

**Draft
Programmatic
Environmental Impact Report
for the
East Bay Watershed
Master Plan**

State Clearinghouse Number 93071033

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List of Acronyms

BAAQMD	Bay Area Air Quality Management District
BMPs	best management practices
CAC	Community Advisory Committee
CAP	Clean Air Plan
CCAA	California Clean Air Act of 1988
CDF	California Department of Forestry and Fire Protection
CEQA	California Environmental Quality Act
CO	carbon monoxide
CRMPs	coordinated resource management plans
District	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EBWMP	East Bay Watershed Master Plan
EIR	environmental impact report
GIS	geographic information system
I-	Interstate
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen
PM10	inhalable particulate matter
ppm	parts per million
ROG	reactive organic gases
SO ₂	sulfur dioxide
SR	State Route
SRA	State Responsibility Act
TDM	Travel Demand Model
µg/m ³	micrograms per cubic meter

Summary

BACKGROUND

The East Bay Municipal Utility District (District) owns and manages approximately 28,000 acres of land and water surface in the East Bay area surrounding five reservoirs and a portion of one basin area that does not contain a reservoir. The District's reservoirs store high-quality drinking water and emergency supplies for approximately 1.2 million water users in Alameda and Contra Costa Counties. Protecting water quality is one of the highest priorities of the District. In addition, the District is committed to preserving and protecting the natural resources on its land and reservoirs.

The purpose of the East Bay Watershed Master Plan (EBWMP) is to establish long-term management direction for District-owned lands and reservoirs that will ensure protection of the District's water resources and preserve environmental resources. Adoption of a plan such as the EBWMP is considered a project under the California Environmental Quality Act (CEQA). Because the EBWMP has the potential to result in significant impacts on the environment, the District has prepared this environmental impact report (EIR) to comply with CEQA.

DISTRICT POLICY DIRECTION

In 1992, the District's Board of Directors adopted the following mission statement for the District:

To manage the natural resources with which the District is entrusted to provide high-quality water and wastewater services for the people of the East Bay, and to preserve and protect the environment for future generations.

In 1993, the District Board of Directors specified seven guiding principles for the EBWMP based on the District's mission statement. These principles have guided an integrated planning process that identifies resource and land use management goals, objectives, and implementation guidelines.

SCOPE OF THE EAST BAY WATERSHED MASTER PLAN

The EBWMP planning process addresses the present and possible future uses of District-owned lands and waters and the District's responsibilities and management direction regarding watershed protection and appropriate land uses. The EBWMP also addresses management issues for lands within the reservoir watersheds that are not owned by the District.

SCOPE OF THE ENVIRONMENTAL IMPACT REPORT

This EIR has been prepared as a programmatic EIR under Section 15168 of the State CEQA Guidelines. The purpose of this programmatic EIR is to allow the District to consider broad policy alternatives and programwide mitigation measures at an early stage in the planning process. Although this programmatic EIR may provide adequate CEQA documentation for some specific watershed activities, additional CEQA evaluations may be required before specific programs or projects can be implemented.

ALTERNATIVES CONSIDERED

This programmatic EIR defines and evaluates five alternatives for managing the District's East Bay watershed lands. The alternatives represent a range of policy direction available to the District and reflect diverse orientations toward land management. Each of the alternatives evaluated in this EIR is described using the same set of 11 management programs to facilitate comparison. All of the alternatives incorporate, to some extent, the District's general goals to protect reservoir water quality and biological diversity.

The primary difference between the alternatives is the level of emphasis placed on various programs and the assumed allocation of District resources to achieve the objectives. Approximately the same level of funding would be available to implement the programs under all of the alternatives. Therefore, emphasizing some aspects of watershed management under each of the alternatives generally requires placing less emphasis on other programs. The alternatives considered in this EIR are described briefly below.

Alternative 1 - Proposed East Bay Watershed Master Plan

Alternative 1 is based on the direction contained in the draft EBWMP. This alternative is focused on protecting reservoir water quality and preserving and enhancing other natural resources

on District lands while maintaining other appropriate land uses that provide public benefit, such as low-intensity recreation, grazing, and agricultural uses.

Fire and fuels management is also an important component of the proposed EBWMP. The proposed EBWMP acknowledges the importance of fire as a natural ecological process and the District's responsibilities to manage fire and fuels adjacent to properties and prevent catastrophic fires that could result in degradation of reservoir water quality.

Alternative 2 - No-Project Alternative

Under Alternative 2, the District would continue to manage its East Bay watershed lands under the existing 1970 Land Use Master Plan (as amended in 1973 and 1976). This plan envisioned fairly intensive recreation development in many areas. The management guidance provided by the Land Use Master Plan does not reflect many of the District's current concerns and objectives because many issues (e.g., drinking water quality, biological diversity, and fire and fuels management) have increased in importance over the past 25 years. Therefore, this alternative also considers the District's actual land management practices as they have evolved over the 25 years since the plan was adopted.

Alternative 3 - Increased Water Quality Emphasis

Under Alternative 3, the District would manage its lands primarily to increase water quality protection. Although the proposed EBWMP (Alternative 1) emphasizes water quality protection, land uses that could affect water quality (e.g., grazing and recreation) would be allowed to continue under that alternative. Under Alternative 3, the increased water quality emphasis would reduce or eliminate many of those potentially conflicting uses. Fire and fuels management would depend more on mechanical and manual activities to provide the same level of fire protection provided under the proposed EBWMP while reducing the level of grazing. Recreation, particularly activities on and near the reservoirs, would be curtailed, and new recreation uses would generally not be allowed. In addition, an increased emphasis on riparian habitat restoration would increase water quality protection.

Alternative 4 - Increased Revenue Emphasis

Under Alternative 4, increasing net revenues would become a primary objective of the District. The District's objectives to protect water quality and biological resources would generally be met, although the quality of stored water would likely decline and land uses that could increase the District's net revenue (e.g., grazing, farming, timber harvesting, etc.) would become a high priority. Under this alternative, habitat restoration would not be a priority. In addition, the District

would review the status of lands based on its contribution to the protection of reservoir water quality or provision of potential reservoir sites and consider designating those lands as surplus, making them available for sale at fair market value and reducing the District's total land holdings.

Alternative 5 - Recreation Emphasis

The East Bay area is a densely populated region with a high demand for recreational opportunities. Alternative 5 would include a greater emphasis on providing recreational opportunities on the District's East Bay lands than would the other alternatives. Water quality is expected to decline with this alternative, and the financial impact of this alternative could be substantial. Uses that would be emphasized are trail construction, multiple use of trails (i.e., by mountain bikes as well as pedestrians and horses), and new facilities for recreation and other community uses. As under Alternative 3, management activities (e.g., habitat restoration) not essential to the District's primary mission would generally not be undertaken.

SUMMARY OF ENVIRONMENTAL IMPACTS

Table ES-1 summarizes the environmental effects of the EBWMP alternatives. The table is organized to present impacts by environmental resource area, indicating the significance of each impact, available mitigation measures, and the significance of each impact if mitigation were implemented.

Table S-1. Summary of Impacts and Mitigation Measures for the Proposed EBWMP and Alternatives

Part I. Proposed EBWMP Impacts before and after Mitigation				
Resource Affected	Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
<u>Water Quality</u>	Reduction of soil erosion and related nonpoint-source pollution.	Beneficial	None	Beneficial
	Improvement of health and vigor of Monterey pine forest at San Pablo Reservoir.	Beneficial	None	Beneficial
	Reduction of point- and non-point-source pollution in tributary streams.	Beneficial	None	Beneficial
	Increase in impermeable surfaces and related runoff.	Less than significant	None	Less than significant
	Potential increase in nonpoint-source pollution and runoff from prescribed burning and forestry management practices.	Less than significant	None	Less than significant
<u>Soils and Geology</u>	Stabilization of watershed soils by developing and implementing BMPs and reducing livestock grazing.	Beneficial	None	Beneficial
	Exposure of bare soils to erosion by removal of vegetative cover in steeply sloped or high erosion hazard areas.	Significant	Modify the EBWMP to specify that BMPs must be developed and implemented to reduce soil erosion on watershed lands.	Less than significant

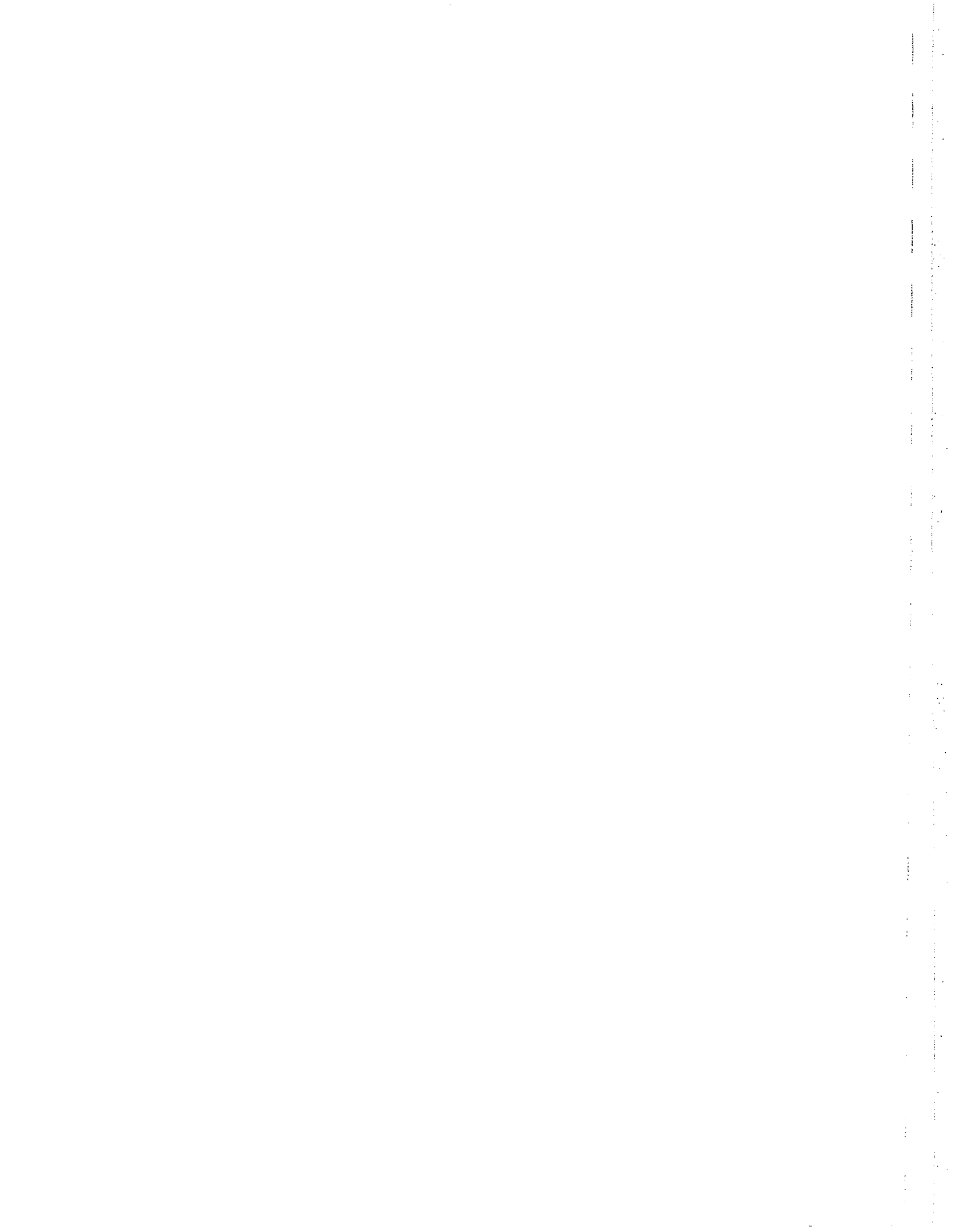


Table S-1. Continued

Part I. Proposed EBWMP Impacts before and after Mitigation					
Resource Affected	Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation	
<u>Vegetation</u>	Enhancement of watershed riparian habitat.	Beneficial	None	Beneficial	
	Maintenance of fire-dependent vegetation communities through use of prescribed burning.	Beneficial	None	Beneficial	
	Reduction of effects from large wildfires on biodiversity.	Beneficial	None	Beneficial	
	Restoration of native woodlands through long-term replacement of non-native forests.	Beneficial	None	Beneficial	
	Reduction in livestock grazing levels and effects on riparian, native grassland, and other vegetation communities.	Beneficial	None	Beneficial	
	Reduction of effects from agricultural operations on vegetation.	Beneficial	None	Beneficial	
	Modification of vegetation to reduce fire risk.	Less than significant	None	Less than significant	
	Loss of vegetation resulting from development of recreation and administrative facilities.	Less than significant	None	Less than significant	
	Promotion of succession of grassland to shrub and woodland habitat types from reduced grazing practices.	Less than significant	None	Less than significant	

Table S-1. Continued

Part I. Proposed EBWMP Impacts before and after Mitigation				
Resource Affected	Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
<u>Wildlife</u>	Enhancement of habitat conditions for native wildlife species.	Beneficial	None	Beneficial
	Protection and enhancement of special-status wildlife species and their habitat.	Beneficial	None	Beneficial
	Maintenance of conditions for large-scale wildlife movement.	Beneficial	None	Beneficial
	Effects of fuels treatment, facilities and trails development, and grazing reduction on vegetation.	Less than significant	None	Less than significant
	Disruption of nesting and roosting areas for sensitive species from forest management activities.	Significant	Provide buffer areas to reduce disruption of nesting and roosting areas for raptors, herons, and egrets during timber harvesting activities.	Less than significant
	Long-term reduction in nesting and roosting habitat for sensitive wildlife species.	Significant	Protect against long-term reduction in nesting and roosting habitat for sensitive wildlife species.	Less than significant
	Reduction in species that favor non-native forests.	Less than significant	None	Less than significant
	Increased recreation disturbance of sensitive species during the nesting season.	Less than significant	None	Less than significant
<u>Cultural Resources</u>	Increased protection and avoidance of new watershed cultural resource sites.	Beneficial	None	Beneficial



Part I. Proposed EBWMP Impacts before and after Mitigation				
Resource Affected	Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
	Reduced effects of ongoing management programs on cultural resource sites.	Beneficial	None	Beneficial
	Potential effects of ground-disturbing activities associated with prescribed burning on known and unknown cultural resources	Significant	Instruct fire management personnel to protect cultural resources during fire and fuels management activities.	Less than significant
<u>Fire Hazard and Risk</u>	Provision of a strategic fuelbreak and fire-safe road network.	Beneficial	None	Beneficial
	Mitigation of the highest watershed fire hazard.	Beneficial	None	Beneficial
	Reduction of fire risk and potential for wildfire ignition.	Beneficial	None	Beneficial
	Enhancement of District fire response.	Beneficial	None	Beneficial
	Development of buffer zones between urban interface areas through proactive fire protection planning.	Beneficial	None	Beneficial
	Watershed hazard abatement and reduction from other resource management activities.	Beneficial	None	Beneficial



Table S-1. Continued

Part I. Proposed EBWMP Impacts before and after Mitigation			
Resource Affected	Impact	Significance before Mitigation	Significance after Mitigation
	Increase in potential fire risk by relying on fuel modification techniques other than grazing.	Significant	Less than significant
		Adopt direction in the EBWMP that ensures implementation of fuel treatment measures and specifies that implementation of the fuels management program is a critical objective of the EBWMP and that grazing will continue to be used for fuel control until alternative measures are in place.	Less than significant
	Safety concerns related to prescribed burning treatment.	Less than significant	Less than significant
<u>Visual Resources</u>	Improved visual quality of the watershed.	Beneficial	Beneficial
	Improved viewing of District lands associated with new regional trail connectors.	Beneficial	Beneficial
	Site-specific changes in watershed visual quality from fuels treatment activities, recreation facility and trail construction, and forestry practices.	Less than significant	Less than significant



Table S-1. Continued

Part I. Proposed EBWMP Impacts before and after Mitigation				
Resource Affected	Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
<u>Land Use</u>	Conflicts between watershed management program activities and existing watershed uses.	Less than significant	None	Less than significant
	Conflicts with uses of property adjacent to District-owned property associated with nuisances from the fire and fuels management program, extension of the San Francisco Bay Ridge Trail, and urban and suburban encroachment on District land.	Less than significant	None	Less than significant
<u>Recreation</u>	Increased access to East Bay watershed lands.	Beneficial	None	Beneficial
	Increased and enhanced recreational opportunities on watershed lands.	Beneficial	None	Beneficial
	No substantial change in recreation activities and opportunities at existing recreation sites.	Less than significant	None	Less than significant
	Restrictions on trail use and access during high-risk resource or fire hazard periods.	Less than significant	None	Less than significant
<u>Fiscal Effects</u>	Decreased expenditures resulting from decreased livestock grazing emphasis.	Beneficial	None	Beneficial
	Decreased revenues resulting from decreased livestock grazing emphasis.	Less than significant	None	Less than significant

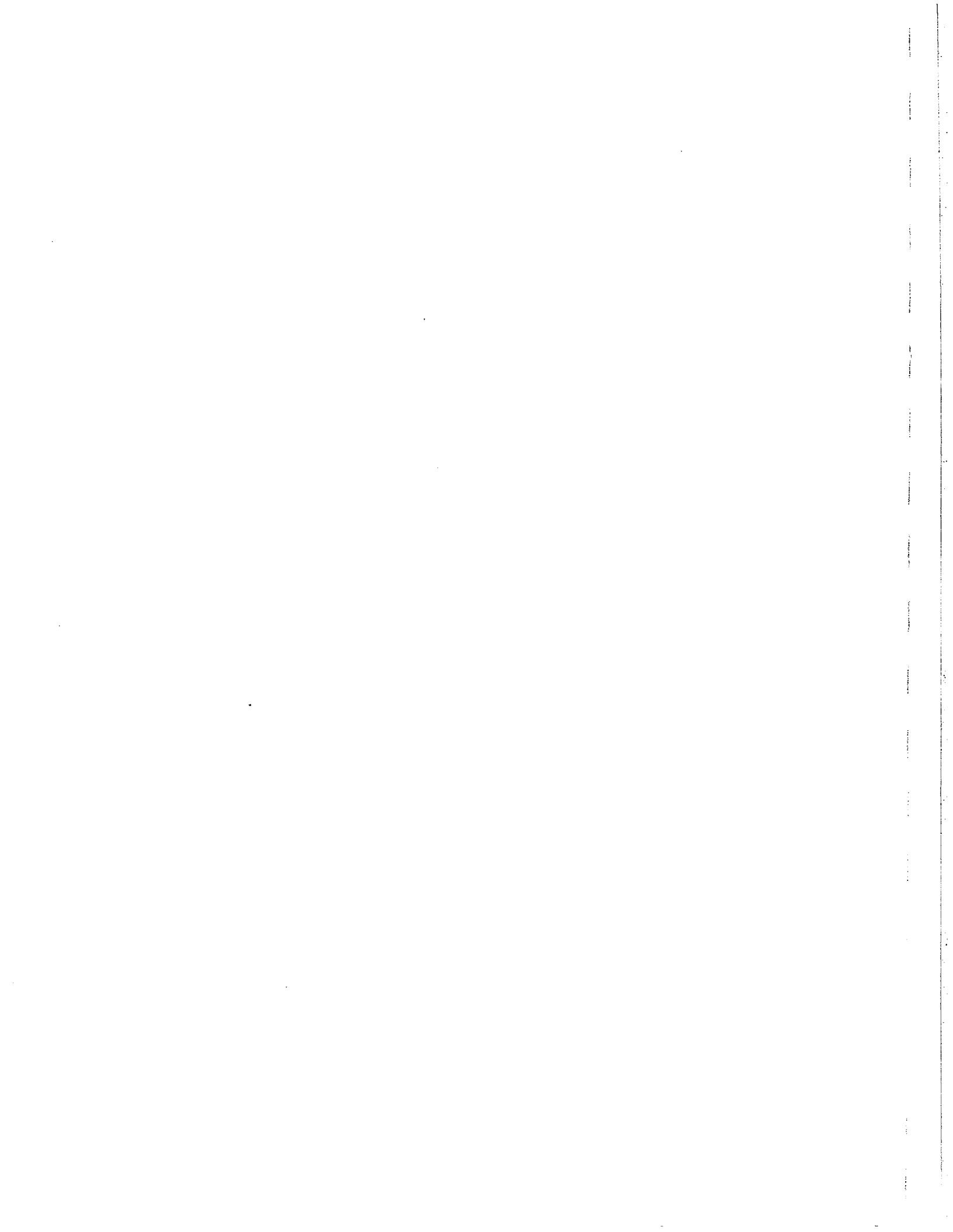


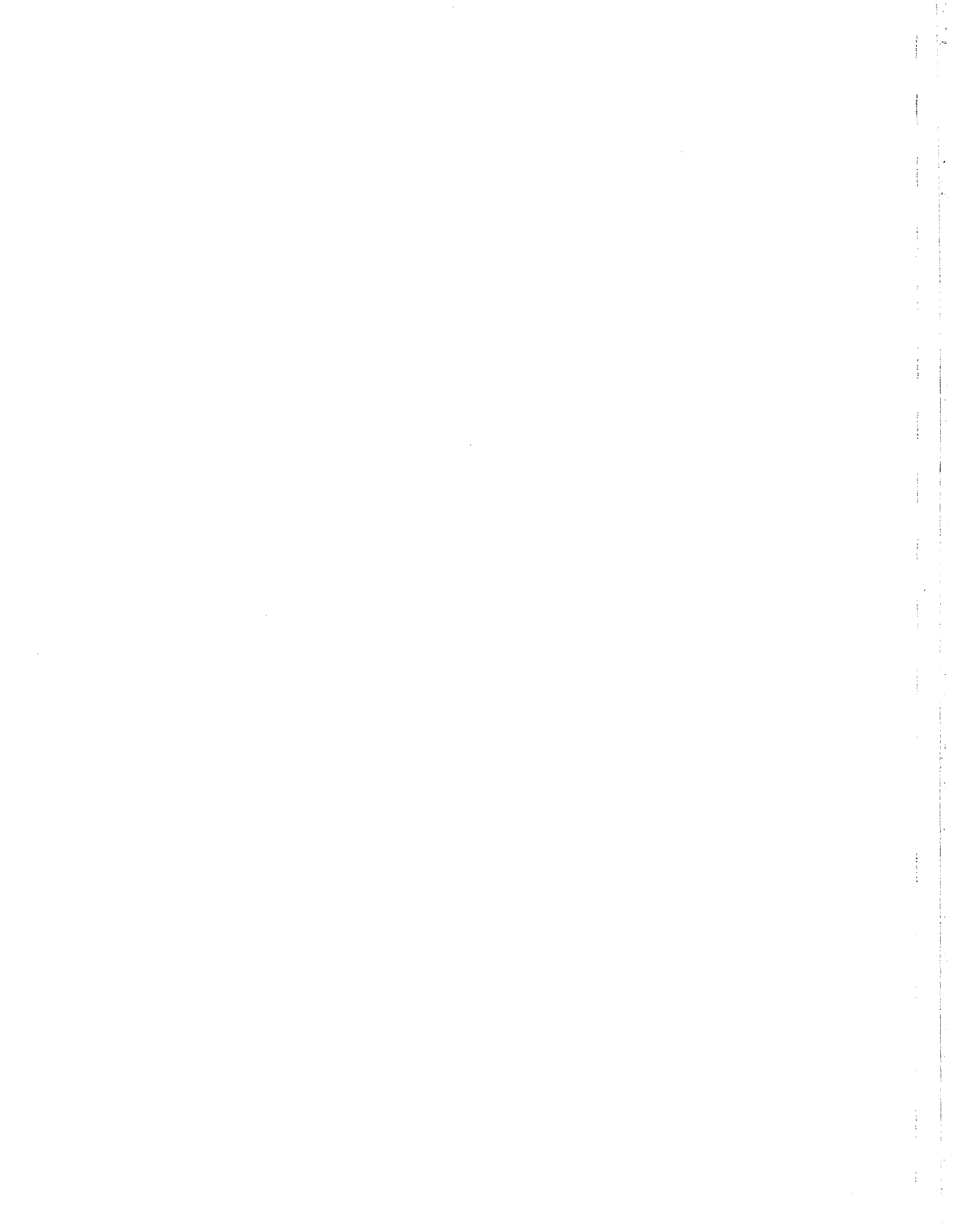
Table S-1. Continued

Part I. Proposed EBWMP Impacts before and after Mitigation				
Resource Affected	Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
	Increased costs associated with the Water Quality Management Program.	Less than significant	None	Less than significant
	Increased costs associated with the Biodiversity Management Program.	Less than significant	None	Less than significant
	Increased costs associated with the Fire and Fuels Management Program.	Less than significant	None	Less than significant
<u>Traffic</u>	Incremental increase in recreation-related traffic volumes on local roadways.	Less than significant	None	Less than significant
	Temporary traffic congestion at District entrances to recreation facilities during special events.	Less than significant	None	Less than significant
	Incremental increase in parking demand at recreation facilities.	Less than significant	None	Less than significant
<u>Air Quality</u>	Incremental increase in vehicle emissions of ozone precursors.	Less than significant	None	Less than significant
	Minor increase in generation of PM10 from watershed development and fire and fuels management.	Less than significant	None	Less than significant

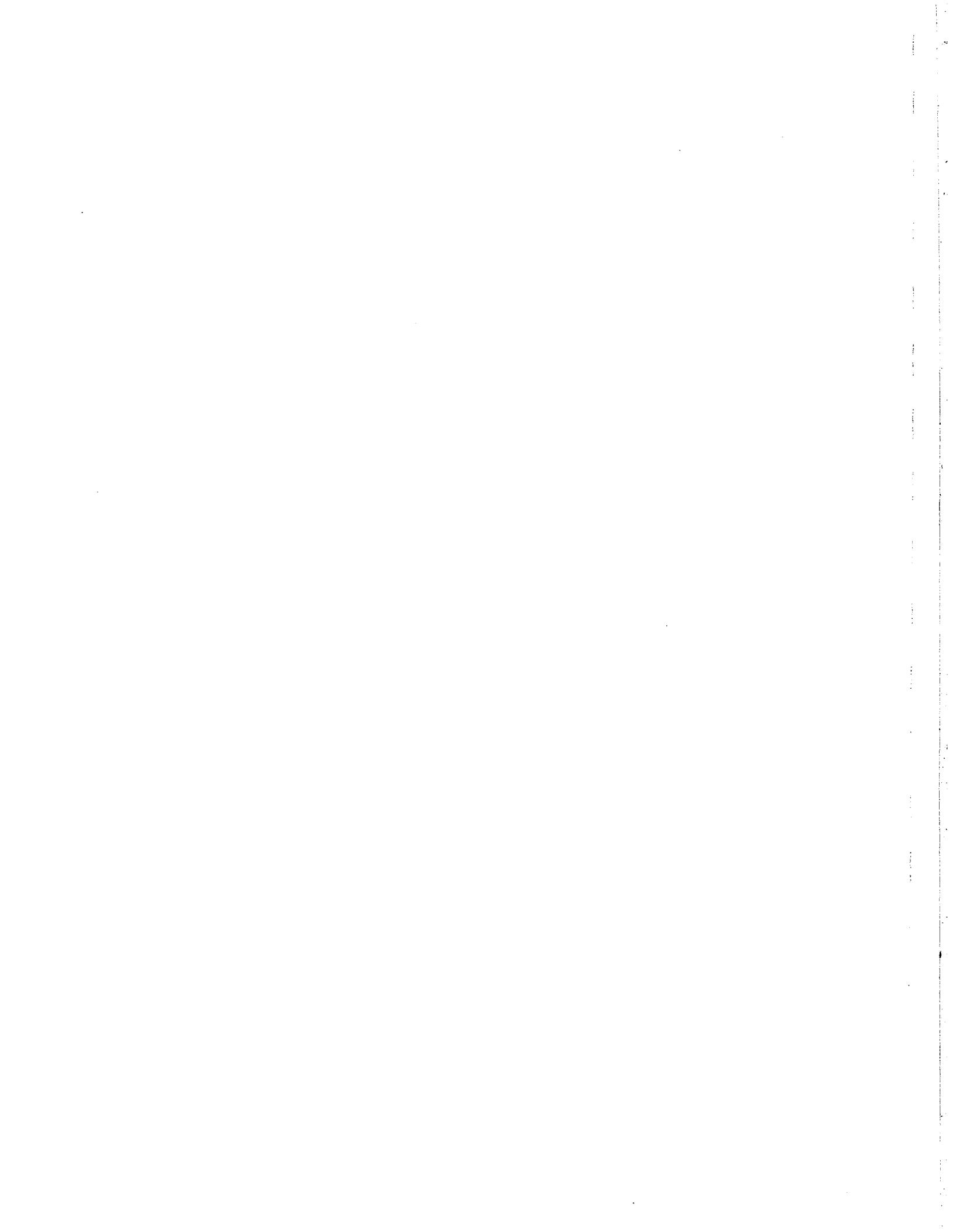


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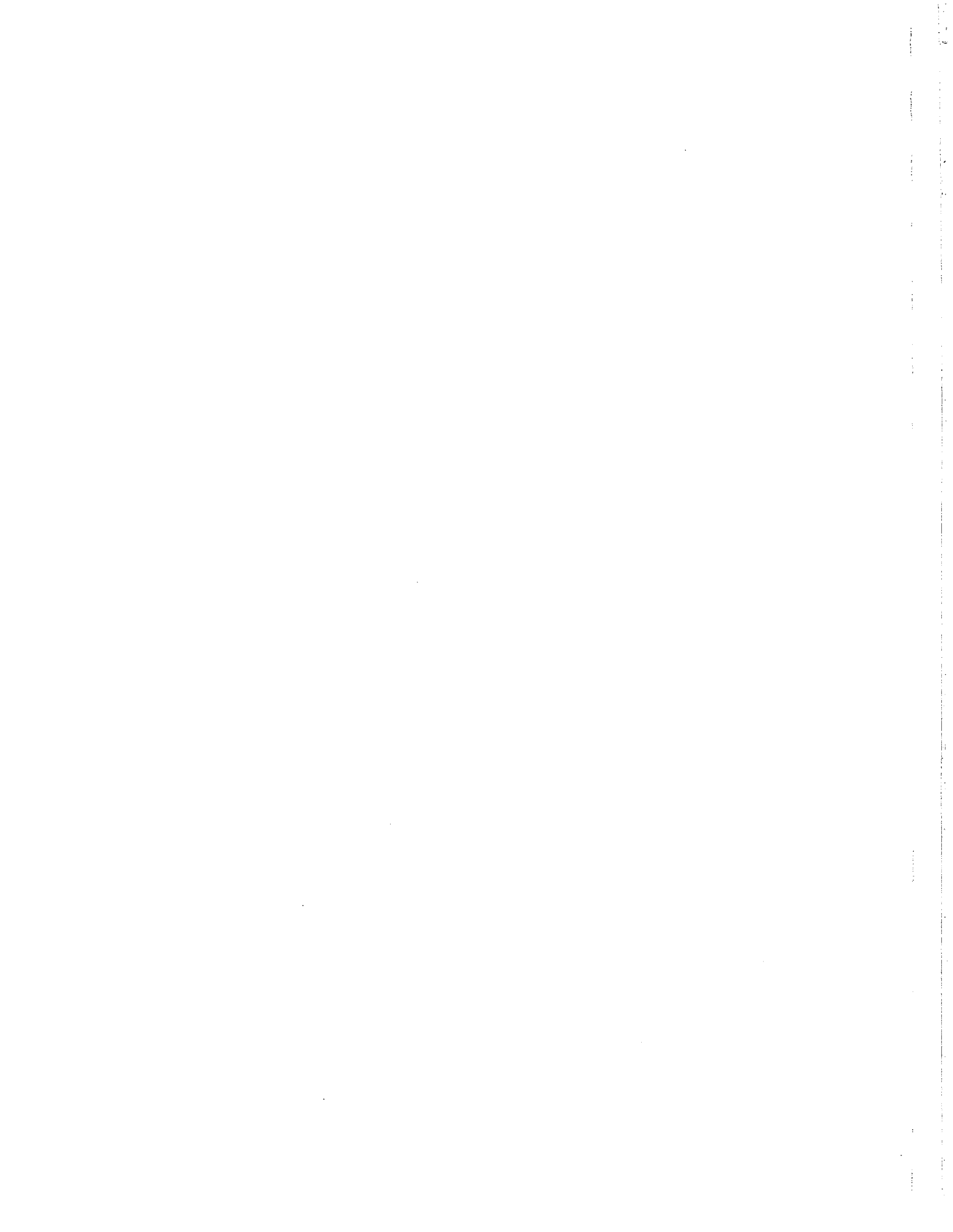
Part II. Comparison of Alternatives: No-Project Alternative	
Resource Affected	Impact Level Relative to Proposed EBWMP
<u>Water Quality</u>	Impact on water quality would be greater than under the proposed EBWMP.
<u>Soils and Geology</u>	Soil erosion effects would be greater than under the proposed EBWMP.
	Soil erosion effects would be greater than under the proposed EBWMP.
	Risk of large, intense wildfires and potential erosion would be greater than under the proposed EBWMP.
<u>Vegetation</u>	Potential would be greater than under the proposed EBWMP.
	Impact would be greater than under the proposed EBWMP.
<u>Wildlife</u>	Impact would be greater than under the proposed EBWMP.
	Impact would be similar to the proposed EBWMP but would favor different wildlife species.
<u>Cultural Resources</u>	Adverse impacts on cultural resources are more likely to occur than under the proposed EBWMP.
<u>Fire Hazard and Risk</u>	Beneficial effects from grazing would be greater than under the proposed EBWMP.
	Fire hazard would be greater than under the proposed EBWMP.
	Ignition risk would be greater than under the proposed EBWMP.



Part II. Comparison of Alternatives: No-Project Alternative		
Resource Affected	Impact	Impact Level Relative to Proposed EBWMP
	Limited fire response capability and resulting safety concerns.	Safety concerns related to fire hazards would be greater than under the proposed EBWMP.
	Increased wildfire threat to urban interface lands.	Wildfire threat to urban interface lands would be greater than under the proposed EBWMP.
	Increased potential for large, intense fires.	Potential for large, intense fires on District property would be greater than under the proposed EBWMP.
<u>Visual Resources</u>	Increased viewing opportunities for watershed recreationists.	Viewing opportunities from developed recreation areas and trails would be greater than under the proposed EBWMP.
	Risk of severe impacts on important visual resources from a large, intense fire.	Impacts on visual resources from a large, intense fire would be greater than under the proposed EBWMP.
	Potential conflicts between watershed management programs.	Conflicts between watershed management programs would be greater than under the proposed EBWMP.
	Conflicts with adjacent land uses.	Conflicts between District goals and adjacent land uses would be substantially greater than under the proposed EBWMP.
<u>Recreation</u>	Increased recreation opportunities at developed and new sites.	Recreation opportunities would be greater than under the proposed EBWMP.
	Increased trail use and new access.	Recreation opportunities on existing trails would be similar to that of the proposed EBWMP. New trails would offer additional opportunities as compared to the proposed EBWMP.
<u>Fiscal Effects</u>	Increase in costs associated with managing developed recreation sites.	The net negative fiscal effect would be greater than under the proposed EBWMP.
	Increase in costs associated with maintaining water quality.	Costs associated with water quality protection would likely be greater than under the proposed EBWMP.



Part II. Comparison of Alternatives: No-Project Alternative	
Resource Affected	Impact Level Relative to Proposed EBWMP
<u>Traffic</u>	<p>Increase in generation of traffic volumes on local roadways.</p> <p>Increase in special-event traffic at recreation area entrances.</p> <p>Increase in parking demand associated with recreation areas.</p>
<u>Air Quality</u>	<p>Increase in generation of traffic volumes on local roadways.</p> <p>Increase in special-event traffic at recreation area entrances.</p> <p>Increase in parking demand associated with recreation areas.</p> <p>Traffic congestion would be greater compared to levels expected under the proposed EBWMP.</p> <p>Parking demand would be greater than under the proposed EBWMP but parking problems are expected to be relatively minor.</p> <p>Air quality effects from increased pollutant levels would be greater than under the proposed EBWMP.</p>
Part II. Comparison of Alternatives: Increased Water Quality Emphasis Alternative	
Resource Affected	Impact Level Relative to Proposed EBWMP
<u>Water Quality</u>	<p>Allocation of additional resources to water quality protection and enhancement.</p> <p>Effect of fire and fuels management and forestry management programs on water quality.</p> <p>Increase in District resources to prevent soil erosion.</p>
<u>Soils and Geology</u>	<p>Benefit to water quality would be greater than under the proposed EBWMP.</p> <p>Water quality effect would be similar to or less than under the proposed EBWMP.</p> <p>Soil erosion protection would be greater than under the proposed EBWMP.</p> <p>Soil erosion effects would be similar to or less than under the proposed EBWMP.</p>
<u>Vegetation</u>	<p>Beneficial effects on enhancing riparian habitat, maintaining fire-dependent communities, reducing wildfire effects, and restoring native woodlands.</p> <p>Benefit to riparian habitat would be greater, benefit to fire-dependent communities and native woodlands would be less, and wildlife effects would be similar compared to the proposed EBWMP.</p> <p>Increased vegetation succession from reducing grazing, vegetation modification from fire danger reduction, loss of vegetation from development of trails and recreation/administration facilities.</p> <p>Vegetation impacts would be similar to those of the proposed EBWMP.</p>



Part II. Comparison of Alternatives: Increased Water Quality Emphasis Alternative

Resource Affected	Impact	Impact Level Relative to Proposed EBWMP
<u>Wildlife</u>	Beneficial effect of enhancing riparian habitat, maintaining fire dependent habitats, limiting the effects of large wildfires, and restoring native woodlands.	Vegetation benefits would be similar to those under the proposed EBWMP.
<u>Cultural Resources</u>	Minimal impacts from vegetation succession, localized vegetation treatment, and loss of vegetation.	Vegetation impacts would be similar to those of the proposed EBWMP.
<u>Fire Hazard and Risk</u>	Potential effects on known and unknown cultural resources during ground-disturbing activities.	Potential effects on cultural resources would be less than under the proposed EBWMP.
<u>Fire Hazard and Risk</u>	Reduced fire risk on lands with high water quality value.	Fire risk benefits would be similar to those under the proposed EBWMP.
Reduced risk of ignition because of human use restrictions.	Reduced risk of ignition because of human use restrictions.	Reduced ignition risk benefits would be similar to those under the proposed EBWMP.
Increased fire risk from reduced livestock grazing.	Increased fire risk from reduced livestock grazing.	Increased fire risks would be similar to those under the proposed EBWMP.
Increased potential for large intense wildfires.	Increased potential for large intense wildfires.	Potential for wildfires would be greater than under the proposed EBWMP.
Reduced involvement in coordinated fire management planning.	Reduced involvement in coordinated fire management planning.	Fire protection would be substantially less than under the proposed EBWMP.
<u>Visual Resources</u>	Visual resource impacts from fire and fuels management and non-native forest conversion.	Visual resource impacts would be less than under the proposed EBWMP.
Potential conflict between visual resource values and other management program activities.	Potential conflict between visual resource values and other management program activities.	Management program conflicts with visual resource values would be greater than under the proposed EBWMP.
<u>Land Use</u>	Watershed land use conflicts and adjacent land use conflicts with proposed watershed program activities.	Watershed land use conflicts would be less than under the proposed EBWMP. Adjacent land use conflicts would be similar to those under the EBWMP.

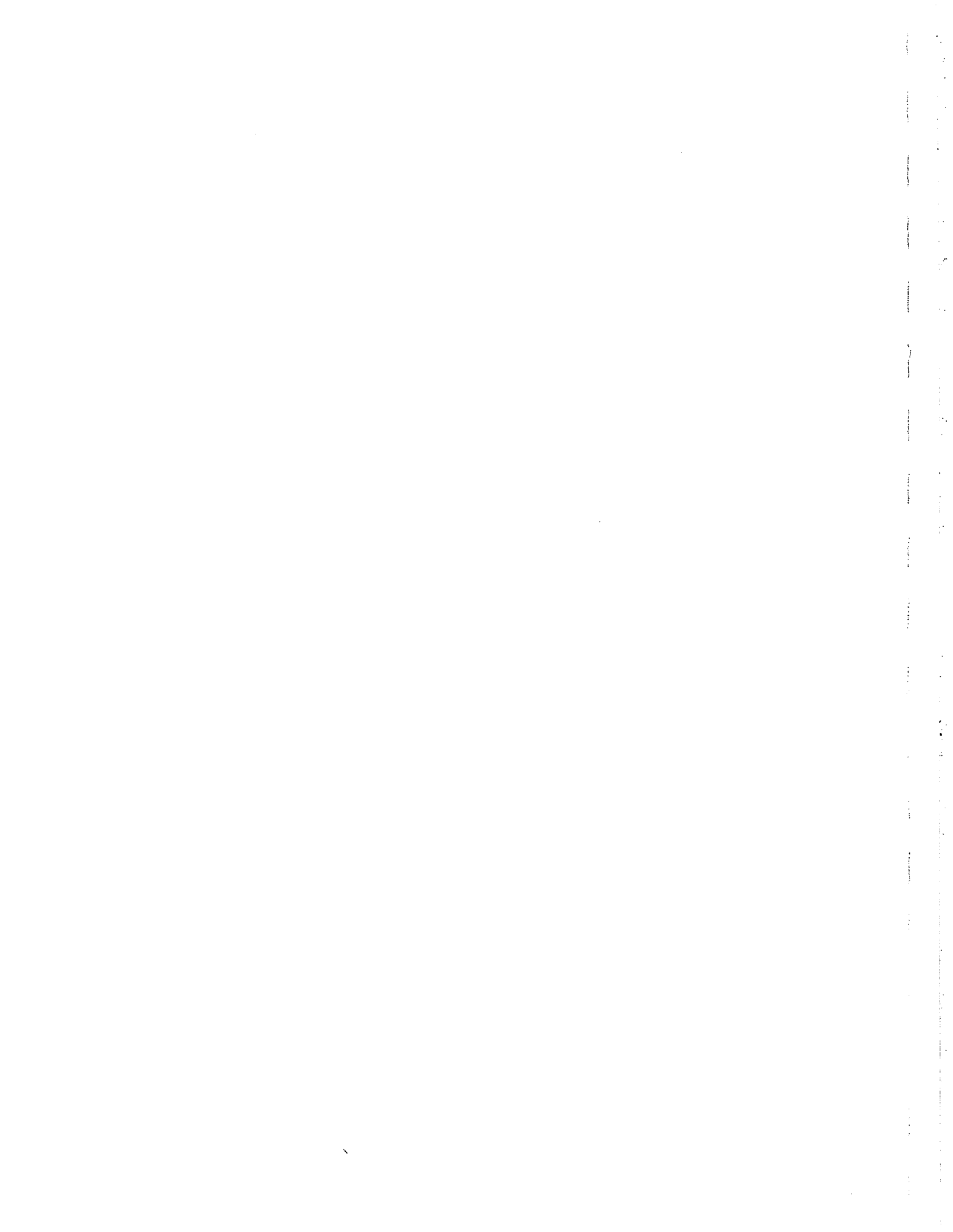


Table S-1. Continued

Part II. Comparison of Alternatives: Increased Water Quality Emphasis Alternative

Resource Affected	Impact	Impact Level Relative to Proposed EBWMP
<u>Recreation</u>	Reduced recreation opportunities at San Pablo and Lafayette Reservoirs.	Recreation impacts would be greater than under the proposed EBWMP.
	Existing trail use and access effects.	Trail use and access would be similar to those under the proposed EBWMP.
<u>Fiscal Effects</u>	Decreased expenditures resulting from decreased livestock grazing.	Expenditures would be substantially less than under the proposed EBWMP.
	Increased revenue associated with disposal of non-reservoir watershed lands.	Revenues generated by sales would be greater than under the proposed EBWMP.
	Increased costs associated with fire and fuels management.	Costs would be greater than under the proposed EBWMP.
	Decreased revenues from development of recreation sites.	Revenues would be less than under the proposed EBWMP.
	Decreased revenues from sale of recreation trail permits.	Revenues would be less than under the proposed EBWMP.
	Increased expenditures for other resource management programs.	Expenditures would be the same or less than under the proposed EBWMP.
<u>Traffic</u>	Traffic volume generation on local roadways.	Traffic volumes would be less than under the proposed EBWMP.
	Special-event traffic at recreation area entrances.	Special event traffic would be less than under the proposed EBWMP.
	Parking demand at recreation facilities.	Parking demand would be less than under the proposed EBWMP.
<u>Air Quality</u>	Increased ozone precursors and PM10 from recreation traffic and construction.	Pollutant levels would be less than under the proposed EBWMP.

