



## **JANE KEES CLARY**

### **ENVIRONMENTAL SCIENTIST**

#### **CURRENT**

Environmental scientist with broad experience in watershed management; water quality protection and evaluation; database management water quality data analysis; stormwater management; water resources management; water conservation; and water/wastewater master planning. Comprehensive technical writing experience in each of these subject areas. Extensive experience in public speaking and large group facilitation of technical projects.

#### **EDUCATION**

M.S., Environmental Science, 1992  
University of Colorado

B.S., Economics, 1989  
Magna Cum Laude, Phi Beta Kappa  
Vanderbilt University

Continuing Education: Civil engineering coursework in water rights and hydrology at University of Colorado (1993-94); OSHA 40-Hour Training

#### **REGISTRATION**

Registered Real Estate Appraiser--State of Colorado AR01326120

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#### **REPRESENTATIVE PROJECTS**

**Big Dry Creek Watershed Association (1997-present).** Project Manger serving as watershed coordinator for the Big Dry Creek Watershed Association since 1997 on behalf of the cities of Broomfield, Westminster, Thornton and Northglenn and Weld County, Colorado. Routine activities include development and maintenance of an extensive water quality database in the SIM format; use of Microsoft Access and Excel for data storage and analysis; annual presentation of findings regarding water quality; development and distribution of annual newsletter; development and maintenance of the Big Dry Creek website; facilitation of quarterly membership meetings and biannual Board meetings; preparation of grant applications; and other routine communication. Worked with steering committee to complete multiple technical reports including the Lower Big Dry Creek Hydrologic Study (2005), technical memorandum on exploration of selenium sources in the watershed (2005), the Big Dry Creek Watershed Management Plan (2002), the Big Dry Creek Stream Survey (2000) hydrologic report, an Integrated Analysis of Biological and Water Quality Conditions (1999 with 2001 update), and a Summary of Existing Conditions (1998) to document the watershed baseline conditions. Helped develop a field-based short-course on stream channel assessment for use by city staff who conduct monthly monitoring along the creek. Also mentored three CSU engineering students on two different senior design projects to further characterize hydrologic characteristics in the rural portion of the watershed.

**Denver Storm Drainage Criteria Manual.** Currently working with the City and County of Denver engineering staff to streamline and update Denver's Storm Drainage Criteria Manual. Key activities include integration of water quality and construction site requirements, including frequently observed problems at development sites. Tasks also include comparison of criteria to rules and regulations with recommendations for updates. Serving as project coordinator and technical editor.

**Denver Water Quality Management Plan.** Worked with a diverse consultant team and multi-departmental advisory committee representing the City and County of Denver to develop a water quality management strategy to enable better implementation of stormwater quality management permit requirements. Primary responsibility was characterization of key issues across city departments, summary of regulatory drivers, research of case studies around the country, identification of relationship to other key planning documents and regional efforts in the Denver area, and overall coordination and technical editing of the final report.

**Big Dry Creek North Area Tributaries Outfall Systems Plan Update.** Serving as project coordinator on drainage plan update for the Urban Drainage and Flood Control District, the cities of Broomfield, Westminster and Thornton, and Adams County. Responsibilities include meeting facilitation, communication, website development and maintenance, existing and future land use estimation, alternatives development and evaluation and water quality issues.

**Urban Storm Drainage Criteria Manuals.** Served as technical editor for the update of the Denver Urban Storm Drainage Criteria Manuals, Volumes 1 and 2.

**Springfield, Missouri Storm Drainage Criteria Manual.** Co-authored several chapters in the Springfield Drainage Criteria Manual with emphasis on policy, planning, and water quality. Additional focus was given to riparian buffer width determination.

**International Stormwater Best Management Practices (BMP) Database.** Serving as the project team coordinator for an international stormwater BMP database project funded by a broad coalition of professional organizations headed by the Water Resource Environment Federation and supported by the U.S. EPA. Key responsibilities have included development of database software to track BMP monitoring and evaluation efforts, developing the user's guide for the software, writing press releases and articles about the project, and regular correspondence with interested parties throughout the nation.

