

CHAPTER 1

INTRODUCTION

1.1 Purpose of Report

This report summarizes and explains the work done as part of Phase 2 of the Pajaro River Watershed Study. This phase included preliminary identification of all project alternatives that provided 100-year flood protection, and the selection of the most feasible alternatives for more detailed study in future phases.

Flood protection measures that include both upstream and downstream alternatives were identified and defined. In this report, the alternative projects were conceptually defined by identifying a possible project location and size, the advantages and disadvantages, a planning level cost estimate, and the approximate level of flood protection.

Once the alternatives and their flood protection capabilities were outlined, the alternatives were packaged into groups of projects that provided 100-year flood protection. Package elimination and comparison criteria were established to differentiate between the packages. Further evaluation of the alternative packages led to the conclusion that some of the alternatives were not feasible due to various factors such as lack of public support, high costs, environmental regulations, or prohibitive construction constraints. The overall list of alternative packages was trimmed by applying the elimination criteria for these factors. The comparison criteria were used to identify nine packages from the remaining alternative packages for detailed study.

This introduction provides background information on the project including the formation of the Pajaro River Watershed Flood Prevention Authority (Authority), the physical setting and history of the watershed, a brief summary of Phase 1 of the Pajaro River Watershed Study (PRWS), and a discussion of the purpose of this report.

1.2 Background

Legal Authority

The Pajaro River Watershed Flood Prevention Authority was established in July 2000 in order to “identify, evaluate, fund, and implement flood prevention and control strategies in the Pajaro River Watershed, on an intergovernmental basis.”¹ Since the watershed covers areas of four counties and four water districts, the board is comprised of one representative from each of the following agencies:

- County of Monterey
- County of San Benito
- County of Santa Clara
- County of Santa Cruz
- Monterey County Water Resources Agency
- San Benito County Water District
- Santa Clara Valley Water District
- Zone 7 Flood Control District

¹ Keeley, “Assembly Bill 807: Pajaro River Watershed Flood Prevention Authority Act.” October 10, 1999.

The Authority acts as a governing body through which each member organization can participate and contribute to finding a method to provide flood protection in the watershed and promote general watershed interests. In addition to flood protection, some identified benefits include:

- Municipal, agricultural, and industrial water supply
- Groundwater recharge
- Support of rare, threatened, or endangered species
- Migration and spawning of aquatic organisms
- Preservation of wildlife habitat²

Although efforts by individual agencies have been made in the past to prevent flooding, the ultimate solution may require coordination of structural and non-structural projects throughout the four counties that make up the watershed. Flooding throughout the lower Pajaro River reaches is a hazard to public and private property including residences, agriculture, highways, watercourses, and environmental resources. Recent floods have caused millions of dollars in damage.

As described in the enabling legislation State Assembly Bill 807, the goal of the Authority is to implement flood prevention and control strategies within the watershed. It is a further goal of the study to identify strategies and projects that will provide multiple benefits, such as drinking water, ground water recharge, or environmental restoration and protection.

Watershed Setting

The Pajaro River is the largest coastal stream between the San Francisco Bay and the Salinas Watershed in the County of Monterey.³ The watershed is approximately 1,300 square miles.

The watershed covers portions of Santa Cruz, Santa Clara, San Benito, and Monterey Counties. The large size contributes to the number of diverse environments, physical features, and land uses within the watershed boundary. Tributaries to the Pajaro River, the largest of which is the San Benito River, originate throughout the watershed. A relief map of the watershed showing major highways, cities, dams, and rivers is shown on Figure 1-1.

Soap Lake is an intermittent feature of the watershed but has been found to be an extremely important flood protection feature. Upper Soap Lake is also known as San Felipe Lake and is a permanent body of water. Lower Soap Lake, referred to in this report as Soap Lake, will be formed in the floodplain between San Felipe Lake and the Highway 101 crossing. Soap Lake is created when flood events cause the flooding of low-lying areas and flow backup on the Pajaro River upstream of the San Benito River. The backwater effect is caused by a narrow passage known as Chittenden Pass that is located at the southern edge of the Santa Cruz Mountains. This upper reach of the Pajaro River acts as a natural control to reduce peak flows from the upper Pajaro River watershed. The lake effects disappear as the floodwaters recede and low-lying areas are drained.

Development within the watershed, both urban and rural, is clustered around the major cities. The major urban centers are Watsonville, Gilroy, Morgan Hill, Hollister, and San Juan Bautista. Agriculture and grazing are the dominant land uses in these areas but represent a small portion of the total watershed land use. Other industries outside of the urban setting include mining and timber harvesting. The majority of the land cover is grassland, shrubland, and forest. Figure 1-2 shows the spatial distribution of the land uses.

