American Water Resources Association
2009 SUMMER SPECIALTY CONFERENCE
Adaptive Management of Water Resources II
June 29 – July 1, 2009
Snowbird, UT

Tuesday, June 30
10:30 AM – 12:00 Noon
Session 20: Monitoring Strategies Supporting Adaptive Management 2

1. Trend Analysis of Monitored Stream Water Quality - A Review of Methods and Applicability in Evaluating the Effectiveness of Conservation Practices - Pushpa Tuppad, Texas AgriLife Research, Texas A&M System, College Station, TX (co-authors: Santhi Chinnasamy, Raghavan Srinivasan)

Stream monitoring for flow and water quality (WQ) is a great sources of information that can be used to assess the impacts of policy changes and management changes affecting point and nonpoint sources of pollution. A variety of methods ranging from exploratory data analysis to multiple regression methods to parametric and non-parametric statistical methods have been used to analyze trends. Trend analysis has been applied in different perspectives in different hydrological and environmental setting. The objective of this study is to (a) briefly review different trend analysis methods and applications and (b) discuss the application of some of these methods in 5157-km2 Richland-Chambers Watershed (RCW) in northcentral Texas. A variety of agricultural management practices have been implemented in RCW. A more intensive BMP implementation is carried out in Mill Creek Watershed, a subwatershed within RCW. Stream water quality has been monitored at several locations within the watershed spanning different time periods. Analyzing the monitored water quality data for trend can help answer question such as, the watershed water quality is getting better or worse and by how much?

2. Calibrated Transport Relations, Sediment Budgets, and Applications to River Management - Susannah Erwin, Utah State University, Logan, UT (co-authors: Paul E. Grams, Milada Majerova, John C. Schmidt)

Sediment budgets are an essential tool in the development of plans for dam re-operations where the goal is rehabilitation of the downstream riverine ecosystem. However, developing an informative sediment budget relies on the ability to accurately estimate sediment transport rates, a task that remains one of the fundamental challenges facing geomorphologists and engineers. Sediment transport functions are imprecise and often inaccurate, but development of empirically-based transport relations based on extensive measurement programs is costly and still yields imprecise data. We illustrate some of the challenges associated with developing sediment budgets useful in river management based on our research on 2 river systems: (1) the Cub River, ID and (2) the Snake River in Grand Teton National Park, WY. Transport data were used to calibrate theoretical transport relations, and the calibrated relations were used in conjunction with stream flow data to estimate sediment flux. Our analysis reveals that despite great effort and the use of innovative technologies, in both cases, a large degree of uncertainty is associated with estimates of long-term sediment flux. Nonetheless, the use of sediment budgets has provided managers with tools to guide river operations in both settings.

3. Storm Properties: How Understanding Rainfall History Improves High Impact Applications - Ilse Gayl, OneRain Inc., Longmont, CO (co-author: James Logan)

Having accurate information about rainfall is critical to the success of any hydrologic application. Rainfall is the input parameter that has the biggest impact on model results. Our talk is about using gage-adjusted radar rainfall history to compute spatiotemporal storm properties for a given area over longer periods of record. We will describe the methodological approach and provide some examples from actual projects. The storm properties approach tests assumptions about rain storm behaviors. Understanding rain storm properties for an area helps create better input data through better rain gage network design and enables the creation of more realistic design storms. Greater understanding allows us to save cost by making the right choices for expensive infrastructure improvements and other rainfall-related activities.

4. Management Responses to Groundwater Quality Violations on Guam: 1996-2007 - Gary Denton, Water & Env. Research Institute, Mangilao, GU (co-author: Carmen M. Sian)

Guam has one of the finest limestone aquifers in the world. Located in the northern half of the island, this vital underground resource supplies the local community with about 80% of its drinking water needs. The majority of Guam's 135,000 inhabitants live in the northern half of the island where significant economic growth and urban development has occurred over the last 25 years. The US military has also occupied large tracts of land in this region for the past 60 years. The risks of groundwater contamination are, therefore, very real considering the population density in northern Guam and the rapid recharge rates to the underlying aquifer. Since April 1996, Guam Waterworks Authority (GWA) has regularly monitored the island's drinking water resources for chemical and biological contaminants in accordance with the US Safe Drinking Water Act requirements. Approximately 7,000 water samples have been tested to date. Records indicate that the island's groundwater is currently in good shape from a chemical standpoint with less than 0.5% of samples so far tested out of compliance (for chlordane, ethylene dibromide, trichloroethylene, tetrachloroethylene and nitrate only). The microbiological integrity of Guam's groundwater has not been so impressive reflecting the many sewage spills, leaks, and overflows that have intermittently occurred in the past. This notwithstanding, improved management practices have significantly reduced the incidence of E. coli contamination in the island's groundwater in recent years