BIG DRY CREEK

STATE OF THE WATERSHED

Annual Newsletter of the Big Dry Creek Watershed Association

December 2011 Volume 13

Big Dry Creek 2010 Water Quality Review

A key focus of the Big Dry Creek Watershed Association (BDCWA) is annual assessment of water quality conditions in Big Dry Creek. In the spring of each year, BDCWA uploads the results of the instream water quality monitoring program into a long-term water quality database and compares the results to applicable water quality standards for Big Dry Creek. Findings are documented in an annual water quality memorandum that is presented and discussed at the March BDCWA public meeting and then posted to the BDCWA website. This brief article highlights some of the key findings of the 2011 water quality analysis, which included samples collected and analyzed during 2010 by staff from the City and County of Broomfield and the Cities of Northglenn, Thornton, and Westminster.

In 2010, water quality samples were collected and analyzed for a variety of constituents, resulting in over 3,600 records being added into the BDCWA water quality database. Metals were monitored on a quarterly basis with the exception of selenium, which was monitored monthly. All other constituents were monitored on a monthly basis.

The Cities and BDCWA also fund operation of the U.S. Geological Survey (USGS) gauging station at Westminster behind Front Range Community College. A clear understanding of the hydrologic regime on Big Dry Creek is important due to its significant effect on pollutant loads and instream concentrations. During 2010, the May, June and July sampling events were influenced by wet weather conditions, with the May event including snowmelt. The June, July, August and September events were conducted during conditions when Standley Lake was releasing flows to Big Dry Creek.

Big Dry Creek in Weld County.

Assessment of Big Dry Creek water quality data shows that the main stem of Big Dry Creek will continue to be listed as impaired on the 2012 303(d) List for Colorado for non-attainment of stream standards for *E. coli* and selenium. (This was also the case for the 2008 & 2010 303(d) Lists.) The 2010 Big Dry Creek data are consistent with these listings, showing attainment of all currently applicable standards with the exceptions of selenium and *E. coli*. A brief synopsis of these two issues follows. See the Annual Water Quality Analysis 2010 Technical Memorandum for more detailed discussion of overall water quality in Big Dry Creek (www.bigdrycreek.org/reports.php).

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Inside this issue:

All Watershed Association general membership meetings are open to the public.

Meetings are generally held on a quarterly basis in March, May, September and December.

For More Information on the Next Watershed Meeting, contact Jane Clary: 303-480-1700 or visit our website: www.bigdrycreek.org

The Big Dry Creek Watershed Association is a 501(c)(3) corporation.

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Selenium

Portions of Big Dry Creek have had elevated selenium concentrations for many years, resulting in special studies by BDCWA to develop a better understanding of selenium sources. As a result, at the December 2007 Colorado Water Quality Control Commission Rulemaking Hearing, irrigation and non-irrigation season site-specific standards were assigned to Big Dry Creek. The 2010 Big Dry Creek data set meets the non-irrigation season (winter) chronic and acute standards and the irrigation season acute standard; however, the 2010 irrigation season data slightly exceed the chronic irrigation season standard. When considering the last five years of data (2006-2010), the stream does not attain the chronic irrigation season standard by a small margin of 0.5 ug/L.

Instream selenium concentrations are influenced by the flow regime at the time of sample collection, which is the basis for the irrigation and non-irrigation season standards. When Standley Lake is not releasing water to Big Dry Creek, instream flows in the upper watershed are typically dominated by groundwater inflows, which are known to have high selenium concentrations due to the geology in the area. The months of April and October are "fringe" months with regard to irrigation releases from Standley Lake. Patterns of irrigation releases during these months appear to have a significant effect on attainment of the stream standard.