² "Draft Water Quality Management Plan for the Pajaro River Watershed." Prepared for Association of Monterey Bay Area of Governments. March 1999.

³ Ibid.

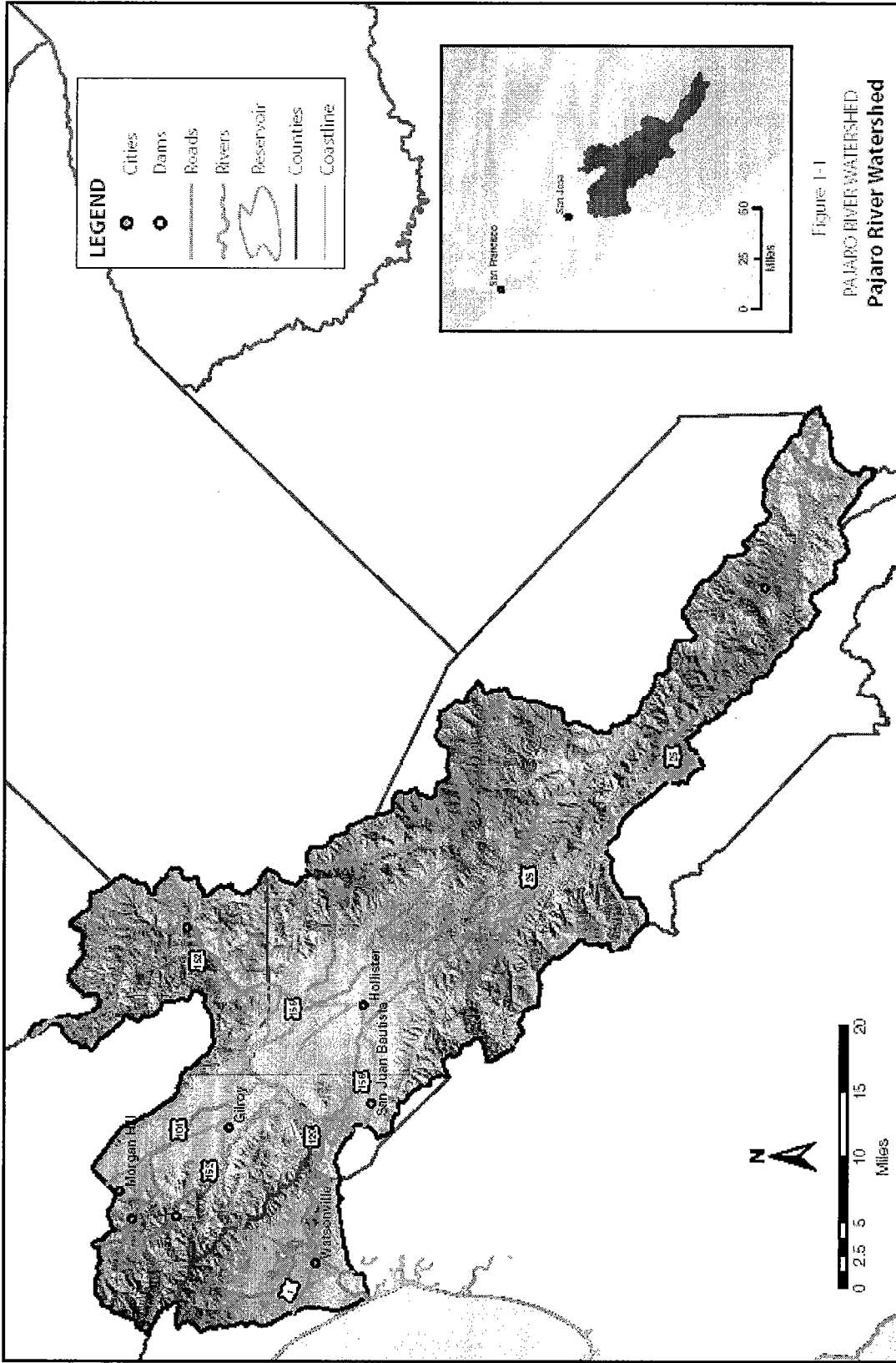


Figure 1-1: Pajaro River Watershed

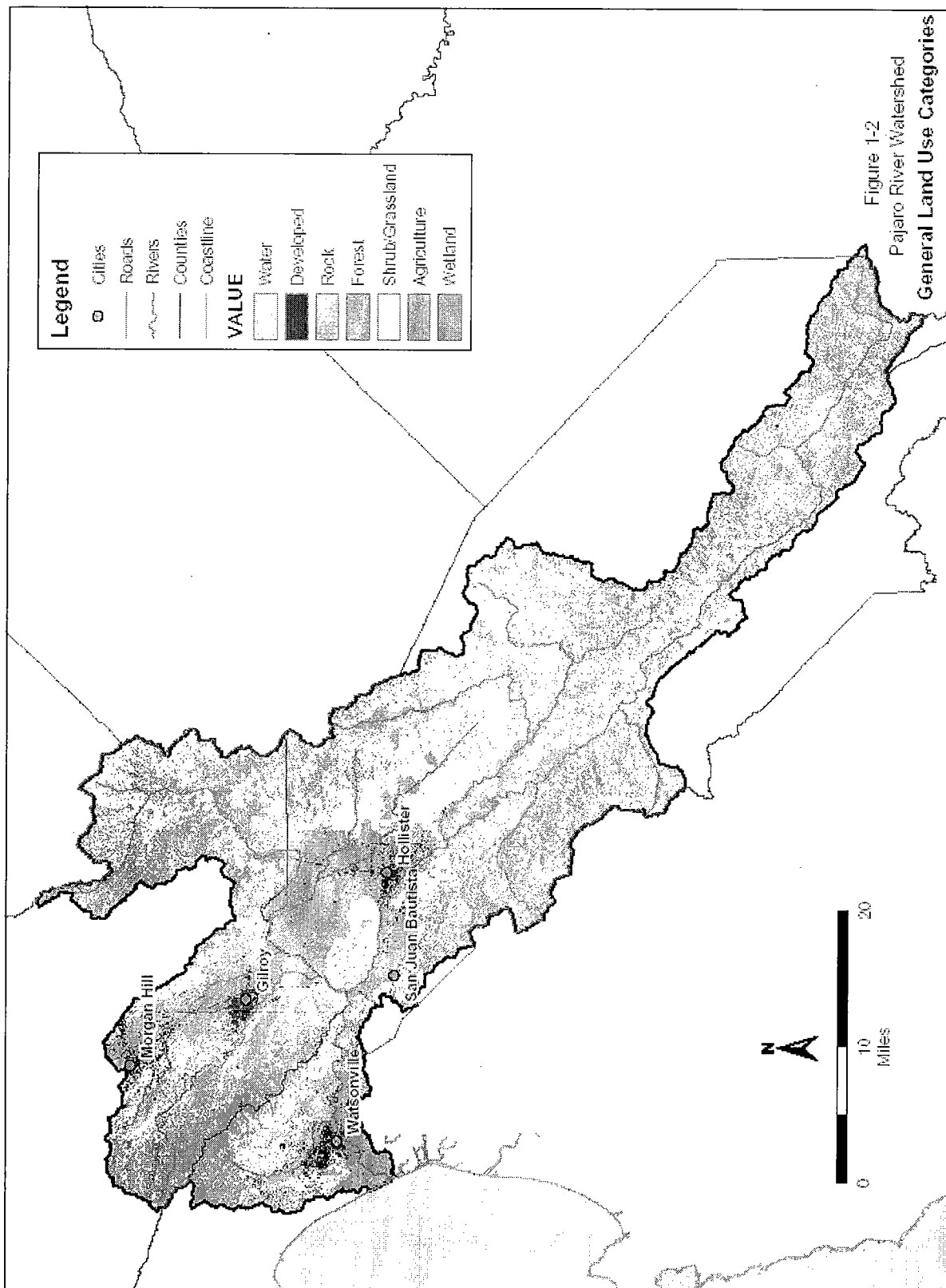


Figure 1-2: General Land Use Categories

Over the recent years, rivers within the watershed have had significant water quality issues. They have been listed on the Clean Water Act 303d list for nutrients, sediments, fecal coliform, chloride, dissolved oxygen, sodium, and total dissolved solids. These pollutants limit the uses of the water and reduce the environmental benefits.

Phase 1 Results

Phase 1 of the study established hydrology and sediment models to describe the flood impacts of watershed conditions. These models described the peak and 3-day discharge at four watershed locations in lower half of the Pajaro River watershed for six flood return periods. Table 1-1 summarizes the 25-year, 50-year, and 100-year event peak discharges at each of the four locations under buildout conditions for the current General Plan land use documents. This planning horizon occurs during the period from years 2015 to 2020.

