Strategic Plan
for the
Fountain Creek Watershed

Prepared by the Fountain Creek Vision Task Force

Finalized on March 10, 2009

Available online at www.fountain-crk.org

PREFACE

The Fountain Creek Visioning Task Force, begun under the leadership of El Paso County Commissioner Sallie Clark and Pueblo County Commissioner Loretta Kennedy, created the framework for one of the most progressive and collaborative initiatives in the State of Colorado. Recognizing that issues on Fountain Creek had come to a critical point, leaders in both counties began a discussion that has led to the drafting and signing of an Intergovernmental Agreement between Pueblo and El Paso Counties and municipalities within both jurisdictions.

The Fountain Creek Visioning Task Force initially created three subcommittees devoted to remedying excessive water flows, improving water quality and exploring land use issues that contribute to these problems. Later, a subcommittee to develop ways to fund an entity dedicated to Fountain Creek, was established. Though the process took two and a half years to complete, it encompassed the hopes and dreams of citizens in both counties to make Fountain Creek an amenity that can be enjoyed by all.

Not only will the entity address the major issues of water quantity and quality, but also how to make this stretch of land between Colorado Springs and Pueblo a recreational and educational area that will sustain the Creek. Where the entity will take the vision in the future is in the hands of those appointed to the Board of Directors. But we are sure that it will continue to develop creative ways to keep Fountain Creek vital and an invaluable link between two great communities.

Sallie Clark
El Paso County Commissioner

Jeff Chostner
Pueblo County Commissioner

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Note: Due to the size of the appendices, they have been posted on the website separately from the rest of the Strategic Plan to facilitate downloading.

INTRODUCTION

The Fountain Creek Vision Task Force was a collaborative effort of government officials, advocacy groups, and residents in three counties in southern Colorado working together to restore a neglected watershed, create a shared natural amenity, and bring their communities together. Task Force participants brought their respective aspirations, perspectives, experiences, and knowledge to bear on the many challenges facing the watershed. Managed by the 29-member Consensus Committee, participants in the Task Force came together in working groups to address issues of water quality, water quantity, and land use and environment. The working groups met monthly for more than two years, inviting expert speakers from local, state, and federal agencies and non-governmental organizations to provide data and other information as context to inform their discussions. When it became clear that the solutions for Fountain Creek would require additional funding and more dedicated management that what was currently available, the Consensus Committee created a working group to identity the best approach to address those issues as well. The Fountain Creek Vision Task Force Strategic Plan is the final work product of all these groups. It is a road map to improved conditions and enhanced opportunities throughout the watershed.

Participation in the Process

Participation in all working groups was open to the public. More than 60 people who were not part of the Consensus Committee participated regularly in working group meetings. Many of these individuals represented various government entities, but several were unaffiliated residents of the watershed with a sincere interest in restoring Fountain Creek.

The Consensus Committee served as the decision-making for the Task Force. The following entities had seats on the Consensus Committee:

Counties	El Paso
	Pueblo
	Teller
Municipalities	Colorado Springs
	Fountain
	Palmer Lake
	Pueblo
Councils of Governments	Pikes Peak Area Council of Governments (Board members & staff)
	Pueblo Area Council of Governments (Board members & staff)
Advocacy Groups	Colorado Open Lands
	Colorado Progressive Coalition (on behalf of residents of Pueblo's East Side)
	Sierra Club
Ranching Community	Arkansas River Basin ranchers
	El Paso County ranchers along Fountain Creek
	Pueblo County ranchers along Fountain Creek
Water Management Agencies	Colorado Springs Utilities
	El Paso County Water Authority
	Fountain Utilities

	Lower Arkansas Valley Water Conservation District
	Pueblo Board of Waterworks
Colorado's Congressional Delegation	Senator Salazar's office
	Senator Allard's office
	Congressman Lamborn's office
	Congressman Salazar's office
Other Entities	Colorado State Parks
	Fountain Creek Technical Advisory Committee
	US Department of Defense

Preparation of the Plan

The Strategic Plan is a collaborative document, written by stakeholders in the Fountain Creek Watershed. These stakeholders came from a variety of perspectives and backgrounds, but each contributed to the preparation of the final Strategic Plan. This Plan benefited greatly from the leadership of the Consensus Committee and the ongoing working group participation and commitment of the following individuals. *Individuals who served on the Consensus Committee are indicated by an asterisk (*). Some entities changed their representatives to the Consensus Committee during the course of the Task Force process.*

Kathy Andrew	El Paso County Environmental Services
Tom Autobee*	Pueblo Board of Water Works
Dick Anderwald	City of Colorado Springs – Dept. of Community Development
Carol Baker	Colorado Springs Utilities
Gary Barber*	El Paso County Water Authority
Mary Barber*	Fort Carson
Dan Bare	City of Colorado Springs
Jeff Besse	City of Colorado Springs – Stormwater Drainage Team
Elise Bergsten	Cross Creek Metropolitan District
Vickie Broerman*	Senator Wayne Allard
Chris Butler	CH2M HILL
Stephanie Carter	Department of the Army – Fort Carson
Jeff Chostner*	Pueblo County Board of County Commissioners
Sallie Clark*	El Paso County Board of County Commissioners
John B. Cordova, Sr. *	Pueblo County Board of County Commissioners
Scott Cowan	Pueblo City/County Health Department
Todd Dahlberg	Colorado Springs Utilities
Barbara Dallemand	El Paso County Public Service Department – Stormwater Program
Pat Edelmann	US Geological Survey
Ron Ensero	URS Corporation
Danny Elsner	Matrix Design Group
Paul Fanning	Pueblo Board of Water Works
Mike Fink	City of Fountain Water Resources
Ferris Frost	Landowner
Dwight Gardner	Senator Salazar
Juliet Glass	El Paso County Public Services Dept – Environmental Services
Mark Glidden	CH2MHILL

Jane Green*	Landowner
Kim Headley*	Pueblo County Department of Planning and Development/PACOG
Dan Henrichs*	Land Owner
Dennis Hisey*	El Paso County Board of County Commissioners
Jeri Howells*	Mayor - Fountain
Amber Jack	El Paso County Public Services Dept. – Environmental Services
Juniper Katz*	Colorado Open Lands
Neil Katz	El Paso County Parks
Brian Kay	El Paso County Parks
Sarah Keith	City of Colorado Springs, Parks, Recreation, and Cultural Services
Loretta Kennedy*	Congressman John Salazar
Irene Kornelly	Citizen
Carole Lange	Carole Lange and Associates, LLC
Dennis Maroney*	City of Pueblo Stormwater Utility
Bruce McCormick*	Colorado Springs Utilities
Gene Michael	Pueblo Wastewater Department
Rex Miller*	Landowner
Bob Miner*	Town of Palmer Lake Watershed Study
Margaret Montano*	Colorado Progressive Coalition
Rich Muzzy*	Pikes Peak Area Council of Governments
Annie Oatman-Gardner*	Senator Salazar
Vera Ortegon*	City of Pueblo City Council
Sal Pace*	Colorado State Representative
Larry Patterson*	City of Fountain
Julie Pearson	City of Colorado Springs
Cynthia Peterson	AWARE Colorado
Nancy Prieve	El Paso County Public Services Dept. – Environmental Services
Joe Rall	Congressman Lamborn
Gary Rapp	Recycling Coalition of Colorado Springs
Sandy Rayl	US Army Corps of Engineers
Tom Ready*	Colorado State Parks Board
Kathleen Reilly	Colorado Department of Public Health and Environment
Jane Rhodes*	Landowner on Fountain Creek in Pueblo County
Lisa Ross	City of Colorado Springs – Stormwater Enterprise
Ken Sampley	City of Colorado Springs
Kirsta Scherff-Norris	Colorado Springs Utilities
Richard Skorman*	Director, Colorado Springs Conservation Corps
Larry Small*	Colorado Springs Vice Mayor
Graham Thompson	Matrix Design Group
Ryan Tefertiller	City of Colorado Springs – Dept. of Community Development
Allen Ward	Pueblo Board of Water Works
Thomas Warren*	Ft Carson
Barb Vidmar*	Pueblo City Council
Tim Williams	Pueblo City/County Department of Health
Jay Winner*	Lower Arkansas Valley Water Conservation District
Ross Vincent*	Sierra Club

Heather Bergman and Niki Koszalka of The Keystone Center provided facilitation and record-keeping services for the Task Force. The maps provided in Appendix A were prepared by Jim Houk of Thomas and Thomas.

I. MISSION AND VISION

Mission

The members of the Fountain Creek Vision Task Force have come together to turn the Fountain Creek watershed into a regional asset that adds value to our communities. We are working to create a healthy waterway with appropriate erosion, sedimentation, and flooding that supports diverse economic, environmental, and recreational interests. We will cooperate to enhance and protect Fountain Creek, promoting sustainable use by members of our watershed community and by the visitors we know this wonderful natural amenity will attract.

Vision

Our vision for the Fountain Creek watershed is a strong, resilient, and sustainable ecosystem that supports a variety of interests and activities. Our vision includes a number of issues:

- In terms of water quality, we see a waterway that supports fish and other aquatic species, is safe for recreation, and protects public health.
- Regarding water quantity, we see successful stormwater management to better control flooding and erosion.
- For the larger natural environment, we see healthy, contiguous habitat for a diversity of wildlife species, including the threatened and endangered species that make their homes here. We envision migration corridors into and out of the watershed, allowing species safe and free movement from north to south and from east to west throughout the region.
- With respect to land use planning, we see great opportunities for recreation, including a state park and an integral part of the Front Range Trail. We expect residents and visitors alike to engage in biking, hunting, cycling, fishing, birding, cross-country skiing, camping, and other activities that foster healthy lifestyles and a greater quality of life. We will continue to respect landowners' rights and envision ongoing opportunities for sustainable agriculture and ranching and responsible growth. We anticipate thoughtful and sustainable development that benefits local economies, supports Ft. Carson, encourages the creation of local jobs, builds neighborhoods and neighbors, promotes alternative transportation, and provides green infrastructure and ecosystem services. Throughout the watershed, we envision open space parks and other green areas that connect our residents but separate our cities, allowing each community to create and sustain its own visual and cultural identity.
- Our vision entails achieving all of these things for the entire Fountain Creek watershed. However, we acknowledge that doing so might not be possible or practical in every case and that some vision elements may be confined by necessity to Fountain Creek itself.
- Our vision for the work of the Task Force is to model successful collaboration in watershed clean-up and stewardship. We hope to demonstrate that by working together and striking a balance between short-term and long-term thinking, communities can create and realize a shared vision, turn problems into opportunities, and choose their own future. Solutions that benefit different communities, different species, and different land

uses are possible, and working together to find and implement them empowers communities and creates lasting relationships. We know it is our responsibility to educate the public about our work and promote sound community stewardship of the watershed.

II. FUNDING AND LONG-TERM MANAGEMENT OF THE WATERSHED

In order to accomplish the many goals that are outlined in this strategic plan for Fountain Creek, the Fountain Creek Vision Task Force determined that a funding and management entity must be created to provide leadership and resources in the implementation process. For this reason, the Task Force is recommending that the Colorado State Legislature create the Fountain Creek Watershed Drainage, Flood Control, and Greenway District. The details of this district are outlined in the Inter-Governmental Agreement (IGA) below. Key elements of the district are summarized below.

1. Creation of **a 9-member Governing Board** as follows:

Board Member	**Appointed By**
Pueblo County	Pueblo County
El Paso County	El Paso County
City of Pueblo	City of Pueblo
City of Colorado Springs	City of Colorado Springs
City of Fountain	City of Fountain
Lower Arkansas Valley Water Conservation District	Pueblo County
Small Municipalities in El Paso County or Citizen of El Paso County	City of Colorado Springs and El Paso County
Pueblo County Citizen-at-Large	City of Pueblo and Pueblo County
Member of the Citizen Advisory Group (see below)	El Paso County and Pueblo County

2. Creation of **a taxing district** to receive and/or raise matching funds for projects and maintenance; the district would include all of Pueblo and El Paso Counties and is subject to a vote of the citizens of those counties.

3. Creation of a **Citizens Advisory Group (CAG)** to bring the voices and ideas of residents of the watershed to the deliberations of the Governing Board.
    - Purpose of the CAG:
        - Establish and maintain strong communication with interest groups, communities and stakeholders by serving as a public sounding board for the District Board, providing an opportunity for both the cooperative exchange of information, emerging issues, new ideas and approaches, dissemination of watershed information, as well as early resolution of problems.

        - Assist in the creation, review and prioritization of management strategies and projects
        - Participation on the annual audit committee for the district.
    - Membership on the CAG will include at a minimum the following representation, not to exceed 15 members:
        - Property owners on Fountain Creek south of Fountain
        - City of Pueblo residents (East Side)
        - Arkansas Basin ranchers/farmers/agricultural water interests
        - Land conservation nonprofit organizations (Colorado Open Lands, Palmer Land Trust, etc)
        - Recreation interests (State Parks, Trails and Open Space Coalition)
        - Environmental groups (Sierra Club, Trout Unlimited, Clean Water Action)
        - Potential funding partners (Fountain Creek Foundation, El Pomar)
        - Citizen-at-large
        - Citizen-at-large
        - Business stakeholders

4. Creation of a **Technical Advisory Committee (TAC)** to ensure thoughtful and informed discussion on technically complex issues. Membership on the TAC will be as follows:
    - Six technical representatives, one each from El Paso County, City of Colorado Springs, City of Fountain, Pueblo County, City of Pueblo, and the Lower Arkansas Valley Water Conservation District..
    - As needed, additional technical experts who are knowledgeable on the key issue areas in the Strategic Plan (water quality, flood control, land use planning, wetlands, wildlife, recreation, agriculture, and municipal water) and/or representatives of state and federal agencies with similar expertise.

Commitment to Ongoing Collaborative Planning

Stakeholders in the Fountain Creek Vision Task Force have spent countless hours over the last three years working together to craft not only a vision for the watershed but also a specific plan for realizing that vision. This collaborative effort has been monumental, bringing together government entities, advocacy groups, and residents together to create a something that will lead to fundamental change and improvements along Fountain Creek.

Once the work of the Task Force is completed, the participants in the Task Force are committed to continuing to work together to see that the plan is implemented to the fullest extent possible. A key component of successful implementation will be the creation of the Fountain Creek Watershed Flood Control, Drainage, and Greenway District, a funding and management entity to oversee projects and improvements along the creek. In the unfortunate event that the District does not pass and is unable to generate funds for implementation, the participants in the Task Force will continue to meet regularly and discuss issues pertaining to Fountain Creek. They will work through existing avenues to find funding for projects and to implement the Strategic Plan.

III. WATER QUALITY AND SEDIMENTATION

A. Current Conditions

Introduction

Having good water quality is very important to human health, to fish, and to quality of life. It makes water usable for wildlife and habitat preservation, recreation, drinking water supply, crop irrigation, and industry. Water quality is affected by the activities of people, by wild and domestic animals and by natural causes.[1]

The United States Geological Survey (USGS) collects water quality information at several locations in the Fountain Creek watershed. Some of the data can be accessed at http://www.dwr.state.co.us. Additional links and information on data can be found in the Appendix.

Unregulated Pollutants

The Colorado Water Quality Control Commission (CWQCC) recognizes that excessive salinity and suspended solids can be detrimental to water quality, but has not assigned specific numeric standards to either salinity or suspended sediment in the Arkansas River Basin [2]. Agricultural agencies and water quality planning agencies should coordinate regarding additional water quality information about impacts at specific concentration levels.

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 do 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.[3]

Standards and Classifications

Colorado streams are divided into individual stream segments for classification and protection of designated uses (aquatic life, recreation, agriculture, etc). Streams are divided into segments at some easily defined geographic point, or at a point where some physical or chemical factor changes the character of the watercourse significantly. Colorado, not the US Environmental Protection Agency (EPA), has the primary responsibility for setting water quality standards.

The Surface Water Standards and Classifications Reviews occur once every five years. These are regulatory hearings where the Colorado Water Quality Control Commission decides whether changes in stream segmentation, designated uses, or stream standards are needed. These reviews are conducted for each of the five major river basins. Under the Clean Water Act, every state must adopt water quality standards to protect, maintain, and improve the quality of the nation's

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[1] In this report, "water quality" means the amounts of pollutants (chemicals, bacteria, etc.) in the water, as measured by scientific tests approved by the U.S. Environmental Protection Agency (EPA), and compared against water quality standards in Colorado regulations.

[2] Colorado Water Quality Control Commission (CWQCC). 2007. Regulation No. 31: The Basic Standards and Methodologies for Surface Water. Title 5, Colorado Code of Regulations, 1002-31.

[3] More information on ECs can be found at http://toxics.usgs.gov/regional/emc/index.html

waters. These standards represent a level of water quality that will support the classification use (e.g. Cold Water Aquatic Life, Warm Water Aquatic Life, Recreation, Water supply, etc.) of the stream segments. Fountain Creek is located in the Arkansas River Basin, and designated uses and stream standards for all waters within the Arkansas Basin are contained in Regulation #32 of the Colorado Department of Public Health and Environment (CDPHE). The Arkansas River Basin Rulemaking Hearing (CDPHE Regulation #32) was last held in July 2007, and the next Rulemaking Hearing for the Arkansas River Basin is expected in 2012. Data Analysis for the Basin Hearings will occur from the fall of 2010 through the winter 2012. A copy of Regulation #32 can be found at: http://www.cdphe.state.co.us/regulations/wqccregs/index.html. The tables for the Arkansas River Basin show that the Fountain Creek Watershed (page 11-12) is broken down into eleven different stream segments. Specific water quality standards are listed for each of these stream segments and if they are not maintained then a stream or stream segment can be placed on the state's list of water quality impaired stream segments (known as the "303(d) list"). To protect a waterbody's classified uses, the state sets both numerical and water quality standards. Narrative standards describe the water quality goals for all state surface waters in a list of six general statements. Numeric standards set the maximum acceptable concentrations of specific pollutants in streams, lakes, and reservoirs. [4]

Water Quality Impaired Stream Segments (303(d) List)

Section 303(d) of the federal Clean Water Act requires states to prepare and submit a list to the EPA listing waters that do not meet water quality standards. This is used to set priorities for pollution controls. Any stream where water quality standards are not attained must be placed on the state's 303(d) list. *E. Coli* is listed on the 303(d) list as a high priority for Upper Fountain Creek and the mainstem of Fountain Creek from the confluence of Fountain Creek and Monument Creek to the Highway 47 bridge in Pueblo. 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. More information regarding the 303(d) list can be found at http://www.cdphe.state.co.us/wq/Assessment/TMDL/tmdlmain.html. Once a segment is listed on the 303(d) list, a Total Maximum Daily Load (TMDL) is required to be developed, or if all sources can be identified and treated and sampling shows that concentrations are below the established stream standards, then it can be de-listed. A TMDL 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. [5]

There are currently no regulations or policies controlling sediment. Although sediment is not currently regulated by quantifiable standards, some general language within the State of Colorado's Basic Standards and Methodologies for Surface Waters asserts that, "state surface waters shall be free from substances attributable to human-caused point source or non-point source discharge in amounts, concentrations, or combinations which...can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials

[4] Colorado Foundation for Water Education, 2003. Citizen's Guide to Colorado Water Quaity Protection

[5] Pikes Peak Area Council of Governments. 2004. Water Quality Management (208) Plan 2003 Update. [Online] Available http://www.ppacg.org

which include but are not limited to anaerobic sludges, mine slurry or tailings, silt, or mud…"[6] Therefore, general regulation currently governs sediment loads within the watershed; however, in the near future this could become a more prominent, numeric constraint.

Stream segments that lack sufficient information to determine the source of pollution, but where there are still concerns with attaining water quality standards, are placed on the Monitoring and Evaluation portion of the state's 303(d) List. Sediment within the Fountain Creek watershed has been identified by CWQCC as a concern for three tributaries to Fountain Creek (Bear Creek, Fourmile Creek and Cheyenne Creek) on the 2008 303(d) Monitoring and Evaluation list. This regulation identifies water bodies that may have water quality problems. However, uncertainty within various evaluation criteria necessitates further evaluation. A determination as to whether or not these waters are to be considered impaired will be made within ten years after their placement on the Monitoring and Evaluation List.

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 Centers for Disease Control and most states track the incidence of bacterial infections of the type that are expected to result from ingesting contaminated water while swimming. In addition, epidemiology data provide information relevant to determining the likelihood that a given illness might be related to recreational exposure to Fountain Creek water. However, there is no mechanism to determine definitively whether people are getting sick because of exposure to high levels of bacteria in the creek or for some other reason. More information regarding *E. Coli* can be found on the Centers for Disease Control and Prevention website (http://www.cdc.gov/).

The standards are 200 fecal coliform bacteria per 100 milliliters of water, or 126 *E. Coli* bacteria per 100 milliliters of water. The EPA estimates that at these levels, for each 1,000 people exposed, eight may become ill. Monitoring conducted by the Pueblo City/County Health Department shows that bacteria frequently exceed water quality standards in Fountain Creek, especially in 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

[6] CWQCC. 2007.

material. 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, like 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 raw sewage spills, storm runoff from urban areas, wildlife (deer, elk, geese), livestock (cattle, horses, pigs, poultry), and runoff from farms, ranches, and open areas. Colorado State University-Pueblo and the U.S. Geological Survey (USGS) are conducting studies using DNA from *E. Coli* bacteria in Fountain Creek to determine whether they come mostly from people or mostly from animals. Identifying the main sources of bacteria may make it possible to reduce bacteria levels in Fountain Creek so that standards are attained. In addition, a cooperative study between the USGS, Colorado Springs Utilities, the City of Colorado Springs, and the Colorado Department of Public Health and Environment is being conducted on Upper Fountain Creek from Green Mountain Falls to the confluence of Fountain Creek and Monument Creek to identify sources of *E. Coli*. [7]

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 Pinõn Road 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

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[7] Bossong, Clifford R. 2001. Summary of Water-Quality Data, October 1987 through September 1997, for Fountain and Monument Creeks, El Paso and Pueblo Counties, Colorado. U.S. Geological Survey. Water-Resources Investigation 2000-4263. [Online] Available: http://www.fountain-crk.org; CWQCC 2007; Colorado Water Quality Control Commission. 2007. Regulation No. 32: Classifications and Numeric Standards for Arkansas River Basin. Title 5, Colorado Code of Regulations, 1002-3; Edelmann, Patrick, S.A. Ferguson, R.W. Stogner Sr., M. August, W.F. Payne, and J.F. Bruce. 2002. Evaluation of Water Quality, Suspended Sediment, and Stream Morphology with an Emphasis on Effects of Stormwater on Fountain and Monument Creek Basins, Colorado Springs and Vicinity, Colorado, 1981-2001. U.S. Geological Survey. Water-Resources Investigation 2002-4104. . [Online] Available: http://infotrek.er.usgs.gov/pubs/; Fountain Creek Vision Task Force Water Quality Working Group Update, February 23, 2007. Coliform bacteria and *E. Coli* updates presented by Dr. Don Stoeckel, U.S. Geological Survey; Dr. Brian Vanden Heuvel, Colorado State University – Pueblo; and Mr. Scott Cowan, Pueblo City/County Health Department; Mau, David P.; Stogner, Robert W., Sr.; Edelmann, Patrick. 2007. Characterization of Stormflows and Wastewater Treatment-Plant Effluent Discharges on Water Quality, Suspended Sediment, and Stream Morphology for Fountain and Monument Creek Watersheds, Colorado, 1981-2006. U.S. Geological Survey. Water-Resources Investigation 2002-5104. [Online] Available: http://infotrek.er.usgs.gov/pubs/

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. [8]

The original selenium standard for Fountain Creek was very low, based on the assumption that selenium can harm wildlife. However, 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 in Segment 2b of Fountain Creek (Highway 47 Bridge to Confluence of Fountain Creek and Arkansas River). Segment 2a of Fountain Creek (confluence of Fountain Creek and Monument Creek to Highway 47 bridge) is on the 2008 303(d) Monitoring and Evaluation List for selenium. In addition, it was found that Fountain Creek carries high concentrations of sulfate. Sulfate decreases the adverse effects of selenium. Sulfate is also a natural substance found in bedrock. Because selenium is so widespread, and because it is difficult for regulatory programs to address natural sources of pollutants, the Fountain Creek Vision Task Force has not formulated specific strategies to address selenium. [9]

Selenium is listed on Segment 6, Monument Creek, of the 2008 303(d) List for the portion of Monument Creek below Mesa Road, because it isn't 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 Water Quality Control Division (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 Water Reclamation Facility in Colorado

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[8] Canton, Steven P., and L. Wall. 2007. Aquatic Biological Monitoring and Selenium Investigation of the Arkansas River, Fountain Creek, Wildhorse Creek, and the St. Charles River, Project 062750. GEI Consultants, Inc., Chadwick Ecological Division, Littleton, CO.

