V - DATA COLLECTION AND COMMUNICATION NETWORK

5-01 Hydrometeorological Stations.

a. Facilities. Precipitation, stream flow, and reservoir water surface elevation (WSE) data are collected and monitored from gages located throughout the Santa Ana River watershed. Plate 5-01 shows the location of stream gages, and reservoir Water Surface Elevation (WSE) gages, and Plate 5-02 shows the location of precipitation gages pertinent to the operation of Prado Dam. Tables 5-1 and 5-2 list the gages by name and the type of information collected at each station. The data from these stations is available on a real-time basis on the water control minicomputer (Harris 800) via the REPORT and TELEM programs. The data is also used by the Santa Ana River Real-Time (SARRT) Water Control System as well as other forecasting methods described in chapter 6. In addition to the above telemetered data, the WSE, precipitation, downstream gage, and gate settings are manually monitored by the dam tender. Plate 5-03 is a list of the hydrometeorological instrumentation at Prado Dam.

b. Reporting.

(1) Manual. The dam tender observes precipitation, WSE, downstream gage, and gate settings. During the non-flood season (April 15 through November 15) these readings are taken once a week on Monday. During the flood season (November 15 through April 15) they are taken daily Monday through Friday. During flood control operations they are taken as often as the Reservoir Operations Center (ROC) deems necessary.

(2) Recording Instruments. The recording instruments listed on Plate 5-03, record data on paper tape. The paper tape is removed at predetermined intervals and maintained on file by the LAD.

(3) Los Angeles Telemetry System (LATS). Hydrometeorological data measured at the dam and other gages are transmitted to the LAD by the Los Angeles Telemetry System (LATS). These gages automatically transmit reports at 24-hr. intervals. The event mode is the primary means of data collection for the telemetry system. Once a gage is triggered the data is radio-transmitted to a repeater, located on either Pleasants Peak or Mount Disappointment, from which it is sent via microwave to the LAD office. Each gage is programmed to trigger whenever 0.04-in. of precipitation or a 0.25-ft change in WSE is recorded. All gages can also be interrogated at any time for the current condition using a polling option from the Central (Microvax) computer. The data is stored on the Harris 800 minicomputer and is available through the TELEM and REPORT programs. The four letter designation for the LATS WSE station at Prado Dam is PRDO. This WSE gage is

triggered ever 0.1-ft. The downstream stream gage is SAR7 and it is also triggered ever 0.1-ft.

Table 5-1

Los Angeles Telemetry System (LATS) Gages
within and adjacent to the Santa Ana River Basin

Gage Name	Location	Rain Gage (PP)	Reservoir Water Surface Elevation (WS)	Stream Gage (GH)
BEAU	Beaumont	PP	–	–
BREA	Brea Dam	PP	WS	–
CCKC	Carbon Creed below CCYN	–	–	GH
CCYN	Carbon Canyon Dam	PP	WS	–
CONV	Converse Fire Station	PP	–	–
CUCM	Cucamonga Creek Near Mira Loma	PP	–	GH
DBAR	Diamond Bar	PP	–	–
DCDB	Demens Creek Debris Basin	PP	–	–
DEVO	Devore Fire Station	PP	–	–
FLTN	Fullerton Dam	PP	–	–
IDYL	Idyllwild	PP	WS	–
LKMA	Lake Mathews	PP	–	–
LYDB	Lytle Creek Detention Basin	PP	WS	–
MTBY	Mt. Baldy	PP	–	–
OAKG	Oak Glen	PP	–	–
PRDO	Prado Dam	PP	WS	–
RIFC	Riverside County Flood Control and Water Conservation District	PP	–	–
RSPR	Running Springs	PP	–	–
SAR5	Santa Ana River at 5th St. in Santa Ana	PP	–	GH
SAR7	Santa Ana River at Hwy. 71	–	–	GH
SARE	Santa Ana River at E St. in San Bernardino	–	–	GH
SARM	Santa Ana River near Mentone	–	–	GH
SBFC	San Bernardino Flood Control District	PP	–	–
SNTO	San Antonio Dam	PP	WS	–
STCL	San Timoteo Creek Near Loma Linda	PP	–	GH
TCKC	Temescal Creek Near Corona		–	GH
VLPK	Villa Park Reservoir	PP	WS	–

