
CHAPTER 2

IDENTIFICATION OF FLOOD PROTECTION ALTERNATIVES

Flood protection alternatives for the Pajaro River were developed by the interagency Staff Working Group at a focused project workshop. The goal of the workshop was to identify multi-objective projects that, taken in combination, would provide 100-year flood protection while enhancing opportunities for water supply, environmental restoration, groundwater protection, and intergovernmental participation. The focus of the workshop was to identify alternatives that maximize the benefits to the Valley. Many alternatives were identified at the workshop and others were developed from the initial alternatives. The alternatives were subjected to a cursory examination for feasibility, magnitude of benefits, and implementation constraints.

This chapter introduces the alternatives and provides a summary of the basic project concepts, feasibility, and benefits. Each of the projects is described in greater detail in Chapter 3. This chapter also includes a brief description of the land acquisition and/or land management alternatives that may be necessary for the various alternatives.

The general conclusions of the cursory examination of the project alternatives are as follows:

- A few single projects, reservoirs or conveyance structures, may completely protect against flooding, but most projects will provide only an incremental level of flood protection
- New dams or the raising of existing dams involve significant environmental limitations.
- Each alternative will require acquisition of land for either construction of the project alternatives or for floodplain easements.

2.1 Preliminary Identification of Alternatives

The Phase 1 models were used to identify the flood protection benefits possible through implementation of a particular alternative. Three types of alternatives were reviewed, including upstream flow retention/detention, downstream flow management flood protection, and sediment management for potential erosion/sediment control. These are described below.

Upstream Alternatives

These alternatives generally rely on flow detention or retention to improve flood protection. Flow detention attenuates the peak flow through storage of flood flows, creating a lower peak flow at a later time in the storm. Flow retention uses the capture of peak flows to prevent high flow rates from occurring in the downstream channels. Examples of these alternatives are new detention and retention in new developments, increased regional detention and retention capabilities at existing locations (i.e. expansion of Soap Lake or raising of existing dams), and construction of a new detention and retention facilities, such as new dams on the Pajaro or San Benito River.

Downstream Alternatives

These alternatives require the modification of downstream channels and floodplains to reduce risk of flood damage. The most common type of improvement is to increase downstream channel capacity. Channel improvement may be structural, as in the case of increased levee heights or floodwalls, to provide sufficient capacity to convey the expected peak flow event. Alternatives may also be non-structural, such as dedication of

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specific lands as floodplains. In this case, formerly flood-prone lands are restored by removing flood flow obstacles in the floodplain.

Sediment Management Alternatives

These alternatives would generally include best management practices for managing land in the watershed, bank stabilization measures along streams, and revisions to maintenance practices regarding sediment removal. Since the Phase 1 sediment studies indicated that sediment conditions would not change significantly from existing conditions, the alternatives developed during Phase 2 were focused primarily on upstream and downstream alternatives to reduce flooding risk.

The Pajaro River Watershed stretches across four counties and multiple cities, and the river itself drains many square miles of coastal plains, providing opportunities for many distinct projects throughout the watershed. The size of the watershed and the magnitude of the peak discharge allow either single projects or combinations of projects implemented together to mitigate the flooding problems on the lower Pajaro River. However, a multiple benefit solution for the watershed would require that several projects be initiated and coordinated with each other to provide the lower Pajaro River flood protection with the maximum range of benefits.

Workshop participants reviewed the Phase 1 hydrology and sediment modeling results. Many project types and alternatives were considered including the following:

- Creating local detention basins,
- Creating regional detention basins,
- Increasing capacity of existing dams,
- Constructing new dam(s),
- Upgrading existing levees,
- Constructing new levees,
- Constructing overflow bypasses, and
- Constructing underground bypasses.

The alternatives developed during the workshop, as well as a cursory estimate of their potential benefits and constraints, are listed in Table 2-1. A more detailed description of the alternatives, their benefits, and their constraints is provided in Chapter 3.