[9] Bossong, Clifford R. 2001; Canton, Steven P. 1995. Aquatic Biological Survey of the Arkansas River in the Vicinity of the City of Pueblo Wastewater Reclamation Facility, Chadwick Ecological Consultants Inc., Littleton, CO; Canton, Steven P., and L. Wall. 2007; CWQCC 2007; CWQCC 2007; Divine, Craig E., and T. K. Gates. 2006. Sources and Occurrence of Selenium in the Arkansas River and Fountain Creek near Pueblo, Colorado. ARCADIS G&M, Inc. Highlands Ranch, CO; Edelmann, Patrick, S.A. Ferguson, R.W. Stogner Sr., M. August, W.F. Payne, and J.F. Bruce. 2002. Evaluation of Water Quality, Suspended Sediment, and Stream Morphology with an Emphasis on Effects of Stormwater on Fountain and Monument Creek Basins, Colorado Springs and Vicinity, Colorado, 1981-2001. U.S. Geological Survey. Water-Resources Investigation 2002-4104. . [Online] Available: http://infotrek.er.usgs.gov/pubs/; Fountain Creek Vision Task Force Water Quality Working Group Update, May 11, 2007. Selenium updates presented by Mr. Pat Wells, Colorado Springs Utilities; and Gene Michael, City of Pueblo Wastewater Department; Huskie, William W., and M. J. Gearhart. 1998. Selenium Source Characterization Final Report: Investigation of Naturally Occurring Selenium, Pueblo, Colorado. Arcadis Geraghty & Miller, Inc., Denver, CO.

Springs may dilute 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. The Water Quality Control Commission recognizes that excessive salinity and TDS levels can be detrimental to the water use classifications.[10] The Commission has established salinity standards for the Colorado River Basin,[11] 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.[12]

The USGS, in cooperation with the Southeastern Colorado Water Activity Enterprise, researched ways to predict whether future water operations might cause water quality changes in the Arkansas River. The USGS selected TDS as the water quality constituent to use as an indicator for water quality changes and estimated background conditions for TDS to provide a baseline for comparison purposes. The results of the study showed background concentrations of TDS in Fountain Creek have historically been elevated relative to the four other study sites in the Arkansas River. [13]

Nutrients

The term "nutrients" includes different forms of phosphorus and nitrogen that can act as fertilizers that 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 are caused by the decay of dead algae using up oxygen from the water that fish need to live. Nutrient impacts may not be seen where the nutrients enter the river, but may occur at downstream locations like lakes and reservoirs where nutrients build up in non-flowing waters. Colorado has not yet adopted standards for nutrients. However, the EPA is pressing states to adopt nutrient standards at the earliest possible time, and Colorado has begun the process. Limiting the amount of nutrient entering rivers will require significant changes in many activities including fertilizing lawns and agricultural fields,

[10] CWQCC 2007.
[11] Colorado Water Quality Control Commission. 1997. Regulation No. 39: Colorado River Salinity Standards. Title 5, Colorado Code of Regulations, 1002-39.
[12] Bossong, Clifford R. 2001; Canton, Steven P. 1995; Divine, Craig E., and T. K. Gates. 2006; Edelmann, Patrick, S.A. Ferguson, R.W. Stogner Sr., M. August, W.F. Payne, and J.F. Bruce. 2002
[13] Ortiz, R.F. 2004. Methods to Identify changes in background water-quality conditions using dissolved-solids concentrations and loads as indicators, Arkansas River and fountain creek, in the vicinity of Pueblo, Colorado. U.S. Geological Survey. Water-Resources Investigation 2004-5024. [Online] Available: http://infotrek.er.usgs.gov/pubs/

irrigating lawns and agricultural fields, and managing livestock wastes, as well as controlling runoff from cities and adding new processes for treating wastewater.[14]

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 that can reduce nutrient levels, such as matching fertilizer to crop needs, keeping runoff from manure out of the river, and reducing erosion. 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. [15]

Based on very limited data sets from the EPA's STORET data base, 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 Fountain Creek (downstream from Colorado Springs' Las Vegas Street wastewater treatment plant) are largely due to effluent discharge. However, elevated nitrogen and phosphorous concentrations also occur as a result of storm runoff; and below Fountain elevated levels also could possibly 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.

Specific factors leading to an increase in sediment transport include floodplain encroachment, construction and other ground disturbing activities, including higher frequency of channel forming flows[16] (main stem and tributaries) and high flow events. The watershed has become increasingly urbanized which has lead to higher base flow[17] and more frequent flood flows.

As the flows are increasing in the streams, the sediment transport capacity has also increased. These additional sediment loads increase floodplain widths, impact water quality, and decrease channel capacities. Sediment loads measured from within the watershed in 2005 range from

[14] Fountain Creek Vision Task Force Water Quality Working Group Update, June 7, 2007. Nutrient updates presented by Mr. Pat Edelmann, U.S. Geological Survey, and Ms. Nancy Keller, City of Pueblo Wastewater Department.

[15] Bossong, Clifford R. 2001; CWQCC 2007; CWQCC 2007; Edelmann, Patrick, S.A. Ferguson, R.W. Stogner Sr., M. August, W.F. Payne, and J.F. Bruce. 2002

[16] Channel forming flows: The representative discharge responsible for doing the majority of the work that shapes the channel (pattern, cross section, profile/slope).

[17] Base flow: That part of stream discharge that is not attributable to direct runoff from precipitation or melting snow. Primarily sustained by groundwater discharge into the stream.

6,400 tons/year within Monument Creek at Woodman Road to 60,200 tons/year within Fountain Creek at Security to 148,000 tons/year within Fountain Creek at Pueblo.[18] There is a need to better ascertain the bedload[19] characteristics and behavior as they relate to Fountain Creek's system. Another parameter of the fluvial[20] system is the meander belt, which can extend beyond the floodplain and is defined as the zone along the floor of a valley across which a meandering stream periodically shifts its channel. Encroachment into this area could prove critical and needs to be considered in future planning associated with land use and creek stability.

Below is a brief summary of three efforts within the Fountain Creek Watershed:

U.S. Army Corps of Engineers (USACE) Study

Factors that influence erosion include velocity (determined by gravity and volume) and composition of the material in the water. Results from the Corps Sediment Transport Study indicate that more reaches in Fountain Creek, as well as its tributaries, have the tendency for degradation rather than aggradation[21] due to the relatively steep slopes of the streams. Streams exhibiting high degradation are Cottonwood Creek, East Sand Creek, Sand Creek, Jackson Creek, and some reaches of Monument and Fountain Creeks.

The study also concluded that channel length is decreasing (becoming straighter) for Cottonwood Creek, Monument Creek, Sand Creek, E. Fork Sand Creek, Jimmy Camp Creek and increasing in the southern part of the watershed.

USGS Studies

The USGS (SIR 2007-5104) has stated that suspended sediment concentrations, discharges, and yields associated with stormflow were significantly larger then normal flow. During normal flow suspended sediment concentrations were smallest at Monument Creek above Woodmen Road (0.5 to 10 tons per day) and highest at Cottonwood Creek (3 to 10 tons per day). Concentrations ranged from 25 to 80 tons per day at Fountain Creek at Security. Suspended sediment concentrations generally varied by site, but increased from upstream to downstream as streamflow increased.

The USGS has conducted multiple studies on suspended sediment and stream morphology[22] and how they are affected by stormflow, normal flow and baseflow. These reports can be downloaded from the Fountain Creek Watershed website at www.fountain-crk.org.

Fountain Creek Corridor Master Plan

[18] Edelman, Pat. 2007. Presentation to a Fountain Creek Vision Task Force working group on October 27, 2007.
[19] Bedload: That part of the sediment transported by a stream that is moved in the form of rolling and salting sediment particals on the bed of the channel.
[20] Fluvial: These sediments generally consist of gravel and sand with a minor fraction of silt and rarely of clay. The gravels are typically rounded and contain interstitial sand.. These materials have been transported and deposited by streams and rivers.
[21] Aggradation: is the accumulation of sediment in rivers and nearby landforms.
[22] Morphology: a branch of geomorphology that deals with the forms of natural water bodies such as rivers, lakes, estuaries, lagoons, coastal zones and seas, as well as with the processes that create and modify these forms.

The Fountain Creek Corridor Master Plan is currently being developed for the mainstem of Fountain Creek from the southern Colorado Springs city limits to its confluence with the Arkansas River in Pueblo (approximately 44 miles of creek). This Plan identifies projects and designs that will:

1. Improve watershed health by reducing erosion, sedimentation, and flooding and by improving water quality;
2. Create stable riparian and wetland ecosystems to attract and support native wildlife and vegetation;
3. Sustain productive agricultural lands along corridor;
4. Lay out trail from Colorado Springs to Pueblo with recreational and educational opportunities; and
5. Gain public and private support through partnerships to facilitate implementation and future funding.

The Plan utilizes the following mechanisms to address water quality and sedimentation concerns:

- Slowing down the creek in erosive segments to reduce the carrying capacity of the stream (i.e., reducing erosion and sediment transport) and consequently reduce sedimentation by:
  - Increasing the curviness (sinuosity) of the stream, effectively lengthening the path the creek takes to slow it down
  - Diverting water into wetlands and side detention areas during flood flows to reduce the amount of water in the stream during a flood
  - Protecting the wide natural floodplain from further infringement to help slow flood flows
- Improving existing wetlands and adding additional wetlands in the floodplain to naturally filter and thus improve water quality in the creek
- Installing a Streamside Systems collector to remove sediment in the levee area in Pueblo
- Stabilizing eroding banks along the creek that contribute large quantities of sediment downstream
- Narrowing the stream channel in areas where sediment deposits so that the sediment can be carried out

These mechanisms have been laid out in a holistic manner in a draft Plan for the entire 44-mile Fountain Creek reach. This Plan has been presented to the US Army Corps of Engineers, local landowners, the Fountain Creek Vision Task Force Working Groups, and local elected officials and planners in Colorado Springs and Pueblo. The Plan has received much support from each of these groups and comments have been incorporated into a revised Plan.

Additionally, the Corridor Master Plan has identified four locations for building demonstration projects, totaling over six miles along the creek. These locations will demonstrate the mechanisms discussed above leading to a cleaner waterway with less erosion and sedimentation. Plan efforts are now focusing on obtaining funds for the projects. The Master Planning effort will be completed in late 2009.

Organics
There are numeric standards for nineteen 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.[23] These standards are shown in the Basic Standards Regulation.[24]

Existing Studies and Reports
There have been numerous water quality studies conducted in the Fountain Creek Watershed (primarily by the USGS). Within the watershed there are about 22 active USGS monitoring stations which measure streamflow and different types of water quality parameters such as biological, nutrients, organics, inorganics, and physical properties. The Pikes Peak Area Council of Government (PPACG) 2003 Water Quality Management Plan gives detailed information on the municipal wastewater treatment plant dischargers in the watershed.

Criteria Manuals
The two most widely used design manuals for both construction and permanent erosion control and water quality protection in the Fountain Creek Watershed are the Urban Drainage and Flood Control District's "Criteria Manual Volume 3 – Best Management Practices" and the City of Colorado Springs' "Drainage Criteria Manual Volume 2 – Stormwater Quality Policies, Procedures and Best Management Practices (BMPs)." Both of these manuals are under review to incorporate the best available techniques in runoff control, erosion mitigation, and water quality protection such as low-impact development.

B. Goals and Strategies to Address Current Conditions

Goals to Improve Current Conditions

1. Assess potential water quality problems in the watershed.
2. Mitigate adverse stream impacts.
3. Reduce selenium to levels that are at or below State water quality standards and/or background conditions or recommend that the CWQCC establish appropriate site-specific standards.
4. Reduce *E. Coli* to levels that are at or below State water quality standards or recommend that the CWQCC establish appropriate site-specific standards.
5. Improve watershed function to manage sediment transport patterns and reduce erosion and sedimentation.
6. Improve stormwater runoff conditions at the source to improve water quality.

Objectives

1. By 2013, all organizations collecting water quality data in the watershed are contributing to a shared on-line water quality database accessible to the public (such as the Colorado Watershed Data Sharing Network).
2. By 2012, remove one parameter from one segment on the 303(d) list.

[23] CWQCC 2007
[24] CWQCC 2007

3. By 2015, remove two parameters from one or more segments on the 303(d) list.
4. By 2013, no additional stream segments will be added to the 303(d) list (based on existing stream standards).
5. By 2020 demonstrate a continuous water quality improvement from 2008 for parameters of concern (*E. Coli*, selenium) measured in each stream segment in order to reach State standards.

Strategies to Achieve Goals and Objectives

1. Better understand water quality baseline conditions in Fountain Creek Watershed.
2. Determine potential factors, such as permitted discharges and non-point sources, that have a significant negative influence on water quality in the Fountain Creek watershed and implement strategies to mitigate negative influences.
3. Develop and implement watershed-wide regulations and policies, as applicable in each jurisdiction, related to storm-water management, water quality, development and overall land use.
4. Develop and implement applicable strategies to address water-quality impacted stream segments.
5. Comply with municipal National Pollution Discharge Elimination System (NPDES) permits.

Note: Additional information about water quality data sources is available in Appendix B.

C. Implementation Plan

Strategy 1: Better understand water quality baseline conditions in Fountain Creek Watershed			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. All organizations collecting water quality data in the watershed are contributing to a shared on-line water quality database accessible to the public (such as the Colorado Watershed Data Sharing Network)	2013	Pueblo Health Department	State and federal agencies; cities and counties; Colorado Watershed Data Sharing Network and USGS
b. Establish a sampling plan that specifies sampling frequency and that varies the time of day, day of week, and season for sampling at each location, including both bacterial sampling and flow measurement	2010	Pueblo Health Department	City of Colorado Springs, Colorado Springs Utilities, Pueblo, Pueblo Health Department. USGS
c. Identify appropriate water quality monitoring locations and water quality parameters throughout the watershed (to be included in the Sampling Plan).	2010	Pueblo Health Department	City of Colorado Springs, Colorado Springs Utilities, Pueblo, Pueblo Health Department, USGS
d. Coordinate Fountain Creek data collection with Arkansas River Basin monitoring programs	2010	Pueblo Health Department	USGS
e. Develop a long-term intergovernmental agreement among local governments to fund sampling, laboratory analysis, data interpretation, and reporting	2013	PPACG	City of Colorado Springs, Colorado Springs Utilities, Pueblo, Pueblo Health Department
f. Create a master inventory of existing water quality BMPs through out the Fountain Creek Watershed	2013	PPACG and NPDES Phase I and Phase II permit holders	Pueblo, City of Colorado Springs, El Paso County, Pueblo County, Monument, Manitou Springs, Fountain
h. Develop a list of maintenance procedures and maintenance frequency for water quality BMPs	2009	City of Colorado Springs	
i. Identify non-point source areas of concern throughout the watershed	2010	Cities and Counties	
j. Compile an inventory of existing evidence of the historic course and condition of the Fountain Creek channel, including aerial photographs, research papers, newspaper articles, etc. to document historic conditions	2009	PPACG	
k. Inventory areas throughout the Fountain Creek watershed where sediments eroded from upstream locations have been deposited, resulting in a change in the shape of the channel and loss of hydraulic capacity	2013	PPACG	

Strategy 2: Determine all potential factors that influence water quality of Fountain Creek			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Determine potential factors (i.e. agricultural return flows, geologic conditions, etc.) that influence concentrations of selenium and use them as input for a predictive model.	2013	Colorado Springs Utilities/Pueblo	Colorado State University
b. Develop a predictive model to support the State's wasteload allocation for selenium	2013	Colorado Springs Utilities/Pueblo	Colorado State University
c. Establish background levels of selenium as the state water quality standards	When determined	Colorado Springs Utilities/Pueblo	
d. Characterize the baseflow and the critical runoff volumes that triggers erosion under various conditions	2010	Future Fountain Creek Watershed Funding Entity	USGS
e. Characterize bed load sediment and transport volumes as a basis for watershed modeling criteria	2013	Future Fountain Creek Watershed Funding Entity//USGS	Pueblo, City of Colorado Springs, El Paso County, Pueblo County
f. Obtain from the U.S. Geological Survey the results of historical studies conducted in Fountain Creek that defined natural bed load volumes or developed data used to make bed load calculations	2010	PPACG	USGS
g. Study off-channel detention storage and water quality treatment systems in conjunction with sediment bypass systems	2010	Pueblo	El Paso County
h. Develop theoretical designs and build projects (such as off-line detention and Streamside Systems) that would achieve sediment bypass and monitor results	2013	Future Fountain Creek Watershed Funding Entity	
i. Select an appropriate site and develop a demonstration project using the Streamside System sediment bypass to protect against downstream channel degradation from detention storage and sediment deposition. The site location should consider high suspended sediment loads, easy access to the stream, available land for off-channel operations line stockpiling and drying extracted sediment, and accessibility to markets or points of use for extracted sediments	2010	City of Pueblo (funded through a 319 Grant)	Cities and Counties and CDPHE
j. Design and implement a sediment monitoring plan for the streamside system that includes measurement of flows, water quality	2013 (this is tied to second	Future Fountain Creek Watershed	Cities and Counties

parameters of interest, suspended sediment measurements, and bed load measurements upstream and downstream of the extraction site to provide a means of measuring the effectiveness and water quality impacts of the process.	Implementation Step in Strategy 1)	Funding Entity//USGS	
k. Establish a channel monitoring plan that targets areas of erosion and sedimentation and elements of channel form to be observed and/or measured	2014	Future Fountain Creek Watershed Funding Entity//USGS	
l. Characterize the effects of suspended sediment and bed load on water quality and aquatic habitat	2013	Future Fountain Creek Watershed Funding Entity//USGS	
m. Develop land development practice recommendations that make it possible to reduce pollution form non-point sources.	2013	City and Counties	Pueblo, City of Colorado Springs, El Paso County, Pueblo County

Strategy 3: Develop regionally applicable regulations and policies, related to storm-water management, water quality, development, and overall use			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Compile and publish an inventory of highly erosive soils throughout the watershed based on existing Soil Conservation Service soils maps	2010	PPACG	
b. Develop a document summarizing non-structural BMPs (street sweeping, use of salt and sand on roadways, pet stations, wetlands enhancements, constructed wetlands, riparian area expansion and enhancements, and other methods to protect water quality) in the form of draft land use control policies and regulations that city and county governments could adopt	2009	AWARE Colorado	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County
c. If sediment bypass pilot projects prove successful, consider adding designs to the acceptable design criteria for new development drainage plans	2014	Cities and Counties	
d. Retrofit where appropriate public water quality features for existing development that can be used to reduce runoff	2010-2018	Cities and Counties	
e. Modify/Enhance local drainage criteria manuals to incorporate new, state-of-the-art BMPs that focus on water quality improvements.	2010	City of Pueblo, City of Colorado Springs, El Paso County	Pueblo, City of Colorado Springs, El Paso County, Pueblo County, Fountain, Woodland Park
f. Each municipality works with community and politicians to modify criteria regarding source control volume specific to each municipality	2012	Pueblo, City of Colorado Springs, El Paso County, Pueblo County, Fountain, Woodland Park	Pueblo, City of Colorado Springs, El Paso County, Pueblo County, Fountain, Woodland Park
g. Hold a Land Use Workshop for local government elected officials and staff to explain the content, use, and benefits of LID practices	2009	Aware Colorado/Colorado State University	Pueblo, City of Colorado Springs, El Paso County, Pueblo County
h. Obtain copies of the land use policies and regulations presently in use by the city and county governments throughout the Fountain Creek watershed .	2010	City of Pueblo and City of Colorado Springs	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County

i. Compile and inventory of existing policies and regulations of local governments within the Fountain Creek watershed pertaining to construction site controls, particularly with respect to vegetation removal and methods to control water borne or windblown erosion from construction sites.	2010	El Paso County and PPACG	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County
j. Develop recommendations to land use planning agencies of city and county governments throughout the Fountain Creek watershed so they can make informed decisions on adoption of the methods summarized in the document as development policies for use in their jurisdictions	2010	Aware Colorado	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County
k. Develop a document summarizing LID practices (porous pavement, sediment basins, infiltration basins, etc.) in the form of land use control policies or draft policies and regulations that city and county governments should adopt.	2010	Aware Colorado/Colorado State University	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County
l. Recommend LID practices to city and county governments through the Fountain Creek watershed	2010	Aware Colorado	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County
m. Where discrepancies exist, provide information to city and county governments so they can make informed decisions on modification of their existing land use policies and regulations to conform to the BMPs and LID draft documents.	2010	Aware Colorado	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County
n. Develop manual for recommending methods for series of uniform incentives and disincentives for consideration of adoption by local governments throughout the Fountain Creek watershed designed to reward contractor compliance and discourage contractor noncompliance with construction site control policies and regulations	2011	Pueblo, City of Colorado Springs, El Paso County, Pueblo County	
o. Establish reward programs within the watershed that recognize and affirm the efforts of developers that adhere to LID principles and that comply with land use policies and regulations designed to protect streams, providing such developers with "most favored developer status" in matters before land use approval bodies, provide free memberships in local Chamber of Commerce, etc.	2012	Aware Colorado/Colorado State University	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County
p. Evaluate and compare existing policies, regulations, and practices to the best management practices and LID draft documents to the benchmark policies and regulations contained in the Center of Watershed Protection document entitled Better Site Design: A Handbook for Changing Development Rules in Your Community	2013	City of Pueblo and City of Colorado Springs	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County

Strategy 4: Develop applicable strategies to address impacted stream segments			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Remove one parameter for one segment on the 303(d) list	2010	CDPHE/WQCD	State and federal agencies, cities and counties
b. Remove two parameters from one or more segments on the 303(d) list	2013	CDPHE/WQCD	State and federal agencies, cities and counties
c. See continuous water quality improvement for parameters of concern (*E. Coli*, selenium) measured in each stream segment	2013 and 2020	All	
d. Identify locations where non-point sources impair designated stream uses	2011	CDPHE/WQCD through TMDL process	
e. Review and publicize a location for a pilot project where restoring the channel is expected to result in a dramatic improvement in the quality and appearance of the stream, that offers easy access to the stream and proximity to established or planned recreational amenities that serve to attract the public, so the success of the project can be showcased to the community	2010	Future Fountain Creek Watershed Funding Entity//USGS	

Strategy 5: Evaluate discharge permits and encourage conformance by all permitted entities and provide watershed level evaluation of possible impacts of permitting activities			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Compliance with municipal NPDES permits	2009 on	Municipalities	Everyone

b. Annually review permit requirements and applicable compliance throughout the watershed	2009 on	Pueblo, City of Colorado Springs, El Paso County, Pueblo County, Fountain, Woodland Park	
c. Develop a schedule of recommended fines for consideration by local governments that penalize failure to comply with land use regulations, escalating by the severity of the impact of the infraction and by the frequency of repeated offenders	2012	Pueblo, City of Colorado Springs, El Paso County, Pueblo County, Fountain, Woodland Park	

IV. FLOODING AND STORMWATER MANAGEMENT

A. Current Conditions - Streamflow

Fountain Creek drains a 930-square-mile watershed with an elevation ranging from 4,640 feet to 14,115 feet. Fountain Creek is currently not a stable fluvial[25] system, exhibiting frequent changes in sediment loads, flows, vegetative conditions and nearby land uses. Fountain Creek has historically exhibited highly fluctuating flows, particularly between April and September, in response to storm events. Since the early 1980s, land and water use changes within the watershed have resulted in ephemeral streams[26] located in urban areas becoming perennial[27] and Fountain Creek downstream of the City of Fountain flowing year round. A majority of these changes have resulted from increased urbanization and lack of a comprehensive watershed management approach for the basin. Increased baseflow[28] in Fountain Creek and its tributaries is attributable to imported water sources (i.e., transbasin diversions), increased amount of impervious surfaces, wastewater effluent discharges, and return flows from lawn watering and crop irrigation.

Three types of flows that impact the overall conditions of Fountain Creek include major flood events, channel forming flow, and baseflow. Major flood events remove tremendous amounts of sediment during an event, but do not occur on a regular basis. Channel forming flow is the representative discharge that shapes the channel with respect to the pattern, cross-section, and profile.[29] This type of flow moves the largest percentage of sediment over time, because it occurs on a more frequent basis in response to daily climate and land use conditions. Baseflow is not a consistent factor in shaping the channel, as it does not typically have enough energy to consistently move sediment. While subtle, erosion caused by increased baseflow is a component of day-to-day channel erosion and sediment transport.[30] An example of hypothetical flows for Fountain Creek would be:

- Baseflow = 30 cubic feet per second (cfs)
- Channel forming flow = 3,000 cfs
- Flood flow = 30,000 cfs

These hypothetical numbers demonstrate the orders of magnitude of difference between the various flow rates.[31]

Major Flood Events

[25] Fluvial: These sediments generally consist of gravel and sand with a minor fraction of silt and rarely of clay. The gravels are typically rounded and contain interstitial sand.. These materials have been transported and deposited by streams and rivers.
[26] Ephemeral streams: A stream that flows only a short time (days or weeks) in direct response to precipitation.
[27] Perennial: A stream with year-round channel flow .
[28] Baseflow: That part of stream discharge that is not attributable to direct runoff from precipitation or melting snow. Primarily sustained by groundwater discharge into the stream.
[29] Thompson, Graham. 2007. Presentation given at a Fountain Creek Vision Task Force working group meeting on March 22, 2007.
[30] Stogner, Sr., Roger W. 2000. "Trends in Precipitation and Streamflow in the Fountain Creek Watershed, Southeastern Colorado, 1977-1999." (Report from the US Geological Survey.) Available at http://pubs.usgs.gov/fs/fs-136-00/pdf/fs136-00.pdf.
[31] Thompson, 2007.