Table S-1. Continued

Part II. Comparison of Alternatives: Revenue Emphasis Alternative		
Resource Affected	Impact	Impact Level Relative to Proposed EBWMP
<u>Water Quality</u>	Short-term exposure of tributary and reservoir waters to nonpoint-source pollution from fuels treatment. Increased water quality effects from large, intense wildfires.	Less water quality effects than under the proposed EBWMP. Water quality effects would be greater than under the proposed EBWMP.
<u>Soils and Geology</u>	Short-term and long-term soil erosion effects from the fire and fuels management program.	Soil erosion effects would be greater than under the proposed EBWMP.
<u>Vegetation</u>	Loss or degradation of vegetation communities related to livestock grazing and forest management practices.	Vegetation effects would be greater than under the proposed EBWMP.
<u>Wildlife</u>	Reduced wildlife diversity from increased grazing, recreation programs, and emphasis on non-native forest production.	Wildlife impacts would be greater than under the proposed EBWMP.
<u>Cultural Resources</u>	Potential effects on known and unknown cultural resources during ground-disturbing activities.	Potential effects on cultural resources would be less than under the proposed EBWMP.
<u>Fire Hazard and Risk</u>	Fuel reduction benefits from revenue-generating activity. Higher safety risk to visitors, District firefighters and other personnel, and adjacent residents.	Fire safety benefits would be substantially less than under the proposed EBWMP. Watershed fire safety would be less than under the proposed EBWMP.
<u>Visual Resources</u>	Increased impact on important watershed visual resources from revenue-generating activities.	Visual resource impacts would be greater than under the proposed EBWMP.
<u>Land Use</u>	Increased conflicts between District management programs and adjacent watershed uses.	Land use conflicts could be greater under this alternative than under the proposed EBWMP.
<u>Recreation</u>	Increased recreation opportunities on watershed lands. Existing trail use and access effects.	Recreation impacts would be less than under the proposed EBWMP. Trail use and access effects would be similar to those under the proposed EBWMP.



Table S-1. Continued

Part II. Comparison of Alternatives: Revenue Emphasis Alternative	
Resource Affected	Impact Level Relative to Proposed EBWMP
<u>Fiscal Effects</u>	<p>Impact</p> <p>Increased revenues associated with disposal of lands. Revenues would be greater than under the proposed EBWMP.</p> <p>Decreased costs associated with fire and fuels management. Costs would be less than under the proposed EBWMP.</p> <p>Increased revenues associated with enhanced recreation opportunities. Revenues would be greater than under the proposed EBWMP.</p> <p>Increased costs to maintain water quality. Long-term costs would be greater than under the proposed EBWMP.</p>
<u>Traffic</u>	<p>Increased traffic and circulation, special event access, and parking impacts. Traffic and parking effects would be greater than under the proposed EBWMP.</p>
<u>Air Quality</u>	<p>Increased ozone precursors and PM10 from recreation traffic and construction. Pollutant levels would be slightly greater than under the proposed EBWMP.</p>
Part II. Comparison of Alternatives: Recreation Emphasis Alternative	
Resource Affected	Impact Level Relative to Proposed EBWMP
<u>Water Quality</u>	<p>Impact</p> <p>Water quality effects from recreation facility and trail construction. Impact on water quality would be greater than under the proposed EBWMP because of the increased emphasis on recreation and trail development.</p> <p>Potential water quality effects from mountain bike use. Impact on water quality would potentially be greater than under the proposed EBWMP.</p>
<u>Soils and Geology</u>	<p>Erosion effects from continued livestock grazing. Soil erosion effects would be greater than under the proposed EBWMP.</p> <p>Soil erosion from facility and trail construction. Soil erosion effects would be greater than under the proposed EBWMP.</p> <p>Potential for soil erosion following large, intense fires. Greater risk of large, intense wildfires than under the proposed EBWMP.</p>



Part II. Comparison of Alternatives: Recreation Emphasis Alternative	
Resource Affected	Impact Level Relative to Proposed EBWMP
<u>Vegetation</u>	Vegetation changes caused by increased acreage subject to burning from wildfire.
	Vegetation changes would be greater than under the proposed EBWMP.
	Vegetation loss during facility and trail construction.
	Vegetation impacts would be greater than under the proposed EBWMP.
<u>Wildlife</u>	Habitat changes resulting from wildfire.
	Habitat changes would be greater than under the proposed EBWMP.
	Wildlife habitat loss to facility and trail construction and use.
	Habitat losses would be greater than under the proposed EBWMP.
	Increased human disturbance of wildlife.
	Human disturbance effects of wildlife would be greater than under the proposed EBWMP.
<u>Cultural Resources</u>	Potential effects on known and unknown cultural resources during ground-disturbing activities.
	Potential effects on cultural resources would be greater than under the proposed EBWMP.
<u>Fire Hazard and Risk</u>	Improved road networks for fire access and protection.
	Fire routes under this alternative would be safer compared to the proposed EBWMP because additional recreation access roads would be available for fire response.
	Fuel reduction through more frequent wildfire.
	Fuel reduction on watershed land would provide a marginal benefit to fire safety compared to the proposed EBWMP.
	Increased potential for large, intense wildfires.
	The potential for large, intense wildfires would be greater than under the proposed EBWMP.
	Increased conflicts with fire risk and fire response.
	Conflicts would be greater than under the proposed EBWMP.
	Constraints on fire and fuels management resulting from conflicts with recreation users.
	Conflicts would be greater than under the proposed EBWMP.

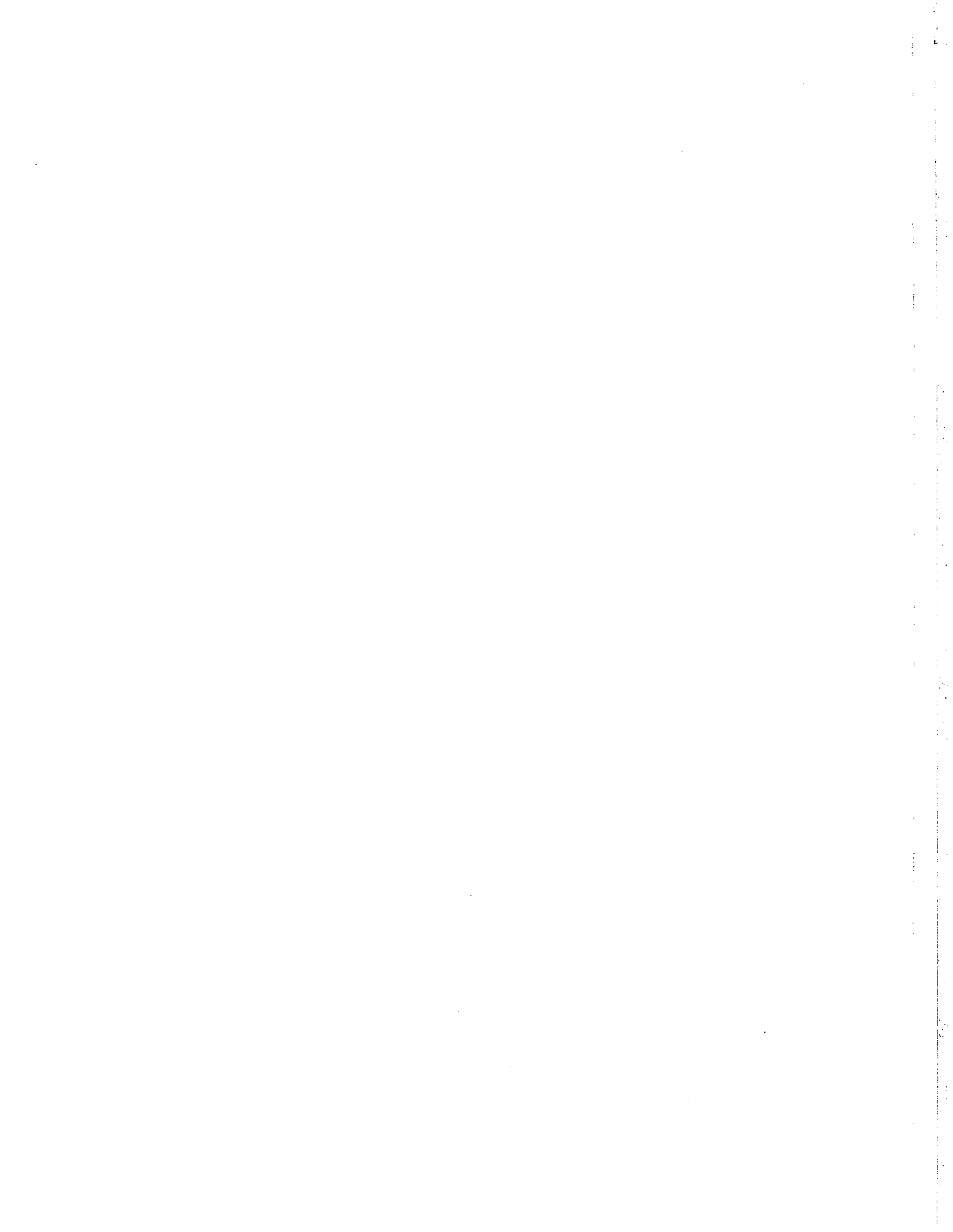
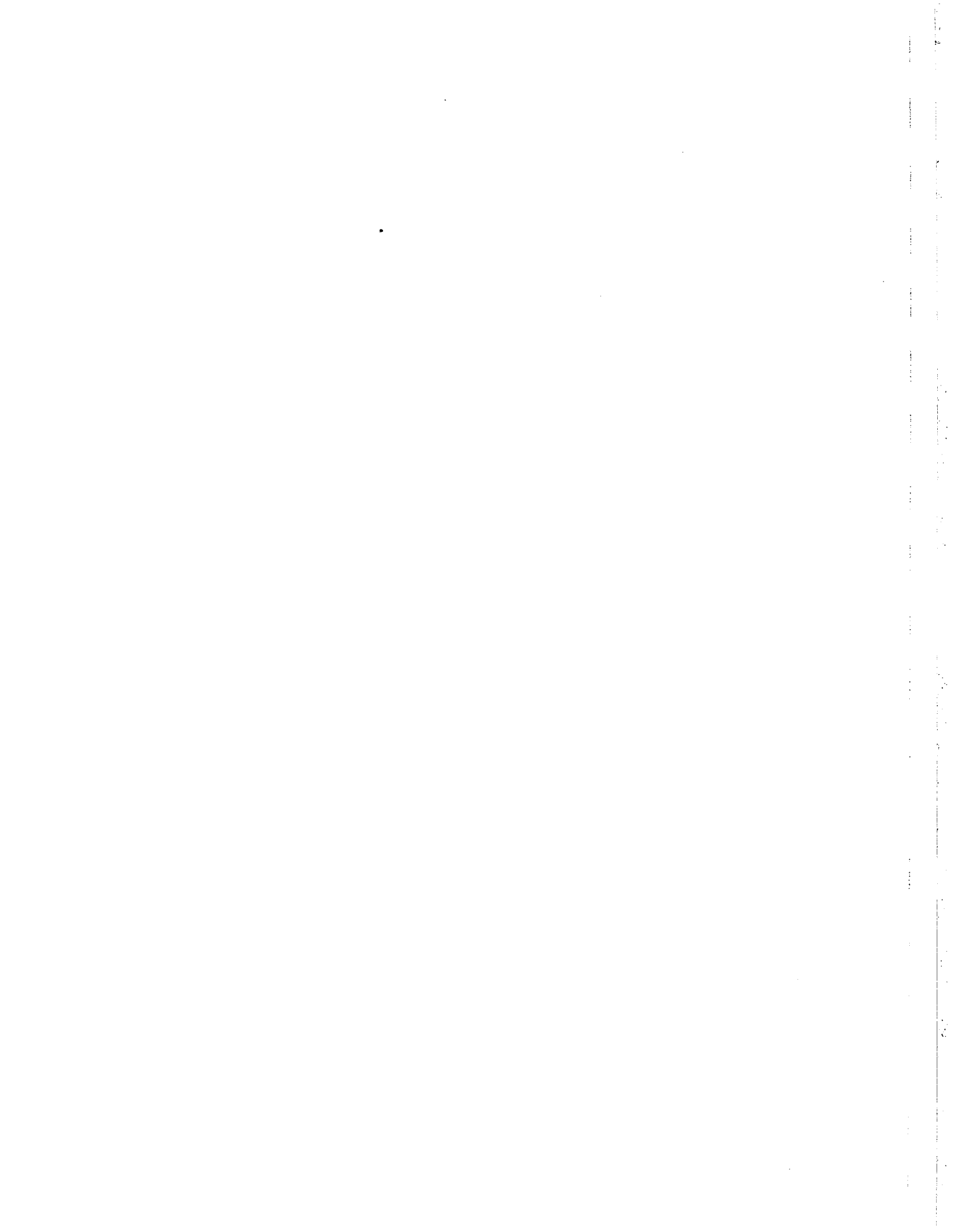


Table S-1. Continued

Part II. Comparison of Alternatives: Recreation Emphasis Alternative	
Resource Affected	Impact Level Relative to Proposed EBWMP
Impact	
Required allocation of fire management resources to protecting human life and security at the expense of other priorities.	Fire safety concerns would be greater than under the proposed EBWMP.
Visual Resources	
Increased viewing opportunities for watershed recreationists.	Viewing opportunities from developed recreation areas and trails would be greater than under the proposed EBWMP.
Risk of severe impacts on important visual resources from a large, intense fire.	Impacts on visual resources would be greater under this alternative than under the proposed EBWMP.
Land Use	
Potential conflicts between watershed management programs.	Conflicts between watershed management programs would be greater than under the proposed EBWMP.
Conflicts with adjacent land uses.	Conflicts between District goals and adjacent land uses would be substantially greater than under the proposed EBWMP.
Recreation	
Increased recreation opportunities at developed and new sites.	Recreation opportunities would be greater than under the proposed EBWMP.
Increased trail use and new access.	Recreation opportunities on existing trails would be similar to that of the proposed EBWMP. New trails would offer additional opportunities as compared to the proposed EBWMP.
Fiscal Effects	
Increased revenues associated with enhanced recreation opportunities.	Revenues would be greater than under the proposed EBWMP.
Increased recreation management expenditures.	Recreation management expenditures would be greater than under the proposed EBWMP.
Traffic	
Increased traffic and circulation, special event access, and parking impacts.	Traffic and parking effects would be greater than under the proposed EBWMP.
Air Quality	
Increased ozone precursors and PM10 from recreation traffic and construction.	Pollutant levels would be greater than under the proposed EBWMP.



Chapter 1. Introduction

BACKGROUND

The East Bay Municipal Utility District (District) owns and manages approximately 28,000 acres of land and water surface in the East Bay area surrounding five reservoirs and a portion of one basin area that does not contain a reservoir (Figure 1-1). The District's reservoirs store high-quality drinking water and emergency supplies for approximately 1.2 million water users in Alameda and Contra Costa Counties. Protecting water quality is the highest priority of the District. In addition, the District is committed to preserving and protecting the natural resources on its owned land and reservoirs.

PURPOSE OF AND NEED FOR THE EAST BAY WATERSHED MASTER PLAN AND PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT

In 1969, the District began work on its first Land Use Master Plan to address the various possible uses of District-owned lands and provide a framework for reservoir and watershed management. The District adopted a Land Use Master Plan in 1970 (East Bay Municipal Utility District 1970) and has been using that plan and two subsequent amendments (1973, 1976) for guidance since its adoption. District Policy Statement 21, which implemented the 1970 Land Use Master Plan, called for the formulation of an approach to multiple uses of watershed lands that would recognize their importance as open space as being second only to their use for watershed and water quality protection.

Changes in drinking water regulations, demographics, recreation demand, and residential development adjacent to and near District watershed lands and reservoirs have increased the need to revise the District's land use policies. The District has undertaken this master planning process to update the 1970 master plan and to reaffirm the District's commitment to water quality and environmental protection.

The purpose of the East Bay Watershed Master Plan (EBWMP) project is to establish long-term management direction for District-owned lands and reservoirs that will ensure the protection of the District's water resources and preserve environmental resources.

An environmental impact report (EIR) is required under the California Environmental Quality Act (CEQA) because the District intends to adopt a master plan for

managing its East Bay watershed lands. CEQA requires that before such a program is adopted, public agencies must consider the potential environmental impacts of its actions; disclose those impacts to the public; and provide the opportunity for the public to comment on the proposed project, alternatives, and environmental impacts.

This EIR has been prepared as a programmatic EIR under Section 15168 of the State CEQA Guidelines. The purpose of this programmatic EIR is to allow the District to consider broad policy alternatives and programwide mitigation measures at an early stage in the planning process. It is anticipated that, although this programmatic EIR may provide adequate CEQA documentation for some specific watershed activities, additional CEQA evaluations may be required before specific programs or projects can be implemented.

DISTRICT POLICY DIRECTION

In 1991, the District's Board of Directors adopted a mission statement that represents general management guidance. The Board subsequently approved a set of guiding principles that provided direction specifically for the master planning process.

Mission Statement

In 1991, the District Board of Directors adopted the following mission statement for the District:

To manage the natural resources with which the District is entrusted to provide high-quality water and wastewater services for the people of the East Bay, and to preserve and protect the environment for future generations.

Implicit in the District's mission statement is a commitment to exercise responsible financial management, ensure fair rates and charges, provide responsive customer service, and promote environmental responsibility. The EBWMP reflects the District's mission by using it as the basis for a plan that protects reservoir water quality for future generations through prudent management of District watershed natural resources.

Guiding Principles

In 1993, the District Board of Directors provided seven guiding principles for the EBWMP. These principles have guided an integrated planning process that identifies

resource and land use management goals, objectives, and implementation guidelines. These guiding principles are as follows:

1. Protect water quality through sensitive natural resource and recreation management.
2. Ensure protection of the natural, cultural, and historical resources of the watershed on a long-term basis.
3. Respect natural resources; sustain and restore populations of native plants and animals and their environments.
4. Provide for appropriate public access to the watershed consistent with the protection of natural resources and water quality.
5. Maintain an open process with full public involvement in development of the Master Plan.
6. Provide for public safety for those who utilize the watershed and reside adjacent to it.
7. Exercise financial responsibility in the development and implementation of land use policies and minimize costs to rate payers.

DEVELOPMENT OF THE EAST BAY WATERSHED MASTER PLAN

Scope of the East Bay Watershed Master Plan

The District owns and manages approximately 28,000 acres of land in Alameda and Contra Costa Counties. This land surrounds five District reservoirs (Briones, San Pablo, Upper San Leandro, Chabot, and Lafayette) and one basin area that does not currently contain a reservoir (Pinole Valley). The District owns on average 50% of the watersheds of each of its reservoirs and Pinole Valley; the remaining lands within the reservoir watersheds are owned by the East Bay Regional Park District (EBRPD) or are privately owned.

The EBWMP planning process addresses the present and possible future uses of District-owned lands in the surrounding area and the District's responsibilities and management direction regarding appropriate land uses. The EBWMP process also addresses management issues for lands within the local watershed that are not owned by the District.

Public Involvement

The proposed EBWMP was developed using a public involvement program that included scoping meetings, project newsletters, a water bill insert to all of the District's customers, and workshops and presentations before the District Board of Directors.

Community Advisory Committee

The District Board of Directors appointed a 24-member Community Advisory Committee (CAC) representing a variety of interests, including grazing, fire protection, outdoor recreation, city and county planning, environmental conservation, Native American interests, and other citizen coalitions. The purpose of the CAC was to review issues, address current land use policies, and explore recommendations to be incorporated into the EBWMP. The committee met approximately monthly over a 4-year period; in addition, numerous field trips were made to familiarize the CAC with District-owned lands and reservoirs, recreation areas, and current management practices.

General Public Involvement

Members of the general public were encouraged to comment or ask questions regarding the EBWMP process during three public scoping meetings and nine public issue workshops. The scoping meetings, conducted in July 1993, provided the public with information about the project and the opportunity to solicit information from the project staff about the proposed scope of work and identify issues. In addition, a public comment period was placed on the agenda for all CAC meetings.

Several project newsletters and a water bill insert have been used to inform the public of the planning process and management issues and to provide opportunities to make additional comments, either to District staff or during issue workshops.

APPROACH TO ANALYSIS

The environmental setting and impact analysis contained in this EIR use existing conditions as the basis for analyzing and comparing the potential impacts of the proposed master plan and alternatives. Existing conditions are generally defined as the current conditions of District-owned and surrounding lands, and the average level of management uses that have been in place for approximately the past 5 years. For example, the description of vegetation resources is based on conditions as they were identified in 1994 surveys. Livestock grazing use and conditions, however, are based on the average level of recent use because the intensity of livestock grazing fluctuates and recently has declined

substantially for a variety of reasons. Therefore, the District believes that the average level of recent use is more representative than current use as a basis for discussing the proposed master plan and alternatives.

The analysis generally compares the impacts of the alternatives to existing conditions, although the analysis recognizes that conditions are likely to change somewhat over time. Impacts of the alternatives to the proposed EBWMP also are discussed in relation to the impacts of the proposed EBWMP to facilitate comparisons between the alternatives.

Chapter 2. Proposed Project and Alternatives

INTRODUCTION

This programmatic EIR defines and evaluates five different alternatives for managing the District's East Bay watershed lands. The alternatives represent a range of policy direction available to the District and reflect diverse orientations toward land management. Each of the alternatives presented in this chapter is described using the same set of 11 management programs to facilitate comparison. All of the alternatives incorporate the District's general goals to protect reservoir water quality and biological diversity to some extent.

The primary difference between the alternatives is the level of emphasis placed on the programs and the assumed allocation of currently available District resources to achieve the objectives. All of the alternatives assume that approximately the same level of funding would be available to implement the programs. Therefore, emphasizing some aspects of watershed management under each of the alternatives generally requires placing less emphasis on other programs. Table 2-1 compares the program emphasis of each alternative to current District resource levels.

ALTERNATIVE 1 - PROPOSED EAST BAY WATERSHED MASTER PLAN

Alternative 1 is based on the direction contained in the draft EBWMP (East Bay Municipal Utility District 1995). The focuses of this alternative are to protect reservoir water quality and to preserve and enhance other natural resources on District lands while maintaining other appropriate land uses that provide public benefit, such as low-intensity recreation, grazing, and agricultural uses. Fire and fuels management is also an important component of the proposed EBWMP. The proposed EBWMP recognizes the importance of fire as a natural ecological process and acknowledges the District's responsibilities to manage fire risks to adjacent properties and prevent catastrophic fires that could result in degradation of reservoir water quality.

Water Quality

The objective of the water quality management program is to provide the highest quality drinking water to District customers. Drinking water quality is affected by the quality of supply, watershed management, and treatment techniques used. Aggressive protection and management of the quality of the water supply is necessary to control treatment costs and to comply with drinking water regulations. The water quality management program includes assessing how human activities and land and water uses may affect water quality and implementing measures, when necessary, to maintain water quality.

The objectives of this program are to:

- maintain the high quality of water stored in District reservoirs,
- ensure that surface runoff from District lands meets state water quality standards,
- restore degraded areas on the watershed that are a source of excessive sediment, and
- address existing and potential water quality impacts for lands within the reservoir basins that are not owned by the District.

Under this program, the District would develop and implement best management practices (BMPs) to reduce soil erosion and sedimentation caused by land disturbance, establish buffers along water bodies and restore riparian habitat to protect against degradation of habitat and water quality, and evaluate the effects of recreational activities and implement measures to reduce water quality impacts. This program would be a high priority for allocation of District resources.

Biodiversity

Biodiversity management involves managing habitats and species to maintain and enhance conditions for biological resources and to ultimately provide for long-term protection of environmental health and water quality. The objectives of the biodiversity management program are to:

- maintain, enhance, and restore (where feasible) plant and animal communities, populations, and species;
- implement an ecosystem management approach that maintains and enhances natural ecological processes;

Table 2-1. Relative Emphasis of EBWMP Alternatives Compared to Existing District Resource Allocations

Program	Alternative 1 - Proposed Project	Alternative 2 - No-Project Alternative	Alternative 3 - Increased Water Quality Emphasis	Alternative 4 - Revenue Generation Emphasis	Alternative 5 - Recreation Emphasis
Water Quality	■ ■	■	■ ■	■	■
Biodiversity	■ ■	--	■	0	0
Forestry	■ ■	--	■	■	--
Livestock Grazing	0	--	00	--	0
Fire and Fuels	■ ■	--	■ ■	--	--
Developed Recreation and Trails	--	■ ■	00	■	■ ■
Environmental Education	■	--	00	0	■
Cultural Resources	■	--	■	■	■
Visual Resources	■	--	--	00	■
Land Ownership	--	--	■	■	--
Entitlements	■	--	■	■	--

Key: ■ ■ = much more emphasis
 ■ = more emphasis
 -- = same emphasis
 0 = less emphasis
 00 = much less emphasis

- apply an adaptive management strategy using inventory, management, monitoring, and research; and
- coordinate all resource management programs to ensure that biological resources are protected.

Under this program, the District would implement activities focused in several areas: protection of threatened, endangered, and other special-status species as required by law; management of non-native species and habitats of high biological value; and control of noxious weeds, invasive plants, and feral animals.

Protection of Threatened, Endangered, and Other Special-Status Species

The District would prepare a management plan for legally protected species that would delineate these species' distribution on District land, their habitat requirements, and potential threats to their survival. The District would also implement habitat enhancement measures for species identified in the management plan, as financially feasible, and monitor populations of sensitive species.

Protection and Enhancement of Native Vegetation Types

The District would design management activities to limit fragmentation of native habitats; consider designating and protecting heritage trees; maintain and enhance habitat suitability for wildlife; and identify high-priority sites for habitat restoration based on water quality benefits, habitat values, and location relative to important wildlife areas.

Management of Non-Native Species and Habitats of High Biological Value

The District would identify areas of non-native habitats that support special-status plants and animals, recognize the ecological value and likely permanence of certain non-native species and habitats (e.g., annual grasslands), and incorporate management of these species into biodiversity planning efforts.

Control of Noxious Weeds, Invasive Plants, and Feral Animals

As part of the biodiversity management program, the District would control, as required by law, certain noxious weeds and maintain an up-to-date list of plant and animal species that warrant control on District lands. The District would also emphasize control of these species near important habitat areas; apply cost-effective strategies that limit impacts on other resources; and, in cooperation with other agencies, reduce effects of

competition and predation by non-native species on the red-legged frog and western pond turtle (both of which are special-status species).

Forestry

Under the forest management program, the District would selectively manage non-native forests (except those identified as having high biological value) to increase the strength and vigor of stands in the short term and to encourage the replacement of non-native forests with native forests in the long term. This phased approach to the conversion would reduce fire risks, maintain biological habitat values, and protect water quality. Native forests would be managed to encourage natural regeneration processes and enhance habitat values. The objectives of the forest and woodland management program are to:

- develop and implement a long-term plan for managing non-native forest species that includes maintenance of stand health and vigor and phased conversion of selected stands of non-native forest to native forest or other ecologically suitable habitats;
- use forest management as a tool to achieve strategic fire management goals, biodiversity goals, and other resource goals;
- protect water quality, biodiversity, and other resource values during forest management program implementation; and
- manage trees in areas of high public use to ensure visitor safety and maintain aesthetic values.

General Management

The District would manage forests and woodlands to discourage establishment of new stands of non-native woody vegetation and expansion of existing stands, and would avoid using even-aged harvest techniques (e.g., clear cutting) on areas larger than 1 acre. The District would also develop BMPs to reduce resource damage during harvesting and management, maintain non-native forests that support special-status wildlife species, and retain non-native forests where stands cannot be removed without significant impacts on other resources.

Eucalyptus Management

The District would manage those non-native eucalyptus forests not identified as having high biological value by removing the stands gradually and restoring native woodland or other natural habitats in those areas to reduce fire hazard. The District would also ensure that adequate staffing and funding are available to control stump-sprouting in eucalyptus stands before harvesting begins, and consult with other resource professionals to identify and apply effective control techniques.

Monterey Pine Forest Management

The District would plan and implement treatments to maintain the short-term vigor of Monterey pine stands, implement long-term management practices to replace stands of Monterey pine forest not identified as having high biological value with native species, and make site-specific decisions to restore native habitats or continue managing non-native forest.

Livestock Grazing

The District would manage livestock grazing to minimize impacts on water quality and biodiversity while using selective grazing as a tool to reduce fire risk, and promote the District's biodiversity goals. Overall, grazing levels would be reduced from historic levels and would be similar to the reduced 1995 grazing levels. The objectives of the livestock grazing management program are to:

- use grazing by domestic livestock (e.g., horses, cattle, llamas, and goats) as a tool to manage vegetation for other resource needs;
- eliminate or restrict grazing in areas where substantial impacts on water quality, biodiversity, fire control, or other management objectives may result;
- maintain current runoff level; and
- generate livestock grazing revenue for the District where consistent with other resource values.

Under this program, the District would exclude grazing from sensitive species habitats, focus grazing in particular areas of the watershed, and use grazing as a low-cost technique to reduce fuel loads in grassland interface zones. The District would also prepare an annual grazing plan for each allotment to ensure that land would be grazed appropriately and to maintain 140% of the minimum recommended residual dry-matter standards recommended by the University of California Cooperative Extension, Division of Agricultural Sciences.

In addition, the District would monitor the effects of various grazing regimes on water quality and biodiversity, and adjust the overall grazing program to meet resource objectives; reduce or eliminate grazing where resulting erosion significantly affects water quality; designate alternate areas to be reserved for grazing during dry years; maintain leases on a short-term, renewable basis to allow modification of grazing practices as necessary; and maintain the prohibition against grazing sheep on District lands.

Fire and Fuels

Fire and fuels management under the proposed EBWMP would be achieved by carefully managing habitats to create a mosaic of habitat types and by using natural firebreaks wherever possible. The goal of the program is to reduce fire risks and prevent catastrophic fires that would denude large areas of the watershed and subject soils to erosion and other water quality effects. The objectives of this program are to:

- provide an appropriate level of fire protection for all watershed lands, emphasizing protection of life, public safety, and property values in interface areas;
- implement measures to reduce fire hazard to protect water quality from wildfire-related soil erosion, sedimentation, and nutrient impacts;
- use a strategic planning approach to fire management that ensures fire and fuels management activities are consistent with the objectives for other resources to the extent practicable;
- recognize the importance of fire as a natural ecological process, and use prescribed burning under carefully selected conditions to achieve long-term fire safety, water quality protection, and biodiversity management objectives;
- use prescribed burning and other techniques to reduce hazardous natural and activity-related fuel loads in a safe, controlled, and environmentally sound manner;
- cooperate with other agencies, adjacent property owners, and homeowner groups to develop coordinated resource management plans (CRMPs) and other cooperative multiagency agreements for fire hazard reduction and fire incident management;
- participate actively in land use planning processes for adjacent lands to prevent and mitigate fire management impacts of urban encroachment on adjacent lands;

- maintain fire management program funding that supports implementation of adopted plan elements; and
- maintain firefighting capability, equipment, and patrols to retain the basic level of fire safety and initial response necessary.

Prescribed Burning

The District would continue to develop appropriate prescribed burning procedures and test various approaches. The District would also ensure that the watershed management staff designs site-specific plans for all prescribed burns, follows California Department of Forestry and Fire Protection (CDF) regulations for prescribed burning, complies with federal, state, and local air pollution control laws and regulations, and develops and implements a monitoring program to evaluate impacts of prescribed burning on water quality and other resources.

Fuels Management

The District would establish fire management units to assist in planning presuppression fire and fuels management activities, and continue to graze livestock in all grassland interface areas where grazing can effectively reduce fuel load and is compatible with other resource objectives. Barriers would be identified that would help retard wildfire spread and a strategic fuelbreak would be established; new fuel modification areas of the fuelbreak network would be designed and constructed; and prescribed fire, grazing as a form of vegetation management, and manual and mechanical fuel treatments would be recognized as effective tools for reducing fire hazards.

Maintaining strategic fuel treatment areas, fuelbreaks, firebreaks, and other vegetation manipulations as part of ongoing watershed maintenance activities would be emphasized, as would developing site-specific treatments for environmentally sensitive areas.

Plowed Control Lines

The District would evaluate the location of plowed control lines and link such lines with the fuelbreak network where possible. The District would also identify locations where plowed control lines can function effectively in fire control and reduce surface disturbance and erosion potential; use existing trails and fire roads as control lines wherever possible; and avoid plowing control lines through sensitive habitats and species, cultural resource sites, and riparian buffer zones around water bodies.

Fire Prevention

The District would address arson issues, implement treatments along public access routes, and develop a fire danger rating system based on weather and fuel moisture conditions. Public use would be restricted during periods of extremely hazardous conditions.

Fire Protection

The District would participate in cooperative multiagency education programs to teach adjacent homeowners how to reduce fire hazard and risk along the interface zone, examine the feasibility of developing a dedicated water supply system for fire suppression in interface areas, and continue annual maintenance of fire roads that provide emergency access to District watershed property.

Cooperative Fire Protection and Presuppression Planning

The District would coordinate with other fire suppression organizations, review and update agreements for cooperative wildland fire suppression, improve the training program for field staff, and implement cross-training with other organizations.

Fire Suppression

The District would maintain its access to regional fire information sources; use contain-and-control strategies to suppress wildfires at minimal cost; and emphasize indirect suppression strategies that use existing breaks, barriers, and burnout procedures when possible.

Developed Recreation and Trails

The developed recreation and trails management program would involve defining the types of recreation uses that are consistent with the District's water quality and other goals, the types of recreation experiences that are compatible with the protection of watershed resources, the ongoing uses that would be allowed to continue, and the types of new uses that the District would consider. The objectives of the recreation management program are to:

- offer recreation experiences that complement and are consistent with the protection of District watershed lands and water bodies and provide opportunities for reasonable use of natural watershed attributes;

- ensure a high quality of recreation experience on District lands by reducing user conflicts, promoting safety and courtesy, and controlling overcrowding;
- promote environmental values in recreation use and management;
- ensure that currently permitted or new recreational activities do not increase the potential for excessive soil erosion, landscape modification, or pollutant loading or adversely affect other watershed or reservoir resources;
- provide trail links to the surrounding regional open space network, where feasible, that do not conflict with resource protection priorities;
- give priority to those recreation uses that serve the broadest spectrum of the population (including the disabled community);
- assess the comprehensive financial consequences associated with recreation proposals; evaluate cost parameters related to initial capital expenditure, District staffing and administration requirements, initial program development costs, and long-term operation and maintenance cost; and
- ensure that no net increase in adverse environmental effects would result from additions to or modifications of District recreation management programs.

The District would not allow proposed recreation uses that require visible alteration of the natural character of the land or create excessive nuisances to other users. The District would also implement an ongoing program to ensure that recreation facilities are in compliance with current standards, establish the carrying capacity of major recreation areas, and avoid overcrowding.

The District would also close recreation facilities and trails as needed to protect sensitive resources and provide for public safety, and would separate potentially conflicting uses wherever possible.

In evaluating proposals for special events, the District would give priority to those events that are temporary, impose the least conflict with normal use, and have minimal effects on sensitive resources. The District would continue to prohibit swimming and other forms of body contact (either human or domestic animal) in reservoir waters.

The District would retain the current trail permit system and consider expanding it to include single day-use permits, as well as explore the feasibility of establishing a volunteer program for maintaining trails.

Under this program, the District would give priority to recreational facilities and uses that are accessible to and attract users from the entire region, all age groups, and users with different physical capabilities. The District would also incorporate the standards of the

Americans with Disabilities Act in all facility upgrades and new developments as required by law.

The costs of personnel and maintenance needs would be evaluated in considering new recreation proposals, detailed feasibility and environmental analysis would be required for recreation proposals, and the burden of these analyses would be placed on the organization, agencies, or individuals proposing the use.

Overall, no new recreation uses that would result in adverse impacts on watershed reservoirs would be permitted unless these effects could be offset by reducing impacts or providing benefits to similar resources elsewhere in the watershed.

Environmental Education

The goals of the environmental education program would be to proactively encourage educational and interpretive uses of District lands and to identify lands suitable for such uses. This program also involves encouraging research uses of District lands, particularly those that would contribute to the District's understanding and knowledge of watershed resources. The objectives of this program are to:

- reclassify 2,500 acres that were designated as educational use areas under the 1970 Land Use Master Plan as sensitive habitats designated for use in environmental education;
- provide an educational outreach program to inform the public about the importance of protecting water quality, the purpose of the District's watershed lands, the importance of watershed lands and their resources, resource management practices and their importance, and water conservation;
- promote research on watershed lands and resources that would be used in the District's management practices and would add to the District's watershed resource database;
- formalize those environmental education programs that are currently conducted informally by District staff; and
- incorporate environmental education into appropriate District actions and activities.

Under this program, the District would develop and conduct an environmental education program that is focused on water quality protection and watershed management issues, develop outreach and public information programs, explore the feasibility of

maintaining and coordinating a group of volunteers for conducting the environmental education program, and encourage college and university research on District lands.

Cultural Resources

In the past, the District has not formally managed cultural resources on watershed lands. The objectives of the cultural resource management program are to:

- identify, preserve, and protect significant cultural resources,
- provide for appropriate research and educational uses of District lands with respect to cultural resources, and
- maintain an ongoing relationship with Native Americans who have ancestral ties to District lands.

Under this program, the District would implement measures to avoid adversely affecting sensitive cultural resources while implementing activities on watershed lands. These measures include developing an education program for District staff, protecting vulnerable resource sites, and conducting appropriate studies before engaging in ground-disturbing activities.

The District would also seek closer relations with the local Native American community by designating contact persons to coordinate communication with interested Native Americans regarding the process to follow when remains or artifacts are discovered.

Visual Resources

The visual resource management program involves managing the watershed's visual resources to limit the effects of other management program activities on important sensitive views. The program would also address the development of methods to ensure consistency in structures, signs, and other watershed improvements. The objectives of this program are to:

- maintain and protect the general character and visual qualities of watershed lands;
- maintain and protect the visual qualities experienced from reservoir surfaces on which public access is permitted;

- maintain and protect the visual qualities viewed from specific public use areas, public trails, and public roads within the watershed;
- maintain and protect the visual qualities viewed from key public viewpoints located adjacent to District lands; and
- maintain and develop a unified visual quality and unity in structures, signs, and other improvements on watershed lands.

Under this program, the District would review developed watershed areas and new development proposals on District-owned property to ensure their consistency with the watershed's visual character. The District would also seek to retain shoreline vegetation where it occurs, restrict public access along reservoir edges to prevent degradation of views, locate new development that is near existing trails so that views from the trails are reduced or eliminated, and review lease terms to ensure that they conform to visual resource management guidelines.

To encourage a cohesive visual unit among watershed lands, the District would develop design standards for all development (including recreation facilities, district buildings, signs, and other improvements) to reflect a strong, unified visual character. The District would also develop native plant restoration and landscaping standards applicable to all watershed development and would group watershed development to reduce visual intrusion.

To reduce visual effects of fire management activities, the District would address visual concerns when coordinating activities such as pruning, clearing, and controlled burns.

Land Ownership

The purpose of the land ownership program is to enable the District to meet its land management and water quality protection obligations in a manner governed by sound asset management practices. The objectives of this program are to:

- ensure long-term protection of water quality through a systematic program of land retention, acquisition, and disposal;
- identify high-priority basin parcels not currently in District ownership that should be acquired to ensure protection of watershed lands, reservoir water quality, wildland fire protection, and biodiversity; and
- increase revenues generated by the use of District facilities and land, consistent with water quality and natural resource protection priorities.

Under this program, the District would consider a variety of land acquisition methods for important lands, identify and rank non-District-owned lands that should be acquired, and identify and rank District-owned nonreservoir watershed properties that could be sold to generate funds for purchasing lands that are important for protection of water quality and biodiversity and for fire and fuels management. The District would take an extremely conservative approach to disposing of any noncritical properties and would sequester any funds generated from land disposals to be allocated for the purchase of watershed lands with greater water quality and sensitive resource value.

Entitlements

The entitlements program is intended to provide administrative flexibility while ensuring that leases do not conflict with reservoir operations or other high-priority management programs, create unacceptable watershed conditions, or generate excessive management costs. The objectives of the program are to:

- administer current and proposed lease agreements and access, research, and land use permits to ensure that lessees/permittees are complying with District priorities to maintain reservoir water quality and protect sensitive natural resources and
- ensure that all lease agreements and land use permits consider potential public safety or nuisance issues that could result from lessee/permittee operations.

Discretionary leases that could adversely affect watershed resources would be limited, and mitigation would be required for all adverse effects. The District would also prohibit or restrict lease agreements that are proposed near populated watershed areas to reduce conflicts, and would review all lease agreements at the time of renewal and modify lease agreements to correct any identified problems.

ALTERNATIVE 2 - NO-PROJECT ALTERNATIVE

Under Alternative 2, the District would continue to manage its East Bay watershed lands under the existing 1970 Land Use Master Plan (as amended). This plan envisioned fairly intense recreation development in many areas. The management guidance provided by the Land Use Master Plan does not reflect many of the District's current concerns and objectives because many issues (e.g., drinking water quality, biological diversity, and fire and fuels management) have increased in importance over the past 25 years. Therefore, this alternative also recognizes the District's actual land management practices over the 25 years since the plan was adopted.

Water Quality

Under Alternative 2, the District would continue to manage water quality in a manner similar to its recent practices. No detailed program to increase protection or improvement of water quality would be developed. Over time, the emphasis on this program is likely to increase somewhat in response to anticipated, increasingly stringent changes in drinking water regulations.

Biodiversity

Under Alternative 2, the District would not develop or adopt an active biodiversity management program. The District would continue to recognize the unique resources provided by its watershed lands and manage those lands to protect sensitive biological resources.

Forestry

Under Alternative 2, the District would limit forest management to those actions necessary to address acute fire and fuels management needs and required for hazard tree removal. The existing nonnative forests would be allowed to remain, and no active program for converting these forests to native habitats would be developed.

Livestock Grazing

Under Alternative 2, the District would continue to allow grazing at recent historical levels, which are substantially higher than the 1995 level. Cattle would be allowed to graze most riparian and wetland areas, with site-specific remedial actions taken where deemed necessary.

Fire and Fuels

Under Alternative 2, the District would continue its current program of fire and fuels management and fire suppression activities. No major new programs would be developed. Most of the fuels management would consist of livestock grazing and maintenance of plowed control lines.

Developed Recreation and Trails

The 1970 Land Use Master Plan anticipated major recreation development of watershed lands. Most of this recreation development was expected to be relatively intensive and has not been developed during the past 25 years for numerous reasons, including availability of funds, water quality concerns, and environmental concerns.

Recreation development envisioned under the 1970 Land Use Master Plan included intensive development of the Oursan Valley area of the San Pablo Reservoir watershed, possibly including golf courses, riding stables, swimming and tennis facilities, and a conference center.

The master plan also envisioned a parking lot, marina and boat ramps, an equestrian center, and other facilities at Briones Reservoir. This development was planned based on the assumption that improvements would be made at the Orinda Filter Plant to address water quality concerns. These improvements have not been completed. Water-based recreation development, including boat ramps, was also planned for the Upper San Leandro watershed.

The master plan also proposed opportunities for development of community facilities on District property.

