

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Institute of Natural Resource Sustainability
Illinois State Water Survey

2204 Griffith Drive, MC-674
Champaign, Illinois 61820-7463



August 12, 2011

Mr. Jeff Smith, Chairman
Imperial Valley Water Authority
25865 E. County Road 1000 N
Easton, IL 62633

Dear Chairman Smith:

The Illinois State Water Survey (ISWS), under contract to the Imperial Valley Water Authority (IVWA), has operated a network of rain gauges in Mason and Tazewell Counties since August 1992 and a network of groundwater observation wells since 1994. The purpose of the rain gauge and groundwater observation well networks is to collect long-term data to determine the impact of groundwater withdrawals during dry periods and during the growing season, and the rate at which the aquifer recharges. The groundwater observation well network consists of thirteen wells, MTOW-01 through MTOW-13. The location of the well and rain gauge network is shown in figure 1 on the following page.

MTOW-01, located near Snicarte, Illinois, is an inactive, large diameter, hand-dug domestic well that has been monitored by the ISWS since 1958. This well is equipped with a Stevens, Type F water-level recorder that produces a continuous record of the groundwater level on a 32-day paper chart. The well has been observed monthly and maintained by ISWS personnel since March of 1958. The long-term hydrograph at MTOW-01 (Snicarte) is shown in Figure 2.

MTOW-01 has gone dry twice during the period of record, during 1989 and for a period of time over the course of 2005 and 2006. That is, the groundwater elevation within the aquifer had dropped to below the bottom elevation of the well. In 2006, another well, which penetrates deeper into the aquifer, was drilled to replace MTOW-01 which we found would go dry during dry weather. This new well, named Snicarte #2 or MTOW-01a, has taken the place of the original well (MTOW-01 or Snicarte #1) within the monitoring well network.

Snicarte #2 was constructed by Grosch Irrigation Co. on September 15, 2006. The well was cased with 8-inch PVC and a 10 foot of screen (the screened interval is 52 to 62 feet) to a depth of about 62 feet. The well was finished at a depth of 62 feet to insure the bottom elevation of the well was low enough to withstand a severe drop in water levels during periods of prolonged drought. The well construction details for Snicarte #2 appear in figure 3. The new wells is located approximately 400 feet southwest from the original well. Snicarte #1 has a land surface elevation of 489.27 feet above mean sea level, while Snicarte #2 has a land surface elevation of 470.34 feet above mean sea level, a difference of 18.93 feet. Figure XX shows the location of the two observation wells. The two wells were measured jointly so that their water level data could be correlated.