E. coli

Big Dry Creek is classified as a "Potential Primary Contact" stream for recreational use. As a result, a numeric standard of 205/100 mL for *E. coli* (fecal indicator bacteria) is in place. During 2010, Big Dry Creek did not meet the *E. coli* standard using current Colorado Water Quality Control Division (Division) assessment procedures. *E. coli* exceeds the stream standard during the recreational season bimonthly evaluation periods of May-June, July-August and September-October.

A Total Maximum Daily Load (TMDL) process has been initiated by the Division and the U.S. Environmental Protection Agency (EPA) for Big Dry Creek with regard to *E. coli*. BDCWA is working cooperatively with the Division and EPA to ensure that the most complete and scientifically sound data set and assumptions are used in this process. Special studies related to sources of *E. coli* in the watershed were conducted by Wright Water Engineers and BDCWA during 2007 and 2008 and provided to the Division. A draft TMDL is anticipated during 2012.

A few noteworthy observations related to *E. coli* in the Big Dry Creek Watershed include:

- Based on review of geometric mean concentrations from 2006-2010, *E. coli* concentrations are consistently the lowest in grab samples from the Broomfield and Westminster wastewater treatment plant (WWTP) discharges.

- Dry weather investigations of storm sewer outfalls in Westminster and Broomfield resulted in identification and correction of one illicit sanitary connection in 2007. No other dry weather *E. coli* sources associated with stormwater outfalls were identified during these special sampling efforts.

- As a result of "ruling out" wastewater discharges and dry weather storm sewer discharges as causes of elevated *E. coli* in Big Dry Creek, wildlife is expected to be the primary source of *E. coli* in the Big Dry Creek urban area under dry weather conditions. Other contributions may include domestic pets in the watershed. Residents can help reduce potential contributions from pets by properly collecting and disposing of pet waste throughout the watershed and particularly in the Open Space along Big Dry Creek.

- In the lower watershed, both wildlife and agricultural land uses are expected to contribute to elevated *E. coli* in the stream.

Conclusion

The BDCWA monitoring program continues to be a vital, comprehensive source of information related to water quality in Big Dry Creek. For the latest information on Big Dry Creek water quality, you are invited to attend the March 2012 BDCWA meeting.

Colorado Nutrient Criteria Rulemaking Slated for March 12, 2012

The Colorado Water Quality Control Division (Division) has provided public notice of proposed nutrient criteria for Colorado. The notice includes over 50 pages of proposed criteria and explanatory information for the Colorado Basic Standards (Regulation 31) and a new Nutrient Management Control Regulation (Regulation 85). As a general synopsis, these two regulations serve the following purposes:

1. Establish interim numeric criteria for total phosphorus (TP), total nitrogen (TN) and Chlorophyll-a for streams and lakes. (Regulation 31 updates)
2. Establish numerical effluent limitations for domestic wastewater treatment plants and other wastewater dischargers that use active treatment and are likely to have significant levels of nutrients in their discharges. It also describes steps to be taken by other point source dischargers and nonpoint sources to address nutrients. (Regulation 85)
3. Establish monitoring requirements for point source dischargers and a program aimed at monitoring surface waters for nutrients and related parameters. This effort is geared towards better characterizing nutrient sources, and current nutrient conditions, to help inform future regulatory decisions regarding nutrients. (Regulation 85)

In the proposed statement of basis and purpose, several important statements are made regarding unique aspects of the rulemaking and proposed regulation, including these statements:

- The Commission has decided to depart from its usual practice of adopting numerical table values in Regulation #31 and then, in subsequent hearings to review individual basin standards, broadly applying those values as segment-specific water quality standards throughout the State. Instead, the Commission is focused on primary control efforts over the next decade using a technology-based approach. However, there are also provisions identifying limited circumstances where the interim numerical values being established may be applied in the adoption of segment-specific water quality standards during the next ten years. No new or revised water quality standards are established by this current rulemaking action.