Flood events have occurred periodically on Fountain Creek, with the most recent occurring in 1999 with a flow of 20,000 cfs recorded at the United States Geological Survey (USGS) gauge in Pueblo. Embankment failures in May 2007 caused additional flooding in low-lying North Side neighborhoods in Pueblo. Flood events are documented with photos and news reports from many sources within the watershed (see Attachments 2a-2s in Appendix C).

Significant flood events have caused damage to public infrastructure, utilities, adjacent farmlands, and residential communities. Flooding also compounds problems associated with increased sedimentation and erosion. As development continues within the watershed, with the associated increase in impervious area, runoff and flood events are expected to increase.

New studies conducted by the US Army Corp of Engineers (USACE) indicate a reduction in flood peaks from prior Federal Emergency Management Agency (FEMA) hydrology (see Attachment 1 in Appendix C). However, channel capacities have been reduced in the lower reaches of Fountain Creek due to sediment build-up and heavy vegetative growth restricting channel widths and reducing channel depths. Critical reach analysis was studied on Monument Creek, Black Forest Tributary, Cottonwood Creek, and Jimmy Camp Creek. The study was conducted to evaluate sedimentation, erosion, and flooding on the selected tributaries and the full report is contained in the USACE study, "Critical Reach Study" for the Fountain Creek watershed.[32] Study results indicate problems with sediment, flooding, and channel degradation ultimately threatening buildings and infrastructure.

FEMA is currently converting floodplain maps for Pueblo and El Paso Counties to develop new Digitized Flood Insurance Rate Maps (DFIRMs) for all previously mapped drainageways. Along portions of the new mapping of the Fountain Creek corridor will be based on hydrologic [33]and hydraulic[34] analyses completed in the USACE study of the Fountain Creek watershed. FEMA mapping will require the certification of all levees and floodwalls providing flood protection before floodplain maps can reflect areas protected by levee and floodwall systems. Preliminary DFIRM mapping by FEMA reflects floodplain changes on Fountain Creek. Recent 100-year hydrologic and hydraulic interim studies indicate freeboard deficiencies[35] on the Fountain Creek levee system in the Pueblo area. Lower reaches of the Fountain Creek levee system do not provide the 3-foot and 4-foot levee height above water surfaces required by FEMA. This deficiency is due to loss of channel capacity because of sediment build-up.

Hydrologic and hydraulic studies have determined the probability of flood events at various locations along Fountain Creek as shown in the USACE Watershed Study. Because the dam at the Pueblo Reservoir controls the release of water, most of the water generated from storms downstream of the confluence of Fountain Creek and the Arkansas River is from Fountain Creek.

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[32] Available at www.fountain-crk.org.
[33] Hydrologic: The relationships between water and the geologic environment.
[34] Hydraulic: An engineering process used to convert a volume of water moving down a channel into a depth of water so that it can be drawn on a map of flooding areas.
[35] Freeboard deficiencies: Lack of sufficient height between the 100-year water suface and the top of the levee to meet FEMA requirements.

Flood attenuation (peak flow[36] reduction) occurs in downstream segments of Fountain Creek due to off-line storage and channel storage. In 1989, levee systems were constructed through Pueblo to protect the East Side community and the downtown area from flooding caused by a 100-year flood event[37]. Private properties were purchased by the City of Pueblo to remove development from the floodplain[38] and provide additional hydraulic capacity within the channel. Current efforts by federal and state agencies, railroads, cities, counties, and stormwater enterprises strive to maintain channel stability by constructing detention facilities, grade control structures, hard points (jetties), embankment protection (riprap), and other channel improvements. Vegetation control and debris removal have been implemented on Fountain Creek to increase channel capacity and improve flow characteristics.

Channel Forming Flow

Channel forming flows are not indicative of catastrophic flooding. Rather, these are smaller events ranging from a few hundred cfs to a few thousand cfs that occur one to two times per year along the Front Range.[39] These flow conditions combined with other factors (e.g. geology, stream modification, infrastructure, 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. (Sediment transport is discussed further in the Water Quality and Sedimentation section of the Fountain Creek Vision Task Force Strategic Plan.)

Runoff Reduction

Conventional stormwater management practices to date have emphasized the reduction of peak runoff rates from flood events with little attention being paid to the more frequent events or to volume reduction. Fundamental changes to the methods used for planning, designing, and constructing development projects are needed to address these issues.

Low-impact development (LID) source controls are being considered by the Fountain Creek Vision Task Force to reduce impacts of future development. The reduction of runoff volumes through the utilization of source controls will provide a reduction in erosion, sedimentation, and flooding, as well as improvement in stormwater quality. NPDES (National Pollutant Discharge Elimination System)[40] permits require implementation of best management practices (BMPs), including runoff reduction techniques to address runoff volume and improved stormwater quality. The City of Colorado Springs, El Paso County, the City of Pueblo, and Pueblo County are all responsible for the implementation of the NPDES permits issued to those communities.

As a result of projected changes within the watershed and documented changes in streamflows in Fountain Creek, the USACE has made some general recommendations regarding future

[36] Peak flow: Refers to a specific period of time when the discharge of a stream or river is at its highest point.
[37] 100-year flood event: Refers to the calculated level of flood water expected to be equaled or exceeded every 100 years on average.
[38] Floodplain: Flat areas bordering streams that are subject to flooding.
[39] Edelmann, Pat. 2007. Presentation to Fountain Creek Vision Task Force working group on October 27, 2007.
[40] NPDES (National Pollutant Discharge Elimination System): A provision of the Clean Water Act that prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the US EPA, or a state or other delegated agency.

development within the watershed (see Attachment 5 in Appendix C). These general recommendations address policies and strategies to reduce flood risk, sedimentation, and erosion, including the rehabilitation of riparian areas, creation of off-channel diversion and storage, and the preservation of existing wetlands, as well as the creation of additional wetlands. The recommendations emphasize LID as a means to mitigate existing conditions and wisely manage future impervious surface areas and increased runoff. In addition to the items mentioned in Attachment 5, the USACE study also identified potential projects and sites for flood risk reduction, eco-system restoration, and channel stability.

Existing Studies and Reports

As impervious areas[41] increase in the watershed, Fountain Creek will experience more frequent flood events from storms of lesser magnitude (Attachment 3 in Appendix C: USGS Report, "Trends in Precipitation and Streamflow in the Fountain Creek Watershed"). The Fountain Creek Watershed Study predicts minor increases in flood peaks for major storm events because saturated conditions in the watershed more closely match runoff from impervious surfaces. Future development within the watershed will continue to increase instabilities on Fountain Creek because of increased runoff, volumes, and peak flows. Pikes Peak Area Council of Governments (PPACG) studies indicate significant increases in imperviousness in 11 sub-basins within the Fountain Creek watershed with major impervious area increases in Jimmy Camp Creek, Sand Creek, and Cottonwood Creek (see Attachments 4a, 4b, and 4c in Appendix C). The USGS report also indicates significant increases in high streamflows in Fountain Creek between Nevada Street and Security because of development within this area of the watershed:

> In the reach from Nevada Street to Security, the average annual per-square-mile increase in streamflow was about five times greater than the other reaches that had increasing trends. Additionally, the reach from Nevada Street to Security showed the greatest annual change in total streamflow during high flows. This indicates on average, the intervening drainage area for the reach between Nevada Street and Security contributed more total flow and more flow per square mile than any of the other drainage areas studied. This trend probably is attributable to changes in land use from rangeland to urban that occurred in the intervening drainage area over the past 23 years, which altered the hydrologic response and increased storm runoff. . .changes in land use within the watershed have increased the rate and magnitude of runoff for more moderate rainfall events.[42] (Attachment 4c notes the impacts of increasing impervious surface in the future for the entire watershed and the need for mitigation going forward.)

This USGS report also notes significant increases in low streamflows in the same reach between Nevada Street and Security:

> The average annual increase in streamflow for the low streamflow statistics generally was from 5 to 10 times greater in the reach from Nevada Street to Security than the other reaches that had increasing trends. Additionally, the reach between Nevada Street and Security generally showed the greatest annual change in total streamflow during low flows. The large annual increases in the low streamflows in the reach between Nevada Street and

[41] Impervious areas: A hard surface area which either prevents or retards the entry of water into the soil. Examples include, but are not limited to, structures, walkways, patios, driveways, carports, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, haul roads and soil surface areas compacted by construction operations.

[42] Stogner, 2000.

> Security have resulted from increased wastewater treatment-plant discharge associated with population growth, importation of transbasin water, and management of the Fountain Creek transbasin return-flow exchange decree, which allows Colorado Springs to exchange return flows from transbasin imports to other locations in the Arkansas River basin.

Future flows on Fountain Creek will likely reflect similar increases in areas experiencing continued growth and development.

B. Goals and Strategies to Address Current Conditions

Goals to Improve Current Conditions

1. Recognize that stormwater is a resource and manage it for the benefit of the watershed and entities downstream.
2. Preserve natural channel capacity through floodplain preservation and sedimentation controls.
3. Preserve the natural drainage way through conservation easements and streamside setbacks.
4. Improve channel stability and flow stability by formulating a watershed development policy that promotes matching the post-development hydrographs[43] and the pre-development hydrographs for peak, volume, and timing to the extent practicable.
5. Promote efficient stormwater management so that runoff will not exceed downstream conveyance capacity in order to minimize adverse impacts downstream.
6. Promote stable base flows and stabilize the stream system by retrofitting, to the extent practicable and in accordance with applicable Municipal Stormwater Discharge Permits (MSDPs)[44], existing drainage systems to provide runoff reduction, water quality treatment, and improved stormwater management practices.
7. Improve stormwater runoff conditions at the source, with respect to quality, quantity, and rate/duration of flow to better mitigate development impacts.

Objectives

1. By 2010, all entities will have participated in a watershed workshop to evaluate watershed management policies based on benchmark principles developed by recognized authorities such as the Center for Watershed Protection.
2. By 2012, all entities in the watershed will have adopted stormwater management policies based on benchmark principles developed by the Center for Watershed Protection; conducted workshops for revising existing drainage and land use regulations; presented revised criteria to developers and policy makers; and adopted recommended criteria for uniform application in the watershed..
3. By 2014, 10% of all existing public systems (as determined by each jurisdiction) will be retrofitted for water quality treatment and volume and peak flow reduction.

[43] Hydrographs: The description and studies of bodies of water (e.g. lakes and rivers): as the measurement of flow and investigation of the behavior of streams and the charting or graphing of them.

[44] Municipal Stormwater Discharge Permits (MSDPs): permits are required for storm water discharges to surface waters from construction and industrial activities and municipalities if stormwater from rain or snow melt leaves your site through a "point source" and reaches surface waters either directly or through storm drainage.

4. By 2014, 50% of all new development and 100% of all new annexations will implement LID techniques to reduce peak flows and runoff volume and to stabilize channel-forming flows.

Strategies to Achieve Goals and Objectives

1. Develop comprehensive Fountain Creek floodplain management regulations, encourage their adoption, and develop floodplain mapping.
2. Retrofit existing stormwater systems to provide runoff reduction, water quality treatment, and improved stormwater management practices to the extent practicable.
3. Study the feasibility and impacts of a flood control dam on Fountain Creek
4. Maintain and restore channel capacity, riverine environment, and stream system functionality to the extent practicable.
5. Evaluate hydrologic and hydraulic controls for the Fountain Creek watershed.
6. Explore LID practices to retrofit existing development and guide future development.

C. Implementation Plan

Strategy 1: Develop comprehensive Fountain Creek floodplains management regulations and encourage their adoption and develop floodplain mapping			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Compile copies of floodplain regulations and streamside ordinances and evaluate effectiveness	2009	Government entities in the watershed	Colorado Water Conservation Board (CWCB)
b. Flood insurance regulations – educate and promote	2009	Government entities in the watershed	CWCB/FEMA
c. Flood warning system – evaluate and upgrade	2010	Offices of emergency managements in jurisdictions	FEMA
d. Review local emergency plans and identify areas of risk	2010	Offices of emergency managements in jurisdictions	FEMA
e. Evaluate DFRIM mapping and compare to historic meander belts and stream stability	2010	Government entities in the watershed	CWCB; USACE; THK and Associates (contractors working on Fountain Creek Corridor Master Plan)
f. Initiate preservation of open space within and adjacent to floodplains through conservation easements, setbacks, and agreements	2009	Cities/Counties	Non-profits
g. Discourage the use of levees in regard to new development in flood hazard areas. Consider only as a last resort for protecting existing development when no other mitigation option is feasible	2009	Cities/Counties	FEMA/USACE
h. Educate private landowners and easement holders such as utilities in alternatives to "hardening" to protect property and facilities from erosion and flood hazards.	2009-ongoing	Cities, Counties, Stormwater entities	THK and Associates
i. Preserve open space corridors along Fountain Creek within the historic meander belts	2010-2018	Cities/Counties	Non-profits

Strategy 2: Retrofit existing stormwater systems to provide runoff reduction, water quality treatment, and improved stormwater management practices to the extent practicable			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Retrofit scoping – identify potential sites	2009	Cities/Counties	US Environmental Protection Agency (EPA) and Center for Watershed Protection
b. Desktop retrofit analysis: map potential sites	2009	Cities/Counties	EPA and Center for Watershed Protection
c. Retrofit reconnaissance field surveys investigation	2010	Cities/Counties	EPA, Center for Watershed Protection, Natural Resources Conservation Service (NRCS)
d. Compile retrofit site inventory	2010	Cities/Counties	EPA and Center for Watershed Protection
e. Evaluation and ranking of identified sites	2011	Cities/Counties	EPA and Center for Watershed Protection
f. Sub watershed treatment analysis of potential site	2011	Cities/Counties	EPA and Center for Watershed Protection
g. Final design and construction drawings of highest ranked sites	2013	Cities/Counties	EPA and Center for Watershed Protection
h. Pilot project selection and construction	2013	Cities/Counties	EPA, Center for Watershed Protection, USACE, Future Fountain Creek Watershed Funding Entity
i. Inspection and maintenance of existing systems	2013-2019	Cities/Counties	Future Fountain Creek Watershed Funding Entity

Strategy 3: Study the feasibility and impacts of a flood control dam on Fountain Creek			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Review 1972 and 1981 USACE reports on potential dam locations on Fountain Creek	2009	Cities/Counties	USACE
b. Review project scoping on the Fountain Creek dam contained in the USACE "Project Report" from the Fountain Creek Watershed Study	2009	Technical Advisory Committee of the Future Fountain Creek Watershed Funding Entity	USACE
c. Communicate results of dam feasibility studies	2010	Cities/Counties	Federal agencies
d. Implement the results of feasibility studies	2013	Cities/Counties	Federal agencies

Strategy 4: Maintain and restore channel capacity, riverine environment, and stream system functionality to the extent practicable			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed in the Watershed**	**Partners in Implementation**
a. Identify sites for pilot projects	2009	Government entities	USACE
b. Compare existing regulations based on goals established by the Fountain Creek Vision Task Force: Including streamside buffers, setbacks, and wetlands preservation	2009	Watershed TAC	Government entities
c. Review THK corridor study on channel alignment and offline storage potentials	2009	Future Funding Entity	USACE
d. Evaluate adverse impacts of detention systems on sediment transport	2009	Colorado State University or USACE	Government entities
e. Evaluate detention/retention systems with sediment bed load bypass system	2009	Colorado State University or USACE	Government entities
f. Remove invasive species and other vegetation to maintain channel capacity	2009-2018	Entity/Government Entities	USACE
g. Monitor stream cross sections and channel slopes at locations of restricted channel capacity	2010-2018	Entity/Government Entities	USGS
h. Initiate preservation of open space within and adjacent to floodplains through conservation easements, setbacks and agreements	2009	City/County	Non-profits
i. Preserve open space corridors along Fountain Creek within the historic meander belts	2010-2018	City/County	Non-profits

Strategy 5: Evaluate hydrologic and hydraulic controls for the Fountain Creek watershed			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Map potential sites for water quality treatment and detention/retention facilities	2009-2018	Cities/Counties	USACE, THK and Associates
b. Evaluate interim and final USACE and FEMA levee certification criteria for relevance to the watershed	2009	Cities	CWCB, USACE, FEMA
c. Identify structures protected by levee	2009-2009	Cities	CWCB, USACE, FEMA
d. Evaluate offline storage impacts on runoff peak, volume reduction, and conformance with water rights laws	2009	Cities/Counties	THK and Associates, USACE
e. Evaluate adverse impacts of detention system on sediment transport	2009	Cities/Counties	Colorado State University
f. Evaluate detention/retention systems with sediment bed load bypass system	2009	Cities/Counties	Colorado State University
g. Define and describe stormwater benchmarks for pre-development conditions for Fountain Creek and for tributaries in terms of runoff volume, peak discharge rate and timing and the relationship between these attributes and water quality	2013	Cities/Counties	
h. Develop a manual for recommending methods for designing new developments to match historic runoff volumes, peak discharge rates, and timing to the extent practicable	2010	Cities/Counties	
i. Evaluate the reduction of runoff volume and improvement of water quality through infiltration and detention/retention systems	2009	Cities/Counties	Colorado State University, EPA
j. Develop plan for levee de-certification based on future watershed development and sediment transport models	2009	Cities	CWCB, FEMA
k. Remove invasive species and other vegetation	2009-2018	Cities/Counties	USACE
l. Monitor stream cross-sections and channel slopes at locations of restricted channel capacity	2010-2013	Cities/Counties	CWCB, USGS
m. Levee structure maintenance activities to comply with certification criteria	2009-2018	Cities/Counties	USACE

Strategy 6: Explore LID practices to retrofit existing development and guide future development			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Evaluate the reduction of runoff volume and improvement of water quality through infiltration and detention/retention systems	2009-2010	Cities/Counties	Colorado State University, EPA
b. Evaluate LID source control and guidelines and their ability to meet the USACE general recommendations	2009-2010	Cities/Counties	Colorado State University
c. Explore LID practices to retrofit existing development	2009-2011	Cities/Counties	Developers
d. Evaluate offline storage impacts on peak runoff, volume reductions, and conformance with state water right laws	2009	Cities/Counties	THK Study
e. Develop LID implementation policy and strategy for watershed application (Clarification on water rights issues and Class V injection wells may be needed.)	2009	Cities/Counties	Colorado State University, COE
f. Map potential sites for water quality treatment and detention/retention facilities	2010	Cities/Counties	NRCS - Soils mapping
g. Identify sites for pilot projects	2010	Cities/Counties	USACE
h. Evaluate potential aquifer recharge and aquifer storage potentials: identify recharge sites, capacities, and pumping rates	2010	Cities/Counties	NRCS – Soils mapping
i. Purchase of reserve areas for future projects in areas of potential redevelopment or infill	2009-2018	Cities/Counties	Non-profits
j. Implement full spectrum detention where appropriate to address water quality and runoff reduction	2009-2018	City/County	Urban Drainage and Flood Control District

V. MUNICIPAL WATER SUPPLIES AND RETURN FLOWS

A. Current Conditions

Most municipal water used within the Fountain Creek Watershed originates from 'non-native' water, both water piped in from another watershed and deep well water. After the initial use of this "non-native" water, a portion returns to waterways, increasing their base flow[45] rates and contributing to the acceleration of their natural instability. At the same time, the return flows from this water enable Fountain Creek to have sustained flows year round, improving conditions for riparian habitat and the sustainability of water organisms. Although the increased vegetation provides greater habitat, in restricted floodplain areas this growth further restricts channel capacity increasing potential flood impacts.

Regional water demand outgrew the relatively small and undependable supply of indigenous Fountain Creek Watershed water supply over 100 years ago. At that time, a cross-basin pipeline was constructed to import water from the south slope of Pikes Peak. Since then, additional pipelines have been built to bring water to this region from up to 200 miles away. In addition, deep wells have been used since the mid 19th century to supply the demands for water in the watershed.

Currently, approximately 80% of the water used for municipal purposes in the Fountain Creek Watershed is 'non-native,' originating from another watershed (mostly from the Colorado River Watershed), or from the Denver Basin aquifers which are located deep underground and do not hydraulically connect with surface waters.

By law, the portion of this "non-native" water that remains after the initial use can be 'reused to extinction,' enabling return flows to be reused either directly for non-potable uses[46], or exchanged for additional non-native water. (That is: the total non-native water delivered to customers for their use *minus* the non-native water fully consumed by the customer and lost to the system *equals* the remaining non-native water discharged from wastewater plant as return flows available for subsequent reuse.) This means that for every one gallon of non-native water that is brought into the system, multiple uses can be achieved through direct reuse or by exchanges. Direct reuse is done through a non-potable water system. This water is used for power generation and non-residential outdoor irrigation (golf courses, parks, cemetery, apartment complexes, etc.). Approximately 13% of the water used in the Colorado Springs service area (10.2 million gallons per day) comes from non-potable sources. Reclaimed water (treated waste water) accounts for half of this, and 'raw' (untreated) water accounts for the other half. Accounting for the losses due to consumption and evaporation, this one gallon of imported water will ultimately equate to a total of 2.1 gallons of imports through multiple reuse and exchanges.

Because of these exchanges, water now flows all the way to the Arkansas River year round. Since agriculture started diverting significant water from the Fountain in the 1800's until around

[45] Base flow: That part of stream discharge that is not attributable to direct runoff from precipitation or melting snow; primarily sustained by groundwater discharge into the stream and wastewater treatment plant discharges.
[46] Non-Potable: Water that is unsafe or unpalatable to drink because in contains objectionable pollution, contamination, minerals, or infective agents.

1980, Fountain Creek dried up during certain times of the year as these diversions depleted stream flows south of Colorado Springs. Thus, because of exchanges associated with non-native water use, Fountain Creek again has sustained flows year round, improving conditions for riparian habitat and the sustainability of water organisms. Because of the non-native water that is being introduced into the Fountain Creek Watershed, water flows going down Fountain Creek have increased. Currently, of all the water that goes down Fountain Creek in a year (base flows plus storm flows, 149 acre-feet/year or 206 cubic feet per second); approximately 18% is non-native water from Colorado Springs, Fountain, and Security (approximately 26,000 acre-feet/year or 37 cubic feet per second). Since base flows in Fountain Creek are currently approximately 165 cubic feet per second, non-native water currently accounts for roughly 26% of base flows. These additional flows have contributed to the acceleration of the waterway's natural instability. A summary of the existing conditions are shown in the table below:

	Existing Conditions[47] - Year-Round Ave Flows at USGS Pueblo Gage			
	Thousand Acre-feet per Year (kaf/yr)	**Cubic Feet per Second (cfs)**	**Millions of Gallons per Day (MGD)**	**% of average**
Reusable Return Flows (Colorado Springs, Fountain, and Security)	27	37	24	20%
Native Water	109	151	98	80%
Total Flow in Fountain Creek	136	188	122	
	Existing Conditions* Base (Winter) Flows			
	kaf/yr	**cfs**	**MGD**	**% of base**
Reusable Return Flows (Colorado Springs, Fountain, and Security)	31	43	28	29%
Native Water	77	106	69	71%
Base Flow in Fountain Creek	108	149	96	

*

Of all the water used in the Arkansas River Basin in Colorado:

[47] Existing conditions values are from page E-64 of the Southern Delivery System Environmental Impact Statement (SDS EIS). They were calculated using actual historical data from 1982 to 2004 modeled with 2006 river operations parameters as described on page 185 of the SDS EIS. This is the most current and accurate data available as of January 2009.

- ~87% used for agriculture
- ~4.3% goes to Colorado Springs
- ~1.7% goes to City of Pueblo and Pueblo West
- ~2.8% goes to Aurora

Municipal water entities in this watershed typically consume 40% of their water through beneficial uses, evaporation, and losses. Of the total approximately 105.4 thousand acre-feet per year (kaf/yr) of water that is used by water users in El Paso County,[48] approximately 42.2 kaf/yr is consumed on an average year. Water use by provider is estimated as follows:

Water Provider	**Water Use**
Cherokee Metro District	4.2 kaf/yr
Colorado Springs	80.5 kaf/yr
Donala Water and Sanitation	1.6 kaf/yr
Fountain	2.8 kaf/yr
Manitou Springs	1.0 kaf/yr
Security	4.0 kaf/yr
Stratmoor Hills	1.1 kaf/yr
Widefield	2.9 kaf/yr
Woodmoor	1.1 kaf/yr
Individual Well Users	2.2 kaf/yr
All Other Users (those using < 1.0 kaf/yr each	3.8 kaf/yr

Source: El Paso County Water Authority Report. September 6, 2002.

Approximately half of the water used by municipal systems is for outdoor irrigation and the remaining half is used indoors. A portion of the water that is used for irrigation returns to the groundwater close to the ground surface and recharges this alluvium[49] (adds water to it). The portion of this groundwater that flows underground to a nearby creek or is recovered by an alluvial well is not considered to have been consumed, since this water is available to be reused. Of the indoor use, the water split is approximately 29% for toilets, 22% for laundry, 22% for showers and baths, 15 % for faucets, 10% for leaks, and 2% for dishwashers.