**GreenCO BMP Manual and Training Program.** Developed a comprehensive water quality and water conservation BMP Manual for the Green Industries of Colorado. Thirty-one BMPs related to landscaping, irrigation, nursery production practices, etc., were completed in a fact-sheet format for use by GreenCO's nine member industries and the public. In a follow-up project, a comprehensive training program based on the manual was developed working with a steering committee. The training course included course materials, testing, and strategy for implementing the training program.

**GreenCO and HBA Water Conservation.** Worked with the Homebuilders Association of Metro Denver, the Built Green Program, GreenCO, Denver Water, and several area homebuilders to improve the state-of-the-practice with regard to landscape water conservation in the homebuilding industry. Developed a series of articles published in Homebuilder Magazine on various water conservation topics, lectured at Builder Product Night, taught the landscape water conservation module at the Built Green University and reviewed the Quality Construction Manual used by the HBA to identify updates related to water conservation. Project funded by the Governor's Office of Energy Management and Conservation.

**Arapahoe County Water and Wastewater Authority (ACWWA).** Developed a technical report addressing the water quality impacts of wastewater discharges upstream of a shallow alluvial aquifer providing drinking water to several communities. Prepared water systems master plan and nonpotable water plan addressing issues such as water demand projections, system components, cost estimates, and nonpotable system feasibility issues. Prepared wastewater discharge permit application, wastewater treatment facility site application, and 201 wastewater facilities plan.

**Philips Farm, Missouri.** Helped develop a water quality management strategy and plan for a development in an area with community concerns regarding impacts of development on two streams. Primary responsibilities were related to structural and non-structural BMPs and review of covenants.

**City of Lincoln, Nebraska.** Researched practical approaches for developing stormwater utilities and effective erosion and sediment control practices. Assisted in development of a Master Drainage Plan and Drainage Criteria Manual

**Standley Lake.** Developed water quality monitoring plan for the proposed Standley Lake Park. Recommended BMPs to help protect water quality from impacts of recreational usage.

**Colorado Non-Point Source Council BMP Manuals.** Working with advisory committees, developed two manuals on BMP guidelines: one for use in the golf course industry and one for use when constructing driveways in mountainous areas. Both projects funded by U.S. EPA through 319 Non-point Source grants and supported by the Colorado Non-point Source Council and Denver Regional Council of Governments. The manuals specify sets of BMP that are most appropriate for golf courses and mountain driveway construction and were developed with input from advisory committees consisting of interested parties. The manuals have been widely disseminated to local governments, golf courses and forestry organizations throughout Colorado. Both projects are included in the Non-point Source Council's "Ten Years of Success" publication.

**Use Attainability Analysis.** Completed a Use Attainability Analysis on Big Dry Creek for purposes of supporting a determination of whether a Recreation Class 1 or 2 standard was appropriate for the creek.

**Greenwood Village.** Inventoried and measured dimensions of drainage structures throughout Greenwood Village to compare existing structures to existing Master Plan.

**Copper Mountain Resort, Colorado.** Assisted in preparation of comprehensive water quality protection plan for Copper Mountain Resort, including specific recommendations (which were implemented) for protecting water quality in West Tenmile Creek (high quality trout stream) during construction projects.

**Keystone, Breckenridge, Copper Mountain, Vail, Winter Park and Silver Creek ski resorts and L.G. Everist, Inc.** Assisted in review and refinement of Northwest Colorado Council of Governments (NWCCOG)-proposed water quality standards for the NWCCOG jurisdictional area. These standards addressed such topics as stormwater quantity and quality management, erosion and sediment control, wetlands protection, protection of hydrologic balance, hazardous materials management, sensitive watershed development, etc. A key focus was on development of criteria for riparian and wetland buffers.

