APPENDIX G

Fountain Creek Vision Task Force
Water Quantity Working Group
Meeting Summaries

Fountain Creek Vision Task Force
Water Quantity Working Group
Meeting Summaries

Fountain Creek Vision Task Force
Water Quantity Task Force
February 9, 2007
Final Meeting Summary

Attendance

Carol Baker, Jeff Chostner, Scott Cowan, Doug Fitzgerald, Ferris Frost, Mark Glidden, Brett Gracely, Jane Green, Terry Hart, Dan Henrichs, Scott Howell, Irene Kornelly, Carole Lange, Walter Lawson, Dennis Maroney, David Mau, Bob McGregor, Jim Munch, Rich Muzzy, Julie Pearson, Gary Rapp, Jane Rawlings, Jane Rhodes, Chip Rice, Graham Thompson, Barbara Vidmar, Ross Vincent, Jay Winner, Chris Woodka, and Heather Bergman

Presentation and Background Materials

At the group's request, Carol Baker from Colorado Springs Utilities gave a brief presentation on water quantity and use in the Fountain Creek watershed. Rich Muzzy, from the Pikes Peak Area Council of Governments, provided the group with a written summary of the existing studies on the watershed. Carol's presentation and Rich's summary will be made available on the website at:
http://www.fountain-crk.org/Watershed%20Vision%20Task%20Force/fc_VisionTaskForce.htm

Key Issues

The primary goal of this meeting was to finish identifying the key water quantity issues in the Fountain Creek watershed. The group brainstormed and identified several issues. After identifying the issues, each member of the group was given 3 dot stickers to use to indicate which issue(s) is/are most important. Because discharge and reuse of water at the Clear Spring Water Treatment Facility was discussed at the last meeting, it was added to the prioritization list. The issues are listed below in order of their ranking, and the number of dots each received is in parentheses. Note that SDS and sediment transport were tied with 20 votes and are listed below in alphabetical order.

- Impervious areas (31)
    - More runoff
    - Increase flows
    - Water quality
    - Water rights
    - Flood control
    - Propensity for flooding analysis
    - Change natural flow dynamics, including volume and timing of flow
    - Change the shape of the stream
    - Growth
    - Ground water recharge is affected
    - Economic impacts to Pueblo County landowners, roads, bridges, etc.

- Sediment transport (20)
- Southern Delivery System (SDS) (20)
    - More information available at www.sdseis.com
    - More water—return flows
    - Impacts to Pueblo Reservoir
    - Decreased flows in the Arkansas River between Pueblo Reservoir and Fountain Creek
- Reuse and discharge at Clear Spring Water Treatment Facility (8)
- Flooding and channel stability (4)
    - Velocity of flows
    - Impacts to public/private entities
- Floodplain filling (3)
- Increased/Changed Vegetation (1)
    - Restricts capacity
    - Levy certification
    - Invasive species
    - Channel stability
    - Channel location
    - Cottonwoods (native)
    - Tamarisk (invasive) - increases non-beneficial consumptive use
- Excess water hazard—solids facility (0)

Data Needs

- How much of the Arkansas River is consumed by Pueblo and other communities east of Pueblo? Colorado Springs uses 41 KAF/year (4.7%).
- Is SDS "creating" more return flows? We need this information for all alternatives in the environmental impact statement.

Next Steps

The group agreed that it needs more information about what land uses affect which flows in Fountain Creek (base flow, channel-forming flow, and flood flow). David Mau and Graham Thompson agreed to work with Heather to put together a panel to share the currently available information on this topic with the group at the next meeting. The next meeting will be on Friday, March 9th from 10 a.m. to 12 p.m. Unless otherwise announced, this meeting will take place at the Fountain City Hall.

Fountain Creek Vision Task Force
Water Quantity Working Group
March 22, 2007
Final Meeting Summary

Attendance

Carol Baker, Dan Centa, Scott Cowan, Pat Edelmann, Doug Fitzgerald, Scott Howell, Irene Kornelly, Rex Miller, Margaret Mora, Rich Muzzy, Julie Pearson, Gary Rapp, Jane Rawlings, Chip Rice, Ken Sampley, Graham Thompson, Barbara Vidmar, Alan Ward, Jay Winner, Daryl Wood, Chris Woodka, Heather Bergman, and Helen Littrell Smith

Action Items

Keystone, Chip Rice, Doug Fitzgerald, and Ken Sampley	Put together a panel to address municipalities' requirements/regulations on impervious surfaces related to water quantity for the next meeting.

Meeting Objectives

- Hear presentations about the relationship between land use and the flows in Fountain Creek
- Discuss land use/flow relationship with experts to ensure a sound understanding of the interplay of these two factors
- Determine if/how to move forward with this issue

Panel Presentations on the Effects of Land-Use Changes in an Urbanizing Area on Stream Hydrology

Introduction and Broad Definition of Terms, Graham Thompson, Matrix Design Group
Note: We expect this presentation to be posted on the Watershed Study website. Questions should be directed to Graham Thompson at (719) 575-0100.

- Water cycle
  - Water from the ocean becomes rain and ends up infiltrating the ground, turns into precipitation, goes through evapotranspiration, becomes surface runoff, etc.
  - The primary focus in the Fountain Creek watershed is on the relationship between precipitation and runoff.
- Hydrograph lingo
  - "Flow" is a volume of water measured over a time period and is typically expressed as cubic feet per second (cfs).
  - "Base flow" is the water accumulated in the watershed in the past that would be there whether a rain event happens or not. Perennial streams have the base flow component year-round (Fountain Creek is a perennial stream). An intermittent stream has a base flow for only part of the year. An ephemeral stream is dry most of the time and only flows when there is a rain event.
  - The part of the flow that is not base flow is the amount of rainfall that turns into runoff in the stream system.
  - Channel forming flow is the representative discharge responsible for doing the majority of the work that shapes the channel (pattern, cross section, profile/slope).
  - It is critical to consider the potential impacts to all three flow ranges when doing land use and impervious surface planning.
  - Flood events remove tremendous amounts of sediment, but they don't happen very often. Channel forming flows move the largest percentage of sediment over time because they occur more frequently (even though they move less sediment per year than a flood event). Base flows do not have enough energy to move sediment to shape the channel.
  - Example/hypothetical flow ranges of Fountain Creek
    - Base flow: 30 cfs
    - Channel forming flow: 3,000 cfs
    - Flood flow: 30,000 cfs

Land Use/Runoff Relationship in the Fountain Creek Watershed, Graham Thompson, Matrix Design Group

- Land use and runoff
  - As the intensity of land use increases, the amount of impervious surfaces (materials like cement, asphalt, roofing, and compacted soil) also increases, and water quantity becomes an issue as a result.
  - An increase in impervious surfaces is related to an increase in runoff.
  - Mathematical relationships are used to determine how much rainfall ends up as runoff.
  - U.S. Army Corps of Engineers Fountain Creek watershed study
    - Constructed a computer model that compared existing (2005) and future (circa 2025) land use
    - Modeled 2-, 5-, 10-, 25-, 50-, 100- and 500-year 24-hour storm events
    - Increased flows reflect expected changes in land use during these periods.
  - The changes reflected on the maps do not necessarily take into account storm water management techniques that might be used in future development.
- This study is an example, a model. The intent of these types of exercises is to examine worst case scenarios to figure out what planning needs to be done.

Explanation and Description of Impervious Surfaces and Effects on Stream Hydrology in Fountain Creek, Rich Muzzy, Pikes Peak Area Council of Governments
Questions should be directed to Rich Muzzy: 719-471-7080, Ext. 109.

