GILA RIVER/INTERSTATE STREAM COMMISSION STREAMFLOW/ALLUVIAL GROUNDWATER STUDY:

Piezometer and surface water data collection and management

FINAL REPORT, 2010

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July 2010

Submitted to the NM Interstate Stream Commission on behalf of Grant Soil & Water Conservation District, 2610 N. Silver St., Silver City NM 88061
Contract Number 2010-SPB-03

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This is the final report for the 2010 data collection project year, through June 2010. The overall study purpose is to utilize ground- and surface water data collected at sites along the Gila River in southwestern New Mexico to calibrate models of surface water and alluvial groundwater interactions along the river. This report summarizes data collection, data management, and data reporting activities during the period through June 2010. Data were initially collected at three sites on the Gila River that were installed, instrumented with recording pressure transducers, and surveyed by Tetra Tech in 2009; Tetra Tech added installations at two other locations on the Gila River in April 2010 and data from those sites were collected in June 2010. All data were supplied to NM Interstate Stream Commission (NMISC) and to modeling staff at SS Papadopulos, Inc (SSP). A series of modifications to survey data collected by Tetra Tech staff required modifications to the spreadsheets created from the collected wells data; only data in the spreadsheets included with the electronic version of this report should be used. See also the interim project report from February 2010, included on this report CD.

Summary

In early 2010, NMISC arranged a meeting among staff from The Nature Conservancy (TNC), SSP, Tetra Tech, the NM Department of Game & Fish, and NMISC to develop a coordinated study plan that would integrate data collected under this study with surface- and groundwater data collected under a study (for which I am research lead) funded by NM Department of Game & Fish and TNC. The map on the next page shows all data collection sites for both studies, except a NMISC site at Virden, NM. Field data collection for the TNC/NMDGF project is ongoing and processing those data will be complete by August or September, 2011. Once complete, the data will be sent to NMISC and SSP for use in this study.

Persistent high-elevation snow and local rain maintained relatively high flows on the Gila River in New Mexico from January 20, 2010 through late May, 2010. High peaks in January were followed by an extended period of elevated river stage, thoroughy saturating all banks and bars along the river in this region. The series of events resulted in the loss of the three stage gauges that had been installed by Tetra Tech in 2009. Although two of the three recording transducers at these sites were eventually recovered, no data collected by the surface water transducers after January 20 were reliable, and the stage installations themselves were completely destroyed. All observation wells were undamaged. However, faulty suspension cabling rusted through in two of the wells; multiple efforts to retrieve the transducers from the saturated sediment at the bottom of each well failed.

During the period March through June, 2010, frequent consultations with SSP and Tetra Tech staff enabled the SSP seepage run component of the study (in May 2010), and Tetra Tech's installation of the two new well sites (April 2010). An earlier interim report details activities during January and February, 2010; this report lists major work events between mid-February and the end of June, 2010, in chronological order.

