as strategically planned and managed networks of open spaces and natural areas, such as greenways, wetlands, parks, forest preserves, and native plant vegetation, that naturally manage stormwater, reduce flooding risk, improve water quality, conserve ecosystem values and functions, and provide associated benefits to human populations. The Plan boundaries for the GI Plan would include the Fountain Creek Watershed which also includes the MPO planning boundaries.

Before a GI Plan would be developed, a GI workshop would be held which would be about 2 to 3 days. The workshop would occur this fall or winter (the date has not been set). Funding for the workshop would be provided through transportation planning funding and be about $20,000 to $25,000. The actual cost for development of a Plan has not been scoped out and would be done after the workshop.

Development of the Plan will require agreement among the various interests and agencies to collaborate and cooperate. One of the primary purposes is to create better linkages by getting agencies to collaborate and determine what would be best for the region and not their individual issues. Development of the Plan would link different and sometimes conflicting resource issues and needs into creating solutions that benefit the entire watershed.

An additional recommendation was added on page 8-57 regarding hosting a Green Infrastructure Workshop and developing a Green Infrastructure Plan and clarification language regarding the intent of Green Infrastructure on page 1-13.

Comment: *Is EPA's proposal to set numeric discharge limits for stormwater discharges discussed in the Plan?*

Response: A summary of the November 23, 2009, EPA rules, which are intended to control stormwater for construction sites, was added on page 2-4. This includes the requirement of numeric discharge limits from larger construction sites.

Comment: *Increase involvement and monitoring for dissolved uranium, radium 221, radium 228 in the entire South Platte headwaters Watershed. Special emphasis would be to establish pre baseline data should in situ uranium mining leach mining occur in the upper basin?*

Response: In the South Platte Conclusions and Recommendations on page 6-55, there are several recommendations regarding the importance of improving the existing surface water and groundwater monitoring network. An additional recommendation was also added regarding the need to conduct dissolved uranium and radium monitoring. Much of the water quality data in Park County is old and sparse, making it difficult to establish trends. Potential ramifications regarding a lack of water quality data were also noted in the conclusion section.

Comment: *Consider designating the Upper South Platte Basin as a watershed of State Concern or which would allow petitioning both the federal governments, state governments and local governments to prohibit certain activities that have a serious threat to both surface and deep water aquifers? Identify the Park County aquifer as a Source Water Protection area?*

Response: According to the EPA website, there are currently no sole source aquifers designated in Colorado and no pending petitions. A recommendation was included in the South Platte Conclusions and Recommendations Section, on page 6-55 to develop a report to petition the EPA to designate the South Park Aquifer as a source water protection area according to the requirements shown on http://www.epa.gov/region8/water/solesource.html. The report should be based on the EPA Sole Source Aquifer Designation Petitioner Guidance which provides procedures and criteria for proposing aquifer boundaries, determining whether an aquifer is the sole or principal source of drinking water, and for evaluating alternative sources of drinking water. One of the requirements by the EPA to designate a sole source aquifer is that it must supply at least 50 percent of the drinking water consumed in the area overlying the aquifer. Further, the EPA regulations stipulate that these areas can have no alternative drinking water source(s) which could physically, legally, or economically supply all those who depend upon the aquifer for drinking water. If this aquifer does not qualify due to drinking water consumption, then further federal, state, or local efforts may be required. This includes the CDPHE Source Water Assessment Protection Program: http://www.cdphe.state.co.us/wq/sw/swaphom.html

PPACG does not have the jurisdictional authority, only EPA has that authority to designate Park County as a Source Water Protection area. As stated in the response to the previous question, an analysis must be completed and sent to EPA. Potential concerns over Radon and Uranium are discussed on page 6-18, in addition to the naturally occurring high levels that have been encountered.

Comment: *Increase emphasis on determining level of radon in private wells throughout the Pikes Peak Council of Governments and mandating that radon mitigation systems be required when building permits are issued.*

Response: There are no regulatory requirements regarding testing of private wells, but information will be added to the recommendations section to encourage testing of local wells for radon. The Colorado Primary Drinking Water Regulations govern public water systems: http://www.cdphe.state.co.us/wq/drinkingwater/ (Table 9-1 of the Regulation includes a list of Regulated Contaminants which includes a list of radioactive contaminants such as Uranium.)