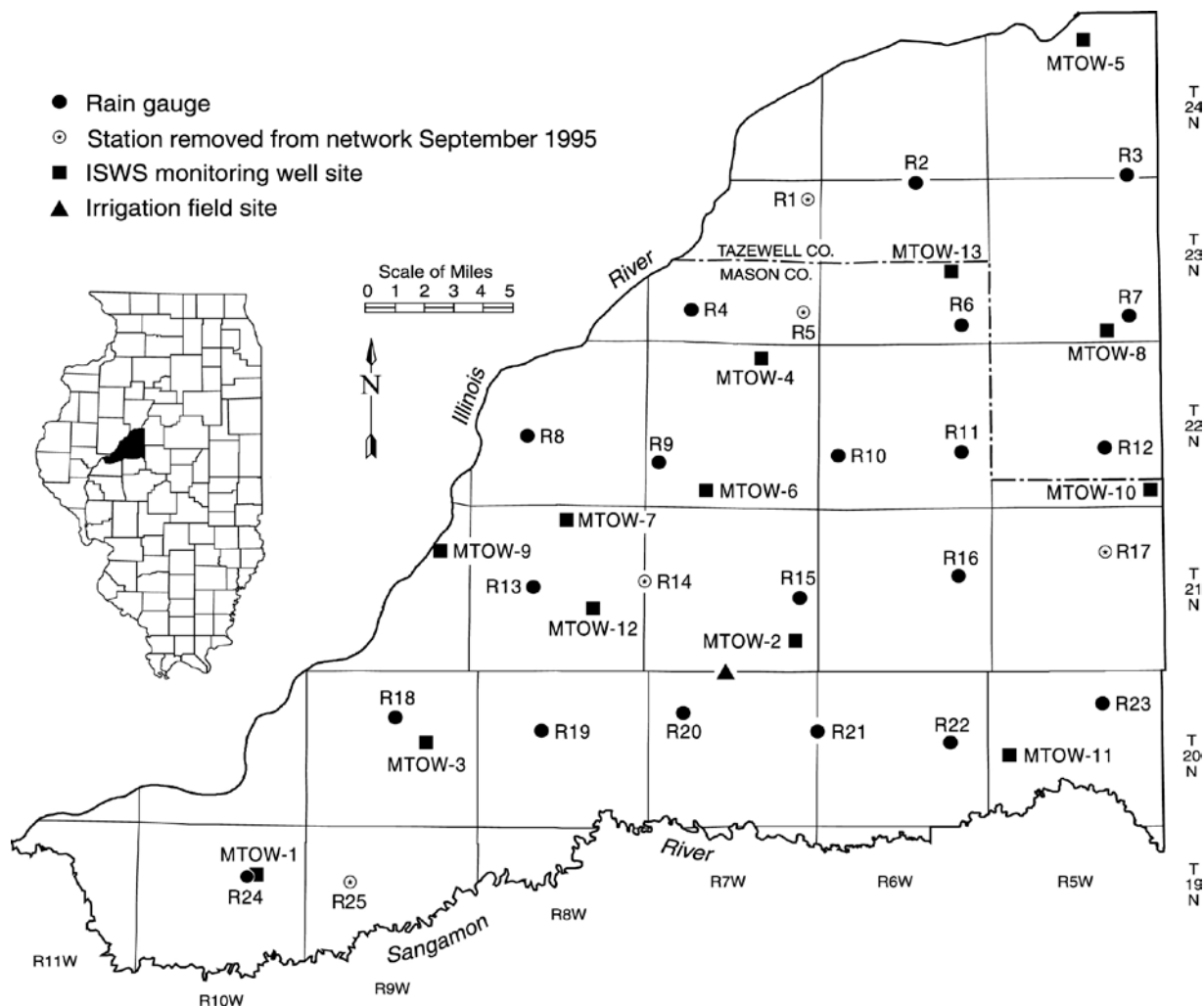


Figure 1. Configuration of the 13-site observation well and 25-site rain gauge networks, and location of the irrigation field site, Imperial Valley, 2009-2010.

The new well (Snicarte #2 or MTOW-01a) was first equipped with the same type of Stevens recorder as the original well (MTOW-01 or Snicarte #1), but has since been converted to a digital data collection system. This digital data collection system is outfitted with telemetry which allows access to the data at the ISWS office via a cell phone modem.

The period of data used for the correlation was from February 28, 2008 until February 24, 2009. The noon measurement was taken from each well and the difference between the two was calculated. An average difference of the two values was calculated to be 18.85 feet. This average value was used to correlate the historical Snicarte data to the new well (Snicarte #2). While the correlation difference is not always exactly 18.85 feet, it does offer a reasonably accurate way to compare any new data collected in the future to the data of the last half century. The hydrograph in figure 4 shows the water level data from the original Snicarte well along with the data from Snicarte #2 and data from Snicarte #2 with 18.85 feet added to the data to show how closely the water levels mimic each other.

