

Recent Project Descriptions – Henry Shovic 031513

Key Officials:

U. S. Army: Lief Christenson, formerly USA CJTF101 WATER RESOURCES COOR for RC East, Afghanistan, lief1948@yahoo.com,

U. S. Army Corps of Engineers: John Hazelton, PE, Wilmington District, USAED 69 Darlington Ave., Wilmington, NC, 28403, 910 251 4758, John.M.Hazelton@usace.army.mil

U. S. AID: Otto Gonzalez, US State Department, 301 4th Street SW Washington DC, District of Columbia 20547, United States, GonzalezOJ@state.gov

Zion National Park: Dave Sharrow, Zion National Park, Resource Management and Research, State Route 9, Springdale, UT 84767, 970-240-5431, Dave_sharrow@nps.gov

Applied Remote Sensing in Afghanistan: In 2005 I completed two details in Afghanistan for USAID to help upgrade pistachio production. Because of the difficulty of field ops, I relied on satellite imagery to inventory and plan conservation strategies. Ground truth was primarily low-elevation overflights and limited field trips. The mapping was successful, since all maps of this resource were destroyed in the years of war, and government administrators could now focus on the best areas for rehabilitation. I completed a second project in 2005 that specified a community-based conservation plan, using remotely-sensed resource inventory. In 2007, a USAID document reported a 65% increase in pistachio production due to the implementation of this plan in that community.

In 2008, I participated in a large remote sensing project to improve water resource use with the Army Corps of Engineers. We identified 295 potential irrigation and power dam sites, evaluated each from the perspectives of potential storage, impacts on local resources, cost, siltation potential, and benefitting agriculture. I developed a decision support model for this project and made remote predictions of soil erosion and transport, recent deforestation, pool impacts, and affected irrigated agriculture. The project helped focus the U. S. Army's project planning to avoid areas of poor potential return.

In 2009, 2010, and 2012, I obtained contracts directly with the U. S. Army in-country to plan and design watershed restoration treatments. We used simple, tested methods (hillside ditching, check dams, irrigation canal improvements) to improve rural watersheds. Using imagery and field truth from on-the-ground soldiers, I planned, designed, and specified contract language for 22 project areas. As an example, an in-country review of nine projects showed five as "successful", with an implementation cost of \$1.7MM and 1,180 local individuals employed. The four "unsuccessful" projects were incomplete because of security or local government issues. Though remote sensing has limitations, they were more than overridden by the advantages of timely, low-cost, low-risk, and appropriate use by experienced personnel.

GeoSpatial Modeling in Zion National Park: There are many publications and studies showing that species are vulnerable to climate change, particularly in the Southwest where the climate is already warm and dry. However, as of 2011 there was little or no information on where, how much, or which ones are most at risk. Knowing local effects is important for Park managers who must prioritize their limited funding for the most important issues.

I was charged with beginning this process of specific prediction in local areas using available science, in a short time frame (one year). We selected four species at risk or of interest in Parks surrounding and including Zion National Park. We searched the literature for available species response models, adapted them to a geospatial environment, and developed local models of change (using local weather station data, regional warming predictions, and lapse rates) to spatially define where and how much habitat would change in the planning period. We reported the results in manager-understandable language. Zion National Park has used our results to help prioritize its funding for species protection programs, and the study is getting Regional and National attention. Modeling and reporting the changes in a spatial format helped communicate the results to management.