Currently there is no federally enforced drinking water standard for radon. Proposed regulations however due suggest a maximum contaminant level of 300 picocuries per liter (pCi/L) and an alternative maximum contaminant level of 4,000 pCi/L contingent on other mitigating remedial activities to reduce radon levels in indoor air. Radon concentrations in about 91 percent of groundwater samples were greater than or equal to 300 pCi/L. and about 25 percent had radon concentrations greater than or equal to 4,000

pCi/L (USGS Scientific Investigations Report 2007-5220). A recommendation was added based on the available data to evaluate the need for mitigation systems to reduce radon levels.

Comment: *Conduct more research into the historic mining activities in the region and the ramifications on surface and groundwater contamination?*

Response: Colorado Upper South Platte (CUSP) currently is conducting a study on historic mining areas and assessing potential water quality impacts.

Comment: *How will future health of residents be protected from surface and groundwater contamination caused by oil and natural gas wells and Uranium mining.*

Response: In August 2010, the Colorado Mined Land Reclamation Board approved new regulations which will increase protection from in-situ uranium mining. This includes a requirement for in-situ uranium firms to restore water quality to either pre mining conditions or state groundwater standards after mining operations are complete. Other measures were also included in the regulation to protect water resources around the State. Baseline water quality testing will also be required for all in-situ Uranium mining during the prospecting phase.

Park County has land use authority over areas where natural gas wells are proposed and existing land use regulations (Article V, Division 10, Section 5-1004) regarding oil and gas operations: http://www.parkco.us/DocumentView.aspx?DID=393

Comment: *Page 5-1, third paragraph, "It is recognized that implementation of standards can have both intended and unintended consequences...." While I understand the intent of this sentence from a planning perspective, as it written it is a bit confusing. Philosophically, can all consequences ever be identified, and if not then would action ever be taken?*

Response: Page 5-1 was reworded to say that it is critical to recognize the intended and unintended consequences of recommendations during planning and prior to implementation because it could influence project design and potential mitigation actions.

Comment: *Table 6-3,"Approved TMDLs South Platte/Upper South Platte Watersheds." Some additional approved TMDLs: Geneva Creek (COSPUS05b) in 2008: Cu and Zn; this has also been updated to include cadmium on COSPUS05b and submitted as final just yesterday (9/2/10). It also includes COSPUS05a for Cd, Cu, Mn and Zn. Also, the TMDL for Trout Creek (COSPUS03) is in progress for a sediment impairment, but it has not been approved by EPA yet.*

Response: This additional information was added to Table 6-3 on page 6-12.

Comment: *The acronym and abbreviation lists should be expanded to include abbreviations of Wastewater Treatment Facilities and the definitions list should be expanded to include more of the technical terminology used in the Plan.*

Response: The abbreviation list was expanded to include names of Wastewater Treatment Facilities and other abbreviations used in the document and the definitions section was also expanded to include additional terminology.

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Comment: *Do El Paso, Teller, and Park Counties have 1041 permit Regulations in place that would affect water quality or ecosystem health?*

Response: El Paso County does not have any 1041 Regulations currently in place; Park County has 1041 permit regulations in place for wildlife habitat, water and wastewater and these are discussed on page 6-43 of the Plan; and Teller County has 1041 permits required for new communities which include analysis of environmental and land use impacts. Further information can be found at:

http://www.co.teller.co.us/CDSD/Planning/LandUseRegs08.aspx
(Note: see Chapter 11, Permit for a New Community)

Comment: *Page 7-25, Conclusions Section, last bullet regarding unmanaged historic mine sites. Please add text to section 7.4.1 addressing historic mining sites. Only permitted mining activities are currently described.*

Response: Historic mining and abandoned mine drainage (AMD) activities in Teller County have impacted water quality and are a potential threat to human and ecosystem health. There are many abandoned hard rock mines on public and private property in Teller County. Some of these are identified in the Colorado State Office Mine Land Reclamation Plan FY 2007 - 2013
http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION_/aml/aml_strategic_plan.Par.71847.File.dat/AMLStrategicPlan%20Colorado.pdf
The second highest priority watershed impacted by abandoned mines on public lands includes the Upper Arkansas Watershed (this includes several mines located in the Upper Arkansas Watershed but outside of Teller County). These watersheds were prioritized by assessment undertaken by the WQCD in 2000 and 2004. A list of some of the historic mines in Teller County is available at: http://www.victorcolorado.com/stcfgnews.htm
This information will be included in Section 7.4.1, page 7-22.

Comment: *Suggestions were made regarding websites to reference where additional information could be found regarding applicable State regulations or Best Management Practices.*

Response: Applicable websites were referenced in the Plan.