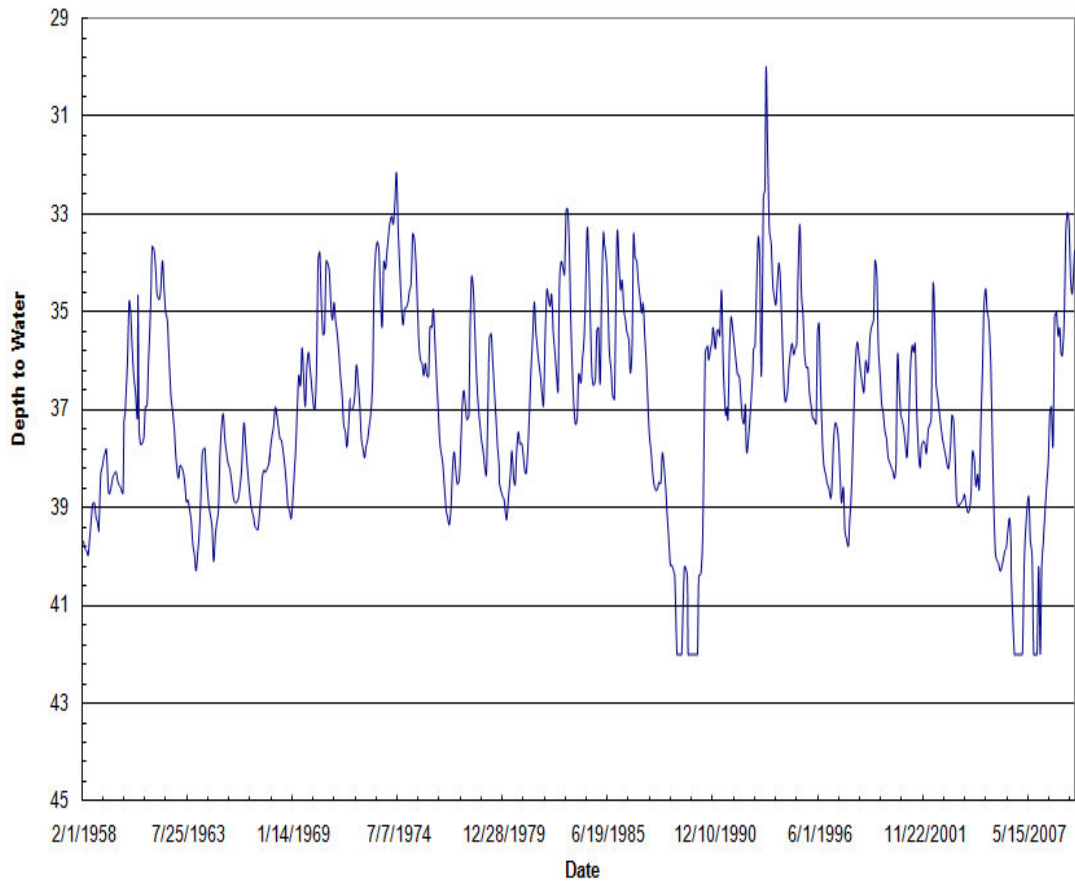


Figure 2. Hydrograph for Snicarte #1 (1958-2009).

GROSCH IRRIGATION CO.

BRANCH Illinois

DATE 9/15/2006

NAME University of Illinois

ADDRESS _____

SEC 14.8h TWP 19 N R. 10 W (10W)
(Locate Testpoint X)

Snicarte Observation well FEET FROM _____ LINE

TEST LOG

FOOTAGE	DESCRIPTION
0	2' Top soil
2	8' Fine sand
8	16' Brown sandy clay & sand
16	33' Fine to medium sand
33	62' Medium sand to fine gravel
	gr Monitor well
	Depth: 62 ft
	SWL: 23 ft

The new Snicarte observation well for the W&M network was drilled on Friday, September 15, 2006, by the Grosch Irrigation Company, Mason City, Illinois. A 1.25-inch diameter straight entry, non-hydro-fractured, to a depth of about 70 feet. An 8-inch diameter PVC casing and 10-foot long, 40-gram well screen was set to a depth of about 62 feet below land surface. The well was gravel packed with Winter Brothers Gravel (WB-407) to a depth of about 40 feet. Bannome chips were placed in the hole up to 3 feet below grade and then back-filled to land surface with cappings.