Table 5-2

ALERT System Gages within and adjacent to the Santa Ana River Basin

Gage No.	Location	Precipitation Gage (PP)	Reservoir Water Surface (WS)	Stream Gage (GH)
	Orange County			
201	Santiago Peak	PP	–	–
203	Plano Trabuco	PP	–	–
220	Villa Park Dam	PP	–	–
231	Silverado Canyon	PP	–	–
233	Modjeska Canyon	PP	–	–
234	Santiago Dam	–	WS	–
235	Santiago Dam	PP	–	–
236	Santiago Creek at Bristol	–	–	GH
241	Miller Basin	PP	–	–
242	Prado Dam	–	WS	–
244	Prado Dam Outflow	–	–	GH
245	Prado Dam	PP	–	–
246	Santa Ana River at Imperial Hwy.	–	–	GH
251	Oak Flat	PP	–	–
261	Brea	PP	–	–
	Riverside County			
805	Riverside Flood	PP	–	–
810	Gavilan Hills	PP	–	–
855	Camp Scherman	PP	–	–
865	Juniper Flat	PP	–	–
870	Red Mountain	PP	–	–
875	Pigeon Pass Dam	PP	–	–
878	Angeles Hill	PP	–	–
881	Alandale	PP	–	–
884	San Jacinto River	–	–	GH
887	Railroad Canyon Dam	PP	–	–
890	Perris Valley CH	PP	–	–
	San Bernardino County			
819	Chino Creek	–	–	GH
820	Chino Creek	PP	–	–
824	Cucamonga Creek	–	–	GH
825	Cucamonga Creek	PP	–	–
828	San Antonio Dam	PP	–	–
830	Raywood Flat	PP	–	–
832	Camp Angelus	PP	–	–
835	Santa Ana River at Mentone	–	–	GH
836	Santa Ana River at Mentone	PP	–	–
841	Santa Ana River at E St.	–	–	GH

(4) ALERT System. The Automatic Local Evaluation in Real-Time (ALERT) system is a cooperative flood warning system sponsored by the NWS. The ALERT gages are also event recording gages. Information from the gages is sent to the LAD and stored on the Harris 800 minicomputer. The data is available through the REPORT program.

Three ALERT stations are located at Prado Dam. They are station numbers 242, 244, and 245 which monitor WSE, downstream stage, and precipitation, respectively.

c. Maintenance. The instruments at Prado Dam listed in Plate 5-03 and the LATS gages listed in Table 5-1 are maintained by the Water Control Data Unit, Reservoir Regulation Section of the LAD. ALERT gages listed in Table 5-2 are maintained by the individual counties.

5-02 Water Quality Stations.

a. Facilities. The LAD does not maintain any water quality stations at Prado Dam. The USGS, San Bernardino Office, maintains a water quality gage below Prado Dam, and the California Regional Water Quality Control Board (CRWQCB), Santa Ana Region regularly takes samples at Prado Reservoir. Other agencies which collect and monitor water quality on the Santa Ana River include, but are not limited to, the California Department of Water Resources, the Orange County Water District, the Riverside County Health Department, and the Santa Ana Watershed Project Authority (SAWPA).

b. Reporting. At present, water quality data is not available on a real-time basis at the LAD. No formal agreements exist between the above mentioned agencies and the Corps to transmit water quality data directly to the LAD. The LAD does, however, collect water quality data on an annual basis in conjunction with the preparation of the annual Water Quality Management Report. The report is prepared in accordance with ER 1130-2-334, "Reporting of Water Quality Management Activities at Corps Civil Works Projects", dated 16 December 1977.

Many of the agencies which collect the above data publish annual summaries of their findings. Data collected by the DWR and the CRWQCB are published annually on microfilm by the State of California Water Data Information System (WDIS). The USGS data is published in Water Resources Data for California which is published each water year. The EPA's STORET data base is also a source for water quality data.

c. Maintenance. The LAD has no maintenance responsibilities with respect to water quality stations.

5-03 Sediment Stations.

a. Facilities. The USGS, at the request of the LAD, maintains two sediment stations on the Santa Ana River. One is at E Street near San Bernardino (USGS DO# 11059300) and the other is at 5th Street in Santa Ana (USGS DO# 11078000). The periodic sediment stations use U.S. Depth-Integrating Samplers, which accumulate a water-sediment sample as the sampler is lowered to the stream bed and raised to the surface at a uniform rate.

b. Reporting. At present, sedimentation data is not available on a real-time basis at the LAD office. The USGS collects, compiles, and publishes sediment data on an annual basis in Water Resources Data for California.

c. Maintenance. The LAD has no maintenance responsibilities with respect to sediment stations.