To date, none of these developments have been approved and, given the historical management approach of the District and lack of funding, they are not likely to be implemented. Alternative 2 assumes, however, that more intensive development of watershed lands would occur using guidelines presented in the 1970 Land Use Master Plan.

Environmental Education

Under Alternative 2, the District would continue to identify certain watershed areas as educational use areas. The District would continue to permit organizations to enter into agreements for limited entrance to District lands to pursue educational objectives, including limited development at the expense of the organization.

Cultural Resources

Under Alternative 2, the District would continue to comply with laws governing the protection of cultural resources, but no additional effort would be made to accommodate educational and research efforts on District lands and the District would not actively pursue establishing a liaison with the Native American community.

Visual Resources

No specific visual resource management program would be developed under Alternative 2.

Land Ownership

Under Alternative 2, the District would continue to address land ownership under District Policy Statement 21, which states, in part, that the District will:

- anticipate land requirements in connection with necessary expansion of District operations and services to permit economic acquisition of such property and
- own, maintain, acquire, or dispose of District lands in accordance with environmental management principles consistent with the primary District functions of providing potable water within the service area of the District.

Therefore, this alternative assumes that in the future, the land ownership program would be similar to historical District practices.

Entitlements

Under Alternative 2, the District would continue to manage rights-of-way and leases on District lands as in the past. No major changes are anticipated.

ALTERNATIVE 3 - INCREASED WATER QUALITY EMPHASIS

Under Alternative 3, the District would focus management of its lands to provide increased water quality protection. Although the proposed EBWMP emphasizes water quality protection, uses that have the potential to affect water quality (e.g., grazing and recreation) would be allowed to continue under Alternative 1. The increased water quality emphasis under Alternative 3 would further reduce or eliminate many of those uses. Mechanical and manual fire and fuels management activities would be increased to provide the same level of fire protection provided under the proposed EBWMP. Recreation, particularly activities on and near the reservoirs, would be curtailed, and new recreation uses

would generally not be allowed. In addition, an increased emphasis on riparian habitat restoration would protect water quality.

Water Quality

Under Alternative 3, the objectives of the water quality management program would be essentially identical to those described under the proposed project. The primary difference is that, under this alternative, water quality management would receive increased emphasis in terms of the allocation of District resources. In addition, the District would examine existing recreation uses, such as powerboats on San Pablo Reservoir, and determine if changes should be implemented to enhance water quality protection. For example, the District might decide to require all boats on San Pablo Reservoir to be powered by electricity only, with a low maximum power rating to prevent shoreline erosion.

Biodiversity

The biodiversity management program under Alternative 3 would be similar to the program described under the proposed project, but the planning emphasis would shift from enhancing plant and animal communities to maintaining those communities, particularly in areas where they are important to water quality protection. Habitat restoration and enhancement would focus primarily on areas where those activities would improve water quality. In addition, monitoring and inventory activities would receive less emphasis. Under this alternative, the District would continue to comply with laws protecting threatened, endangered, and other legally protected species.

Forestry

As with the biodiversity management program, forest management would emphasize programs and activities that would reduce the potential for erosion and catastrophic fire and the resulting water quality degradation. These activities would include maintaining the vigor of non-native forests and encouraging the gradual conversion of these plantations to native forests where beneficial for water quality. Forest management activities aimed at enhancing biodiversity would receive substantially less emphasis.

Livestock Grazing

Under Alternative 3, livestock grazing within reservoir watersheds would be largely eliminated. Some grazing would be permitted where other methods of fire control would be ineffective, and grazing would be allowed to continue on District lands that are not tributary to a District reservoir.

Fire and Fuels

The goals of the fire and fuels management program would be identical to those described under the proposed project. Fire and fuels management would be a major emphasis under this alternative because catastrophic fire has the potential to significantly degrade water quality. As described for the proposed EBWMP under "Livestock Grazing", however, fuels control would be accomplished largely through manual and mechanical methods rather than by livestock grazing.

Developed Recreation and Trails

Developed recreation and trails management activities under Alternative 3 would focus on evaluating existing recreational uses of watershed lands to determine the potential for water quality degradation. New recreational uses would generally not be allowed, and existing uses that could affect water quality would be reduced or eliminated. These uses may include boating on San Pablo Reservoir, shoreline fishing, and hiking and equestrian use of trails.

Environmental Education

Under Alternative 3, no significant District resources would be allocated to establishing an environmental education program.

Cultural Resources

Under Alternative 3, the cultural resource management program would be identical to the program described under the proposed project. Allocation of District resources would also be similar.

Visual Resources

Under Alternative 3, little emphasis would be placed on visual resource management. No significant level of District resources would be allocated to this program.

Land Ownership

Land acquisition for water quality protection would be emphasized under Alternative 3. The District would consider selling properties that are not needed to protect reservoir water quality and using the funds to acquire other, higher priority watershed parcels.

Entitlements

The entitlement program under Alternative 3 would be identical to the program described under the proposed project.

ALTERNATIVE 4 - REVENUE EMPHASIS

Alternative 4 would emphasize increasing net revenues as a primary objective of the District. The District's objectives to protect water quality and biological resources would generally be met, although the quality of stored water would likely decline, and uses that have the potential to provide increased revenue to the District (e.g., grazing) would become a high priority. Under this alternative, habitat restoration would generally not be implemented; the District would review the status of lands that do not contribute to the protection of reservoir water quality and consider designating those lands as surplus, making them available for sale at fair market value and reducing total District land holdings.

Water Quality

The water quality management program under Alternative 4 would be similar to that under the No-Project Alternative (Alternative 2).

Biodiversity

Under Alternative 4, the biodiversity management program would be deemphasized. Allocation of District resources to biodiversity management would also be reduced as compared to existing allocations. The program would focus largely on complying with legal mandates protecting designated species and controlling noxious weeds and animal pests.

Forestry

Under Alternative 4, the forest management program would not be similar to that under the proposed project. Little emphasis would be placed on forest management for biodiversity enhancement. Instead, the District would seek to develop forest management and harvest strategies that could generate revenue. For example, the District would generally manage eucalyptus and Monterey pine forests for harvest potential rather than seek to convert the plantations to native species.

Livestock Grazing

Livestock grazing under Alternative 4 would be emphasized because of the revenues generated by grazing. Stocking rates would be similar to those on District lands during the past several years (substantially higher than 1995 levels).

Fire and Fuels

The fire and fuels management program under Alternative 4 would be similar to that under the No-Project Alternative and would essentially be a continuation of existing practices. Most of the fuels management would consist of livestock grazing and maintenance of plowed control lines.

Developed Recreation and Trails

Developed recreation and trails management under Alternative 4 would emphasize those uses that have the greatest potential to generate revenue. These would most likely be focused uses, such as a community center. Special-event uses that are consistent with the District's water quality objectives would be encouraged, provided that all of the District's real costs could be covered by the use proponent and the District could realize net revenue

gain. Dispersed recreation uses, such as new trails, would be discouraged because the administration and maintenance costs generally exceeds the revenues generated by these uses.

Environmental Education

Under Alternative 4, no significant District resources would be allocated to an environmental education program.

Cultural Resources

Under Alternative 4, the cultural resource management program would be identical to the program described under the proposed project. Allocation of District resources would also be similar.

Visual Resources

Under Alternative 4, little emphasis would be place on visual resource management. No significant level of District resources would be allocated to maintaining visual quality where conflicts might arise with revenue-producing activities.

Land Ownership

Under Alternative 4, the District would emphasize identifying lands that are not needed for reservoir water quality protection purposes and selling those lands. The revenues generated would then be used to acquire watershed lands not currently owned by the District that are important for water quality protection. In addition, when assessing and prioritizing land acquisition targets, the District would emphasize lands that have both important implications for water quality protection and revenue generation potential, such as lands that could be added to the District's grazing program.

Entitlements

The lease program under Alternative 4 would be similar to that under the proposed project. Agricultural uses that generate revenues and are consistent with the District's water

quality goals would be more strongly encouraged, however. These uses include Christmas tree farms on watershed lands and agricultural uses of the Pinole watershed area.

ALTERNATIVE 5 - RECREATION EMPHASIS

The East Bay area is a densely populated area with a high demand for recreational opportunities. Alternative 5 would place greater emphasis on providing recreational opportunities on the District's East Bay lands than would the other alternatives. Water quality is expected to decline under this alternative, and the financial impact of this alternative could be substantial. Uses that would be emphasized include trail construction, multiple use of trails (i.e., by mountain bikes as well as pedestrians and horses), and new facilities that would contribute to recreation and other community uses. As under Alternative 3, management activities not critical to the District's primary mission (e.g., habitat restoration) would generally not be undertaken.

Water Quality

The water quality management program under Alternative 5 would be similar to that described for the No-Project Alternative.

Biodiversity

Under Alternative 5, the biodiversity management program would be deemphasized. Allocation of District resources would also be reduced as compared to existing allocations. The program would focus largely on complying with legal mandates protecting designated species and controlling noxious weeds and animal pests.

Forestry

The forest management program under Alternative 5 would be similar to that under the No-Project Alternative (Alternative 2). Forest management for biodiversity enhancement would not be emphasized.

Livestock Grazing

The livestock grazing program under Alternative 5 would be similar to the program described under the proposed project.

Fire and Fuels

Under Alternative 5, the fire and fuels management program would be similar to the program described under the No-Project Alternative and would essentially be a continuation of existing practices. Most of the fuels management would consist of livestock grazing and maintenance of plowed control lines.

Developed Recreation and Trails

Alternative 5 would place increased emphasis on the provision of recreation opportunities on District lands. In addition to the regional trail connections described under the proposed project, this alternative would allow additional new recreation uses, including trails, recreation facilities at San Pablo Reservoir, play fields, and mountain bike use of the District's fire and maintenance road system. Public access to Upper San Leandro Reservoir would continue to be prohibited, however, because of the unique aquatic resources present.

Environmental Education

The environmental education program under Alternative 5 would be identical to the program described for the proposed project.

Cultural Resources

Under Alternative 5, the cultural resource management program would be identical to the program described under the proposed project. Allocation of District resources would also be similar.

Visual Resources

Under Alternative 5, the visual resource management program would be essentially identical to the program described for the proposed project.

Land Ownership

The land ownership program under Alternative 5 would be identical to the program described for the proposed project, except that the existing and potential recreational values of properties would also be considered when examining the desirability of disposing of and acquiring lands. Lands that provide or have the potential to provide major recreation opportunities would have a lower priority for disposal and a higher priority for acquisition.

Entitlements

The entitlement program under Alternative 5 would be identical to the program described for the No-Project Alternative (Alternative 2).

Chapter 3. Environmental Setting

WATER QUALITY AND HYDROLOGY

Introduction

District water resources consist of six main watersheds: San Pablo Reservoir, Briones Reservoir, Pinole Creek, Lafayette Reservoir, Upper San Leandro Reservoir, and Chabot Reservoir. Water from the Mokelumne River is diverted from the Pardee Reservoir through the Mokelumne Aqueduct and pumped into San Pablo, Briones, and Upper San Leandro Reservoirs. Water may then be released from Briones Reservoir into San Pablo Reservoir and from Upper San Leandro Reservoir into Chabot Reservoir. Briones, San Pablo, and Upper San Leandro Reservoirs are used to store water for ongoing domestic use, whereas Chabot and Lafayette Reservoirs hold emergency water supplies. Table 3-1 provides a listing of water sources for each reservoir.

The quality of water in the District's East Bay reservoirs varies. Issues related to hydrology and water quality primarily involve the potential effects of land uses within the watersheds on the water quality of local runoff. Water quality studies have shown that the pollutant load of local runoff, particularly that originating from nonpoint sources such as agricultural and stormwater runoff, is substantially higher than that from the water imported from the Mokelumne River. Figure 3-1 shows the relationship of pollutant loading from each source for San Pablo Reservoir. Other reservoirs demonstrate similar relationships.

Although these issues apply to all District reservoirs, the water quality of Upper San Leandro and San Pablo Reservoirs is of greatest concern because these are the only East Bay reservoirs that are "on-line" to supply drinking water year round. Water quality at Briones Reservoir is also of concern because few facilities would be available to adequately treat the reservoir water if its quality were to decline substantially, and the related costs of treatment facility upgrades would be high.

The proportion of reservoir inflow contributed by local watershed runoff is substantially less than the proportion of contaminants that it adds to the reservoirs. For example, the load of nitrogen to Upper San Leandro Reservoir from local runoff was estimated to be 760 times that from the Mokelumne Aqueduct, although it represented only 40% of the water flowing into the reservoir.

Within each watershed, water quality analyses indicate that developed lands produce more contaminants per acre than undeveloped areas. For example, a residential area in the San Pablo watershed was estimated to produce 1,480 pounds of sediment per acre per year,

whereas undeveloped land produced only 120 pounds. Because undeveloped land represents a far greater proportion of this watershed, it contributes more pollutants overall; however, further development of this area would create significantly higher amounts of pollutant contaminants.

San Pablo Reservoir and Watershed

The water quality of San Pablo Reservoir is relatively high because, along with the Upper San Leandro Reservoir, it provides the District's primary on-line water supplies and so water from the Mokelumne River is delivered continuously to replenish the reservoir. Land uses within the watershed (particularly non-District-owned areas) are of primary concern because of their negative effect on the quality of stormwater runoff to the reservoirs.

Average nutrient concentrations, particularly nitrate, measured during routine monitoring by the District have usually been relatively low (Table 3-2); however, it was noted that concentrations tended to increase near the inflow of San Pablo Creek (Commins 1993). Furthermore, higher nitrate values typically corresponded with wet-weather months, particularly January through April (Commins 1993).

Stormwater runoff quality data for local streams indicates that relatively high concentrations of some heavy metals (lead and chromium) have accumulated during storm events. However, the volume of local supply is much lower than the volume of flows brought through the Mokelumne Aqueduct, and metals concentrations in aqueduct water are generally lower than those in local runoff. Dry-weather sample measurements for the same constituents were regularly lower than samples collected during wet weather.

Briones Reservoir and Watershed

The water quality in Briones Reservoir is very high (Table 3-2), primarily because the watershed is relatively undeveloped. Consequently, runoff from the watershed does not substantially alter the quality of water delivered to the reservoir from Pardee Reservoir. Sampling data collected during the 1991 water year indicate little or no significant contamination by nutrients, metals, pesticides, or toxic organic compounds.

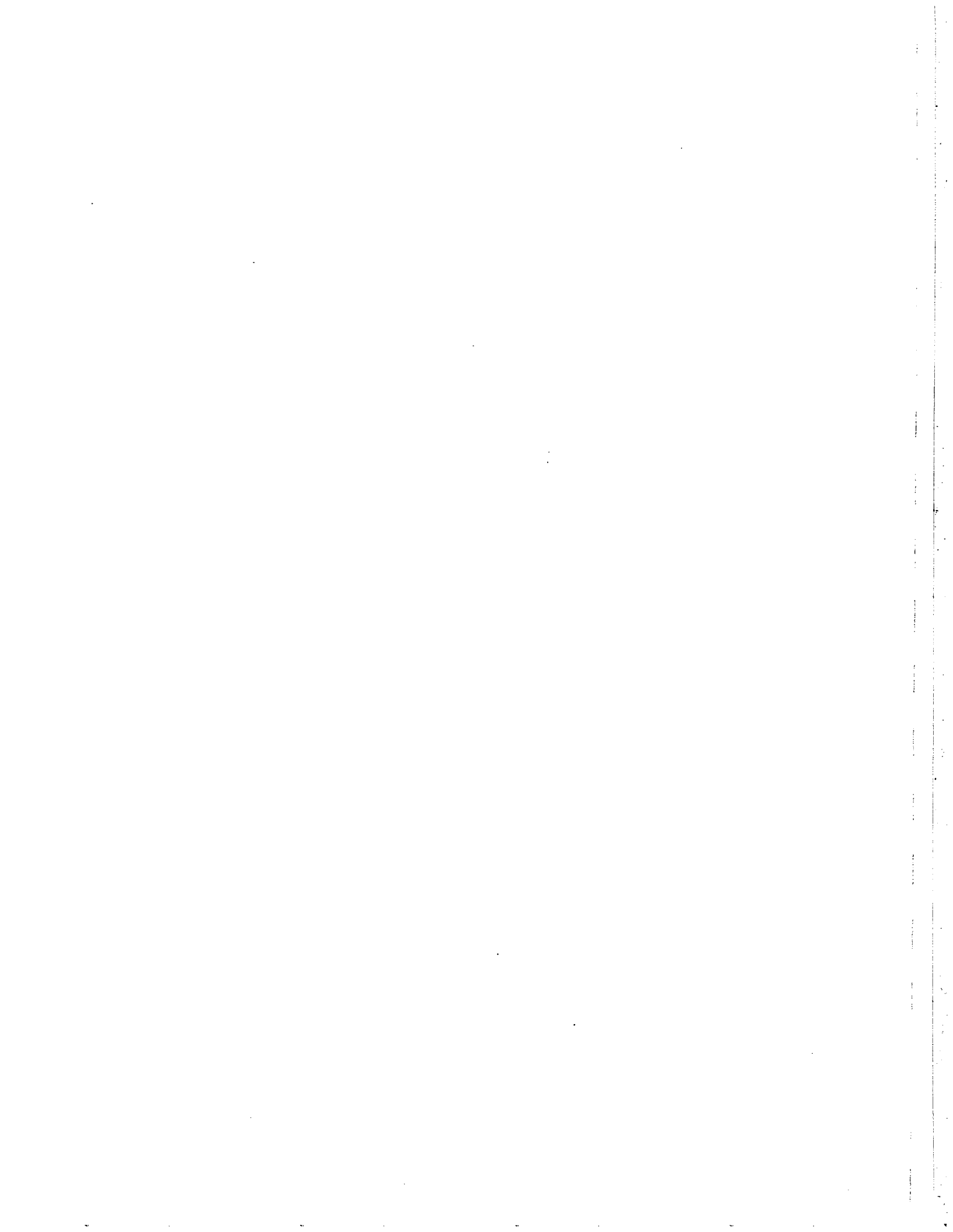
Pinole Watershed

The Pinole watershed is the only major watershed on District lands that does not contain a reservoir. Water flows off of District lands in a northwesterly direction through Pinole Creek to San Pablo Bay.

Table 3-1. Water Sources by Reservoir

Reservoir	Water Sources
San Pablo Reservoir	Mokelumne Aqueduct San Pablo Creek Briones Reservoir
Briones Reservoir	Mokelumne Aqueduct Bear Creek
Lafayette Reservoir	Local runoff
Upper San Leandro Reservoir	Mokelumne Aqueduct San Leandro Creek and tributaries Redwood, Rimer, Buckhorn, Kaiser, and Indian Creeks
Chabot Reservoir	Mokelumne Aqueduct San Leandro Creek Upper San Leandro Reservoir Miller Creek

Source: EDAW 1992.



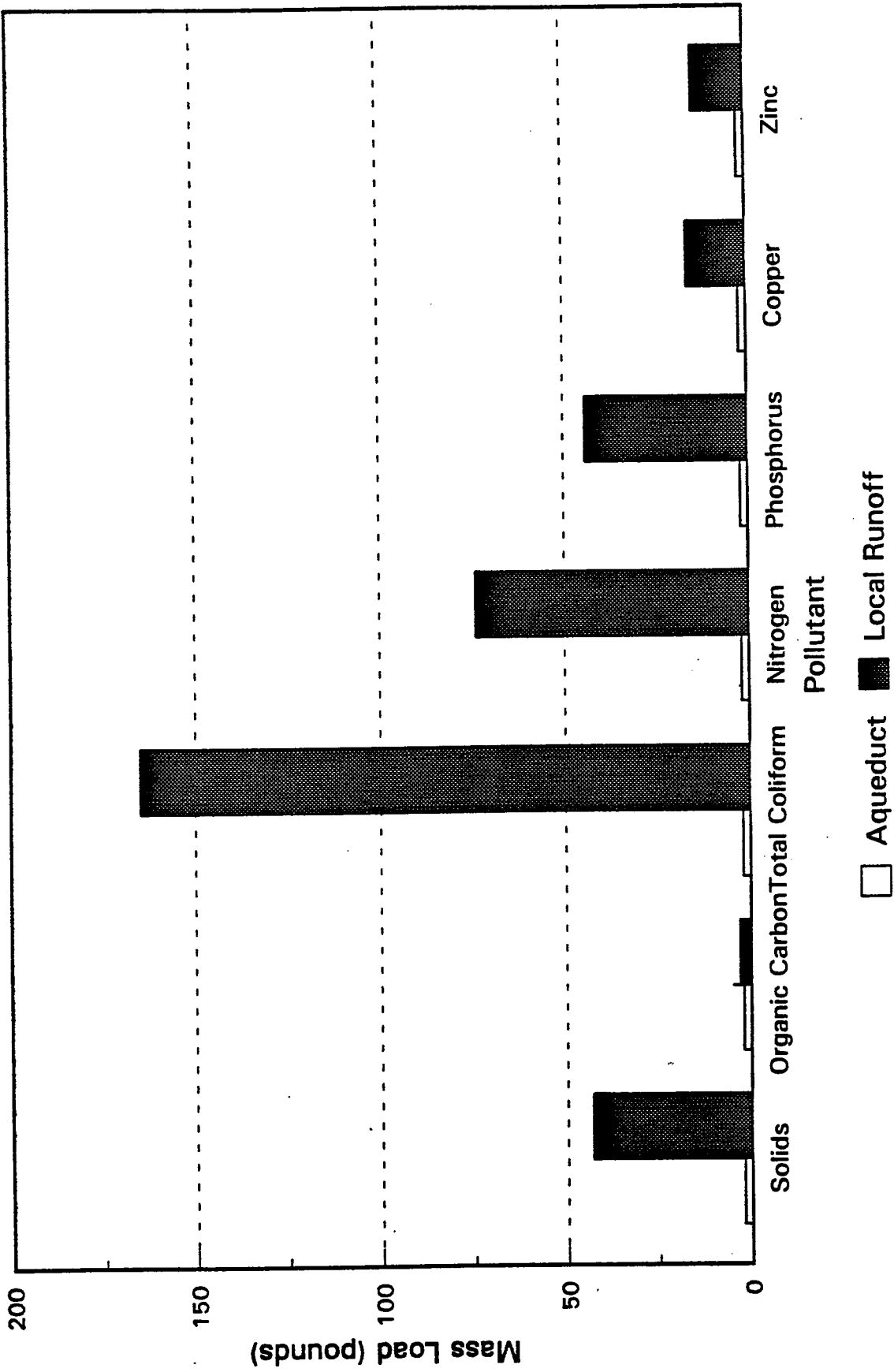


Figure 3-1
Annual Aqueduct Pollutant Mass Load Relative to
Local Runoff in San Pablo Reservoir



Table 3-2. Recent Water Quality Data for District Source Waters

Constituent	Maximum Containment Level	San Pablo Reservoir					Upper San Leandro Reservoir	
		Pardee Reservoir	Briones Reservoir	Chabot Reservoir	Lafayette Reservoir	San Pablo Tower	Sobrante Tower	Reservoir
Chemical Analysis								
Chloride (mg/l)	250 ^a	2.3	11	27	15	10	9	12
Color (ACU)	15 ^a	6	6	8	23	24	10	7
Detergent (MBAS mg/l)	0.5 ^a	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Fluoride (mg/l)	2.4-4.0	0.05	0.25	0.28	0.28	0.09	0.12	0.14
Nitrate (mg/l)	10 ^b	<0.006	<0.006	<0.006	0.13	<0.01	<0.006	<0.006
Specific conductivity (μ mhos/cm)	900 ^a	42	344	450	320	153	133	264
Sulfate (mg/l)	250 ^a	1.6	75	44	7.2	14	14	25
Trace Metal Analysis								
Arsenic (μ g/l)	50	<1.0	<1.0	<1.0	<0.5	<0.5	<1.0	<1.0
Barium (μ g/l)	1,000	7.7	32	62	48	22	19	30
Cadmium (μ g/l)	10	<0.05	<0.50	0.10	<0.2	<0.2	<0.05	0.6
Chromium (μ g/l)	50	2	<2	6	<2	<2	2	<2
Lead (μ g/l)	15	<0.5	<0.5	<0.5	<1	<1	1.5	<5 ^c
Mercury (μ g/l)	2	<0.05	<0.05	<0.05	<0.5	<0.5	<0.05	<0.05
Selenium (μ g/l)	10	<2	<1	<1	<1	<1	<1	<2
Silver (μ g/l)	50	<0.2	<0.2	<0.2	<2	<2	<0.2	<2 ^c
Regulated Pesticides, Herbicides, and Volatile Organic Chemicals^d								
Pesticides								
Heptachlor (μ g/l)	0.01	<0.007	<0.007	<0.007	0.02	<.01	<0.007	<0.007
Herbicides								
Atrazine (AAtrex) (μ g/l)	3	<0.37	<0.37	<0.37	<0.7	<0.7	<0.37	<0.37
Volatile Organic Chemicals								
Diethylhexylphthalate (DEHP) (μ g/l)	4 ^e	<0.22	61	0.31	NA	<0.5	0.14	0.17

Notes: Data are from sampling conducted August 1994, except at Lafayette Reservoir and San Pablo Tower, which were sampled in January-March 1992.

^a Secondary standard based on consumer acceptance.

^b Primary drinking water standard.

^c Detection limits differ from other samples as a result of dilutions made during the laboratory analysis.

^d Sampling for many constituents occurred. Constituent is included in this table only if it was detected.

^e Levels of DEHP between 1 and 3 μ g/l are considered to be normal.



Lafayette Reservoir Watershed

Water in Lafayette Reservoir is not used for human consumption; it serves strictly as an emergency supply only. Because the reservoir receives local watershed runoff only, and has a significant level of recreational use, the water quality is relatively poor compared to that of the District's other reservoirs (Table 3-2).

Upper San Leandro Reservoir Watershed

The water quality of Upper San Leandro Reservoir, similar to that of San Pablo Reservoir, is relatively high because it provides the District's on-line water supplies and is continually replenished with Mokelumne River water diversions. Average concentrations of nutrients, particularly nitrate, measured during routine monitoring by the District have usually been relatively low (Table 3-2); however, concentrations tend to increase near the inflows of San Leandro and Kings Creeks (Commins 1993).

Metals concentrations were highest at the Upper San Leandro monitoring sites relative to the San Pablo and Briones watersheds during sampling conducted during the 1991 water year. No pesticides were detected at any Upper San Leandro Reservoir stations where measured. (Smith 1992.)

Stormwater runoff quality data also indicate that chloroform was present in the Moraga Creek tributary. Because it was also detected at substantially lower levels under dry-weather conditions, chloroform levels in the Upper San Leandro Reservoir are likely a wet-weather phenomenon. The total halogenated methanes exceeded the drinking water standard in source water, but standards were met for treated drinking water. Their presence in Moraga Creek indicates one or more substantial sources in the watershed. (Smith 1992.)

Chabot Reservoir Watershed

Chabot Reservoir water quality, although acceptable, is less pristine than that of the other reservoirs because this reservoir is not used as an on-line supply, recreation use of the reservoir and the developed watershed area is relatively high, and inflow from tributary streams drains developed areas (Table 3-2).

SOILS AND GEOLOGY

Introduction

This section discusses existing conditions of geology and soil resources in the District watershed areas. Information on geology and soil characteristics was compiled from the U.S. Natural Resources Conservation Service (formerly the U.S. Soil Conservation Service) and other sources, as documented in the East Bay Watershed Master Plan Natural Resources Inventory (EA Engineering, Science, and Technology 1994a).

The District's watershed lands are located in the East Bay Hills. These hills are situated along the east side of the central and northern portions of San Francisco Bay.

In the northern watershed area, which contains San Pablo Reservoir, Briones Reservoir, Lafayette Reservoir, Siesta Valley, and the Gateway area, the East Bay Hills include the Berkeley Hills; San Pablo Ridge; Sobrante Ridge; Oursan Ridge; and most or all of the drainages of San Pablo Creek, Pinole Creek, and Lafayette Creek.

In the southern watershed area, which contains Chabot Reservoir and Upper San Leandro Reservoir, the East Bay Hills include the San Leandro Hills, Rocky Ridge, the southern end of the Berkeley Hills, Gudde Ridge, Mullholand Hill, Moraga Valley, and most of the drainage of San Leandro Creek.

Soils

Soils occur in general patterns over the landscape. To aid mapping of these general patterns, soils series are grouped with other similar soils to form an association. In Alameda and Contra Costa Counties, most of the soils are upland associations. Terrace, alluvial fan, and floodplain associations are also represented to a lesser degree.

Most of the watershed lands lie in the upland association called the Millsholm-Los Gatos-Los Osos Association, which has steeply sloping and eroding soils. The major soils in this group are gravelly and well drained to excessively well drained. Much of the soil surface has undergone some erosion. Landslides occur in Los Osos and less frequently in Millsholm soils, which make up about 60% of this association. Both of these soils have high erosion hazard ratings. Approximately 40% of the association is Los Gatos loam, which also has a high erosion hazard rating. Also represented on watershed lands is Gaviota rocky sandy loam, which has a very high erosion hazard rating.

None of the soils in the District's watersheds have been identified as prime, unique, or of statewide importance based on a review of the California Department of Conservation's Farmland Mapping and Monitoring Program.

Soil acts as a filter, storage area, and transport mechanism for water. It stores and then transports rainwater across its surfaces to streams and then to storage reservoirs, and it acts as a filter, cleaning groundwater as it flows through the aquifers beneath the soil surface. Poor soil quality can degrade or alter water quality. Sediments generated from the soil, as well as organic and inorganic pollutants, can increase the cost of water treatment and transport.

Disturbed land is prone to degradation and destruction, especially from landslides and erosion. Geologic slope failures and erosion can cause sediments to be deposited on roadways and in reservoirs, decreasing storage capacity in the reservoirs, increasing the cost of water treatment, and requiring the District to expend effort and funds on removal.

Geology

Topography of the District watershed lands consists of generally northwest-trending ridges and valleys interspersed with some northeast-trending landforms. Topography varies from subdued, rounded hills and wide valley bottoms in the northern reaches of the northern watersheds to steep, rugged slopes with narrow ridges and valley bottoms in the southern watersheds. Scattered synclines and anticlines are present throughout the management area.

Various drainage patterns occur within the watershed areas. For instance, San Pablo Creek and Pinole Creek drain northwestward into northern San Francisco Bay, whereas San Leandro Creek drains southwestward into central San Francisco Bay. Stream morphology varies from deeply incised and actively eroding channels to streams entrenched in wide valley bottoms.

Elevations in the northern watershed range from about 150 feet to 1,600 feet above mean sea level, whereas the southern watershed has elevations ranging from 80 feet to 2,000 feet above mean sea level. In general, the areas of higher elevation are underlain by bedrock with relatively high resistance to weathering. The valleys generally are underlain by easily weathered claystones and shales.

Approximately 35 formations or large mappable rock bodies are found within the watershed. All three rock classes (i.e., igneous, sedimentary, and metamorphic) can be found within the watershed.

Major faults near the watershed areas are the Miller Creek fault zone, King Canyon-San Leandro Creek fault, Hayward fault, Concord fault, Chabot fault, and Pinole fault. The Hayward fault lies approximately 1 mile west of the watershed areas, and the Concord fault is approximately 7 miles to the east. These two faults have been active within the last 200 years.

Landslides

Landslides occur throughout the watershed. They vary in size from small, thin failures on steep hillsides to large, deep slides involving many acres of land (Table 3-3). Except for a dormant landslide that has been mapped just west of the lower spillway of the Upper San Leandro Reservoir, no obvious hazards to District facilities or structures resulting from landslide activity have been observed.

Erosion

Erosion is the process in which, by action of wind and water, soil particles are displaced and transported. Erosion is a naturally occurring process by which soil, in the form of sediment, moves into streams and drainages. Various types of land uses and disturbances can accelerate the rate of soil erosion for a particular area. Sediment can become a significant maintenance and water quality concern in reservoirs. The erosion hazard of the soils in the management area is generally high (Table 3-4).

Rainfall impact, runoff, scour, groundwater flow, and wave impact are the direct causes of erosion that occur in varying degrees in the management area (Table 3-5). The primary factors that affect erodibility are topography, soil structure, and vegetative cover. Soils that are steep and unstable and those that do not have some type of protective cover are likely to erode. Soils along road cuts or that are saturated (e.g., soil in creek banks) are likely to erode, as are soils that are subject to concentrated stormflows (e.g., soil around culvert outlets).

Cover in the watershed area is typically vegetation, mulch, gravel, or pavement. Mulches, gravel, and pavement cover soil and reduce or eliminate rain impact; however, concentrated water from runoff may increase erosion hazard on uncovered areas. Unpaved roads, trails, fire breaks, and road surfaces are continuous sources of sediment.

Economic Resources

Historically, some quarrying activities took place in the watersheds, but no commercial quarrying operations or gas or oil production takes place today. Although oil and gas deposits have been known to exist in the area since at least 1860, no economically successful oil wells have been drilled and the available quantities of oil are not known to be sufficient to encourage commercial investment.

Table 3-3. Number and Acreage of Mapped Landslides
on District Watershed Lands

Watershed Area	Active and Recent Landslides		Static and Dormant Landslides	
	Number	Acreage	Number	Acreage
San Pablo Reservoir	81	1,051	197	915
Briones Reservoir	25	62	94	269
Pinole Valley	33	163	122	416
Lafayette Reservoir	0	0	36	77
Upper San Leandro Reservoir	210	1,365	320	523
Chabot Reservoir	36	37	91	157
Other	<u>8</u>	<u>16</u>	<u>25</u>	<u>115</u>
Total	393	2,694	885	2,472

Source: EA Engineering, Science, and Technology 1994a.



Table 3-4. Soil Erosion Hazard of Watershed Lands
(Acreage and Percentage)

Watershed	Erosion Hazard					
	None	Slight	Moderate	Moderate-High	High	Very High
San Pablo Reservoir	72 (1%)	576 (8%)	936 (13%)	3,457 (48%)	1,225 (17%)	936 (13%)
Briones Reservoir	60 (3%)	60 (3%)	80 (4%)	800 (40%)	600 (30%)	400 (20%)
Pinole Valley	557 (15%)	260 (7%)	334 (9%)	743 (20%)	1,375 (37%)	446 (12%)
Lafayette Reservoir	0 (0%)	0 (0%)	72 (11%)	549 (84%)	33 (5%)	0 (0%)
Upper San Leandro Reservoir	729 (9%)	162 (2%)	405 (5%)	1,134 (14%)	1,863 (23%)	3,807 (47%)
Chabot Reservoir	108 (3%)	144 (4%)	218 (6%)	0 (0%)	900 (25%)	2,233 (62%)
Other	18 (2%)	55 (6%)	18 (2%)	320 (35%)	237 (26%)	265 (29%)
Total East Bay watershed	1,544 (6%)	1,257 (5%)	2,063 (8%)	7,003 (27%)	6,233 (24%)	8,087 (31%)

Source: EA Engineering, Science, and Technology 1994a.

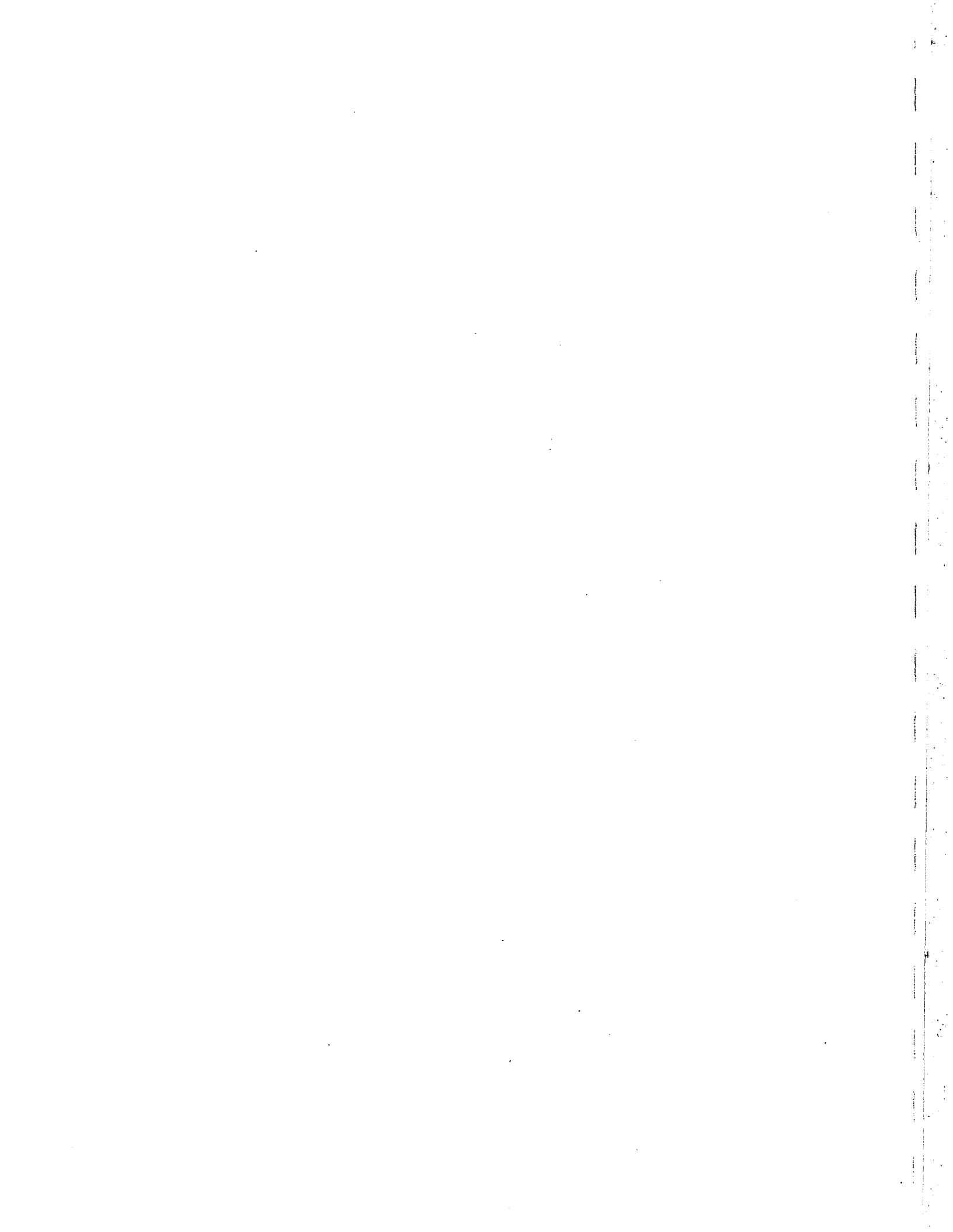
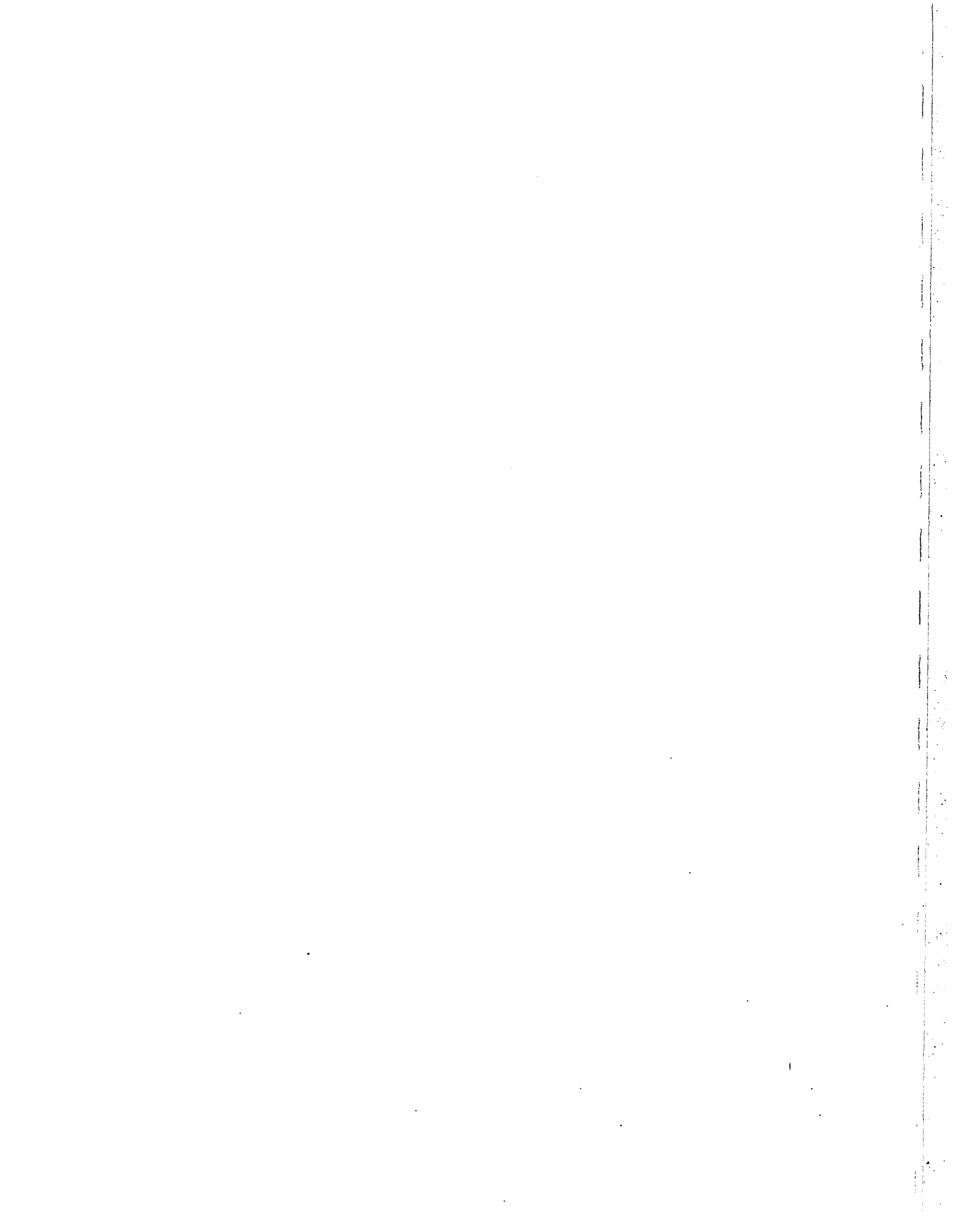


Table 3-5. Examples of Erosion on the District's East Bay Watershed Lands

Erosion Feature	Location and Example
Fire breaks	Simas Valley
Nonvegetated road cuts, especially road cuts that are steeper than 2:1 (vertical:horizontal)	Widespread; example: San Pablo Dam Road
Road cut slumps and small failures	Scattered; example: along San Pablo Dam Road
Ditches and shoulders, unpaved or unvegetated	Example: Wild Cat Canyon Road
Erosion of softened, disturbed soils on landslides, slumps, and other earth movement	Widespread; examples: Nunes Ranch Road and hills visible from San Pablo Dam boat dock
Unconsolidated soils	On moving soil and other places; example: Pinehurst Road slide
Culvert outlets	Widespread
Downstream dam-face erosion	San Pablo Dam
Trailside erosion	Around Briones Reservoir at cut banks
Erosion caused by blading trails to low side	Around Briones Reservoir
Wave erosion	San Pablo Reservoir
Bank erosion	San Pablo Dam boat launch facility, scattered drainages
Sheet erosion	Overgrazed areas, areas of concentration (gathering) of cattle, along trail to Nike Base, Tilden Park
Unpaved equipment landings	Near Upper San Leandro Reservoir Dam
Unconsolidated or unvegetated fill or dredge spoils	Scattered; example: Navy Flat
Head cutting at gullies	Widespread; examples: see Figure 3-2
Creebank failures, typically due to downcutting, scattered locations	Widespread; examples: Upper San Leandro Creek near Canyon along Pinole Creek; also see Figure 3-2
Erosion of toe of landslides that have slid into creeks	Scattered; example: large landslide on Pinehurst, into Upper San Leandro Creek
Sedimentation in drainages	Scattered; example: along Pinehurst Road between Canyon and Skyline Boulevard
Construction sites	Scattered; example: renovation of water treatment facility on San Pablo Dam Road



Geologic and Soil Resources of Educational Value

Except for a few obvious landmarks, the interesting and educational features in the watershed can be difficult for the layperson to see or comprehend. This is because most of these resources are largescale features and many are hidden by soil, vegetative cover, or landslides.