Several upstream and downstream alternatives were estimated to have potential for significant impacts on flood protection. These alternatives were a flood channel bypass on the Lower Pajaro River, control of Soap Lake at Chittenden, and a setback levee with wetlands in the Lower Pajaro River region. Each alternative could be sized to provide 100-year flood protection to meet the flood protection benefit criteria, although there are a number of engineering, environmental, land, public, and other constraints. In addition to flood protection, other potential benefits included groundwater recharge and water quality, environmental enhancement, and reliable water supply.

Alternatives providing lower level of flood protection (up to 30% of the excess peak flow) were a regional retention basin at Tres Pinos River or San Benito River, a bypass at the San Benito River, and additional flooding of Soap Lake.

Alternatives estimated to have the least amount of additional flood protection (between 0 to 10% of the excess peak flow) were raising the existing dams at Uvas, Pacheco, Chesbro, and Hernandez, and a regional detention basin at College Lake. Raising all the dams would provide approximately 5% of the necessary flood protection, while creating a regional detention basin at College Lake is estimated to provide about 10% of the necessary flood protection.

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Table 2-1: Initial Selection of Flood Protection Alternatives

Alternative	Location	Potential Flood Protection Benefit	Other Benefit(s)	Implementation Constraint(s)	Example Installation(s)
Improve channel, increase capacity	Lower Pajaro River	0 – 100%		Cost	Delta
Setback levee / habitat creation	Lower Pajaro River	0 – 100%	Environmental enhancement Recreation	Land loss	Napa
Land Acquisition	Soap Lake Floodplain Area	Maintains planned peak flood flows	Open space Control land use Environmental enhancement	Cost	Napa
	General Land Acquisition for Projects	Prevents additional flood conditions	Open space Controllable	Cost	
Offstream Detention	San Justo Reservoir	Negligible	GW recharge GW quality Wastewater discharge Environmental enhancement Recreation Water supply	Permitting Land loss Cost	Lake Cunningham
Raise existing dams	Uvas, Pacheco, Chesbro, and Hernandez Dams	5%	Water supply GW recharge Recreation	Permitting	Los Vaqueros Shasta Nacimiento
Regional Detention	College Lake Expansion	0 – 10% Lower Pajaro only	Water supply GW recharge GW quality Recreation	Limited by current development	
Regional Retention	Tres Pinos / San Benito	0 – 30%	GW recharge GW quality Wastewater discharge Environmental enhancement Recreation Water supply	Permitting Land loss Cost	Warm Springs Marsh Creek
Control Soap Lake	Soap Lake	0 - 30%	GW recharge Protects Santa Clara conduit Sediment harvesting	Permitting Fault line	College Lake
	Chittenden Pass	0 – 100%			
Bypass	Lower Pajaro	0 – 100%	GW recharge	Land loss Cost	Yolo Sutter
	San Benito River	0 – 30%			
	Other Tributary	Negligible			

2.2 Land Acquisition and Management

Land acquisition or land use restrictions will be required for each of the projects. This section briefly describes the land management alternatives considered for the various projects.

Land acquisition or control can occur through two methods, the purchase of physical property or the purchase of the right to use a given property. The purchase of property would result in land ownership in fee, with control over land access. The purchase of the right to use the land for flooding is known as a flood easement. In this case, the land ownership would be retained by the existing owner, with the purchase of the easement to allow control of land use in the area. The easement purchase would allow land to be flooded temporarily and would restrict the building of structures that could be damaged by the flood or cause damage to the surrounding area. Examples of these structures include buildings, fill materials, and septic tanks. Land acquisition is one of the options available to the Pajaro River Watershed Authority to provide flood protection to the lower Pajaro River.

2.2.1 COUNTY POLICIES

Counties often have policies in place to prevent development within a floodplain or within a certain distance from the river. The following sections highlight and summarize safety and building policies associated with flood plains for each county. The information was taken from county general plans. This section includes descriptions of the existing policies effects on the study and the projects identified.