- The Commission is not determining in this proceeding that it is necessary or appropriate to adopt these numerical values as water quality standards for any specific water bodies. The Commission has labeled these values "interim" to emphasize its intent to undertake further review of the evolving science regarding nutrients before applying numerical nutrient standards broadly to surface waters throughout Colorado. These values will be subject to review in subsequent triennial reviews.

- The Commission does not intend that the numerical nutrient values set forth in sections 31.17(b), (c) and (d) will be used directly as a basis for identifying impaired waters to include

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Fast Facts for Colorado Nutrient Criteria

Basic Facts

- Basic Standards and Methodologies for Surface Water, Regulation #31 (5 CCR 1002-31) (revisions)
- Nutrients Management Control Regulation, Regulation #85 (to be codified at 5 CCR 1002 -85) (new)
- Website: http://www.cdphe.state.co.us/op/wqcc/Hearings/Rulemaking/Nutrients/Nutrients.html

Rulemaking Hearing Timeline

- November 21, 2011: Water Quality Control Division's Proposal Posted
- December 9, 2011: Proponents Prehearing Statements Due
- December 20, 2011: Party Status for Hearing
- January 20, 2012: Responsive Prehearing Statements
- February 22, 2012: Rebuttal Statements
- March 12, 2012: Rulemaking Hearing

Broomfield WWTF Upgrades Complete

The Phase 2 Expansion of the Broomfield Wastewater Treatment Facility (WWTF) has been successfully completed ahead of schedule and under budget. The WWTF is now a 12-million-gallon-per- day (MGD) treatment facility with biological nutrient removal designed to meet current wastewater treatment standards. The facility provides biological nutrient removal through an integrated fixed film activated sludge (IFFAS) process. Ultraviolet (UV) disinfection results in consistent attainment of *E. coli* discharge permit limits. The expansion/upgrade project broke ground in January 2007 with a projected completion date of September 2011. The project was completed several months ahead of schedule in January 2011.

The May 2011 BDCWA meeting was held at the Broomfield facility, with Chief Wastewater Operator Anthony Tuka giving a special tour to BDCWA participants, including guests from sister watershed organizations (SPCURE and Barr Milton). The water quality benefits of this upgrade are clearly demonstrated in the annual water quality analysis results for Big Dry Creek, particularly with regard to phosphorus reduction.
For more information on the Broomfield facility, see: http://www.broomfield.org/wastewater/.

Participants in the May 2011 tour of the Broomfield WWTP.

Volunteers Remove Russian Olive

In September, both Broomfield and Westminster hosted Russian olive removal projects in various parts of the watershed. In the Westminster Open Space, Russian olive removal and planting of 100 native trees was accomplished with the support of a $9,000 REI grant. Volunteers included Westminster City Council members, youth, residents and the Broomfield United Methodist Church Green Team. In Broomfield, volunteers from the Mile High Youth Corps helped with Russian olive removal at several locations in the watershed. The City and County of Broomfield plans to follow up with planting of native buffalo berry shrubs. Although in the short run, watershed residents may wonder why the trees have been cut, this will benefit the riparian corridor in the long run.

Once thought to be a beneficial windbreak tree, ecologists have since determined that Russian olive is detrimental to the environment. Although it provides a plentiful source of edible fruits for birds, ecologists have found that bird species richness is actually higher in riparian areas dominated by native vegetation. Russian olive is designated as a "List B" species in the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local infestations.

The Colorado Department of Agriculture reports that the key to effective control of Russian olive is preventing establishment of the trees or shrubs. If plants are already present, the most effective combination of control efforts has been identified as cutting the trees, followed by either spraying or burning the stumps. "Cut-stump" treatments that are applied during the winter months, using an approved herbicide, appear to be effective. After cutting, trees can be immediately treated with herbicide on the open wound.

For more information visit www.colorado.gov/ag/csd and click on the Noxious Weed Management Program. Or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Big Dry Creek Leadership On the Move

Over the past 15 years, BDCWA has benefited from the dedication and leadership of many individuals who have helped the organization emerge from a fledgling watershed group to a stable 501 (c)(3). BDCWA would like to recognize the following individuals who have been active in the leadership of BDCWA.

