



## Water Resources in California Project Description:

**Project**

### Measurement and Analysis of Potential Land Subsidence in Coachella

**Title:**

Measurement and Analysis of Potential Land Subsidence in Coachella

**Number:**  
CA517

**Location:**

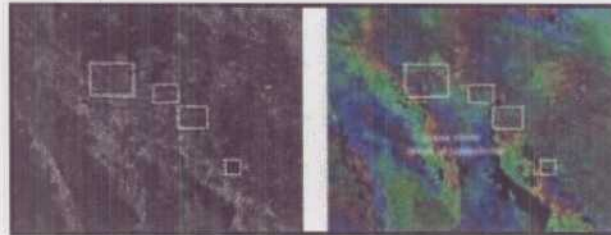
**Cooperating Agencies:**  
[Coachella Valley Water District](#)

**Project Chief:**  
[Devin Galloway](#)

**Period of Project:**  
April 1996 through September 2000

**Team**

**Problem:** In the lower Coachella Valley, ground water has been an important source of agricultural, municipal, and



domestic water supplies since the early 1920's. Pumping of ground water resulted in water-level declines of as much as 50 ft between the early 1920's and the late 1940's before the importation of Colorado River water in 1949. As a result of the availability of this surface- water supply, pumping of ground water was reduced, and water levels recovered throughout most of the valley during the 1950's through the 1970's. Since the 1970's, however, the demand for water has exceeded the deliveries of imported surface water, and ground-water levels have been declining again as a result of increased pumping.

**Objective:** The primary objective of this study is to characterize quantitatively the distribution and the potential of subsidence in the lower Coachella Valley. Specific objectives are to determine ① if subsidence has occurred during the past several decades, and if so, where and how much; ② if subsidence is related to hydrologic activities (pumping, artificial recharge); and ③ the timing of the subsidence with respect to hydrologic history if subsidence can be attributed to hydrologic activities.

**Relevance and Benefits:** The extent and magnitude of land subsidence will be identified by analyses of Interferometric SAR (INSAR) images. These images will be compared to land-surface elevations measured using GPS techniques at selected bench marks. INSAR is a fairly new technique that provides relatively detailed spatial information (30-m resolution expected) of land-surface displacement compared to conventional geodetic methods which provide relatively sparse information (at bench mark locations) of land-surface displacement. Future management of water resources and land subsidence may be more effective because INSAR images may identify areas that need more or less attention in the future than has been given to those areas in the past. Additionally, comparison of land-surface displacement information from both techniques may help identify advantages and disadvantages of each technique.

**Approach:** Second phase (unofficially), FY 1999 - A GPS survey will be done for the network of bench marks established and measured in 1996. Several interferograms for Coachella Valley spanning several recent periods will be prepared. Water-level data will be used to attempt to correlate land-surface



changes, where noted, with seasonal ground-water usage.

**Progress and Significant Results in FY 1999:** A GPS survey was completed in October 1998; values from the survey were compared with values from the 1996 survey. SAR data were purchased and processed to create interferograms. Preliminary analysis of the SAR data indicates local subsidence around pumping wells in the Palm Desert area. Work on a report describing the GPS and SAR data was postponed while the project chief attended a 6-month Women's Leadership Program; after completing the program the project chief left the USGS.

**Plans for FY 2000:** A new project chief will be selected to complete the project. A report describing the GPS and SAR data will be completed by September 30, 2000.

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[California Projects](#) or: [Water Resources in California](#)

URL: <http://ca.water.usgs.gov/projects00/ca517.html>

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