The Bear Creek Anticline and the Lafayette Syncline are examples of plunging folds. The Bollinger fault provides a good example of a syncline forming a valley. It is of interest because a syncline will form a valley only when the center of the fold has eroded away.

Fossils are fairly abundant within the management area and are scattered throughout the site. Their occurrence is dependent on the geologic formation.

Soil creep is visible at the Nunes Ranch in the San Pablo watershed, where a long row of leaning posts lines the road and demonstrates the movement of soil since the installation of the fence.

The knobcone pine forest at Flicker Ridge demonstrates the close relationship between plant species and soil characteristics.

The Chabot Reservoir serpentine soils area is an example of an endemic plant community that has evolved to survive in soils that are low in nutrients and high in heavy metals.

Watershed Descriptions

San Pablo Reservoir Watershed Lands

The San Pablo Reservoir watershed encompasses more than 7,000 acres. More than 50% of the surface soil textures in this watershed are clay loam, with loam and clay together adding an additional 43%. Roughly one-third of the soils have slopes of 50% or more, and the average erosion hazard is moderate to high (Figure 3-2). Only about 10% of the slopes are 10% or less. The Moraga fault passes beneath the dam, and the Pinole fault is within 0.5 mile of the southern reaches of this reservoir.

The dominant soils in this watershed are the Los Osos, Los Gatos, Millsholm, and Gilroy series.

The Los Osos series consists of well-drained soils underlain by soft, fine-grained sandstone and shale. The surface layer is typically gray, slightly acidic clay loam approximately 10 inches thick. Permeability is slow and runoff is medium to rapid.

The Los Gatos series consists of well-drained to excessively drained soils formed from fine-grained sandstone and shale. The surface layers are dark brown to reddish brown, neutral loams. This series has moderate permeability, and runoff is medium to rapid. The depth to bedrock is typically 12-48 inches.

Millsholm soils are well drained and are formed from interbedded shale and fine-grained sandstone. The surface layer is a grayish-brown, moderately acidic loam about 4 inches thick. Permeability is moderate, runoff is rapid, and the hazard of erosion is high, especially where the soil is bare.

The Gilroy series makes up about 20% of this watershed's soils. This series consists of well-drained soils underlain by basic igneous rock. The surface layer is reddish-brown, slightly acidic, light clay approximately 15 inches thick. Permeability is slow and runoff is medium to rapid.

Briones Reservoir Watershed Lands

The Briones Reservoir watershed comprises about 2,000 acres. Nearly 60% of the surface soil textures in this watershed are clay loam and more than one-third are loam. Approximately 35% of the soils have slopes of 50% or more, and only about 6% have slopes of 10% or less. Most of the soils have a moderate to very high erosion hazard rating (Figure 3-2); the average rating for this watershed is high, especially if the soils are bare.

The dominant soils found in this watershed are Los Osos clay loam and Millsholm loam. These soils are described above for the San Pablo Reservoir. No known faults pass beneath Briones Reservoir.

Pinole Valley Watershed Lands

The Pinole Valley watershed contains about 3,700 acres. Loam, clay, and clay loam make up 95% of the surface soil textures in this watershed. Although only 17% of the soils have a slope of 50% or more, erosion hazard is moderate to very high for approximately half of the watershed (Figure 3-2). Roughly one-tenth of the slopes have slopes of 10% or less.

Millsholm loam makes up 42% of the soils in this watershed, while Los Osos clay loam makes up nearly half of the soils. These soils are described above for the San Pablo Reservoir watershed.

Clear Lake, Croyley, Altamont, and Sehorn clay make up the remainder of the Pinole Creek watershed soils, underlain by either fine alluvium or sandstone and shale. These soils range from grayish brown to dark gray in color and have slow permeability. Runoff ratings range from slow in Clear Lake and Croyley soils to very rapid in Sehorn clay. The erosion

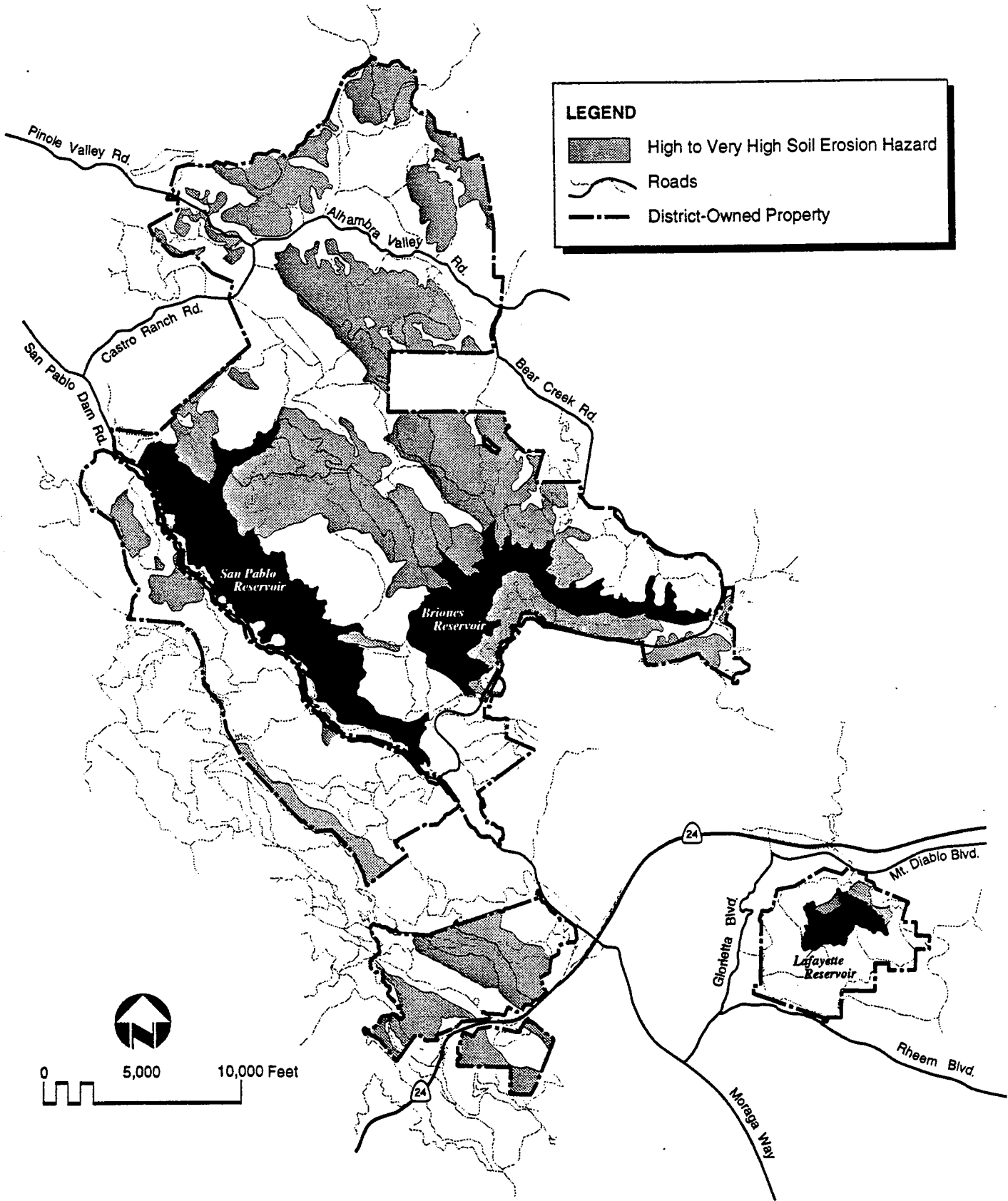





Figure 3-2 (North)
Areas of High to Very High Soil Erosion Hazard



LEGEND

-  High to Very High Soil Erosion Hazard
-  Roads
-  District-Owned Property

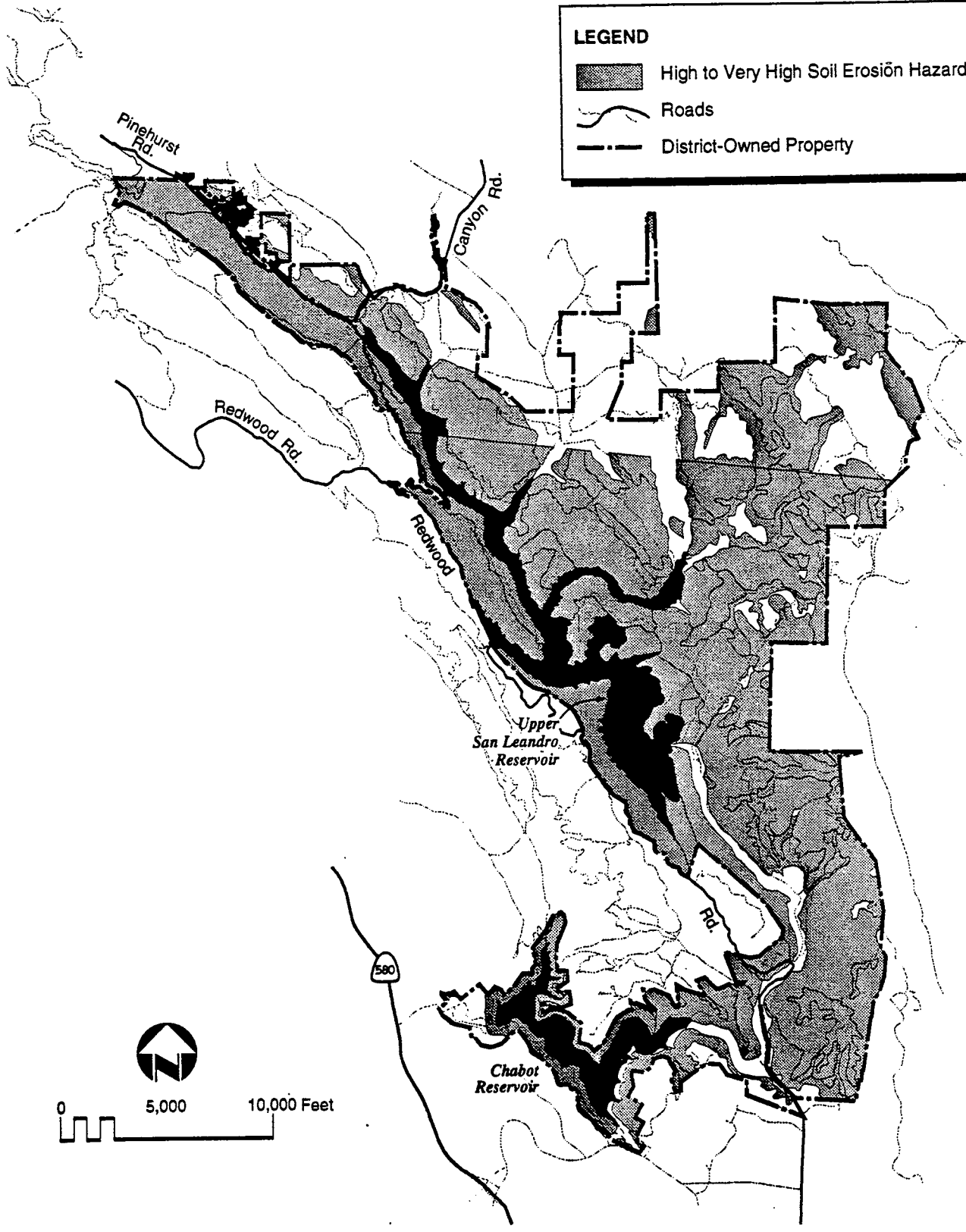
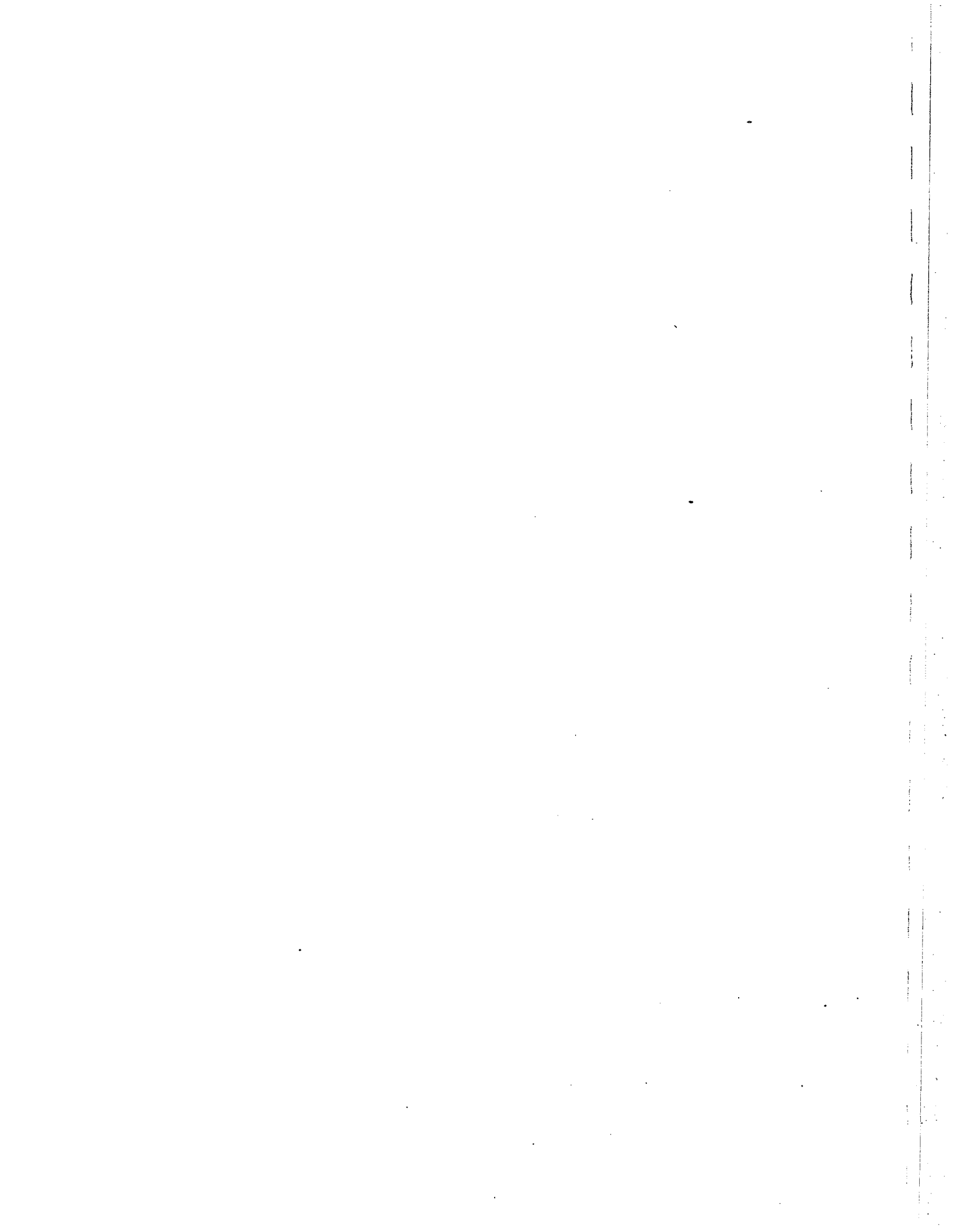


Figure 3-2 (South)
Areas of High to Very High Soil Erosion Hazard



hazard also varies widely, ranging from none or slight in the former soils to high in the latter, with Altamont in the moderate zone. No faults are located beneath Pinole Valley.

Lafayette Reservoir Watershed Lands

The Lafayette Reservoir watershed consists of about 650 acres. More than one-half of the surface soil textures in this watershed are clay loam and another one-third are clay. No slopes in the area are listed as greater than 50%, but only approximately 10% of the slopes are 10% or less. Most of the soils have a moderate to high erosion hazard rating (Figure 3-2); the hazard is high for cut-and-fill slopes in this watershed.

Approximately 25% of the soils in this watershed are Los Osos clay loam, which is described above for the San Pablo Reservoir. Another 25% is Lodo clay loam. The Lodo series consists of somewhat excessively drained soils underlain by soft, fine-grained sandstone and shale. The surface layer is typically dark gray, slightly acidic clay loam approximately 18 inches thick. Permeability is moderately slow and runoff is medium to rapid.

The Altamont/Fontana soil series is present in nearly one-fifth of this area. It contains small percentages of Los Osos and Millsholm soils, as well as 50% Altamont clay and 35% Fontana sandy clay loam. Altamont and Fontana soils are underlain by shale and fine-grained sandstone. Their surface layer is typically dark grayish-brown, neutral to moderately alkaline loams. The Altamont surface horizon is typically 16 inches thick, whereas the surface horizon for Fontana soil is typically 26 inches thick. Permeability is slow and runoff is medium.

Upper San Leandro Reservoir Watershed Lands

The San Leandro Reservoir watershed comprises about 7,500 acres. Nearly 80% of the surface soil textures in this watershed are clay loams and silt loams. More than one-half of the slopes are 50% or greater, and only approximately 2% of the slopes are 10% or less. Most of the soils have a moderate to very high erosion hazard rating (Figure 3-2), with ratings of very high for almost 50% of the soils overall.

More than one-third of the soils are in the Millsholm series, with the rest made up of Los Osos and Los Gatos soils. These soils are described above for the San Pablo Reservoir.

Approximately 9% of this watershed contains rocky outcrops. Although no faults are found under this reservoir, a dormant landslide has been mapped just west of the spillway for the lower dam. Failure of this landslide could cause temporary blockage of the spillway.

Chabot Reservoir Watershed Lands

The Chabot Reservoir watershed is made up of about 3,600 acres. Nearly 90% of the surface soil textures in this watershed are silty clay loam and silt loam. Almost 85% of soils in this area have a high to very high erosion hazard rating (Figure 3-2). The slopes are 50% or greater for 62% of the soils, and only approximately 6% of the slopes are 10% or less.

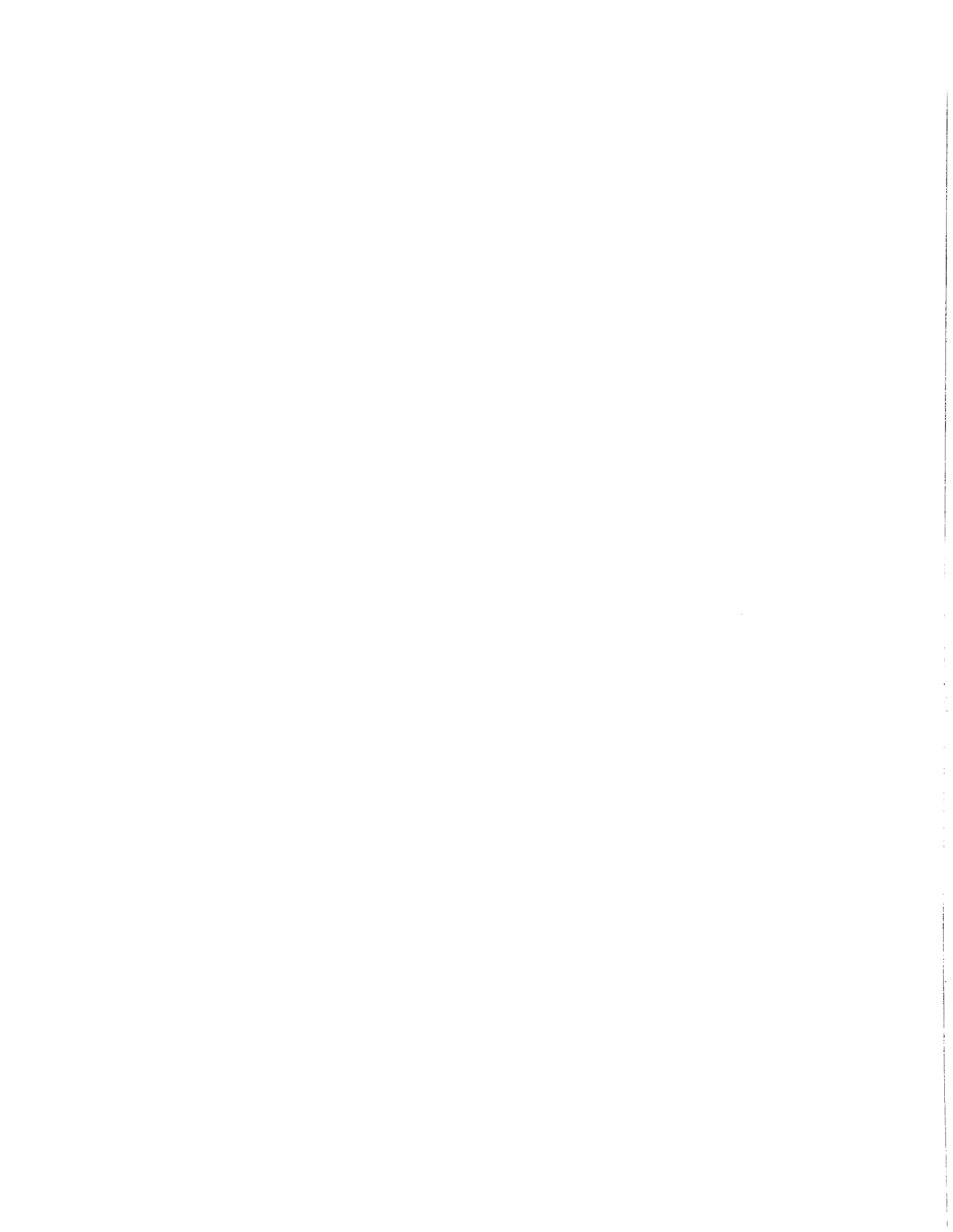
More than 40% of soils on this watershed belong to the Los Gatos/Los Osos soil complex, and 15% are Millsholm silt loam. These soils are described above for the San Pablo Reservoir.

Chabot Reservoir is near two faults. The Hayward fault passes 1,000-1,500 feet west of the reservoir, and the Chabot fault zone passes beneath the western edge of the reservoir and near the dam itself.

Table 3-6. Habitat Acreages and Percentages for East Bay Municipal Utility District's East Bay Watershed Lands

Habitat	Watershed Area															
	Pinole		San Pablo		Briones		Lafayette		Upper San Leandro		Chabot		Total			
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%		
Redwood forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	269	1
Knobcone pine forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	0
Hardwood forest	674	18	2,322	28	768	29	450	41	3,410	41	1,938	47	9,562	34		
Oak savanna	120	4	53	1	103	4	47	4	67	1	30	0	420	1		
Non-native forest	16	0	669	8	10	0	37	3	36	0	94	2	862	3		
Coastal scrub	157	5	990	12	204	8	218	20	863	11	591	15	3,023	11		
Riparian and wetland	146	4	242	3	37	2	6	1	286	4	101	3	818	3		
Grassland	2,335	63	3,132	37	826	30	200	18	2,517	30	831	20	9,841	35		
Reservoir	7	0	760	9	678	26	107	10	679	8	344	9	2,575	9		
Agriculture and development	228	6	208	2	27	1	28	3	57	1	153	4	701	3		
Total	3,683	100	8,376	100	2,653	100	1,093	100	8,240	100	4,082	100	28,127	100		

Source: EA Science, Technology, and Engineering (1994a).



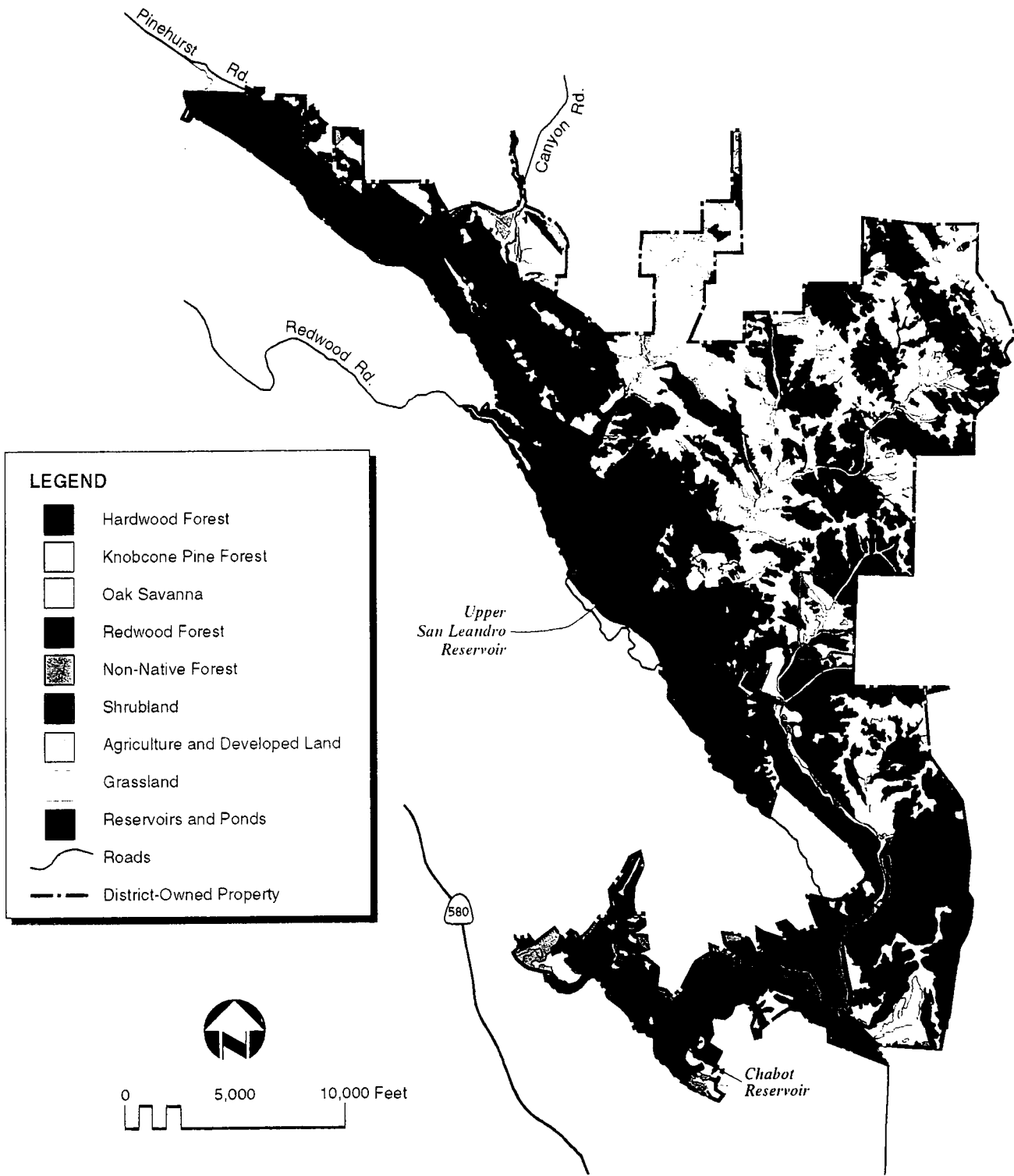
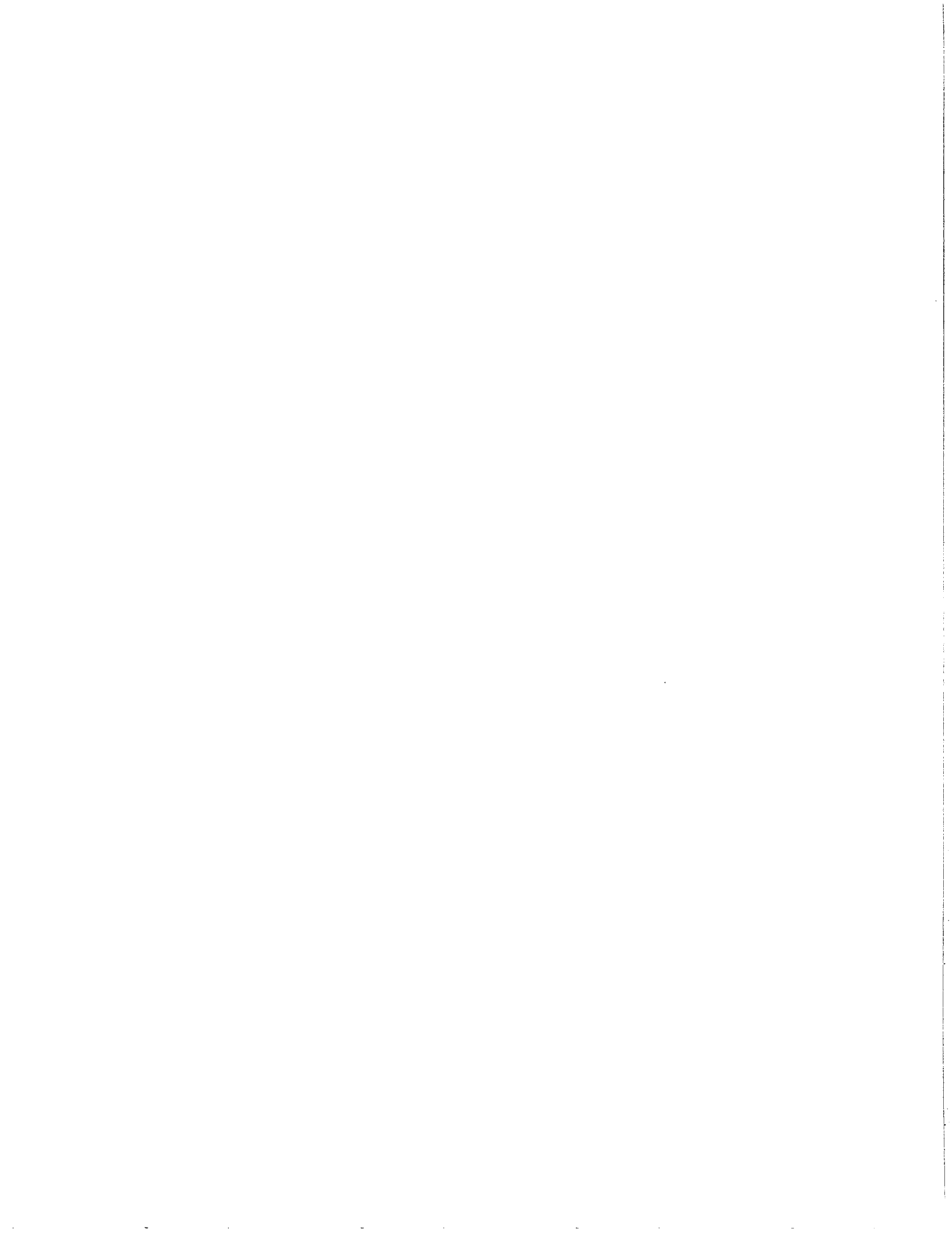


Figure 3-3 (South)
Distribution of Vegetation
on East Bay Watershed Lands



The redwood forest supports a subcanopy layer of California bay and other hardwoods. The forest floor is dominated by shade-tolerant ferns and perennial herbs.

Knobcone Pine

The knobcone pine forest occurs as an isolated remnant in the East Bay area. One of two East Bay occurrences of this habitat is on District lands and adjacent private lands in the Upper San Leandro watershed.

Knobcone pine is an extremely fire-adapted community that regenerates itself only after intense fires. Suppression of fire in the East Bay area has prevented regeneration and led to senescent, deteriorating stand conditions. Fire-adapted understory species include woolly manzanita, chinquapin, chamise, and chaparral pea.

Oak Savanna

Oak savanna habitat is regionally common and occurs in patches throughout East Bay watershed lands. Of the two subtypes (mixed oak savanna and valley oak savanna), mixed oak savanna is the most common subtype. Coast live oak and valley oak are the dominant overstory species in this subtype, and the understory is dominated by grasses. The less common valley oak savanna occurs as patches on grassy hillsides. Most oaks in the watershed are middle aged (based on size), indicating a lack of recent regeneration (EA Engineering, Science, and Technology 1994a).

Non-Native Forest

Stands of non-native Monterey pine and eucalyptus have been planted in scattered locations throughout the watershed. The Monterey pine subtype is found primarily in the San Pablo Reservoir watershed near the reservoir. This habitat consists primarily of widely spaced pine trees in the overstory with groundcover dominated by introduced grasses and herbaceous plants. Some denser stands are decadent. The rate of regeneration is insufficient to sustain this community, and native species are invading in some areas.

Several eucalyptus plantations also occur throughout District watershed lands. These trees are regenerating naturally. The high concentration of volatile oils present in green foliage and the large amount of available fuel contribute to the high flammability of eucalyptus stands.

Orchards and Christmas tree farms, also considered subtypes of non-native forest, occupy small acreages in the watershed.

Riparian and Wetland Vegetation

Riparian and wetland vegetation is found throughout the watershed to a smaller degree than other habitat types but is important because of the biological diversity contributed by these habitats. A wide range of riparian communities has been created by different hydrologic and topographic conditions and by the varying conditions of past and current land use. These communities include woodland, shrub, and herbaceous communities. Dominant trees in woodland communities are white alder, black cottonwood, black walnut, and several willow species.

Seeps and springs support a diversity of herbaceous plants. Small amounts of freshwater marsh habitat occur along the reservoir edges, where bulrush and cattail dominate.

Developed and Reservoir Lands

Developed and reservoir habitats consist of various types of disturbed cover, including cultivated fields, developed recreation and administrative areas, and the five District reservoirs.

Special-Status Plant Species

Special-status plants are species legally protected under the state and federal Endangered Species Acts and species that are considered rare or declining by state and federal agencies and the scientific community but have not been formally listed as threatened or endangered. Specifically, special-status plants are species in the following categories:

- plants listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.12 [listed plants] and various notices in the Federal Register [proposed species]);
- plants that are Category 1 or 2 candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (58 FR 188: 51144-51190, September 30, 1993);
- plants listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 CCR 670.5);
- plants listed under the California Native Plant Protection Act (Cal. Fish and Game Code, Section 1900 et seq.);

- plants that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA) (State CEQA Guidelines, Section 15380);
- plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1B and 2 in Skinner and Pavlik 1994);
- plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in Skinner and Pavlik 1994), which may be included as special-status species on the basis of local significance or recent biological information; and
- plants listed as sensitive by the local U.S. Forest Service region (Forest Service Manual 2670) or U.S. Bureau of Land Management resource area.

This section summarizes information on special-status species; additional information is available in the natural resources inventory (EA Engineering, Science, and Technology 1994a).

Listed Species

Listed species are plants that have been formally designated as endangered or threatened under the California or federal Endangered Species Act. Only two listed species are found on watershed lands; both are listed by the State of California as endangered.

Pallid Manzanita. Pallid manzanita is an evergreen shrub that occurs in woodlands and shrublands on siliceous shales, slopes, and ridges. One population has been documented on District land in the upper San Leandro Reservoir watershed.

Santa Cruz Tarplant. The only known occurrence of Santa Cruz tarplant is a site where the species was introduced near Briones Reservoir in an effort to reestablish its population. The plant is an annual herb that grows on grassy coastal terraces.

Other Special-Status Species

Eight other special-status plant species have been documented in the watershed (Table 3-7). An additional 17 species have potential to occur but have not been documented (EA Engineering, Science, and Technology 1994a).

Many of these special-status plants are annual or perennial herbs that occur in hardwood forest, grassland, and shrubland habitats. Most of the potential species that have not been documented are annual and perennial herbs associated with grassland habitats.

Weedy and Noxious Species

Most weedy and noxious plants on watershed lands are non-native species that establish in disturbed areas and can spread rapidly to outcompete native and naturalized non-native species. State and federal legislation identifies particular species as noxious weeds and obligates landowners to control them. The District has maintained a moderate-level control program for the most aggressive species.

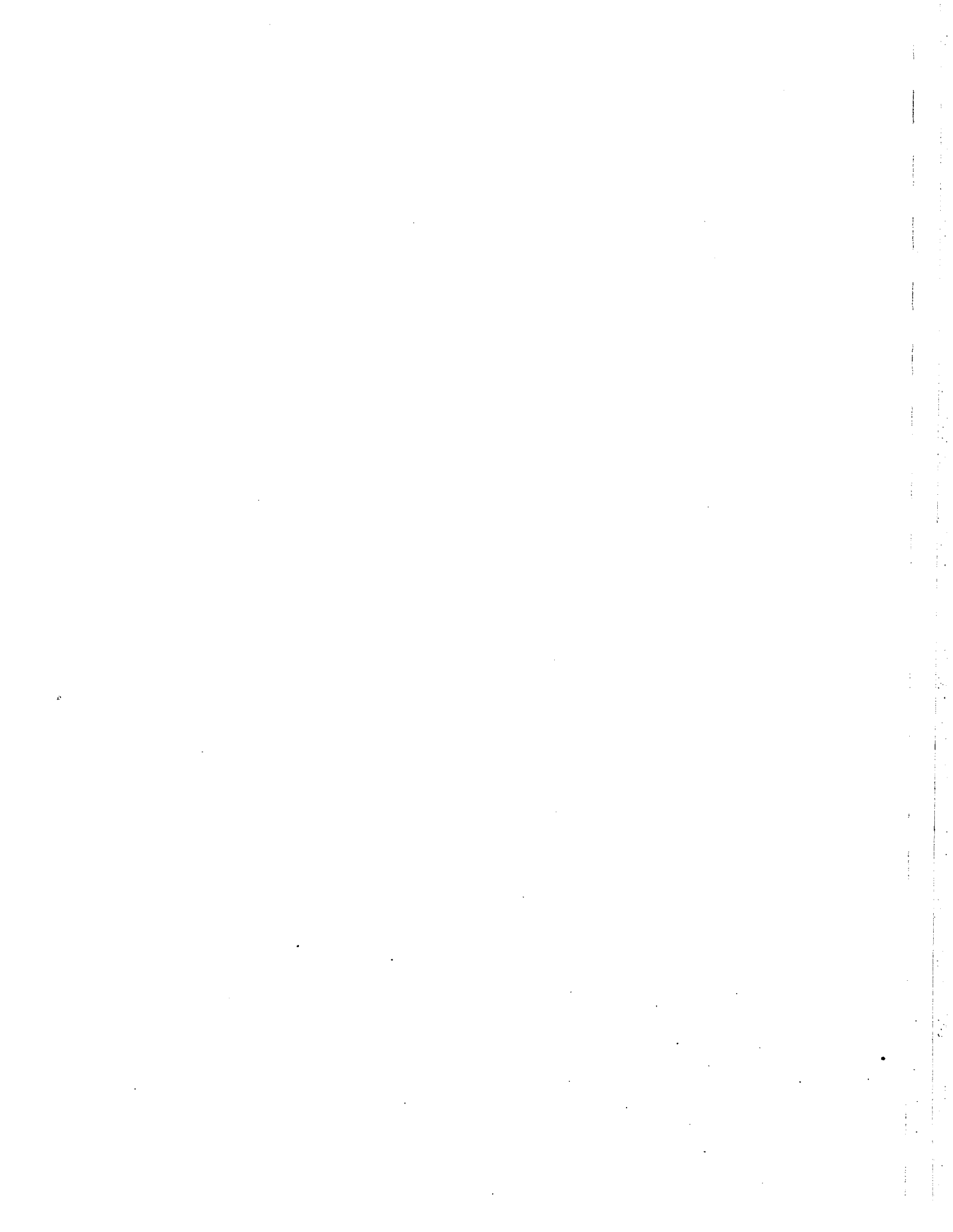
Weedy species on District watershed lands include scotch broom, yellow star-thistle, purple star-thistle, artichoke thistle, goat grass, pampas grass, oxalis, and eucalyptus. These species most commonly invade disturbed grassland habitat (which itself is largely composed of naturalized non-native species). Many of the weedy and noxious plant species are not well established, and eradication or control is possible.

Table 3-7. Special-Status Plant Species Known to Occur on East Bay Watershed Lands

Species	Status ^a	Preferred Habitat	Occurrence on Watershed
Bent-flowered fiddleneck <i>Amsinckia lunaris</i>	CNPS 4	Open woods and valley and foothill grasslands; 50-100 m	Grows near Briones Reservoir
Pallid manzanita <i>Arctostaphylos pallida</i>	C1/SE CNPS 1B	Broadleaved upland forest, chaparral, and open woods on siliceous shales of slopes and ridges in the Berkeley-Oakland Hills; 200-350 m	One population on former Goldberg property in canyon adjacent to Pinehurst Road in the Upper San Leandro Watershed basin
Mt. Diablo fairy lantern <i>Calochortus pulchellus</i>	CNPS 1B	Wooded slopes, chaparral, and valley and foothill grasslands; 200-800 m	Grows on Rocky Ridge, Cull Hill Ridge, and Mendonca Ranch
Oakland star-tulip <i>Calochortus umbellatus</i>	CNPS 4	Chaparral, broadleaved upland forests, and valley and foothill grasslands; 100-700 m	Grows on Rocky Ridge
Franciscan thistle <i>Cirsium andrewsii</i>	CNPS 4	Broadleaved upland forests and coastal scrub; < 100 m	Grows at Lily Spring on San Pablo Ridge
Western leatherwood <i>Dirca occidentalis</i>	CNPS 1B	Moist, partially shaded slopes; broadleaved upland forests, closed-cone conifer forests, riparian habitats, and chaparral; 50-300 m	Grows near San Pablo Creek and in Gateway Valley
Diablo sunflower, or helianthella <i>Helianthella castanea</i>	C2 CNPS 1B	Open, grassy areas, often associated with broadleaved upland forests, riparian woodland, chaparral, and coastal scrub; 200-1,300 m	Grows at several locations on San Pablo Ridge, Rocky Ridge, and in Pinole Valley
Santa Cruz tarplant <i>Holocarpha macradenia</i>	C1/SE CNPS 1B	Coastal prairie and valley and foothill grasslands; prefers sandy clay soil; < 100 m	A planted species on the watershed; no plants located in 1991 and 1992 surveys
Northern California black walnut <i>Juglans californica</i> var. <i>hindsii</i>	C2 CNPS 1B	Riparian forests and woodlands; requires deep alluvial soil associated with a creek or stream; 50-200 m	Known at Kaiser Creek just upstream from Upper San Leandro Reservoir
San Antonio monardella <i>Monardella antonina</i> ssp. <i>antonina</i>	C3C CNPS 3	Open rocky slopes in chaparral and open woods; 500-900 m	Reported from South Hampton Road on the watershed



Species	Status ^a	Preferred Habitat	Occurrence on Watershed
<p>^a Status explanations:</p> <p>Federal</p> <p>C1 = Category 1 candidate for federal listing. Category 1 includes species for which USFWS has on file enough substantial information on biological vulnerability and threat to support proposals to list them.</p> <p>C2 = Category 2 candidate for federal listing. Category 2 includes species for which USFWS has some biological information indicating that listing may be appropriate but for which further biological research and field study are usually needed to clarify the most appropriate status. Category 2 species are not necessarily less rare, threatened, or endangered than Category 1 species or listed species; the distinction relates to the amount of data available and is therefore administrative, not biological.</p> <p>C3C = no longer a candidate for federal listing. Category 3C species have been dropped from the candidate list because they are too widespread or not threatened at this time.</p> <p>State</p> <p>SE = listed as endangered under the California Endangered Species Act.</p> <p>California Native Plant Society</p> <p>List 1B = List 1B species: rare, threatened, or endangered in California and elsewhere.</p> <p>CNPS 3 = List 3 species: more information needed to determine status.</p> <p>CNPS 4 = List 4 species: plants of limited distribution.</p> <p>Source: EA Engineering, Science, and Technology 1994a.</p>			



WILDLIFE

Overview

The District's East Bay watershed lands support a high diversity of wildlife and fish species. All known and potential wildlife and fish species, and their habitat associations, are described in the natural resource inventory (EA Engineering, Science, and Technology 1994a).