Vic Lucero, Water Quality Administrator for the City of Thornton, served on the BDCWA Board from 2004 to 2005. Vic is retiring from the City of Thornton in December after 20 years of service. In addition to service to BDCWA, Vic has also served on the Board for South Platte CURE, the Barr Milton Watershed Association and the Colorado Monitoring Council, as well as other organizations. BDCWA wishes Vic well in his upcoming retirement.

Shelley Stanley, Water Quality Coordinator for the City of Northglenn, has served as the Chairperson of BDCWA since 2006. She is passing the torch to Lesa Julian, City of Broomfield, but will continue serving BDCWA as Vice-chairperson. Shelley has played a key role in helping BDCWA secure stable funding and prioritize important water quality efforts during a challenging economic climate. During Shelley's tenure as Chairperson, key technical efforts have included special studies regarding *E. coli* on Big Dry Creek and representation of Big Dry Creek during development of the Barr Milton TMDL. BDCWA thanks Shelley for her service to the organization.

Lesa Julian, City of Broomfield, is the newly elected Chairperson of the Big Dry Creek Watershed Association. Lesa has participated in BDCWA since its inception and has a detailed understanding of the Big Dry Creek water quality monitoring program, including field sampling and analysis issues. Lesa also has first-hand experience in nutrient reduction at WWTP facilities, through her experiences with the City and County of Broomfield WWTP upgrades. BDCWA thanks Lesa for taking on new responsibilities with BDCWA.

Mary Fabisiak, Water Quality Administrator for the City of Westminster, has served as coordinator of the Nutrient Criteria Work Group of the Colorado Water Quality Forum. This voluntary group has worked with the Colorado Water Quality Control Division in developing draft nutrient criteria for the State of Colorado, which were released for public notice in November, with a rulemaking hearing scheduled for March 2012. This has been a challenging endeavor, with significant effort required to balance a variety of perspectives considering factors such as source water protection, wastewater treatment economics, EPA nutrient criteria, stormwater and nonpoint source issues, recreational and aquatic life interests and other factors. BDCWA thanks Mary for her service to the State of Colorado.

A Blast from the Past

During the 1990's students from Merritt Hutton Jr. High/Thornton Middle School participated in a series of archaeological surveys and sponsored events in conjunction with Colorado Archaeology Awareness month in the Big Dry Creek drainage. The area surveyed was within the Westminster Open Space, with the permission from the open space manager. The surveys and Archaeology Awareness Month events were supported by staff from the Colorado State Office of Archaeology and Historic Preservation.

The survey located 16 sites on the terraces along Big Dry Creek. One was a multi-component site with a "historic dump." The students followed professional methods and techniques locating and recording the sites, with copies of the reports provided to the Westminster Open Space manager and filed with Colorado State Office of Archaeology and Historic Preservation.

Artifacts observed included fire-cracked rock, ground stone, lithic debitage, utilized flakes and formal tools. Artifact locations were mapped and then collected, with the collection curated at the Westminster Historical Society.

This technical note was contributed by Westminster resident John Bridges.

Rocky Flats News

U.S. Department of Energy (DOE) staff and its contractors played a significant role in the formation of the Big Dry Creek Watershed Association. Since decommissioning and decontamination of the site in 2005, these staff have stepped out of leadership roles in BDCWA; however, water quality related efforts at the site continue, including monitoring and other activities.

The DOE Office of Legacy Management (DOE-LM) is conducting the third Five-Year Review of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Remedy for the Central Operable Unit (OU) at the Rocky Flats Site. The purpose of the review is to ensure the CERCLA remedy remains protective of human health and the environment. The remedy for the Central OU consists of environmental monitoring, physical controls and institutional controls. The Five-Year Review report is required to be completed September 14, 2012.

