The Droplet

Florida Water Environment Association
Integrated Water Resources Committee

May 2011 Volume 3 Issue 2

Committee News & Information

This issue of *The Droplet* focuses on the Florida Water Resources Conference (FWRC) that was held earlier this month at the Gaylord Palms Resort and Convention Center in Kissimmee. Therefore, the technical articles presented herein are authored by some of the presenters of the Integrated Water Resources track completed at the FWRC. Additionally, the Integrated Water Resources Committee (IWRC) would like to recognize the recipient of the Annual IWRC Award presented at the FWEA Award Luncheon at the FWRC.

The IWRC presented its Annual Award for 2011 to Ms. Cammie Dewey, P.E., of the St. Johns River Water Management District (SJRWMD). The award is presented to individuals and organizations for outstanding contributions to the water resources profession in Florida. Ms. Dewey is the Director of the Division of Surface Water Management at the SJRWMD. She has 22 years of experience with the SJRWMD, which includes nearly 17 years in regulation and 5 years on the Lake Apopka Restoration Project. She specializes in site-hydrology, stormwater runoff and stormwater runoff treatment mechanisms and water quality. She has helped design and oversee projects being built for the Lake Apopka Restoration Project.

Lastly, committee elections are held in conjunction with the FWEA Annual Meeting held each year at the FWRC. Leslie Turner takes over as the new Chair for the committee for year 2011-12. Gabe Retana is the new Secretary, Leslie Gowdish is the Treasurer, and Susan Gerena the Website Chair. We thank Liz Bartell for her leadership and hard work as the committee Chair for 2010-11.

To become an official sponsor of *The Droplet* or to consider becoming a member of the IWRC, please visit our website at http://www.fwea.org/ or Saurabh Srivastava (Srivastava@pbworld.com).

Stormwater Harvesting as an Alternative Water Supply (AWS) in Volusia County

In support of an AWS plan for Volusia County Utilities, the feasibility of harvesting stormwater from Deep Creek and Lake Ashby was evaluated as a potential solution to meeting the projected 2030 potable water demand deficit of 7.5 mgd AADF. Both surface waters are located in south-central Volusia County, within the central portion of the Deep Creek basin and in close proximity to areas of future predicted growth. The evaluation focused on the optimization of the beneficial use of stormwater harvesting without infringing upon established environmental constraints in the basin. The conceptual feasibility of using a county-proposed property located in the vicinity of Deep Creek and Lake Ashby to construct a reservoir for storing water from these two sources was evaluated. As an alternative to the reservoir, aquifer storage and recovery (ASR) was evaluated to determine the extent that ASR can be applied at the site. The surface water withdrawals are proposed to supplement limited groundwater supplies traditionally used by the County. Managing the conjunctive use of these sources will result in improved water availability and reliability. The proposed AWS plan consisting of two storage options (reservoir or ASR wellfield) was integrated into the 2010 Water Supply Plan update being prepared for the region by the SJRWMD. This plan replaces less desirable water supply alternatives for Volusia County included in previous water supply planning efforts adopted by the SJRWMD.

AUTHOR: Lena Rivera, P.E., D.WRE, is a Project Manager with CDM in Maitland, FL. Email: riveral@cdm.com

Aquifer Recharge through Direct Injection – What do we need to know about geochemistry?

Based on their potential to address many water management issues, aquifer recharge projects are increasingly being incorporated into water resource management programs. Recharge projects have the potential to address many water management issues, including declining groundwater levels, saltwater intrusion, declining or seasonally variable surface water supplies, environmental opposition to surface reservoirs, storage and treatment of stormwater and reclaimed water, increasing concerns regarding global climate change, the need for large-scale water storage, and more fully integrated water resource management. Historically, the emphasis for developing aquifer recharge projects has been on characterizing the factors that control the inflow, outflow, and movement of water in the aquifer system. As a result, geologic and hydraulic factors that affect feasibility of aquifer recharge programs are becoming better understood, even in complex settings. What is less understood, but critical to success of aquifer recharge projects is the potential for undesirable water chemistry changes which can be induced upon the mixing of source and native waters of different character. These chemical changes can include formation of precipitates and potential aquifer plugging and reactions which cause desorption or dissolution of inorganic constituents, often present in minute quantities, that ultimately lead to water quality degradation (Mirecki, 2006 & 2004; Arthur et al., 2003 & 2001; Welch, 1999).

