

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

**Piezometer and surface water data collection and management**

**FINAL REPORT, 2013**

**Ellen S. Soles**

**June 2013**

**Submitted to the NM Interstate Stream Commission on behalf of  
Grant Soil & Water Conservation District, 3082 32<sup>nd</sup> St. Bypass, Suite C, Silver City NM 88061  
Contract Number 2013-SPB-05**

**GILA RIVER/INTERSTATE STREAM COMMISSION  
STREAMFLOW/ALLUVIAL GROUNDWATER STUDY:  
Piezometer and surface water data collection and management  
FINAL REPORT, 2013**

This is the final report for the 2013 data collection project year, through June 2013. Included on the report CD are all data downloaded from the four Cliff-Gila Valley well transects installed by ISC, and from two recording surface water stage gages (RSGs) installed for a separate, corollary project with New Mexico Department of Game & Fish (NMDGF) and The Nature Conservancy. The surface stage gage data substitutes for surface water data originally recorded at Tetra Tech installations three of the four transects; two of these were destroyed by floods in January 2010, and high water levels during installation of the third left it positioned well off the active low flow channel. All data are transformed into groundwater elevations format after compensation for barometric pressure effects, and delivered as standard spreadsheets by water year (WY).

Additionally, continuous groundwater data collected on eight other transects (18 wells total) as part of the NMDGF/TNC study were provided between February and June 2013 (see Table 2). The installation dates for these wells vary. Consequently the data sets provided encompass a range of dates, with the earliest data sets extending to mid-2007. Continuous groundwater data collection from these wells is ongoing and future data will also be supplied to ISC at periodic intervals.

Previously downloaded data and photographic documentation collected since the start of the project in mid-2009 were supplied on the 2010-2011 final report CD. All data collected through June 2013 have also been supplied to modeling staff at SS Papadopoulos, Inc (SSP). 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.

**Summary**

Manual QA/QC measurements were collected, and transducer data were downloaded, at the four NMISC piezometer/observation well sites in the Cliff-Gila Valley throughout 2012 and the first half of 2013. Correspondence between the manual measurements and barometrically compensated data recorded by the transducers is generally very good; within < 0.02 ft. All water level data is recorded at 30-minute intervals by the transducers installed in the wells and surface water gages (Solinst Corp.). The raw water levels data are

compensated for barometric pressure effects with barometric pressure data simultaneously recorded by one of four Barologgers (Solinst Corp.) at 30-minute intervals. Each Barologger used for pressure compensations is located within one mile of all of the water level transducers for which its data are used for barometric compensation.

In late April 2013, a "firmware" upgrade recommended by the transducer manufacturer, Solinst Corp., was performed for all of the ISC transducers and corresponding Barologgers; the same upgrade was performed for all NMDGF/TNC project instrumentation at about the same time. Instrumentation is periodically re-launched after downloading in order to clear memory, and this routinely occurs in "delay" mode in order to maintain synchronized data collection intervals among all instrumentation. The firmware upgrades required this step. At the next downloading site visits, however, the delay launch for nearly all ISC instrumentation was found to have failed, resulting in data loss for the month of May and most of June. At the attempted download, the initial instrument information screen for each transducer displayed the correct date and time for the delay launch (matching the field records), but for unknown reasons the instrument failed to deploy. Oddly, however, no delayed launch for any NMDGF/TNC instrumentation failed. This was the case even for instrumentation at transects adjacent to the ISC transects, where all of the firmware upgrade/delay launches occurred simultaneously (e.g., at the NMDGF transect T15 and ISC "Bird Area" transect; Figure 1). Instrumentation for both projects is the same, consisting of both "Junior" and "Gold" model transducers. The solitary difference seems to be that the ISC transducers were originally ordered in one batch (i.e., nearly consecutive serial numbers) by the contractor who installed and instrumented the wells, which strongly suggests that some idiosyncrasy in those particular transducers interacted with the new firmware installation to prevent the delay launch. I have sent a list of the serial numbers to Solinst Corp. and requested that they look into the problem. It is painfully unfortunate that this of course will not replace the data lost during this period, for which only 3 to 5 manual measurements are available from each well.