The review will answer these questions: 1) Is the remedy functioning as intended? 2) Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) still valid? and 3) Has any other information come to light that could call into question the protectiveness of the remedy? An overview of this review process was presented by DOE-LM at the September 12, 2011, meeting of the Rocky Flats Stewardship Council meeting.

For more information on Rocky Flats, visit the DOE LM Rocky Flats Site website: http://www.lm.doe.gov/Rocky_Flats/Sites.aspx.

Major Drainageway Planning Update

The Big Dry Creek Major Drainageway Planning and Flood Hazard Area Delineation (FHAD) study is nearing completion, focusing on the main stem of Big Dry Creek from the Standley Lake dam to the Weld County line. The study area includes parts of Westminster, Thornton and Adams County and is sponsored by these entities in conjunction with the Urban Drainage and Flood Control District. Portions of the City and County of Broomfield and Jefferson County are also in the study area.

This challenging study integrates multiple drainage planning reports and FHADs completed over the past 30 years (1979-2007) and updates the hydrology to reflect existing and future conditions. As of December 2011, the majority of this effort has been completed, including a Baseline Hydrology report, a Flood Hazard Area Delineation (FHAD) report, Alternatives Analysis, and a Selected Plan. A Conceptual Design Report based on the Selected Plan is expected by year-end.

Among other improvements, recommendations are provided for the culvert at the Union Pacific Railroad (UPRR) crossing near Colorado Boulevard. The UPRR crossing is undersized, which creates a large, upstream backwater area. The Conceptual Design proposes to increase the conveyance capacity of the crossing by constructing a "bathtub" spillway. The bathtub spillway would consist of two 120-inch-diameter pipes through the embankment at invert elevations similar to the existing 120-inch-diameter culvert. A weir wall would be constructed upstream of the two new culverts with a crest elevation at or above the top of the existing culvert so that frequent flows would continue to pass through the existing culvert. During flood events, the weir would allow flow to enter the two additional culverts, providing additional conveyance through the embankment.

Union Pacific Railroad culvert near Colorado Blvd.

To download these drainage-related reports, go to: http://www.bigdrycreek.org/majordrainageplan/index.html.

(Nutrient Criteria , Continued from page 3)

on Colorado's Section 303(d) List. In the limited circumstances where these numeric values are used prior to 2022 as the basis for adopting site -specific numerical water quality standards, those adopted numerical standards would be used as the basis for listing decisions.

The initial nutrient values for phosphorus and chlorophyll *a* adopted in this regulation would not be used for the adoption of water quality standards for specific water bodies in Colorado prior to May 31, 2022, except as described below. Tables 1 through 3 provide the proposed nutrient criteria, with "Rivers and Streams - Warm" being the relevant category for Big Dry Creek.

During the initial period of implementation, the initial nutrient values for **phosphorus** and **chlorophyll *a*** would be used for the adoption of water quality standards for waters located above significant point source discharges with preliminary effluent limitations issued prior to May 31, 2012. These values would also be used to adopt standards for protected water supply lakes and reservoirs. The proposed regulation also reserves the right for the Commission to make a policy determination to use the interim nutrient values to adopt standards in certain other unanticipated circumstances, as well.

The initial nutrient values for **nitrogen** would not be used for the adoption of water quality standards for any specific water bodies in Colorado prior to May 31, 2017. From May 31, 2017 to May 31, 2022, these nitrogen values would be used for the adoption of water quality standards for specific water bodies only in limited circumstances.

In Regulation 85, proposed effluent permit limits for existing wastewater treatment facilities include annual median effluent limits of 1 mg/L for total phosphorus and 10 mg/L for total inorganic nitrogen, with 95th percentile values also specified. There are also provisions providing exceptions, variances, compliance schedules, nutrient trading, economic criteria, etc., that are not summarized in this short article.