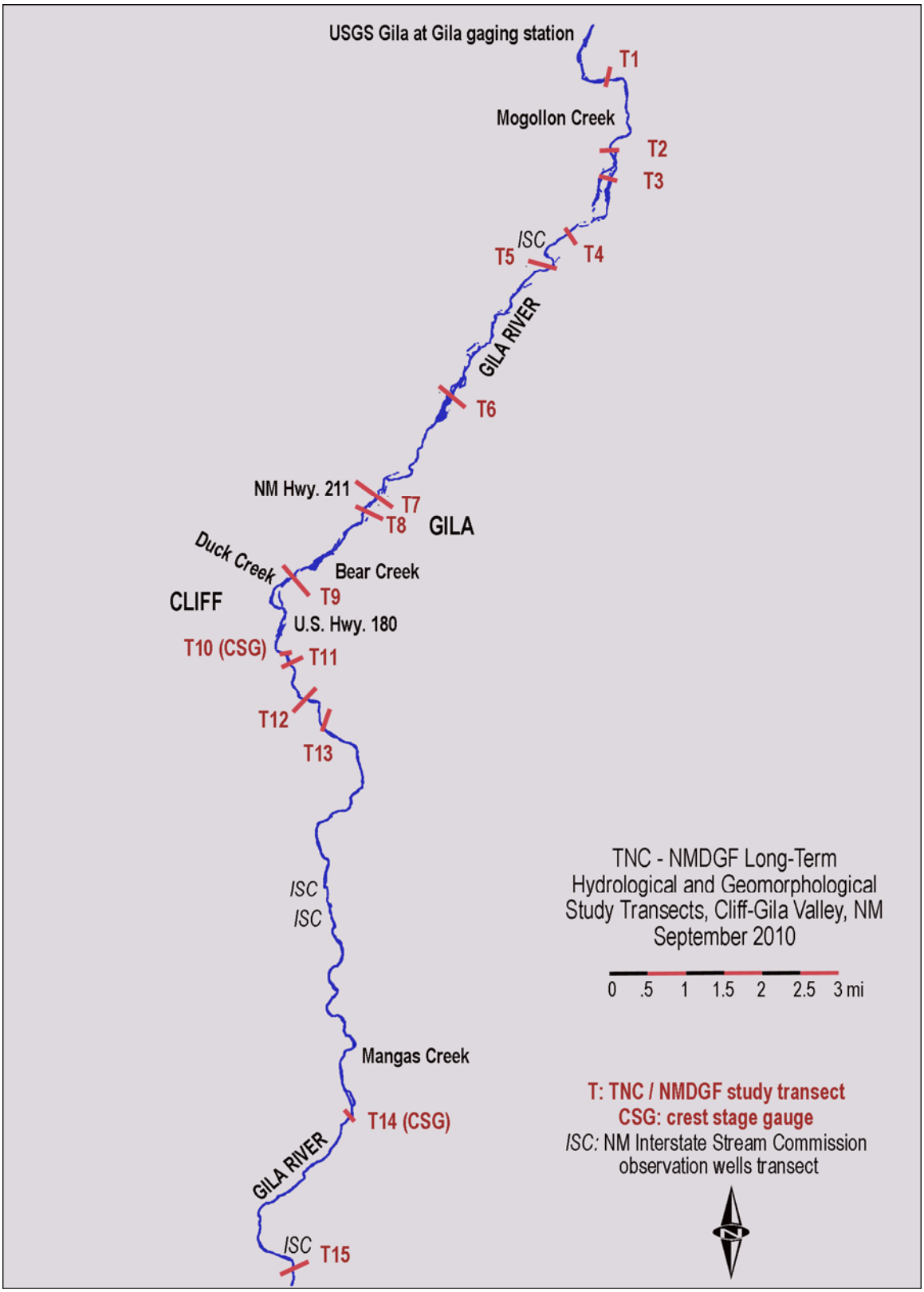

Figure 1. Sketch map of data collection sites in and near the Cliff-Gila Valley, NM for integrated NMISC and NMDGF/TNC studies.

February and March 2010: Seepage run development with SSP. Aerial photography and on-the-ground reconnaissance were used to construct a list of locations where SSP would collect flow data, by standard wading measurements, during their seepage run. Of interest were confluence zones from potentially significant tributaries, ditch diversion points, and ditch return flow locations. We jointly developed a draft plan, and then revised the plan based on an on-the-ground reconnaissance on March 11. SSP staff performed the actual seepage run May 10 – May 13, after streamflow had dropped sufficiently to allow wading measurements to be completed.

April 2010: Staking additional well locations for Tetra Tech installations. Project participants jointly developed a plan for installing up to three additional well transects to provide additional ground- and surface water data for the modeling team. I located and flagged individual well installations at each of the sites; terrain and access issues precluded Tetra Tech from installing wells at one site (just below the Mogollon Creek confluence). Tetra Tech installed two lines of wells (4 wells each) and a surface gage at each new line between April 15 and April 27. The map on the previous page shows the location of the well lines added between T4 and T5, and just upstream of T15; also see Tetra Tech's June 15, 2010 *GilaRiver2010_PiezometersMemo*. In addition, they installed one well at each of two of the TNC/NMDGF piezometer transects (on the map, at T5 and at T15). Tetra Tech staff surveyed the lines by high-accuracy GPS/RTK and supplied partners with georeferencing data. They also accompanied me to control points at 5 of the TNC/NMDGF transects, collected high-accuracy GPS data, and provided those to enable more precise geo-positioning of the transects.