Monterey County

Monterey County considers the designated 100-yr floodplain to be the significant flood area. The following policies apply to 100-yr floodplains.

- The county will develop and participate in floodplain management plans
- The most appropriate land uses in the floodplain are agriculture, passive to low intensity recreation, and conservation
- New development within 200 ft of the riverbank or in the 100-yr floodplain is prohibited except as permitted by ordinance
- No new development is permitted in the riparian corridor
- All new development in the 100-yr floodplain must conform to the guidelines of the National Flood Insurance Program and policies of the County Board of Supervisors
- All development must be approved by the County Flood Control and Water Conservation District

San Benito County

San Benito County floodplain delineations are consistent with the FEMA 100-yr floodplain delineations. The following policies apply to the 100-yr floodplains.

- Development in potential flood hazard areas is strongly discouraged
- Floodplain zoning designation precludes development
- Parcels located completely within a flood hazard area and created before January 1994 are allowed one single-family residence
- Development of residential homes within the 100-yr floodplain requires an environmental impact report
- Lands within the 100-yr floodplain are considered to be open space and use should be limited to agriculture and open space

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Santa Clara County

No mention of the floodplain delineations was found in the Santa Clara general plan. It is assumed that the policies refer to the FEMA 100-yr floodplain delineations.

- Significant natural hazard areas are designated as Resource Conservation Areas with low development densities
- The resident population in high natural hazard areas should be minimized
- It is acknowledged that some development will occur
- New development should not increase downstream risks

Santa Cruz County

No mention of the floodplain delineations was found in the Santa Cruz general plan. It is assumed that the policies refer to the FEMA 100-yr floodplain delineations.

- Development proposals that are adequately protected from hazard and do not add damage potential should be approved
- Development in the 100-yr floodplain is allowed if each proposed parcel has at least 1 development site which would not flood and deed restrictions indicating the limits and elevations of the 100-yr floodplain are recorded with the County Recorder
- Flood protection projects are allowed within the 100-yr floodplain only to protect existing development

Cities may have their own policies and should be researched before land acquisition decisions are made.

2.2.2 ACQUIRING AND USING LAND

Land acquisition and land use restrictions can be utilized in several different ways. The following sections briefly describe some of the methods considered for the PRWS project alternatives.

Purchase/Condemn

This method is used when the successive land use will be completely different from its current land use. The former owner sells his property rights to the buying authority and has no further claim to the property. For example, a parcel within the 100-yr floodplain could be bought and any structure inhibiting flood flow removed. The land could then be returned to its natural state.

Purchase/Lease

This option is a variation of the one described above. Rather than switching the land use completely, it is possible to purchase the land and lease it back to its original or a new owner. The buying authority then has control of the land use and no liability for damage claims, but allows a second party to maintain an acceptable land use. By allowing the land to be leased, some of the purchase price for the land can be recouped.

Flood Easement

A flood easement is an agreement between the landowner and purchasing authority that land within a flood zone will be allowed to flood. An easement can be bought for the use of a fraction of the land. The owner maintains the property rights and use. The easement limits building structures and other things that might impact its stated use in the easement. The original land use, such as agriculture, can be continued while that area of land is not flooded. When the land does flood though, there can be no damage claims made. Due to the productive agricultural land in the watershed, this will likely be the most attractive option for land acquisition.

Eminent Domain

All of the above options take place between a willing seller and buyer. Occasionally landowners are not willing to sell their land or right to use the land. When this happens and it has been shown that there is no other alternative, public agencies can take the land by eminent domain for the good of the public. This involves rigorous review of different options to solve the problem, study of environmental impacts, and court proceedings. The court forces the sale of the needed land at fair market value. Out of necessity, this is the last option to be considered in terms of both land acquisition and other projects.