

studies were completed, additional information has become available about peak flows and flood plain elevations that will significantly change the flood estimates these maps display. However, complete restudies using traditional methods are expensive and time consuming, so it is unlikely that the maps can be updated quickly enough to meet demand.

Flood maps updated with Geographic Information Systems techniques have many advantages. They are:

- Relatively inexpensive. According to Jones and others (1998), costs are about 10-20 percent of a re-study using traditional methods. Therefore, frequent updates are more feasible.
- Typically more detailed. Digital maps can provide information like depth-of-flood, identify areas where uncertainty in flood or land elevations causes uncertainty in extent of flood inundation, and easily combine with other digital data, such as locations of roads and buildings.

3.4.2 Essential Facility Inventory Exposed to Flood Hazards in Riverside County

An advantage of GIS data is the ability to run simple queries on digital data sets. For example the inventory of essential facilities and hazardous materials sites available from national data sets (FEMA, 1999) can be overlain on the 100 and 500 year flood hazard zones. The results of these queries are presented in Table 3-4.

Table 3-4: Facilities in Riverside County Exposed to Flood Hazards

| Facility Type | Total No. in County* | No. in Flood Hazard Zones |
|--|----------------------|---------------------------|
| Airports | 39 | 14 |
| Hospitals | 18 | 4 |
| Police Stations, Fire Stations and Emergency Operation Centers | 109 | 47 |
| Schools | 380 | 92 |
| Highway Bridges | 1,306 | 446 |
| Hazardous Materials Sites | 1,978 | 695 |

*: Based on HAZUS '99 various national-level inventories

3.5 County Flood Control and Reservoir Projects

3.5.1 Seven Oaks Dam

The Seven Oaks Dam was completed in 1999 by the U.S. Army Corps of Engineers, Los Angeles District, as part of the Santa Ana River Mainstem Project. The dam sits on the Santa Ana River in the upper Santa Ana Canyon about 14 miles northeast of Riverside County. It is an important flood control structure for the Santa Ana River channel through northwestern Riverside County. Historical flood flows on the Santa Ana have exceeded 300,000 cfs.

The Seven Oaks Dam project consists of a zoned, earth-filled embankment, spillway, outlet tunnel, air shaft, gate chamber, and intake structure tower. Seven Oaks is the 12th highest dam in the country and provides flood protection to the growing urban communities of Orange, Riverside, and San Bernardino counties. It operates in tandem with Prado Dam, about 40 miles downstream. During the early part of each flood season, runoff is stored behind the dam in order to build a debris pool to protect the outlet works (U.S. Army Corp of Engineers, 2000). Small releases are made on a continual basis to maintain the downstream water supply. During a flood, Seven Oaks Dam will store water destined for Prado Dam for as long as the reservoir pool at Prado Dam is rising. When the flood threat at Prado Dam has passed, Seven Oaks will begin to release its stored flood water at a rate which does not exceed the downstream channel capacity. At the end of each flood season, the reservoir at Seven Oaks will be gradually drained and the Santa Ana River will flow through unhindered.

3.5.2 Prado Dam

Prado Dam is a flood control and water conservation project constructed and operated by the U.S. Army Corps of Engineers, Los Angeles District. Completed in 1941, the project is built at the upper end of the Lower Santa Ana River Canyon, at a natural constriction controlling 2,255 square miles of the 2,450 square mile Santa Ana River watershed. The dam embankment is located in Riverside County approximately 2 miles west of the City of Corona. Portions of the reservoir are in both Riverside and San Bernardino Counties (California Division of Safety of Dams, 2000). The dam is approximately 30 miles upstream of the Pacific Ocean. Prado Dam is the downstream element of the Santa Ana River flood control system. Its purpose is to collect runoff from uncontrolled upstream drainage areas along with releases from other storage facilities.

The historic maximum release from Prado Dam was 5,992 cubic-feet per second (cfs) on February 22, 1980 (California Division of Safety of Dams, 2000). Historically, releases larger than 5,000 cfs have been damaging to downstream improvements.