**Rocky Flats Interim Measures/Interim Remedial Action (IM/IRA) Plans.** Helped complete several IM/IRA plans at the Rocky Flats Environmental Technology Site. For the Pond Water Management IM/IRA, evaluated and integrated surface water quality data pertinent to management of multiple drainage ponds at the former nuclear weapons production facility. After data analysis was completed, assisted in evaluation of pond water management alternatives. In support of an IM/IRA for the Industrial Area of Rocky Flats, evaluated surface water quality, identified contaminant transport pathways in surface water and provided recommendations for a surface water monitoring program for the Industrial Area.

**Gore Creek Watershed Committee.** Assisted with the development of the Gore Creek Watershed Committee. Involved writing a white paper, researching case studies of watershed management groups throughout the country and possible sources of funding to support the group.

**RAC Transport.** Developed stormwater management plan and spill prevention control and countermeasures plan for trucking facility.

## OTHER EXPERIENCE

**AT&T Bell Labs, Denver (1993).** Coordinated statewide, non-profit Colorado Environmental Action Exchange program. Involved partnering government agencies, community groups, and businesses with schools to implement environmental projects and launching a statewide public relations campaign, including monthly newsletter.

**Environmental Protection Agency (1992).** Office of External Affairs. Internship in community involvement, Superfund Branch. Updated Community Relations Plan for a mining-related Superfund site in Colorado. Wrote press releases, assisted in community interviews, and reviewed the site's risk assessment results.

## PUBLICATIONS (AND PROFESSIONAL PRESENTATIONS)

Clary, J.K., Jones, J.E., Strecker, E.S., and M. Quigley. 2006. "International Stormwater BMP Database Moves Forward," *Civil Engineering News*, February (at press).

Clary, J.K. 2005. "Findings of the Lower Big Dry Creek Hydrologic Study." Colorado Association of Stormwater and Floodplain Managers, Steamboat Springs, CO September (powerpoint provided in proceedings).

Clary, J.K. 2005. "Success and Challenges in Planning and Implementing Watershed Approaches" (focus on Big Dry Creek and Selected National Efforts), Colorado Water Quality Forum Annual Retreat. June 27-28, Breckenridge, CO (Invited Speaker).

Clary, J.K., Calomino, K. and J. Wilson. 2005. "Homebuilders Work Toward Landscape Water Conservation," *Stewardship Across Landscapes: 21st Century Smarter Growth Conference*, Denver, CO, April 18 – 20, 2005 (invited speaker).

Clayshulte, R., Clary, J. and T. Steele. 2005. "Colorado's Watershed Cookbook: Recipe for a Watershed Plan." (Watershed Plan Development Training Course). Colorado Nonpoint Source Forum, Glenwood Springs, Colorado. September (invited instructor/ course materials in notebook).