Table 1-1: Hydrologic Model Peak Flows Based on General Plan Buildout Conditions

Watershed Location	Peak Model Flow Rate (cfs)		
	25-year Event	50-year Event	100-year Event
San Benito River	18,800	26,200	31,600
Soap Lake Outlet on Pajaro River	21,600	27,400	30,700
Chittenden Gage on Pajaro River	29,300	38,400	44,400
Pajaro River downstream of Salsipuedes Creek	32,700	43,100	49,600

Figure 1-3 is a schematic of the four locations in the lower half of the Pajaro River watershed. As listed in Table 1-1, the San Benito River 100-yr peak flow is 31,600 cfs and the Pajaro River 100-yr peak flow at the Soap Lake outlet is 30,700 cfs. However, due to the time difference between peak flows on each river, the cumulative peak discharge of these two rivers at Chittenden and the Murphy Road Crossing is a lower flow rate, at about 44,400 cfs. The channel capacity just downstream from Chittenden is about 19,000 cfs, based on the design channel size and levee conditions. However, the channel capacity certifiable by the Corps based on current channel and levee conditions could be much lower, at 9,000 cfs. The design conditions of 19,000 cfs for channel capacity were used in this analysis. Flow from Salsipuedes Creek increases the peak discharge in the lower Pajaro River. The Pajaro River flow of 49,600 cfs just downstream from the Salsipuedes Creek confluence is the design flow for the 100-year flood event. The existing channel capacity in the lower reaches of Pajaro River is approximately 22,000 cfs, which is well below the expected 100-year flood event. Frequent flooding occurs in the region because of the lack of flood flow capacity in the river channel downstream of Chittenden.

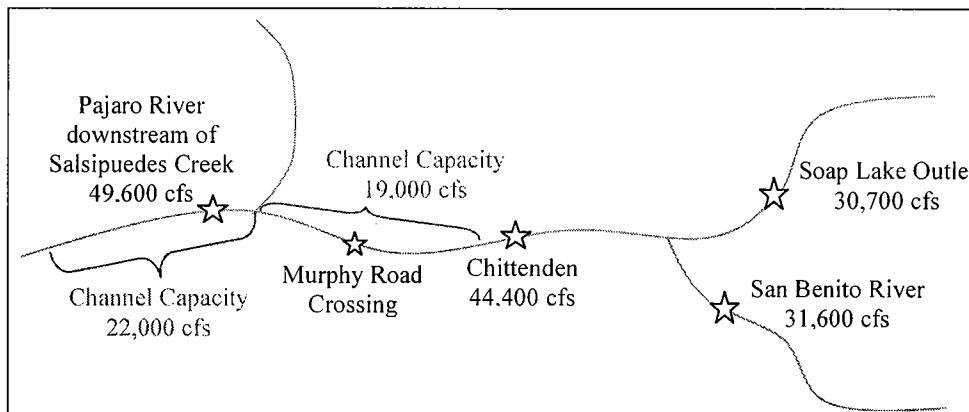


Figure 1-3: 100-Year Return Period Peak Design Flows on the Lower Pajaro River.

The following results and conclusions were based on the hydrologic modeling work:

- Since 1947, the addition of three reservoirs (Hernandez, Uvas, and Chesbro dams) reduced peak flood flows and the probability of flooding in the lower Pajaro River.
- Neither current agriculture conditions nor potential changes in agricultural conditions will cause significant changes in the design discharge or flood conditions.
- Urbanization will increase the runoff from events with frequent return periods (2-year to 25-year), but causes little change in runoff from larger storms with longer return periods (50-year to 200-year).
- Flooding in the Soap Lake area provides peak flow attenuation of Pajaro River flows upstream of the San Benito River confluence, and this situation has been assumed to continue for the Corps peak flow design conditions.

The following results and conclusions were based on the sediment modeling work:

- Sediment conditions within the Pajaro River channel should not be significantly altered by the small, predicted changes in peak design discharges.
- Significant growth of shrubby vegetation could be expected to cause an increase in sediment deposition.
- Changes in sediment load may have localized impacts at the confluence of the San Benito and Pajaro Rivers, but do not affect the Lower Pajaro system as a whole.
- The flooding along Soap Lake limits sediment discharge from the Pajaro River upstream of the San Benito River confluence.

Since the results and conclusions of the sediment studies indicated that sediment conditions would not change significantly from existing conditions, the alternatives developed during Phase 2 were focused primarily on reduction of flooding risk within the lower Pajaro River. However, sediment management impacts were considered for alternatives with incidental effects on sediment conditions, such as reservoirs and detention basins.