Table 1 below lists the wells and stage gauge installed by Tetra Tech on the four "ISC" transects along with status details and data available and/or collected through the period ending June 30, 2010.

Table 1. Tetra Tech well and stage gauging installations and data status as of June 2010 for collection of surface- and groundwater modeling data.

Site/Well or stage	Status (see footnote)	Available data this period	Notes
Bird Area			
B-1S	2	5/2010	All Bird Area altitudes were set incorrectly;
B-1D	2	5/2010	adjustments made in spreadsheet files
B-2	2	5/2010	No Barologger at site; use FM-2 data
B-3	2	5/2010	
B-stage	2	5/2010	
FM-1			
FM1-1S	3	None	Cable found parted at first visit Jan. 2010
FM1-1D	1	6/2009-5/2010	
FM1-2	1	6/2009-5/2010	
FM1-3	1	6/2009-5/2010	
FM1-stage	5	6/2009-1/2010	Installation destroyed Jan 20, 2010; xducer retrieved after flow recession. Data after 1/20/2010 are invalid.

Table 1, continued.

Site/Well or stage	Status (see footnote)	Available data this period	Notes
FM-2			
FM2-1S	1	6/2009-5/2010	
FM2-1D	1	6/2009-5/2010	
FM2-2	1	6/2009-5/2010	
FM2-3	1	6/2009-5/2010	
FM2-stage	5		Installation destroyed Jan 20, 2010; xducer retrieved after flow recession. Data after 1/20/2010 are invalid.
Lichty			
TNC-2D	1	5/2010	All Lichty altitudes were set incorrectly; adjustments made in spreadsheet files
TNC-3S	1	5/2010	
TNC-4	1	5/2010	
TNC5	1	5/2010	
TNC-stage	2	5/2010	
Vance Lee (Virden)			
VL-1	3	None	Cable found parted at first site visit Feb. 2010.
VL-2	3	6/2009-2/2010	Cable found parted at site visit early Mar. 2010.
VL-3D	1	6/2009-2/2010	
VL-3S	1	6/2009-2/2010	
VL-stage	5?	Unk.	Unable to access due to high river stage in Feb. 2010; appears damaged. Barologger?

Status codes: 1: Functional; installed 2009. 2: Functional; installed 2010. 3: Well functional; transducer lost. 4. Stage installation requires modification; installed above low stage. 5: Destroyed.

May and June 2010: All wells at the four "Tetra Tech" sites in and near the Cliff-Gila Valley were downloaded, except those in which transducers were "lost" due to faulty cabling. Well and stage gauge maintenance—such as replacing the remaining rusted cables, extending some cable lengths to place transducers nearer the bottom of their wells, and dragging destroyed stage assemblies from the river bed to the nearest bank surface—was completed. Erroneous altitude entries in many of the transducers and Barologgers were corrected as they were identified during the initial site visits; these were corrected in the datafiles using procedures outlined by the transducer manufacturer, Solinst Corporation. All data were transformed into water level elevations using top-of-casing (TOC) and stage transducer port elevations collected and supplied by Tetra Tech staff. The transformed data, field notes, and QA/QC measurements obtained during each site visit were supplied to all project participants.

Future tasks: Return visits are scheduled for August–September 2010 to all sites for continued QA/QC measurements, photographic documentation, and downloading of existing transducers. The transducer lost in FM1-1S will be replaced with the transducer retrieved from the stage gauge

installation; the VL-1 transducer will be replaced with the stage transducer from FM-2. Future contractual site visits will occur on a quarterly basis.

Ellen S. Soles

July 15, 2010