



MEETING MINUTES
BIG DRY CREEK WATERSHED ASSOCIATION MEETING

Tuesday December 6, 1:00-3:00 p.m.

Broomfield Water Treatment Plant

4395 W. 144th Avenue

- I. **Big Dry Creek North Area Tributaries Public Meetings/Status**—Jane Clary announced that the next public meeting for the “Big Dry Creek North Area Tributaries Outfall Systems Plan Update,” which is being sponsored by UDFCD, the City and County of Broomfield, City of Thornton, Adams County and the City of Westminster, will be held on December 12, 10:00-12:00 in Thornton and provided an agenda. These meetings are open to the public and BDCWA stakeholders are invited to participate. To be placed on the mailing list or e-mail list for the North Area Tributaries Update, please notify Jane Clary (303-480-1700 or clary@wrightwater.com). For more information on the project, go to www.bigdrycreek.org/northareatribsupdate.

- II. **AWARE Colorado Presentation**—Cynthia Peterson provided a presentation on “Connecting Land Use and Water Quality for Local Officials.” The presentation was provided to the group as a potential tool to take back to local government staff and elected officials to improve awareness of water quality issues and tools to help reduce water quality impacts associated with urbanization. (Note: The presentation was consistent with work completed by the BDCWA earlier in the summer on the importance of reducing impacts associated with development by techniques such as minimizing directly connected impervious area.) Highlights of the presentation included:
 1. The project was developed by the League of Women Voters and is funded by the Colorado Department of Public Health and Environment through the U.S. EPA (319 program).
 2. AWARE’s goal is to inform community leaders about the impacts of land use decisions on water quality and give them the tools to protect water resources.
 3. Cynthia provided an overview of impacts of urbanization including pollutant loads and hydrologic impacts.

4. Tools that can help reduce impacts of urbanization highlighted by AWARE include:
 - a. Minimizing directly connected impervious area.
 - b. Conducting a natural resources inventory to identify areas in need of protection.
 - c. Collaborating on a watershed scale.
 - d. Planning and zoning strategies (e.g., cluster development, buffers/setbacks, overlay zoning, PUDs).
 - e. Transportation/Infrastructure approaches (e.g., “Low Impact Development” techniques, swales, porous landscape detention in parking lots, driveway/cul-de-sac designs, porous pavement).
 - f. Landscaping choices (e.g., using native or Xeriscape plants with lower fertilization/irrigation needs, saving/amending topsoil, increasing tree cover, roof gardens).
5. Cynthia provided a CD containing AWARE tools and contact information. She would be glad to give a similar presentation to any of the local governments involved with the BDCWA.

III. **Selenium Issues on Big Dry Creek**—Jane Clary provided an update on selenium source identification on Big Dry Creek. Highlights included:

- Plotting of groundwater, in-stream, lake and wastewater sample locations on a surficial geologic map and/or review of available well completion data indicate that most of the elevated selenium concentrations are associated with Upper Cretaceous (TKda, KI) bedrock formations, which are expected to be the naturally occurring source of selenium in the watershed.
- Groundwater concentrations are roughly six times in-stream concentrations. Some ponds and reservoirs in areas with surficial outcrops of Upper Cretaceous formations also show elevated selenium.
- There is not an upstream to downstream trend for selenium; however, concentrations at bdc1.5 are significantly higher than all other locations on the creek, which do not vary significantly from each other. This sampling location is located in an un-irrigated open space area upstream of both the wastewater discharges and agricultural influences. The source of selenium in this reach is hypothesized to be groundwater high in selenium. This hypothesis is supported by data from two wells in the open space between Front Range Community College and the stream that show high selenium.

- Statistically significant seasonal variation exists on the stream with the highest selenium concentrations present during the non-irrigation season (low flows) and the lowest concentrations present during the irrigation season. Seasonal variation is most pronounced at the three locations between Standley Lake and the Broomfield WWTP discharge. There is less variation downstream of the WWTPs due to the more constant flow conditions associated with the WWTP discharges.
- Selenium concentrations from the WWTPs are below the underlying stream standard on average with the 85th percentile around the stream standard. Occasional elevated concentrations of selenium from the WWTP discharges are hypothesized to be due to infiltration/inflow (I/I) into the sanitary sewer system and possibly sump pumps connected to the sanitary system. Once again, the underlying source is expected to be naturally occurring selenium in Upper Cretaceous bedrock formations in the watershed.
- Analysis of the extensive Rocky Flats groundwater and surface data as contained in the final RI/FS released in October 2005 clearly show high selenium concentrations in groundwater in the Upper Hydrostratigraphic Unit (consisting of various alluvial and colluvial formations and weathered claystone from Upper Cretaceous formations) at many locations on the site. Since Rocky Flats is not irrigated, these data support the theory of naturally elevated selenium in the watershed. Surface water concentrations at Rocky Flats were below the stream standard, but this is expected to be due to the relatively low groundwater contribution to the streams and dilution from the Rocky Flats WTP flows, among others.
- Correlation analysis of selenium concentrations and fish index of biologic integrity (IBI) scores did not show a statistically significant relationship. Additionally, multiple species of fish continue to live and reproduce on Big Dry Creek in spite of selenium concentrations slightly to moderately above the stream standard. At the site with the highest selenium concentrations, (bdc1.5) ten species native to the South Platte River basin are present, including at least one pollution-intolerant species.
- Limited fish tissue analysis shows that fish tissue concentrations on Big Dry Creek would be expected to exceed the proposed fish tissue-based chronic standard for selenium. Additionally, speciation of several in-stream selenium samples showed that the biologically available form of selenium (selenate) appears likely to be the predominant form in the creek. This is consistent with pH conditions measured on the creek.
- Dissolved selenium is not believed to be due to sediment-laden runoff based on a statistically insignificant correlation between dissolved selenium and TSS.

- Dissolved selenium and sulfate concentrations on the creek are positively correlated ($r=0.85$). This is important since sulfate affects the bioavailability of selenate and is included as a factor in EPA's proposed acute criterion for selenium.

IV. **Next Meeting**—The next meeting will be held in March 2006, but an exact date has not yet been scheduled.

Please contact Jane Clary at (303-480-1700) or clary@wrightwater.com with any questions. If you would prefer to receive meeting notifications by e-mail, please e-mail your request to clary@wrightwater.com.

V. Meeting Attendance

Last Name	First Name	Organization Name
Carter	David	City of Westminster
Clary	Jane	Wright Water Engineers, Inc.
Fabisiak	Mary	City of Westminster
Hand	Brittney	City of Thornton-Water Quality
Hargadin	Kelly	City of Thornton
Hronich	Greg	Adams 12 Five-Star Schools
Julian	Lesa	City of Broomfield-Wastewater Reclamation Facility
Lucero	Vic	City of Thornton
Mahan	Hallie	City of Broomfield-Environmental Lab
McKee	Bill	Colorado Water Quality Control Division
Meyer	David	City of Westminster
Cynthia	Peterson	AWARE Colorado