District lands contribute substantially to maintaining wildlife and fish diversity in the East Bay area. The presence of a large amount of relatively undisturbed habitat on watershed lands enables many species to survive there that have been reduced in numbers or eliminated elsewhere in the region. District lands contribute to the habitat needed to support species that require large land areas or protection from human disturbance (e.g., raptors, mountain lions, and other predators).

District lands also serve as connections between other wildlife habitat areas that allow large animals to move between fragmented areas of habitat. District lands in Siesta Valley are part of an important wildlife travel corridor formed by the Caldecott Tunnel. Because exposed portions of State Route (SR) 24 are an almost complete barrier to movement by non-flying animals, the land above the tunnel is the only area that allows movement between wildland areas north and south of the highway. Maintenance of conditions suitable for animal movement is critical to maintaining populations of the mountain lion and other species with low-density populations and large home-range requirements.

Wildlife and fish species that should be taken into consideration in the plan are special-status species, other locally uncommon or extirpated species, and non-native wildlife.

Special-Status Wildlife

Special-status wildlife species are animals that are legally protected under the state and federal Endangered Species Acts and other rare or declining species that have not been formally listed as threatened or endangered.

Special-status wildlife are species in the following categories:

- animals listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.11 [listed animals] and various notices in the Federal Register [proposed species]);

- animals that are Category 1 or 2 candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (59 FR 219: 58982-59028, November 15, 1994);
- animals that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, Section 15380);
- animals listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 CCR 670.5);
- animal species of special concern to the California Department of Fish and Game (Remsen 1978 [birds] and Williams 1986 [mammals]);
- animals fully protected in California (Cal. Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]); and
- animals listed as sensitive by the local U.S. Forest Service region (Forest Service Manual 2670) or U.S. Bureau of Land Management resource area.

Listed and Proposed Species

Four wildlife species have been formally listed as endangered or threatened under the California or federal Endangered Species Act. One species, the red-legged frog, is proposed for federal listing as endangered (Table 3-8).

Aleutian Canada Goose. The Aleutian Canada goose breeds on the Alaskan peninsula and winters at traditional sites in California. In winter, the geese roost in large marshes, flooded fields, and ponds and feed in a variety of habitats, including harvested grain fields and wet meadows. Aleutian Canada geese winter regularly on District lands in the Pinole and San Pablo Reservoir watersheds (Kelchlin 1993).

Bald Eagle. In California, bald eagles nest mainly in conifer forests near large water bodies at high elevations. They winter throughout the state, mostly near water bodies. Bald eagles have been known to roost on District lands in Monterey pines and eucalyptus stands in the Lafayette, San Pablo, Briones, and Upper San Leandro Reservoir watersheds.

American Peregrine Falcon. Peregrine falcons nest and roost on protected ledges of high cliffs, usually near lakes, rivers, or marshes that support large populations of other birds species. They are widespread as individuals during the nonbreeding season, especially during fall and spring migration. Peregrine falcons have been observed occasionally near reservoirs during migration.

Alameda Whipsnake. The distribution of the Alameda whipsnake is restricted to Alameda and Contra Costa Counties, where it occupies coastal scrub, chaparral, and oak woodland habitats, especially in areas of rocky soils. The whipsnake has been documented

on District lands in the Pinole, San Pablo Reservoir, and Upper San Leandro Reservoir watersheds.

California Red-Legged Frog. The California red-legged frog is a subspecies that has declined substantially in California in recent years and is now restricted to coastal areas of the state. Red-legged frogs inhabit creeks and cold-water ponds with emergent, submergent, and woody riparian vegetation. Breeding populations have been identified on District lands in the Pinole, San Pablo Reservoir, and Upper San Leandro Reservoir watersheds (Dunne 1994). Livestock use of riparian and pond habitats has reduced habitat quality for red-legged frogs on District lands.

Other Special-Status Species

In addition to the species described above, 23 other special-status wildlife species have been documented as occurring on District watershed lands (Table 3-8). An additional 15 species have potential to occur but have not been documented. Additional information on the biology and local status of these unlisted species is presented in the natural resource inventory (EA Engineering, Science, and Technology 1994a).

Most of the unlisted special-status wildlife species occur in grassland, riparian, and wetland habitats. Reservoirs provide habitat for six of the species known to occur on District lands, including the white pelican and common loon. Ten special-status species occur on District lands in winter, including several water birds that use the reservoirs for roosting and foraging and a variety of wintering raptors.

Upper San Leandro Reservoir and its tributaries support a strain of steelhead rainbow trout that is believed to be genetically pure (i.e., not diluted by hatchery stock). The San Leandro Creek steelhead was landlocked by the construction of Chabot and Upper San Leandro Reservoirs. Although steelhead is under consideration for federal listing as threatened or endangered, the listing may not apply to the San Leandro Creek form because of its landlocked status. Although some stream habitat used by the San Leandro rainbow has been degraded, the population is generally considered secure.

Extirpated Species

Some species once were found on East Bay watershed lands but no longer occur there. For some species, such as the grizzly bear, black bear, and tule elk, reintroduction is infeasible because of the potential for conflict with adjacent urban uses. Several extirpated species, however, could be reintroduced.

The California ground squirrel was eliminated from District lands as part of a large-scale control campaign conducted in the 1970s. Several other species that have disappeared are known to depend on ground squirrels as prey (e.g., badger) or make use of their burrows

(e.g., burrowing owl and possibly tiger salamander). The presence of recovering populations on adjacent lands suggests that ground squirrels may recolonize some District lands soon.

Disruptive Species

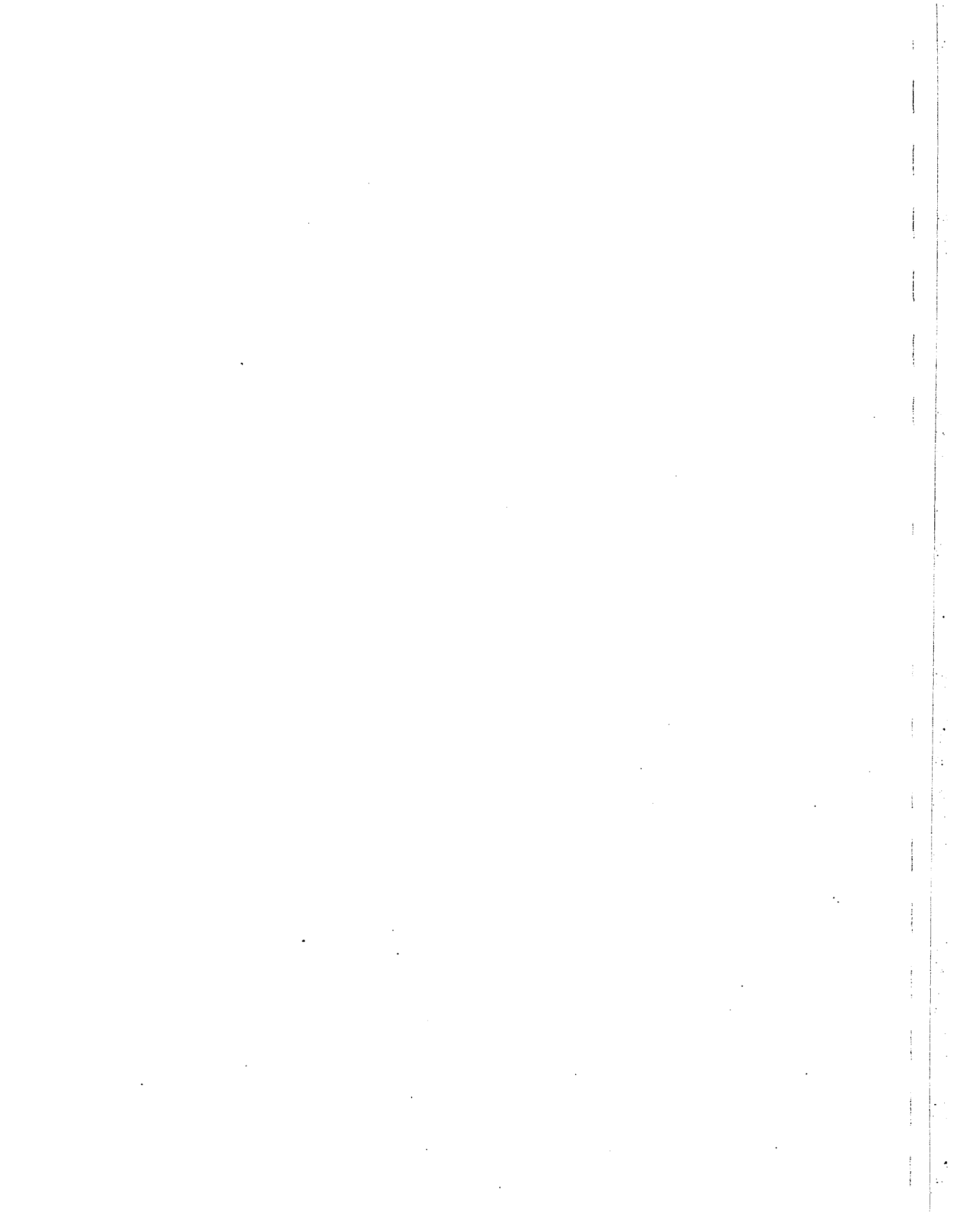
Several wildlife species that occur on or have potential to colonize District watershed lands could disrupt native wildlife populations and damage other natural resources. Control of some non-native species may be warranted to protect resource values. Important pest species that may warrant control are feral pigs, red fox, feral cats, free-ranging dogs, bullfrog, and pond slider turtle. Other species, such as the European starling and brown-headed cowbird, may disrupt native populations but are difficult to control.

A variety of non-native fish species occupy reservoirs, ponds, and streams on District watershed lands. Hatchery-raised rainbow trout are planted regularly in San Pablo Reservoir. Other non-native fish have been introduced to water bodies through water importation, human transplantation (e.g., for mosquito control), or colonization from upstream or downstream areas.

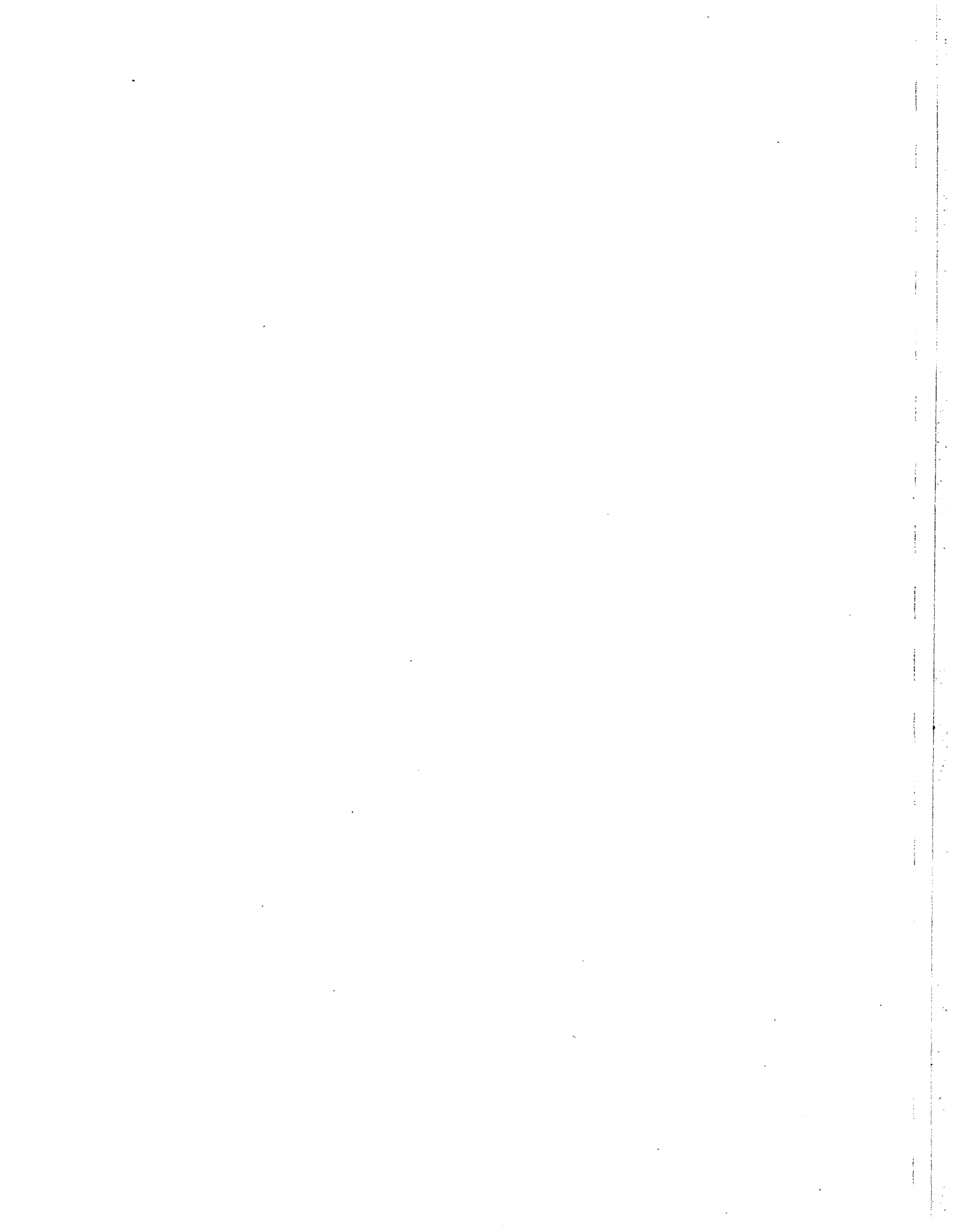
Non-native fish have positive and negative effects on biodiversity. They serve as a forage base for a variety of waterbirds, including the bald eagle, osprey, and other special-status and common species. Non-native fish also may detrimentally affect populations of native amphibians (including the red-legged frog and tiger salamander) through predation or competition for food.

Table 3-8. Special-Status Animal Species Known to Occur on East Bay Watershed Lands

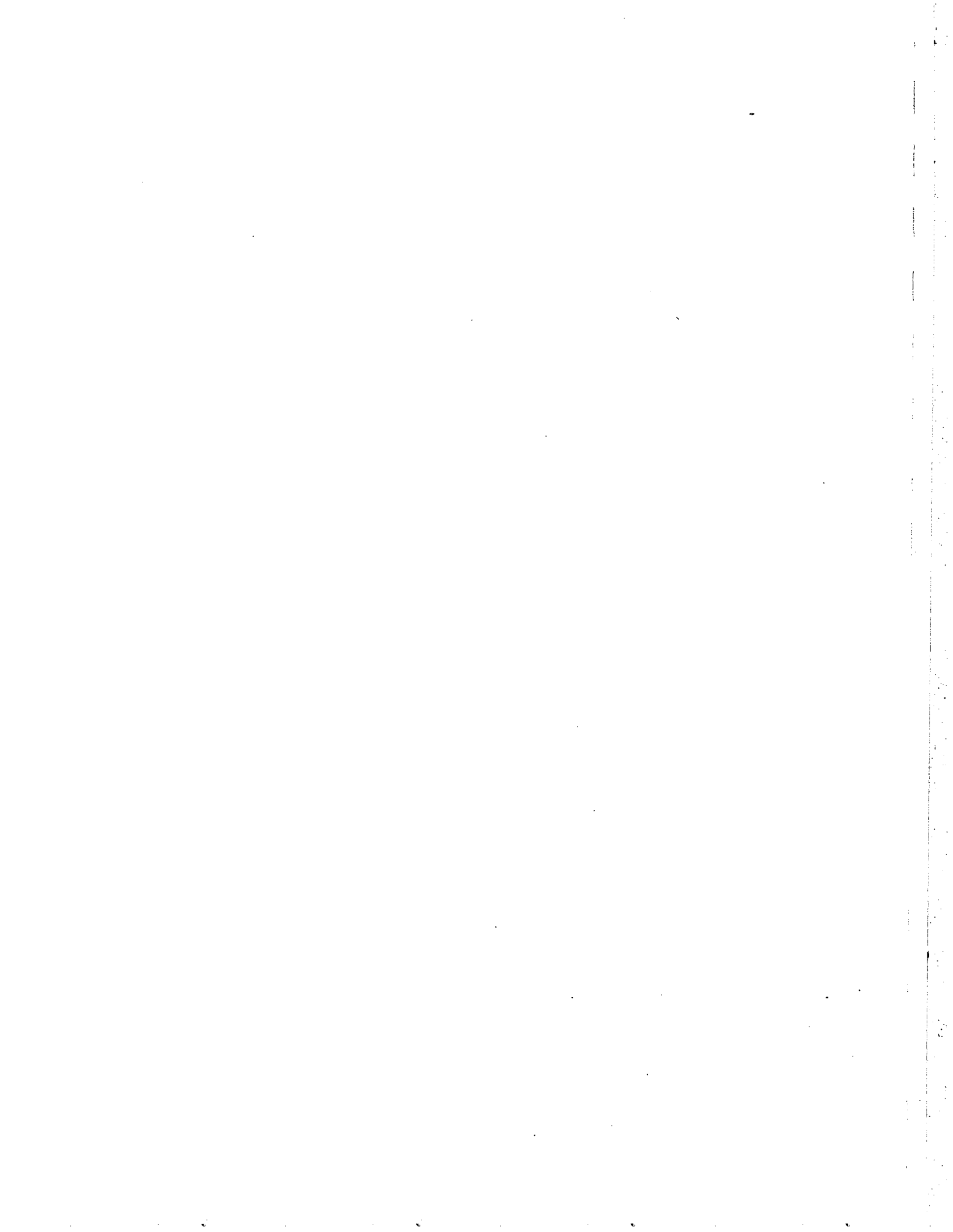
Species	Status ^a	Preferred Habitat	Occurrence on Watershed ^b
Mammals			
Ringtail <i>Bassariscus astutus</i>	SP	Inhabits chaparral and foothill canyons, preferring riparian areas	Occurs on the watershed (SP, USL)
Mountain lion <i>Felis concolor</i>	SP	Inhabits forested and brushy regions; tends to avoid open areas	Recent sightings on the watershed (SP, B, L, USL, C)
Birds			
Common loon <i>Gavia immer</i>	CSC	Requires deep freshwater lakes with sufficient food; needs at least 18 m (60 ft) of water for running take-off from water	A winter migrant on the watershed (SP, B, USL, C)
American white pelican <i>Pelecanus erythrorhynchos</i>	CSC	Winters on salt ponds, large lakes, and estuaries; loaf on open water during the day; roosts at night along the water's edge on beaches, sandbars, or driftwood	A winter migrant on the watershed (P, SP, B, USL)
Double-crested cormorant <i>Phalacrocorax auritus</i>	CSC	Found along the coast in estuaries and salt ponds; also frequents reservoirs and lacustrine habitats in the coastal slope lowlands and Central Valley	Occurs on the watershed (SP, B, L, USL, C)
Aleutian Canada goose <i>Branta canadensis leucopareia</i>	FT	Winters on lakes and inland prairie; forages on natural pasture or that cultivated to grain; feeds and roosts on lakes, reservoirs, and ponds	Occurs on the watershed as a winter resident (P, SP)
Osprey <i>Pandion haliaetus</i>	CSC	Requires snags or living trees adjacent to or over water for nesting; also will nest on poles or cliffs	Occurs on the watershed (SP, B, L, USL); possible nest located at Briones Reservoir
White-tailed kite <i>Elanus leucurus</i>	SP	Inhabits herbaceous lowlands with variable tree growth	Occurs on the watershed (B)
Bald eagle <i>Haliaeetus leucocephalus</i>	FE/SE, SP	Nests and winters along ocean shorelines, lake margins, and river courses; roosts communally in winter	A winter resident on the watershed (SP, B, L, USL)
Northern harrier <i>Circus cyaneus</i>	CSC	Inhabits coastal and freshwater marshes; nests on ground in shrubby vegetation and grasslands; forages in grasslands	Occurs on the watershed (P, SP, B, USL)



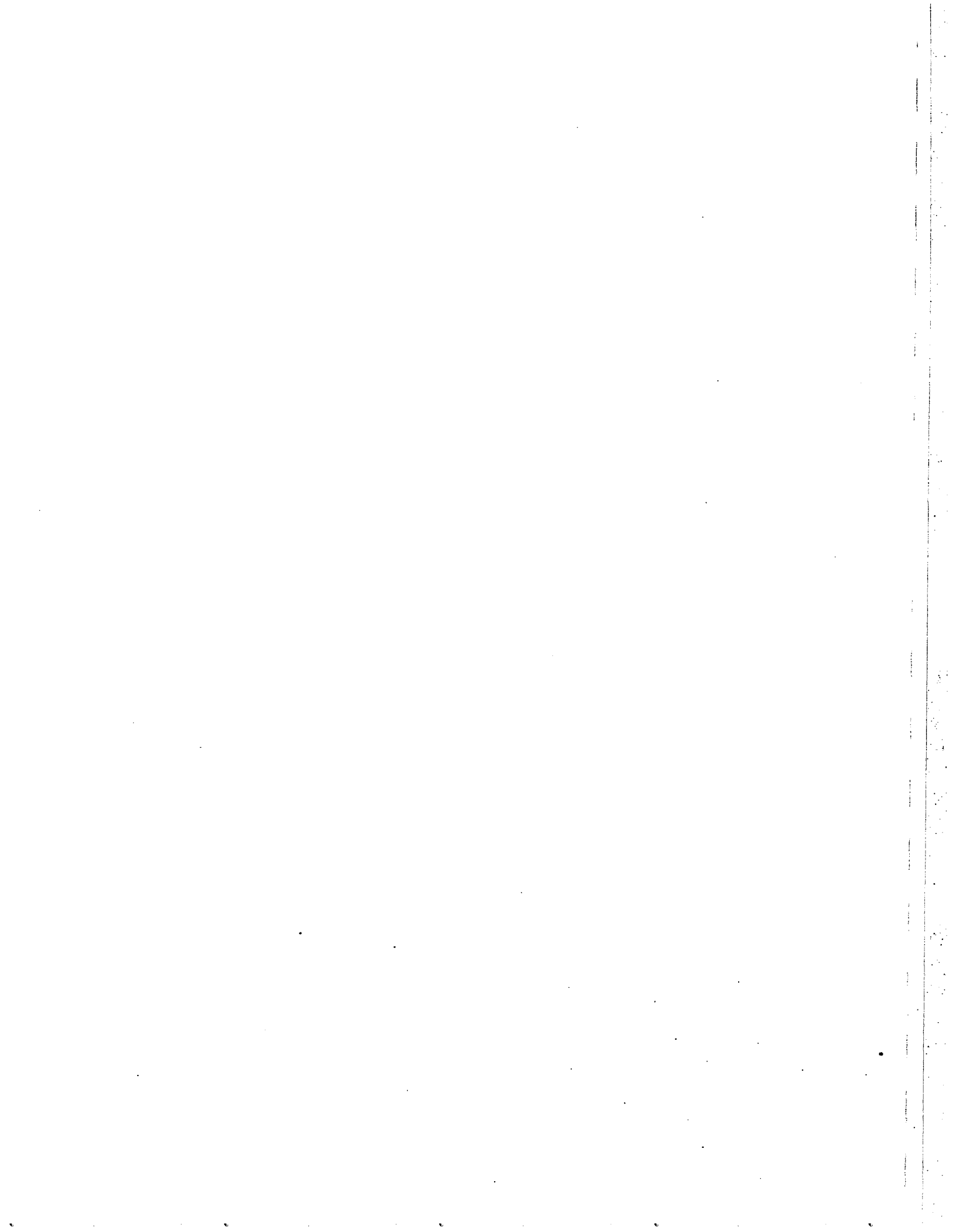
Species	Status ^a	Preferred Habitat	Occurrence on Watershed ^b
Sharp-shinned hawk <i>Accipiter striatus</i>	CSC	Inhabits open deciduous woodlands, mixed or coniferous forests, and thickets	Breeds and winters on the watershed (P, SP, B, USL, C)
Cooper's hawk <i>Accipiter cooperii</i>	CSC	Nests in forests or woodlands; prefers broad-leaved trees in riparian areas	Breeds and winters on the watershed (P, SP, B, USL)
Ferruginous hawk <i>Buteo regalis</i>	C2/CSC	Inhabits western plains and prairies, nesting in trees along streamcourses; in treeless areas, nests on low cliffs or on the ground	Winters on the watershed (P)
Golden eagle <i>Aquila chrysaetos</i>	CSC/SP	Nests usually found on cliff ledges; prefers nesting in trees in hilly areas	Breeds and winters on the watershed (P, SP, B, USL)
Merlin <i>Falco columbarius</i>	CSC	Frequents coastlines, open grasslands, savannas, woodlands, lakes, and wetlands	Observed in winter on the watershed (USL)
American peregrine falcon <i>Falco peregrinus anatum</i>	FE/SE, SP	Inhabits riparian areas and coastal and inland wetlands throughout the year	Occurs as a migrant on the watershed (SP, B, USL)
Prairie falcon <i>Falco mexicanus</i>	CSC	Inhabits perennial grasslands, savannas, rangeland, agricultural fields, and desert scrub areas	Breeds and winters on the watershed (P, SP, USL); observed in the Simas Valley area (1992); nested on Rocky Ridge 1959-1989
California gull <i>Larus californicus</i>	CSC	Frequents coastal and interior lowlands in winter, often roosting in large concentrations along shorelines, landfills, pastures, and on islands; needs undisturbed, isolated islands for nesting	Winters on the watershed (SP, B, L, USL, C)
Long-eared owl <i>Asio otus</i>	CSC	Frequents dense, riparian and live oak thickets near meadows; requires riparian or other thickets with small, densely canopied trees for nesting and roosting	Winters on the watershed (SP, B)
Short-eared owl <i>Asio flammeus</i>	CSC	Frequents open, treeless areas with elevated perches and dense vegetation for roosting and nesting	Winters on the watershed (B)
California horned lark <i>Eremophila alpestris actia</i>	C2/CSC	Inhabits prairies, fields, and open grasslands	Occurs on the watershed (P, SP, B, USL); possibly breeds



Species	Status ^a	Preferred Habitat	Occurrence on Watershed ^b
Loggerhead shrike <i>Lanius ludovicianus</i>	C2/CSC	Inhabits open brushy areas with lookout posts (e.g., wires, trees, and scrub)	Breeds and winters on the watershed (P, SP, B, L, USL, C)
Yellow warbler <i>Dendroica petechia</i>	CSC	In breeding season, frequents open to medium-density riparian zones, woodlands, and forests with a brushy understory; in migration, found in a variety of sparse to dense woodland and forest habitats	Occurs on the watershed during migration (SP, USL); may breed; migratory habitat available; breeding habitat limited
Tricolored blackbird <i>Agelaius tricolor</i>	CSC	Frequents fresh emergent wetlands; roosts in large flocks in emergent vegetation or trees	Winters on watershed (P, SP); limited marginal breeding habitat available
Reptiles			
Southwestern pond turtle <i>Clemmys marmorata pallida</i>	C1/CSC	Inhabits permanent or nearly permanent bodies of water in many habitat types at <6,000 feet elevation; requires basking sites such as partially submerged logs, vegetation mats, or open mud banks	Western pond turtle known to breed on the watershed; northwestern and southwestern subspecies intergrade in the watershed region (P, SP, B, L, USL, C)
California horned lizard <i>Phrynosoma coronatum frontale</i>	CSC	Frequents a wide variety of habitats; most common in lowlands along sandy washes with scattered low bushes; requires open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects	Collected on Hampton Road in 1992 by R. Nuzum; occurred in the late 1960s in the Berkeley Hills
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	FPE/ST	Restricted to valley-foothill hardwood habitat of the Coast Ranges; inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with oak trees and grasses	Many documented occurrences on the watershed (P, SP, USL)
Amphibians			
California red-legged frog <i>Rana aurora draytonii</i>	FPE/CSC	Inhabits marshes, ponds, streams, lakes, and reservoirs; prefers permanent sources of water with cattails or other plants to provide cover	Breeds on the watershed (P, SP, USL); several documented occurrences



Species	Status ^a	Preferred Habitat	Occurrence on Watershed ^b
<p>Status explanations:</p> <p>Federal</p> <p>FE = listed as endangered under the federal Endangered Species Act. FT = listed as threatened under the federal Endangered Species Act. FPE = proposed for listing as endangered under the federal Endangered Species Act. C1 = Category 1 candidate for federal listing. Category 1 includes species for which USFWS has on file enough substantial information on biological vulnerability and threat to support proposals to list them. C2 = Category 2 candidate for federal listing. Category 2 includes species for which USFWS has some biological information indicating that listing may be appropriate but for which further biological research and field study are usually needed to clarify the most appropriate status. Category 2 species are not necessarily less rare, threatened, or endangered than Category 1 species or listed species; the distinction relates to the amount of data available and is therefore administrative, not biological.</p> <p>State</p> <p>SE = listed as endangered under the California Endangered Species Act. ST = listed as threatened under the California Endangered Species Act. SP = fully protected under the California Fish and Game Code. CSC = species of special concern.</p> <p>Watersheds</p> <p>P = Pinole SP = San Pablo B = Briones L = Lafayette USL = Upper San Leandro C = Chabot</p>			
<p>Source: EA Engineering, Science, and Technology 1994a.</p>			



CULTURAL RESOURCES

Introduction

The information presented below is excerpted from a cultural resources inventory contained in the East Bay Watershed Master Plan Natural Resources Inventory (EA Engineering, Science, and Technology 1994a).

The human history of the District's watershed lands during the prehistoric and historic periods is discussed in this section, as well as a summary of sensitive cultural resources found on watershed lands.

Methodology

Background Research

Before conducting fieldwork, a search of records and literature was conducted at the Bancroft Library at the University of California, Berkeley; the Oakland History Room at the Oakland Public Library; the Contra Costa County Historical Society History Center in Pleasant Hills; the Moraga Historical Society and Archives in Moraga; and the Hayward Area Historical Society Archives in Hayward to determine the history and extent of cultural resources in the project area.

Map research was conducted at the Bancroft Library and the Doe Library Map Room, University of California, Berkeley, to identify structures and features within the District's East Bay watershed lands; in addition, rancho plats and maps identifying property ownership in Contra Costa and Alameda Counties were also consulted. Photographic collections at the Contra Costa County Historical Society History Center in Pleasant Hills were also examined to gain visual recognition of the resources and features within the District's East Bay watershed lands.

Prehistoric and historic archaeological research was conducted at the California Archaeological Inventory's Northwest Information Center at Sonoma State University. Information relevant to prehistoric communities within the watershed was examined, and major historic property listings, points of interest, and ethnic site surveys were reviewed. Based on this analysis, a summation of the people and the cultural activity in the East Bay area and, more specifically, the District's East Bay watershed lands was formulated.

Field Research

Focused field investigations were used to identify cultural resources within the watershed lands. Efforts were concentrated on known and accessible cultural resources in which archaeological sites were located, updated, and recorded. In addition, sample surveys were conducted, on foot, at potentially sensitive zones that had not been inspected previously.

Cultural Context

Prehistoric Period

East Bay prehistory appears to have its origins approximately 4,500 years ago. Populations of Hokan, a native culture of hunters and gathers, settled along the bay and ocean shores and within the area of East Bay watershed reservoirs. At the time of European contact, Costanoan/Ohlone groups occupied the East Bay watershed lands.

The Huchiun, Bay Miwok, and Wekemaynon tribal groups, all considered Costanoans, were located in permanent villages defined by geographic features within the watershed lands. Temporary camps were used on a seasonal basis while the occupants harvested the floral and faunal resources. The typical Costanoan/Ohlone dwelling consisted of a dome-shaped, earth-covered hut supported by a bent-pole framework. Wickiups (thatched houses), semi-subterranean sweathouses, and assembly houses capable of accommodating the entire village population were also found at major settlements.

Costanoan/Ohlone technology included many woven items made of natural fibers, tule, milkweed, and animal skin; stone tools made from sedimentary and metamorphic rock; and lacing and weaving awls, scrapers, and whistles made from bone.

Historic Period

The mid-1700s marked the first Spanish expeditions to the area and, thus, the beginning of the historic period for the area. Gaspar de Portola led an expedition from San Diego that resulted in the first sighting of San Francisco Bay, from what is now San Mateo County. The last major Spanish exploration of the East Bay area took place in 1810 under the leadership of Gabriel Moraga. Secularization and establishment of missions within the Costanoan territories during 1770-1835 resulted in the relocation of Native Americans from the East Bay area and a continued decline in the Costanoan population.

In 1822, the Mexican government granted large parcels of land to individuals engaged primarily in raising cattle and the tallow trade. The present-day District watershed lands lie within the boundaries of nine of the early ranchos: Rancho El Pinole, Rancho El Sobrante, Rancho la Boca de la Canada de Pinole, Rancho Acalanes, Rancho Laguna de

los Palos Colorados, Rancho San Lorenzo, Rancho El Sobrante de los Romeros, Rancho San Antonio, and Rancho San Leandro.

Throughout the 19th century, cattle ranching and agriculture were the main driving forces in the economy of Alameda and Contra Costa Counties. Lumber was the first industry to be developed within the watershed lands in the early 1800s. The discovery of gold in the Sierra Hills in 1848 increased California's population and aided industrial development in the East Bay area. A renewed interest in agriculture occurred after the gold rush to continue its major role in the economy during the 1850s. Railroad development became central to the success of the Contra Costa County ranchers and farmers and future industries in and around the watershed lands.

Summary of Sensitive Cultural Resources

A total of 47 archaeological and historic resources have been identified and recorded on the District's watershed land.

San Pablo Reservoir Watershed Lands

Nineteen known cultural resources are located in the San Pablo Reservoir watershed. Nine are prehistoric archaeological sites, of which five also have a historic component. Of the nine historic archaeological sites, two have associated structures and one, the Orinda Filter Plant, is a historic structure with no known or suspected archaeological component.

Briones Reservoir Watershed Lands

Three known cultural resources are located in the Briones Reservoir watershed: one prehistoric site; the historic Hampton's Grave Site; and Felipe Briones Adobe, a historic archaeological site.

Pinole Valley Watershed Lands

Five known cultural resources are located in the Pinole Valley watershed. Three are prehistoric in nature. The other two resources (Mohring Homestead and Tormey Homestead) are historic sites.

Lafayette Reservoir Watershed Lands

One known cultural resource, the historic Lafayette Reservoir Dam, is located in the Lafayette Reservoir watershed.

Upper San Leandro Watershed Lands

Twelve known cultural resources exist in the Upper San Leandro Reservoir watershed. Nine are historic archaeological sites, one with a prehistoric component; eight of these sites are associated with structures or features. Two sites are historic structures and one is a prehistoric site.

Chabot Reservoir Watershed Lands

Seven known cultural resources are found in the Chabot Reservoir watershed. One is a prehistoric archaeological site. Four of the sites are historic structures or features, and one of these has a historical archaeological component.

FIRE HAZARD AND RISK

Introduction

Three elements are required for a fire to begin: fuel, heat, and oxygen. The presence and condition of vegetative fuels is assessed to help determine the level of fire risk and identify areas that require protection. In the past, the District has dealt with fire hazards on its watershed lands primarily by suppressing fires, maintaining road access, plowing control lines, and encouraging extensive grazing on District watershed lands. This management approach has strategically reduced the overall fuel load and fuel continuity by encouraging the growth of fuels that are easy to control. These efforts have been effective to date in preventing the spread of a catastrophic wildfire.

The 1991 Oakland fire, which destroyed nearly 3,000 dwellings and resulted in 25 deaths, focused public attention on the serious threat of fire in the East Bay hills. Although less than 5 acres of the District's lands burned in the Oakland fire, management of these lands is recognized as an important link in maintaining fire protection for adjacent urban areas. Management of District lands for fire protection is a key element of the District's water quality protection program. A catastrophic fire such as the 1991 fire within the District's watershed areas could have major effects on reservoir water quality because of the increased erosion and sedimentation that would follow and the input of additional nutrients from ash and other fire byproducts.

Encroaching urban development along the District's watershed land boundaries has increased fire danger and constrained fire and fuel management options. Reduced grazing on adjacent lands also has increased fuel accumulation in those areas and the consequent hazard.

This generalized fire analysis identifies high-hazard vegetative fuels, wildfire ignition risk, important interface areas, and existing fire management activities and fire suppression response. This analysis identifies areas based on fire hazard and risk to identify high-fire-hazard zones and identify priority areas for fuel treatment. This fire hazard and risk analysis rating system is based on elements of the Standard 299 rating system (National Fire Protection Association 1991).

This analysis was conducted for watershed areas and specific vegetation types. Subsequent analyses for site-specific fire management planning will incorporate local data such as microclimates, slope direction (aspects), urban/rural interface, vegetation types, topography, and land use.

This fire hazard and risk analysis is based on an assessment of five components:

- weather,
- fire hazard and interface exposure,
- fire risk,
- fire mitigation, and
- fire response and evacuation.

Each of these components is described for existing conditions.

Weather

Weather is an important consideration in fire management because it affects wind conditions, humidity, and fuel moisture. The East Bay has a Mediterranean climate characterized by cool, wet winters and warm, dry summers. In summer, prevailing winds typically bring cool, moist air from the west or southwest. Several times a year, however, strong, dry winds (i.e., Foehn or Diablo winds) blow from the north, northeast, or east and create weather conditions that increase the danger of fire. Such conditions led to the Oakland fire.

Much of the land at the western boundary of the watershed supports woody vegetation on northeast-facing slopes above San Pablo and Upper San Leandro Reservoirs. These western lands are affected by the coastal influence that brings summer fog to these hillsides. Additionally, the shorter periods of solar exposure on the northeastern slopes result in a cooler, moister microclimate. As a result, the north slopes usually provide a natural fuelbreak under normal summertime weather conditions. Vegetation and dead fuels on north slopes dry out quickly, however, when exposed to hot, dry Foehn winds.

The eastern portion of the District watershed lands is drier and characteristic of the inland valley. Much of this land supports grassland and brush, providing hot, dry fuels that burn readily under typical conditions. Woody north-slope vegetation is less common and less moist than vegetation in the western portion of District lands.

Fire Hazard

Fire hazard is the condition of fuels (as defined by kind, arrangement, volume, condition, and location), which determines the degree of ignition threat or suppression difficulty. Fire hazard can be assessed by evaluating a set of factors that together contribute to the rate of wildfire spread, burning intensity, and resistance to control. The fire hazard assessment of vegetative fuels accounts for vegetation type, age, vertical and horizontal continuity, and overall flammability. Various abiotic factors also contribute to overall fire hazard, such as steepness of slope, type of terrain, and aspect.

Fire hazard ratings of the vegetation types found on the District's watershed lands are summarized in Table 3-9. Grassland, coastal scrub, chaparral, and hardwood forest make up approximately 80% of the watershed area. The forest and woodland habitats, including eucalyptus, Monterey pine, knobcone pine, and redwood, each occupy less than 2% of the watershed acreage (EA Engineering, Science, and Technology 1994a).

Grassland

The grassland grouping (included savannah oak) comprises approximately 10,260 acres, or 36% of District lands.

Grassland is a hazardous fuel type under normal summertime weather conditions. Grassland fuels are referred to as "one-hour fuels" because they respond extremely quickly to changes in weather or drying conditions. These rapid changes occur mostly on southern, southwestern, and western aspects, which are exposed to both a longer daily period of solar heating and normal summertime prevailing winds. Fuel loadings (i.e., the amount of fuel) are lower in grasslands than in woody vegetation types; thus, fire intensity (i.e., flame heights and duration) also is low.

Most of the District's watershed grasslands are located on moderate to extreme slopes (Table 3-10). Grasslands on the driest aspects (southern, southwestern, and western) also tend to occur on the steepest slopes. These conditions result in high susceptibility to rapid fire spread under most summertime conditions. Firefighting response times and access to grassland areas are of critical importance because of the high rate of fire spread.

Because of its low burning intensity (due to lower fuel loadings), grassland vegetation can provide an effective break in continuity from shrub and woodland habitat that support fuels with higher burning intensity. Where easy access is available, fire control in grasslands can be used for effective fire suppression.

Coastal Scrub

Coastal scrub constitutes 2,816 acres, or 10% of the watershed lands. The coastal scrub areas are scattered throughout the watershed, especially to the east of San Pablo and Upper San Leandro Reservoirs. Coastal scrub is intermixed with grassland, chaparral, and woodland vegetation.

The primary fire hazard concern in coastal scrub habitat relates to areas adjacent to or linked with high-hazard fuels. Most of these areas are on dry, steep slopes, which are grazed less frequently and have extensive solar exposure and dry soil conditions (Table 3-11).

Coastal scrub habitat occurs mostly on south-facing slopes or other dry sites. Thus, coastal scrub is susceptible to increased fire risk from normal summer weather and drying conditions that occur under prevailing summertime west or southwest winds, especially on steep

slopes. In addition to being affected by slope and aspect, the hazard ratings of individual coastal scrub stands depend on shrub density and overall continuity of hazardous vegetation.

Chaparral, Eucalyptus, and Hardwood Woodland

The chaparral-eucalyptus-hardwood group combines vegetation types that are highly resistant to fire control because of moderate to high burning intensities, inaccessibility, and well-developed vertical fuel ladders. This grouping makes up 10,021 acres, or 36% of watershed lands. Fire hazard conditions for these fuel groups are shown in Table 3-12.

Chaparral. Chaparral habitat occupies only 166 acres of the watershed. This habitat occurs on the drier southern, southwestern, and western aspects with moderate to extreme slopes. Chaparral fuels are susceptible to drying under normal prevailing summer winds and even more so under Foehn winds. Site-specific fire hazard ratings vary depending on shrub density and continuity with areas of high-hazard vegetative fuels. Chaparral is hazardous under most summertime weather conditions.

Eucalyptus and Hardwood Woodland. Most of the vegetation on northern, northeastern, and eastern slopes on District lands consists of hardwood forests and eucalyptus stands. These habitats remain cool and moist under normal summer weather conditions. Thus, during most of the year, hardwood forest and eucalyptus vegetation are not a significant fire threat. However, long periods of Foehn wind conditions dry both the smaller fuels and larger woody fuels in these areas. By drying these fuels with high burning intensity, Foehn winds create a fuelbed condition that is extremely hazardous if fire ignition occurs.

Understory vegetation in the hardwood forests varies from grassland to dense shrubs. The hazard rating within individual hardwood stands depends on the amount of understory vegetation, fuel moisture, fuel ladder, and overall continuity of hazardous fuels. The hardwood forest just southwest of Miller Road in the Upper San Leandro Reservoir watershed is an area that, because of vegetative cover type and arrangement, provides a continuous fuel link for a wildfire during Foehn wind conditions.

One eucalyptus stand exists southwest of the San Pablo Dam area and west of San Pablo Dam Road. Although the slope exceeds 20%, this stand occurs on a northeast-facing slope, which provides some protection from normal summer prevailing winds.

Several other eucalyptus stands occur within the Upper San Leandro Reservoir watershed.

Conifer Forest Group

The conifer forest group is composed of Monterey pine, knobcone pine, and redwood forest. This fuel type constitutes 894 acres, or approximately 3% of watershed lands. Slope and aspect conditions of this group are shown in Table 3-13.

Knobcone Pine. The knobcone pine forest is near the community of Canyon in the Upper San Leandro watershed. The forest is in an extremely decadent state because of past fire exclusion. Knobcone pine stands require intense fire approximately every 30 years to maintain healthy forest conditions. Fire exclusion has resulted in the accumulation of large amounts of dead vegetative material and coastal scrub understory.

The knobcone pine forest occurs in an area where frequent fog generally maintains fuel moistures. Hazards can be substantial, however, when fuels dry in response to long periods of dry weather and Foehn wind conditions. The knobcone forest habitat is adjacent to and within the community of Canyon, which includes intermixed private and District-owned parcels.

