Real-Time Data in Educational Displays Enhance Hydrologic Literacy

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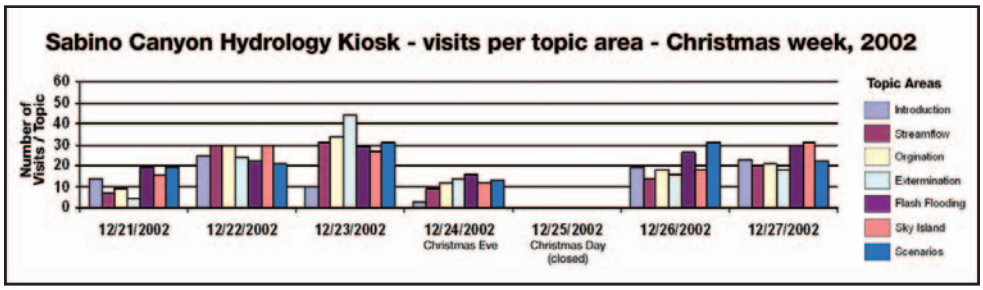
Sabino Canyon is a popular recreation area northeast of Tucson, Arizona at the base of the Santa Catalina Mountains. It receives nearly 1.5 million visits per year by tourists from around the world and local residents. The centerpiece of the recreation area is Sabino Creek, an ephemeral stream fed by seasonal snowmelt, monsoon rains, and springs.

Regular visitors often call the Visitor Center to see if the creek is flowing, or if storms have made any of the nine bridges on the main path impassable. First-time visitors ask more basic, yet challenging, questions, such as:

- How can a creek flow in the desert?
- Why does the creek disappear and then reappear further downstream?
- Where do springs originate?
- Why are the mountaintops so much cooler and wetter?
- When is flash flooding most likely?
- Where does the water go when it leaves the canyon?

To better serve Sabino Canyon users and increase their hydrological literacy, a joint project was launched by the U.S. Forest Service, U.S. Geological Survey (USGS), and the NSF Center for Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA) at the University of Arizona to develop displays, a touch-screen kiosk, and a Web site on the hydrology of Sabino Creek. These exhibits address the origins and fate of the creek, the hydrology of "sky island" environments, and conditions that produce flash flooding. Real-time data are incorporated into the kiosk and Web site, including:



Sample of kiosk usage data during a busy holiday season.

Sabino Canyon Visitors Center exhibit on hydrology of the stream in the canyon.

- streamflow and flood-warning data from the USGS/Tucson Water Department gauge in Sabino Creek;
- weather and fire-risk data from the Coronado National Forest meteorological station near the Visitor Center;
- climate and hydrological research data from SAHRA's meteorological tower on Mount Bigelow near the top of the Santa Catalina Mountains; and
- webcam images from SAHRA's meteorological tower.

Data include current weather and streamflow information at various points in the canyon, plus extreme values for the date. Streamflow data are tied to information on the conditions required for various bridges to become inundated. Webcam shots from Sabino Creek's headwaters are updated every five minutes. Normally aimed so as to show snowfall in winter and monsoon storms in summer, the webcam can be controlled by researchers, local weather forecasters, and Forest Service personnel.

Incorporating and interpreting real-time data increase the complexity and cost of developing educational displays, but the benefits are numerous. Hikers use the information to make plans, thereby reducing routine calls to staff. Public awareness of the work of agency and academic researchers is increased. Finally, constantly changing real-time and near-real-time data give people a reason to keep coming back.

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