

American Water Resources Association
2011 SUMMER SPECIALTY CONFERENCE
Integrated Water Resources Management:
The Emperor's New Clothes or Indispensable Process?
June 27 - 29, 2011
Snowbird, UT

Monday, June 27

1:30 PM – 3:00 PM

SESSION 1: Collaborative Modeling Experiences Across the U.S.

Applying IWRM Through Technical and Regulatory Integration and Sustainable Stakeholder Collaboration - Carol Collier, Delaware River Basin Commission, West Trenton, NJ (co-author: Kenneth Najjar)

Integrated Water Resources Management (IWRM) has been a key topic of discussion over the past decade. The recognition that for the best environmental outcomes water should be managed holistically rather than in compartments is seldom disputed. The benefits of integrated management include improvements in water supply planning, better water quality control, scale-appropriate system management, equitable protection of in-stream and off-stream uses, and more cost effective solutions. Yet implementation of IWRM has gained little traction due to the inherent difficulties of this management approach. This paper will review the obstacles to performing IWRM but will focus on approaches to making it work at the local, regional and national levels. The key to successful IWRM lies in the ability to integrate both the difficult technical issues along with the complex political/regulatory aspects. Political boundaries tend to be very rigid while boundaries are fluid and often times elusive. Yet in order to manage water effectively political barriers need to be softened and watershed boundaries need to be respected. Management of water resources on a watershed basis requires integrating all physical aspects (water supply, water quality, groundwater, surface water, flooding, stormwater, droughts, stream flows, channel stability, etc.) and placing the needs of the watershed above the needs of entities comprising the watershed. To do so requires extensive collaboration among governmental and non-governmental entities. Case studies will be presented to illustrate methods of applying IWRM at various levels. While the national dialogue on use of IWRM should continue, examples of basin and watershed scale approaches will be presented. These include efforts in the Delaware River Basin and its watersheds where a multitude of federal, state and local regulatory programs have been integrated to improve watershed health. For example, in the Upper Wissahickon Creek watershed in Montgomery County, PA, over forty stakeholders developed an integrated plan using tools and techniques such as a Water Use Screening Tool, GIS analysis, build-out analysis, water use projections, methodology for a local ordinance review, identification of water resource impacts, and supply/demand alternatives in order to arrive at a set of recommendations for the watershed as a whole.

Shaping the Future: the City of Pasadena's Approach to Water Integrated Resources Planning - Kelley Dyer and Natalie Zwinkels, CDM, Carlsbad, CA and City of Pasadena, CA respectively (co-authors: Dan Rodrigo)

The city of Pasadena's Department of Water and Power (PWP) currently relies on two main water sources: local groundwater from the Raymond Basin and purchased imported water from the Metropolitan Water District of Southern California (MWD). Future reliability of imported water is challenged with prolonged droughts and environmental flow restrictions, along with uncertainty of climate change. In addition, recent groundwater levels in the Raymond Basin have caused the Raymond Basin Management Board to call for a reduction in water rights holders for the foreseeable future. To address these critical water supply challenges, PWP has taken a proactive step to lead as a model water agency by developing a Water Integrated Resources Plan (WIRP). The WIRP was developed using an open, participatory planning process, with input from a dedicated stakeholder Advisory Committee and the public at large. Planning objectives included: (1) Provide a reliable water supply, (2) Maintain affordability, while addressing fairness and equity, (3) Protect and enhance source waters and the environment, (4) Protect cultural and recreational resources, (5) Maximize efficiency of water use, (6) Maintain quality of life and positive economic climate, (7) Reduce risk and maximize opportunities, (8) Reduce energy footprint for water operations, (9) Ensure safe, high quality drinking water, and (10) Ensure public safety. A comprehensive and innovative list of more than 50 supply and demand management options were considered, including recycled water; urban stormwater capture; graywater; ocean desalination; and various conservation options. Technical analysis and system modeling was performed to characterize option yields, variability in supply, capital and operation and maintenance costs, water quality attributes, environmental impacts, and implementation issues. The options were

combined into portfolios based on themes, and a decision model was created to rank the portfolios and perform sensitivity analyses. The result of the WIRP is a long-term water resources strategy that reflects community values and adapts to changing conditions. The WIRP process was successful in providing a roadmap to help guide future water management decisions and investments for PWP. This presentation will discuss the overall WIRP process, including stakeholder involvement, technical evaluation of alternatives, and the development of an adaptive implementation strategy.