Conservation efforts such as tiered water rates, education and outreach, regulations, rebates, and incentives have been successfully used to decrease the per capita water use. In fact, residential water use in Colorado Springs (largest population center in the watershed) is among the lowest in the West, and is 15-30% lower than the Boulder, Denver, and Pueblo per capita residential water use.

Conservation efforts have proven very effective in reducing water use. However, water providers must be prepared for the risks associated with this 'water hardening,' meaning that when conservation efforts reduce water consumption to meet only essential needs, there is no longer a water 'cushion' to curtail during an emergency or drought. Watering restrictions and other drought measures are therefore not as effective in reducing water use during dry cycles

[48] El Paso County Water Authority Report. September 6, 2002.
[49] Alluvium: A general term for unconsolidated material deposited by a stream or other body of running water.

when conservation has already reduced demands to essential needs only. Thus, water providers must be careful to increase storage capacities to assure that water supplies can meet essential water demands during times of drought.

The Future

The population in the Fountain Creek Watershed is increasing. Greater water demands accompany this growth and thus water projects are being planned to meet these demands. One major water project being planned to increase water supply to Colorado Springs, Fountain, Pueblo West, and Security is the Southern Delivery System (SDS). As a result of this project, non-native return flows will increase into Fountain Creek. More details about this project and alternatives are available at www.sdseis.com.

Even with the planned future water projects, the Arkansas Basin Roundtable estimates that by 2030 El Paso County will have a 22,600 acre foot/year (AF) gross gap between water demand and water supply. This gap will be caused by:

- Increased demand in unincorporated El Paso (9,250 AF)
- Loss of groundwater supplies in unincorporated El Paso County and the Town of Monument (13,350 AF)

El Paso County requires the following for new development approved after 1986 that utilizes Denver Basin groundwater:

- A single residence or a subdivision of 4 lots or less must prove a 100-year aquifer life for these residences
- A subdivision exceeding 4 lots in size must prove a 300-year life for the residences

Furthermore, the State of Colorado (HB 1141) requires that building permit applications for developments of more than 50 single-family equivalents include specific evidence of an adequate water supply. Per HB 1141, adequate water supply is defined as one that is sufficient for the proposed development through build-out, in terms of quality, quantity, and dependability.

If these requirements are strictly abided by, some of the future shortfall should be avoided. Additionally, through conservation, reuse, and the reduction of distribution system leaks, water use in the Fountain Creek Watershed will be further reduced. Alternatives to deep aquifer well water dependence will also be necessary to create a sustainable water supply for this region.

Increased discharges and creek flows are expected in the future. The table below is an estimate of these flows, assuming all water demands are met. Although the flows are estimated for 2046, decreased development indicates that these flow rates will not likely occur until a later date.

Future Conditions* (2046) Year-Round Ave Flows at USGS Pueblo Gage

	Thousand Acre-feet per Year (kaf/yr)	Cubic Feet per Second (cfs)	Millions of Gallons per Day (MGD)	% of average
Reusable Return Flows (Colorado Springs, Fountain, and Security)	64	89	58	36%
Native Water	116	160	104	64%
Total Flow in Fountain Creek	180	249	161	
	Future Conditions* (2046) Base (Winter) Flows			
	kaf/yr	**cfs**	**MGD**	**% of base**
Reusable Return Flows (Colorado Springs, Fountain, and Security)	67	92	59	49%
Native Water	70	96	62	51%
Base Flow in Fountain Creek	136	188	122	

* Future conditions values are from page E-64 of the Southern Delivery System Environmental Impact Statement (SDS EIS). They were calculated using models predicting future creek flows.

The challenge of increased impervious area[50] and increased stormwater runoff associated with increased development will require mitigation measures within the watershed to reduce these impacts.

Sources of Statistics Used in This Summary
The statistics used in this summary come primarily from the Colorado State Engineers Office and in the Arkansas Basin Consumptive Use Water Needs Assessment: 2030 (2008 Update). The data on residential water use comes from Western Resource Advocates and the Pueblo Board of Water Works. Future reuse and flows are runs from the SDS EIS consultant's model (MWH). Most of these statistics have been presented to the Fountain Creek Vision Task Force Consensus Committee and many can be read in the Fountain Creek Vision Task Force Top 10 publication.

B. Goals and Strategies to Address Current Conditions

Goals to Improve Current Conditions

[50] Impervious area: A hard surface area which either prevents or retards the entry of water into the soil. Examples include, but are not limited to, structures, walkways, patios, driveways, carports, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, haul roads and soil surface areas compacted by construction operations.

1. Develop and enhance region-wide conservation efforts
2. Develop and enhance region-wide reuse programs
3. Minimize region-wide water system losses
4. Initiate regional discussions for addressing the long-term water supply gap

Objectives

1. By 2009, issue a report identifying all the watershed stakeholders in water supply.
2. By 2009, perform a SWOT (strengths, weaknesses, opportunities, and threats) analysis on the water conservation for at least three water districts in the watershed. Prioritize the elements from this analysis into water conservation phases for water providers. Set water reduction targets for each phase.
3. By 2010, introduce water conservation phase concepts to all water providers serving 50 or more homes in the watershed.
4. By 2010 – 2015, help implement phased water conservation plans to all watershed water providers open to participating, with the goal of a 15% residential water use per household reduction for providers that do not currently have a conservation program. Monitor and verify programs impact water demands for each provider, fine-tuning programs as needed to meet goals.
5. By 2015, help establish watershed reuse programs with all feasible water districts that are open to participating.
   **Note that water conservation includes efforts to reduce potable water distribution system leakages.*

Strategies to Achieve Goals and Objectives

1. Identify stakeholders (cooperative water provider groups) in the watershed
2. Identify education and outreach efforts on water conservation and other related topics and adopt State of Colorado's "Best Management Practices" (BMPs) program.
3. Develop urban water conservation programs in each community in the Fountain Creek Watershed, as appropriate with a watershed-wide target for residential gallons per capita per day (gpcd) water use.
4. Develop programs to lower water demands associated with new development.
5. Develop water reuse programs for all communities in the Fountain Creek Watershed, with watershed-wide reuse percent targets, as appropriate.
6. Establish watershed-wide potable water distribution system targets for acceptable leakage rates
7. Initiate regional discussions for addressing the long term water supply gap.
8. Establish a watershed-wide plan for future growth (Please see strategies for land use planning elsewhere in the Fountain Creek Vision Task Force Strategic Plan)

C. Implementation Plan

Strategy 1: Identify stakeholders (cooperative water provider groups) in the watershed			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Generate contact list	2009	Pikes Peak Area Council of Governments (PPACG)	Water provider organizations

Strategy 2: Identify education and outreach efforts on water conservation and other related topics and develop the "best of the best" program			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Interview local water providers (at least 3) and water conservation organizations	2009	Future Fountain Creek Watershed Funding Entity	Water provider and conservation organizations
b. Gather existing electronic information on programs	2009	Future Fountain Creek Watershed Funding Entity	Water provider and conservation organizations
c. Develop phases for water conservation programs combining the best elements from local providers and water conservation organizations	Year-end 2009	Future Fountain Creek Watershed Funding Entity	Water provider and conservation organizations

Strategy 3: Develop urban water conservation programs in each community in the Fountain Creek watershed, as appropriate with a watershed-wide target range for residential gallons per capita per day use.			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Establish tiered water rate structures	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations
b. Develop and enforce landscape ordinances that favor low-water use practices	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations
c. Establish education and outreach focused on reducing outdoor irrigation and indoor water use including: Xeriscape, water-wise appliances and fixtures, efficient irrigation techniques, etc.	2010 (or as soon as possible after entity is created)	Future Fountain Creek Watershed Funding Entity	Water provider organizations
d. Establish rebate, assistance, incentive, and other conservation programs	2010 (or as soon as possible after entity is created)	Future Fountain Creek Watershed Funding Entity	Water provider organizations

Strategy 4: Develop programs to lower water demands associated with new development			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Assure/enforce that low-flow faucets and showerheads and low water toilets are installed in all new residences and other facilities	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations, developers/builders
b. Have aggressive water conservation programs for new development (see above)	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations, developers/builders
c. Use a portion of new-home development fees to help fund water conservation programs, as appropriate	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations
d. Develop a model landscape ordinance for new development and annexations, as appropriate	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations

Strategy 5: Develop water reuse programs for all communities in the Fountain Creek watershed, with watershed-wide reuse percent targets, as appropriate			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Develop long-term plans and programs to meet water reuse targets, as appropriate	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations & agricultural users, as appropriate
b. Educate the public on how runoff from their property may be used for irrigation purposes	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations

Strategy 6: Establish watershed-wide potable water distribution system targets for acceptable leakage rates			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Develop programs to help each community reach these targets	Ongoing	Future Fountain Creek Watershed Funding Entity	Water provider organizations
Strategy 7: Initiate regional discussions for addressing the long term water supply gap			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Initiate regional discussions for addressing the long term water supply gap	Ongoing	EPCWA	Water provider organizations

VI. LAND USE PLANNING AND DEVELOPMENT

A. Current Conditions

Issue/Problem

Physical development is the greatest agent of change in the watershed. As municipalities and unincorporated counties approve developments within the watershed, the functionality of the physical environment changes. Colorado has one of the highest growth rates in the west. Expanding development increases the amount of impervious surfaces[51] and increases demands on natural resources and physical infrastructure. Meeting these increased demands of development within the watershed affects water quality, water quantity, the natural environment, and patterns of land use within the watershed.

The table below shows the most recent population and projected growth for the eight municipalities and three counties within the Fountain Creek Watershed.

	2000	2005	2010	% change b/w 2000-2005	% change b/w 2005-2005
City of Colorado Springs	360,890	385,312	NA	6.8%	NA
Fountain	15,197	19,489	NA	28.2%	NA
Geen Mountain Falls	773	916	NA	18.5%	NA
Manitou Springs	4,980	5,329	NA	7.0%	NA
Monument	1,971	4,114	NA	108.7%	NA
Palmer Lake	2,179	2,399	NA	10.1%	NA
Pueblo	102,121	103,994	NA	1.8%	NA
Woodland Park	6,515	7,155	NA	9.8%	NA
El Paso County	520,571	568,436	622,858	9.2%	9.6%
Pueblo County	142,054	150,917	164,783	6.2%	9.2%
Teller County	21,147	22,260	24,096	5.3%	8.2%

Source: Colorado Department of Local Affairs Website (2/26/09)

El Paso County

The rate of residential and commercial development is increasing in the watershed. This raises the issue of how to manage this growth and track the impacts. Residential and commercial development in unincorporated El Paso County had undergone record increases between 2002 and 2006. Though development submittals slowed significantly in 2007 and 2008, growth during the decade has proceeded at a rapid pace.

Within the unincorporated portion of the watershed, there are numerous developments that are entitled at a specific density; however development has not yet begun. The major projects

[51] Impervious Surfaces: A hard surface area which either prevents or retards the entry of water into the soil. Examples include, but are not limited to, structures, walkways, patios, driveways, carports, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, haul roads and soil surface areas compacted by construction operations.

tracked by the El Paso County Development Services Department total 22,883 planned residential units in the watershed and 86 acres of planned commercial development. This number is based on a development cap approved by the Board of County Commissioners for each project, but may be less when the design comes to fruition. The 22,883 dwelling units (du's) and 86 acres of commercial is the expected cap for major projects (over 150 du's) and mixed use projects. This does not include smaller projects and infill development occurring in the Cimarron Hills area.

The City of Colorado Springs

Colorado Springs is a sizeable and growing community. There are thousands of land use applications reviewed per year; of those, approximately 1,500 are for major projects. The City has a population of 400,000 people and is growing by 1.3% per year, comprising the majority of the region's 575,000 people. By 2030, the city's population is expected to exceed 500,000; the region is anticipated to grow to more than 800,000 during the same time. Two-thirds of recent population growth has resulted from net natural increase (more births than deaths). One-third resulted from people moving into the area[52] Given the rapid growth of the unincorporated areas surrounding the City, Colorado Springs' share of the regional population is expected to drop from 69% to 63% by 2030. City strategic growth policies seek to focus future urban growth within the City.

The City of Fountain

Several large ranches are in Fountain's urban growth area. Kane Ranch and a portion of Norris Ranch have petitioned for annexation. Fountain's population has grown an average of 7% per year since 2000. It 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.[53]

Fort Carson

The Base Realignment and Closure (BRAC) expansion is the largest proposed change to the base in the near future. The estimated cost of the BRAC construction projects is $526 million, and the majority of that construction is taking place between June 2006 and September 2009. Projects include: a Division Headquarters complex at a cost of $104 million, heavy brigade facilities at a cost of $341 million, and an alteration to Evans Army Community Hospital and consolidated clinic at a cost of $81 million The base is also planning to build 401 additional family housing units. Fort Carson is anticipating the arrival of an additional 10,000 soldiers at Fort Carson as a result of BRAC.[54]

Pueblo County (including the City of Pueblo)

Net migration in Pueblo in 2006 totaled 2,810. Assuming a household size of 2.5, this meant that occupied housing increased by about 1,120 units. Last year the Pueblo economy saw employment grow by 2,550, up 4.0%. Employment growth in 2006 was almost four times as

[52] Healy, Bill and Ryan Tefertiller, 2007. City of Colorado Springs Planning Department. Presentation to a Fountain Creek Vision Task Force working group on March 22, 2007.
[53] Smedsrud, Dave. 2007. City of Fountain. Presentation to a Fountain Creek Vision Task Force working group on March 22, 2007.
[54] Alguirre, Hal. 2007. Fort Carson. Presentation to a Fountain Creek Vision Task Force working group on March 22, 2007.

high as it was in 2005. Relatively low mortgage rates also contributed to a strong housing market in 2006. Builders' inventories of speculative homes were down slightly compared to a year ago, totaling an acceptable four-month supply. Housing production per capita was within normal limits. Supply and demand are in balance. In 2005 new housing construction in Pueblo per 1,000 population totaled 8.1, down from a peak of 10.3 in1999. Pueblo's housing production rates of about 7 to 10 units per 1,000 population are well below per capita housing production seen in the most active markets in the country.[55]

The portion of the Fountain Creek Watershed in Pueblo County represents one of the last major areas of Colorado's Front Range that has not been entitled and subdivided in preparation for development or placed under conservation easement. Within this Fountain Creek / I-25 corridor there has been a lot of interest from developers related to annexation to the City of Pueblo. Pueblo recently annexed a 370-acre ribbon of land around the border of Pueblo Springs Ranch (formerly McCulloch Ranch) as a first step in the potential annexation of the remaining 24,000 acres. This recent activity has spawned interest from a number of large landholders within the lower portion of the watershed[56].

Imperviousness of the Fountain Creek Watershed

"The Fountain Creek Watershed Impervious Surface Area and Watershed Health Analysis Report" describes growth and development trends and health characteristics of the Fountain Creek Watershed. The watershed was divided into 27 smaller drainage basins (sub-watersheds) and for each individual sub-watershed, current and future percent imperviousness was calculated and classified depending on the amount of imperviousness as either sensitive (0-10%), impacted (11-25%) or non-supporting (26-60%)[57]. Results of the study indicate that changes in percent imperviousness will be most pronounced in the northern and eastern portion of the Fountain Creek Watershed and in the areas that have shared boundaries between the City of Colorado Springs (or other municipalities) and unincorporated portions of El Paso County. Increased growth in the unincorporated portions of El Paso County will continue to put more pressure on creeks within those areas and immediately downstream due to increased stream-flow and increased suspended sediment concentrations. Ephemeral[58] and intermittent streams will continue to see more stream-flow and become perennial[59]. This has already occurred in Cottonwood Creek, sections of Sand Creek, and Jimmy Camp Creek, which are also expected to see the largest increase in percent imperviousness in the future.

Strategies to address increasing imperviousness are being considered by the various counties and municipalities within the watershed. Changes to development techniques may allow post-development hydrographs[60] to approximate pre-development hydrograph on a site-by-site basis. The implementation of low-impact development (LID) practices may be one means to

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[55] Pueblo Housing Market 2007-2009, 2007 Bamberger Housing Study, http://www.prbd.com/pdfforms/PuebloHousing2007.pdf

[56] City of Pueblo, Planning Department

[57] Fountain Creek Watershed Imperviousness Surface Area and Watershed Health Analysis Report, http://www.fountain-crk.org/Reports/fc_impervious_surface.html

[58] Ephemeral: A stream that flows only a short time (days or weeks) in direct response to precipitation.

[59] Perennial: A stream with year-round channel flow.

[60] Hydrographs: The description and studies of bodies of water (e.g. lakes and rivers): as the measurement of flow and investigation of the behavior of streams and the charting or graphing of them.

accomplish this goal. Adopting Smart Growth principles and promoting Green Infrastructure, Energy Star Housing, and Leadership in Energy and Environmental Design (LEED) Criteria for non-residential structures will go a long way toward minimizing the negative impacts of development within the watershed. These strategies do not necessarily require changes in planned uses, only the manner in which sites are developed.

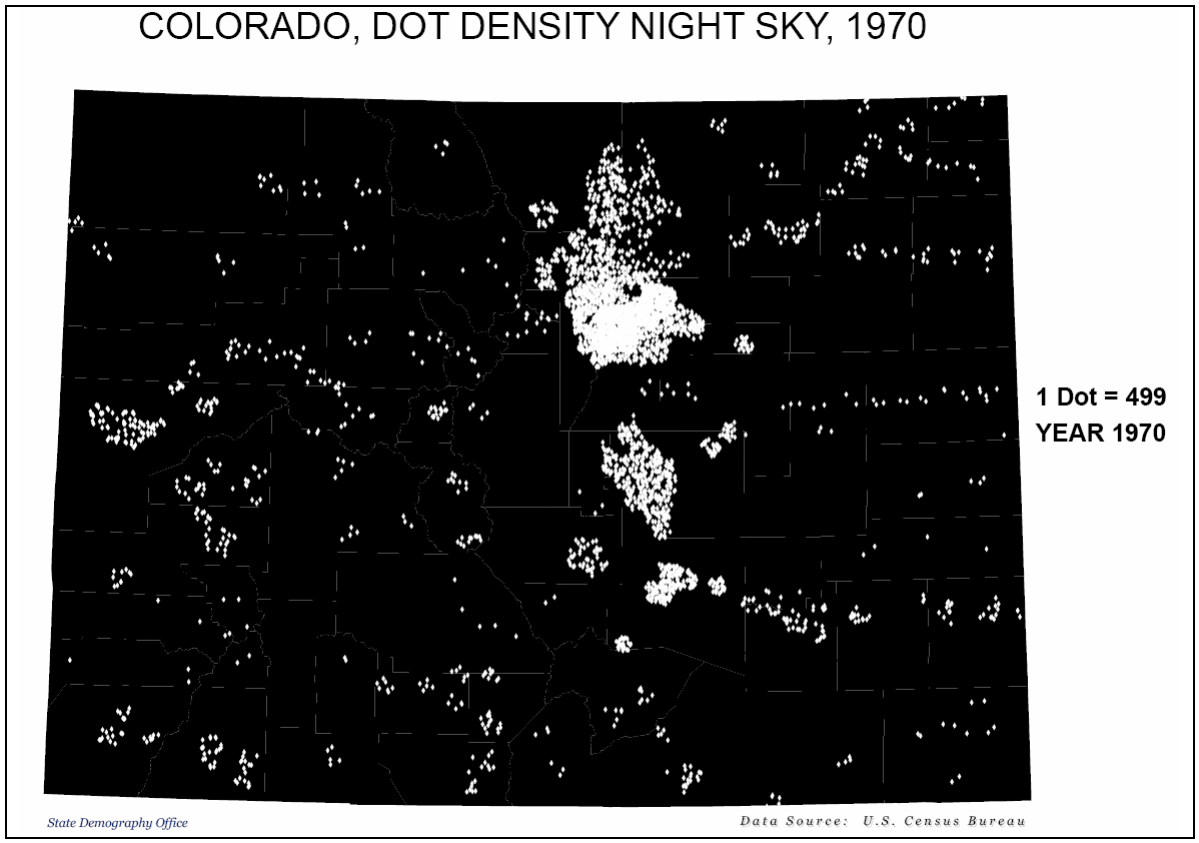
Anticipated Water Needs

If we assume that the average household contains 2.5 persons, and also assume a per person average water usage of 69.3 gallons of water per day, each household on average would use 173.25 gallons of water per day. When this number is extrapolated to reflect the amount of growth expected in the watershed in the next 20 years, it provides a large target for optimizing our efficiency as it relates to resource usage and allocation within the watershed. The Colorado Springs Region is expected to grow by 225,000 residents by 2030[61] and the Pueblo area proposed annexations could accommodate as many as 175,000 residents.[62] If these growth projections are actualized, and current water use trends remain the same, the minimum water needs for the Colorado Springs region would increase by roughly 15,592,500 gallons per day and the Pueblo region's minimum water needs for the region would increase by approximately 12,127,500 gallons per day.[63]

[61] Healy, Bill and Ryan Tefertiller, 2007. City of Colorado Springs Planning Department. Presentation to a Fountain Creek Vision Task Force meeting on March 22, 2007.
[62] City of Pueblo Planning Department, Land Use and Environment Working Group, March 22, 2007.
[63] Arkansas River Consumptive Use; July, 2008.

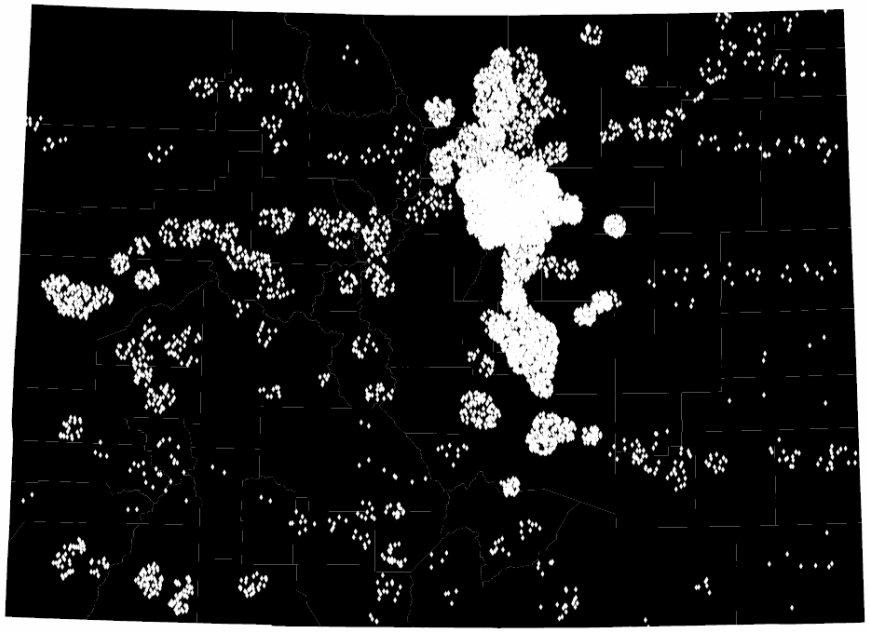
Growth Indicator

The Colorado State Demographer uses a "Dot Density, Night Sky" format to show the impacts of residential growth in various parts of the state. Imagine each "dot" represents about 500 people. The State of Colorado in 1970 is shown below.



The "darkness" between both Colorado Springs and Pueblo is readily observed. As the next series of depictions indicates, growth in the Fountain Creek Watershed will fill in the darkness. These dots similarly represent increasing impervious surface in the watershed, with all the consequences that follow.

COLORADO, DOT DENSITY NIGHT SKY, 2010



1 Dot = 499
YEAR 2010

State Demography Office

Data Source: State Demography Office

COLORADO, DOT DENSITY NIGHT SKY, 2020

1 Dot = 499
YEAR 2020

State Demography Office

Data Source: State Demography Office

Prospective Development in the Fountain Creek Watershed

Sundance Investments/Lafarge West Inc. Gravel Pit

The Sundance Investments/Lafarge West Inc. Gravel Pit is a 745-acre property that will contain a 437-acre sand and gravel pit, along with a use variance request for possible asphalt and concrete batch plants. This proposed project would be located along two miles of the west bank of Fountain Creek just southeast of I-25, Exit 122. The land is currently leased for 15 years, though the rate of use will depend on the market and determine the length of the lease – up to 30 years.[64] The site will be mined from north to south in increments to expose no more than 30 acres of ground water at one time; reclamation will be sequential with this progression. The land will be returned to agricultural uses and a possible 270-acre water reservoir upon conclusion of operations. Water needs are stated at 150 acre-feet per year. Lafarge indicates that the water supply will come from "local sources." There will be discharge into Fountain Creek from directly adjacent settling basins. Lafarge states that peak dewatering and stormwater release to Fountain Creek of clarified water will meet or exceed all standards and that "no impact to surface waters is anticipated."

Sand and gravel would be mined from the pits, and some of it would be processed on site in proposed concrete and asphalt batch plants. There would be up to 750 truck-trips per day, utilizing the proposed improved Exit 122 overpass. Negotiations with the Colorado Department of Transportation (CDOT) are ongoing relative to this overpass.

