American Water Resources Association
2017 International Conference: Cutting-Edge Solutions to Wicked Water Problems
September 10-11, 2017
Tel Aviv University, Tel Aviv, Israel

Monday, Sept. 11
15:30 – 17:00
SESSION 12: Improving Water and Land Management Through Modeling, Managed Aquifer Recharge, and Regional Cooperation

Improving Rangeland Management Models with Ecohydrologic Connectivity - Benjamin Turner, Texas A&M University-Kingsville, Kingsville, TX, USA (co-author: S. Nelson)

Systems analysis has aided in analyzing and predicting the impacts of various management strategies to many semi-arid rangeland issues, including grazing effect on annual net primary production, animal health, farm profitability, or wildlife populations. Based on previously published management models, evidence suggests that many of these models are limited or constrained in their ability to properly account for hydrologic changes that drive many rangeland processes due to lack of hydrologic connectivity expressed in their formulation. Previous rangeland models have relied on: a) empirical relationships of precipitation and plant production; and b) coupling these estimates to assumed coefficients about range condition and previous rainfall trends; in order to model forage supply usable for grazing or wildlife through changes in range condition, irrespective of changes in plant community composition. On the other hand, ecohydrology models have focused on the importance of soil texture and the basic water-balance equations to model infiltration, excess runoff, and changes in plant community composition through changes of evapotranspiration, which is partly driven by available soil moisture. By combining approaches, rangeland models could also account for the impacts to site-specific hydrologic function, which should prove useful given climate change effect on precipitation timing and volumes. In this presentation, we present a simple plant-soil-water model created in StellaTM (iSeeSystems, Lebanon, NH) that illustrates how ecohydrology concepts could be incorporated to new or existing rangeland models. The model is calibrated to observed data from four locations of diverse soil properties and climate characteristics in Texas (Seymour, Palestine, San Marcos, and Edinburg; TAMU North America Soil Moisture Database). Early diagnostic and sensitivity tests will be presented. Lastly, some model limitations are described along with directions of future work.

2013 Chino Basin Recharge Master Plan Implementation - Mark Wildermuth, Wildermuth Environmental, Lake Forest, CA

The Chino Basin is one of the largest groundwater basins in Southern California. The Chino Basin Watermaster and the Inland Empire Utility Agency (IEUA) developed a recharge master plan in 2000 and implemented it completely in 2005. In the last four years of the current drought the new recharge created by the recharge master plan projects averaged about 17,000 AFY and consisted of storm, dry-weather and recycled waters through the last four years of the drought. In 2013 the Watermaster and IEUA completed their recharge master plan update (RMPU) to add an additional 14,600 AFY of storm, dry-weather and recycled water recharge. The update included: updating water supply plans for all retail water agencies that pump from the Chino Basin; updating and calibrating surface water models to estimate storm water discharge and recharge on a daily time for all the watersheds overlying the Basin;

the application of these models to estimate the recharge based on a 60-year daily hydrology and to determine the non-storm period availability of recharge facilities for imported and recycled water recharge; reviewing the hydrologic modeling work above and developing a series of new recharge facility proposals to increase storm, imported, and recycled water capacity in the Chino Basin; applying the surface water models to evaluate the efficacy and practicality of recharge facility alternatives; preparation of cost opinions; developing and applying screening and ranking criteria and applying them to short list projects; and developing recommendations and an RMPU implementation plan. The entire surface water drainage was simulated in the work enabling the Watermaster and the IEUA to evaluate the impact of new recharge projects on the recharge at existing downstream projects and the impact of various low impact development and MS4 compliance schemes on the recharge performance overall. The methodology applied by the Watermaster and IEUA is transferable to most areas where groundwater recharge is desirable.The facilities included in the RMPU range from redesigns of passive stormwater retention basins to complicated storage and transfer facilities that temporarily store stormwater during storms and subsequently transfer the stored water to dedicated recharge basins. The project stakeholders included the Watermaster, IEUA, San Bernardino County Flood Control District, the Chino Basin Water Conservation District and about 24 cities and retail water agencies and 300 overlying entitles. The Watermaster and IEUA are in the process of implementing the 2013 RMPU. The recommended 2013 RMPU projects are currently in design and the Watermaster and IEUA anticipate that construction will be completed by 2020. This talk with focus on the process used by the Watermaster and IEUA to conduct and implement their recharge master plans, how well the master plan facilities performed compared to the plan, how this same master plan process can be extended elsewhere, and include up-to-date information on the status of the current 2013 RMPU implementation.

Wastewater Treatment at the Yad Hana Emergency Water Treatment Facility on the Nablus Stream - Humberto Yaakov, Yad Hana Water Treatment Facility, Emek Hefer Economic Development Corporation, Ltd., Tel Aviv, Israel

The Yad Hana Emergency Water Treatment Facility is located on the Israel side of the Green Line, near the West Bank community of Tulkarem and approximately 32 Km (20 miles) west of Nablus. Wastewater flows create problems for the Nablus Stream, which is the principal influent for the Alexander Stream on the Israeli side of the border. This presentation will provide information on the complex situation, the geographic setting, and uses of treated wastewater in the region. It will discuss the extent to which pollution issues remain a concern and potential plant upgrades.

The Not-So-Mighty-Anymore Jordan River; EcoPeace Regional Master Plan Offers Solutions – Mira Edelstein, EcoPeace Middle East, Tel-Aviv, Israel

EcoPeace Middle East recently launched the "Regional Integrated NGO Master Plan for Sustainable Development in the Jordan Valley", from the Sea of Galilee to the Dead Sea. Akin to a Marshal Plan, this plan aims to convert a polluted river and highly depressed economic area to a model for river rehabilitation, economic growth, and regional stability.

127 specific regional and national projects ("interventions") have been identified in the framework of the Master Plan, with a total investment value of 4.58 billion USD until the year 2050. The interventions are grouped around 7 **strategic planning objectives**: Pollution Control, Sustainable Water Management and River Rehabilitation, Sustainable Agriculture, Jordan River Basin Governance, Ecological Rehabilitation, Sustainable Tourism and Cultural Heritage Development, and Urban and Infrastructure Development.

The key development challenge facing the NGO Master Plan is to strike the right developmental balance between a healthy economic developmental path for the valley and its people on the one hand, and a Jordan River with sufficient environmental flows to sustain a healthy eco-system on the other hand. To meet this objective there is a need to ensure that the river serves as a natural water conveyor and source for water supply for residents in and outside the valley. Creative solutions are therefore needed to provide sufficient water to supply the projected water requirements of both people and nature.