Report as of FY2007 for 2006NV102B: "Flood Warning System for the Clark County Wetlands Park"

Publications

- Other Publications:
  - Chataut, S., 2006. Development of Flood Forecasting Model for the Flamingo Tropicana Watershed in the Las Vegas Valley. M.S. Thesis, University of Nevada Las Vegas.
  - Betley, D. 2007. HEC-RAS Steady and Unsteady Flow Model Analysis for the Las Vegas Wash. M.S. Project, University of Nevada, Las Vegas.

Report Follows

Synopsis

Progress Report (Year 1)

<u>Title:</u> Flood Warning System for the Clark County Wetlands Park

<u>Investigators:</u> Thomas C. Piechota and Jim Pollard

<u>Problem and research objectives:</u>

This research project will develop an integrated flood warning system for the Clark County Wetlands Park located in the Las Vegas Valley. The Clark County Wetlands Park is located adjacent to the Las Vegas Wash and is an invaluable environmental resource. The facility is open to the public with various walking trails; however, there is potential for the facility to be inundated with flood waters during significant rainfall events. The proposed research project seeks to integrate the rich sources of data (rainfall and GIS) available in Clark County to develop the Wetlands Advanced Inundation Threat System (WAITS) that will be able to (1) predict when the Wetlands Park may flood using real time and historical rainfall data; (2) be used to make assessments of flooding at the Wetlands Park for various hypothetical storms; (3) and can be used for future development into Las Vegas Valley wide flood forecasting system.

<u>Methodology:</u>

The basis for the system will be a series of hydrologic and hydraulic models that will be integrated within a Geographic Information System (GIS) to provide seamless exchange of data and the flood inundation mapping. The research will accomplish the goals through 5 tasks.
- Task 1: Compile existing rainfall and topographic data
- Task 2: Adopt the Clark County Master Plan Hydrology Model
- Task 3: Develop a hydraulic model for the Las Vegas Wash
- Task 4: Develop a decision support system (WAITS)
- Task 5: Expansion of the decision support system

<u>Principal findings and significance:</u>

The first year of the research project focused on Tasks 1, 2, and 3. All of the rainfall data from Clark County has been compiled and specific storms have be identified for modeling. The Clark County Master Plan Hydrology Model was obtained from the Clark County Regional Flood Control District and imported into HEC-HMS. The first trial subbasin that was evaluated for model performance was the Flamingo/Tropicana watershed. The Master Plan model was tested for three (3) storms: November 21-22, 2004; December 28-29, 2004; and July 24, 2005. For all the storms, the time to peak runoff captured in the model; however, the magnitude of the peak flow was overestimated.

In addition to the gage precipitation data obtained from the Clark County Flood Threat Recognition System, radar data (at 1 km and 2 km resolutions) was obtained from OneRain Inc. A comparison was made between the two data sets and it was found that when the radar precipitation was used in the model, the estimate of the peak flow rate was improved. Lastly, there was not a significant

improvement from using 1 km radar data as compared to the 2 km radar data. This research was by Satya Chataut Masters Thesis at UNLV (Masters of Science in Civil Engineering, December 2006).

For Task 3, a preliminary hydraulic model was developed for the Las Vegas Wash which drains the entire Las Vegas Valley. Modeling results were obtained for steady flow and unsteady flow conditions. This was research developed as part of a Masters Project by David Betley at UNLV (Master of Science in Civil Engineering, May 2007).

<u>Information Transfer Activities</u>

a) **Meeting with Stakeholders**

- **May 9, 2006: Clark County Regional Flood Control District (Tim Sutko) and Clark County Parks and Recreation (Bruce Sillitoe and Elise Sellars)**

b) **Conference Presentations:**

c) **Publications**

- Chataut, S., 2006. Development of Flood Forecasting Model for the Flamingo Tropicana Watershed in the Las Vegas Valley. M.S. Thesis, University of Nevada Las Vegas.

- Betley, D. 2007. HEC-RAS Steady and Unsteady Flow Model Analysis for the Las Vegas Wash. M.S. Project, University of Nevada, Las Vegas.

<u>Student Support:</u> Funding two MS students at UNLV (Satya Chataut and David Betley)