

San Luis Obispo
Master Water Plan
Water Management Data Collection

This following discussion identifies what data, with respect to water, has been recorded within the County and by whom. Apparent “data gaps,” or areas where there appears to be insufficient data to assess the condition, dependable yield, or status trends of San Luis Obispo County water supplies have been identified. Revisions to current data collection programs, including a cost estimate, have been recommended based on data gaps.

Pertinent Data

The type of data that pertains to water management includes:

Water Supply

- stream flow records
- rainfall records
- ground water levels, including elevation differentials
- reservoir levels
- well logs
- other hydrogeologic information

Water Usage

- water usage records
- cropping patterns / irrigated acreage
- power usage records and efficiency tests for un-metered wells
- evaporation measurements and evapotranspiration rates

Other pertinent water management data are water quality records and recharge volumes associated with wastewater disposal or storm water recharge.

To date, the source of information regarding existing data has been WRAC members and other agencies throughout the County. We acknowledge there are other sources for information, such as the Paso Robles Vintners & Growers Association.

A questionnaire was distributed in December 1997 requesting the types of data, collection points, measuring devices, years of records, sampling interval, etc. We tabulated the data we were aware was being collected and asked for confirmation or corrections.

Table 1 is a list of data collection by Water Planning Area.

Apparent “Data Gaps”

Highlights of our observations regarding current data collection programs are:

1. **Water Level Records** - One of the more valuable pieces of data collected pertaining to long-term trends in ground water basin status is ground water levels. The County maintains a data base¹ of 625 wells, about half of which are currently being tracked. Readings started in the early 1950’s. Water level readings are taken in April and October. Access to wells and ability to measure well levels is getting increasingly difficult. More properties are fenced;

¹ For the most part, ACCESS2 is the data base software being used for data archiving.

gates are locked; more dogs; people want advance notice to access their property, etc. Some wells were dropped from the circuit because of this. Level records are in hard copy and are now being converted into electronic format. Regarding accuracy, County staff makes a point of measuring the data at the same time each year which lends to the usefulness of the information. Level readings are taken at active, private and public wells which occasionally are in operation during the scheduled readings. Although well levels are not read if the pump is on, County staff has no way to tell if the pump has been on as recently as a few minutes, days, or weeks prior to the measurement.

Overall, we observe a decrease in the number of wells at which Spring and Fall static water level readings are taken.

2. **Water Usage** - Records of urban water use abound throughout the County. Water use records for agricultural and rural/ranchette development are lacking. Larger purveyors send water production records annually to the County Engineering Dept. on a voluntary basis. This has been maintained on a Dbase II program written 15 years ago. It is planned to be converted to a more current data base format.
3. **Well Logs** - Perhaps thousands of well logs are on file for locations throughout the County, although a clear policy is lacking regarding release of the log information. Well logs are on file at both the County Engineering and Health Depts.
4. **Stream Gauges** - County ceased measuring approx. 12 stream gauges in 1995. Regarding equipment, five gauges are mercury manometer gauges for which it is getting increasingly difficult to obtain parts.² USGS is replacing their mercury gauges because of risk (i.e. threat of releasing mercury into waterway). One County mercury manometer (at Lopez Reservoir) was replaced in 1992. Stream flow data is kept in hard copy and in data base. Regarding accuracy, County staff is confident in the low flow readings. To estimate higher flows, County uses HECRAS analysis to develop the rating curve, then records flow depth. As in any setting, this method is not highly accurate but is parallel with industry standard for accuracy.

Overall, too few stream gauges are in place throughout the County. This is particularly true in WPAs 1 and 4. WPA 1 is dependent on streams for ground water recharge. For this reason it is vital that flows in the major streams be monitored over time. With one of the major population centers in the County, WPA 4 has no active stream flow gauges. This is as important from a water supply standpoint as it is from a flood control standpoint.

5. **Rainfall Gauges** - County Engineering Dept. maintains rainfall data for numerous locations throughout the County.

Regarding equipment, three types of rain gauges are used;

- Universal weight scale gauges which weigh rainfall and continuously record weight/event,

² Two of the five mercury manometer gauges are scheduled for replacement in 1998. Parts are on order.

- Rain gauges with radio transmitted data³ which measure intensity by tracking the occurrence interval and give a continuous read of rainfall event, and
- Static rain gauges which are read by volunteers. The County purchases and maintains static rain gauges and volunteers retrieve the charts and submit the information to the County yearly.

Rainfall data is kept in hard copy (charts and tabulated readings) and is being converted to data base format. Information exists to generate rainfall intensities, average and peak events, etc. but staff has not developed a routine to readily retrieve such information.

Regarding accuracy, the universal weight scale and radio transmitter gauges require periodic maintenance to sustain accuracy. Charts on the weight scale gauges must be changed weekly.

There appears to be a sufficient number of rain gauges throughout the County, though many provide daily totals only.

6. **Evaporation Pans** - County maintains evaporation pans at Santa Margarita and Lopez reservoirs. Evaporation pans are maintained by others at Whale Rock, Nacimiento, and Twitchell Reservoirs. Regarding accuracy, locations at each reservoir are chosen for security reasons as well as for accurate readings.

The CIMIS station at Cal Poly and the Mobile Lab both gather data by which evaporation can be calculated. In light of this, there appears to be sufficient evaporative pans in operations throughout the County.

7. **Reservoir Levels** - Reservoir level records are maintained at the five major reservoirs.

³ Radio gauges are normally connected to the statewide ALERT system.

