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

Monday, June 29
10:30 AM – 12:00 Noon
Session 2: Adaptive Management in Riparian Ecosystem Restoration

1. Hydrologic Suitability Evaluation of the Kissimmee River Floodplain in Florida - Joseph Helkowski, AECOM, West Palm Beach, FL (co-authors: Christine Carlson, Jaime Graulau, Guillermo Regalado, Lawrence Spencer)

The South Florida Water Management District (SFWMD) has embarked on the Kissimmee Basin Modeling Operations Study (KBMOS) to identify alternative water control structure operating criteria to meet the flood control, water supply, aquatic plant management, and natural resource operating objectives of the Central and Southern Florida Project in the Kissimmee Basin. The Kissimmee Basin, located in Central Florida, covers approximately 2,300 square miles and is the largest watershed draining into Lake Okeechobee. As part of KBMOS, a spatial analysis was performed to define the location and targets for a set of Hydrologic Performance Measures for evaluating operating criteria to meet proper vegetation hydrologic conditions for the fully restored Kissimmee River floodplain. The analysis was initiated with the development of the Kissimmee River Floodplain Hydraulic Model (KRFHM) and the Floodplain Spatial Analysis Tool (FSAT). The KRFHM represents the fully restored conditions of the Kissimmee River floodplain using MIKE11 model (1D hydraulic model). The model was applied to simulate a time series of pre-channelization flows through the fully restored conditions of the Kissimmee River floodplain. The FSAT was then used to evaluate floodplain inundation depths and durations for purposes of determining hydrologic suitability for broadleaf marsh and wet prairie vegetation communities. The tool generates daily stage raster datasets from the KRFHM output, converts those to water depths, and then classifies the water depths, on a cell by cell grid, into water depth and/or duration classes. A total of seven different hydrologic suitability evaluations were performed using criteria provided by the SFWMD to represent different vegetation types. The final results were maps of the floodplain defining the spatial distribution of the vegetative community classifications for three climatic conditions as defined by rainfall (Wet, Normal, and Dry). As a measure of quality control and validation, a 1954 vegetation map and survey cross-sections of the Kissimmee River basin were used to validate the generated maps. Results suggest that the amount of Broadleaf Marsh present in the pre-channelization floodplain is roughly comparable to the amount of Broadleaf Marsh predicted from modeled hydrology within the restored floodplain.

2. Development of an Adaptive Management (AM) Program to Support Recovery of the Missouri River: Creating Functional Shallow Water and Emergent Sandbar Habitat - Craig Fleming, Omaha District, US Army Corps of Engineers, Yankton, SD (co-authors: Carol S. Hale, Drew J. Tyre, Ronald M. Thom, Heida L. Diefenderfer)

The purpose of the Missouri River Recovery Program (MRRP) is to restore sustainable ecosystem functions, mitigate historical habitat losses, and recover and prevent further declines of terrestrial and aquatic habitat and species while seeking to balance social, economic, and cultural values. The program is a long-term, comprehensive effort to develop and implement ecological restoration of the system. That said, the constraints to actual ecosystem restoration are great, and much of the near-term recovery is focused on implementing Biological Opinion actions by building specific habitat types believed to support endangered and threatened species including the Pallid sturgeon, least tern and piping plover. There are critical uncertainties associated with decisions about potential actions. These uncertainties generally concern the ability of constructed habitat to significantly improve the populations of the target species, and the location density and type of engineering designs to implement to maximize the habitat size, quality and long-term sustainability. Because these uncertainties hamper decisions about actions, the MRRP has chosen to approach the program using an adaptive management framework. The MRRP has developed a stakeholder group and a management team, as well as a set of technical teams. The

stakeholders and management team are responsible for key decisions in the process. The technical teams are responsible for researching the technical uncertainties through development and evaluating of models employing a structured decision-making process. We will report on the status of the AM program and provide specific examples showing how learning is being incorporated into the process at this point and in the future.

3. Adaptive Management of the Lower Owens River Project: Where Policy and Science Meet - Brian Tillemans, Los Angeles Department of Water and Power, Bishop, CA (co-author: David Martin)

The Lower Owens River Project (LORP) is considered the largest river restoration effort in the United States, and is a cooperative effort by the Los Angeles Department of Water and Power (LADWP) and the County of Inyo. The LORP is restoring 62 miles of the Owens River below the Los Angeles Aqueduct Intake that had essentially been dry since 1913. Management of the LORP ecosystem is based on fundamentals of ecology and allows the natural colonization of plant and animal species to attain balance and optimum biodiversity with minimal human manipulation of materials or processes. Regulators and interested parties who are monitoring and measuring restoration success are often in a hurry to see progress and make the mistake of not allowing adequate time for natural processes to develop before passing judgment. Legal, political, economic, and human priorities too often demand unnatural and mechanistic interventions for “quick-fixes” that usually do not allow the time necessary for nature to find balance, and actually can often be undermining or even destructive to ecological restoration efforts. The LORP is a very complex project. Not only is the restoration and ecology of the project multifaceted, but the LORP legal agreements that direct, and often dictate, the procedures to be followed for the future management of the LORP are factors that define the limitations of management and monitoring. Adaptive management decisions may be either directly or indirectly constrained because of legal agreements and other guiding documents. Notwithstanding these constraints, the LORP Monitoring and Adaptive Management Plan strives to use the best available science, collection of the most pertinent data that describes evolving ecological conditions, and efficient use of manpower and budgets to effectively observe and manage the area resources into the future. Using sound flow and land management, the LORP has spread water into previously dry basins and is creating hundreds of acres of wetland habitat and off-river lakes and ponds for waterfowl, shorebirds and fisheries. The LORP also provides new opportunities for fishing, bird-watching, and other outdoor recreation and nature activities.

4. Cheonggye-cheon Restoration Project and Adaptive Management of Its Water Quality - Hyunook Kim, University of Seoul, Seoul, South Korea (co-authors: Soo Hong Noh, Hyunook Kim)

Cheonggye-cheon (cheon means stream in Korean) which is a branch of the Han-River once flowed from the center of the Seoul to the east. After the Korean War, however, the Cheonggye-cheon became a symbol of poverty and slovenliness. Eventually, the Korean government decided to cover the stream with concrete and asphalt and to build a 5.8km-long and 16 m-wide elevated highway over the stream in the late 1960’s. As the economic size of Seoul increased, citizens started to want to have a stream to walk along. So, citizens formed a nongovernmental organization and requested the city government to restore the stream and return it back to the citizens. In 2002, the citizens realized their dream by electing Myong P. Lee who had given a campaign pledge to restoration of the Cheonggye-chon as a top priority among a number of his other campaign pledges. Mr. Lee initiated the Cheonggae-chon restoration project right after his inauguration as the Mayor. The restoration of Cheonggye-cheon was considered, not only as a part of Seoul’s urban planning, but as a symbolic project to return Korea’s historical and natural heritage to the citizens. The project was successfully carried out. Within 9 months after the 350 million US dollar project was finished, more than 30 million people visited the restored stream. In this paper, we will present how Choenggye-cheon was restored, and how its water quality is monitored and adaptively managed. In addition, research strategies to maintain its good water quality are introduced.