This project has potential impacts to the Fountain Creek corridor:

- The northern extension of the proposed property lies in a narrow band between Fountain Creek and the railroad tracks, where the creek takes a turn east. Some analysts anticipate the need to "hard point"[65] the creek at this point in order to mitigate flooding risks, which may cause even low levels of floods to be redirected into an area of natural wetlands on the opposite bank. Lafarge states that it is required to implement flood mitigation as appropriate and that **"**no wetland impacts are anticipated" within the site. No studies have been done at this time to determine effects on the opposite bank.
- Portions of the northern end of this property are located within the 100-year floodplain. Lafarge states that the asphalt and concrete plants will not be situated within the floodplain area.
- Lafarge states that dewatering discharge and stormwater will be intercepted on site by settling basins and will be subject to discharge permitting. They also report that "no erosion in Fountain Creek is anticipated as the result of this operation."

The gravel pit's eastern boundary is located along 2 miles of the west bank of Fountain Creek. Just across the creek along those two miles is a 915-acre conservation easement intended to preserve agriculture, wildlife, and wildlife habitat, including wetlands. Lafarge states that impacts on wildlife within the site were studied and are estimated to be negligible based on avoidance of riparian areas and utilization of only existing, disturbed agricultural land.

[64] In a presentation to the Fountain Creek Vision Task Force Consensus Committee on April 20, 2007, a Lafarge representative indicated that the lease could be for up to 30 years. However, Lafarge's submittals to the El Paso County Planning Department indicate that the lease would be for 15 years only.

[65] Hard pointing involves reinforcing the creek bank with rocks and/or cement in order to prevent erosion.

Lower Fountain Metropolitan Sewage Disposal District (LFMSDD)
A wastewater treatment and biosolids stabilization and disposal plant is proposed to be located on Birdsall Road 4 miles south of Fountain (and 1.5 miles northeast of Exit 122). The site application is currently being reviewed by the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division. In its first phase it will handle 2.5 million gallons per day (mgpd) and build up to 6 mgpd. It will serve development in the lower Jimmy Camp Creek watershed. Discharge will be made into Fountain Creek with efforts to mitigate erosion. This facility is scheduled to open late 2010. A geotechnical study has been completed to determine soil conditions and develop suitable design criteria for pipelines and structures. Commencement of construction is anticipated to begin during the first quarter of 2009.

Pueblo Springs/ LDM Development
Pueblo Springs is a proposed 24,000-acre residential development in Pueblo County just south of the Pueblo/El Paso County line and east of I-25. Technically, only a small part is within the Fountain Creek Watershed but that part is along Fountain Creek. The developer is in talks with the City of Pueblo on many things, including the need for a future wastewater treatment plant.[66]

Jimmy Camp Creek
While there is an area in the north of the proposed development that could be conducive to industrial development, there are no plans for it at this time.

Pikes Peak International Raceway (PPIR)
PPIR was sold to International Speedway Corporation (essentially NASCAR) in early 2006. They are in negotiations with several unspecified entities for providing "multi-function sports car activities" that do not conflict with NASCAR activities. Nothing further is known at this time.

Construction
Construction activity (beyond these large projects) is a significant part of the economy and can have important land use, water quality, and water quantity effects on the watershed.

Roadways

US24 Highway Improvement
In the mid-90's, in response to projected traffic congestion concerns, Pikes Peak Area Council of Government (PPACG) asked CDOT to study the route from Colorado Springs to Woodland Park. In 2004, planning efforts began on the 6.5 mile stretch of US HWY 24 between I-25 and West Manitou Avenue. An effort to solicit local and regional input resulted in nearly 400 "ideas." These were narrowed down to three alternatives: the No-Build alternative, which would include only those projects already approved and funded; the Midland Expressway, with an emphasis on local neighborhoods and local (40-45 miles per hour) traffic; and the US24 Freeway alternative with an emphasis on regional traffic traveling at higher speeds (50-55 miles per hour). In May 2006 the Midland Expressway alternative was chosen. The Midland Greenway Advisory Committee championed the re-visioning effort (See: www.dot.state.co.us/us24w/greenway). Local concerns included the effects on local neighborhoods, loss of homes and business in the

[66] Munch, Jim. 2007. Personal communication.

path of the new route, non-motorized traffic trails and pathways, environmental degradation, light, noise, and air pollution.

The Environmental Assessment for the Expressway alternative, preparatory to CDOT's recommendation and the Federal Highway Administration's Decision Document, should be completed in 2008. PPACG will then address funding for construction which will most likely happen in phases over a 10- to 15-year period. (Design graphics for the plan are available at: www.ppacg.org/trans/2030/2030plan under "graphics.")

State Highway 16

Among all the other roadways envisioned, planned, or proposed (see below) for the Fountain Creek Watershed, one is of particular note: State Highway 16 which connects Mesa Ridge Parkway /South Powers Boulevard to HWY 85 (at Fountain) to I-25 (at exit 132) to Fort Carson (at Gate 20). Already congested and operating beyond its capacity, this series of interchanges and overpasses is being constructed at an accelerated pace due to the imminent arrival of 10,000 additional troops assigned to Fort Carson (which is estimated to bring a total of 30,000 people to the area), the need for a Rapid Deployment route from Fort Carson to Peterson AFB that will support the 115-ton "Heavy Equipment Transporter" vehicles; and provide for an east-west connection for future growth in southern Colorado Springs and Fountain. Parts of this project should be completed in 2009.

Toll Roads

Plans for Toll Roads abound throughout the Watershed; far too many to be analyzed here. Please see maps on the following websites: www.PPACG.org (under "Transportation"), www.Dot.state.co.us (under "CTE (Colorado Tolling Enterprise) Executive Summary"), and Powerslink.com.

One toll road that directly impacts the Watershed and that is not specifically named in the above documents is the Southlink, Inc, Private Toll Road (PTR). PTR is proposing a 9.3 mile, 300-foot corridor to form a 4-lane, median-divided toll road from South Powers Boulevard/Mesa Ridge Parkway (in Fountain) to I-25 Exit 123. That is, from Mesa Ridge Parkway straight south, curving a bit east to circumvent Calhan Reservoir, then curving southwest over Fountain Creek and the railroad tracks to I-25 Exit 123. (NOTE: This project is not the so-called Super Slab, which would be located farther east, i.e. outside the Fountain Creek Watershed.)

PTR has filed formation documents with the Colorado Secretary of State and must commence work within 3 years. Before construction begins, they must provide an environmental study approved by CDOT and construction plans for the road must be "approved by CDOT and each Metropolitan Planning Organization or Regional Planning Organization" affected by the route. The project also "needs to be included in the regional transportation plan(s) and in the comprehensive statewide transportation plan prepared by CDOT."

PTR "intends to offer additional forums for public involvement" and "contemplates preservation of wildlife habitat and open space adjacent to the corridor." Southlink states that they "do not have the power to condemn private property" and that "such condemnation could occur only through action by CDOT."

Powerlines
The following power lines and towers are included in this plan due to their impact on viewsheds in the area.

Eastern Plains Transmission Project (Tri-State/WAPA Power Transmission Lines)
Western Area Power Administration (WAPA) and Tri-State Generation and Transmission Association are proposing a 1,000-mile high-voltage transmission line with associated facilities throughout eastern Colorado and western Kansas. One part of this will intersect with the Midway Substation (just southwest of Exit 122). As currently proposed, there would be a long series of 90 to 115 foot towers for the 345 kilovolt power lines that would originate at the Boone substation, head north and west across the prairie to a point near the El Paso/Pueblo County line, then turn west to cross Fountain Creek to the Midway substation. Then reverse course back across the creek heading east to split north-south somewhere out near the Chico Basin Ranch. The actual route is in a state of flux. **Note on November 30, 2008**: According to a WAPA spokesperson, Kansas did not approve an air permit and the entire project is on hold until further notice.

Xcel Energy/Public Service Company of Colorado Power Line
Xcel has proposed and has gained approval for a powerline from the Comanche power plant south of Pueblo to the Daniels plant south of Denver. The power line would follow established corridors (power lines) from east of Pueblo, angle to a point two and a half miles east of I-25 and just south of the El Paso-Pueblo County line, then cross open prairie north near Birdsall road and head north on established corridors. The towers for this 345-kilovolt line would be 140 feet tall along this 70-mile stretch.

Robert Norris - Radio Communications Towers
Landowner Robert Norris is applying to the Pueblo County Planning Commission for approval of a cluster of from four to six, 200- to 350-foot radio towers just north of the power line corridor, just south of the El Paso-Pueblo County line, along Overton Road. This project has been approved.

B. Goals and Strategies to Address Current Conditions

Goal to Improve Current Conditions
Establish and implement land use policies that preserve, maintain, and enhance ecosystem health (including flood control, wildlife habitat and water quality).

Objectives
By 2010, establish a process that Fountain Creek communities can use to work together to achieve the land use vision and goal

Strategies to Achieve Goals and Objectives
1. Create and implement a common land use vision for the watershed.
2. Develop a suite of land use and development approaches to mitigate negative impacts on water resources.
3. Identify and promote land use and development best management practices.

4. Preserve open space and agriculture with a coherent system of conservation easements.
5. Collaborate and cooperate with all entities that control land use and development in the region to achieve the goal.
6. Remove regulatory barriers and provide selective incentives to promote water protective land use and development, such as low-impact development, sustainable design, and green building.
7. Develop watershed-wide criteria, regulations, and policies, as appropriate to each jurisdiction, to ensure water protective land use and development
8. Create a pilot project that demonstrates low-impact development practices.
9. Evaluate the effectiveness of the new suite of land use and development approaches.

C. Implementation Plan

Note: Many of the actions items for improving land use planning in the watershed overlap with action items for improving water quality. For the sake of clarity, these crossover action items are only listed in the Water Quality section of the Strategic Plan.

Steps to Implement Land Use Strategies	Target Completion Date	Recommended Responsible Entity in the Watershed	Partners in Implementation
a. All jurisdictions in the watershed to develop a task force to meet twice a year to discuss land use planning issues, review current land use and development practices in each community and develop voluntary guidelines.	2009	City of Pueblo	Colorado Springs, Woodland Park, Fountain, Pueblo County, El Paso County, Manitou Springs, Monument, Department of Defense representatives, Army Corps of Engineers
b. All watershed jurisdictions have revised land use planning and development guidelines that are similar to those proposed by the task force	2013	Pueblo County	Colorado Springs, Woodland Park, Fountain, El Paso County, Manitou Springs, Monument, Department of Defense representatives, Army Corps of Engineers
c. A watershed entity is developed to provide and recommend voluntary land use and development best management practices in the watershed	2013	Pueblo County El Paso County	Pueblo, Woodland Park, Fountain, Pueblo County, El Paso County, Manitou Springs, Monument, Department of defense representatives, Army Corps of Engineers
d. Guidelines are set for existing undeveloped private land to incorporate a percentage of open space dedications or other measures for all proposed development	2014	Future Fountain Creek Watershed Funding Entity	Colorado Springs, Pueblo, Woodland Park, Fountain, Pueblo County, El Paso County, Manitou Springs, Monument, Department of Defense representatives, Army Corps of Engineers
e. Development of new regulations incorporating LID, best management practices (BMPs), streamside or riparian regulations, and green building practices.	2015	Colorado Springs	Pueblo, Woodland Park, Fountain, Pueblo County, El Paso County, Manitou Springs, Monument, Department of Defense representatives, Army Corps of Engineers
f. All new development in the watershed will incorporate, to the extent practicable, LID, sustainable design, and green building into development practices	2018	Future Fountain Creek Watershed Funding Entity	Colorado Springs, Pueblo, Woodland Park, Fountain, Pueblo County, El Paso County, Manitou Springs, Monument, Department of Defense representatives, and the Army Corps of Engineers

VII. RECREATION

A. Current Conditions

Overview

One of the goals of the Fountain Creek Task Force is to create a recreational amenity of Fountain Creek. The Task Force hopes to increase recreational opportunities along Fountain Creek in order to benefit the region's residents, wildlife, and the stream itself.

This summary focuses on opportunities for passive recreation[67] along Fountain Creek and provides general background on existing recreational opportunities in the Fountain Creek watershed. Active or motorized recreation[68] is not part of this summary because those uses are not consistent with the vision articulated by the Task Force**.** This summary is not intended to provide a blue print for recreation in the entire watershed.

Current Conditions: Existing Recreational Facilities and Opportunities

There are many parks, nature preserves, and trail amenities in the watershed. As is true for Colorado as a whole, residents of the watershed enjoy outdoor recreation opportunities and consistently respond favorably when asked if more opportunities for recreation are desired.

Although there are substantial recreational facilities in Colorado Springs and many in the City of Pueblo, south of the City of Fountain and north of the City of Pueblo there is little opportunity for recreation along Fountain Creek. The primary public recreational facilities between the City of Fountain and Pueblo is a designated bird watching trail along Hanover Road in El Paso County. This area is sparsely populated, with ranching and farming the primary land use within the corridor. Transportation right-of-way, residential development, and utility corridors are other significant land uses.

State Parks has two facilities in the area: Lake Pueblo State Park (not in the Fountain Creek Watershed) and Cheyenne Mountain State Park. Lake Pueblo State Park is among the most heavily utilized parks in the state (with an estimated 1.5 million visitors each year) and is anticipated to connect to the Front Range Trail (see below for more on the Front Range Trail). Flat water recreation, fishing, and camping are the main attractions to the Park. Cheyenne Mountain State Park is a scenic foothills-to-mountain park located just southwest of Colorado Springs and west of Ft. Carson with hiking, biking, and educational opportunities. State Parks and Colorado Springs are in the process of acquiring the top of Cheyenne Mountain and will provide increased trail and recreational opportunities once the entire area is purchased.

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[67] Passive recreation includes is generally limited to hiking, biking, horseback riding, picnicking, camping, climbing, hunting, fishing, and wildlife viewing.

[68] Active recreation includes physical education, athletic fields, and supporting athletic elements (such as but not limited to: goals, goal posts, backstops, dugouts, fences, etc.).

There are numerous local and regional parks in the watershed. Among these are: Monument Valley Park, North Cheyenne Canyon & Stratton Open Space, Bear Creek Canyon Park, Palmer Park Bluestem Prairie Open Space, Honor Farm, Fountain Creek Regional Park, and Whitewater Kayak Park. In addition to parks and open space, there are trail systems throughout the area, some of which follow Fountain Creek and connect to parks such as Fountain Creek Regional Park. The majority of these parks and open space are used for passive recreation such as walking, bicycle riding, jogging, wildlife viewing, and, in the case of Whitewater Kayak Park in Pueblo, limited non-motorized water recreation (kayaking).

Other recreational activities such as hunting and motorized recreation have not been discussed by the Task Force. Currently, hunting is not a major activity occurring on Fountain Creek. If increased hunting were to occur careful planning would be required in order to ensure the safety of the public while recreating in or near areas where hunting is allowed. As of third quarter 2008, there are several options being considered for the Pikes Peak International Raceway.

Future Recreational Opportunities

One upcoming recreational opportunity within Pueblo County is the Fountain Creek Stewardship Center. The Fountain Creek Stewardship Center will serve as the hub for the Fountain Creek system of parks, open space, natural areas and research sites. It will be connected to the other facilities located along Fountain Creek with Internet and webcam technology, making it an educational amenity for those who visit in person or on-line. Each element of the system will promote natural resource management practices.

Functioning full-scale exhibits at this location will be used to educate the public in many areas including: natural creek functions, water quality improvement, flood/sediment attenuation, bank protection techniques for rural areas, wildlife habitat improvements, backwater areas for Arkansas Darter habitat (a threatened species in Colorado), and recreational management. This project is currently in the planning and development stage with a proposed 2009 construction start date.

Another project that will encourage the public to become Fountain Creek stewards is the Fountain Creek Eco-Fit Education Park. The Fountain Creek Eco-Fit Education Park, which is a critical component of the watershed improvements, will also be connected to the other facilities located along Fountain Creek with Internet and webcam technology, making it an integral educational amenity for locals and tourists alike. Visitors will learn and explore through inviting interactive and hands-on play, and health will be promoted through active play.

The park will be a case study of how the ecology of Fountain Creek can be improved in an urban setting. This will be accomplished through innovative design techniques such as backwater channels and wetlands that will act as water quality filtration ponds and for flood storage. These areas will also provide beauty, wildlife habitat, and recreational opportunities. Hands-on educational displays will teach park visitors about the Fountain Creek drainage basin, how floods occur and can be safely avoided, and the history of the creek.

Both of these demonstration projects will actually be a part of the solution for the watershed because it will:

- construct wetlands that will help improve water quality in Fountain Creek and will help attenuate flood flows;
- provide bank stabilization will help reduce sediment loads in the Creek and will demonstrate state-of-the-art practices that can be duplicated in both rural and urban settings elsewhere in the watershed;
- provide habitat improvements that offer a healthy environment for the Arkansas Darter, a threatened fish species in Colorado; and

create demonstrations that will educate the public on watershed health, safety, and the importance of proper watershed management.

In addition to these future recreational facilities are other upcoming and planned deveopments in the watershed. State Parks is spearheading an initiative to connect Wyoming to New Mexico via the Front Range Trail (FRT). The FRT will piggyback on existing trails systems through metropolitan areas and will work to build new sections of trail where there are none. Colorado Open Lands, a non-profit land trust and member of the Task Force, was awarded in 2008 a trail planning grant from State Parks to prepare a trail implementation plan for the Front Range Trail section south of Fountain to the Pueblo City boundary. The goal of the grant is to help State Parks and its partners implement the FRT by presenting two potential trail alignments, assessing cost for trail easement acquisition, compiling contacts for interested landowners, and to coordinate efforts among various stakeholders interested in planning for the FRT (including the Task Force). To date, no detailed planning has been done on parking, esthetic impacts of the FRT, and public access points. Any private landowner participating in granting a trail easement would do so willingly. Impacts to agricultural operations and other land uses will be considered in the trail alignment phase of planning.

The Task Force has also brainstormed opportunities for loop trails off of linear trails that would provide wetland and riparian habitat viewing for birders and general wildlife viewing nearer to the Creek, although no formal plans have been produced by the Task Force to date. Portions of Fountain Creek including Hanover Road and Clear Springs Ranch are included in Colorado Division of Wildlife Pikes Peak Birding Trail. Viewing and parking is from the road and no private property access is allowed. The envisioned loop trails would likely be raised or planked in order to cross wet or riparian areas and would require easements on private property or the acquisition of such access. Currently, no specific plans for the location of birding and wildlife viewing trails has been identified. Parking and public access would need to be carefully planned.

There has also been discussion of establishing one or more State Park facilities along Fountain Creek that would be linear in shape and provide camping, flat water recreation, and ranching activities. If graveling of the creek occurs, there may be future opportunities for flat water recreation such as that found at St. Vrain State Park on the Northern Front Range. Any discussion of a State Park would have to be supported by the local communities that would be impacted by a Park. State Parks is pursuing negotiations with landowners for potential location(s) for a State Park. Two ideas have been discussed for the use of the park(s): 1) a working ranch park where visitors can experience Colorado's ranching heritage through hands-on activities, and 2) passive recreation site(s) for camping and nature viewing. No further planning work has been done by the Task Force in conjunction with State Parks.

Local planning for recreation is ongoing on the local level and includes trails such as the Midland Trail along US Highway 24 between Colorado Springs and Manitou Springs following Fountain Creek. A broad based citizen's group called the Greenway Advisory Committee is planning a greenway that will use a state road expansion project to implement a new trail system in this same stretch of Fountain Creek . The Greenway Committee is exploring three different visions for the trail that include considerations for water quality, floodplains, and impacts to recreational resources. Planning efforts in Pueblo include improving linkages to the Fountain Creek Trail at El Centro de Quinto Sol, Plaza Verde Park, and Hoff Elementary School; trail enhancements that better link trail users to wildlife and the river corridor through vegetation management and improvements; and consideration of the viability of a 'confluence park' located between Plaza Verde Park and the confluence of Fountain Creek and the Arkansas River.

Other local planning efforts are too numerous to list in this summary. The intent of the Fountain Creek Recreational Task Force Committee, recommended in this report, is not to duplicate but to encourage coordination of recreational planning such as the segment of Fountain Creek south of Fountain. The Fountain Creek Recreational Task Force Committee would also be able to ensure that the vision and general goals of the Fountain Creek Vision Taskforce are upheld in recreational planning.

Note: Currently, there is no non-motorized transportation alternative connecting the metropolitan areas of Colorado Springs and Pueblo. Members of the public have expressed an interest in having a trail that could provide not only recreational opportunities but bicycle and other non-motorized commuting options. The Task Force has begun to explore what trails currently exist in order to plan for future trails that could also provide routes to Ft. Carson gates, for example, or access to city centers.

Challenges and Next Steps

There is no information available on the costs of implementing any of the recreational visions discussed by the Task Force. Trail building costs will vary depending on the type of surface, width, and engineering issues associated with different segments of the trail. Implementing a State Park or other recreational facilities will require partnerships and a financial commitment from regional citizens to share the costs of planning, constructing, and maintaining recreational facilities. One mechanism available is dedicated county open space funding raised through taxes or mil levies.

Some members of the Task Force and the community at large have expressed the opinion that cleaning up the water quality and flooding issues along Fountain Creek are key steps to implementing any long-term recreational goals along Fountain Creek. The current conditions of Fountain Creek could provide wildlife viewing and wetlands creation; however, major flood events or pollution events could diminish or destroy investments in recreational facilities and discourage recreationists from enjoying the resource. Any major recreational plans would need to be coordinated with efforts to improve the stability and quality of Fountain Creek.

The challenges presented by planning for increased recreational activities include: establishing accurate baseline data for existing and planned recreational activities for the entire focus area and balancing needs of private landowners with recreational needs. The most obvious challenge of

establishing any trail system will be the cost of acquiring trail easements, the cost of building the trail, and the ongoing costs of trail maintenance. There are also natural and man-made constraints to the Fountain Creek corridor such as railroad tracks, difficulty of crossing I-25, floodplain challenges, utility corridors, and creek crossings that will have to be considered when planning for the trail.

B. Goals and Strategies to Address Current Conditions

Goals for Improving Current Conditions

1. Create a common vision for recreational uses within the Fountain Creek Corridor between the various municipalities/counties.
2. Expand the types of recreational opportunities within the Fountain Creek Watershed and Corridor.
3. Preserve, maintain, and enhance the Fountain Creek Watershed and Corridor through environmentally sensitive and sustainable recreational design. Restore ecological systems that have been lost or are struggling.

Objectives

1. Implement the recreation vision and strengthen existing master plans by jointly creating unique recreational opportunities.
2. By 2009, identify preferred trail alignment for the Front Range Trail
3. By 2009, begin removal of invasive plant and animal/inspect species from the Fountain Creek Watershed.
4. By 2009, create a coherent list of current recreation opportunities within the Fountain Creek Watershed and Corridor.
5. By 2010, work with the Outreach Committee on programming events.
6. By 2010, create a Fountain Creek Watershed Recreational Task Force Committee
7. By 2010, complete an inventory of existing conditions along the proposed trail routes
8. By 2011, develop a list of recreational maintenance needs and solicit the help of various businesses and corporations.
9. By 2011, acquire necessary trail easements for the Front Range Trail
10. By 2011, hire an engineering firm to begin construction drawings for the Front Range Trail
11. By 2015, start construction and establish an ongoing maintenance schedule of the Front Range Trail within the Fountain Creek watershed.

Strategies for Achieving Goals and Objectives

1. Finish construction of the Front Range Trail.
2. Develop recreational standards that promote healthy and thriving environments, which encourage the strong presence of flora, fauna, and wildlife species.
3. Establish a core panel of recreational leaders within the Fountain Creek watershed who will act as the recreation consensus committee for establishing Task Force committees that would address long-term and short-term funding mechanisms, identify recreational needs and opportunities/constraints, and create a common recreation vision along the Fountain Creek Corridor.

4. Pursue funding mechanisms that would allow for continued development and maintenance of future recreational uses within the Fountain Creek Watershed and Corridor.