- Farahmandi, S., B. Urbonas, A. Sorrel, T. Christianson, J.E. Jones, and J. Clary. 2005. "City and County of Denver Storm Drainage Criteria Manual Update." *Proc. Colorado Association of Stormwater and Floodplain Managers Annual Conference*, Steamboat Springs, CO, September 21-23, 2005.
- Jones, J.E. and J.K. Clary. 2005. "Positive Signs for American Watersheds in 2005." Prepared for February 2005 Meeting of American Water Resources Association in Tucson, Arizona regarding National Water Policy Dialogue (invited speaker).
- Jones, J.E., Earles, T.A., Fassman, E.A., Herricks, E.E., Urbonas, B. and J.K. Clary 2005. "Urban Stormwater Regulations—Are impervious Area Limits a Good Idea?" *Journal of Environmental Engineering*. American Society of Civil Engineers. February.
- Baus, T., Jones, J. and J. Clary. 2004. "Development of Water Quality Management Plan (Part 1): Vision Overview and Process," Proceedings of *High Water-Low Budgets, Colorado Association of Stormwater and Floodplain Managers*, Glenwood Springs, CO. September.
- Clary, J., M. Figurski and B. Urbonas. 2004. "Updated Findings of the ASCE/USEPA National Urban Stormwater BMP Database," Proceedings of *High Water-Low Budgets, Colorado Association of Stormwater and Floodplain Managers*, Glenwood Springs, CO. September.
- Clary, J.K. 2004. "The Role of Landscaping in Water Quality and Water Conservation Efforts," Colorado Watershed Assembly Annual Conference, Glenwood Springs, CO. (invited speaker)
- Clary, J.K. 2004. "GreenCO Update: GreenCO Develops BMP Training, Promotes Water Budgeting," *Colorado Green Magazine*. Summer.
- Clary, J.K. 2004. "So What is Water Budgeting?" in "On the Waterfront" column. *Homebuilder Magazine*. May.
- Clary, J.K. and K. Calomino. 2004. "Survey of Homebuilders: How Interested Are Builders in Landscape Water Conservation?" in "On the Waterfront" column. *Homebuilder Magazine*. June.
- Clary, J.K. 2004. *Citizen's Guide to Water Conservation*. Provided three sidebar articles included in the guide including: "Over-watering Can Damage Residential Foundations," "Homebuilders Offer Water-Efficient Landscapes," and "Green Industry Promotes Water Quality and Efficiency." Colorado Foundation for Water Education.
- Clary, J.K. 2003. "Selecting the Right BMP for the Job," in *Tools for Your Shed, Colorado Nonpoint Source Forum*, Glenwood Springs, CO. September 10. (invited speaker).
- Clary, J.K. 2003. "Importance of BMPs as Components of Watershed Protection, Using Phase II," in *Working with the Water We Have, Colorado Watershed Assembly*, Glenwood Springs, CO. September 11-12. (invited speaker).
- Crane, D. and J.K. Clary. 2004. "HBA Builders Promote Water Conservation with Three Case Studies, in "On the Waterfront" column. *Homebuilder Magazine*. April.
- Clary, J.K. and Green Industries of Colorado BMP Advisory Group. 2002. Green Industry Best Management Practices (BMPs) for the Conservation and Protection of Water Resources in Colorado. *Proc. 10<sup>th</sup> National Nonpoint Source Monitoring Workshop*, Breckenridge, CO.

