

# Spring Lake

## Watershed Characterization & Management Recommendations

Final Project Meeting · Dec. 13, 2012 · 7 p.m. · City Park Rec Hall · San Marcos, Texas

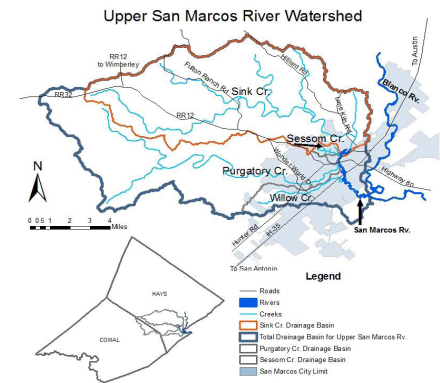
- AGENDA:**
- A. Introduction & Stakeholder Process – Mary Van Zant
  - B. Watershed Characterization and Modeling – Dr. Weston Nowlin
  - C. Water Quality Data Collection and Results – Dr. Benjamin Schwartz
  - D. Management Measure Recommendations – Chris Clary
  - E. Final Report – Meredith Miller
  - F. Upcoming WPP – Mary Van Zant

Spring Lake in central Texas is a unique ecosystem and serves as the headwaters of the Upper San Marcos River. Artesian spring water from the Edwards Aquifer emerges into the lake from hundreds of spring openings, creating one of the most productive spring-fed systems in Texas. Spring Lake and the Upper San Marcos River are important resources in this portion of Texas, thus protecting and preserving the water quality is crucial.

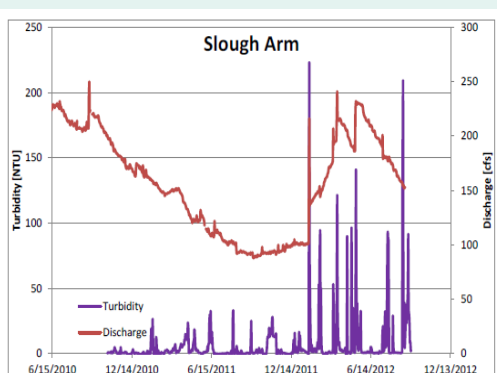
The Interstate Highway-35 (IH-35) corridor in central Texas is one of the fastest growing regions of the United States. Recently, it has been noted that the water quality in Spring Lake and the Upper San Marcos have declined after storm flow events. The purpose of the Spring Lake Watershed Characterization and Management Measures Recommendations Project is fivefold:

### Watershed Characterization

Sink Creek potentially plays an important role in determining nutrients and sediments loads to Spring Lake and the Upper River. However, Spring Lake, home to the 2nd largest spring system in the Western United States, receives substantial groundwater from both local- and regionally-derived sources within the Edwards Aquifer. Thus, the high degree of surface- and ground-water connectivity likely makes any non-point source pollution loading to groundwater within the Edwards Aquifer recharge zone relevant to pollution dynamics in Spring Lake. That recharge zone and the Sink Creek watershed have undergone major shifts in Land Use and Land Cover between 1992-2006. Decreases in aquifer levels and human development on or along aquifer recharge sites will likely lead to decreased water quality through an increased reliance on surface water inputs and non-point source pollution inputs associated with runoff from disturbed lands.



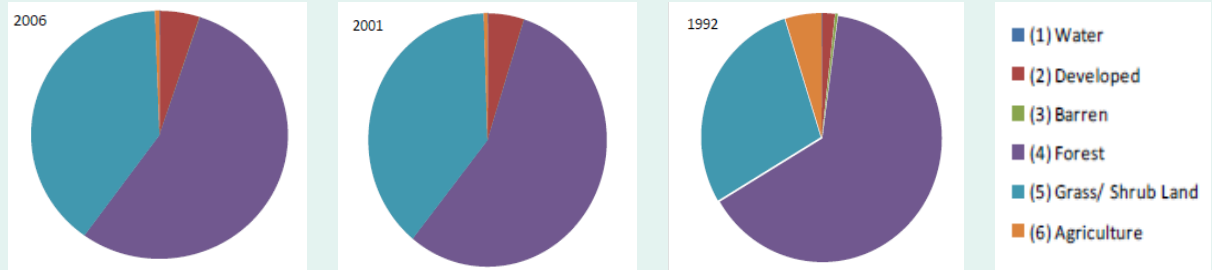
### Data Collection & Analysis



The Data Collection and Analysis section of the project collected data to characterize spatial and temporal properties of water quality in the Spring Lake watershed. Compared to surface waters and the Slough Arm, waters from San Marcos Springs show relative temporal stability for all measured parameters. The largest source of pollutants is due to stormwater entering the Spring Lake System. Targeted sampling during storms indicate that local urban runoff, nutrients, and other contaminants affect the Slough Arm of Spring Lake for longer periods than the Spring Arm because sediment and nutrient rich stormwaters stagnate in the Slough Arm after storm events.

## Estimation of Loads

Changes in the percent composition of Land Use and Land Cover the Upper San Marcos River Watershed ▶



Calculated/modeled estimates of hydrological inputs including sediment, nutrient and bacteria loadings from the Sink Creek watershed to Spring Lake indicated that the magnitude of the non-point source pollution loads were a function of the proportion of each land use land cover type within the watershed. The results from calculations of per acre yield from the different land use types indicate that conversion of the dominant land use types in the watershed (undeveloped/ open and rangeland) to more intense human impact land uses (residential, commercial, cropland and industrial land uses) generally increase the nutrient, bacterial, and metal yield from the watershed.

## Mission & Goals

The mission of the Upper San Marcos Coordinating Group is to restore and preserve the natural integrity of the Upper San Marcos Watershed through research, education and stewardship.

### Goals:

- Develop, coordinate and implement watershed protection planning activities
- Protect water quality and optimal spring flows for current and future generations
- Broaden and enlighten civic engagement in watershed management activities
- Increase awareness of the influence human activities have on the intricate web of biological relationships found within the watershed

## Management Measures

The stakeholder group concluded that the most important management measures which aim to improve current water quality, include land conservation strategies, mitigation practices within urban/residential development, and mitigation of sedimentation. The specific management measures that may be used to preserve or improve the water quality of Spring Lake and the Upper San Marcos River depends on further stakeholder involvement in the decision making-processes.



The Upper San Marcos Watershed Initiative is a 3 year Watershed Protection Planning process which will allow the community to protect or restore water quality in the river and creeks. A holistic and stakeholder driven approach will result in a plan that incorporates science, education and voluntary action. The plan will include a watershed characterization of the entire Upper San Marcos River, pollutant load estimations, identification of the management measures needed, implementation and funding plan for that management, and an education and outreach component.