- Rich presented a table from an EPA document examining runoff from four types of land use (available at www.epa.gov/safewater).
  - There are two types of impervious surfaces: buildings and transportation-related.
  - Impervious surface areas related to transportation are connected; with buildings, there is some open space between impervious surface areas.
  - In a four-inch rainfall event on 1-acre:
    - A forest has 13,600 gallons of runoff.
    - A residential area has 32,600 gallons of runoff.
    - A commercial area has 100,520 gallons of runoff.
- Impervious surface area report (posted at www.fountain-crk.org)
  - The report describes the growth and development trends and health characteristics of the Fountain Creek watershed.
    - The land use data was compiled from cities and counties in the watershed.
  - It allows for a better understanding of the critical problem areas, projected patterns, and anthropogenic changes affecting the watershed.
  - The report shows the effects of impervious surfaces on runoff, including:
    - Increased frequency and severity of flooding
    - Reduced groundwater recharge
    - Decreased base flow in streams
    - Increase of channel erosion and sedimentation
    - Reduced natural filtration of the water
    - Negative impact on overall stream health
  - There is a direct connection between the amount of imperviousness and aquatic health (water quality, biodiversity, etc.). There are threshold levels of imperviousness that, if surpassed, make it difficult to maintain water quality standards.

    - Recommended next steps
        - Determine potential resources that will be most affected by an increase in imperviousness and correlations between imperviousness and watershed health.
        - Determine groundwater recharge and source water areas that should be protected.
- Recommend that local governments utilize methods to minimize impervious surface areas and use imperviousness as a land use planning tool.

Historical Changes in Streamflow Conditions on Monument and Fountain Creeks, Pat Edelmann, U.S. Geological Survey (USGS)
Note: Due to the provisional nature of this presentation, it will not be made available on the website or distributed via email. Keystone has tried to capture the key elements of this technical presentation to the best of our ability. Questions should be directed to USGS: Pat Edelmann, 719-544-7155.

- The presentation covered testing done at four sites:
    - Monument Creek at Pikeview
    - Fountain Creek near Colorado Springs
    - Fountain Creek at Security
    - Fountain Creek at Pueblo
- Normal Flow Index (NFI) = flows not associated with runoff. For example, ground water discharge, irrigation return flows, wastewater discharge, base flow, effluent, regulated flows, etc.
- Fountain Creek near Colorado Springs
    - Cumulative daily flow & NFI flows diverge over time, which suggests that the divergence is related to runoff events (more analysis is needed). Climatology may also have an influence in the variance.
    - There are "steps" in the graph that represent an increase in flows in the early 80s and mid-late 90s; the graph from the year 2000 and after seems to have a steadier slope.
    - At this site, the annual peak flow has not significantly increased over time.
- Monument Creek at Pikeview
    - There are similar "steps" in the flows as in the previous graph
    - How many days do you have elevated flows?
        - Looked at the number of daily flows greater than 100 cfs. There is cluster of data points around 20/year in the 1940s/50s, now seeing more per year.
    - At this site, the annual peak flow has significantly increased over time.
- Fountain Creek at Security
    - The slope on the graph increases in the early 1980s in cumulative daily flow & NFI, then the lines diverge.
    - At this site, the annual peak flow has significantly increased over time.
- Fountain Creek at Pueblo
    - Graph shows a greater divergence between cumulative daily flow & NFI, suggesting greater runoff events.
    - "Steps" appear on the graph in the early 80s, again in the late 90s.
    - At this site, the annual peak flows have not changed significantly over time.
    - The frequency of channel forming flows is increasing.

Question/Answer and Group Discussion

- What caused the "steps" to occur?
  - In general, those were periods of climatic related change. There is more research to be done in this area.
- Did historic increases in the NFI have an effect on cumulative historic flow?
  - Yes.
- Did the increase in NFI effect channel forming flows, and if so, how much?
  - Generally speaking, base flows for the most part do not have enough energy to move large volumes of sediment. Increases in base flows do not change the magnitude of the event that is responsible for the channel forming flow. There is a critical sheer stress that has to be exceeded to get sediment to move en masse. The critical sheer stress for Fountain Creek is low because the sediment particles are so small. The critical sheer stress changes across areas of the stream.
- It appears that the base flow condition has increased over time, with "steps," and the streambed responds to that increase. If you raise the normal flow, has the stream channel fluctuated enough with that phased increase in flow that the sheer critical stress point increases as well?
  - Generally, no. As your normal flows increase, it is possible to see an increase in the frequency of channel forming flows if the channel changes. Changes in channel form are not being driven by base flow but rather by storm events.
- If increased flows are inevitable, there is concern about more channelization and erosion.
  - There is no longer a flood plain administrator position in El Paso County, and the best guess is that the work of that position will be done by existing staff.
  - Working group members were encouraged to look at proposals for channelization permits and comment on them with respect to the effects that channelization will have on Fountain Creek.
  - The sediment transport/channel forming topic is probably a separate discussion for this group to take up. The amount of sheer stress required to move sediment increases as flows increase. There are three elements to a stream: pattern, dimension, and profile. If those are changed, there is a change in sheer stress and thus more erosion.
  - It was suggested that the group look at fixes to Fountain Creek from a holistic approach and not on a site-specific basis.
- Is the U.S. Army Corps of Engineers getting $300K to fund their study?
  - They are looking to apply funds to the Fountain Creek study, and as of now they think they have identified $120-160K to get started on the next phase of the plan. The anticipated timeframe is mid-April, so they would need an additional $149K to complete the study.
- It seems that there is information about the nature of Fountain Creek that indicates the channel has changed over time due to the lifecycle of the stream (as opposed to outside sources). Is that a fair assessment?
  - It is difficult to make this determination in Fountain Creek because of the changes in hydrology and the difficulty of separating what is natural and what isn't. In theory, if flows don't change they should maintain the pattern, dimension, and profile of the stream. However, this is not the case in certain sections of Fountain Creek, as some sections are getting longer and some are getting shorter.
- When we had big storm events, was there a lot of change in the streambed?
  - Yes.

    - Because there are only so many aerial photos of the creek historically, there are limited pictures to compare. For example, if you compare pictures from 1955 and the next available set is from 1983, you can't isolate whether any changes were due to the 1965 flood event.
- Aren't we trying to manage peak flows? What are the solutions? Is it possible to manage Fountain Creek during storm events?
    - Yes, we are. What flow you are trying to manage to is an important question for this group to tackle. If you do shape the channel with respect to a 100-year event, you will mess it up for smaller events (e.g., it won't be able to move sediment). The unintended consequences of management actions are important to consider.
    - Concepts like bankfull flow have existed in the scientific world for some time, but haven't yet made it into regulatory arena.
- Channel forming flows are sensitive to impervious surfaces, how sensitive are they to flood plain encroachments?
    - Channel forming flows stay the same. What changes is the dimension of a channel if it is encroached upon; then you've changed the sheer stress relationship.
- Is bankfull flow the same as channel forming flow?
    - In a way, yes.
- The system is complex and a lot of particulars that play into the system are extremely site-specific.
- The stream is dynamic and will always be changing. Human impact on the Front Range is changing and will continue to do so. The goal is for the stream to be healthy from a holistic standpoint, and part of that is trying to understand what the state of Fountain Creek is today. We want to be able to look to the future and understand what impact different actions will have on the state of stream. For example, planning for impervious surfaces. The more we improve the stream's ability to function healthfully, the more value we get out of it as a community.
- If we build an off-channel diversion reservoir to manage peak events, would that impact the stream from a holistic point of view ("streaminess")?
    - Yes. As soon as you divert water you could create a major instability in that one area (impact the stress relationship). A single silver bullet fix will never be as successful as multiple, smaller solutions across the watershed.
- What if the reservoir was designed for flood management over a certain cfs?
    - When you manage that way, you do affect the "streaminess," because no one thing in and of itself will solve the issue. People downstream with water rights want peak flows because that may be the only time they get their water. Again, the holistic approach is the one we want to focus on.
- Pueblo Reservoir has managed to meet water rights.
    - There has been tremendous impact downstream because no channel forming flows are making it downstream of the reservoir.
    - Additionally, the peak flows are a part of the "streaminess" of the creek.
- Are there other watersheds this size and complex that we can use as a guide?
    - Cherry Creek was a quality issue only, but is similar in size.
    - Black Foot Challenge (in Montana)
- Key Themes/Lessons
    - There are no silver bullets, but there are solutions.