C. Implementation Plan

Strategy 1: Finish construction of the Front Range Trail within the Fountain Creek watershed.			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Identify preferred trail alignment for the Front Range Trail	2009	Colorado State Parks and State Trails	El Paso and Pueblo County; Colorado Open Lands
b. Complete an inventory of existing conditions along the proposed trail routes	2010	Colorado State Parks and State Trails	El Paso and Pueblo County
c. Acquire necessary trail easements for the Front Range Trail	2011	Colorado State Parks and State Trails	El Paso and Pueblo County
d. Secure all necessary capital funding for the construction/acquiring/maintenance of the Front Range Trail	2012	Colorado State Parks and State Trails	El Paso and Pueblo County
e. Hire an engineering firm to begin construction drawings for the Front Range Trail	2011	Colorado State Parks and State Trails	El Paso and Pueblo County
f. Identify permitting requirements and develop the critical path chart for construction	2011	Colorado State Parks and State Trails	El Paso and Pueblo County
g. Construct and maintain the Front Range Trail within the Fountain Creek watershed	2015 Ongoing	Colorado State Parks and State Trails	El Paso and Pueblo County

Strategy 2: Develop recreational standards that promote healthy and thriving environments, which encourage the strong presence of flora, fauna, and wildlife species			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Begin removal of invasive plant and animal/insect species (i.e. Zebra Mussel and Elm Trees). Create a "firewall" to prohibit the continued spread of the invasive plant and animal/insect	2009	Pueblo County, El Paso County, Colorado Springs, Colorado State Parks	Grant Money
b. Repair and replace trail sections negatively affected by events of nature. In the event the trail cannot be repaired in a timely fashion, provide appropriate signage and trail detours	2009	Pueblo County, El Paso County, Colorado Springs, Colorado State Parks, City of Pueblo	

Strategy 3: Establish a core panel of recreational leaders within the Fountain Creek watershed who will act as the recreation consensus committee for establishing Task Force committees that would address long-term and short-term funding mechanisms, identify recreational needs and opportunities/constraints, and create a common recreation vision along the Fountain Creek Corridor.			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in theWatershed**	**Partners in Implementation**
a. Create a coherent list of current recreational opportunities within the Fountain Creek watershed and corridor and provide the public with appropriate links and ways to find information about these opportunities	2009	El Paso County, Colorado Springs, Pueblo County, City of Pueblo, State Parks	Friends groups, non-profit organizations
b. Create a Fountain Creek Watershed Recreational Task Force Committee to create a coherent recreation system between the various counties and municipalities. This committee would be responsible for informing other committee members about recreational opportunities and planned projects for the watershed	2009	El Paso County, Colorado Springs, Pueblo County, City of Pueblo, State Parks	Friends groups, non-profit organizations
c. Upon establishment of a coherent list of current recreational opportunities, set up yearly meetings so the task force can review the dynamic document and adjust it with changing trends in the recreation world	2010	El Paso County, Colorado Springs, Pueblo County, City of Pueblo, State Parks	Friends groups, non-profit organizations
d. Consult with neighbors and community members to discuss what has happened with recreation in the Fountain Creek watershed and corridor and up-coming projects. Invite the public to have an open dialog with the task force committee	2010	El Paso County, Colorado Springs, Pueblo County, City of Pueblo, State Parks	

Strategy 4: Pursue funding mechanism that would allow for continued development and maintenance of future recreational uses within the Fountain Creek watershed and corridor			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Create "friends" groups for all the various recreational uses and existing recreational areas within the Fountain Creek watershed and corridor. The friends group would be an integral part of fund raising efforts for on-going maintenance needs and programs	2010	El Paso County, Colorado Springs, City of Pueblo, Pueblo County, State Parks	Non-profit organizations
b. Establish opportunities within the various recreational uses so the friends group can become regular volunteers and help preserve the history of the properties	2010	El Paso County, Colorado Springs, City of Pueblo, Pueblo County, State Parks	Non-profit organizations
c. Develop a list of recreational maintenance needs and solicit the help of various businesses and corporations. Provide a menu of options and allow the businesses and corporations the opportunity to match their strengths/interests to the project(s) needs	2010	El Paso County, Colorado Springs, City of Pueblo, Pueblo County, State Parks	Non-profit organizations
d. Aggressively apply for grants and funding opportunities	2009 – on going	El Paso County, Colorado Springs, City of Pueblo, Pueblo County, State Parks	Non-profit organizations

Strategy 5: Create an interpretative/education plan that would address the positive and negative impacts human behavior has on the Fountain Creek watershed and corridor			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Create a campaign to encourage and explain why dog owners need to keep their pets on leashes and out of Fountain Creek	2010	El Paso County, Colorado Springs, City of Pueblo, Pueblo County, State Parks	
b. Work with the Outreach Committee on programming events	2010	El Paso County, Colorado Springs, City of Pueblo, Pueblo County, State Parks	

VIII. WETLANDS

A. Current Conditions

Issue/Problem

The Fountain Creek Watershed waterways are experiencing erosion, sedimentation, flooding, and degraded water quality in some reaches. Properly located and designed wetlands can help improve these deleterious conditions, as well as increase adjoining property values and tourism (through recreation and wildlife viewing opportunities), and can provide opportunities for environmental education. There are many existing wetlands in the Fountain Creek Watershed, some of which have been created by increased local water flows. However, some are at risk due to floodway reduction, increased flood flows, and Tamarisk invasions.

Current Situation

The Clean Water Act (CWA) has jurisdiction over "waters of the U.S." which includes lakes, enforced by the US Army Corps of Engineers, and filling a qualifying wetland or stream requires a Section 404 permit under the CWA.

Wetlands provide a number of important benefits to natural and human communities. They can help improve water quality by filtering water through vegetation and stabilize the banks of streams as the roots hold soil in place. Because wetlands reduce the velocity of water traveling through them and hold excess water like sponges, they can reduce erosion and flooding. As waterway sediment loads increase exponentially with water velocity, the reduced creek velocities also result in significantly reducing sediment loads. Wetlands are an important component of the ecosystem as they attract and support a high diversity of wildlife species. Created wetlands can mimic many of these functions of natural ones, although they rarely mimic all of them. Additionally, wetlands can serve as an outdoor classroom for environmental education and are attractive for ecotourism. (For additional information concerning the types of wetlands, associated vegetation/habitat, wildlife, the benefits of wetlands such as water filtration, and dynamics of wetland loss and creation, please visit the websites of the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and U.S. Army Corps of Engineers.)

Less than 3% of the surface area in Colorado was originally wetlands.[69] Of that 3%, approximately 40 to 60% of the original wetlands area has been lost.[70] This equals approximately 1-3 million acres. The loss of wetlands in Colorado is greater proportionately than the losses of other habitat types.

Under natural hydrology[71] wetlands/riparian vegetation are maintained as shifting patches on the landscape, e.g. one patch of shrubs might get washed away, while a sandbar gets created that

[69] Dahl, T. E. 1990. Wetland losses in the United States: 1780s to 1980s. U.S. Fish and Wildlife Service. Washington, D.C.

[70] Ibid.; Wilen, B. O. 1995. The nation's wetlands. Pages 473-476 *in* Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems (E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, editors). U.S. Department of the Interior, National Biological Service, Washington, D.C.

[71] Hyrology: The study of relationships between water and the geologic environment.

starts new wetland vegetation building. A naturally healthy system is always in flux; the number of acres of each wetland type changes constantly but the total acres is relatively stable at the watershed scale. The Fountain Creek Watershed has become so dynamic, however, that it is beyond the natural levels of fluctuation in water quantity and frequencies of flows that would have been expected from a stable system. The natural hydrology of Fountain Creek, as well as that of other riparian systems, is increasingly impacted by urban development. Treated wastewater discharges, stormwater, and other sources are likely to prevent a restoration of the creek to a pre-development hydrology.

In the Fountain Creek watershed, typical wetlands are cattail and bulrush marshes, wet meadows of grasses and grass-like plants, and stands of willow shrubs. The composition of wetlands in the Watershed within El Paso County is open water and marshes (2.5 square miles), shrublands (2.5 square miles), wet meadows (5 square miles), and wetlands associated with streams (10 square miles). These wetlands make up approximately 2.5% of the total land area, a much greater percentage than the 1% Colorado statewide average. Wet meadows are found in the prairies in northern and northeastern El Paso County. Traveling south into Pueblo County, the land becomes more arid and there are fewer wet meadows. Willow shrublands and marshes are found throughout the Fountain Creek Watershed along streams. Fountain Creek has a large cottonwood forest and an understory of willow shrubs. The cottonwood forest is filled with pockets of small to large marshes. Colorado Springs, as the largest urban area, has an evolving wetland resource. The increase of urbanization has increased base flows[72] in the creek and the increased available water source for growth on the banks and the wetland acreage in some areas. Marshes do not fair as well with urbanization. In areas where more water carried by the stream has led to significant streambed downcutting, lowering of the surrounding local alluvial[73] aquifer[74] has dried out adjacent wetlands. Wetlands and stream corridors represent a small percentage of the Colorado landscape. However, while wetlands constitute only one percent of the landscape statewide, they (along with riparian areas) support 80% of all wildlife and more non-bird species than any other habitat area.[75]

The Monument Creek basin consists mainly of riparian vegetation such as a variety of willows, sedges, and rushes. Surrounding uplands consist generally of midgrass prairie with a variety of grasses. Northern reaches of Monument Creek and surrounds represent important habitat for the Preble's meadow jumping mouse – dense herbaceous and shrub riparian communities and upland grass communities free from urban development and significant grazing.

The Fountain Creek Vision Task Force (FCVTF) reviewed a variety of maps to identify possible opportunities for wetlands creation in the Watershed. These maps included land ownership, biodiversity, floodplains, existing wetlands, and recreational opportunities. Based on this very high-level examination of the maps, the group identified several potential sites as options for

[72] Base flow: That part of stream discharge that is not attributable to direct runoff from precipitation or melting snow. Primarily sustained by groundwater discharge into the stream.

[73] Alluvial: A general term for unconsolidated material deposited by a stream or other body of running water.

[74] Aquifer: A geologic formation, group of formations, or part of a formation that that contains sufficient saturated permeable material to yield sufficient quantities of water to wells or springs.

[75] Browne, Claudia. 2007. Biohabitats, Inc. Presentation to a Fountain Creek Vision Task Force working group on June 29, 2007.

wetland creation or protection throughout the watershed. It was agreed, however, that a wetland professional would need to be consulted on final locations for successful wetland creation and protection. Additionally, although National Wetlands Inventory Maps were not researched by the FCVTF during this process, they will likely be useful tools in delineating where wetlands currently exist, changes over time, and where new wetlands might be encouraged naturally or created for specific purposes.

Determining where the most stable areas of Fountain Creek are is an important first step in deciding where to create viable wetlands in and around Fountain Creek. This information is available in the Fountain Creek Watershed Study prepared by the US Army Corps of Engineers.[76] Other factors in choosing wetland rehabilitation and development locations include:

- Land ownership
- Development costs
- Accessibility for maintenance and for the public
- Habitat quality
- Potential for flood attenuation
- Erosion prevention ability
- Water availability

Careful selection of wetland sites is imperative as wetland construction is quite costly, ranging from $50,000 to $110,000/acre (these costs include general land costs, structural facilities to assure an adequate water supply and grading, and vegetation to achieve the desired function).[77] Newly created wetlands will require a dedicated water supply (and therefore dedicated water rights, which may have to be purchased prior to wetland creation) to ensure proper functioning and survival of the wetlands. How much water and when the water is needed vary by specific location and wetland type. However, a reasonable range of water that may be required for a new one-acre wetland in this watershed is between 2 and 5 acre-feet per year.[78] City of Fountain consultants suggest that wetlands here typically consume 3 acre-feet (includes evaporation losses) of water per wetland acre so this adds to the water company's consumptive use augmentation requirement. At the very least, it appears that a consumptive use augmentation plan and funding for same would be required for created wetlands.

There are several federal statutes that may be applicable to wetlands and wetlands creation. These include the Clean Water Act, National Environmental Policy Act, and the Endangered Species Act. Related state statutes may also apply, including surface water law and Colorado groundwater law. These laws may pose challenges to wetlands creation, but these problems are likely not insurmountable.

Wetland Banking

Wetland banking appears to have potential for implementation of wetland and related projects along Fountain Creek, but it is recognized that more consultation with wetland professionals is required. A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or (in certain circumstances) preserved for the purpose of

[76] Available at www.fountain-crk.org.
[77] Glidden, Mark. 2008. Senior Project Manager, CH2MHill. Personal communication on January 3, 2008.
[78] Lusk, Kevin. 2008. Principal Engineer, Colorado Springs Utilities. Personal communication on January 3, 2008.

providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 of the Clean Water Act or a similar state or local wetland regulation. A mitigation bank may be created when a government agency, corporation, nonprofit organization, or other entity undertakes these activities under a formal agreement with a regulatory agency. The 1995 Banking Guidance established a structure for banking that is characterized by four distinct components:

- The bank site: the physical acreage restored, established, enhanced, or preserved;
- The bank instrument: the formal agreement between the bank owners and regulators establishing liability, performance standards, management and monitoring requirements, and the terms of bank credit approval;
- The Mitigation Bank Review Team (MBRT): the interagency team that provides regulatory review, approval, and oversight of the bank; and
- The service area: the geographic area in which permitted impacts can be compensated for at a given bank.

The value of a bank is defined in "compensatory mitigation credits." A bank's instrument identifies the number of credits available for sale and requires the use of ecological assessment techniques to certify that those credits provide the required ecological functions. Although most mitigation banks are designed to compensate only for impacts to various wetland types, within the past five years, banks have been developed to compensate specifically for impacts to streams (i.e., stream mitigation banks).

Mitigation banks are a form of "third-party" compensatory mitigation, in which a party other than the Clean Water Act permittee assumes the responsibility for compensatory mitigation implementation and success. This transfer of liability has been a very attractive feature for Section 404 permit holders, who would otherwise be responsible for the design, construction, monitoring, and ecological success of a compensatory mitigation site for a minimum of five years in addition to ensuring the site's long-term protection. Although not currently available in the Fountain Creek Watershed, wetlands banking has occurred on the Middle South Platte River http://www.coloradowetlandbank.com/pages/msprbank.html.

B. Goals and Strategies to Address Current Conditions

Goals to Improve Current Conditions

1. Develop a wetland and riparian area management plan that addresses flood attenuation, water quality, water quantity, wildlife habitats, recreation and tourism, erosion and sedimentation, and public education.
2. Maintain and enhance the health and functionality of existing wetlands and riparian areas to accomplish the goals of the wetland and riparian management plan.
3. Create additional wetlands and riparian areas that help to accomplish the goals of the wetland and riparian management plan.
4. Practice adaptive management to improve wetland protection, enhancement, and creation.

Objectives

1. By 2010, prepare and release a comprehensive inventory and assessment of all wetland and riparian areas in the watershed.
2. By 2011, interpret one pilot project using an existing wetland to demonstrate wetlands' ability to filter pollutants and to demonstrate wetlands' ability to attenuate flooding.
3. By 2018, increase the number of wetland acres in the watershed by 100 to 300 acres, with an approximate increase of 2% of the existing wetlands.

Strategies to Achieve Goals and Objectives

1. Inventory existing wetland and riparian areas and evaluate their conditions and functionality. List their desired future conditions and functionality. Look for additional mapping of wetlands at a higher resolution and quality than the National Wetlands Inventory Mapping of past and potential wetlands. Create a fact sheet on how water rights relate to wetland creation, and stated goals for specific wetlands.
2. Protect and enhance existing wetlands and riparian areas while also creating new wetlands as determined to be appropriate by the aforementioned evaluations.
3. Differentiate between native and engineered/created wetlands in terms of how they function, and their biological value, both initially and over longer periods time. Incorporate those nuanced expectations into considerations of wetlands strategies.
4. Develop and distribute a watershed-wide plan that includes prioritized opportunities for protecting, enhancing, and creating new riparian and wetland areas along with their associated functions.
5. Continue to evaluate, enhance, and maintain the functionality and health of wetlands in the Fountain Creek Watershed, including removing sediment and pollutants if they fill wetlands over time, evaluating plant health and biodiversity, and ensuring habitat viability.

C. Implementation Plan

Steps to Implement Strategy	Target Completion Date	Recommended Responsible Entity in the Watershed	Partners in Implementation
a. Preserve existing wetlands through conservation easements, floodplain management tools, and land-use planning regulations	2009-2018	Nature Conservancy, El Paso County	Federal – Environmental Protection Agency, US Army Corps of Engineers, US Fish and Wildlife Service, USGS National Wetlands Research Center, The Natural Resource Conservation Service and Elected Officials.
b. Consider wetland banking as an option in the watershed. Identify an entity to oversee the implementation of a wetland bank	2009-2010	Cities/Counties	
c. Work with the Army Corps of Engineers to determine design details of a wetland bank	2009-2010	Cities/Counties	State – Colorado Natural Heritage Program, Colorado Division of Wildlife, [CDOW Wetland Wildlife Conservation Program], Colorado State Parks, Colorado Cooperative Fish and Wildlife Research Unit, Colorado Department of Natural Resources, Colorado Department of Public Health and Environment, Colorado Department of Transportation Elected Officials.
d. Work with local planning departments to clarify and improve existing standards, regulations, and guidelines for development in and around wetland areas based on professional recommendations of wetland scientists	2009-2012	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County	
e. Host a regional forum on land-use standards and regulations within the watershed as they relate to riparian and wetland areas	2009-2012	Pueblo, City of Colorado Springs, El Paso County, and Pueblo County	Local – Counties, Municipalities, Utilities, Fort Carson, Air Force Academy, Stakeholders, Coalitions of Government, Metropolitan Districts, Conservancy Districts, Departments of Public Health and Environment, Elected Officials.
f. Manage tamarisk and other invasive species and create wetlands to mitigate them	2009-2020	Pueblo County, El Paso County, Colorado Springs, Colorado State Parks	Arkansas River Watershed Invasive Plants Plan / SECWCD

g. Educate stakeholders about the value of wetlands. Coordinate education efforts with local planning departments, homebuilders' associations, and local environmental regulatory agencies	2009-2012	Nature Conservancy	Organizations – Ducks Unlimited, Front Range Anglers, Colorado Open Lands, Colorado Fly Fishing and Stream Information, The Nature Conservancy, Partners for Fish and Wildlife, The Sierra Club, World Wildlife Fund, Natural Resource Defense Council, Defenders of Wildlife, Fountain Creek Foundation.
h. Enhance existing wetlands and create new wetlands with the help of wetlands scientists, landowners, and the Army Corps of Engineers	2009-2018	Pueblo County, El Paso County, Colorado Springs, Colorado State Parks	
i. Consider the water quality relationship with wetlands related to the sedimentation and pollutants	2011-2015	NPDES permit holders	
j. Evaluate monetary value of wetlands and their ecosystem services	2011-2015	Cities/Counties	
k. Create pilot projects to demonstrate the effectiveness of wetlands in providing ecosystem services and educate the region about their habitat and monetary values	2011-2015	Fountain Creek Foundation	
l. Create incentives for the preservation of existing wetlands	2010-2020	Pueblo County, El Paso County, Colorado Springs, Colorado State Parks	
m. Work with the Army Corps of Engineers, the US Fish and Wildlife Service, Colorado Division of Wildlife, local planning offices and interested agencies, and organizations on wetland preservation issues	2009-2020	Pueblo County, El Paso County, Colorado Springs, Colorado State Parks	

IX. WILDLIFE

A. Current Conditions

Issue/Problem
Wildlife habitat in the Fountain Creek Watershed is negatively impacted by invasive species and the effects of development. Loss of habitat, habitat fragmentation and degradation, and loss of connectivity/migration corridors are among the biggest threats to wildlife locally. (Additional information specific to wetland habitat may be found in the wetlands chapter elsewhere in the Fountain Creek Vision Task Force Strategic Plan.)

The Current Situation

Physical Setting
The Fountain Creek Watershed encompasses mountains, foothills, and grasslands and transition zones between these habitat types. The watershed is a crossroads of sorts, straddling two major physiographic regions: the Southern Rocky Mountains and the grasslands of the Great Plains. It is a meeting place where eastern, western, and southwestern North American species come together to form a uniquely diverse collection of plants and animals. Snow-capped, ruggedly-alpine mountains rise majestically out of the Pikes Peak-San Isabel National Forest and provide a western backdrop for one of the most spectacularly beautiful landscapes in Colorado. At their base, rolling, pine-covered foothills give way to juniper and piñon-speckled shrublands. These then blend into vast expanses of short-grass prairie and fragrant sand sage ecosystems. Tying all of this variety together is a laced network of braided wetlands, reservoirs, lakes, mountain streams and riparian corridors that together form the numerous tributaries of the greater Arkansas River system.

Fountain and Monument Creeks, originating in the mountainous uplands, are the core of the watershed, carrying water from the mountains into more arid landscapes below. This unique landscape provides a setting for numerous species of birds and land animals. It shelters rare plants and animals that are found nowhere else in the world and provides critical habitat to a number of rare, threatened, and endangered species. This diversity of ecosystems provides a range of habitats for wildlife that are utilized year round and for purposes such as migration corridors, hunting ground, breeding, severe winter range, and water sources by regional species.

Development Impacts on Habitat
The quality of habitat varies by area of the watershed as it relates to development and agricultural use. The upper elevations of the watershed are least impacted by development. Major portions of the headwaters area remain undeveloped and include national forest lands and other preserves. Development intensifies at lower elevations of the watershed, particularly in the urbanized foothills and plains surrounding Colorado Springs, Pueblo, and the I-25 corridor. Fountain Creek downstream of Colorado Springs is impacted by increased total water flows and storm flow surges due to upstream development and the increase of impervious surfaces.[79] As a

[79] Impervious surface: A hard surface area which either prevents or retards the entry of water into the soil. Examples include, but are not limited to, structures, walkways, patios, driveways, carports, parking lots or storage

result, the lower creek and banks are increasingly unstable. Increased flows in the main stems of the creek are changing and eliminating habitats important to a wide array of plants and animals. Without action to address these flows, the diversity of habitats critical to maintaining the variety of wildlife in the watershed will continue to be degraded or lost. Graminoid[80] meadows and marshes, shallow water wetlands, and willow and cottonwood stands are all needed to maintain the diversity of wildlife and provide for changing species needs throughout the year. There are many stretches of Fountain Creek between Colorado Springs and Pueblo that have remained healthy through changing water flows due to various geomorphic conditions and the influence of adjacent land uses. These healthier sections provide a good model for future restoration projects.

Also, it is important to note the habitat improvements that are associated with a base flow[81] in creeks. Before diversions were made for agriculture along Fountain Creek, water ran year round in this waterway. In the early 1980's, when water exchanges were permitted, water again ran year round. This has increased the sustained wildlife habitat and water source in the region. Additionally, wetlands and riparian habitats have been created in areas where previously there was no flow but now there is sufficient flow present to support a wetland or riparian[82] community.

Imperiled Species

A number of rare, threatened, and endangered species of plants and animals coexist within the Fountain Creek Watershed. Some 500 vertebrate species consisting of residents and migrants inhabit the watershed, including federally and state listed species and numerous invertebrate, fish, amphibian, and bird species and plant communities of special concern. At greatest risk in the watershed are species directly associated with stream stems and adjacent wetland and riparian habitats.

In the upper reaches of the Monument watershed, a major Fountain Creek tributary, the federally threatened Preble's Meadow Jumping Mouse (*Zapus hudsonicus preblei*) and several plant species/communities of special concern are at risk due to urbanization and elimination and fragmentation of wetland and riparian habitats along Monument Creek and its tributaries. In addition to direct destruction of wildlife habitat, urbanization can isolates populations of small mammals by eliminating travel and dispersal corridors connecting populations, resulting in restriction of gene flow or extirpation of small populations and loss of genetic diversity. Urbanization increases populations of carnivores, both wild and domestic, that create sinks in populations of "prey" species found in adjacent ecological systems.

Several riparian plant communities of significant biological importance are found in the Monument creek watershed and some are directly threatened by urbanization. Although high

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areas, concrete or asphalt paving, gravel roads, packed earthen materials, haul roads and soil surface areas compacted by construction operations.

[80] Grasses and grass-like plants such as sedges and rushes

[81] Base flow: That part of stream discharge that is not attributable to direct runoff from precipitation or melting snow. Primarily sustained by groundwater discharge into the stream.

[82] Riparian: Plant community succession naturally occurring along the bank of a natural freshwater waterway such as a river, stream, or creek. Riparian zones support diverse and abundant terrestrial wildlife species, protect stream banks and adjacent land from erosion, and contribute significantly to aquatic communities by providing shade, cover from predators, nutrients, a buffer from nearby land use activities, and a filter for overland soil erosion.

volume storm flows causing stream channelization and loss of habitat such as undercut banks and loss of riparian cover are less problematic in the northern reaches of the watershed, continued urbanization will increase these effects and eliminate or reduce the quality of habitat for two species of concern, the Flathead Chub (*Platygobio gracilus*) and the Northern Leopard Frog (*Rana pipiens*). Urbanization along Monument Creek threatens the regional persistence of wetland and riparian populations of Dwarf False Indigo (*Amorpha nana*), Arrow-leaved Tearthumb (*Truellum sagittatum*), and American Currant (*Ribes americanum*).

Wetlands and riparian habitats at the headwaters of Fountain Creek are threatened by erosion and a variety of recreational activities occurring on Pikes Peak. Commercial and recreational activities have degraded upper elevation wetlands and aquatic habitats at lower elevations in the mountains by increasing sedimentation, introducing disease, or degrading the genetic viability of native trout through introduction of non-native fish species. Severy Creek in the Fountain Creek Watershed supports populations of the federally threatened Greenback Cutthroat Trout (*Oncorhynchus clarkii stomias*), the only trout species native to the state. Spread of whirling disease to mountain streams threatens the recovery of the greenback in the watershed. Less at risk is the *Corylus cornuta* plant community of special concern and endemic populations of the Golden Columbine (*Aquilegia chrysantha* var. *rydbergii*), both found along streams in the lower mountains. As above, it should be mentioned again here that wetlands and riparian habitats have been created in areas where previously there was no flow but now there is sufficient flow present to support a wetland or riparian community.