Building a Legacy: Integrated Water Resources Management in Damascus, Oregon - Mark Anderson, CH2M HILL, Portland, OR (co-authors: Steve Gaschler, Emily Callaway, David Green)

The City of Damascus, Oregon has a current population of nearly 10,000 people and expects to grow to 50,000 residents by 2060. On the eastern edge of the Portland metropolitan area, the City is located in the Clackamas and Willamette basins with an area of almost 12,000 acres. Semi-rural in character, the recently incorporated city will require water, wastewater, and stormwater infrastructure to serve expected growth. The City developed an Integrated Water Resource Management (IWRM) Plan, in cooperation with several regional service providers, to capitalize on a unique opportunity to consider urban water management from a local watershed perspective, while considering water supply, environmental health, drainage and flood control, water reuse, treatment, and disposal as part of a single system. The IWRM Plan used a structured decision process, community and stakeholder outreach, and a water balance simulation model to develop and evaluate fifteen financial and non-financial criteria for eleven scenarios, including sensitivity analysis of regulatory uncertainty and climate change impacts on recommended solutions. Scenarios included treatment, storage and conveyance infrastructure for potable use, indirect non-potable reuse, and discharge at local basin, city-wide, and regional scales to find an efficient and resilient system solution. Rainwater capture, environmental flow requirements, groundwater availability, and use of existing ecosystem services to provide stormwater and wastewater treatment and disposal were also considered in the analysis. The IWRM Plan built on the City's core values and an earlier Public Facilities Plan that identified ecosystem services as both a "facility" to be protected and developed, as well as a possible alternative to built infrastructure solutions. The Voyage™ model used for simulation and reporting of results facilitates decision-making and assists to visualize alternatives. The IWRM Plan builds a portfolio for water management that balances risk, cost, and long-term uncertainty to establish a fundamental direction for water management in the next century in Damascus.

Use of Integrated Surface and Groundwater Modeling in the Southeast Lee County Integrated Planning Project, Florida - Carter Borden, DHI Water and Environment, Boise, ID (co-authors: Marcelo Lago, Tim Hazlett)

In 1990, a special designation was applied to southeast Lee County, Florida to protect the area's shallow aquifers and impact of urbanization. The designated land (83,000 acres) is characterized by rural neighborhoods, limerock mines, and active farms as well as valuable ecological and hydrological features. Since the area's designation, the pressure to mine and build new residences has been increasing. In the Fall 2007, the Board of County Commissioners initiated a 14-point Action Plan addressing critical mining, traffic, and landuse issues. As part of the Action Plan, Lee County commissioned a major planning effort that included: mining truck impact evaluation, integrated surface and groundwater model (ISGM) development, detailed ecological mapping, and a major landuse study to consider alternative futures for sensitive areas. DHI developed an ISGM using MIKE SHE software to provide hydrologic analysis of scenarios outlined in the Action Plan. A committee of County officials, planners, and local stakeholders identified future scenarios of increased urbanization, increased mining activities, and mitigation activities to protect endangered natural systems. The ISGM specifically evaluated alternative futures of mine placement and quantities of limerock removed from the aquifer; landuse patterns in residential qualities of life; and the protection of sensitive native habitats on the ecosystem. The model evaluated the net impacts of changing landuse and water management activities on the shallow water table during wet and dry periods, on hydroperiods within wetlands, and on water budgets. Relative indicators reflecting spatial and temporal changes in groundwater availability, wetlands, and mining density were also developed to compare different scenarios. The County used modeling results to effectively communicate the impacts of future scenarios to the local land owners, farmers, and miners. By incorporating broad public input, the Southeast Lee County Integrated Planning Project delivered a plan that establishes the conservation, mining, development and transportation principles guiding the Comprehensive Plan and Land Development Regulation amendments. The Project won 3 awards from the New Urbanism's Charter Awards for its emphasis on the entirety of the development and natural environment.