- Be conscious of unintended consequences.
- Look at the whole system—the big picture is key to finding solutions.
- Policy, institutional, funding, and technical solutions are needed.
- Who can we learn from?
- Better technology/new thinking

Next Steps

- Do we know where the problems are to start brainstorming solutions?
  - Generally speaking, anything you can do to not increase the amount of impervious surfaces is good.
- What about existing imp surfaces? Can we reduce those?
  - It is possible; we can try to reduce existing surfaces while trying to reduce the amount of future impervious surfaces being built. This group might think about setting a specific goal around impervious surfaces (i.e., no net increase, no more than 5% increase/year, etc.)
  - There will be more opportunities for success by changing future aims than trying to change the past.
- A subgroup of the Water Quality Working Group will be discussing stormwater, which is related to impervious surfaces. If we spent a month on something else, we could have that group come talk to us about what they've done.
- How far is this group trying to take this? Recommendations, policy suggestions?
  - There are entities trying to manage to this currently. We need to learn more about what the municipalities require in new developments and if the standards are not good enough we should look to have an impact on those standards.
  - This group will be successful in setting goals around managing to a target, but should also develop broader suggestions on what kind of policy changes they'd like to see (i.e., more green spaces).
- Put together the next panel on impervious surfaces and figure out:
  - Who requires what of developers?
  - Who reviews development plans and what goals are they trying to accomplish? What rules are implemented to accomplish those goals?
  - How does this group change policies?
  - What do the municipalities' criteria manuals say (with respect to quantity and not quality) and do they consider those flow ranges we discussed to be important?
- Chip Rice, Doug Fitzgerald, and Ken Sampley agreed to help put the panel together for the next meeting.
- Next meeting
  - The next Water Quantity Working Group meeting is scheduled for Friday, April 27 from 9:00 a.m. – 12:00 noon in Fountain.

Fountain Creek Vision Task Force
Water Quantity Working Group
April 27, 2007
Final Meeting Summary

Attending

Bill Alspach, Carol Baker, Dan Bare, Mark Glidden, Brett Gracely, Kim Headley, Dan Henrichs, Brian Kelley, Carole Lange, Walt Lawson, Dennis Maroney, Jim McGannon, Rex Miller, Jerry Pacheco, Julie Pearson, Alf Randall, Gary Rapp, Chip Rice, Ryan Tefertiller, Paul Thomas, Juan Trujillo, Tim Williams, Chris Woodka, Heather Bergman, and Niki Koszalka

Meeting Objectives

- Hear presentations on water quantity permitting requirements in the watershed
- Decide if/how to move forward with this and other water quantity issues
- Discuss water quantity goals provided by the Consensus Committee

Panel Presentations: Permitting Requirements

Presentation: Jerry Pacheco (City of Pueblo) and Tim William (City of Pueblo)

- In a 2005 study regarding relative imperviousness, it was determined that, typically, there is a direct correlation between how urban an area is and the amount of impervious surface in that area. There are projections for 2020 showing that there will be many changes in imperviousness in the next decade that will alter Fountain Creek and Pueblo. Pueblo's goal is to have the post development hydrograph match the pre-development hydrograph to the maximum extent practicable. This can be accomplished effectively through a two-pronged approach of stormwater detention and infiltration.
- The City of Pueblo is attempting to limit the negative impacts resulting from future development and urbanization by the Development Review Process. There are annexation agreements that require developers to keep flows to lower levels. Developers are required to submit master drainage plans and reports for rezoning projects. In advance of any residential development there must be a plan for stormwater and run-off.
- When looking at the Erosion Buffer Zone, it is necessary to take into consideration the 100-year floodplain and stream boundaries. Inside of the prudent line is a no-build line. The erosion limit line will need to protect the boundary line. If the erosion line is inside the boundary line, there can be no impact on any developed area. The prudent line is a 100-foot setback from the 100-year floodplain.
- Pueblo also working on a Non-Developable Lands Project, which is a comprehensive land use plan identifying areas should not be developed.

Questions and Answers

Has there been feedback from the community regarding maintaining the historic hydrograph?
The City of Pueblo is only allowed to pursue this goal only through the annexation process. It is a very high standard. The City Council endorses and approves of this goal. It is a requirement if development is part of annexation. In older areas it is still a goal but not a requirement.

Were any issues of volume studied during the drainage basin planning?
The basin studies in the City of Pueblo were just finished and volume concepts were not addressed.

How big are the annexations?
Most of the annexations are small. There will be a more noticeable impact on the historic hydrograph with the larger projects.

Has the requirement to match the historic hydrograph been used effectively?
It has been used in the northeast and has been found to work effectively there.

Does that mean it is workable here?
A lot depends on hydrology and soils as well as vegetation types. Some parts of city will have reasonable success. Other parts, due to poor soils, may see lesser results. Western water law needs to be considered as well.

Please say more about the prudent line/erosion buffer zone.
No development is allowed within 100 feet of the prudent line. Most of the lots within the city are on the "fringe" area.

Do historic areas have to comply with this requirement?
There are no guidelines in place for historic areas. There may be more opportunity to comply than people think. This is especially true for new developments. The older developments are challenging because the lines may not have been in existence when the properties were developed.

If a property wants to re-develop, is that acceptable?
There is no development inside the floodplain for either the Arkansas River or Fountain Creek.

Presentation: Alf Randall (Pueblo County)

- In Pueblo County, the types of applications in which drainage requirements are imposed include new or redevelopment of subdivisions, planned unit developments, rural land use plans, and special use permits.
- A drainage report and drainage plans may be imposed as a condition of approval for a special use permit. This depends upon the use covered by the permit and the specific characteristics of the site.
- There are basic guidelines and requirements for drainage reports and plans. The development will not block or impede flows that historically cross the site from upstream basins, and proposed onsite drainage facilities are adequate to convey drainage without property damage or safety risks. Developments will not result in a higher peak flow rate onto downstream properties.
- Drainage reports and plans are reviewed by the Engineering Division of the Public Works Department. Approval of the reports and plans by the Public Works Department is typically made a condition of approval for a particular land use application. The Public Works Department also imposes similar drainage requirements on new commercial and industrial developments via the access permit process.
- Pueblo County Public Works reviews and approves drainage reports, plans, and proposed facilities by using the following resources in review of drainage plans and reports: Storm Drainage Criteria and Drainage Policies for the City of Pueblo and Urban Storm Drainage Criteria Manual (prepared by Urban Drainage in Denver).

- Pueblo County also requires compliance with any formally adopted master drainage basin studies and collateralized subdivision improvement agreements guaranteeing installation of public improvements.

Questions and Answers

When the city does a drainage basin planning study, is the county incorporated?
Yes, there is serious discussion between the city and the county. There was an idea, initially, that the city and the county would adopt an enterprise, but it needs to have ballot approval. The city wanted a non-approval initiative, but it needs to be balloted.