More than 160 species of birds are known to have nested in the watershed, and the majority of these nest annually. Many of these occur in riparian habitats in the lower foothill tributaries of the main stems of Fountain and Monument Creeks. Three of the 29 bird species of regional conservation concern breeding in the watershed nest annually in the riparian habitats along lower Fountain Creek: Swainson's Hawk (*Buteo swainsoni*), Lewis's Woodpecker (*Melanerpes lewis*), and Red-headed Woodpecker (*Melanerpes erythrocephalus*). The cottonwood riparian forests and wetlands of lower Fountain Creek provide significant stopover habitat to thousands of migratory land birds in spring and fall and are important winter habitat for many species. Migratory waves of land birds appear and disappear throughout the migration season, seeking shelter, rest, and food during inclement weather. Some 290 species (70% of the species recorded in El Paso County) have been recorded at Fountain Creek Regional Park and most of these are associated with wetland and riparian habitats. The spread of Tamarisk (*Tamarix ramosissima*), an aggressive, invasive plant that is not native to the watershed, threatens the persistence of riparian cottonwood forests and their diverse species assemblages in the Fountain Creek Watershed by crowding out native vegetation, lowering water tables, and increasing soil salinity, thus making the area unsuitable for native species growth. Uncontrolled flooding downstream from Colorado Springs reduces available riparian habitat by removing soil, trees, willows, and other native vegetation.

Water birds and species associated with aquatic habitats along Fountain Creek, particularly those habitats occurring south of Colorado Springs, are abundant in fall and spring migration. More than 100 species of water birds have been recorded at Big Johnson Reservoir, located near the center of the watershed. The importance of the reservoir to aquatic birds is threatened by future recreational development.

Aquatic habitats of Fountain Creek and its associated wetlands support populations of sensitive species threatened by high creek flows resulting from urbanization at the northern end of the watershed and in Colorado Springs.[83] Important fish habitat such as undercut banks, velocity chambers[84], pools and vegetation adjacent to the creek are lost as channelization and water velocity increase. Native fish diversity will likely decline in the lower reaches of the watershed as channelization increases. These changes will also negatively affect creek populations of Northern Leopard Frog, Plains Leopard Frog (*Rana blairi*), Flathead Chub (*Platygobio gracilus*) and Arkansas Darter (*Etheostoma cragini*), a state threatened species. Less threatened are populations of the Painted Turtle (Chrysemys picta) residing in permanent water impoundments of Fountain Creek Regional Park. There is an ongoing study by the US Geological Survey (USGS) to evaluate the health of aquatic life over time; however, additional study is needed to make conclusions.

Diseases

Significant diseases found in the watershed affect both wildlife and humans. The three most virulent are recent immigrants: Bubonic Plague, West Nile Virus, and Chronic Wasting Disease. Enzootic plague persists in rodent communities in the watershed, occasionally erupting in epizootics devastating Black-tailed Prairie Dogs and indirectly impacting Golden and Bald eagles, Ferruginous Hawk, Burrowing Owl, and Mountain Plover - species depending on this "keystone" species for food, shelter or nesting space. The devastating affects of the West Nile Virus in recent years on humans and birds in the U.S. is well documented and remains a significant health concern for residents in the watershed and the region.

Chronic Wasting Disease is fatal to deer and elk, but not known to cross over to human hosts. Currently only a few cases in deer are known in the foothills of the watershed; the first reported in 2005. Like the West Nile Virus and plague, wasting disease has changed the way many enjoy the outdoors. The chytrid fungus (*Batrachochytrium dendrobatidis*) is a disease threatening Northern Leopard Frog populations nationally and in Colorado, as well as many amphibians species internationally. The disease is generally fatal to leopard frogs and is responsible for deaths of the Boreal Toad (*Bufo boreas*), which is listed as an endangered species by the State of Colorado. At this time, it is not known to occur in the watershed,[85] but its introduction could have negative effects on local amphibian populations. The Northern Leopard Frog is a species of special concern in Colorado and was petitioned for protection under the Endangered Species Act in 2006.

Fishing and Hunting

Game species are numerous along the creek and hunting figures prominently in the watershed from management, sociological, and economic perspectives, but few public land hunting opportunities are available in the lower watershed. The Colorado Springs State Wildlife Area, an area under the control of Colorado Springs Utilities, once provided the only publicly accessible hunting area along the lower Fountain Creek corridor. However, that area is now managed by El Paso County Parks as the Clear Spring Ranch Trail and provides wildlife watching and

[83] Dowler, Gary. 2008. Colorado Division of Wildlife, personal communication.
[84] Velocity chamber: Section of a river where the current is stronger and focused in a narrow notch in the river bed.
[85] Jackson, Tina. 2008. Colorado Division of Wildlife, personal communication.

hiking/biking opportunities. It is no longer used for hunting. Mule and White-tailed deer are the most abundant big game species found along the creek, where much of the hunting occurs on private lands. Elk in the foothills of the watershed, responding to recent droughts, moved into riparian and agricultural lands adjacent to lower Fountain Creek this decade, creating concerns among agricultural interests. Wild Turkey, waterfowl, cottontail rabbits, and particularly doves, are important small game species along the creek. Fishing in the watershed is generally confined to federally, state, and privately stocked reservoirs and to stocked sections of lower mountain streams.

Regulated Species

In addition to the many imperiled species found within the watershed, the following are designated as federally or state listed or as Species of Special Concern by the U.S. Fish and Wildlife Service (USFWS) or the State of Colorado.

- **Plants:** Ute ladies' Tresses (Federally Threatened)
- **Amphibians:** Northern Leopard Frog (State Special Concern), and Plains Leopard Frog (State Special Concern)
- **Reptiles:** Triploid Checkered Whiptail (State Special Concern)
- **Fishes:** Arkansas Darter (Federal Candidate Species, State Threatened), Flathead Chub (State Special Concern), and Greenback Cutthroat Trout (Federally and State Threatened)
- **Birds:** American Peregrine Falcon (State Special Concern), Bald Eagle (State Threatened), Burrowing Owl (State Threatened), Cassin's Sparrow (USFWS), Ferruginous Hawk (State Special Concern), Lark Bunting (USFWS), Lewis's Woodpecker (USFWS), Long-Billed Curlew (State Special Concern), Mexican Spotted Owl (Federally and State Threatened), Mountain Plover (State Special Concern), Northern Harrier (USFWS), Plains Sharp-tailed Grouse (State Endangered; extirpated, except NE CO), and Prairie Falcon (USFWS)
- **Mammals:** Townsend's Big-Eared Bat (State Special Concern), Preble's Meadow Jumping Mouse (Federal and State Threatened), River Otter (State Threatened; extirpated), Swift Fox (State Special Concern), Black-footed Ferret (Federally and State Listed; extirpated)

Factors Impacting Habitat

According to Colorado Division of Wildlife biologists, the most important actions stewards of the watershed can take to enhance and maintain wildlife populations is to protect and preserve the habitats the species depend on for survival. Topping the list of priorities are noxious weed removal (particularly Tamarisk), reducing the instability of the creek systems to ensure the existence of predictable long-term habitat for wildlife, providing corridors for wildlife over or under transportation facilities such as I-25, maintaining suitable flows in riparian and wetland habitats, and protecting open space for food, foraging, and breeding. Because some watershed species of federally protected birds nest in Tamarisk (most notably the Long-eared Owl, Mourning Dove, Blue Grosbeak, and Yellow-breasted Chat), control measures should include precautions to avoid destroying nests, a strategy for replacing the lost shrubby cover with native woody species, and most importantly, a strategy to prevent recolonization by Tamarisk after it is removed. Stands of Russian Olive, another exotic invader, has crowded-out native vegetation at

some locations in southeast Colorado and should be removed from riparian areas before it becomes extensively established along watershed creeks. Russian Olive supports high numbers of over-wintering non-native European Starlings, a species aggressively competing with native bird species for nesting cavities in cottonwood riparian habitat. Big Johnson Reservoir supports the greatest diversity and numbers of water birds in the watershed, but it has virtually no aquatic bird nesting due to an absence of associated wetlands and riparian habitat. Introduction of native floating aquatic and shoreline vegetation should be considered to establish a nesting population of Clark's Grebe and other water birds present at the reservoir in summer. Marsh vegetation and cottonwood groves should be established at selected shore locations to increase bird and mammal diversity and nest sites for birds of prey.

Other factors impacting natural habitat associated with Fountain Creek include noxious weeds, degraded water quality, fragmentation, degradation, and loss of habitat and barriers to wildlife migration. Most species within the Fountain Creek watershed require access to riparian areas in order to survive. Many use Fountain Creek and its tributaries as natural corridors to move across the landscape. From multiple perspectives, the health and viability of the habitat along the creek is very important to the viability of wildlife populations in the region.

Well managed agriculture and biodiversity in the Fountain Creek Watershed are generally seen as mutually beneficial. Such groups as The Nature Conservancy and Colorado Open Lands have worked with landowners in the watershed successfully to craft conservation leases and easements to preserve agricultural lands and to demonstrate integrated agricultural and wildlife management techniques.

Agricultural lands can negatively impact the quality of water in a riparian system if their management regime includes tilling practices that increase soil erosion or if fertilizers and pesticides added to croplands are transported into the water system. Wildlife managers may also be concerned about indirect effects of farming practices such as fragmentation of habitat. More often than not, though, agriculture benefits a wide variety of wildlife species, as farms and ranches provide important habitat compared to most urbanized areas. Agriculture can benefit wildlife by providing relatively large, unbroken, and undisturbed parcels as well as open space that is not in production, such as edges separating fields and rangeland. Irrigation may provide even more diverse habitat.

Agricultural communities may be concerned about wildlife-transmitted diseases, protection of livestock from predation, damage from migratory birds (e.g. geese), and protection of property (e.g. beaver, Prairie dogs). Conversely, having wildlife living on farm or ranchland can provide substantial aesthetic, economic, and ecological benefits. A diversity of plants, insects, birds, and animals living in and around agricultural lands is mutually beneficial to the rancher or farmer and wildlife. For example, open agricultural lands and fence rows provide habitat for sensitive species, natural pest control, and pollination services, nesting or foraging habitat, and hunting opportunities.

Education

Educational programs are an important component in conservation in the Watershed. The City of Pueblo Stormwater Utility, City of Colorado Springs Stormwater Enterprise, El Paso County,

Colorado Springs Utilities, and the Pueblo City-County Health Department provide educational programs such as presentations to school children, setting up displays at the Colorado State Fair, and conducting several public education efforts pertaining to Fountain Creek.

El Paso County is home to two world-class nature centers. The Bear Creek Nature Center was the first nature center built in Colorado. Programs are offered year-round at both the Bear Creek Nature Center and the Fountain Creek Nature Center. El Paso County Parks also hosts 85 miles of trails within the Pikes Peak Region.

- Fountain Creek Regional Park – Fountain Creek Nature Center, located in the park's Cattail Marsh Wildlife Area, is the site of numerous interpretive programs. The program focus is hands-on environmental education and educational displays for adults and children. The interpretive staff leads over 100 general group programs and over 160 school programs annually.
- Bear Creek Nature Center - The Bear Creek Nature Center is located in the western portion of the Bear Creek Regional Park in Colorado Springs. The Center provides opportunities to hike in the foothills, see native wildlife, and discover Bear Creek. Scrub oak thickets, ponderosa pine forests, meadows, a mountain creek, and abundant foothills wildlife attract children and adults to Bear Creek Regional Park and Nature Center. Interpretive programs, special events, guided and self-guided tours, and media presentations are offered all year. Two miles of self-guiding nature trails wind through the short-grass prairie, scrub oak woodlands, and cottonwood riparian communities.

At Colorado State Parks, many trails and educational opportunities abound. Cheyenne Mountain State Park, located south of Colorado Springs on Highway 115, offers numerous nature education opportunities.

In addition to those listed above, other organizations with educational/outreach programs include military installations such as Fort Carson and the Air Force Academy, U.S. Forest Service, the Colorado Division of Wildlife, other municipalities and many more offer a wide variety of educational and outreach programs within the Fountain Creek Watershed.

Existing Statutes

Federal statutes related to conservation activities in the Watershed include the Endangered Species Act, Migratory Bird Treaty Act, the Eagle Protection Act, and the National Environmental Policy Act. Regulations encoded in Title 33 of the State statutes protects wildlife in the Watershed and regulates hunting. The Colorado Wildlife Action Plan, along with federal and state laws, provides a basis for guiding essential and basic conservation in the Watershed. However, it is up to local governments and private landowners to manage ecosystems for the purpose of providing native wildlife habitat and maintaining the diversity of species.

Water Needs for Wildlife Habitat

It is beyond the scope of this assessment to quantify the amount of water required to maintain the current level and quality of wildlife habitat in the Watershed. However, water provides habitat for the greatest number and diversity of species in the Watershed. Flat water such as ponds and lakes, running water such as streams and rivers, springs, playas, and wetlands all provide

important wildlife habitat. Over 75% of native species are dependent on wetland and riparian habitat for a portion of their lifecycle.[86] The quality of the water, behavior of stream systems, and seasonal availability of water will affect the ability of wildlife to thrive in the Watershed.

Portions of this watershed in its current state experience fairly dramatic seasonal and storm-related spikes in flows. There are many causes for these storm-related spikes in flows, including climate. The region receives most of its rainfall in short, powerful summer thunder bursts. Secondly, soils in the Watershed that can contain large amounts of clay make water generated by these storms less likely to soak into the ground and more likely to run off into the river systems. The bankfull[87] discharge, or the flow that occurs about every 18 months, (not the 100-year flood[88]) is what influences the shape, pattern and profile of a stream.[89] This is also partially due to regional urbanization and increased impervious areas in the watershed. Impervious surfaces such as buildings, concrete, and asphalt typically generate more runoff from the site than existed before the site was developed. Current studies indicate that this "hardening" of the watershed is likely to continue into the future.[90] The final reason for these storm-related spikes in flows, is stormwater management strategies. For many years, these systems were designed to interact with stormwater in a way that focused on getting the water away from the developed areas, and into pipes, which then delivered that water directly to the local river systems.

The level of the spike in flows and general instability in the channel varies depending on where in the watershed a site is located. Typically areas near the lower portions of a watershed would experience greater spikes in flow as the accumulated spikes from all of the upstream sub-watershed areas feed into one lower channel. The section of Fountain Creek south of Colorado Springs to the confluence with the Arkansas River has experienced these greater spikes in the form of erosive, channel-changing flows.

The following general description of healthy riparian habitat comes from the US Environmental Protection Agency's "Discussion of Importance of Riparian Habitat to Aquatic Communities and the Topeka Shiner."[91]

> To maintain at least "good" water quality for aquatic habitats in general, riparian areas should contain at least a 12 m (~40 feet) wide vegetated area, 15 plant species, vegetation of at least two height classes, and provide at least sparse shade (>10% shade). The following three attributes of riparian vegetation habitat quality were evaluated for this assessment: stream bank stability, sedimentation, and thermal stability. Each of these attributes and their relative importance with respect to the Topeka shiner is discussed briefly below. Although this species is not present in the Fountain Creek Watershed, the same considerations would apply.

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[86] Katy Fitzgerald, U.S. Fish and Wildlife Service, FCVTF Land Use/Environment Working Group, April 27, 2007.
[87] Bankfull: The channel-forming flow of the stream usually equivalent to 1½ to 2 year storm recurrence interval.
[88] 100-year flood: Refers to the calculated level of flood water expected to be equaled or exceeded every 100 years on average.
[89] Graham Thompson, (formerly) URS Corporation, (Now Matrix Design Group), Technical Advisory Committee, April 26, 2006
[90] Fountain Creek Watershed Impervious Surface Area and Watershed Health Analysis Report
[91] http://www.epa.gov/espp/litstatus/effects/topeka_shiner_appendix_h.pdf

Stream and river bank stabilization: Riparian vegetation typically consists of three distinct height classes of plants, which include a groundcover of grasses and forbs, an under-story of shrubs and young trees, and an over-story of mature trees. These plants serve as structural components for streams, with the root systems helping to maintain stream stability, and the large woody debris from the mature trees providing in-stream cover. Riparian vegetation has been shown to be essential to maintenance of a stable stream (Rosgen, 1996). Destabilization of the stream can have a severe impact on aquatic habitat quality. In fact, stable streams and river channels and banks are identified as highly important for habitat. Any action that would significantly alter channel morphology or geometry to a degree that would appreciably reduce the value of the critical habitat for both the long-term survival and recovery of the species is considered as part of the critical habitat impact analysis of the risk assessment. Following a disturbance in the watershed bank, the stream may widen, releasing sediment from the stream banks and scouring the stream bed. Changes in depth and or the width/depth ratio via physical modification to the stability of stream and river banks may also affect light penetration and the flow regime of the [riparian] habitat. Destabilization of the stream negatively impacts aquatic habitat quality by increasing sedimentation within the watershed. The effects of sedimentation are summarized below.

Sedimentation: Sedimentation refers to the deposition of particles of inorganic and organic matter from the water column. Increased sedimentation is caused primarily by disturbances to river bottoms and streambeds and by soil erosion. Riparian vegetation is important in moderating the amount of sediment loading from upland sources. The roots and stems of riparian vegetation can intercept eroding upland soil (USDA NRCS, 2000), and riparian plant foliage can reduce erosion from within the riparian zone by covering the soil and reducing the impact energy of raindrops onto soil (Bennett, 1939). Increased siltation could alter spawning habitat and affect other processes such as feeding efficiency.

Increased sedimentation may affect the spawning habitat of fish by settling on spawning gravel and reducing flow of water and dissolved oxygen to the eggs and fry (Everest et al., 1987). In addition, fine particles settling on the streambed can also disrupt the food chain by reducing habitat quality for aquatic invertebrates, and adversely affect groundwater-surface water interchange (Nelson et al., 1991). Increased turbidity from sediment loading may also reduce light transmission, potentially affecting aquatic plants (Cloern, 1987; Weissing and Huisman, 1994).

Thermal stability. Riparian habitat including mature woody trees provides stream shading resulting in thermal stability. Maintaining thermal stability is highly important for survival of aquatic species. Different species are sensitive to specific water temperature ranges.

B. Goals and Strategies to Address Current Conditions

Goals to Improve Current Conditions

1. Preserve, protect, and enhance the biodiversity, health, and long-term sustainability of wildlife within the Fountain Creek Watershed.
2. Preserve, protect, and enhance the functionality, biodiversity, health, and long-term sustainability of the habitats that local wildlife require, while maintaining access to the resources upon which wildlife depend, within the Fountain Creek Watershed.

Objectives

1. By 2009, complete a report identifying regional wildlife populations, their regional and crucial habitats, and their values.

2. By 2010, establish a watershed-wide wildlife health and population monitoring program that identifies indicator species of overall wildlife viability. This will include re-evaluations every 5 years.
3. By 2013, adopt a Wildlife Action Plan to maintain populations with the goal of reducing/eliminating declines in population for all federally-listed threatened and endangered species in the watershed, that coordinates with associated federal recovery plans for listed species.
4. By 2013, implement 10 habitat restoration projects in the watershed.
5. By 2018, identify areas in the watershed that would have the least negative impacts on wildlife and make recommendations for future development practices. Adopt watershed-wide, consistent regulations and standards for development within these areas.
6. By 2018, preserve a minimum of 75% of all identified crucial wildlife habitat in the watershed to protect it from the impacts of future development.

Strategies for Achieving Goals and Target Objectives

1. Identify wildlife species within the Fountain Creek watershed and their respective local, regional, and global values and regulatory status. Look for ways of prioritizing wildlife in terms of their conservation and biological values, and also look for potential "indicator species" whose health and abundance can be used as an indicator of the health of many other species.
2. Identify threats to wildlife and prioritize those threats within the watershed and region. Look for areas of convergence between important wildlife habitats and resources and high levels of threats. Consider the realities of the built environment, existing land uses, and private property rights when considering threats.
3. Create a ***Regional Wildlife Management Plan***[92] based on the information gathered through Strategy #1 and the input of all involved parties. At a minimum, such a plan will:
    - Identify areas of crucial-grade, medium-grade, and low-grade habitat conservation priorities within the watershed based on biological value, scarcity and threat assessment.
    - Protect a minimum of 75% or more of the identified crucial habitats and resources.
    - Establish workable conservation goals for medium-grade and low-grade conservation priorities.
    - Maintain and enhance wildlife access to these crucial habitats and resources.
    - Identify appropriate opportunities for habitat restoration projects.
    - Interact with the realities of the built/existing environment and land uses.
    - Manage wildlife within the watershed through on-going education, communication and collaboration with stakeholders.
    - Create adaptive management strategies that assess the success of past management actions and modify, if necessary, future management actions.

[92] *See State Wildlife Action Plans and Defenders of Wildlife: Linking Conservation and Land Us Planning, at:* http://www.defenders.org/resources/publications/programs_and_policy/habitat_conservation/habitat_and_highways/reports/final_report_linking_conservation_and_transportation_planning_workshops.pdf

4. Adopt and Implement the ***Regional Wildlife Management Plan***. The implementation of such a plan could take one of a number of political paths.
    - Wildlife management could be an element of the overall strategies that would address regional environmental health and stability within a watershed management authority with regulatory influence over land use policies.
    - Municipalities and counties should be educated on the importance of new policies and should be encouraged to individually adopt and enforce a series of uniform recommended policies related to wildlife and land use policies in the watershed.
    - State and Federal wildlife agencies could take on the implementation of a more detailed and specific wildlife management plan for the watershed.
5. Educate about, and encourage the acceptance of, goals to achieve healthy riparian habitat in the Fountain Creek Watershed. Opportunities should be examined in the Fountain Creek watershed to stabilize channel flows and create the opportunity for healthy riparian habitats to regenerate. These opportunities are focused on the human-caused aspects of habitat degradation.

C. Implementation Plan

Steps to Implement Strategy	Target Completion Date	Recommended Responsible Entity in the Watershed	Partners in Implementation
a. Determine the scale, budget, and authority of the wildlife strategies	20010-2012	Future Fountain Creek Watershed Funding Entity	Federal – US Fish and Wildlife Service (Mountain-Prairie Region), Environmental Protection Agency, Natural Resource Conservation Service, US Federal Highway Administration, Elected Officials. State – Colorado Division of Wildlife, [CDOW Wetland Wildlife Conservation Program], [CDOW Habitat Partnership Program], [CDOW Natural Diversity Information Source], [CDOW State Wildlife Action Plans], Colorado Cooperative Fish and Wildlife Research Unit, Colorado Fish and Wildlife Management Assistance Office, Colorado Department of Natural Resources, Colorado Department of Public Health and Environment, Colorado Department of Transportation, Elected Officials. Local – Counties, Municipalities, Utilities, Fort Carson, Air Force Academy, Stakeholders, Coalitions of Government, Metropolitan Districts, Conservancy Districts, Departments of Public Health and Environment, Elected Officials. Organizations – The Nature Conservancy, The Sierra Club, Colorado Open Lands, World Wildlife Fund, Natural Resource Defense Council, Defenders of Wildlife, Ducks Unlimited, Partners for Fish and Wildlife, Southern Rockies Ecosystem Project.
b. Look for partners with shared values and goals who will agree to support a common effort regionally	2010-2012		
c. Work through the strategies at a scale that is appropriate for a potential partnering group/organization	2010-2012		
d. Continually work with stakeholders who will be affected by any policy or regulatory change you might suggest	2010-2012		
e. Because development, hardening of the watershed, certain agricultural practices, habitat fragmentation, invasive species, and water contamination can negatively impact the continuing viability of riparian habitats and wildlife diversity in Fountain Creek, further evaluate and compare policies and controls among jurisdictions within the watershed related to stormwater management (especially on-site management and LID as means of controlling flow, volume, and water quality), smart growth/sustainable development concepts and principles, invasive species removal, creek flow stabilization, open space/habitat protection	2010-2015		
f. Complete a report identifying regional wildlife populations, threats to wildlife, their regional and crucial habitats and their values. Also look for potential "indicator species" whose health and abundance can be used as an indicator of the health of many other species	2011		
g. Establish a watershed-wide wildlife health and population monitoring program that identifies indicator species of overall wildlife viability. This will include re-evaluations every 5 years	2012		
h. Create and adopt a Regional Wildlife Action Plan to maintain populations with the goal of reducing/eliminating declines in population for all federally-listed threatened and endangered species in the watershed, that coordinates with associated federal recovery plans for listed species.	2015		
i. Implement 10 habitat restoration projects in the watershed	2015		

j. Identify areas in the watershed that would have the least negative impacts on wildlife and make recommendations for future development practices. Adopt watershed-wide, consistent regulations and standards for development within these areas.	2020		Federal – US Fish and Wildlife Service (Mountain-Prairie Region), Environmental Protection Agency, Natural Resource Conservation Service, US Federal Highway Administration, Elected Officials. State – Colorado Division of Wildlife, [CDOW Wetland Wildlife Conservation Program], [CDOW Habitat Partnership Program], [CDOW Natural Diversity Information Source], [CDOW State Wildlife Action Plans], Colorado Cooperative Fish and Wildlife Research Unit, Colorado Fish and Wildlife Management Assistance Office, Colorado Department of Natural Resources, Colorado Department of Public Health and Environment, Colorado Department of Transportation, Elected Officials. Local – Counties, Municipalities, Utilities, Fort Carson, Air Force Academy, Stakeholders, Coalitions of Government, Metropolitan Districts, Conservancy Districts, Departments of Public Health and Environment, Elected Officials. Organizations – The Nature Conservancy, The Sierra Club, Colorado Open Lands, World Wildlife Fund, Natural Resource Defense Council, Defenders of Wildlife, Ducks Unlimited, Partners for Fish and Wildlife, Southern Rockies Ecosystem Project.
k. Preserve a minimum of 75% of all identified crucial wildlife habitat in the watershed to protect it from the impacts of future development.	2020		
l. Create wildlife corridors under and over passes for wildlife in collaboration with Colorado Department of Transportation	2013-2022		
m. Produce a noxious weed management plan for the watershed including baseline data	2013-2022		
n. Maintain migration corridors by protecting habitat through acquisition and/or conservation easements	2013-2022		
o. Create incentives for buffers and smart growth within the watershed, and work with local municipalities to accomplish wildlife goals and identify the best locations for development	2013-2022		
p. Identify compatible adjacent uses and work with the Natural Resource Conservation Service and farmers/ranchers to increase wildlife forage opportunities	2013-2022		
q. Expand education and outreach options in parks, wildlife areas, trails, nature centers, and recreation facilities including interpretive information and signage on basic environmental information, values, and protection efforts.. Also provide education on, and encourage the acceptance of, goals to achieve healthy riparian habitat.	2013-2022		

X. AGRICULTURE

A. Current Conditions

Background

The present character of Colorado is rooted in the ranching and farming heritage of the State. Today, agricultural production contributes more than $16 billion annually to Colorado's economy.[93] The Fountain Creek Watershed has been used for the production of food and agricultural products since the first settlers came here over 150 years ago. Fountain Creek is one of the last significant waterways that contain no water storage facilities or flood diversion dams along the Front Range. There are many challenges to the health of Fountain Creek, including altered flow regime, flooding, erosion, and water diversions. Many of these issues threaten the economic and physical viability of agriculture in the watershed, particularly along Fountain Creek. Nevertheless, population growth and demand for water are the greatest threats to agriculture in the watershed. These threats have the potential to reduce productive agricultural acreage in the region, transfer water resources from rural areas, and further alter natural hydrological processes.