In order to check and correct the problem, each transducer was stopped and immediately re-launched in the field. It was again stopped, and a 2-3 minute delayed launch was established. These launches occurred correctly. Each was then re-launched a final time with the delay set to the correct 30-minute interval. Data collected by all transducers will be validated during the month of July to ensure that the instruments are again functioning properly.

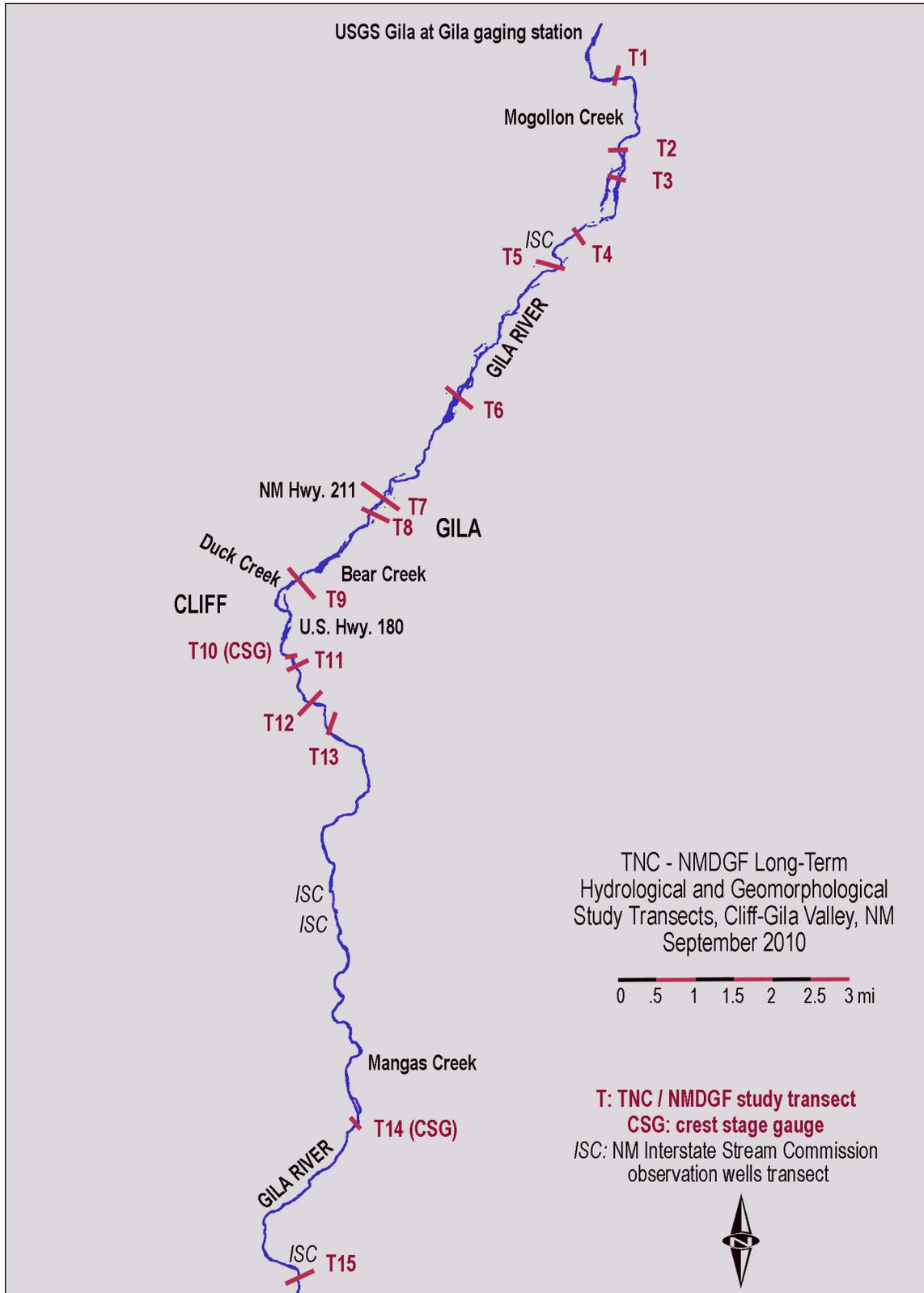


Figure 1. Sketch map (to scale) of data collection sites in and near the Cliff-Gila Valley, NM for integrated NMISC and NMDGF/TNC studies.