Does the historic hydrograph requirement encourage developers to use metropolitan areas? Would it tend to bring more metropolitan areas into the county?
Outside of the two metropolitan areas, there is not much development within the county now and we are not anticipating much more. Subdivisions need water and sewers. To get water and sewers outside metropolitan areas, there would have to be an annexation into the city ,which entails applying or petitioning with the city.

A comprehensive plan was prepared in 2002. This included a policy to encourage the City of Pueblo to be maintained as the hub of the area. Currently there are only two metropolitan areas (created in the 1960's). New metropolitan development is not encouraged.

How is new metropolitan development discouraged?
Developers are told that the city does not want it new metropolitan districts. All these areas would need water or sewer; again developers would be encouraged to see if there are options for other areas.

Do you encourage enlarging the current metropolitan areas?
No, we do not.

Presentation: Brian Kelley (Colorado Springs)
- The City of Colorado Springs drainage policy includes the health, safety and welfare of the community. Drainage is considered by Colorado Springs to be a regional issue that affects all governmental jurisdictions, and the master drainage planning should be integrated on a regional level. In addition, it uses a Comprehensive Land Use Plan and includes a 5- and 100-year storm plan.
- The City of Colorado Springs requires a Drainage Planning Study (DPS). The DPS identifies facilities required to control the 100-year event, delineates sub-basins, and estimates costs of construction.
- The City of Colorado Springs requires a Master Development Drainage Plan (MDDP) when the phased development exceeds 10 acres. The MDDP has greater hydrologic and hydraulic detail and interfaces with the requirements established in the DPS. The MDDP also delineates rights-of-way required for drainageways and detention facilities.
- The City of Colorado Springs requires a Preliminary Drainage Report (PDR) for concept plans and non-phase concept plans. The PDR identifies and proposes specific solutions to

drainage and provides detailed analysis of hydrology and hydraulics (which is required). The PDR also provides improvements, located and sized, for both initial and major storms.

- The City of Colorado Springs requires a Final Drainage Report (FDR) prior to the final plan approval, which provides specific hydrology and hydraulic design. The FDR will provide the detailed analysis needed to complete construction plans for all drainage structures and includes grading, streets, and off-site facilities as applicable.
- The Subdivision Engineering Review Team (SERT) reviews all the development and drainage plans. SERT is a team of civil engineers and inspectors.
- The City of Colorado Springs has goals to comply with the Drainage Criteria Manual and to comply with the DPS for the basin and other studies. The City of Colorado Springs also has a goal to comply with all intended land uses and to have responsible/adequate conveyance and detention facilities. The implemented rules to achieve these goals include approval of the applicable level drainage study, inspection of facilities and sites, and financial assurances.
- The Drainage Criteria Manual for stormwater quantity establishes storm run-off methods of analysis and design criteria for streets, pipes, culverts, open channels, and detention storage.
- Policy changes are made by The City of Colorado Springs City Council. The City/County Drainage Board makes recommendations to the City Council, and the meetings are held on a monthly basis. All parties realize that new technologies, new drainage concepts, changes to drainage law, and intergovernmental agreements can affect drainage planning policies.

Questions and Answers

Is there a prudent line concept?
There is one in Cottonwood Basin. The prudent line concept will be determined in a basin-by-basin process.

Are there any detention alternatives?
The City of Colorado Springs is looking at historic release. In addition, the City is looking at smaller regional facilities and ones that reduce flow to the level that can be accommodated downstream.

Are you addressing the quantity of water that leaves the facility?
If a historic release is applicable, the City of Colorado Springs will release to the historic criteria. If there is no historic information available, the City of Colorado Springs will release to key.

Is there a requirement for the volume of water that comes off the watershed?
There is no requirement for volume reduction in the current policy.

What were the experiences of the facilities at Sand Creek?
There is only one facility that is completed (at Constitution Avenue). It is functioning and was properly installed in 2002. The facility is designed to reduce the peak flows to what the downstream main stem can handle, which is 240 acre feet at the detention basin. Several more facilities have been planned for up stream if they are needed.

How will you accomplish this?

The Federal Emergency Management Agency (FEMA) mapped the 100- and 500-year floodplains. The streamside ordinance will provide preservation corridors, and engineering will be used to determine if certain areas need to be preserved. The City of Colorado Springs is always looking to improve on what has been done. The Streamside Ordinance was adopted in late 2002, and this is the first major study where it will be used for the DPS.

Presentation: Dan Bare (El Paso County Department of Transportation)

- Stormwater quantity is defined by run-off, rainfall that causes flow, snowmelt, return flows, and ground water.
- The framework of stormwater management includes floodplain management, state law, and policy criteria. The goals of stormwater management are to operate on a regional basis, to protect the environment, and to provide an equitable basis for funding. The Land Development Code establishes how the county-wide plan would be implemented, identifies other documents, implements documents, and also identifies drainage basin fees.
- The Engineering Criteria Manual protects the natural systems via methodologies that are acceptable by the county.
- The Drainage Criteria Manual (DCM) includes both the 10- and a 100-year floodplains. The DCM works with regional detention and requires major consideration for floodplains and open space. The DCM requires "good channel design" and finds ways to apply hydrology methods.
- The Drainage Criteria Manual 2 (DCM2) deals with run-off reduction practices (but does not identify how that can be used for runoff downstream in the basin) and recognizes that there will be a need for stream stabilization.
- To implement the DCM and DCM2, there need to be flood insurance maps, drainage basin planning methods, a fee calculation from the county (based upon impervious acreage not just total acreage), and construction plans.
- The Department of Transportation completes and reviews the DPS.

Question and Answer

How do you address erosion and sedimentation?
Erosion and sedimentation are addressed in general terms. There are no specific guidelines on how that is to be done.

How is the fee schedule set up with the county?
The system was set up 25 years ago. A regional system would be the best approach. Developers pay into a fund (one for each basin) if they have to build improvements. If the improvement cost is greater than the fee, they get a refund. If not, they pay the difference.

Is there an established budget for major drainage maintenance?
There are no set aside funds. It is something the county has been struggling with. It is in the regular budget. The El Paso Department of Transportation would need to get revenue for stormwater projects. The immediate need is $45 million, and there is a total need of $100 million.

Additional Information on Permitting in the Watershed

Brief written notes provided by Ft. Carson

- Fort Carson does not require any special permitting in terms of water quantity and runoff controls beyond regulatory requirements at this time.

Brief written notes provided by the City of Fountain

- The City of Fountain has adopted the City of Colorado Springs Subdivision Design and Drainage Criteria Manuals by reference. As such, Development must detain flow to historic levels utilizing the 5-year and 100-year as key design storm events. The City of Fountain is now requiring full spectrum detention pond design with water quality features such as pre-sediment pools, outlet micro-pools and 70-hour excess urban runoff volume release rates. The City of Fountain is also requiring more implementation of low-impact BMP drainage impact improvements throughout the development rather than simply utilizing a single detention pond. Grading, Erosion & Drainage plans are reviewed by the Public works Director/City Engineer's office and a copy kept on site during construction. The City requires private drainage easements and detention basin maintenance agreements. The best way to change policies is by way of City Ordinance. The City of Fountain is currently updating our subdivision regulations. Drainage criteria standard modifications can be included with these subdivision regulation changes or done separately as part of a low-impact development ordinance.

Questions and Answers

How can this information be interpreted to learn the future effects on development in the Fountain Creek watershed?
Obviously there are problems in Fountain Creek. The Task Force is effective but there is more that needs to be done, including: creating best management practices (BMPs), education, keeping City Council aware, and keeping elected officials knowledgeable so that they can make good decisions.