Agricultural land use dominates the section of the Fountain Creek Watershed between Fountain and Pueblo. The land is held in relatively large parcels (250-3,000 acres) and is used for irrigated crop production (alfalfa, hay, and vegetables), seasonal livestock grazing, and hobby farms. In El Paso and Pueblo Counties, dry land livestock grazing is supplemented by irrigated hay and crop production. Ranching in the area is supported by adjacent Colorado State Land Board property that is leased to local ranchers, thereby increasing the availability of grazing land. Much of the short grass prairie is well suited to responsible grazing of its native grasses. The use of uplands for cattle production not only benefits agricultural producers, but also has positive impacts on groundwater recharge that maintains the regional water table. Land that is not surfaced with pavement or other impervious surfaces[94] is critical to the long-term supply of groundwater by providing infiltration from rain and snow back into the water table.

Fountain Creek agricultural producers' irrigated lands support local and regional markets by providing locally grown produce, cattle, hay, and pasture for livestock. Agricultural land use along this corridor has obvious ancillary public benefits, providing habitat, corridors for migration and daily water needs for wildlife, wide open spaces, a scenic back drop to travelers and residents using Interstate-25, and recreational opportunities such as wildlife watching and hunting. These values must be nurtured and protected if we are not to lose the very reasons people want to live and work in Colorado.

Agriculture and Development

[93] Sherman, Harris 2007. Director of Colorado Department of Natural Resources, quoted in "Water roundtables tackle growth issues," in *The Pueblo Chieftain,* by Chris Woodka. November 17, 2007.

[94] Impervious surfaces: A hard surface area which either prevents or retards the entry of water into the soil. Examples include, but are not limited to, structures, walkways, patios, driveways, carports, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, haul roads and soil surface areas compacted by construction operations.

The most direct threats to agricultural production in the Fountain Creek Watershed are population growth and development pressure. Farmers and ranchers face increasing economic pressure to sell their land and water. Since 1990, Colorado has gained nearly 1.9 million new residents.[95] It is estimated that we will gain an additional 2.4 million residents by the year 2030.[96] It is projected that more than 80% of these new residents will be putting down roots along the Front Range. El Paso County's rapid growth is indicative of this trend - in 2006, El Paso County's population grew to 575,000 residents. According to the Colorado Department of Local Affairs website, during the period 1990-2006, El Paso County grew by 45% and is expected to grow at a rate of 42% for the period 2006-2025. While these rates are not indicative of the entire Fountain Creek Watershed's estimated growth rates, they do capture the pace of population growth and have implications for the conversion of land from open space and agricultural uses to residential and commercial uses.

From 1990 to 2006, there was a cumulative loss of over 2 million acres of agricultural land in Colorado.[97] It is anticipated that nearly another 1 million acres of agricultural land will be lost by 2030. The bulk of this conversion will be from undeveloped agricultural land to large-lot subdivisions or ranchettes.[98] Again, El Paso County serves as a sobering case study. Between 1997 and 2002 the average size of farms and ranches dropped from 1,010 acres to 690 acres, while the number of farms and ranches has nearly doubled.[99] As this trend continues and farms and ranches are divided into smaller parcels, it becomes less likely that agriculture will survive as a sustainable land use.

Along Fountain Creek these pressures are evident as development follows I-25 access ramps and annexation activities. In the past, the scarcity of water and other services impeded the active development of the region between Colorado Springs and Pueblo. Annexation and the creation of new facilities for water, electricity, and sewer could remove impediments to development. Strip development along the Interstate could displace agricultural producers for a variety of reasons, including water availability, incompatible adjacent land use, and increased land values, making it harder for agricultural producers to remain. With increases in land values come increases in taxes, which compound problems by sometimes forcing the next generation to sell off a portion of the property to pay the inheritance tax. Since water rights are property rights, some choose to sell their water in order to keep their land.

Agriculture and Water

With the increase in population in Colorado, there is a proportional strain on water resources and the potential for conflict between agricultural, commercial, industrial, and residential uses. The Colorado "Statewide Water Supply Initiative" has projected that

[95] Ibid.
[96] "Colorado Conservation at a Crossroads." Page 2, Publication of Colorado Conservation Trust, 2005.
[97] "Colorado Agriculture: A profile of Colorado's agriculture and its contribution to the state's economy." Compiled by USDA, NASS, Colorado Field Office, 2007.
[98] "Colorado Conservation at a Crossroads." Page 2, Publication of Colorado Conservation Trust, 2005. Ibid. Page 1.
[99] "Colorado Profiles 2002 - 2006", Colorado Agricultural Statistics, pgs 111, 219.

municipal and industrial demand for water will increase by 53% statewide by 2030. Coloradans use about 208 gallons of water per day (gpd) per person. If agriculture is included, the per capita use increases to 3,690 gpd.[100] Agriculture, then, accounts for roughly 90% of Colorado's water demand and as such has been identified as the likely source for new municipal and industrial water sources in the future.[101]

The historic practice of permanently transferring water from agricultural uses to municipal or industrial uses comes in the form of selling/buying water rights and drying up the associated land. This form of water use conversion is not new to Colorado and causes the loss of arable land. This loss of land has tremendous economic and social impacts to the agricultural community in the Fountain Creek Watershed. The table below summarizes this trend.

1950-2007

Water Right	**County**	**Acres dried up**		**Water Right**	**County**	**Acres dried up**	
Fountain Mutual	El Paso	3300		West Pueblo Ditch	Pueblo	330	
Miller Ditch	El Paso	440		Booth Orchard Ditch	Pueblo	1433	
Cacuts Ditch	El Paso	40		Bessemer Ditch	Pueblo	1976	
Greenview Ditch	El Paso	80		Hamp Bell Ditch	Pueblo	80	*
Chilcotte Ditch	El Paso	510		Excelsior Ditch	Pueblo	1965	a
Lock/Lock 2 Ditch	El Paso	250		Colorado County	Pueblo/ Crowley	50000	b
Laughlin Ditch	El Paso	256	*				
Lincoln Ditch No. 5	El Paso	294	*				
TOTALS		**5170**				**55784**	

Source – Colorado Division of Water Division 2 (water change cases)
* denotes acres based on 1cfs for 40 acres
a denotes changed for Augmentation
b denotes most acres dried up in Crowley County/water transferred to Colorado Springs, Pueblo West, Aurora

A new alternative is being developed that would involve municipalities *leasing* rights to water from farmers but only using the leased water in years when it is necessary. This allows the farmer to stay in business and earn cash for the lean/dry years when the cities need the water most. Reportedly, this system is being considered by Colorado Springs Utilities and Arkansas River farmers. A recent article in the journal *High Country News* highlighted the pitfalls and benefits to the Los Angeles Water Authority's in using the lease approach.[102]

Water conservation is, of course, the preferred alternative to reducing demand among all sectors. Conservation efforts during and since the 2002 drought have dropped urban

[100] "Water and growth subject of new CU report", CU-Boulder Natural Resources Law Center, Fact Sheet. November 15, 2001. Summary of "Water and Growth in Colorado".
[101] Sherman 2007.
[102] Jenkins, Matt. 2007. Quoted in "L.A. Bets on the farm," in *High Country News*, November 12, 2007, pgs 12-17.

water use to the range of 120-180 gpd per person.[103] It is unlikely that water conservation alone will satisfy future water needs.

Unlike municipal water conservation, increased agricultural water efficiency *may* improve the quantity and quality of water available to downstream users, but it is not a panacea for water needs.[104] Flood irrigation is relatively inefficient on a field scale: it consumes approximately 50% of the water applied and raises the water table with the ensuing problems of increased evaporative losses. It also fosters noxious weed growth by providing a water source.[105] The 'extra' water from flood irrigation that drains back to the creek leaches more salts into the water, jeopardizing downstream users' water quality.[106] Seepage from ditches also raises the water table and adds to evaporative losses, however these practices also create habitat for wildlife. To the extent that more efficient irrigation methods reduce non-beneficial evaporative consumption, it may be possible to increase beneficial consumption by a corresponding amount without reducing the supply available to others. However, whether or not such savings can be transferred to other users or uses is not well established in Colorado law at the present time.

Nevertheless, "By reducing the consumptive use (e.g. converting alfalfa to drought-tolerant grasses or adopting new irrigation methods), farmers can potentially increase revenue by selling the water they save. A risk to farmers is the high cost associated with increasing irrigation efficiency. For example, converting from flood to center-pivot irrigation includes a $568 per acre capital cost and $80 per acre annual cost. While conservation can 'free' water for other uses, high infrastructure costs make it unfeasible to implement conservation strategies during drought years alone."[107] The critical issue to be understood is that in order to change the use and/or place of use so that water may be sold to be used by another, a farmer must reduce the amount of water consumed by his or her own retained uses.[108]

It is assumed that more efficient use of water will yield higher agricultural productivity or enable the agricultural community to aid industry and municipalities to meet their water needs. Studies in the South Platte watershed are underway to examine alternative modes of irrigation, including "sprinklers or drip systems, rotational fallowing, changing irrigation patterns, lining canals, and improving drainage from fields."[109] These studies will have more or less direct applicability to the Fountain Creek Watershed or at least give us models to adapt to the region. One unanticipated result of increased irrigation efficiency is loss of ancillary riparian and wetland habitat. In parts of the county where

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[103] "Water and growth subject of new CU report", CU-Boulder Natural Resources Law Center, Fact Sheet. November 15, 2001. Summary of "Water and Growth in Colorado".
[104] For the purposes of this summary, water efficiency refers to the method of delivery (i.e. center pivot sprinklers, ditches and flood irrigation) and type of crop use (corn vs. wheat, for example), not the consumptive use of a water right.
[105] Gates. Tim. 2007. Colorado State University, quoted in "Saving water could help farmers, river," in *The Pueblo Chieftain*, by Chris Woodka. November 16, 2007.
[106] Ibid.
[107] Ibid.
[108] Witte, Steve. 2008. Colorado State Water Engineer. Personal communication.
[109] Gates 2007.

unlined irrigation ditches were converted to lined ditches, considerable loss of habitat has occurred because the seepage from the ditches was no longer feeding these riparian areas.

Another aspect of population growth that has an impact on agriculture is the effect that urbanization has on the hydrology[110] of a watershed. Development increases the impermeability of the ground due to pavement and other covered surfaces that do not allow water to percolate into the ground. This impermeability causes an increase in the rate and volume of runoff during storm events. Some water users may benefit from this runoff by a temporary increase in water availability. However, the funneled water is essentially lost once it heads downstream as opposed to the more gradual release of water that occurs over time in a permeable watershed. Increased flows over short time periods can also cause increased stream bank erosion in riparian areas and in more extreme cases, flood damage to water diversion and control structures. A principle to be considered is that Colorado water right owners are entitled to streamflow conditions as they existed at the time their water rights were established.

One of the tools that can keep land and water available for agricultural use is conservation easements. In 2004, conservation easements enacted by land trusts and local governments protected nearly a million acres of valuable Colorado land. These easements achieve multiple outcomes including: protecting natural wonders, wildlife habitat, open space, and helping landowners keep their land in family ownership and production.[111] However, once water is tied to agricultural land in a conservation easement, it typically would then not be available for the type of municipal water leases discussed earlier.

In summary, increasing population pressures will require new and creative models to address competing needs between urban and agricultural uses of resources. Conserving water, using it more efficiently and productively, recycling and re-using it and coming up with creative models for transferring the use of that water, will all have to come into play in order to preserve water, agriculture, wildlife and the open spaces of Colorado.

B. GOALS TO ADDRESS CURRENT CONDITIONS

Goals to Improve Current Conditions

1. Preserve and Protect Agricultural Land
2. Preserve Agricultural Water
3. Promote Agricultural Viability
4. Protect Ecosystems

Note: Although the Fountain Creek Vision Task Force is deeply committed to maintaining agriculture in the watershed and to supporting activities that will help achieve the goals outlined above, the group decided not to pursue specific strategies to

[110] Hydrology: The study of relationships between water and the geologic environment.

[111] "Colorado Conservation at a Crossroads." Publication of Colorado Conservation Trust, 2005, Page 3.

realize these goals, as only agricultural producers and landowners can determine what is best for their land and livelihood.

XI. OUTREACH

A. Current Conditions

Regional watershed outreach efforts are essential for:

- Establishing appreciation, understanding, and connecting with the waterway corridors in the Fountain Creek Watershed
- Creating public stewardship to increase watershed health/runoff water quality, to help assure waterway safety, to sustain healthy and functioning ecosystems/wildlife habitat, and to instill water conservation practices
- Facilitating enjoyment of healthy waterways that support diverse environmental, economic, wildlife, and recreational opportunities

- Preserving and protecting agricultural viability

There are multiple existing outreach programs in the region that educate a variety of people on diverse watershed topics. The region will benefit through greater cooperation and collaboration on pubic watershed outreach and educational programs that focus on common themes and messages.

There are currently various waterway outreach opportunities available throughout the Fountain Creek Watershed. These include (but are not restricted to):

Fountain Creek Vision Task Force (FCVTF)
The Task Force has provided the following outreach venues:
- Created a voice-over PowerPoint presentation that discusses the FCVTF efforts and delivered this presentation to various organizations throughout the watershed
- Participated in the Catamount Institutes 2008 Creek Connections Research Symposium.
- Created a Fountain Creek 'Top 10' flier that discusses the top ten facts concerning the watershed. This has been presented to the full Task Force, at a booth at the Colorado State Fair, and to various organizations in the watershed.
- Hosted a day-long watershed bus tour with expert interpretation in August 2007 for approximately 30 people
- Established a FCVTF web site on the www.fountain-crk.org site
- Is currently developing a video on the Fountain Creek Watershed

City of Colorado Springs, El Paso County, and Pueblo City and County
The localGovernments provide the following watershed-related outreach:
- Regional Partnership of the Pikes Peak and Pueblo Area Councils ofGovernment, www.fountain-crk.org
- Various stormwater protection educational materials have been developed including printed materials, videos, table-top displays, a children's watershed model, and presentations. These are used for education at schools, to various organizations, and at public events.
- School programs have been developed for various school-aged children to teach about stormwater protection.
- Signage is used to educate the public on the dangers of getting into waterways and on stormwater pollution.
- Pueblo Annual Water Festival

Local Schools
A few local schools and colleges have watershed related educational opportunities. These include:
- Colorado State University Pueblo, Water Quality Program
- Pikes Peak Community College: Water and Waste Water Technology, Associates Degree (One of only two in the State of Colorado)
- Saint Mary's High School, Colorado Springs
- Canyon Elementary Student Conservation Club – David Eick

Environmental Organizations
Several environmental groups in the region offer watershed outreach including:

- The Catamount Institute: Creek Connections –www.catamountinstitute.org/
- Colorado Watershed Network: River Watch – www.coloradowatershed.org
- Sierra Club's Water Sentinels –www.geocities.com/water_sentinels

Parks and Nature Centers
There are several parks and nature centers in the watershed that are excellent sources for watershed outreach including:

- El Paso County Parks, The Fountain Creek Nature Center Campaign: No Child Left Inside!, http://adm.elpasoco.com/Parks/Fountain_Creek_Nature_Center.htm
- El Paso County Parks, Bear Creek Nature Center –http://adm.elpasoco.com/Parks

Other Organizations
Several other organizations offer the following outreach opportunities:

- Colorado Springs Utilities offers water conservation education through a wide venue including the Xeriscape Demonstration Garden, www.csu.org/environment/xeriscape/index.html
- City of Fountain offers Landscaping for the Fountain Valley, Xeriscape Demonstration Garden, http://fountaincolorado.org/
- Colorado Water Quality Monitoring Council (CWQMC), Xeriscape, Data Sharing Network, http://cwqmc.coloradowatershed.org/
- FutureSelf in collaboration with the Catamount Institute: *Stream of Conscience*
- City of Colorado Springs Stormwater – www.springsgov.com/stormwater
- Pueblo City-County Health – www.co.pueblo.co.us/pcchd/

Although there are multiple existing outreach programs in the region that educate a variety of people on diverse watershed topics, they are not linked or coordinated. These programs have the potential to be much more effective through watershed-wide coordination that focuses on filling the gaps between the organizations, optimizing their overlaps, and more effectively announcing upcoming events. Additionally, other entities in the watershed like the Home Builders Association, could be effective partners in outreach and should be invited to participate in future outreach efforts.

B. Goals and Strategies to Address Current Conditions

Goal to Improve Current Conditions
Educate and engage the public (from elementary age through adult) on the Fountain Creek Watershed to:

1. Establish appreciation, understanding, and connection with the waterway corridors in the Fountain Creek Watershed
2. Create public stewardship to increase watershed health/runoff water quality, to help assure waterway safety, and to instill water conservation practices
3. Facilitate enjoyment of healthy waterways that support diverse environmental, economic, wildlife, and recreational opportunities

4. Preserve and protect agricultural viability

Objectives

1. By mid 2009, create and implement a Fountain Creek Watershed website that includes a calendar for upcoming watershed related events.
2. By mid 2009, distribute Fountain Creek Watershed press packets to all television, radio, and newspaper outlets in the watershed.
3. By mid 2009, convene a roundtable of existing outreach and education program directors to develop short- and long-term program goals and implementation plans.
4. By the spring or fall of 2010, hold a Fountain Creek Watershed contest for K-12 school children throughout the watershed.
5. By 2010 and thereafter, hold at least 3 volunteer events annually focused on assessing and/or improving conditions in Watershed waterways.
6. Have a watershed educational curriculum in use in public schools throughout the watershed (5% of schools by 2011, 25% of schools by 2014).

Strategies to Achieve Goals and Objectives

2. Identify and leverage partnerships for funding.
2. Establish schedule of major events for Fountain Creek Watershed (FCW), develop a calendar, and develop press releases to publicize events.
3. Develop press packets and distribute them to the 'support team', update packets, as appropriate.
4. Develop a presentation packet for use by interested FCV sponsors.
5. Establish watershed-wide educational, volunteer, and experiential programs that include the following topics:
    - Stormwater protection and management (urban and agriculture)
    - Waterway safety / flooding
    - Waterway mechanisms and health (including wetlands, sedimentation, and erosion)
    - Water use and water conservation (urban and agriculture)
    - Wildlife and wildlife habitat
    - Regional agriculture
    - Recreation
    - Water quality
    - Land use issues impacting waterways
6. Establish Fountain Creek Watershed educational programs

C. Implementation Plan

Strategy 1: Identify and leverage partnership for funding			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Develop list of grants under $10K that are available (>$10K goes to funding options group)	2009	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	PPACG, PACOG, CWCB, others
b. Develop template for grant applications	2009	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force

Strategy 2: Establish schedule of major events for Fountain Creek Watershed (FCW), develop a calendar, and develop a press release to publicize events			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Establish what entities do public outreach, education, and events that support the outreach goals and determine what programs they do	2009	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force
b. Determine what events the Fountain Creek Regional Watershed Regulatory and Funding Entity and/or the Fountain CreekNon-profit entity will participate in and what the key messages will be for these events	2009 and quarterly thereafter	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force
c. Develop a calendar of events associated with the Outreach goals and post on a website	2009 with monthly updates thereafter	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force
d. Develop list of FCV sponsors that will promote watershed events (AKA a "support team" e.g. news publication representatives, TV station representatives, elected officials, Consensus Committee members, and Task Force Volunteers)	2009	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force
e. Develop a list of events that may be news worthy, updating the list monthly. Compose news releases with key messages for each such event. Review list with FCV, news publications, and TV stations to get coverage and post on website	2009 with monthly updates thereafter	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force

Strategy 3: Develop press packets and distribute them to the "support team", update packets, as appropriate			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Develop press packets including these items: FCV "Top 10", FCW Newsletters (PPACG/PACOG), video of watershed tour, video and pictures from helicopter flyovers, maps (Thomas and Thomas and Corridor Master Plan), demonstration project summaries, USGS publications (both summaries and links to reports), and fact sheets	2009	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force
b. Write a series of short articles for publication in small local publications	2009	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force
c. Update packets and articles as appropriate	Quarterly	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force

Strategy 4: Develop a presentation packet for use by interested FCV sponsors			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Develop power point presentation of various lengths containing key messages	2009 with quarterly updates	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force
b. Develop handouts and displays to be used and/or distributed at presentations	2009 with quarterly updates	Non-profit entity or similar and/or future Fountain Creek Watershed Funding Entity	Government and other entities involved in the Fountain Creek Vision Task Force

Strategy 5: Establish watershed-wide educational, volunteer, and experiential programs			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Establish watershed-wide educational, volunteer, and experiential programs to address: stormwater protection and management (urban and agriculture), waterway safety/flooding, waterway mechanisms and health (including wetlands, sedimentation and erosion), water use and water conservation (urban and agriculture), wildlife and wildlife habitat, regional agriculture, recreation, water quality, land use issues impacting waterways	Late 2010	Non-profit entity or similar and/or regional watershed regulatory and funding entity	Government and other entities involved in the Fountain Creek Vision Task Force

Strategy 6: Establish Fountain Creek Watershed educational programs			
Steps to Implement Strategy	**Target Completion Date**	**Recommended Responsible Entity in the Watershed**	**Partners in Implementation**
a. Convene a roundtable of existing outreach and education program directors to develop short- and long-term program goals and implementation plans for a K-College curriculum for watershed education	Late 2009	Non-profit entity or similar and/or regional watershed regulatory and funding entity	Government and other entities involved in the Fountain Creek Vision Task Force
b. Produce videos for educational purposes	2010	Non-profit entity or similar and/or regional watershed regulatory and funding entity	Government and other entities involved in the Fountain Creek Vision Task Force
c. Establish a watershed wide contest for K-12 students that will increase understanding and commitment to the watershed	2010	Non-profit entity or similar and/or regional watershed regulatory and funding entity	Government and other entities involved in the Fountain Creek Vision Task Force

APPENDICES

Note: Due to the size of the appendices, they have been posted on the website separately from the rest of the Strategic Plan to facilitate downloading.

Appendix A: Maps

Appendix B: Additional Information: Water Quality

Appendix C: Additional Information: Flooding and Stormwater Management

Appendix D: Relevant Studies (referenced in the strategic plan)

Appendix E: FCVTF Consensus Committee Meeting Summaries

Appendix F: FCVTF Water Quality Working Group Summaries and Stormwater Management Group Meeting Summaries

Appendix G: FCVTF Water Quantity Working Group Summaries

Appendix H: FCVTF Combined Water Working Group Summaries

Appendix I: FCVTF Land Use and the Environment Working Group Summaries

Appendix J: FCVTF: Joint Meetings of Water and Land Use Working Group Summaries

Appendix K: FCVTF: Funding Options and Long-Term Management Working Group Summaries