Monterey Pine. Monterey pine also is a fire-adapted species that is scattered throughout the watershed areas. Stands contain a three-story ladder through which wildfire can spread by the continuity of surface, aerial, and canopy fuels. The hazard rating of some denser stands is high because of their decadence. The following stands of Monterey pine occur within the San Pablo, Lafayette, and Upper San Leandro Reservoir watersheds:

- near the boundary between EBRPD and Oakland along Sea View Road in Wildcat Canyon,
- along the southeastern shoreline of San Pablo Reservoir,
- in the northeastern portion of the Lafayette Reservoir watershed,
- in the Skyline Gate area of the Upper San Leandro Reservoir watershed, and
- along Canyon Road in the Upper San Leandro Reservoir watershed.

Most of the Monterey pine stands are located in areas where fog drip creates higher fuel moistures, but moisture decreases during long periods of dry weather and under Foehn wind conditions.

Redwood. The redwood forest is located in the Canyon area in a narrow drainage that provides the necessary higher fuel moisture and cooler temperatures to reduce fire intensity and spread. All three types of ladder fuels (surface, crown, and aerial) are highly resistant to fire control. The understory includes hardwoods and dense vegetation with higher fuel moistures.

Redwood is the least likely vegetation type to burn because the microclimate maintains high fuel moisture. When vegetation and woody fuels are dried by Foehn winds, however, redwood could burn at a high intensity and low rate of spread.

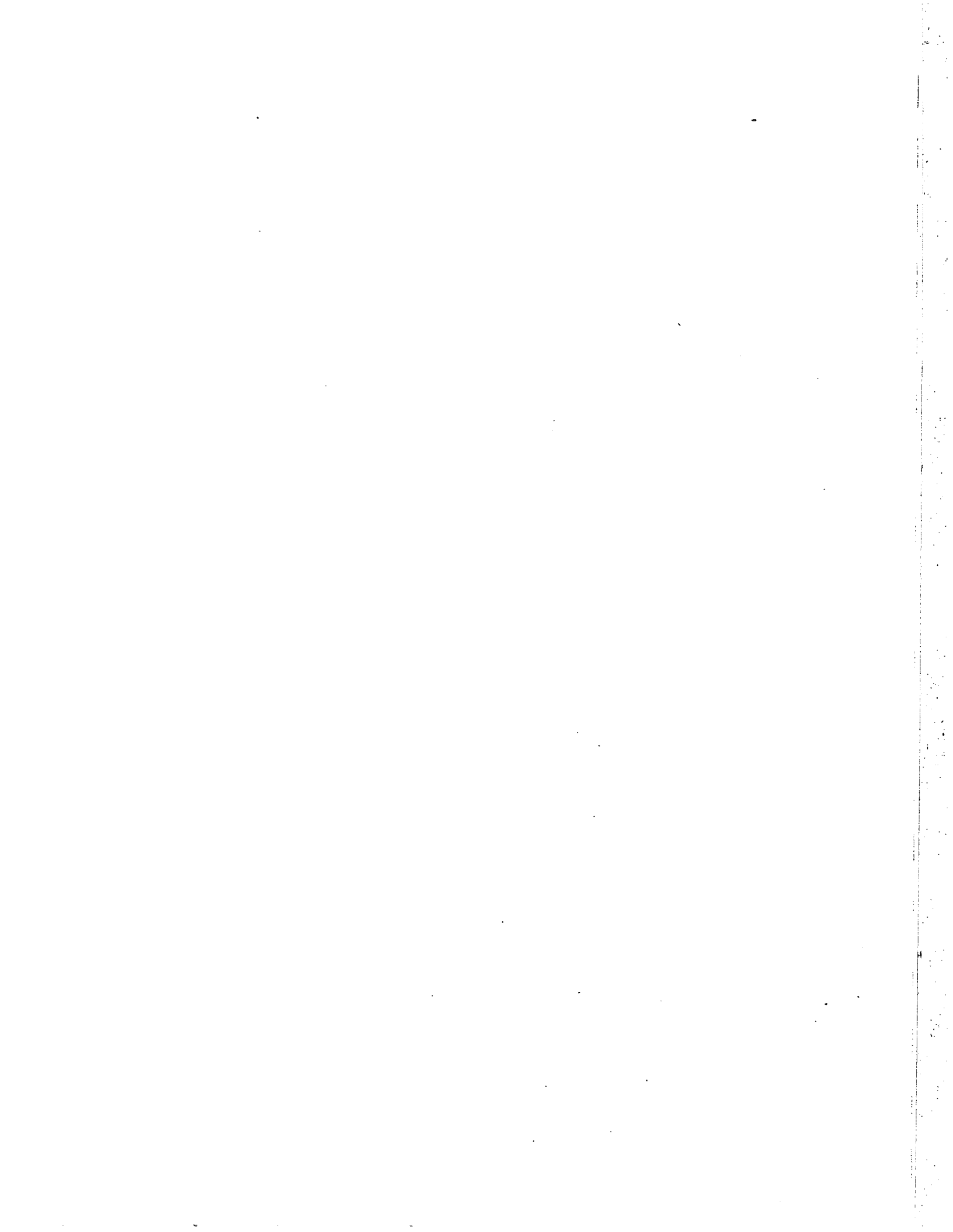


Table 3-9. Fire Hazards by Vegetation Type

Vegetation Type	Fuel Ladder	Rate of Spread	Burning Intensity	Resistance to Control
Grassland	Surface	High	Low	Low
Coastal scrub	Aerial	Moderate to high	Moderate	Moderate
Chaparral	Aerial	Moderate	Moderate to high	Moderate to high
Hardwood forest	Surface, aerial	Low	Moderate	Moderate to high
Eucalyptus	Aerial, crown	Moderate with spotting	High	High
Monterey pine	Aerial, crown	Low	High	High
Knobcone pine	Aerial, crown	Low	High	High
Redwood	Surface, aerial, crown	Low	Moderate to high	Very high
Oak savannah	Surface	High	Low	Low
Riparian	Surface, aerial	Moderate	Moderate	Moderate

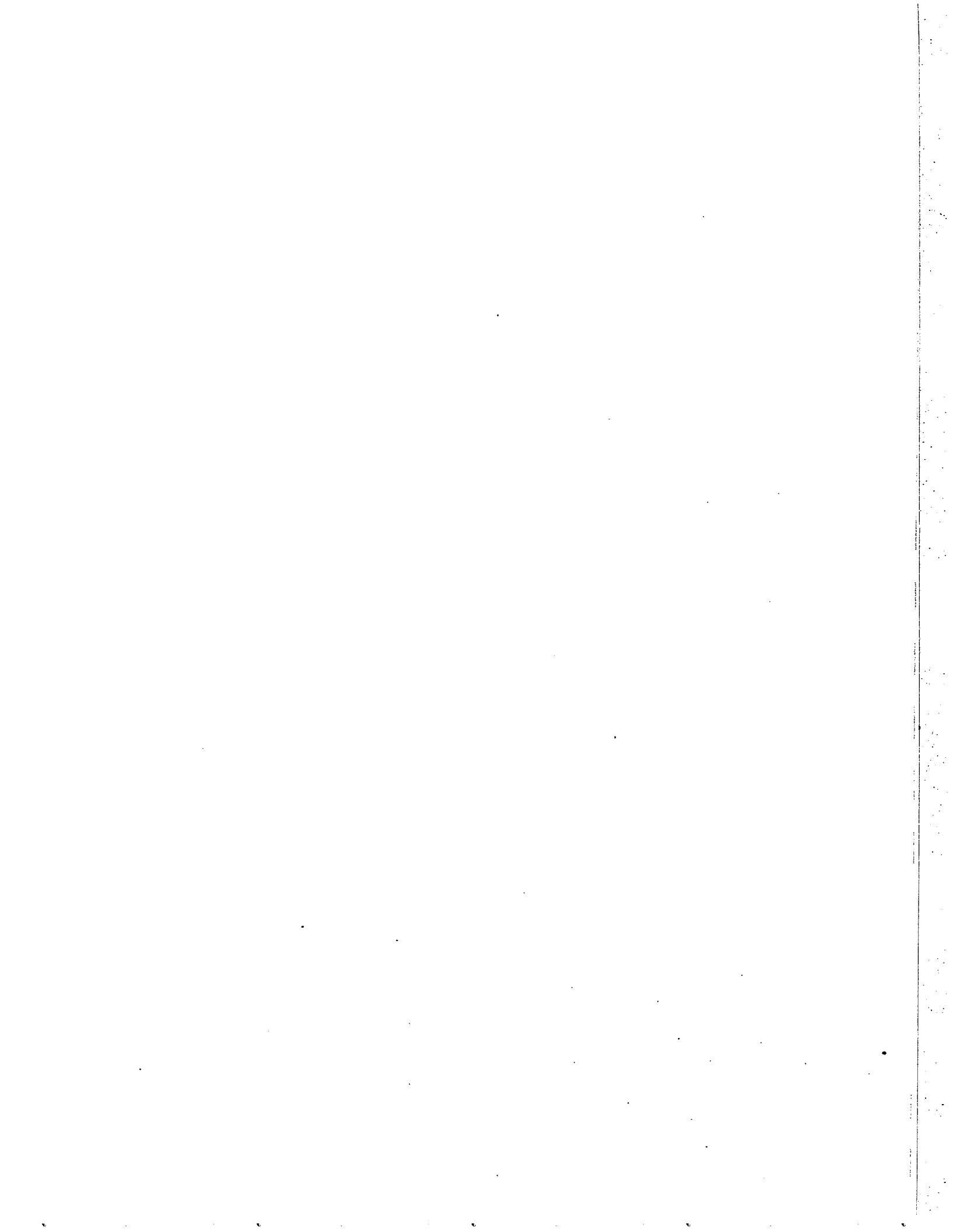


Table 3-10. Slope and Aspect of Grassland Habitats

Slope Class	Area in Slope Class	Area of Slope Class in Driest Aspects*
Extreme (>40%)	22%	61%
High (20-40%)	47%	51%
Moderate (5-20%)	25%	47%
Low (<5%)	6%	10%

*The driest aspects are those facing south, southwest, and west.



Table 3-11. Slope and Aspect Conditions of Coastal Scrub Habitats

Slope Class	Area in Slope Class	Area of Slope Class in Driest Aspects*
Extreme (>40%)	39%	56%
High (20-40%)	44%	40%
Moderate (5-20%)	14%	34%
Low (< 5%)	3%	4%

*The driest aspects are those facing south, southwest, and west.

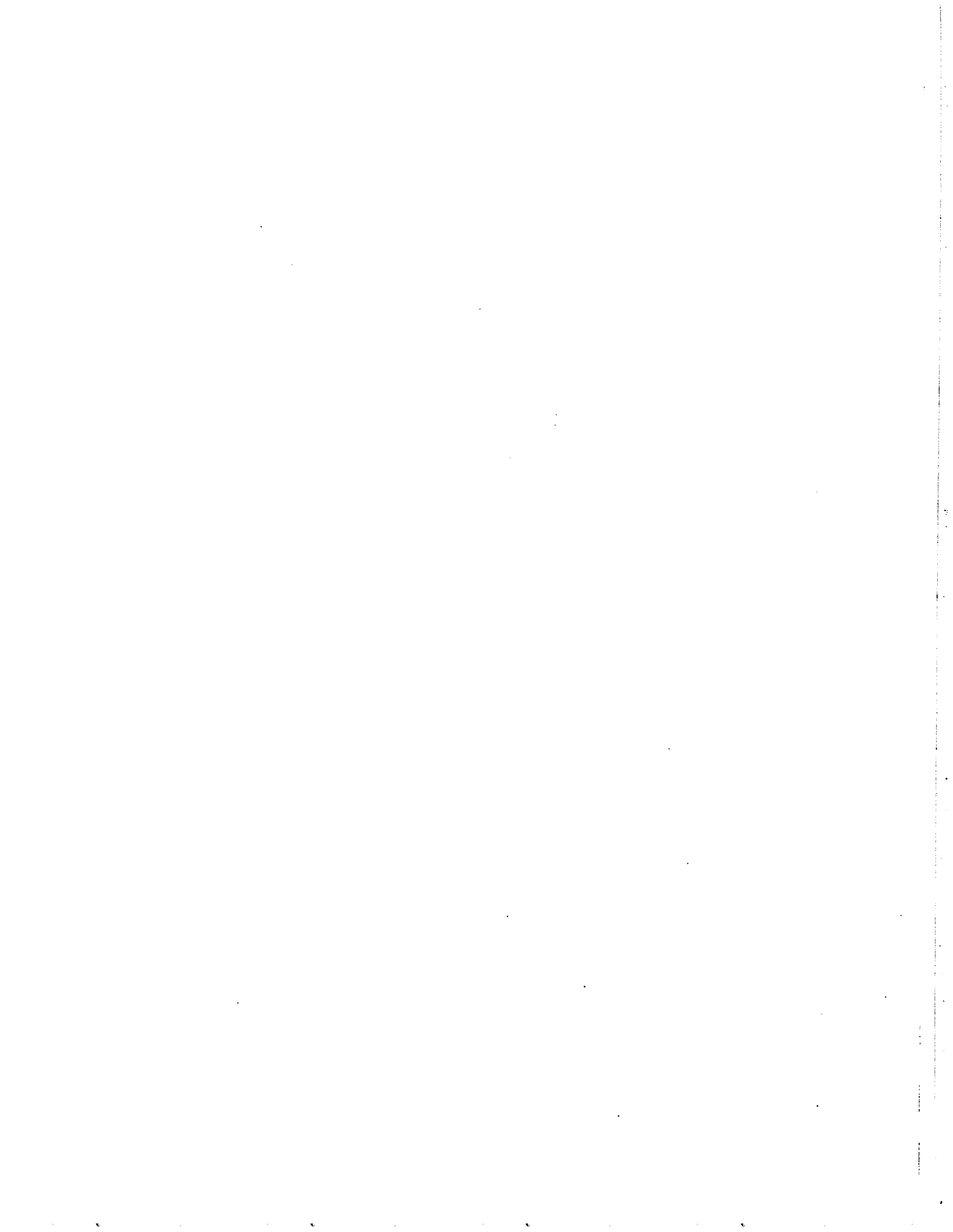
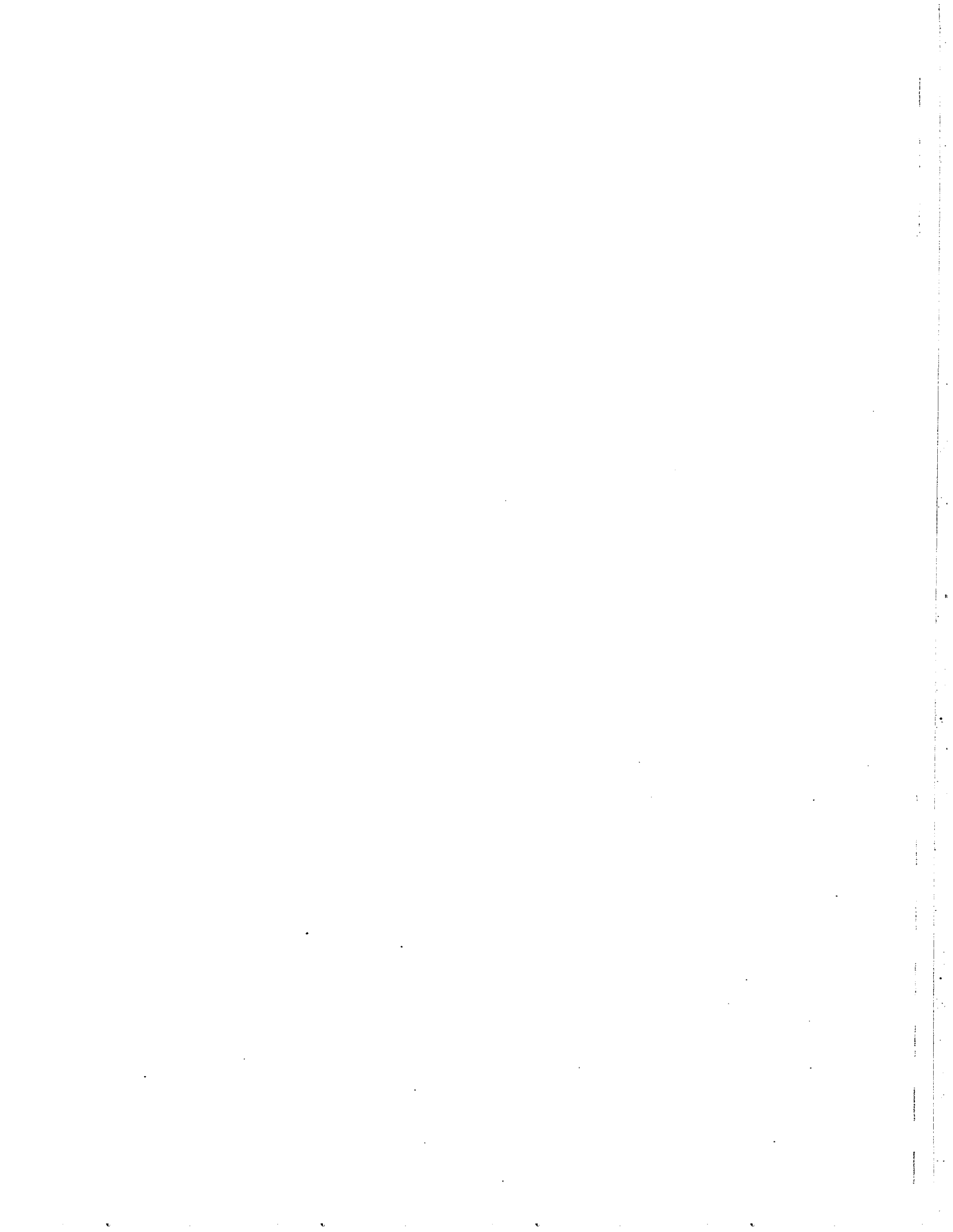


Table 3-12. Fire Hazard Conditions for Chaparral, Eucalyptus,
and Woodland Fuels Group

Slope Class	Area in Slope Class	Area of Slope Class in Driest Aspect ^a	Area Subject to Foehn Winds ^b
Extreme (>40%)	47%	27%	54%
High (20-40%)	39%	27%	53%
Moderate (5-20%)	11%	33%	46%
Low (< 5%)	3%	12%	87%

^aThe driest aspects are those facing south, southwest, and west.

^bAreas subject to Foehn winds are those facing north, northeast, and east.



Riparian and Wetland Areas

Riparian and wetland areas are generally not a significant fire hazard except during extreme weather conditions or long periods of drought. Most riparian areas are isolated islands among the grassland areas and do not represent a major fire hazard.

Interface Areas

The establishment of developed areas adjacent to the District's watershed boundaries increases fire risk. The interface consists of the boundary between developed areas and watershed lands; a special class of interface is the intermix zone, which occurs in a few areas (e.g., Canyon) where District and private lands interconnect. Interface and intermix areas are described briefly in Table 3-14.

Planting of non-native (and often fire-prone) vegetation by residents in watershed/urban interface areas creates hazardous fuel conditions in these areas. Such development also encourages encroachment of non-native vegetation into District watershed lands, which can also increase hazard levels.

The District's boundary mostly coincides with the watershed boundary, and many of the interface areas are downslope of the property line, often separated by dense north-slope vegetation. Dense vegetation outside the District boundaries represents a significant fire hazard to adjoining properties and developed urban areas. The encroachment of urban development also limits the possible use of wildland fire suppression activities such as backfiring. Most of the urban development in the interface or intermix areas does not meet safety criteria for fire-safe landscaping and overall fire awareness.

The encroachment of urban development has resulted in a disproportionate need to increase overall fuel management efforts on District lands and to focus this effort within interface and intermix areas because little or no fire hazard mitigation has been implemented in some adjacent developed areas. The fuel management treatments for interface fire protection place greater constraints on watershed and resource management objectives.

Fire Risk

Fire risk is the likelihood that an ignition will occur that results in a wildfire. Thus, fire risk is based on both the likelihood of a fire ignition and the probability that the ignition will generate a wildfire. The fire risk for the District's East Bay watershed lands varies from low to high under normal summertime weather conditions, increasing rapidly under extreme or Foehn fire weather. The lands adjacent to urban interface or intermix areas have high fire risk ratings, primarily to account for activities such as fireworks, smoking, and playing with matches. Areas with unauthorized human uses (e.g., homeless camp sites and youth trespass) also have high fire risks.

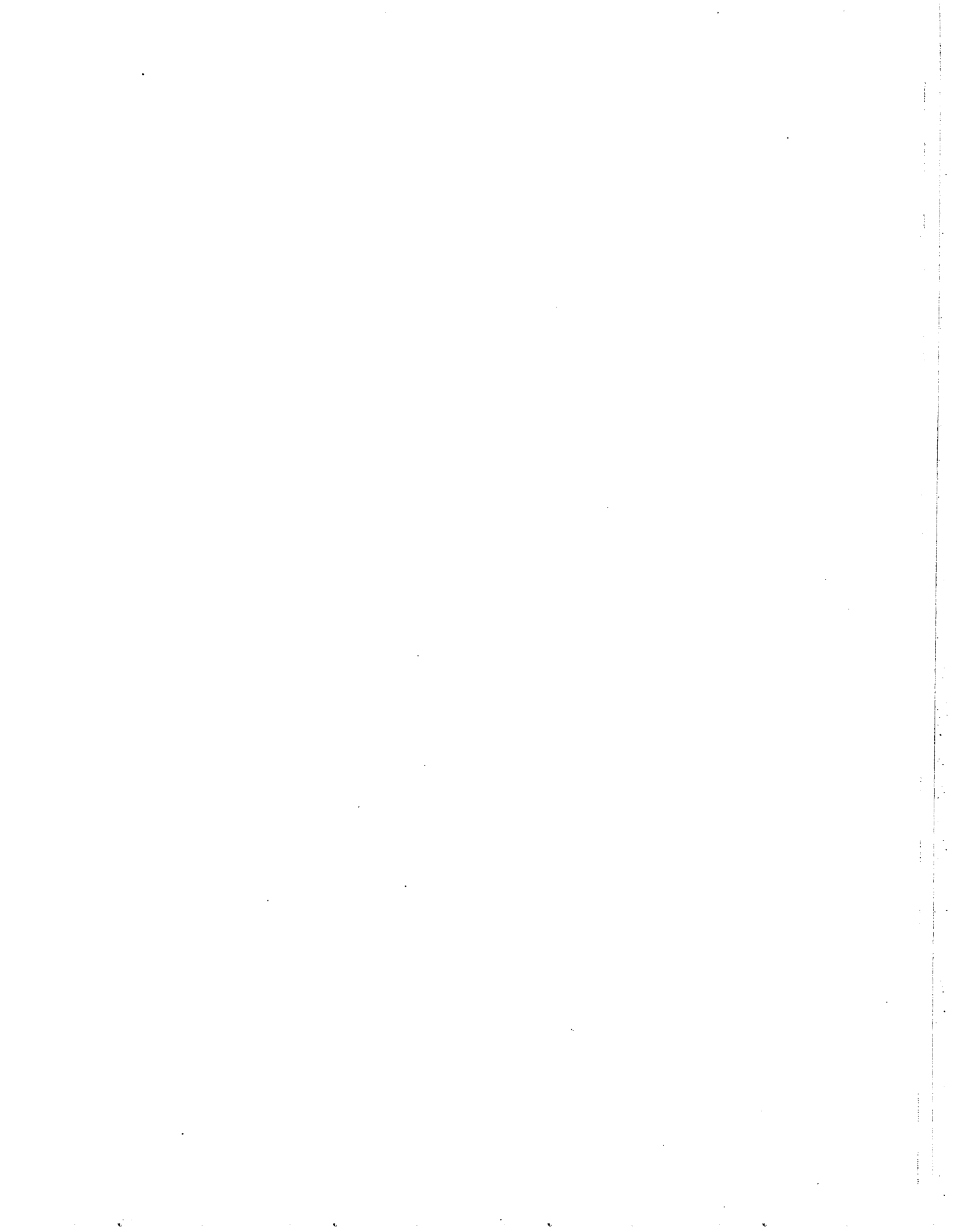


Table 3-13. Slope and Aspect Conditions in the
Conifer Forest Fuels Group

Slope Class	Area in Slope Class	Area of Slope Class in Driest Aspects*
Extreme (>40%)	29%	19%
High (20-40%)	42%	45%
Moderate (5-20%)	21%	55%
Low (<5%)	7%	5%

*The driest aspects are those facing south, southwest, and west.

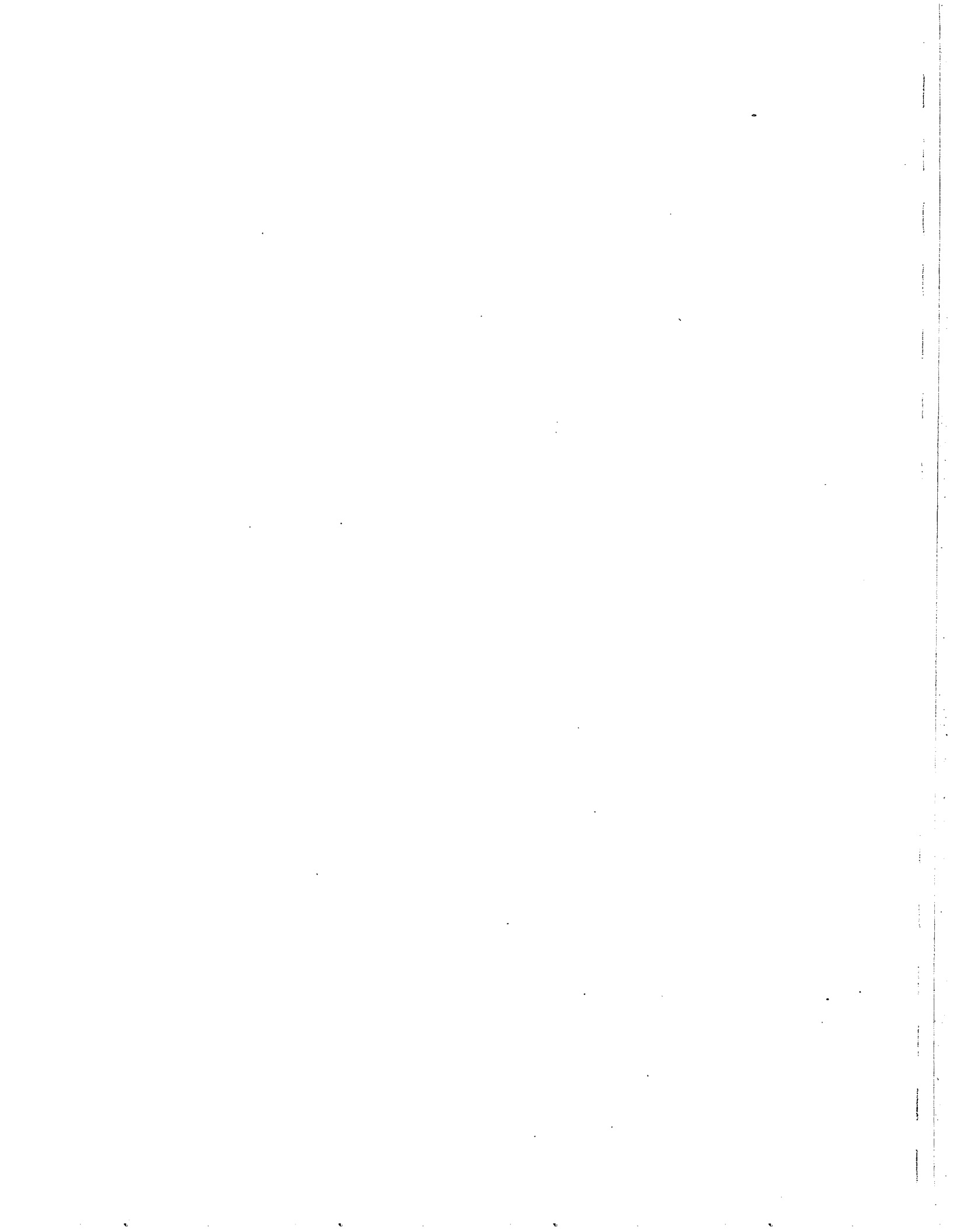
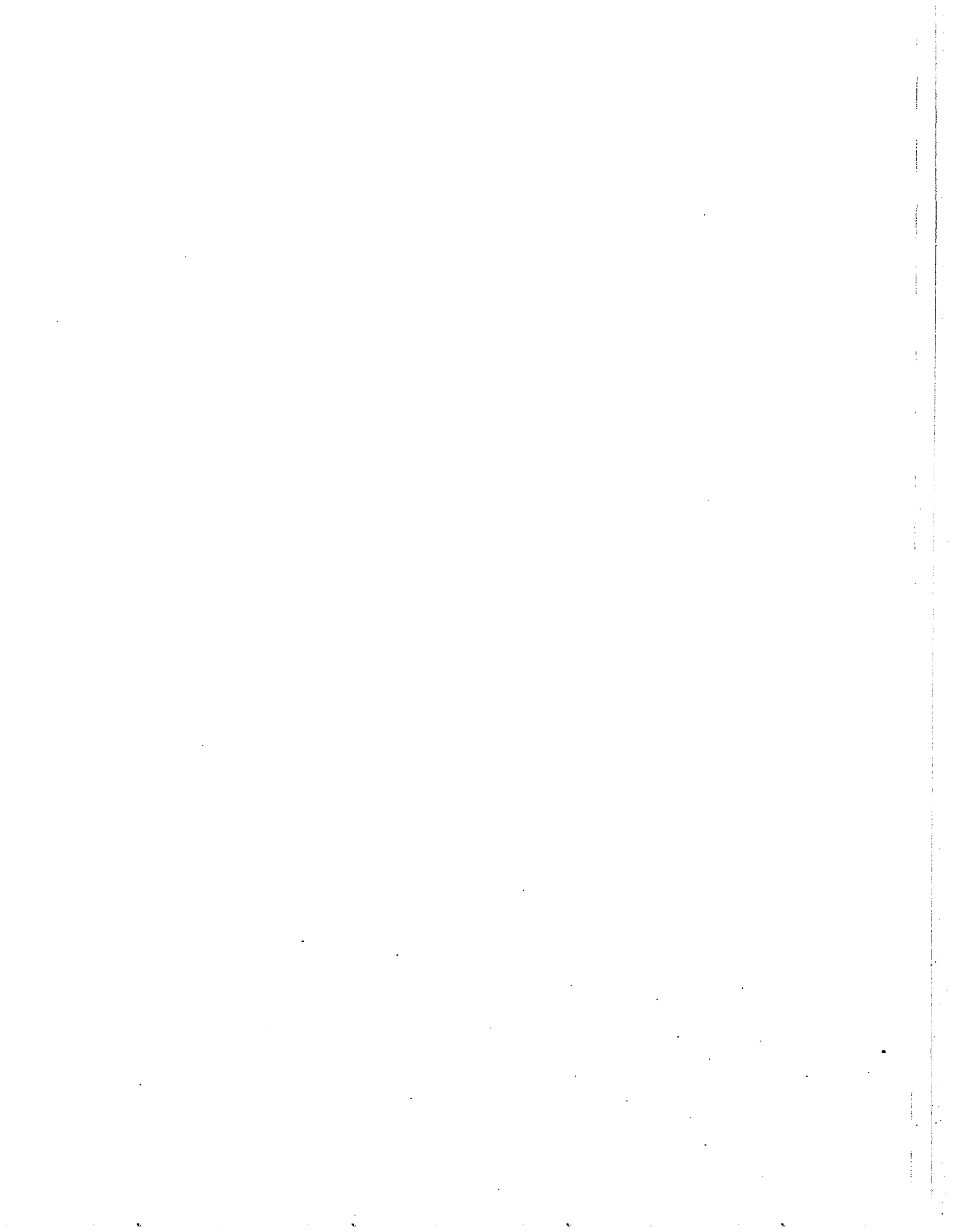


Table 3-14. Key Fire and Fuels Management Areas at the Interface of District Watershed Lands and Adjacent Development

Area	District Boundary Topographic Position	Vegetation Conditions
Intermix Areas		
El Toyonal	Below and above	Hardwood woodland, monterey pine, eucalyptus
Canyon	Interspersed	Coastal scrub, knobcone
Orinda View Road	Below	Hardwood woodland
Other Interface Areas		
Moraga	Above	Grassland, hardwood forest, coastal scrub
Pinole	Above	Hardwood forest, coastal scrub
Lafayette	Above	Hardwood forest, coastal scrub, non-native
Hercules	Below	Grassland, hardwood forest, coastal scrub
Sanders Ranch	Below	Hardwood forest
Orinda/Lafayette Reservoir	Above	Coastal scrub, non-native
Orinda/Briones Reservoir	Above	Coastal scrub
Skyline Gate	Above	Monterey pine, eucalyptus
Carriage Hills	Adjacent and above	Grassland
Grizzly Peak	Above	Eucalyptus, grassland, hardwood forest
Castro Valley	Above	Coastal scrub



Roads are significant sources of fire risk from vehicle accidents, discarded cigarettes, and other ignition sources. Roads that support more than 1,000 vehicles trips per day, such as San Pablo Dam Road, Bear Creek Road, and SR 24, are considered a moderate to high fire risk (depending on fuel moisture conditions). Routes with low to moderate fire risk are Fish Ranch Road, Grizzly Peak Road, Happy Valley Road, Redwood Road, Canyon Road, and Pinehurst Road.

Fire risk from recreational use of the reservoirs can range from moderate to high depending on fuel conditions and shore activity levels. Risk from hiking trail use also increases from low to moderate over the spring and summer as use levels and temperatures increase and fuel moisture decreases. Fire risk decreases greatly during the wet season because of higher fuel moistures, limited access, and reduced potential for ignitions. Areas with limited access (e.g., less than 15 people per day) are classified as low fire risk areas.

The potential for natural wildfire ignitions (e.g., non-human-caused ignitions, such as from lightning) is low.

Fire Mitigation

Mitigating all fire hazards is impractical and infeasible; however, fire mitigation activities can be applied to interrupt fuel continuity and provide strategic control lines that help to contain wildfire ignitions within the area of ignition.

The current and past fire and fuel management program has effectively maintained a level of fire protection that has prevented wildfires on the District's watershed lands from burning more than 100 acres. Fire protection activities have included the annual opening and maintenance of fire roads, trails, and plowed control lines. Disking, mowing, and goat grazing also have been used on the District's watershed lands adjacent to interface areas.

Fuel reduction has been achieved primarily through cattle grazing leases. The current grazing lease program has provided fuel reduction benefits throughout the watershed by maintaining grassland and discouraging brush invasion (McBride and Heady 1968). Cattle grazing effectively reduces fuels over large areas; however, interface areas or areas along boundary fencelines, which are critical for fire protection, may not be grazed to the level desired. This selective grazing results from inaccessibility, distance to water, and location of fencing. Goat grazing has been introduced as a strategic fuel reduction tool along some interface areas.

Fuel management practices such as thinning and pruning of eucalyptus trees and sprouts have been implemented along Grizzly Peak Road. The fire and fuels management program has been effective in meeting the public safety goals; however, changing vegetative cover conditions, encroaching urban development, higher water quality standards, and enhanced resource or biodiversity goals will require a more strategic fire management strategy.

In general, strategies that provide quick fire suppression lead to an accumulation of fuels over time. Strategic implementation of fuel management treatments can help to create important buffers between wildlands and urban interface areas. Strategic planning through the use of land use planning, coordinated resource management plans, and coordinated response plans can be effective in improving fire hazard management along the interface or intermix areas, without affecting water quality and biodiversity objectives on the District's watershed lands.

Fire Response and Evacuation

Fire response on District lands has been designed to respond quickly to wildland fire incidents. The District's fire suppression resources include several quick-attack vehicles that are specially suited for grassland mobile attack. Response is enhanced by annually maintaining a network of fire roads, trails, and plowed control lines that provide key access to watershed lands and serve as preplanned lines of control.

The District does not have any urban or structural firefighting responsibilities. Contra Costa Consolidated Fire District (CCFPD) provides much of the fire protection within and just outside the District's watershed property boundaries in Contra Costa County. CCFPD is primarily equipped and trained for structural fire protection with wildland firefighting responsibilities. Some of the smaller communities (e.g., Orinda and Moraga) operate as independent units of CCFPD. District-owned watershed property not within the incorporated boundaries of a local jurisdiction is designated a State Responsibility Area (SRA), and CDF has primary suppression responsibility. Coordination and cooperative wildland fire suppression training with CDF, EBRPD, and local fire control agencies have increased the overall effectiveness of wildland fire response in these areas.

EBRPD manages most of the property adjoining the western boundary of District watershed lands. Wildfires originating on the western portion of District lands would have to cross EBRPD lands before threatening the East Bay communities (i.e., Richmond, Berkeley, Oakland, San Leandro, Castro Valley) to the west.

The existing road network is an effective tool for evacuation of the District's watershed lands. No current policies exist that permit closure, restrictions, or limitations on use of existing land use and recreational activity based on the daily fire danger rating. This lack of policy precludes an important opportunity to reduce localized fire risk in the overall watershed, especially under high or extreme weather conditions. Increasing urban encroachment adjacent to or near the District's property boundary further complicates regional firefighting responsibilities.

VISUAL RESOURCES

District-owned watershed lands are situated in a regionally unique, open space setting adjacent to and surrounded by large Bay Area and East Bay area population centers. District-owned open space lands are complemented by adjacent open space areas, most of which are under the jurisdiction of the EBRPD and Alameda and Contra Costa Counties. Regionally, this open space complex is an outstanding visual resource that provides the opportunity for a diverse range of panoramic views to and from District-owned watershed lands. The importance of this regional visual resource, in its setting in the East Bay hills, is highlighted by the absence of other such resources nearby and the dominant urban character of much of the Bay Area.

Most of the District-owned watershed lands can be characterized as grassy, rolling to steep hills with prominent ridges interspersed with woodland and riparian areas. The dominant visual features of five of the six watersheds are the reservoirs themselves. Because water levels in San Pablo, Briones, Lafayette, Upper San Leandro, and Chabot Reservoirs are relatively stable, distant views of the reservoirs provide a lake-like setting with a more natural shoreline appearance than is normally exhibited by water supply reservoirs.

Regional views to and from District-owned watershed lands consist of panoramic views from roads and public access points, EBRPD-operated regional parks, and isolated public trail vantage points within and outside of District-owned property.

San Pablo Reservoir Watershed

Important visual resources in the San Pablo Reservoir watershed are dominated by the 749-acre reservoir, which is surrounded by rolling and steep coastal foothills. Hillsides consist mainly of grassland interspersed with coastal scrub, hardwood forest, Monterey pine, riparian woodland, and eucalyptus stands. Most of the landscape is highly intact, and the area is an excellent example of California's coastal foothills.

Developed visual elements are concentrated mainly in the western watershed between San Pablo Dam Road and the western shoreline of the reservoir. Dominant developed elements are the reservoir dam, administrative and maintenance buildings, trails, picnic and parking areas, and boat launching facilities associated with the San Pablo Reservoir recreation area. Overall, developed visual elements intrude only mildly on the dominant natural character of the watershed. East of San Pablo Reservoir, the watershed's visual character is decidedly natural and open with only a few minor intrusive elements, such as the Oursan Trail and various maintenance and fire roads. Portions of the watershed south of the reservoir are dominated largely by development in the City of Orinda and the SR 24 corridor.

The Siesta Valley and Gateway Valley portions of this watershed are largely undeveloped. Siesta Valley is located north of SR 24 between Grizzly Peak Boulevard and Camino Pablo Road. The central section of the property is a valley between steep, U-shaped ridges of volcanic strata that dip beneath the valley floor on one side and reappear on the opposite ridge. The valley floor has gently sloping benches and covers a total area of about 40 acres. The valley floor and western slopes support stands of eucalyptus, cypress, and pine. The California Shakespeare Festival's stage complex is located in Siesta Valley. The Gateway Valley area, a continuation of the volcanic ridges seen in Siesta Valley, is located on the south side of SR 24. The land consists of moderately sloping hills that rise abruptly to a steep ridge. Motorists can view both Siesta and Gateway Valleys just before entering the Caldecott Tunnel on SR 24.

Overall, the dominant panoramic views of the San Pablo Reservoir watershed are from Wildcat Canyon Road, Inspiration Point, and San Pablo Dam Road west of the reservoir. Important views from public use areas within the watershed are mainly from the western reservoir shoreline at the San Pablo Reservoir recreation area. Typical views from shoreline recreation areas consist of middleground views of the reservoir and eastern shoreline and background views of the wooded hillsides of Sobrante Ridge.

Briones Reservoir Watershed

The Briones Reservoir watershed lies just east of San Pablo Reservoir. Visual resources are similar to those of the San Pablo Reservoir watershed, with large open spaces, rolling hills, and the reservoir dominating the view. Watershed vegetation consists of grasslands, hardwood forest, coastal scrub, and oak woodlands.

Developed visual elements at Briones Reservoir consist of two staging areas, a boat house, trails, picnic areas, and a spoils area. The boat house and the spoils area, located on the southwestern portion of the reservoir, are minor intrusive elements to the predominantly natural landscape. Electrical transmission towers in the northwestern portion of the watershed are the dominant human-made element in the watershed.

Public views of the Briones Reservoir watershed are available while driving along Bear Creek Road, which runs along the southern and eastern edges of the watershed. The Oursan Trail encircles most of the reservoir and provides hikers an excellent opportunity to view the entire watershed. Important views from public use areas within the watershed are mainly from the picnic areas along the southern shoreline. Typical views from these picnic areas consist of middleground views of the reservoir and northern shoreline and background views of the wooded and grassy hillsides of Oursan Ridge.

Residential development from the City of Orinda has crested the ridges in several locations in the southern portion of the watershed and can be viewed from within the watershed along the Black Hills and Mama Bear Hill ridges.

Lafayette Reservoir Watershed

The Lafayette Reservoir watershed consists of a reservoir surrounded by rolling hillsides of grassland, hardwood forest, and coastal scrub habitats. Most of the landscape is intact but some developed visual elements are present.

Developed visual elements consist of paved and unpaved trails, a marina, a parking lot, and fishing piers. With the many recreation opportunities at Lafayette Reservoir, visitors are able to view much of the watershed's landscape from anywhere in the watershed. Typical views from shoreline recreation areas consist of middleground views of the reservoir and opposite shoreline and background views of the wooded hillsides. Because the watershed is visually contained, few public views are possible from adjacent lands.

Upper San Leandro Reservoir Watershed

Upper San Leandro Reservoir is enclosed, for the most part, in seven narrow, steep-walled canyons. These watershed lands are the most rugged and ecologically diverse of the District's holdings. Primary vegetation types are hardwood forest, grassland, coastal scrub, riparian woodland, redwood forest, and chamise-black sage chaparral. The watershed also contains the only occurrence of knobcone pine forest on District land.

The few developed visual elements that exist on this watershed are unpaved hiking trails and parking facilities. East of the watershed are several unpaved District roads that are closed to the public. Overall, the visual character of the watershed is intact, and the watershed's natural, open space character dominates the entire area.

The public can view much of the reservoir and watershed land from Redwood Road along the western edge of the watershed and from Rocky Ridge along the eastern edge of the watershed. Views of the reservoir are less abundant than those available at other District reservoirs because public access is largely prohibited near Upper San Leandro Reservoir. The western portion of the reservoir and watershed can be viewed from several locations along Redwood Road, and views of the northern and eastern watershed areas are provided from hiking trails. Several trails at the eastern boundary of the watershed also provide limited opportunities for viewing the natural landscape, but the reservoir cannot be seen from these trails.

Chabot Reservoir Watershed

Chabot Reservoir lies just south of Upper San Leandro Reservoir. Hillsides consist mainly of grassland interspersed with hardwood forest and coastal scrub habitat.

Developed visual elements in the watershed are concentrated in the northern and southern watershed areas. Dominant developed elements are paved and unpaved trails, picnic areas, camping areas, a marina, a safety building, parking areas, and fishing piers. Overall, developed visual elements intrude only mildly on the dominant natural watershed character.