How far back are you looking for the historical hydrology?
(From a participant) We generally look at the hydrograph of today—that becomes the historic hydrograph. If it is developed, developers have to make sure the hydrograph matches what it did at the beginning of their development work.

Isn't volume more important than peak flows?
If left unchanged, volume will continue to degrade the stream and the ecosystem.

Should we look at the issue of volume instead of peak flows?
Solutions for solving issues with Fountain Creek lie in the watershed. There has been a change because we increased instability in the watershed. One way of trying to maintain historic flows and reducing the instabilities would be low impact development (LID). LID helps to stabilize the channel and flow into Fountain Creek. There is no way to stop change in Fountain Creek.

<u>Next Steps</u>
It was agreed that the group needs a better understanding of the relationship between reducing runoff and downstream water rights. This information could help set boundaries on what the

Task Force can do, what it can change, and what it cannot change. It was decided that the next water quantity meeting should address this issue. Dan Henrichs and Bretty Gracely will work together on a balanced panel to discuss this issue.

Water Quantity Goals from Consensus Committee

The group reviewed and revised the water quantity goals drafted by the Consensus Committee. The group agreed that the following revised goals should be sent to the Consensus Committee for final review and approval:

- Regulate/control flows in watershed
- Mitigate existing and wisely manage future impervious surface area
- Stabilize sediment transport patterns
- Effectively manage return flows

Fountain Creek Vision Task Force
Water Quantity
May 24, 2007
Final Meeting Summary

Attending

Carol Baker, Dennis Caldwell, Stephanie Carter, Scott Cowan, Dennis Darrow, Wesley Eck, Danny Elsner, Stan Feddy, Mark Glidden, Bill Grasmick, Doug Fitzgerlad, Ferris Frost, Jane Green, Kim Headly, Dan Henrich, John Hill, Irene Kornelly, Carole Lange, Greg Langer, Dennis Maroney, David Mau, Bruce Miller, Rex Miller, Bob Miner, Julie Pearson, Cynthia Petersen, Gary Rapp, Lisa Ross, Herb Ryhner, Ken Sampley, Kirsta Scherff-Norris, Mark Shea, Don Steerman, Manny Torrez, Juan Trujillo, Alan Ward, Greg Williams, Tim Williams, Tom Williamsen, Jay Winner, Steve Witte, Niki Koszalka, and Heather Bergman

Action Items

Kim Headly and Doug Fitzgerald	Will help bring a panelist from Pueblo in regards to Southern Delivery System (SDS)
Carol Baker	Will help bring a panelist from Colorado Springs Utilities (CSU) and the federal sector in regards to SDS
Doug Fitzgerald	Will help bring a panelist from Pueblo West in regards to SDS

State of Colorado, Water Rights Division (Steve Witte)

- There is an interface between water rights and stormwater runoff control. There is no complete understanding of what the laws are. The purpose of this presentation is to add to the whole of the understanding. To administer, distribute and regulate the water of the Arkansas Basin is not something that can be done on a minute level.
- The subject of appropriation is an issue when dealing with water rights. It was built into the constitution. The Doctrine of Prior Appropriation covers how water is to be allocated. There was the assumption that there would not be a great deal of change in the amount of snow, rain, or hydrologic response to a given storm event. It was further

assumed that runoff would continue within the natural courses. The error in these assumptions is central to this discussion.

- When precipitation falls on undeveloped areas, the rain has to fill up low places first. A certain percentage of this water has to be detained. There are low-lying areas that have to be filled before there is runoff or any contribution to stream flow. About one third of an inch can fill the detention capability. If rain fell in an excess of half an inch per hour, it would fill up detention capability. The earth can absorb the precipitation at one half inch per hour. These detention numbers become less with the creation of impervious areas and runoff occurs faster from developed areas. When runoff is more rapid, the hydrologic response on a creek is more rapid. A hydrograph would show that a natural response would be slower, gradual and spread over time. Developed areas show more peaks in a hydrograph response curve.
- When there is infiltration, water goes into the soil-moisture profile and may be consumed by roots. This ultimately makes the runoff less. Once there has been infiltration, there can be a deep percolation that contributes to the groundwater table. This groundwater then contributes to stream flows (days, weeks, years) later depending on how far from the stream they are and what kind of earth they need to travel through. The difference in the hydrographical response creates the question of who is entitled to the flow that has been made available. The issue of why the water is available does not matter. The available runoff is to be allocated by the priority system. This is done by administrators, who daily look at the water supply from streams and allocate to the priorities of the water right holders. Peak flows go to senior water right holders and down the line to the lesser holders. Junior water right holders love the sharp peaks resulting from urbanization and development because they will have opportunities to come into water priorities that otherwise would not exist. Junior water right holders are entitled to runoff to the extent that it is available. It is not clear if part of their entitlement is minimized runoff control so that the water can be diverted. There is not entitlement to wasteful practices, nor is minimized control practiced necessarily entitled.
- Because this area is so dry, there is the temptation to harvest or collect such rainwater in rain barrels. The official stance of the state, from the state engineer's website, is that grey water and rainwater are waters of the state and are subject to appropriation. These waters are not to be collected or harvested. If you have not gone to court to get a water right, you are not entitled to it. If the predevelopment conditions are compared to the post development condition, some water went into infiltration and was consumed by the native vegetation. There was a natural condition for a fraction of that water to be consumed. If a barrel collected rainwater to water flowers, the flowers would consume some of that water and the rest would be infiltrated. This is the same as predevelopment and preserves the status quo to have some water consumed and the rest returned to the watershed. Perhaps the legal thinking and administrative process is not as mature on that point yet and there is the possibility of a mechanism to allow taking water out of priority. This would need a court order. This would help to explain to those with water rights that a rain barrel does not actually have an impact on their water.
- In terms of stormwater control, the objective ought to be to maintain predevelopment status quo regarding the hydrographic response. Developers are now required to have stormwater runoff structures, for control, that limit the runoff rates to levels more than the historic predevelopment condition of the 10 and 100-year storm. This methodology is to

preserve the flows that developed the stream channel and does not harm the water right owner. They are no worse off than they were when the water rights were established. Perhaps it takes away the windfall they experienced due to lack of stormwater control in the past. If a flood control criteria state is reached than the Army Corps of Engineers (ACE) takes over and attempts to pass the inflows as rapidly as possible without causing damage down stream.

- In 1948, Colorado entered a contract with the state of Kansas regarding the John Martin Reservoir for water conservation and retention. Any additional flood control reservoirs cannot deplete shares for Kansas. The operational objectives are to pass the inflow at the same incoming rate with non-damaging flows downstream. If there were a large dam on Fountain Creek, this issue would be much more complex. The dam would cause a change in the hydrology to the water upstream. There would need to be an agreement regarding how inflows would be passed through and not affect their entitlements to Kansas and local water right holders. Not receiving the historic amounts could be compromised if there is over control.

Questions and Answers:

You are not infringing on water rights if the predevelopment hydrographic response is mimicked?
No, there is not interference.

With water rights litigation being so precise, at some point, will developers need to prove that they are meeting historic numbers?
Yes, that very well could happen in the future. The laws are not mature on this subject.

Colorado and the west are unique in terms of water rights. What is the state of our water rights?
Colorado is more sophisticated and mature in thinking about water use issues. Colorado and most western states are delving into the minutia and flexibility regarding movement of water. Nevertheless, Colorado has not come to grips with all the complexities on the subject.

Stormwater management practices will not have an impact on junior water rights holders?
There is not an obvious conflict regarding junior water rights and stormwater management.

In addition, in the 1880's, when water rights were established, were there not runoff and flood events?
Yes, there were floods before there was development. Natural conditions include uncontrollable flooding.