Recommended Revisions

We recommend the following revisions to the data collection programs:

1. **Continue collecting Spring and Fall static water level readings** in wells throughout the County. Ground water elevations at these times of the year, when observed over time, are an important indicator of whether a basin is in balance or overdraft. Observed trends in water levels remains one of the most reliable means of evaluating ground water basin status.

County should **construct piezometers** at which water level readings could be taken, within public right-of-way where practical. This would avoid the need to take measurements at private wells, which are either in operation, have recently been pumped, or are influenced by neighboring wells and may not render accurate water table information. County Engineering Dept. staff is the best source of information for prioritizing locations of the proposed piezometers.

Water resource experts value the water level data in assessing the condition of ground water sources. As keeper of the level records, the County should **provide a policy statement** as to the circumstances under which water level records will be made available for water resource planning.

2. Individual purveyors should continue keeping records of urban water use. San Luis Obispo County (WRAC) may embark on a voluntary program for purveyors to **tabulate water usage by Water Planning Area** and water source. No additional reporting would be required to do so. However, usage records would need to be tallied by Water Planning Area to be most useful in the context of this Master County Water Plan Update.

Although similar water usage records for agricultural and rural users would have a value in water management, providing the hardware (meters) and a reporting mechanism would be cumbersome. Alternate methods for estimating non-rural water usage (such as those employed in this Master Water Plan Update) remain a viable method of estimating non-urban water usage.

WRAC should **consider sponsoring a voluntary “pilot program”** which would track actual applied water per acre for various agricultural users throughout the County. The results of the pilot program could be used to evaluate estimates of applied water stated in this Master County Water Plan Update.

3. Water resource experts value the data reflected by well driller’s logs while understanding the confidentiality thereof. As keeper of the well logs, the County should **provide a policy statement** as to the circumstances under which well logs will be made available for water resource planning.
4. The coastal communities in WPA 1, in particular, depend on ground water replenished by local streams for water supply. At least **one gauge per major stream** should be in place in WPA 1. Emphasis on stream gauges should be such that the low flow data has a high degree of accuracy as such events are design events from a water supply stand point.

There are records of one active stream gauge in WPA 4. At least **two additional gauges** are recommended for both supply management and flood assessment. The two gauges should be placed on San Luis Obispo Creek and Davenport Creek, these are two major streams through the City of San Luis Obispo.

Mercury manometer stream gauges should be replaced to avoid risk of release of mercury into waterways. This potential hazard is considered significant enough by the USGS that they have replaced their mercury manometer gauges.

5. While the number of rain gauges appears adequate, the majority of gauges are static rain gauges read daily only. **Continuous-read gauges** which measure storm intensity are of value in flood evaluations and in establishing storm drain design standards. Continuous-read gauges are recommended in WPA 1 along Upper Santa Rosa Creek in particular. No revisions are recommended to evaporative pan nor lake level measurements.
6. There is only one DWR-monitored CIMIS station in the County, located at Cal Poly campus (WPA 4). CIMIS stations track weather data (wind velocity, relative humidity, barometric pressure, etc.) and are useful in irrigation management. The County should **sponsor additional CIMIS stations** for use particularly in irrigation management. Specifically, additional CIMIS stations are recommended in WPAs 6 and 9a. The WRAC should **continue to promote use of the Mobile Lab** as an aide to irrigators throughout the County in efficient timing of irrigation schedules.
7. Another set of recommendations pertains to data format. For the most part, the County Engineering Dept. maintains the records mentioned above, though there is no means by which water planners or others may retrieve the information electronically such as from the Internet.

As a start, the County Engineering Dept. should **complete the data conversions to electronic data base format**. At least three staff members should be trained in the data base software such that “intelligent data queries” can be readily run.

As a second step, the long-term data should be accessible via the Internet such that others may retrieve the data and run individual queries regarding trends.

8. Regarding staffing, we observe that a single individual understands the routine of all current data collection practices. **An assistant should be assigned to data collection** now to:
 - Get existing data bases up to date (i.e. enter hard copy data).
 - Assist in conversions to current data base format.
 - Train at least two other staff members in software queries/report generation.
 - Assist in field data collection procedures.
 - Document data collection procedures.

Estimated Costs

Table 2
Recommended Data Collection Revisions

Recommendation	Basis for Cost Estimate	Estimated Cost 1998 Dollars
Construct piezometers for water level readings	Budget \$10,000 per piezometer; drill one per year	\$10,000 per year
County (WRAC) assembly of urban water use data	2 hours/month at \$35/hour plus \$50/month copying	\$1,500 per year
Issue policy on access to well logs and well level readings	60-80 hours at \$50/hr	\$2,000 one time cost
Install four new stream gauges	\$20,000 to 25,000 per gauge; install one every other year	\$12,000 per year
Replace five mercury manometer stream gauges	\$4,000 per gauge; replace over next 5 years. Disposal costs not included	\$4,000+ per year
Install continuous read rainfall gauge in WPA 1	\$3,500 per gauge including some staff time	\$3,500 per gauge
Install two additional CIMIS stations	\$5,000 equip. cost each site, plus installation; est. 16 hrs/month total at \$35/hour staff time.	\$15,000 for two stations \$6,700 per year wages
Data collection assistant	Full-time Aide/Civil Tech.; 100 hrs training time for other Dept. staff; assume \$35/hour weighted wage.	\$76,300 per year
ANNUAL TOTALS =		\$44,500 equipment \$86,500 wages