The public can view the reservoir and watershed from Chabot Road, along the southwestern portion of the reservoir, and from a series of hiking trails throughout the northern portion of the watershed. Typical views from shoreline recreation areas consist of middleground views of the reservoir and opposite shoreline with background views of the wooded hillsides.

Pinole Valley

Pinole Valley is located 2 miles north of San Pablo Reservoir and is the only District watershed without a reservoir. Visual resources in Pinole Valley consist of a valley floor with surrounding uplands in a natural landscape setting. Vegetation consists mainly of grasslands over most of the valley and slopes that are densely wooded with oak and laurel on the southern rim. The only developed visual elements are unpaved roads and trails that are closed to the public. Most views of watershed lands are from Alhambra Valley and Pinole Valley Roads and the Bay Area Ridge Trail, which bisect the area.

LAND USE

The District's watershed lands comprise approximately 28,000 acres of watershed and water surface encompassing five reservoirs (San Pablo, Briones, Lafayette, Upper San Leandro, and Chabot) and one nonreservoir basin area (Alhambra/Pinole Valley). The watershed lands are located in western Alameda and Contra Costa Counties and are bordered by urban development in the Cities of Orinda, Lafayette, Hercules, and Pinole; the town of Moraga; and the unincorporated community of Castro Valley, and lands of the EBRPD.

Watershed lands are within a 30-minute drive of numerous Bay Area communities along Interstate (I-) 80 and I-580, including Richmond, Berkeley, Oakland, Alameda, and San Leandro. Figure 3-4 shows existing land uses surrounding the District's watershed. Unincorporated portions of Contra Costa and Alameda Counties also border substantial portions of District watershed lands. Uses consist mainly of agriculture and open space, including regional parkland operated by the EBRPD. Figure 3-5 shows general plan designations of land under the jurisdiction of Alameda and Contra Costa Counties.

District Watershed

Land uses for the entire watershed area consist primarily of open space, livestock grazing, agriculture, recreation, and trail use. All District-owned watershed lands are operated primarily for the purposes of water supply and preservation of reservoir water quality. Watershed management activities include ongoing operation and maintenance of reservoir and dam facilities, roads and trails, and important natural resource areas. All of the District's recreation and trail facilities except those at Lafayette Reservoir are operated by a concessionaire or the EBRPD and provide services and amenities.

San Pablo Reservoir Watershed

San Pablo Reservoir is open for public recreation and provides fishing, boating, hiking, horseback riding, limited bicycling, and picnicking opportunities. Four staging areas, a marina, boat ramps, trails, and a law enforcement station are also provided. Parking is provided at the recreation area, along the controlled-access road along the southern end of the reservoir, and at the boat launch area. San Pablo Reservoir is also used by some colleges and universities as an outdoor geology laboratory. (See "Recreation" below for more information about uses at San Pablo Reservoir.)

Briones Reservoir Watershed

The Briones Reservoir watershed is primarily open space, with most of the land leased for livestock grazing. Recreational uses are restricted to hiking and horseback riding. Trails and two staging areas are located at Briones Reservoir to facilitate recreational uses. Access to reservoir waters is limited to college crew teams, which practice under a special permit. No other boating is permitted on the reservoir except that required by District maintenance personnel.

Lafayette Reservoir Watershed

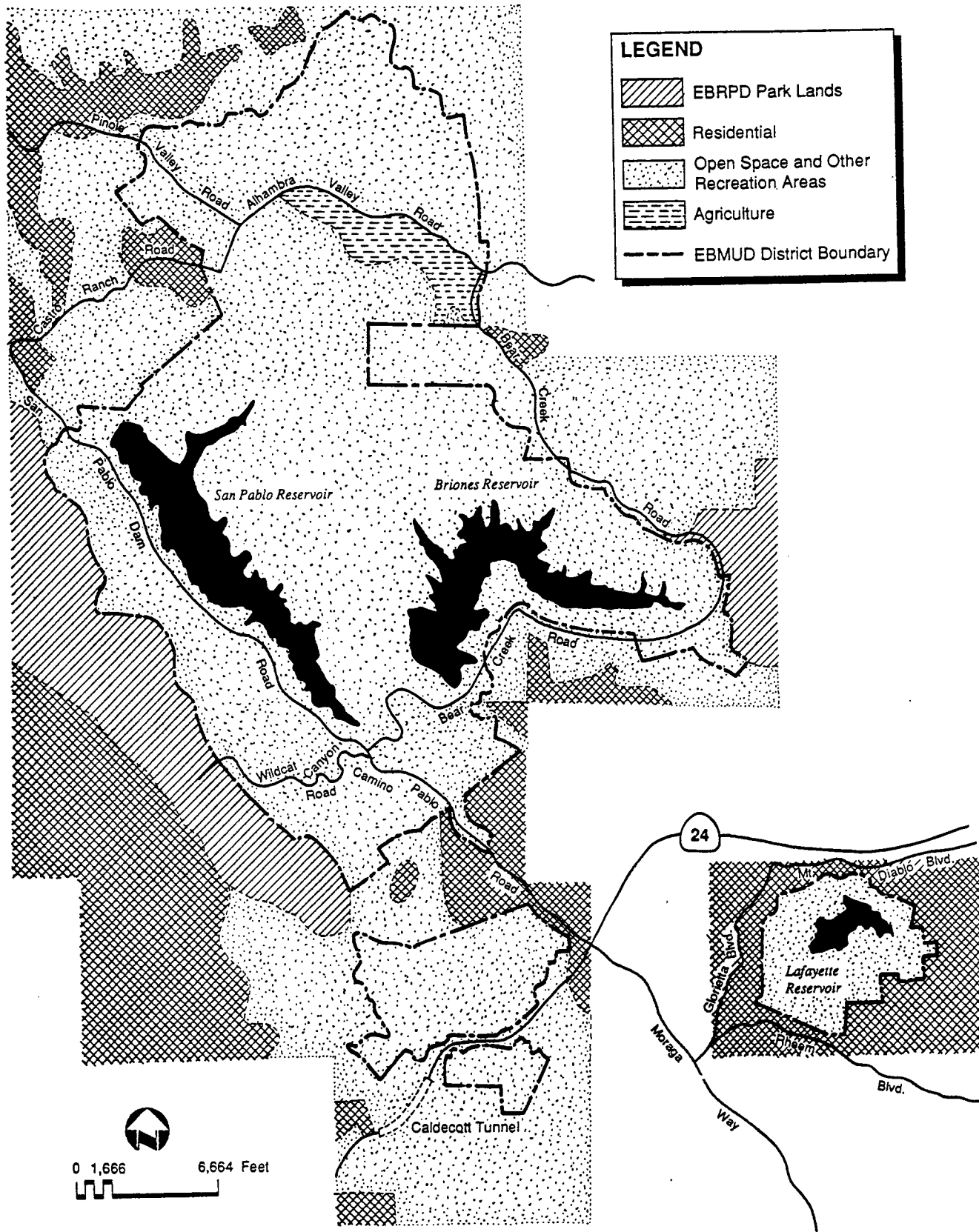
The Lafayette Reservoir watershed, a 1,000-acre public recreation area and reservoir, is located within the city of Lafayette. It accommodates hiking, jogging, bicycling (on paved roads), boating (with size limitations), fishing, picnicking, dog walking, and roller skating as recreational uses, although some of these activities are restricted to certain trails and certain periods in the watershed. A marina, paved parking areas, and a staging area are also available.

Upper San Leandro Reservoir Watershed

Access to this 660-acre reservoir east of the city of Oakland is limited. Public use of this watershed area is limited as well. No boating or fishing is permitted in the reservoir. Trails in the watershed are open to hikers and equestrians. No bicycles are permitted on District trails. Two staging areas are located in the watershed in conjunction with the limited recreational uses. Other land uses include livestock grazing and some Christmas tree farming.

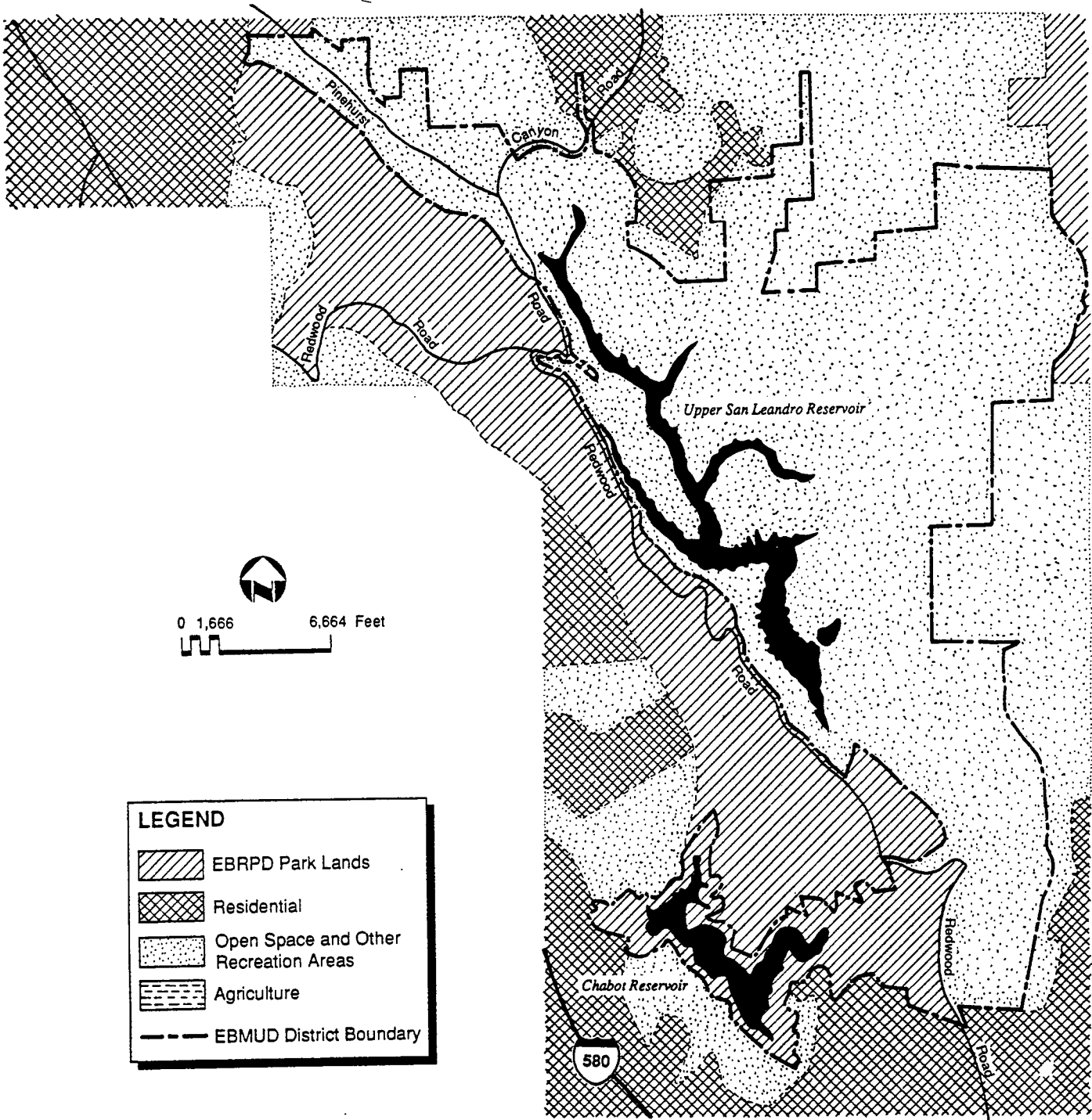
Chabot Reservoir Watershed

Chabot Reservoir lies east of the cities of Oakland and San Leandro. The reservoir has been leased to the EBRPD since 1966 and lies within the 4,900-acre Anthony Chabot Regional Park. Two public golf courses are located adjacent to the park. Chabot Reservoir is open to the public, and many recreational uses are permitted there, including fishing, boating, hiking, picnicking, bicycling, pet areas, model rockets, and model airplanes, horseshoe throwing, and horseback riding. Two parking lots (one paved and one unpaved), 11 staging areas, a snack bar, a marina, and boat rental facilities are located at Chabot Reservoir to support recreational activities. Other uses in the watershed area are livestock grazing and Christmas tree farming. The reservoir is surrounded by steep hills traversed by fire breaks and game trails.








**Figure 3-4 (North)
 Existing Land Uses**

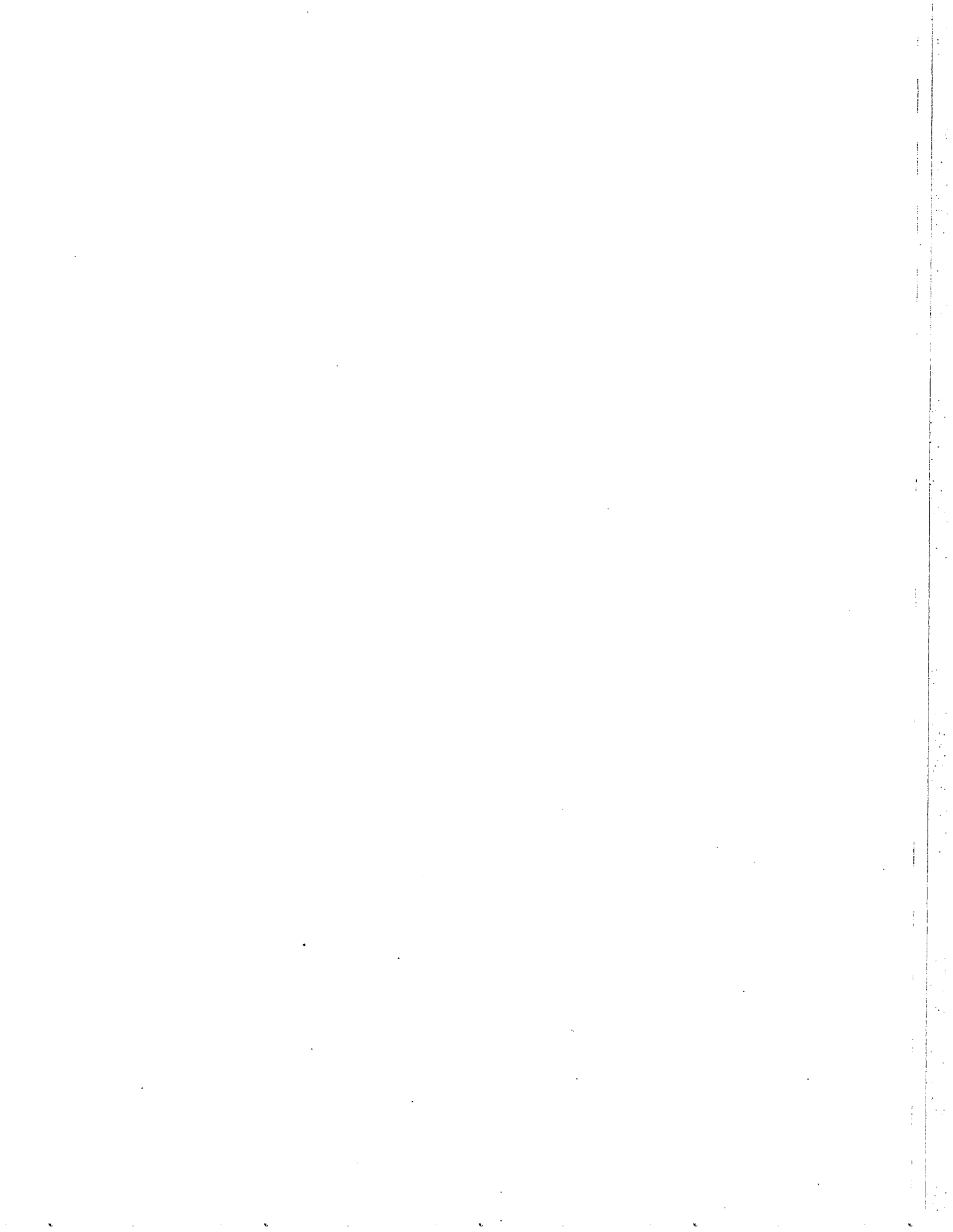


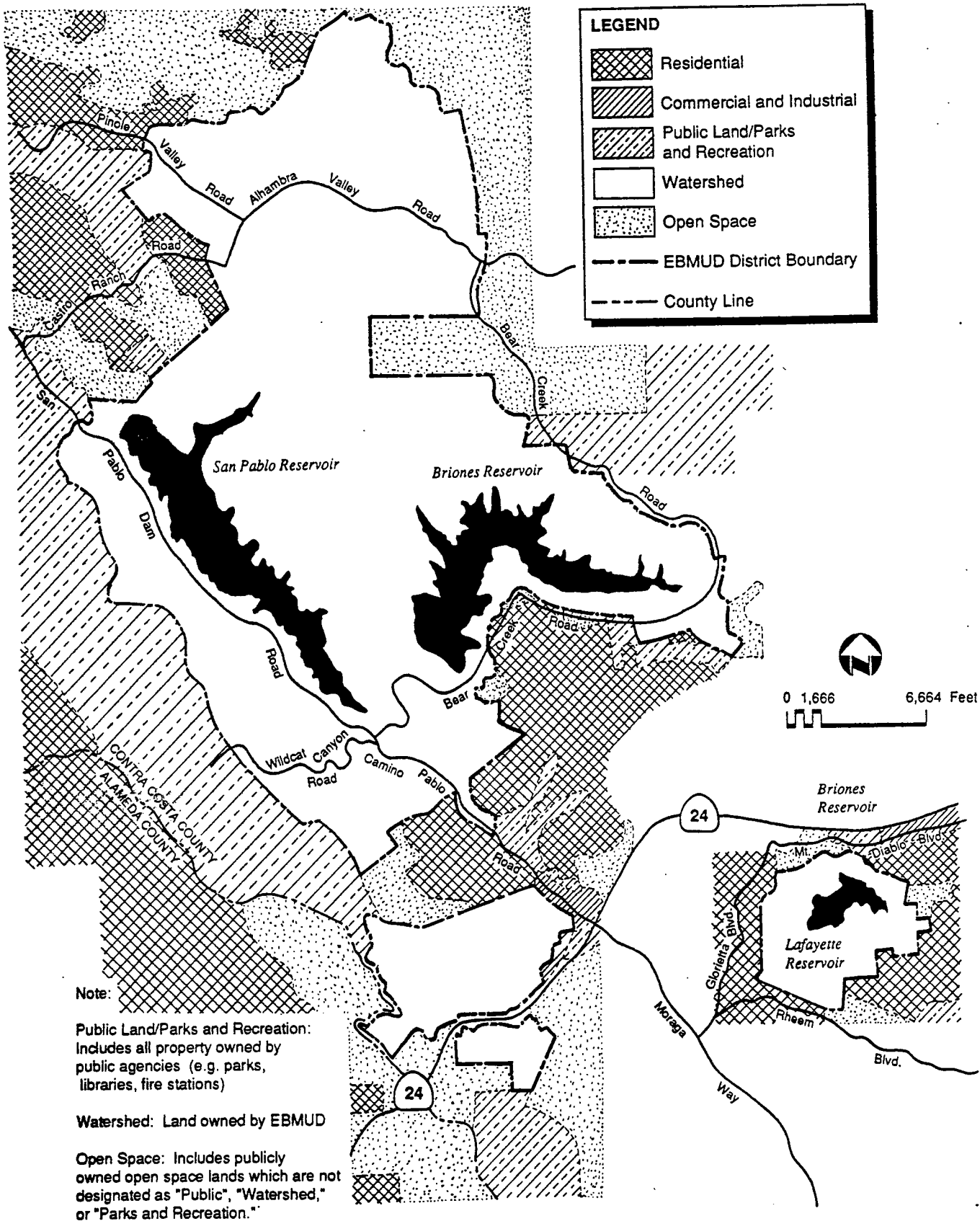


LEGEND

-  EBRPD Park Lands
-  Residential
-  Open Space and Other Recreation Areas
-  Agriculture
-  EBMUD District Boundary

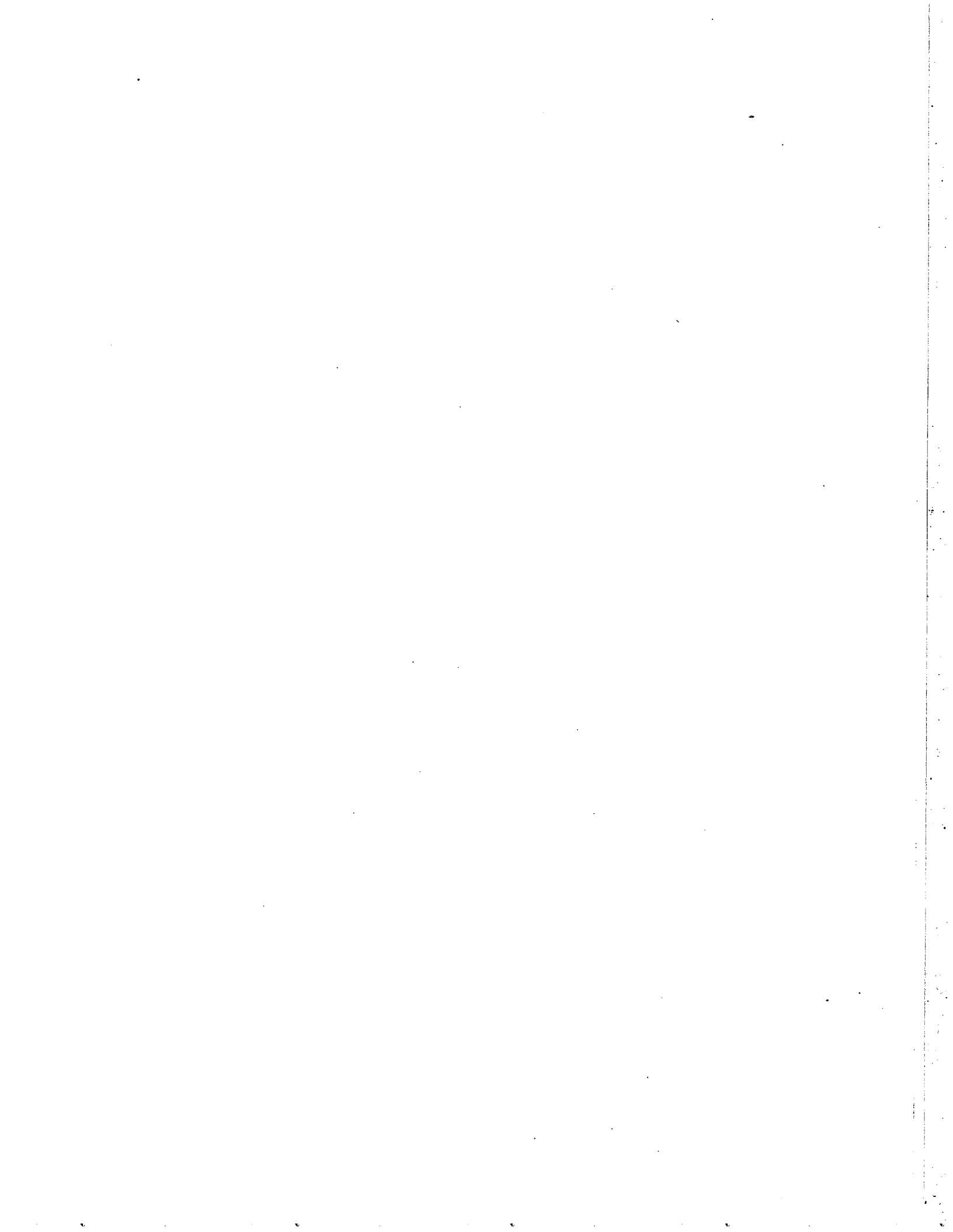
**Figure 3-4 (South)
Existing Land Uses**

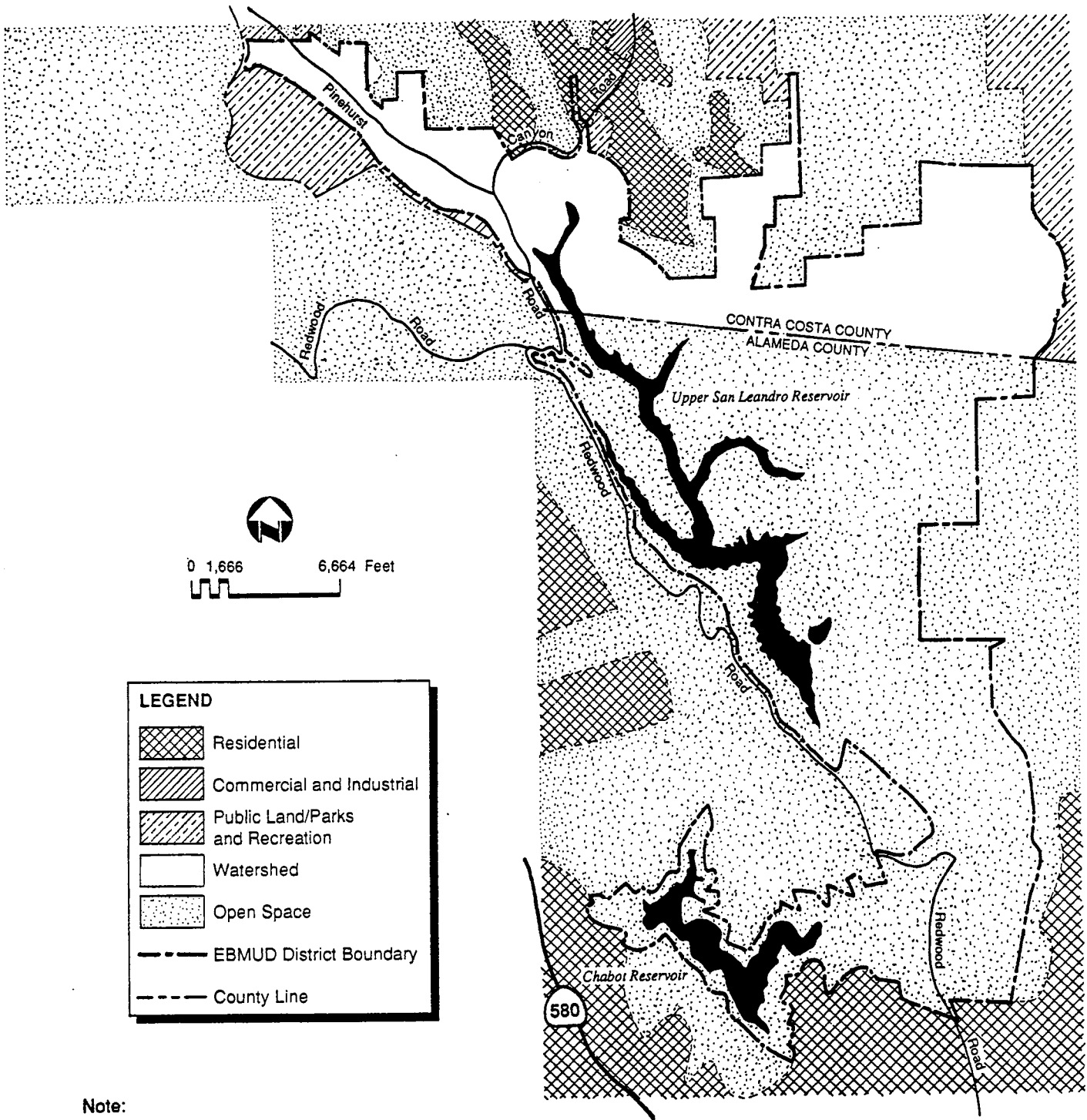




Jones & Stokes Associates, Inc.

Figure 3-5 (North)
County General Plan Land Use Designations





Note:

Public Land/Parks and Recreation: Includes all property owned by public agencies (e.g. parks, libraries, fire stations)

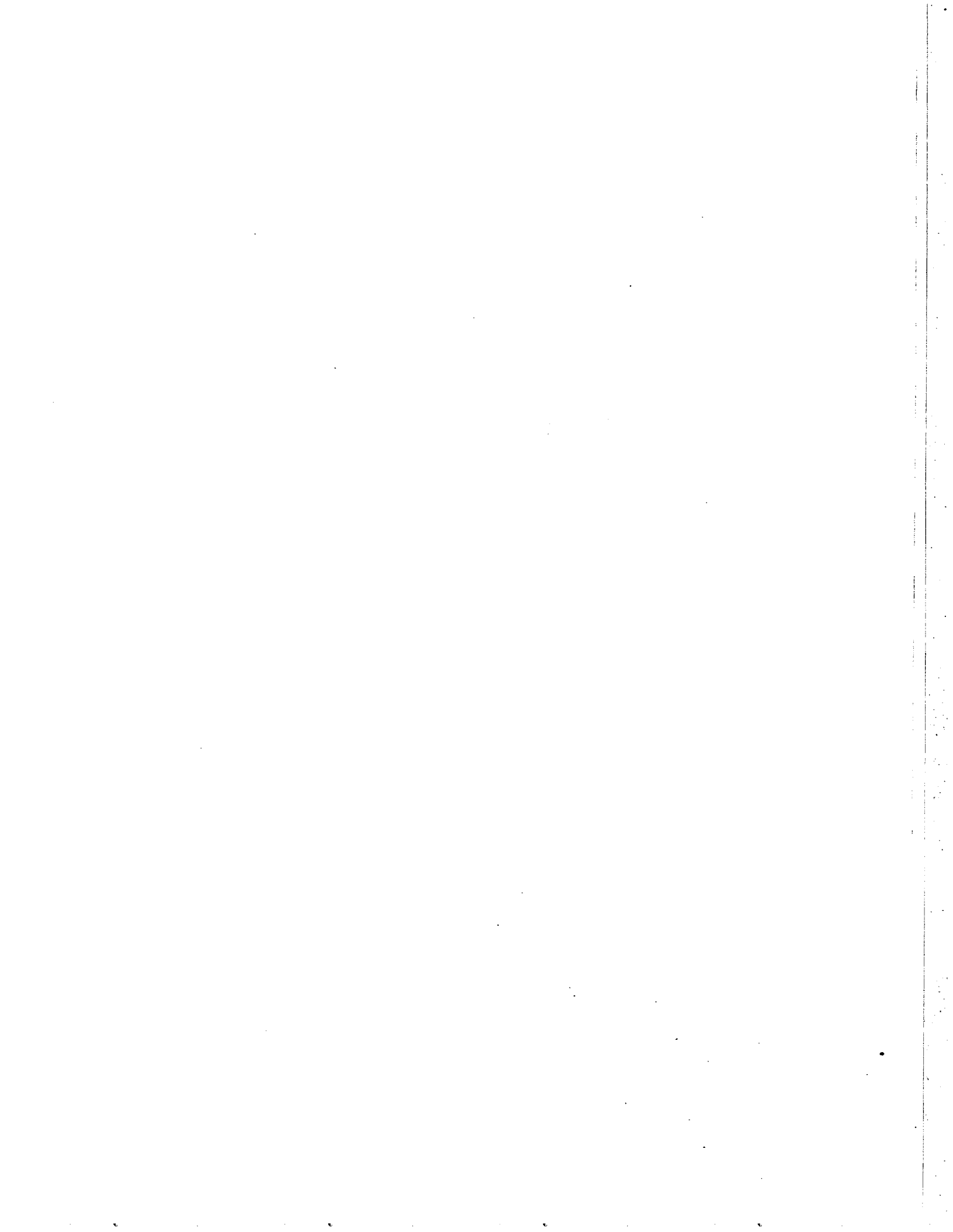
Watershed: Land owned by EBMUD

Open Space: Includes publicly owned open space lands which are not designated as "Public", "Watershed," or "Parks and Recreation."



Jones & Stokes Associates, Inc.

**Figure 3-5 (South)
County General Plan Land Use Designations**



Pinole Valley

Pinole Valley is located 4 miles from Pinole and 2 miles north of San Pablo Reservoir. It is the only District watershed area without a reservoir. Land uses include cattle grazing, horse pastures, hay farming, and Christmas tree farming.

Lands Adjacent to District Property

Orinda

The City of Orinda is a residential community that lies almost entirely within the San Pablo Reservoir and Upper San Leandro Reservoir watersheds. Orinda's city limit is adjacent to Bear Creek Road along the southern portion of Briones Reservoir. Although the city has almost reached buildout, some development is still possible.

Orinda's general plan designates the District watershed lands that lie within its planning area for "utility" uses. "Utility" is defined as uses appropriate for utility, watershed, open space, and public recreation and for cultural uses where specifically designated. The general plan designates most development adjacent to watershed lands for very low- to low-density single-family housing (e.g., maximum of one to two units per acre). The District leases out a portion of the District's lands north of the Gateway interchange on SR 24 as a site for the California Shakespeare Festival facility.

Moraga

The Town of Moraga is located north of Upper San Leandro Reservoir. Much of the western half of Moraga is within the Upper San Leandro Reservoir watershed. The town limits lie about 0.5 mile or more north of Pinehurst Road. A very small portion of Upper San Leandro Reservoir actually lies within the town limits.

Moraga's general plan designates much of the town for open space, and most of the remaining areas are developed with single-family residential units. Together, these two uses make up nearly 90% of the uses in the town. The general plan does not designate uses for District watershed lands that are outside of its city limits. Laguna Creek and Moraga Creek and their tributaries flow southward to Upper San Leandro Reservoir. Most of the planned growth for the town is on lands already designated for residential uses. The Paso Colorados development and the Larch Avenue development area, however, present future land use and encroachment issues.

Castro Valley

A small portion of the unincorporated community of Castro Valley, located immediately south and adjacent to Chabot Reservoir, drains into the Chabot Reservoir watershed. Castro Valley is extensively developed, predominantly with single-family housing, and relatively little vacant land remains. The Castro Valley Plan designates District lands in its planning area for "appropriate open space," as defined by the Alameda County General Plan. Castro Valley's urban area ends about 0.5 mile south of Chabot Reservoir. The potential exists for development anywhere along the northern and northwestern interface between Castro Valley and the District watershed, and such development could have implications for managing water quality, wildfire hazard, public encroachment, and visual quality of watershed lands.

Contra Costa County

Contra Costa County has jurisdiction over all lands located outside incorporated areas of the county, including District watershed lands and EBRPD lands. The Contra Costa/Alameda County line extends southwest of San Pablo Reservoir, across SR 24, through the northern tip of Upper San Leandro Reservoir, and east toward I-680. All of San Pablo, Briones, and Lafayette Reservoir watersheds and a small portion of the Upper San Leandro Reservoir watershed are within Contra Costa County.

The Contra Costa County General Plan designates District watershed lands as "watershed", a designation intended to safeguard the public water supply stored in District reservoirs. Uses permitted on lands with this designation are agricultural uses that do not rely on pesticides or chemical fertilizers; passive, low-intensity recreational uses; and small-scale commercial uses.

The unincorporated community of Canyon, which is surrounded by District watershed land, presents many land use issues, including concerns about land configuration, limited access, vegetative cover, and fire hazard. The private, unincorporated land bordering the eastern edge of the District watershed lands around Canyon is in agricultural use, with some development scattered throughout.

Alameda County

Alameda County has jurisdiction over all unincorporated lands in the county. District land under Alameda County jurisdiction includes most of Upper San Leandro Reservoir watershed and all of the Chabot Reservoir watershed. The Alameda County General Plan strongly recommends that development remain within existing urban boundaries. For incorporated areas, the plan promotes the efficient use of suitable vacant and infill land. For unincorporated areas, the plan establishes a limit to urban development to reduce the impacts of development on open space and the environment.

Most of the private, unincorporated land bordering the eastern edge of District lands in Alameda County is in agricultural use. Management of the agricultural/watershed interface focuses primarily on cooperative actions to reduce the potential risk of and damage from wildfire.

East Bay Regional Park District

Other than the District itself, EBRPD is the largest single landowner within the watersheds of the District reservoirs. Management activities on EBRPD lands have the potential to affect water quality and other District programs. Almost the entire western edge of District watershed lands is bordered by EBRPD property, with the exception of the areas near the Caldecott Tunnel at SR 24 and immediately northwest of Chabot Reservoir. Similarly, substantial portions of the eastern and southern edges of District watershed lands are bordered by EBRPD property. Properties owned or operated by EBRPD drain into the Briones, Lake Chabot, San Pablo, and Upper San Leandro Reservoir watersheds. The specific parks and their relative sizes within the drainages are listed below:

Briones Reservoir Watershed

- Briones Regional Park (large)

Lake Chabot Watershed

- Anthony Chabot Regional Park (large)
- Fairmont Ridge Regional Park (large)

San Pablo Reservoir Watershed

- Sibley Volcanic Reservoir Preserve (large)
- Tilden Regional Park (very small)
- Wildcat Canyon Regional Park (very small)
- National Skyline Trail (small)

Upper San Leandro Reservoir Watershed

- Redwood Regional Park (large)
- Roberts Regional Recreation Area (small)
- Sibley Volcanic Regional Preserve (medium)
- Huckleberry Botanic Regional Preserve (small)
- Lafayette-Moraga Regional Trail (small)
- Old Moraga Ranch Trail (very small)

In addition to the parklands that are within the watersheds, the following EBRPD parks adjoin District watershed property but are outside of the basins:

- Las Trampas Regional Park,
- Kennedy Grove Regional Recreation Area,
- Sobrante Regional Preserve, and
- Claremont Canyon Regional Preserve.

Of these, six major parks are adjacent to District watershed land:

- Tilden Regional Park is located east of San Pablo Reservoir, supporting many developed recreational uses.
- Wildcat Canyon Regional Park is located northeast of San Pablo Reservoir and offers multiuse trail access for recreationists.
- Briones Regional Park is located east of Briones Reservoir and provides multiuse trail access, picnicking, camping, and archery opportunities for recreationists.
- Redwood Regional Park is located northwest of Upper San Leandro Reservoir and provides multiuse trail access, play fields, and picnicking.
- Anthony Chabot Regional Park, which surrounds Chabot Reservoir and extends to the northwest, provides numerous developed recreational opportunities, including multiuse trail access, picnicking, fishing, camping, and boating.
- Las Trampas Regional Park is located east of Upper San Leandro Reservoir and provides multiuse trail access and picnicking.

Through a lease with the District, the EBRPD also manages the District's Chabot Reservoir and a portion of the watershed. The District also leases land upstream of Chabot Reservoir to the EBRPD to operate the Willow Park Golf Course, which is subleased to a concessionaire.

Few land management issues arise from these established recreational uses. Of concern, however, are the potential for new medium- to high-intensity recreational development along the District/EBRPD interface and utilization of higher intensity land management practices or trespass by nonpermitted trail users, which could have implications for managing water quality, wildfire hazard, public encroachment, and visual quality of watershed lands.

Other Surrounding Jurisdictions

Richmond

A portion of the City of Richmond abuts District watershed lands. The area of Richmond northwest of San Pablo Reservoir drains into the reservoir. This is the only portion of the city that drains into District watersheds; most of the interface is located downstream of watershed lands and drain elsewhere. San Pablo Reservoir and the District watershed lands below it drain into San Pablo Creek, which flows into San Pablo Bay. Portions of Richmond's irregular boundary adjoin the western edge of Pinole Valley, approximately 0.5 mile east of San Pablo Reservoir. Potential for development anywhere along the Richmond/District interface has implications for managing water quality, wildfire hazard, public encroachment, and visual quality of District watershed lands. Carriage Hill; Castro Ranch, east of Carriage Hill; and Kennedy Grove are specific areas of concern in Richmond because of their potential for future development.

Pinole

North of Pinole Creek, the City of Pinole adjoins District property primarily with low-density residential development, much of which abuts directly onto District watershed lands with no setbacks. This is one of the major remaining areas in the city that are designated for residential development. South of Pinole Creek, the city abuts District watershed lands with public parks. The southern portion of the city limit divides Pinole Valley horizontally and is located about 2 miles north of San Pablo Reservoir. The location of Pinole Valley Park adjacent to District-owned watershed also could cause fire and public encroachment issues.

Hercules

Low-density residential development and open space in the City of Hercules adjoin District property. Some existing developments at the northern boundary of the Pinole Valley watershed directly abut District property with no setbacks. Other residential developments provide open space buffers adjacent to District-owned lands. Some lands within the city drain into District watershed lands. The city limit lies approximately 0.75 mile north of Pinole Valley. No particular area of this interface raises specific concerns; however, in general, development anywhere along the watershed interface could complicate management of wildfire hazard, public encroachment, and visual quality of District watershed lands.

Oakland

All of the City of Oakland's urban area is located west of the ridgeline of the Oakland Hills and drains into San Francisco Bay. However, a portion of the north shoreline of Chabot Reservoir and a portion of the reservoir itself are located within the city limits. The City of

Oakland's Lake Chabot Municipal Golf Course also is located in this area. Parts of the golf course drain into Chabot Reservoir and could present water quality issues for management of Chabot Reservoir.

San Leandro

A very small portion of San Leandro is located in the Chabot Reservoir watershed. In most places, the city boundary is more than 0.5 mile from Chabot Reservoir. Most of the city drains into San Leandro Creek and San Francisco Bay. This includes Anthony Chabot Regional Park, which is owned by the District but is leased to the City of San Leandro for a park. Few, if any, land use management issues have resulted from this arrangement.

Lafayette

Except for very small areas at the extreme western edge of the city, which drain into San Pablo Reservoir, the City of Lafayette is located outside of District watershed lands in the Walnut Creek watershed. The Lafayette Reservoir watershed is essentially self-contained. The watershed is within the jurisdiction of the City of Lafayette but is entirely under District ownership and control.

RECREATION

Introduction

The District's reservoirs remained closed to the public until the 1960s, when the District began opening the reservoirs to non-water-contact recreation uses. Subsequently, the District opened Lafayette Reservoir to the public in 1966 and, shortly thereafter, Chabot Reservoir, which was leased to the EBRPD, was also opened. In 1972, San Pablo Reservoir was opened to recreation use. Limited public access to Briones Reservoir is allowed, whereas Upper San Leandro Reservoir remains closed to public access. Three developed recreation areas at San Pablo, Lafayette, and Chabot Reservoirs are designed to serve large numbers of people.

Four District-owned reservoirs provide varying degrees of water-dependent and water-enhanced recreation opportunities. Water-dependent activities include boating, sailing, and fishing. Although facilities vary at each recreation area, they generally include marinas, boat docks, boat launch ramps, fishing docks, and support facilities (e.g., restrooms, bait and tackle shops, food services, and parking). Water-enhanced activities include bicycling, picnicking, and wildlife viewing.

A recreational trail system also provides controlled equestrian, hiking, jogging, and wildlife viewing access to a large portion of the watershed lands. The overall quality of the watershed is more wild and natural than that of adjacent lands.

Recreation use of East Bay watershed lands is limited compared to other public recreation opportunities because of the District's primary goal of providing high-quality drinking water to its service area.

Public access is allowed to East Bay watershed lands under a system of trail use and watershed entry permits. Trail permit types are divided into Senior and Adult/Junior/Trail Leader categories. Allowable uses include hiking and horseback riding. A typical yearly breakdown of use among Senior permit holders is 40% for hiking, 55% for equestrian, and 5% for both. A typical yearly breakdown of use for the Adult/Junior/Trail Leader permit type is 78% for hiking, 20% for equestrian, and 2% for both. Motor vehicle and bicycle access to trails and fire roads is not allowed.

San Pablo Reservoir Watershed Lands

Recreation uses within the San Pablo Reservoir watershed include both water-dependent and water-enhanced activities at the reservoir and hiking and equestrian uses on the watershed trail system.

Water-dependent activities at San Pablo Reservoir include boating and fishing. These uses include both gasoline- and electric-powered boats, canoes, row boats, and sailboards. Fishing for planted trout and bass is allowed from boats and docks. The marina, which is operated by a private concessionaire, has 80 slips for rental boats. Boat rentals, snack stand, and restrooms are available. San Pablo Reservoir also accommodates water-enhanced activities such as picnicking. Picnic facilities include two group reserved sites (100- and 200-person capacity) and 127 picnic tables with 33 barbecue pits.