Peaks in the hydrograph caused by development and removing trees, are these waters claimable?
An allocation system is set up to distribute water. If trees or phreatophytes (a deep-rooted plant that obtains water from a permanent ground supply or from the water table) are cut down, the "saved" water is to be allocated according to the priority system. If you increase the runoff rate or volume by paving or land development, that is to be allocated by the priority system.

In terms of rainwater harvesting, how would you perceive the engineering and proof that use was not expanding via evaporation?
In our system of laws, it has to be proved. The official position does make sense, you prove it in court that you are not expanding the use but merely maintaining that historical right.

Why are rain barrels different from the issue of removing trees and phreatophytes?
A water salvage operation from cutting down trees liberates water to the priorities. Water capture is an out of priority appropriation. It needs to be proven in a court of law that rain barrels feeding your lawn or plants are not different from infiltration at historic levels.

Bratton Hill LLC (John Hill)

- Fluvial geomorphology is the science that deals with the shaping of channels by water flow. The first principle is that nature determines the channel to carry the flow. Fountain Creek was shaped by the frequent recurring flows not the floods. The most energy is the frequent flows. Floods do not normally shape a channel. When impervious surfaces increase, the channel is not always capable of handing the increase in flow and volume.
- The Colorado Supreme Court decided that cutting down trees does not give the person cutting more water rights. Water is part of the river system, part of what was appropriated to the early settlers.
- Water rights and flood control do not have much to do with each other. There is no administering for storing water in a flood situation. There is a state appropriated area in Chatfield Reservoir for recreation. Chatfield Reservoir is a multi-purpose recreation center. Floodwater goes to the top. The flood control storage is let out right away. A flood on Fountain Creek could be damaging. If there was a proposed reservoir, it could catch the floodwater and then slowly release it. The only issue would be the delay in release.
- Constitutionally, there is a right to dig a ditch for water but not to open a head gate. In order to appropriate, there needs to be a permit. The Supreme Court upheld the need for a permit regarding wells.

Questions and Answers

Water cannot be detained for more than a 24-48 hour period. If water is pushed out too quickly, can someone downstream sue for damage that occurred to his property?
This would be looked at more as a trespass issue.

Group Discussion with Panelists

The historic hydrograph is anything that goes back to log in on the gage. Once the gage is in place, everything changes. It was determined that when the water rights were divided up, they were divided on a calculation from a wet year. Colorado divided more water than was available. A legal document would need to be drawn up and accepted to define historic hydrograph in chosen terms. There is a distinction between historical hydrograph and predevelopment. The historic hydrograph was based on what the previous records show. Perhaps a better approach would be to look at the predevelopment condition regardless of what kind of storm falls on it. The historic hydrograph annexation policy looks at the pre-developed state of the watershed. A developer must look at this before putting your infrastructure in. The peaks and volumes must be matched. Historic hydrograph, from an engineer's perspective is predevelopment. This may

not stand from a legal standpoint. Attempts can only be made to control the portion of the watershed that has yet to be developed.

There is not a great deal of difference between having one large wetland facility and multiple facilities. Storage times and release flows would need to be researched. Wetlands creation may be viewed as taking appropriable water out of the stream and would be considered non-beneficial consumption (evaporation). Research could be done on the Charles River in Massachusetts. Wetlands have been helpful regarding flood retention. If there were a created wetland, plants that consumed more water would need appropriations. There was a debate between Natural Resource Conservation Service (NRCS) and ACE regarding controlling water where it landed (#566). This could be useful for the Fountain Creek Vision Task Force. There is the need to augment for evaporation and different consumptive uses.

If there is federal money or permits, all EPA standards and regulations will need to be followed. This includes exploring the alternatives. Many channel improvement projects only move the flood downstream.

During the rain barrel discussion, there was no mention of size. This could be abused and there could be the implementation of a 1000 square foot water barrel. A 55-gallon barrel drum would be of a realistic size. It is an out of priority appropriation. This could be because there was historical consumption with the same precipitation.

The channel that you see today is not the only from the large floods, it is also from smaller flows over time. It would take a large reservoir to begin to contain a large flood and properly operate the criteria for all existing Colorado water rights downstream. It is unclear if the downstream water right holders would be satisfied if there were non-peak flows. If the timing of water is changed, than the ownership can change as well. With a fixed volume of water, different people will be allocated water for a certain period. If the time frames changes, so does the allocation. Timing is an essential factor for downstream junior water-right holders. A change in timing can make rights useless. The breaking point between retention and detention would have to be determined by the courts. However, courts do not answer hypothetical questions. There would have to be a lawsuit. In statute, erosion control dams are limited in their height and capacity but there are criteria that they are brought to two-acre feet in a half hour. Water right owners can hold water for 72 hours in a headwater.

It is important not to flatten out peaks because they are the livelihood of many people. There could be plans to augment the river when you can buy other water rights in the main stem and send them along to the junior water right holders. A flood control project in one place may have benefits but would harm the junior water rights holder. In conjunction with an engineer, other plans need to be developed that do not harm the main stem. Working with channel forming flows instead of flood flows may not make the junior water right holders feel more satisfied. If this was initiated, there could be an attempt by the junior water rights holders to stop it. Ditch owners and attorneys do not want to be obstructionists but they need to protect their water rights.

There is no right to the runoff water in Fountain Creek. This does not change the fact that the water does get used. If you match the historical hydrograph in terms of peak, volume and time,

there is no water rights issue. The issue relates to the existing development over the last 20 years and the lack of rights to the water from impervious areas.

The channel could be made more hydraulically efficient by controlling the amount of vegetation to determine where the flow would go. There are ways that this can be done in an esthetically pleasing way. New development and channel improvement need to be dealt with simultaneously. In terms of fluvial geomorphology, altering vegetation at the stream bank could create more negative issues than positive.

A half-inch or three-quarters of an inch of rain in Colorado Springs may vastly change the Arkansas River water rights. In the 1900's, water from a storm in Colorado Springs would make it back to the river via infiltration. With the current amount of impervious areas, Fountain Creek gets water so quickly that water rights are not hurt. The volume is not the same. There is greater water in a shorter amount of time.

Wetlands could be effective not only for flood control but also for source control. Creating wetlands does cause evaporation. There is no difference between rain barrels and wetlands. They are both out of priority depletion. The legal system forces that you ask the court if there is an injury to water rights holders.

In terms of the water quantity group of the Fountain Creek Vision Task Force, there has been discussion of different ways to detain waters and to keep flooding down. There needs to be an understanding of how to detain water and maintain the historic hydrograph. A group of engineers would be advantageous to determine if "x" happens, how much water will affect the system. Additionally Best Management Practices (BMP) that are verified by the state and attorneys, with out injuring water rights could prove helpful. It would also be helpful to discover if there is a way to formulate strategies that could meet the needs of other people.

Next Steps

SDS, sediment, erosion and stabilization are huge topics for Fountain Creek. It is imperative that this group hold a discussion on SDS. Kim Headly and Doug Fitzgerald will help bring a panelist from Pueblo. Carol Baker will assist in providing a panelist from the federal sector and from CSU. Doug Fitzgerald will also bring in a speaker from Pueblo West.