- Clary, J.K., J.M. Kelly, J. O'Brien, J.E. Jones, and M. Quigley. 2001. National Stormwater Best Management Practices Database: A Key Tool in Helping Communities Meet Phase II Stormwater Requirements. *Stormwater Magazine*. March/April.
- Clary, J.K., B. Urbonas, J.E. Jones, E. Strecker, M. Quigley, and J. O'Brien. 2001. Developing and Evaluating a Stormwater BMP Effectiveness Database. *Proc. Novatech 2001 4<sup>th</sup> International Conference on Innovative Technologies in Urban Drainage*. Lyon, France, June 25-27, 2001.
- Strecker, E., M. Quigley, B. Urbonas, J.E. Jones, and J.K. Clary. 2001. Determining Urban Stormwater BMP Effectiveness. *Journal of Water Resources Planning and Management*. 127 (3): 144-149.
- Clary, J.K. and the Big Dry Creek Watershed Steering Committee, 2001. "Big Dry Creek Watershed Association Develops Sound Scientific Understanding of Stream Conditions through Joint Monitoring Effort," Proceedings, *The Future of Water Quality Monitoring in Colorado: Collaboration, Cooperation, and Communication*, A Joint Conference Sponsored by the Colorado Section of the American Water Resources Association and the Colorado Water Quality Monitoring Council, March 15-16, 2001, Mt. Vernon Country Club, Golden, Colorado
- Clary, J.K., J.E. Jones, J. O'Brien, B. Urbonas, E. Strecker, and M. Quigley. 2000. "Development of National Stormwater BMP Database." Southeast Stormwater Manager's Conference, Orlando, FL. June 28. (invited speakers)
- Clary, J.K. 2000. Big Dry Creek Watershed: Applying an Integrated Approach to Watershed Planning Based on Analysis of Biological, Chemical and Physical Data." *Proc. ASCE Watershed Management 2000 Conference*, Fort Collins, CO.
- Clary, J.K., B. Urbonas, and J. O'Brien. 1999. "Development of National Stormwater BMP Database." *Proc., 26<sup>th</sup> Annual ASCE Water Resources Planning and Management Conference*, Tempe, AZ.
- Jones, J.E., J.K. Clary, and T. Brown. 1999. "Urban Stormwater Management Institutions for the 21st Century" in *Development of Methodologies for the Design of Integrated Wet-Weather Flow Collection/Control/Treatment Systems for Newly Urbanizing Areas, Volume 1: Technical Report*. Published by the U. S. Environmental Protection Agency Wet Weather Flow Program in Edison, New Jersey and the U. S. Environmental Protection Agency National Risk Management Research Laboratory at the Office of Research and Development in Cincinnati, Ohio.
- Clary, J.K. 1998. "Big Dry Creek Watershed," Course Notebook for Introduction to Watershed Planning, Colorado Association of Soil Conservation Districts, Estes Park, CO, November 17. (invited speaker)
- Clary, J.K. and W. Lorenz. 1998. "Big Dry Creek Watershed Progress," Proceedings, *71<sup>st</sup> Annual Meeting of the Rocky Mountain Section of the American Water Works Assoc and 61<sup>st</sup> Annual Meeting of the Rocky Mountain Water Environment Association*, Snowmass Village, CO. September 13-16. (abstract only)
- Wright, K.R., C. Crowley, and J.K. Clary. 1998. "Erosion Control on 12,000-Foot Independence Pass." *Erosion Control*, September/October.
- Brown, E.W., J.E. Jones, and J.K. Clary. 1997. "Criteria for Variable-Width Mountain Stream Buffers" *Aesthetics in the Constructed Environment - Proc. of the 24th Annual Water Resources Planning and Management Conference*. ASCE, Houston, Texas. April 6 - 9.

- Clary, J., J.E. Jones, and E.W. Brown. 1997. "Stormwater Management for Municipalities: Challenges and Solutions." *Proc., Seventh Southern States Environmental Conference and Exhibition*, Biloxi, MS.
- Brown, E.W., J.E. Jones, J.K. Clary, and J.M. Kelly. 1996. "Riparian Buffer Widths at Rocky Mountain Resorts." *Proc., Effects of Watershed Development and Management on Aquatic Ecosystems, Engineering Foundation Conference*, Snowbird, UT.
- Jones, J.E., J.K. Clary, E.W. Brown, and J.M. Kelly. 1996. "Riparian Corridor Protection and Rocky Mountain Resorts." *Proc., A National Symposium: Assessing the Cumulative Impacts of Watershed Development on Aquatic Ecosystems and Water Quality*, Chicago, IL.
- Jones, J.E., J.M. Kelly, J.K. Clary, and E.W. Brown. 1996. "Colorado Regulations for Preserving Riparian Corridors." *Proc. of the Colorado Association of Stormwater and Floodplain Managers Conference*. Vail, Colorado. September.
- Lorenz, W.F., J.K. Clary, and N. Wright. 1996. "Indirect Potable Reuse of Wastewater Effluent: Controversies in Watershed Management." Presented at the Rocky Mountain Section Meeting of American Water Works Association, Steamboat Springs, CO.
- Tomback, D.F., J.K. Clary, J. Koehler, R. Hoff, and S.F. Arno. 1995. "The Effects of Blister Rust, An Introduced Disease, On Post-Fire Regeneration of Whitebark Pine: Case History--The Sundance Burn of Northern Idaho." *Conservation Biology*. April.