The well was developed by pumping with air. After about an hour of pumping, the discharge was clear and contained only a few very fine sand grains. The depth to water shortly after pumping concluded was 25.16 feet below the top of casing, which is about 2.74 feet above ground level. A PVC cap was slipped on top of the casing and secured with a set screw.

RDC, 9/18/2006

ISWS Snicarte #2 Monitoring Well

ISWS ID 01393

P# 440802

Mason County (125)

Location:

T.19N. R.10W. Section 14.8h

Figure 3. Well Construction Detail for Snicarte #2.

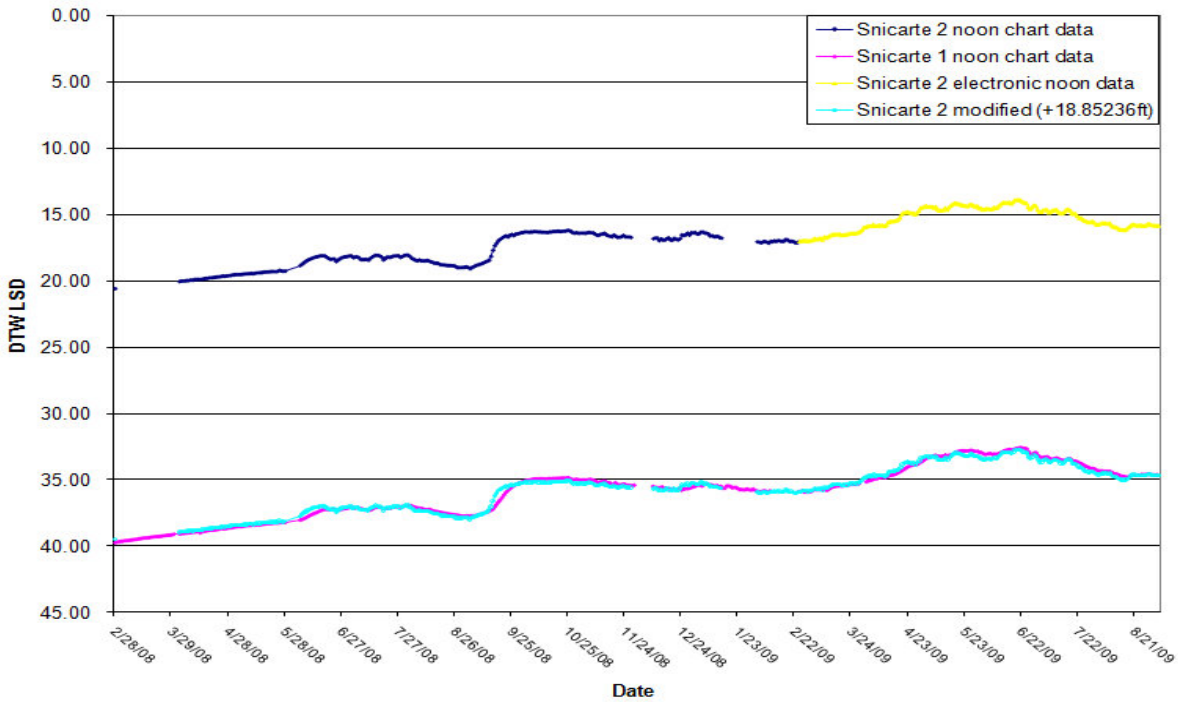


Figure 4. Correlation Hydrograph.

In summary, the ISWS has recorded water levels at the Snicarte, Illinois well since 1958. A new well was drilled to replace the original well with the observation well network to allow data collection during periods of prolonged drought. This new well, Snicarte #2, has replaced the original well with the observation well network and the data for Snicarte #2 includes any historical data collected from Snicarte #1. We are confident the new data collected at Snicarte #2 along with the historical data correlated from Snicarte #1 will serve us accurately and will be of great benefit in the future. The data from Snicarte is available upon request.

Please contact either Kevin Rennels or Steve Wilson if you have any questions or comments.

Sincerely,

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