Groundwaters are complex aqueous solutions, having different dissolved solid and gas phases present. There are a number of factors that control the chemical state of these phases, including temperature, pH, redox potential, and biogenic activity. The interaction of these factors must be understood to design, permit and develop aquifer recharge systems that minimize the potential for adverse geochemical reactions.

Ultimately, direct recharge projects have the potential to solve many challenging long-term water supply issues. However, these projects are not without risk, and there is significant value in reaching beyond the traditional tools that have been used in planning these projects. There are a number of excellent geochemical modeling tools available to project designers, and these should be used during the planning stage of a direct recharge project to identify project risks and also as a means for evaluating engineering solutions that can be implemented to manage those risks.

AUTHOR: Jason M. Mills, P.G., is a Geologist with CDM in Maitland, FL.
Email: millsjm@cdm.com

Reclaimed Water ASR in a Shallow Coastal Aquifer

The Canaveral Port Authority (CPA) is located on the east coast of Florida on a barrier island system just north of the City of Cape Canaveral and the City of Rockledge. The CPA maintains the port, which is home to several worldclass cruise lines, charter fishing enterprises, fuel storage, and an international trade zone. Improvements to landscaping in the CPA required that additional groundwater would be needed for supplemental irrigation. The CPA had been purchasing potable water from the City of Cape Canaveral to irrigate the current landscaping, but estimated that with the additional landscaping, a total of approximately 100,000 gpd would be needed. Purchasing that quantity of potable water from the City would have been very costly, and the City would have had to modify their consumptive use permit to receive an additional allocation from the SJRWMD. The CPA and SJRWMD supported the idea of storing reclaimed water from the City of Cape Canaveral in the surficial aquifer, and recovering it during the time when additional irrigation water is needed. The project was the first of its' kind where the potential ASR zone was in the surficial aquifer. Geotechnical test data collected since the 1960s provided lithologic data and an indication of the zones where reclaimed water could potentially be stored and recovered. An exploratory well construction permit from the FDEP was received and an extensive hydrogeologic investigation, including lithology and groundwater quality, was initiated. This included the construction of a production well and several monitor wells to conduct testing of the shallow aquifer system. The FDEP authorized the injection and recovery of potable water into the production well and monitoring of water levels and water quality in the surficial aquifer. After cycle testing, the resistivity survey clearly showed the limits of the injected water as well as the flow path and shape of the freshwater. Based upon that data and analysis, additional groundwater monitoring wells were constructed well away from the storage zone and groundwater quality sampling was conducted to determine if arsenic detections

(Continued to Page 3)

Calendar of Events

Date	Description
June 6, 2011	IWRC Meeting Teleconference
July 5, 2011	IWRC Meeting Teleconference
August 2, 2011	IWRC Meeting Teleconference
September 6, 2011	IWRC Meeting Teleconference

(Continued from Page 2)

were naturally occurring or if arsenic mobilization was created by the storage and recovery of potable water. Tide gaging was also implemented to determine the impact of tide changes on the surficial aquifer water levels and if those tidal changes had any influence on the arsenic concentration in the background and/or ASR test wells. It was found that the change in arsenic concentration is related mostly to tidal changes and that the injection and recovery of potable water had no impact on arsenic concentrations. The CPA is waiting to proceed with this project until other regulatory issues can be resolved.

AUTHOR: Charles Drake, P.E., is a Vice President with Tetra Tech in Orlando, FL. Email: charles.drake@tetratech.com

Officer Contact Information

Chair: Leslie Turner
turnerla@cdm.com

Vice Chair: [Vacant]

Secretary: Gabriel Retana
gretana@brwncald.com

Treasurer: Leslie Gowdish
lcgowdish@pbsj.com

Website: Susan Gerena
sgerena@interfloweng.com

Newsletter: Saurabh Srivastava
srivastava@pbworld.com