APPENDIX B

A PROPOSED PRECIPITATION GAGE AND GAGE NETWORK SYSTEM

The concept of telemetered rainfall data is not new, however the precipitation gage proposed herein, can assist flood control and forecasting agencies in improving their product to the user.

A network of 6 to 12 precipitation gages would be placed in a river basin, with line of sight communications to the responsible agency's operation unit. (ref. Fig 1) This agency would have a mini computer installation placed to receive the signals from the precipitation gages. These proposed precipitation gages are non-interrogatable and would be a self reporting tipping bucket type.

The site locations in the field (ref. Fig 2) should meet local requirements of meteorological and hydrologic conditions. This gage is approximately 8 to 10 ft. in height, (above ground level), and would be made from stock material, such as 12 inch irrigation pipe, or other similar materials.

The basic design of the proposed precipitation gage eliminates much of the problems with vandalism. This is because the main structure of the gage does not contain any equipment or access doors that could be shot full of holes, or damaged. The top 18 inches of the gage is a separate and removable unit which contains the tipping bucket mechanism, (ref. Fig 3). No other equipment is contained in this top unit, although the 12 inch O.D. funnel and screen are removable from the top. The top is held in place by several sheet metal screws and contains several 3/4 inch drain vents to allow the water to drain as the bucket tips. The funnel is placed in the top so as to allow 1 1/2 inch of the orfice to be

above the wire screen, (ref. Fig 4). The funnel holds 1/4 inch mesh hardware cloth or screen, to keep debris out of the tipping bucket. The removable top, has a plate welded 2 inches up from the bottom. This plate holds the tipping bucket unit, has an air vent to allow condensation to escape from the lower unit and prevents the water from flowing into the base section, from the tipping bucket. The radio unit and battery package is to be contained in the lower 2 ft. of the 12 inch diam. standpipe. The lower 2 ft. is buried underground. (ref. Fig 5) The radio-battery package would be placed in an insulated box, with cables attached to the box and to the upper part of the standpipe, allowing the "package" to be pulled up, to be serviced or replaced. The concept of burying the radio-battery package underground and accessing the "package" from the top of the gage, would be the elimination of a door and padlock, on the lower portion of the standpipe, thereby eliminating a temptation to vandals.

Once the precipitation regime starts and the tenth inch bucket tips, it trips a mercury switch and allows the radio to send the signal to the appropriate mini computer.

The agencys mini computer is programmed prior to the storm and contains the appropriate information concerning basin conditions and requirements necessary for producing streamflow warnings or relaying information to the joint river forecast center. As the precipitation gages send their information, the "mini" stores and compares rainfall rates, with internally stored values. A visual display map of the river basin could be set up, with warning light placed in appropriate areas depicting the

rainfall gages. (ref. Fig 6) As rainfall intensities increase, a light or signal would flash, if the intensity rate meets or exceeds criteria that would produce warning or flood stage in the stream. The same concept of warning lights or signals could be set up for critical stream levels.

In Fig 7, a visualization of a possible network of proposed precipitation gages and the mini computer site, is shown. As an example, in the Kern River Basin, a mini computer might be placed in Bakersfield, with several raingages located in the basin, in line of site of the mini computer. The low equipment costs of this type system would allow numerous networks throughout the state, (ref Fig 8), which would serve local agencies, and be linked through a California cooperative hydrologic center, to produce a statewide system, (ref Fig 9).

In summary of the proposed precipitation gage and network system, the following items were considered:

Proposed precipitation gage features:

Lower cost equipment
Lower maintenance costs
Rainfall data transmitted automatically
Non-interrogatable and non-recording
Battery operated on low voltage requirements,
no recharging equipment required
Less susceptable to vandalism
Stock material available

Proposed network of rain gages features:

Low cost mini computer system
More data available at lower equipment costs
Timely warnings (savings of lives and property)
Lower installation costs
Low maintenance costs on gages
Local agency collection and monitoring

Automatic receipt of data (immediate observation)
Temporary storage of data (up to 10 days)
Interagency communications (shared data)
(also state and inter-state communications)