Stormwater discharge permits and non-point sources of nutrients are also addressed in the regulation, including requirements for stormwater monitoring and a "data gap assessment" for stormwater sources.

Table 1. Proposed Interim Phosphorus Values

Lakes and Reservoirs, cold, >25 acres	20 ug/L[1]
Lakes and Reservoirs, warm > 25 acres	80 ug/L[1]
Lakes and Reservoirs, <=25 acres	RESERVED
Rivers and Streams - cold	110 ug/L[2]
Rivers and Streams - warm	170 ug/L[2]

[1] summer (July 1-September 30) average Total Phosphorus (ug/L) in the mixed layer of lakes (median of multiple depths), allowable exceedance frequency 1-in-5 years.
[2]Annual median Total Phosphorus (ug/L), allowable exceedance frequency 1-in-5 years.

Table 2. Proposed Interim Nitrogen Values (Effective May 31, 2017)

Lakes and Reservoirs, cold, >25 acres	410 ug/L[1]
Lakes and Reservoirs, warm, > 25 acres	850 ug/L[1]
Lakes and Reservoirs, <=25 acres	RESERVED
Rivers and Streams - cold	1,250 ug/L[2]
Rivers and Streams - warm	2,010 ug/L[2]

[1]Summer (July 1–September 30) average Nitrogen (ug/L) in the mixed layer of lakes (median of multiple depths), allowable exceedance frequency 1-in-5 years.
[2]Annual median Total Nitrogen (ug/L), allowable exceedance frequency 1-in-5 years.

Table 3. Proposed Interim Chlorophyll *a* Values

Waterbody type		Direct Use Water Supply
Lakes and Reservoirs, cold, >25 acres	8 ug/L[b]	5 ug/L[c]
Lakes and Reservoirs, warm, > 25 acres	20 ug/L[b]	
Lakes and Reservoirs, <=25 acres	RESERVED	
Rivers and Streams - recreation	150 mg/m^2 [a]	

[a]mg/m^2 chlorophyll *a* of attached algae, not to exceed.
[b]Summer (July 1- Sept 30) average chlorophyll *a* in the mixed layer of lakes (median of multiple depths).
[c]March-November average chlorophyll *a* (ug/L) in the mixed layer of lakes (median of multiple depths), allowable exceedance frequency 1-in-5 years.

What is the Big Dry Creek Watershed Association?

The Big Dry Creek Watershed Association (BDCWA) is a non-profit corporation consisting of individuals and entities who dedicate time and resources to developing a sound scientific understanding of water quality, flow, aquatic life and habitat conditions in the Big Dry Creek watershed and act to improve these conditions.

The Big Dry Creek Partnership, which included the City and County of Broomfield, the Cities of Northglenn and Westminster, and Rocky Flats Environmental Technology Site (RFETS), founded the BDCWA in 1997. These entities have been heavily involved in monitoring stream conditions for many years. Since 1997, the Association has expanded to include representatives from other cities, counties, farmers, ditch companies, citizens and regulatory and resource agencies. The BDCWA is open to those interested in cooperatively working towards understanding and prioritizing efforts to improve basin conditions.

In 2004, the BDCWA formed a non-profit corporation with a Board of Directors currently consisting of representatives of the Cities of Westminster and Northglenn, the City and County of Broomfield, Weld County and Adams County. Activities of the BDCWA during the last fourteen years have been funded through the contributions from these entities, as well as the City of Thornton, U.S. Department of Energy, the Woman Creek Reservoir Authority, the Colorado Water Conservation Board, the U.S. Environmental Protection Agency's 319 program (as administered by the Colorado Department of Public Health and Environment) and the Regional Geographic Initiative grant program.

For more information on the Big Dry Creek Watershed Association, please visit the BDCWA's web page at www.bigdrycreek.org or contact Jane Clary, Watershed Coordinator, Wright Water Engineers, Inc., 303-480-1700 or clary@wrightwater.com.

BIG DRY CREEK

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