Fountain Creek Vision Task Force
Water Quantity Working Group
June 28, 2007
Final Meeting Summary

Attending

Carol Baker, Richard Bartels, Gary Bostrom, Dan Centa, Dennis Darrow, Mike Fink, Ferris Frost, Mark Glidden, Jaci Gould, Brett Gracely, Steve Harrison, Kim Headley, Linda Hobbs, Carole Lange, Marsha Looper, Dennis Maroney, David Mau, Deb Owings, Larry Patterson, Julie Pearson, Bruce Spiller, Jerry Pacheco, Ray Petros, Gary Rapp, Keith Riley, Don Saling, Richard

Skorman, Paul Thomas, Graham Thompson, Bill VanDerveer, Ross Vincent, Alan Ward, Tim Williams, Jay Winner, Chris Woodka, Niki Koszalka, and Heather Bergman

Action Items

Graham Thompson	Let Heather Bergman know who from USGS will help with the sediment transport presentation in August
Outreach Committee, USGS, and Heather Bergman	Work together to arrange a tour of Fountain Creek.

Presentations

Southern Delivery System (SDS): Colorado Springs Utilities (CSU) Perspective (Keith Riley and Gary Bostrom, CSU)

- In 1871, Colorado Springs had a population of 1,000. By 1930, the population had risen to 35,000. In 1942, the first water treatment plant was built. In 1953, there was a west slope delivery system for water treatment and the population rose to 45,000. During the 1960's, Colorado Springs collaborated with Aurora to bring water to Colorado Springs. The population was about 70,000. In the late 1970's and early 1980's, the population grew to 135,000 and started working with the Fryingpan-Arkansas Collection System, as well as Twin Lakes. Today, the population is about 400,000, and more water delivery is needed. CSU devised a Water Resource Plan that was adopted by City Council on March 20, 1996. Included in this plan were conservation and demand-side management, non-potable water development, improvements to the existing system, and the Southern Delivery System (SDS). Even with all of these functioning, it would still not meet the expected future need for water. SDS was compared to other delivery systems along the Arkansas River. In a worst-case scenario, by 2012 water would be desperately needed in the Colorado Springs area if no steps are taken to remedy the situation. This forecast was based on revenue and took into account more drought and development.
- In 2001, a single-family residential home would use 122 gallons of water per day. This is on the high end of the scale because the data was gathered prior to the drought. The project objectives for SDS are to ensure the needed quantity and quality of water to the Colorado Springs community. It is part of the goal to do this on time, at the optimum cost, and in an environmentally sensitive manner. The SDS charter will implement a water delivery system from the Arkansas River that provides a long-term water supply, utilizes existing water rights, and provides redundancy for existing delivery systems. Currently, the regional partners in SDS are the City of Fountain, the Security Water District, and Pueblo West (conditional partner depending on the source-water location).
- The formula to determine the size of the water system component has many variables, including the actual water supply and the demand from the community.
- The chain of events for SDS would be 1) gathering the water source into a regulated storage facility (Pueblo Reservoir), 2) conveying untreated water via a pipeline from Pueblo West to Colorado Springs, 3) storing the water and buffering for seasonal demand, 4) treating the water, 4) conveying the treated water, and 5) storing the treated water.
- The proposed alternatives include pipelines and pump actions, a terminal and exchange reservoir, and a treatment plant. The federal actions that trigger the National Environmental Policy Act (NEPA) are contracts for storage and conveyance at Pueblo Reservoir. The

regional activities needed for SDS are water partnership, intergovernmental agreements (IGAs), the Preferred Storage Option Plan (PSOP), and Fountain Creek activities.

- The current water partnerships are with the Pueblo Board of Water Works, the Aurora Homestake Project, the Fountain Valley Authority, the City of Fountain, Security, South East District, and the Colorado River District. The emerging partners are the City of Pueblo, Pueblo West, and the Lower Arkansas Valley Water Conservancy District.
- The IGAs are with Colorado Springs and the Pueblo City Council. These preliminary discussions occurred in 2003. The Arkansas River Preservation Principles (2003) are also included in the IGA. The three parties signed the IGA in March 2004. A six-party IGA was signed in May 2004 amidst regional IGA negotiations. These regional IGA negotiations addressed Pueblo's concerns of maintaining flows of the Arkansas. In addition to the Arkansas, there was discussion about keeping the flow in Fountain Creek and attempts to explore new ways to do business within the water community. It is important for people to know that there is a partnership process in the works.

Southern Delivery System (SDS): The Environmental Impact Statement (EIS) Process (Bill VanDerveer and Jaci Gould, US Bureau of Reclamation (BoR)

- The proposed federal actions that trigger NEPA are associated with the FryingPan-Arkansas Project, excess capacity contracts for Pueblo Reservoir physical connection to the Fry-Ark Facility, and conveyance and exchange contracts.
- The Bureau of Reclamation is the lead federal agency for reclamation. Some of the cooperating agencies are the Army Corps of Engineers (ACE), the US Fish and Wildlife Service, US Bureau of Land Management, the US Environmental Protection Agency. All of these agencies have regulatory responsibilities for the proposed action and have specialized expertise to offer.
- Part of an EIS is always the Alternatives Screening Process. This is based on purpose and need, impact evaluation, and mitigation. Elements of the NEPA process are public involvement, interagency coordination, process, and documentation. The objective for the Alternatives Screening Process is to develop alternatives for detailed analysis. The screening criteria are significant issues (logistical, technical, or environmental), relative environmental characteristics, purpose and need, cost, NEPA requirements and scoping issues. There are several hundred options for each component in the Alternatives Screening Process. The website for the EIS is www.Sdseis.com .
- BoR took hundreds of EIS alternative plans for SDS and narrowed them down to 162 complete alternatives. In the fall of 2005, there were seven alternatives identified in public meetings. In March 2006, the seven alternatives were selected for detailed evaluation. The seven EIS alternatives are as follows:
    - The "No action" alternative is what will most likely occur in the future without the major action by BoR.
    - In the "Proposed Action" alternative, untreated water would be stored in and diverted from Pueblo Reservoir, stored in a new reservoir on Jimmy Camp Creek, treated, and distributed to the participants' customers.
    - The "Wetland" alternative minimizes wetland acres that could be permanently disturbed and minimizes surface acres disturbed. Three is no return flow storage, and the return flow occurs upstream from Pueblo Reservoir.

- The "Arkansas River" alternative provides the highest minimum flow through Pueblo and withdraws water downstream, returning it upstream of Pueblo. It also minimizes the impact of water quality on the Arkansas River.
- The "Fountain Creek" alternative minimizes erosion, eliminates exchange releases down Fountain Creek, reduces water quality impacts, and avoids marine shale at one reservoir site.
- The "Downstream Intake" alternative is based on public interest in an alternative using an intake downstream of Fountain Creek.
- The "Highway 115" alternative is based on public and participant interest in an untreated water pipeline on Route 115.

❖ Indirect-potable reuse was a major component for Colorado Springs for the original No Action alternative. It was removed due to changes in early 2007.

❖ The SDS EIS water quantity studies have examined surface hydrology, flood hydrology, floodplains, the Denver basin groundwater, alluvial groundwater, and stream geomorphology. The SDS EIS water quality studies have assessed salinity, Upper Arkansas Basin, Lower Arkansas Basin/Fountain Creek, emerging containments, low flow analysis for permitted discharges, alluvial and Denver basin groundwater, Pueblo Reservoir, proposed return flow reservoir, Turquoise and Twin Lake Reservoirs, and Lake Henry and Meredith.

❖ The next steps are the Alternatives Analysis Addendum which should be released in July or August of 2007, preparation of the draft EIS in early 2008, public review and hearings, preparation of final EIS, and the Record of Decision to be signed by the regional director.

Questions/Answers

Would you please describe the scope of the decision that the Bureau of Reclamation is making?
The Bureau of Reclamation will prepare a draft EIS and identify a preferred alternative.

Has the analysis to date ruled out any relationship of increased return flows and sediment transport in Fountain Creek?
That analysis is not done yet.