5-04 Recording Hydrologic Data. Each agency maintains records of its own data. The NWS Data are archived at the NOAA, National Climatic Data Center in Asheville, North Carolina. Precipitation and other data are published monthly by the National Climatic Data Center in Climatological Data and Hourly Precipitation Data.

The State of California, Department of Water Resources, publishes monthly data from the ALERT telemetry gage network. The OCEMA, Riverside County Department of Public Works and The San Bernardino County Department of Public Works archive their recording and non-recording data and will furnish these data to other agencies upon request. The LAD maintains pertinent hydrologic data files from different sources.

The LAD maintains a file of data from its recording and telemetry gauges and provides selected data to the NWS for publication. The LAD also enters data from its manual observations on various forms, which are maintained on file in the District. The reservoir information, reported to the ROC via radio or telephone is entered into the RESCAL computer program which stores the data in a computer database and generates a "Daily Reservoir Report" for internal distribution.

The dam tender maintains a record of the WSE, downstream gage height, and the gate positions on SPL Form 19 - Flood Control Basin Operation Report (FCBOR). The Water Control Data Unit of the LAD calculates inflows from data collected on the FCBOR's. These calculations are made on SPL Form 30 - Reservoir Computations and are stored at the Base Yard Office, located in El Monte, 11 miles east of the downtown district office. Examples of both forms are on Plate 5-04.

Data from the ALERT and LATS stations are stored in computer-data files at the LAD office.

5-05 Communication Network. The LAD maintains a voice radio communication network connecting the ROC with all of its projects. This FM radio system uses repeaters on Mount Disappointment or Pleasants Peak. When communicating with Prado Dam the Pleasants Peak repeater should be used. This radio network is backed up by a second, parallel radio system.

Power at each dam, is backed up by an emergency generator system. If all systems fail at the District Office there is a complete radio system at the District's Base Yard.

5-06 Communication with the Project.

a. Between the ROC and Prado Dam. During the flood season (15 November through 15 April), a routine radio call is made at least once each weekday from the District Office to the Dam Tender at Prado Dam. A Reservoir Operation Report, or "Morning Report", is usually made at 0800 hours, Monday through Friday. During flood events the reporting interval is usually reduced to one hour, with the ROC originating the call. The Base Yard is used as an alternate communication center.

In the event that all communications with the District Office, including the Base Yard, should be interrupted, a set of Standing Instructions to the dam tender (Exhibit A) has been compiled for Prado Dam.

b. Between Prado Dam and Others. No routine communication exists between Prado Dam and other agencies.

c. Between the ROC and Others. During normal operating conditions, the LAD is in contact with officials of OCEMA's Storm Center and with the OCWD. Continuous coordination with OCEMA is maintained during extended periods of flooding.

A list of agencies to be notified, with applicable office and home telephone numbers, is published annually in the LAD's Instructions for Reservoir Operations Center Personnel (unofficially called the "Orange Book"). The ROC is also in direct radio contact with channel observers dispatched to patrol the downstream channel during significant floods.

5-07 Project Reporting Instructions. During periods of flood control operation, communications between the ROC and the dam tender are made on a frequent basis, normally once each hour. A more frequent interval of communications may be requested by ROC personnel if needed. If a gate change is required, the ROC broadcasts the gate change instructions to the dam tender. When the gate change is completed, the dam tender calls back to the ROC with confirmation of the gate change, time gate change was completed, and current WSE.

Other instructions to the dam tender are conducted in a similar manner. This network of radio communications is also used by the dam tender to report any mechanical failures or other problems at the dam.

Through the utilization of a real-time computerized gaging network, the ROC regularly monitors water surface elevation in the reservoir and the releases and stream flows at various locations within the Santa Ana River watershed.

5-08 Warnings. The responsibility for issuing all weather watches and warnings and all flood and flash flood watches and warnings rests with the NWS. Local emergency officials of cities and counties are responsible for issuing any public warnings regarding unusual overflows, evacuations, unsafe roads or bridges, toxic spills, etc. The LAD makes notifications to local authorities when critical WSE's are reached and critical release rates are initiated. The notifications list is updated on an annual basis and can be found in the LAD's "Instructions For Reservoir Operations Center Personnel" commonly referred to as the "Orange Book". In the event of a dam break the Emergency Action and Notification Subplan notebook for Prado Dam should be consulted. Copies are located in the ROC and the LAD's Emergency Operations Center (EOC).