Table 1. NMISC groundwater and surface stage gauging installations, Cliff-Gila Valley; TNC/NMDGF surface stage installations, and data status as of June 2013 for collection of surface- and groundwater modeling data.

Site/Piezometer or stage	Status (see footnote)	Currently available data for project year 2013	Notes
<b>Bird Area</b>			
B-1S	2	6/2012-4/2013	See text.
B-1D	2		
B-2	2	(all installations)	
B-3	2		
B-stage	3		
<b>FM-1</b>			
FM1-1S	1	6/2012-6/2013	
FM1-1D	1	6/2012-6/2013	
FM1-2	1	6/2012-4/2013	See text.
FM1-3	1	6/2012-4/2013	
FM1-stage	4	--	
<b>FM-2</b>			
FM2-1S	1	6/2012-6/2013	
FM2-1D	1	6/2012-4/2013	See text.
FM2-2	1	6/2012-4/2013	
FM2-3	1	6/2012-4/2013	
FM2-stage	4	--	
<b>Lichty</b>			
TNC-2D	1	6/2012-6/2013	Thru early June; delay
TNC-3S	1	6/2012-6/2013	launch status to be
TNC-4	1	6/2012-6/2013	checked July 2013.
TNC5	1	6/2012-6/2013	
TNC-stage	4	6/2012-6/2013	Many data gaps.
<b>Iron Bridge RSG</b>	2	6/2012-4/2013	
<b>BLM RSG (below Mangas Cr. confluence)</b>	installed 2011	6/2012-6/2013	

Status codes: 1: Functional; installed 2009. 2: Functional; installed 2010. 3: Probably functional but data supplied with cautionary notations. 4: Destroyed. 5. Location is off and suspended above active low flow channel; many data gaps.

Table 2. Groundwater installations in the Cliff-Gila Valley for corollary NMDGF/TNC study, and data collection periods for all data supplied to ISC in this project period.

Site/Piezometer or stage	Data provided in project year 2013	Notes
<b>T1</b>		
N-1	7/2008-9/2012	Data after 9/2012 to be provided July-Aug 2013 for all sites listed.
N-2	6/2010-9/2012	
S-1	7/2007-9/2012	
S-2	6/2010-9/2012	
<b>T2</b>		
BME	6/2007-9/2012	
BMC	6/2010-9/2012	
BMW	6/2007-9/2012	
<b>T3</b>		
DS E	9/2010-9/2012	Installed March 2013.
DS W	9/2010-9/2012	
DS wetland	--	
<b>T5</b>		
GRF E	6/2007-9/2012	
GRF W	11/2008-9/2012	
GRF C	5/2010-9/2012	
<b>T6</b>		
E1	7/2010-9/2012	
E2	7/2010-9/2012	
<b>T11</b>		
RC	7/2010-9/2012	
R	7/2010-9/2012	
<b>T12</b>		
IBE	7/2009-9/2012	
IBC	12/2010-9/2012	
<b>T15</b>		
B4	5/2010-9/2012	
USFS	12/2010-9/2012	

Notes on surface water gages:

**Bird Area:** The stage gauge at the NMISC site in the Bird Area was installed by the ISC contractor during relatively high flows in May 2010. The installation is intact, but the housing for the transducer has not been located since the fall of 2010. The data suggest that it is still collecting actual water surface data, but it may be buried beneath the left bank or the channel bed.

**FM1 and FM2:** The nearest surface stage data is collected at the RSG installed just downstream of the Gila River/Mangas Creek confluence in June 2011.

**Lichty:** The Tetra Tech surface gage was installed during high flows, and consequently far enough from the active low flow channel that it has recorded little actual water surface data since installation. The active channel at the transect is often completely dry during much of irrigation season. In 2013, it has been dry since at least mid-April. The RSG installation at Iron Bridge, approximately 7 miles downstream, supplies no accurate corollary surface stage data for this site due to 1) irrigation returns and field seep between the two sites, and 2) possible tributary inflows from Duck and Bear Creeks, also downstream of the Lichty site.

**Iron Bridge RSG and BLM RSG:** Stage data from these sites will continue to be supplied with future reports.

Ellen S. Soles  
June 30, 2013