Will the preferred alternative come off the Municipal Outlet in Pueblo? Are there other uses of that outlet and other pipelines?
CSU plans to use the joint outlet recognizing that there are more requests and need than there is capacity. The pipeline would also connect to the north river intake and help with redundancy.

What is the cost for SDS?
The first phase will cost $593 million (2006 dollars). The costs will go up with inflation.
What is the cost of enlarging Pueblo Reservoir?
The cost to enlarge Pueblo Reservoir has not been re-estimated since 2002. At the time, it was more cost effective to enlarge an existing reservoir rather than build a new one.

Why is the age of the existing infrastructure a problem for redundancy?
There could be failures on pipelines and there could be land that slides and buckles on the line. In the last 3 or 4 years, there have been major outages along the existing infrastructure. There are continually issues with maintenance, rehabilitation, and/or natural forces.

Has the delay in the ACE study on Fountain Creek affected the SDS EIS?
The best information available needs to be used in order to make good decisions about SDS. There has not been a delay specifically because of the ACE study. ACE has been helpful in the SDS process.

SDS: Pueblo County Perspective (Ray Petros, Petros & White)

- Pueblo County does not have a position regarding SDS, because there has been no application submitted or public discussion. Pueblo County is attempting to anticipate what may come up in the 1041 process. The 1041 process was legitimized in 1974 when the state legislature thought it necessary to give local governments regulatory power over water projects. This allows a county to require a permit for work involving site selection of new and large municipal water and sewer systems and to make sure that water projects are efficient (including reuse). In 2004, the 1041 regulations were updated. Pueblo County designated efficient use of municipal water and sewer projects for 1041 permits. CSU filed a lawsuit against Pueblo County charging that SDS should be exempt from 1041. Pueblo County enacted its right to 1041, because it had concerns about SDS and wanted to generate discussions and studies about a dam on Fountain Creek. Because of the 1041 litigation, there have been no county meetings to discuss SDS. We know from the litigation that there is a proposed 20-mile long pipeline that would run through Pueblo County. Pueblo County has not been informed what information was studied to generate these alternatives, nor has it been informed of any impacts that have been taken into consideration. Pueblo County does not have the information needed to formulate an opinion.
- SDS would potentially bring in 80,000-acre feet of new water into Colorado Springs. That is 50% larger than the Fry-Ark project.
- The concerns of Pueblo County, at this time, are:
    - Fountain Creek already has too much water in it, but CSU wants to build a pipeline through Pueblo. It would seem to be a better option to use the excess from Fountain Creek. It is also an option to change or reverse the systems and build storage on Fountain Creek to help with the high flow and to regulate flows.
    - Pueblo County wonders if the SDS money could be better spent on addressing water supply, flood control, stormwater management, and recreation. It would be terrific to see a multi-purpose water project. There is interest in knowing the impact of the pipeline, if there are any alternatives to spend money better, and if there are ways to minimize effects to Pueblo. In regards to a multi-purpose water project, alternatives should look at ways to harness the water that comes down Fountain Creek, keep it local, and build in redundancy as well. There could be an emergency check dam on Fountain Creek, sending it to an off-channel detention facility. Alternatively, there could be one or more small reservoirs along Fountain Creek to keep the water locally. Theses ideas are meant to trigger discussion.

Question/Answer

What are Pueblo County's thoughts on Senator Salazar's comment about a dam?
Senator Salazar's proposal was that he would like to see a study to determine if there is feasibility for a multipurpose water project. It is important to see these studies so that the idea

either can stay on or be removed from the table. The options are to enlarge Pueblo Reservoir, a possible reservoir along Fountain Creek, or something on Turquoise Reservoir. The Senator is open and willing to hear from the communities involved.

SDS: Pueblo West Perspective (Don Saling, Pueblo West Metropolitan District)

- The biggest issue of SDS is the cost and service to the community of Pueblo West. The current population is 31,268; seven years ago, it was under 16,000. Ninety-nine percent of its water comes from Twin Lakes on the western slope. The water is deposited into Pueblo Reservoir. Pueblo West has no water storage rights.
- There are 12 million gallons per day (mgd) going to Pueblo West. There is only one pipe serving the Pueblo West community. The pump station can convey 20 mgd, and so can the wastewater treatment facility. If Pueblo West reaches its population capacity, it would need 30 mgd. The pipe has been laid to provide the need for 30 mgd but there are restrictions as to how much water they can get. It is necessary to be able to get more water to the residents of Pueblo West. There are issues for water quality when you take water out of a river, including higher costs in terms of water treatments. The best and most cost effective choice would be for water to not come out of the river.
- The Pueblo West taxpayers realized that to pay for the delivery of 30 million gallons per day, the best thing to do is to tie in with SDS. They realize that the pipeline will come through their community. This will not be a major disturbance other than during the initial construction.

Questions/Answers

What is the build-out of Pueblo West in terms of rates and impacts to people that live there?
The build out for Pueblo West is 50,000 to 60,000 people. It is a friendly community, but those in Pueblo West do not like neighbors too close. Rates have been raised by 32% recently and are reasonable compared to other communities in the area. Pueblo West received a $6 million bond for improvement of the wastewater facility.

Will Pueblo West eventually have to withdraw water out of the river regardless of SDS?
Yes. When SDS is incorporated, the water coming out of the river will serve as redundancy. There will be a request for proposal (RFP) for the river pump station.

What percentage returns to the Arkansas?
Returning to the Arkansas is 13% and 87% does not, except for infiltration, return.

Group Discussion

- These discussions have reinforced the concept of determining how much water we want to see in Fountain Creek. The range of flows that is considered ideal for Fountain Creek needs to be determined. There could be many studies that need to be done to determine if flows should be at some certain number. This will need lots of technical information. It is important to note that even if Pueblo SDS does not go forward, the community will still grow. This issue will have to be dealt with at some point.
- Bringing water into the basin will encourage growth. It will also underscore the need to be careful as to how the watershed is developed. This will cause instabilities not only in Fountain Creek but also in the tributaries. Due to the vision of the Fountain Creek Vision Task Force, there needs to be awareness of development in the watershed.

- There will be impacts on Fountain Creek due to growth. Through the EIS, some of the incremental impacts of SDS have been quantified. There is a further need to know how much more before it is decided how to deal with it.
- To a significant extent, all these issues are wrapped up in a never-ending cycle. There needs to be a clearer picture of what the Task Force wants Fountain Creek to look like. This information could help Pueblo and Colorado Springs, in terms of development, and could shape what SDS alternative is to be chosen. The Task Force can weigh in on the EIS that BoR is doing. BoR is willing to see or read a report that is submitted. It would be best to have all input to BoR by the end of September. The Task Force needs to give BoR its vision. Perhaps it would be possible to find an alternative that matches the Task Force vision. If BoR does not get the information at the right time, they will not hold up the process waiting for something from the Vision Task Force. The timeline is to receive technical information by September 30, 2007 and the Task Force vision by the end of December 2007.

Next Steps

- The group decided to table discussion of SDS for the time being.
- The group will begin to discuss sedimentation at its next meeting. Graham Thompson will coordinate a presentation to the Working Group that seeks to answer the following questions about sedimentation:
  - How does development affect sediment transport?
  - How does sediment affect flooding and risks to property?
  - How does flooding affect water rights?
  - How does flooding affect bank stabilization?
  - How much sediment is in Fountain Creek and where is it coming from?
  - If we want to reduce sediment, how could we do this?
  - What benefits does sediment have downstream?
- The group discussed the need for a field trip to visit key areas of the watershed. It was agreed that USGS should coordinate with Heather and the Outreach Committee to plan a field trip that includes, where possible, visits to USGS monitoring stations.