Hikers and equestrians are permitted on trails. Bicycles are allowed only on the Old San Pablo Trail (4.35 miles), which was once the main road through the San Pablo Valley before the construction of the modern San Pablo Dam Road. Other trails are Inspiration Trail (2.00 miles), which runs from Inspiration Point down to the reservoir, and Eagle's Nest Trail (0.92 miles), which is part of the Bay Area Ridge Trail system.

Most of the recreation use of the reservoir and adjacent land takes place on weekends and holidays (EA Engineering, Science, and Technology 1994b). Annual attendance declined from 393,110 in 1990 to 350,981 in 1992. Through August 1993, attendance was 254,108. The number of vehicles entering the recreation area declined from 112,318 in 1990 to 100,271 in 1992. In 1994, the District expanded parking to accommodate 822 cars and 199 cars and trailers.

Briones Reservoir Watershed Lands

Recreation uses within the Briones Reservoir watershed include limited water-dependent activities at the reservoir and hiking and equestrian uses on the watershed trail system.

Use of the reservoir is limited to college crew teams for practice only under a special permit. No other recreational boating is permitted on the reservoir. Water-enhanced activities include small picnic sites that are reached by the trail system.

Major trails are the Oursan Trail (10.22 miles), which encircles the northern side of Briones Reservoir and provides access to Hampton Trail (0.54 mile), Bear Creek Trail (4.50 miles), the Orinda connector link (0.50 mile), and Old San Pablo Trail (discussed above). The Oursan Trail begins at the Bear Creek Staging Area, climbs into the higher meadows through Sobrante Ridge, crosses a variety of pine and oak forest terrains, and finally descends to Briones Dam. Permitted uses on the trail include dog walking, hiking, and equestrian use. Other trails provide access to Briones Regional Park and Old San Pablo Dam Road above the San Pablo Reservoir watershed area.

Pinole Valley Watershed Lands

Presently, no recreation is allowed within the Pinole Valley watershed.

Lafayette Reservoir Watershed Lands

Recreation uses within the Lafayette Reservoir watershed include both water-dependent and water-enhanced activities at the reservoir and hiking and equestrian uses on the watershed trail system.

Located within the City of Lafayette, the 1,000-acre public recreation area and the 129-acre reservoir offer water-dependent activities associated with boating, including boat rentals, and fishing from 15 small piers or docks. Private "car-top" boats permitted in the reservoir are sailboats, canoes, kayaks, inflatable boats, and boats with electric motors. No launch ramp is available for trailers, and gasoline-powered boats are not allowed. Row boats and pedal boats are available to be rented. The marina accommodates 50 rental boats.

Water-enhanced activities include picnicking and nature interpretation. Picnic facilities include 125 tables and 51 barbecue grills, and two reserve areas are available for groups. The smaller group area accommodates 50 people and the larger one 250 people. The visitor center offers exhibits of plants and insects and includes an aquarium, photographs, fishing licenses, and bait and tackle. Interpretive programs and a self-guided nature trail are provided. Bicycle riding is permitted on paved trails around the shoreline.

The Lafayette Reservoir watershed trails, approximately 7 miles of trails plus connectors, are popular with hikers, joggers, and bicyclists. They are the only trails maintained by the District where horses are not allowed. The Shore Trail (2.80 miles) is completely paved and encircles the entire reservoir. The Rim Trail (4.31 miles) is a dirt fire road that traverses brushlands and oak forests along the ridge surrounding Lafayette Reservoir. Permits are not required for trail use.

The recreation area receives approximately 650,000 visitors annually for an average of 1,781 daily visitors. The District has determined that users of the area are primarily residents of the three surrounding communities: Lafayette (30.6% of total users), Walnut Creek (17.8%), and Orinda (15.4%) (EA Engineering, Science, and Technology 1994b). Parking areas provide 542 total spaces in two lots, and capacity is reached three or four times during the year. About 10-20 special events are accommodated each year, such as races and charity walks, some attracting more than 1,000 people.

Upper San Leandro Reservoir Watershed Lands

Water-dependent activities are not allowed at Upper San Leandro Reservoir. Trails are accessible to hikers and equestrians, however.

San Leandro Reservoir trails begin at the Valle Vista Staging Area, which is located at the northwestern tip of the reservoir and provides access to Las Trampas, Anthony Chabot, and Redwood Regional Parks, as well as Cull Canyon Regional Recreation Area. The King Canyon Trail (3.64 miles) connects with the Rocky Ridge Trail (6.25 miles) and the Rocky Ridge Loop (4.30 miles). The Rocky Ridge Loop is a steep trail that is popular with hikers who wish to experience the scenic vistas of Rocky Ridge. District lands on the southwestern side of the reservoir are adjacent to the Anthony Chabot Recreation Area.

Chabot Reservoir Watershed Lands

Recreation uses within the Chabot Reservoir watershed include water-dependent activities at the reservoir and hiking, bicycling, and equestrian uses on the watershed trail system. Recreational facilities are managed by the EBRPD.

Water-dependent activities are common at Chabot Reservoir (referred to as Lake Chabot by the EBRPD). The lake is primarily used for fishing, either from the shoreline, from eight fishing piers plus fishing pods, or from boats. The Lake Chabot Marina has 82 slips for rental boats and has a bait/tackle shop, snack stand, horseshoe pits, restroom, and parking area. Boats available for rent are row boats, canoes, pedal boats, and boats with electric trolling motors. Canoes, kayaks, and scull craft up to 20 feet long are permitted with a \$2 launching fee. A tour boat, the Chabot Queen, shuttles hikers and anglers to several points along the shoreline on summer weekends and holidays. Water-enhanced activities include picnic sites with 98 tables, 75 barbecue pits, and seven reserve group areas.

Much of the lake's perimeter is accessible along paved trails. On the lower eastern side of Chabot Reservoir, the Chabot Staging Area is the starting point for the Ramage Peak Trail (8.30 miles) and the Garin Trail (3.50 miles). The Ramage Peak Trail takes hikers eastward through heavily wooded and meadow areas to a connection with the Rocky Ridge Loop. Two smaller trails, the Rimer Trail (1.00 mile) and the Ritchie Trail (0.75 mile), are popular with hikers and equestrians.

Similar to Lafayette Reservoir, Chabot Reservoir has all the features of a high-use urban park, and local residents often walk, ride horseback, or bicycle to the park rather than drive. In 1993, Chabot Reservoir had 255,252 visitors and 33,000 paid vehicles (EA Engineering, Science, and Technology 1994b). Two parking lots (one paved and one unpaved) provide 375 parking spaces.

FISCAL EFFECTS

This section describes the expenditures and revenues associated with managing East Bay watershed lands. Expenditures are made by the District for management of natural resources, developed recreation, and trails. Sources of revenue include livestock grazing and agricultural leases, use of developed recreation sites, and sale of trail use permits.

All revenues generated from the use of East Bay watershed lands are placed within the District's general fund except for a portion of the revenue generated from concessionaire operations. This revenue is placed in a capital improvement fund specifically allocated to the developed recreation program. Watershed management programs are funded annually by the District independent of income generated by those programs.

Expenditures

Natural Resources Management

Resource management programs being implemented on East Bay watershed lands include water quality, biodiversity, restoration and erosion control, livestock grazing, fire and fuels, land acquisition, livestock and grazing lease administration, and entitlements. Management of natural resources requires expenditures for labor and supplies. From 1989 through 1994, expenditures totaled \$6,757,000, for an annual average of \$1,126,000 (Table 3-15).

Labor costs to manage the natural resources program totaled \$3,686,000 from 1989 through 1994. Annual labor costs during this period averaged approximately \$614,000. These costs accounted for approximately 54% of the total cost of the natural resource management program.

Expenditures for supplies used for the natural resource management program totaled \$3,071,000, for an average annual expenditure of \$512,000. The cost of these supplies accounted for 46% of the total cost of the natural resource management program.

Developed Recreation Management

Management of the developed recreation sites at San Pablo and Lafayette Reservoirs requires expenditures for labor and supplies. From 1989 through 1994, expenditures totaled \$8,472,000, for an average annual expenditure of \$1,412,000.

Labor costs to manage the developed recreation sites totaled \$3,431,000 during the 6-year period. Annual labor costs, which averaged \$572,000 during this period, have remained relatively constant from year to year. Labor costs accounted for approximately 41% of the total cost to operate the developed recreation sites.

Expenditures for supplies to maintain and improve recreation facilities totaled \$5,040,000, or an average annual expenditure of \$840,000. The annual expenditures on supplies has remained relatively constant, ranging from \$971,000 in 1991 to \$715,000 in 1994. The cost of supplies accounted for 59% of the total cost to operate the developed recreation sites.

Recreational Trails Management

Management of the recreational trail system includes expenditures for labor and supplies. From 1989 through 1994, approximately \$1,388,000 was spent on the recreation trail system program, an average expenditure of \$231,000.

Labor costs to manage the trail system totaled \$500,000 from 1989 through 1994. Annual labor costs during this period averaged \$83,000 and did not fluctuate substantially from year to year. Labor costs accounted for approximately 36% of the total cost to operate the recreational trail system.

Expenditures for supplies used in the maintenance of the trail system totaled \$888,000, for an average annual expenditure of \$148,000. Depending on the need for repairs or programmed improvements to the trail system, the annual expenditure for supplies may fluctuate significantly. For example, expenditures for supplies were \$376,000 in 1989 but only \$8,000 in 1993. The cost of supplies accounted for 64% of the total cost to operate the recreational trail system.

Revenues

Revenues from the use of East Bay watershed lands are generated from rental income, recreation fees at developed sites, and trail permits. Rental income is generated from land leased for grazing, Christmas tree farms, and other farming operations. Recreation revenues are generated from developed recreation sites at Lafayette and San Pablo Reservoirs. District revenues generated at San Pablo Reservoir include a portion of the annual sales made by the concessionaire operating the recreation facilities at the reservoir. Revenues from recreational trail use come from permit sales.

From 1989 through 1994, combined revenues from land rents, developed recreation sites, and trail permits averaged \$709,000 per year. On average, 74% of this revenue was generated from developed recreation sites and 24% from land rents. The remaining 2% was generated from the sale of trail permits.

Rental Income

Rental income is generated by land leased for livestock grazing, Christmas tree farms, and other agricultural operations. From 1989 through 1994, combined rents totaled

Table 3-15. Average Annual Expenditures and Revenues
 Related to East Bay Watershed Lands, 1989-1994

Program	Expenditures ^a /Costs	Revenues
Natural resources management	\$1,112,000	\$174,700
Developed recreation management	1,412,000	521,000
Recreational trails management	<u>231,000</u>	<u>15,900</u>
Total	\$2,755,000	\$711,600

Source: District 1989-1994 cost and revenue data (disaggregated by R. Leong, S. Abbors, and R. Nuzum).



approximately \$1,036,000, for an annual average of \$173,000. Income from rental income peaked in 1990 at \$216,000 but declined to approximately \$115,000 in 1994. Livestock grazing accounted for the majority of this rental income.

Developed Recreation

Revenues generated by recreation activities at San Pablo and Lafayette Reservoirs from 1989 through 1994 totaled approximately \$3,123,000, for an annual average of approximately \$521,000. Revenues have increased over the 6-year period from \$378,000 in 1989 to \$672,000 in 1994.

Average annual revenue generated by recreation occurring at Lafayette Reservoir totaled approximately \$492,000 over the 6-year period, or approximately 95% of the total revenue generated at developed sites. San Pablo Reservoir accounted for an average of \$28,000 per year during that period, or 5% of total revenue generated at developed recreation sites (this represents the 2.5% franchise fee on gross receipts paid to the District). Also, 20% of gross receipts up to \$1 million (23% between \$1 and \$2 million) are placed in a maintenance and capital improvement fund.

Recreational Trails

The sale of trail use permits from 1989 through 1994 generated approximately \$95,400 in total revenue, for an annual average of \$15,900. Revenue from the sale of trail permits has increased from \$12,300 in 1989 to \$21,000 in 1994.

TRANSPORTATION

This section describes the existing traffic conditions within and near the District's watershed area. The information in this section was obtained from the Contra Costa County Department of Public Works (Kersevan pers. comm.), the Alameda County Department of Public Works (Carrera pers. comm.), and the District (Leong pers. comm.).

Major Features of the Regional Transportation System

The District watershed area is served by a network of arterial and rural roadways and one freeway (Figure 3-6). The roadways in the area serve as weekday commuting routes, weekend recreational access routes, or both. The major roadways serving the plan area are described below.

None of the area roadways experience substantial circulation problems. The existing traffic volumes for each roadway are described below. These volumes were all counted on weekdays. For most roadways, weekend traffic volumes should be less than weekday volumes because of the lack of commuter traffic.

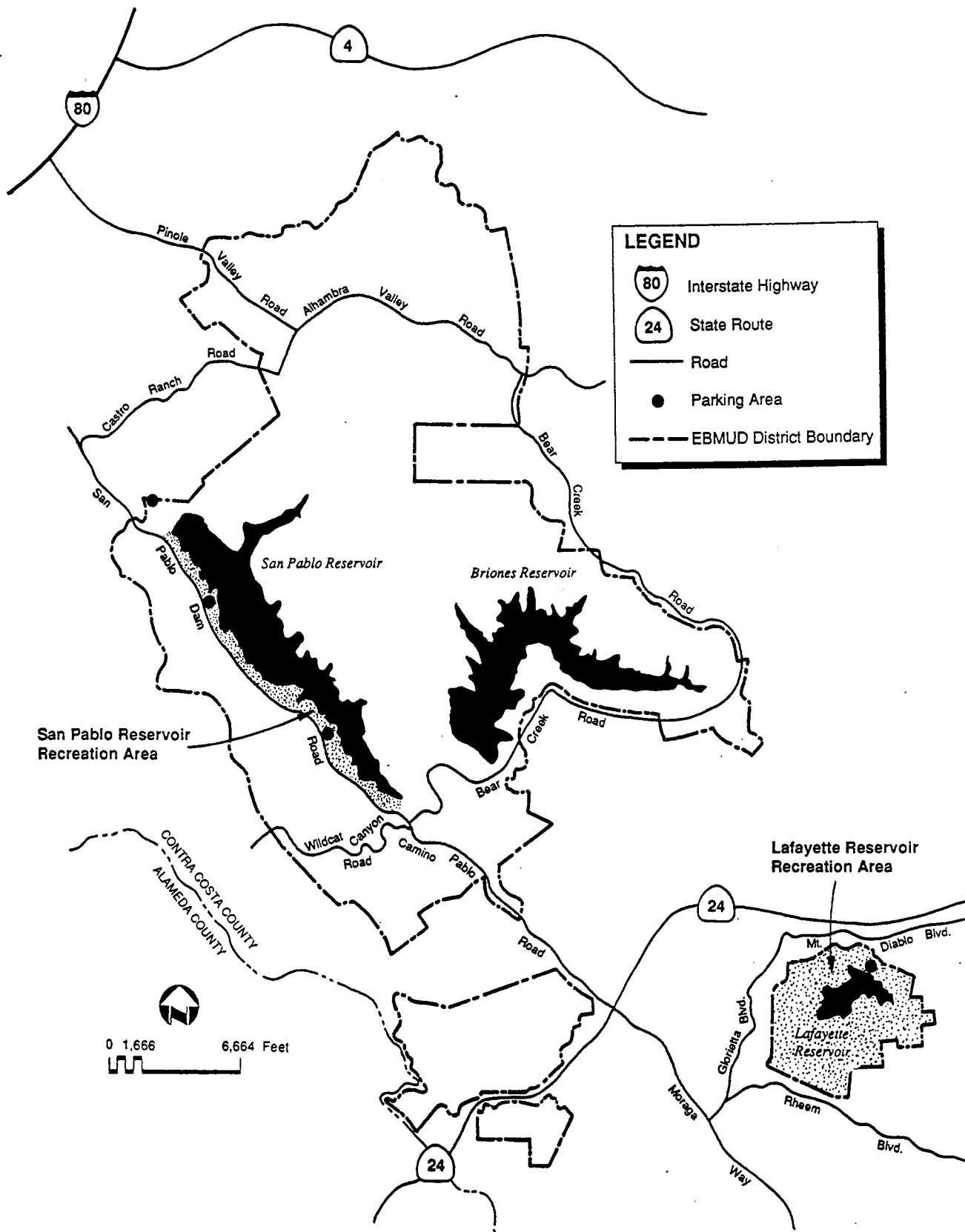
Future traffic volumes on area roads are expected to be somewhat higher than existing volumes. Data from the Contra Costa County Travel Demand Model (TDM) was used to represent future traffic volumes for 2000 and 2010. For most of the study roadways, volumes in 2000 are expected to be greater than 2010 volumes because of planned improvements in alternate transportation routes during the intervening period. Predicted future traffic volumes were not available from Alameda County.

State Route 24

SR 24 is an east-west freeway extending from I-80 near Oakland to I-680 near Walnut Creek. Within the area, SR 24 is a six-lane freeway with access ramps at Fish Ranch Road, Gateway Boulevard, and Camino Pablo/Moraga Way.

Pinole Valley Road

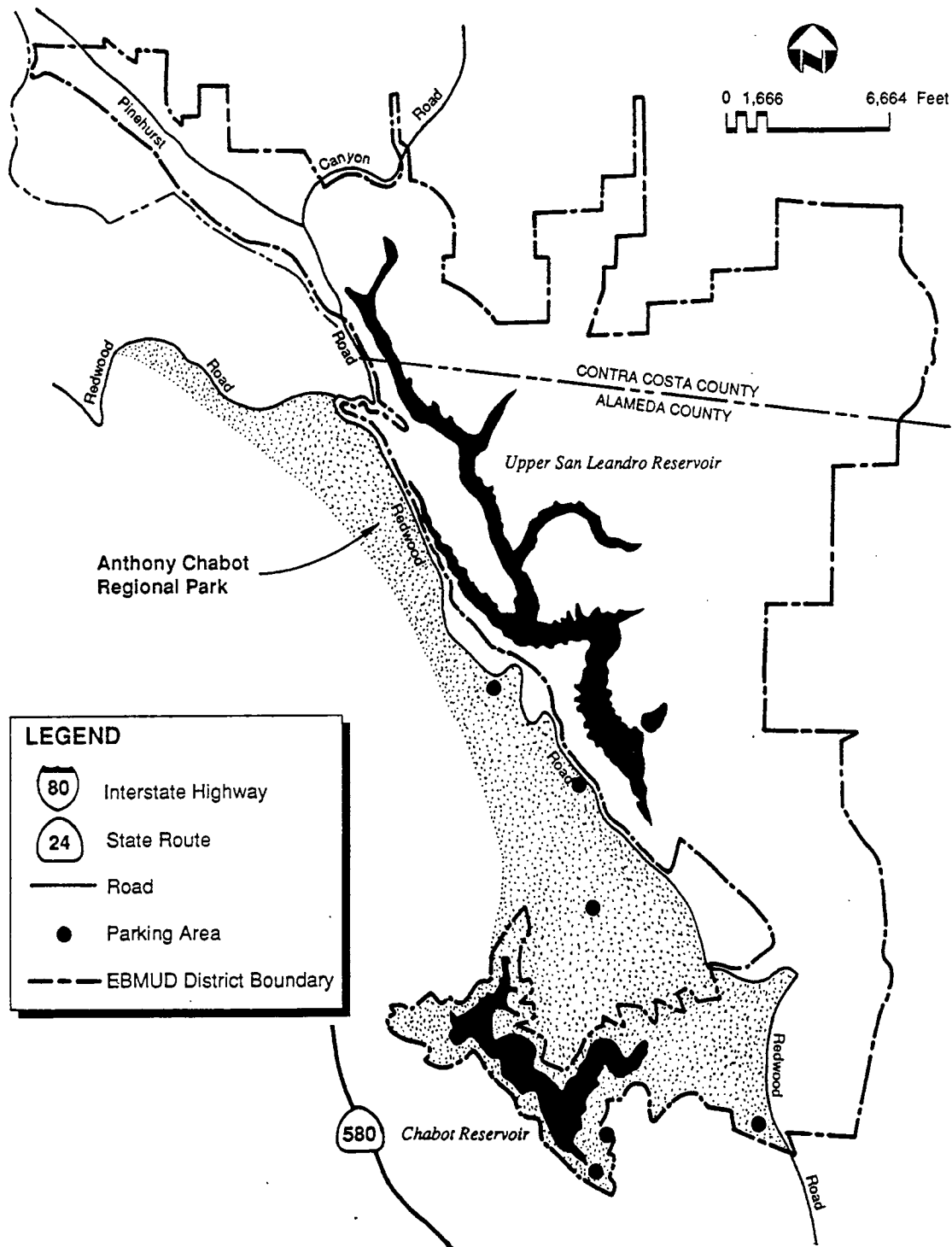
Pinole Valley Road is an east-west rural road that connects with I-80. Pinole Valley Road has two lanes, except for the section within the City of Pinole, which has four lanes. In 1994, the daily traffic volume on Pinole Valley Road west of Castro Ranch Road was 4,216 vehicles. Pinole Valley Road becomes Alhambra Valley Road west of Castro Ranch Road. Commuters use Pinole Valley Road and Alhambra Valley Road as an alternate route between SR 4 and I-80. Data from the TDM indicate that daily traffic volumes will reach 8,600 vehicles by 2000 and 8,400 vehicles by 2010.



Jones & Stokes Associates, Inc.

**Figure 3-6 (North)
Transportation System**





Jones & Stokes Associates, Inc.

**Figure 3-6 (South)
Transportation System**



Alhambra Valley Road

Alhambra Valley Road is a two-lane, east-west rural road that connects with Pinole Valley Road to the west. In 1993, the daily traffic volume on Alhambra Valley Road west of Briones Road was 3,022 vehicles. Data from the TDM indicate that daily traffic volumes will be 1,100 vehicles by 2000 and 700 vehicles by 2010.

Castro Ranch Road

Castro Ranch Road is a two-lane, north-south road that connects Pinole Valley Road with San Pablo Dam Road. In 1994, the daily traffic volume was 4,572 vehicles. Data from the TDM indicate that daily traffic volumes will be 11,000 vehicles by 2000 and 9,000 vehicles by 2010.

San Pablo Dam Road

San Pablo Dam Road is a north-south arterial roadway that carries a substantial amount of commute traffic between SR 24 and I-80 near the City of Richmond. Over most of its length, San Pablo Dam Road is a two-lane road with two 10-foot shoulders. At its north end, however, the road has four lanes and two 8-foot shoulders. San Pablo Dam Road provides access to the San Pablo Reservoir recreation area and administration and maintenance facilities and becomes Camino Pablo south of Wildcat Canyon. In 1994, the daily traffic volume was 18,728 vehicles. Data from the TDM indicate that daily traffic volumes will reach 22,900 vehicles by 2000 and 20,900 vehicles by 2010.

Camino Pablo

Camino Pablo is a two-lane arterial roadway north of Miner Road and a four-lane arterial between Miner Road and SR 24. Traffic counts performed in 1989 found a daily volume of 31,093 vehicles. The City of Orinda estimates that an approximately 20% increase in traffic volumes has occurred since 1989 (Evans pers. comm.). Therefore, the current volume is about 37,300.

Moraga Way

Moraga Way is a two-lane arterial roadway that connects the City of Moraga with SR 24. Traffic counts performed in 1989 found a daily volume of 29,960 vehicles. The City of Orinda estimates that an approximately 20% increase in traffic volumes has occurred since 1989 (Evans pers. comm.). Therefore, the current volume is about 32,350.

Wildcat Canyon Road

Wildcat Canyon Road is a steep, winding, two-lane, east-west rural road. This road is not a commute route and primarily carries traffic to Tilden Regional Park. No current traffic counts are available for Wildcat Canyon Road. Data from the TDM indicate that daily traffic volumes will be 1,400 vehicles by 2000 and 1,500 vehicles by 2010.

Bear Creek Road

Bear Creek Road is a two-lane rural road that connects San Pablo Dam Road with Alhambra Valley Road. For 7 miles east from San Pablo Dam Road, Bear Creek Road has two 8-foot shoulders. The rest of the road has shoulders of 0-2 feet. Bear Creek Road provides access to staging and picnic areas in the Briones Reservoir watershed. In 1994, the daily traffic volume was 985 vehicles. Data from the TDM indicate that daily traffic volumes will be 300 vehicles by 2000 and 300 vehicles by 2010.

Skyline Boulevard

Skyline Boulevard is a winding, two-lane, north-south road that runs from SR 24 near Berkeley to I-580 near San Leandro. Traffic volumes were not available; however, Skyline Boulevard is not a major commuter route and probably has low weekday and weekend traffic volumes.

Pinehurst Road

Pinehurst Road is a steep, winding, two-lane, north-south rural road. In 1994, the daily traffic volume was 986 vehicles. Future volume estimates for Pinehurst Road are not available.

Redwood Road

Redwood Road is a north-south road that is rural at the north end and urban at the south end. The north end has two lanes and low traffic volumes. A 1994 traffic count near Skyline Boulevard found 1,561 daily vehicles. South of Procter Road, Redwood Road has four lanes. A 1992 traffic count near Castro Valley Boulevard found 21,487 daily vehicles. Redwood Road is not a major commute route and has no substantial circulation problems.

Lake Chabot Road

Lake Chabot Road is a two-lane road near Lake Chabot. Along this section, traffic volumes in February 1994 were 2,900 vehicles per day. Near Castro Valley Boulevard, Lake Chabot Road has four lanes and carries 19,600 vehicles per day.

Roadway Safety Issues

None of the roadways described above has an accident rate high enough to warrant attention by applicable agencies. Many of the roadways are narrow and curving, however, and the potential for accidents exists.

Recreation Access

San Pablo Reservoir Recreation Area

At the San Pablo Reservoir recreation area, roadway and parking lot capacity at both the main recreation area (north end of the reservoir) and the boat launching facility (south end of reservoir) generally are sufficient to meet the demand. The following are specific situations that are exceptions.

On some weekends and major holidays, vehicles with and without boat trailers sometimes line up at area entrance gates the evening before opening. This pre-entry traffic sometimes extends onto the shoulder of San Pablo Dam Road, creating a temporary safety hazard.

Recreation area entrances are closed when capacity limits are reached. This situation occurs about three to five times a year.

The upper parking lot at the main recreation area is not fully utilized, even on the most crowded days, because it is located further from recreation areas.

Lafayette Reservoir Recreation Area

At the Lafayette Reservoir recreation area, roadway and parking lot capacity is generally sufficient to meet demand. On major holidays and during special events attended by large groups, however, parking lots can fill to capacity, and entrance gates are then closed. When these closures occur, traffic and parking use increases on Mt. Diablo Boulevard. Parking capacity is reached about three to five times a year.

Anthony Chabot Regional Park

Roadway and parking lot capacity generally meets demand at Anthony Chabot Regional Park. However, two or three times each year parking lots can fill to capacity and entrance gates are closed. When these closures occur, traffic flow on Lake Chabot Road is disrupted.

Many visitors to Lake Chabot park on the shoulder of Lake Chabot Road to avoid paying the parking fee. This results in a substantial number of pedestrians walking along and crossing Lake Chabot Road near the park (Schultz pers. comm.).

AIR QUALITY

Climate and Atmospheric Conditions

The climate of the area is generally characterized by hot, dry summers and cool, moist winters. Monthly average temperatures range from about 45°F in January to about 70°F in July. Annual extreme temperatures range from minimums in the upper 20s and low 30s to maximums in the 100-110°F range. On an annual basis, predominant winds are from the west; however, winds from the east are common during winter (California Air Resources Board 1984).

The region experiences atmospheric temperature inversions that limit atmospheric mixing and trap pollutants, resulting in high pollutant concentrations. Surface inversions (at elevations of 0-500 feet) are most frequent during the winter, whereas subsidence inversions (at 1,000-2,000 feet) are most frequent during the summer. Generally, the lower the inversion base height and the greater the rate of temperature increase from base to top, the more pronounced effect the inversion will have on inhibiting dispersion.

Air Quality Pollutants and Ambient Air Quality Standards

Both the State of California and the federal government have established ambient air quality standards for several pollutants. For some pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (e.g., protection of crops, protection of materials, or avoidance of nuisance conditions). The pollutants of greatest concern in the plan area are carbon monoxide (CO), ozone, and inhalable particulate matter (PM10). A summary of state and federal ambient air quality standards is shown in Table 3-16.

Carbon Monoxide

State and federal CO standards have been set for both 1-hour and 8-hour averaging times. The state 1-hour standard is 20 parts per million (ppm) by volume, while the federal 1-hour standard is 35 ppm. Both state and federal standards are 9 ppm for the 8-hour averaging period. CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

Ozone

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include reactive organic gases (ROG) and oxides of nitrogen (NO_x), react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem.

Because photochemical reactions take time to occur, high ozone levels often occur downwind of precursor emissions. For this reason, ozone is a regional pollutant.

Ozone is a respiratory irritant that increases susceptibility to respiratory infections. Ozone is also an oxidant and can cause substantial damage to vegetation and other materials. State and federal standards for ozone have been set for a 1-hour averaging time. The state 1-hour ozone standard is 0.09 ppm, not to be exceeded. The federal 1-hour ozone standard is 0.12 ppm, not to be exceeded more than three times in any 3-year period.

Inhalable Particulate Matter

Health concerns associated with suspended particulate matter focus on those particles small enough to reach the lungs when inhaled. Few particles larger than 10 microns in diameter reach the lungs. Consequently, both the federal and state air quality standards for particulate matter apply only to particulate matter 10 microns or less in diameter.

The state PM10 standards are 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as a 24-hour average and 30 $\mu\text{g}/\text{m}^3$ as an annual geometric mean. The federal PM10 standards are 150 $\mu\text{g}/\text{m}^3$ as a 24-hour average and 50 $\mu\text{g}/\text{m}^3$ as an annual arithmetic mean.

PM10 in the District watershed area reflects a mix of rural and urban sources, including agricultural activities, industrial emissions, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere.

Existing Air Quality Conditions

Air quality data for the period from 1991 through 1993 from monitoring stations near the project area are summarized in Table 3-17. These stations are located in Concord, Richmond, Oakland, and San Leandro. The San Leandro station was included because the Oakland station does not monitor PM10. The federal and state 8-hour CO standards have not been exceeded, whereas the state ozone standard has been exceeded as many as seven times each year. The state 24-hour PM10 standard is exceeded about 10% of the time. The state annual PM10 standard has not been exceeded during the period.

Table 3-16. Ambient Air Quality Standards Applicable in California

Pollutant	Symbol	Averaging Time	Standard, as parts per million		Standard as micrograms per cubic meter		Violation Criteria	
			California	National	California	National	California	National
Ozone	O ₃	1 hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 3 days in 3 years
Carbon monoxide (Lake Tahoe only)	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour 8 hours	20 6	35 --	23,000 7,000	40,000 --		
Nitrogen dioxide	NO ₂	Annual average 1 hour	-- 0.25	0.053 --	-- 470	100 --	If exceeded	If exceeded
Sulfur dioxide	SO ₂	Annual average 24 hours	-- 0.05	0.03 0.14	-- 131	80 365	If exceeded	If exceeded If exceeded on more than 1 day per year
		1 hour	0.25	--	655	--		
Hydrogen sulfide	H ₂ S	1 hour	0.03	--	42	--	If equaled or exceeded	
Vinyl chloride	C ₂ H ₃ Cl	24 hours	0.010	--	26	--	If equaled or exceeded	
Particulate matter, 10 microns or less	PM ₁₀	Annual geometric mean	--	--	30	--	If exceeded	If exceeded
		Annual arithmetic mean 24 hours	-- --	-- --	-- 50	50 150		If exceeded on more than 1 day per year
Sulfate particles	SO ₄	24 hours	--	--	25	--	If equaled or exceeded	
Lead particles	Pb	Calendar quarter	--	--	--	1.5	If equaled or exceeded	If exceeded on more than 1 day per year
		30 days	--	--	--	1.5	--	--

Notes: All standards are based on measurements at 25° C and 1 atmosphere pressure. National standards shown are the primary (health effects) standards. The California 24-hour standard for SO₂ applies only when state 1-hour O₃ or 24-hour PM₁₀ standards are being violated concurrently.

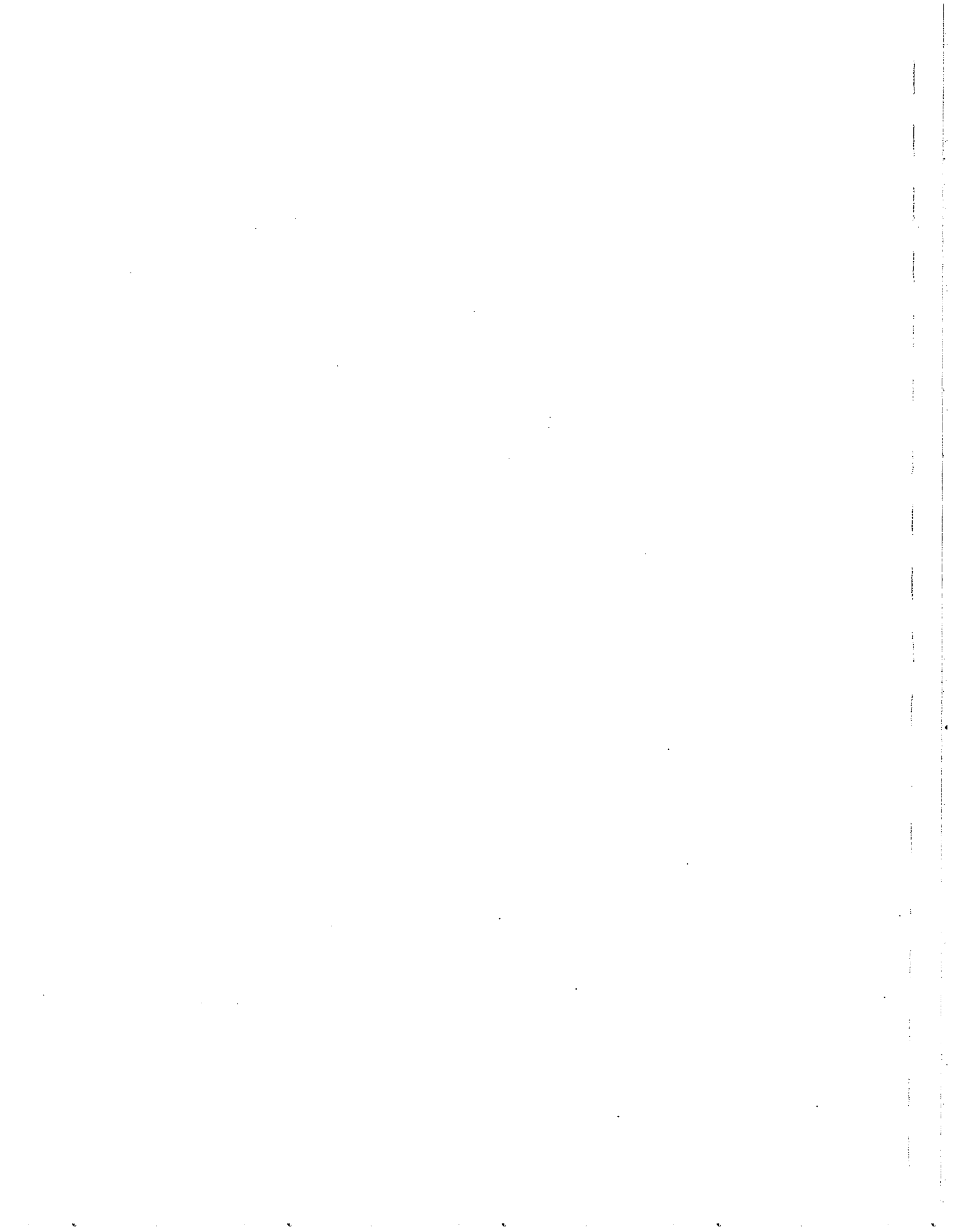


Table 3-17. Summary of Carbon Monoxide, Ozone, and PM10 Monitoring Data at East Bay Monitoring Stations

Pollutant	1991	1992	1993
Carbon Monoxide			
Concord			
Highest 1-hour concentration (ppm)	9	9	7
Highest 8-hour concentration (ppm)	5.4	5.4	5.0
Hours above standard ^a	0	0	0
Days above standard ^b	0	0	0
Richmond			
Highest 1-hour concentration (ppm)	7	5	9
Highest 8-hour concentration (ppm)	4.5	4.1	3.8
Hours above standard ^a	0	0	0
Days above standard ^b	0	0	0
Oakland			
Highest 1-hour concentration (ppm)	9	7	7
Highest 8-hour concentration (ppm)	6.8	4.6	4.9
Hours above standard ^a	0	0	0
Days above standard ^b	0	0	0
Ozone			
Concord			
First high (ppm)	0.11	0.11	0.13
Second high (ppm)	0.11	0.10	0.13
Days above standard ^c	4	3	7
Richmond			
First high (ppm)	0.05	0.08	0.12
Second high (ppm)	0.05	0.07	0.10
Days above standard ^c	0	0	2
Oakland			
First high (ppm)	0.06	0.08	0.11
Second high (ppm)	0.06	0.07	0.08
Days above standard ^c	0	0	1

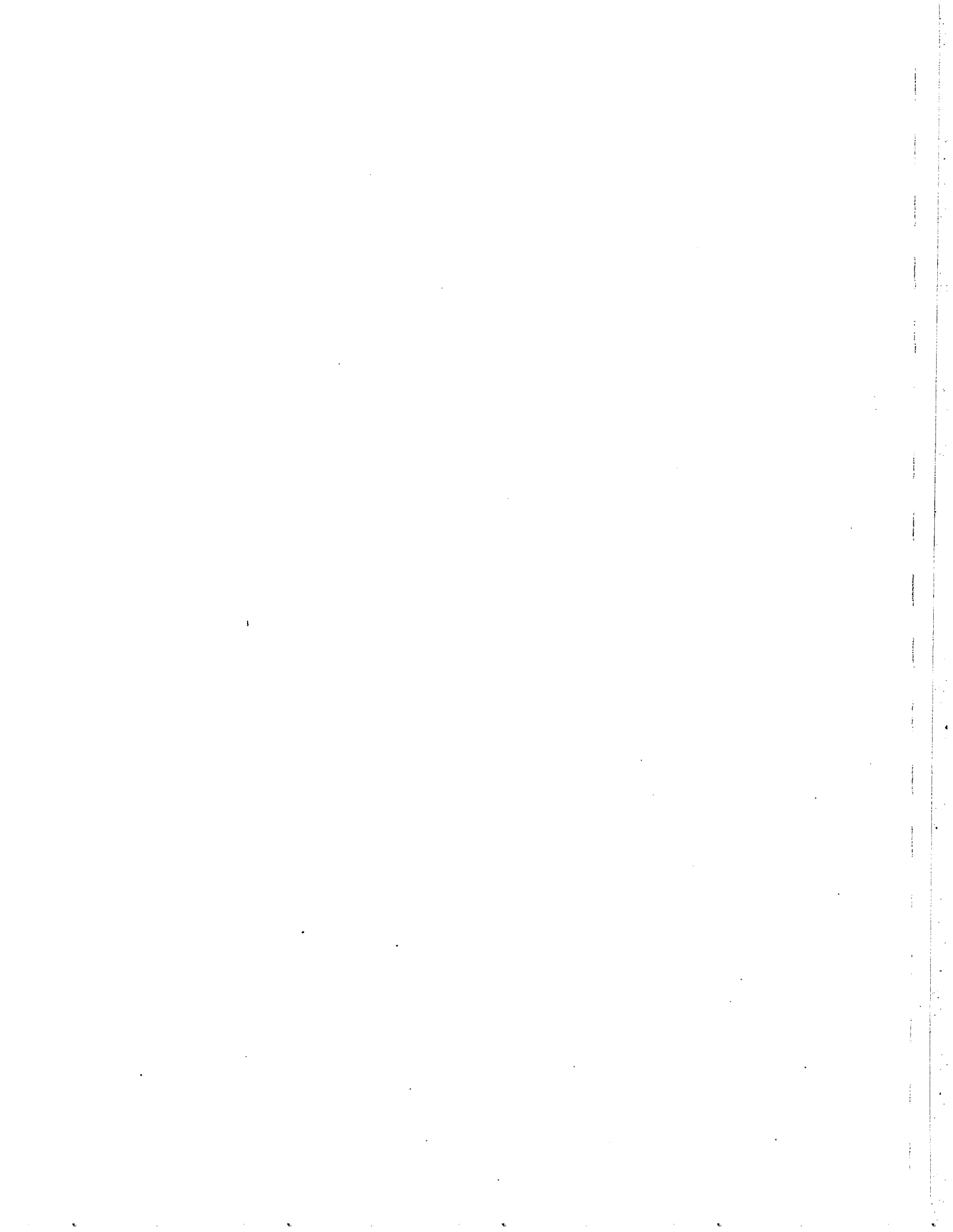


Table 3-17. Continued

Pollutant	1991	1992	1993
PM10			
Concord			
Highest 24-hour concentration ($\mu\text{g}/\text{m}^3$)	111	73	81
Geometric mean ($\mu\text{g}/\text{m}^3$)	25.2	22.6	19.3
Arithmetic mean ($\mu\text{g}/\text{m}^3$)	31.2	26.0	22.8
Percentage of days above standard ^d	22	13	3
Richmond			
Highest 24-hour concentration ($\mu\text{g}/\text{m}^3$)	97	55	76
Geometric mean ($\mu\text{g}/\text{m}^3$)	24.4	23.4	21.3
Arithmetic mean ($\mu\text{g}/\text{m}^3$)	29.1	26.1	25.2
Percentage of days above standard ^d	15	5	5
San Leandro			
Highest 24-hour concentration ($\mu\text{g}/\text{m}^3$)	99	56	51
Geometric mean ($\mu\text{g}/\text{m}^3$)	27.6	22.7	18.1
Arithmetic mean ($\mu\text{g}/\text{m}^3$)	32.4	24.9	20.8
Percentage of days above standard ^d	17	3	2

^a Hours above state 1-hour standard of 20 ppm.

^b Days above state and federal 8-hour standard of 9 ppm.

^c Days above state 8-hour standard of 0.09 ppm.

^d Days above state 24-hour standard of $50 \mu\text{g}/\text{m}^3$ divided by number of days sampled.

Source: California Air Resources Board 1994.



Air Quality Management

Air quality management responsibilities exist at local, state, and federal levels of government. Air quality management planning programs developed during the past decade have generally been in response to requirements established by the federal Clean Air Act; however, the enactment of the California Clean Air Act of 1988 (CCAA) has produced additional changes in the structure and administration of air quality management programs in California.

The CCAA substantially added to the authority and responsibilities of the state's air pollution control districts. The CCAA establishes an air quality management process that generally parallels the federal process. The CCAA, however, focuses on attainment of the state ambient air quality standards, which, for certain pollutants and averaging periods, are more stringent than the comparable federal standards.

The CCAA requires that air districts prepare an air quality attainment plan if the district violates state air quality standards for CO, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), or ozone. No locally prepared attainment plans are required for areas that violate the state PM10 standards. The CCAA requires that the state air quality standards be met as expeditiously as practicable but does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards. The least stringent requirements were set for areas that were expected to achieve air quality standards by the end of 1994. The most stringent requirements are set for areas that cannot achieve the standards until after 1997.

The air quality attainment plan requirements established by the CCAA are based on the severity of air pollution problems caused by locally generated emissions. Upwind air pollution control districts are required to establish and implement emission control programs commensurate with the extent of pollutant transport to downwind districts.

Air pollution problems in the San Francisco Bay Area are primarily the result of locally generated emissions. However, the San Francisco Bay Area has been identified as a source of ozone precursor emissions that occasionally contribute to air quality problems in the Monterey Bay Area, the northern San Joaquin Valley, and the southern Sacramento Valley. Consequently, the air quality planning for the San Francisco Bay Area must not only correct local air pollution problems but must also reduce the area's impact on downwind air basins.

Air Quality Planning in the San Francisco Bay Area Air Basin

The Bay Area Air Quality Management District (BAAQMD) developed the 1991 Clean Air Plan (CAP) for the San Francisco Bay Area (Bay Area Air Quality Management District 1991). The 1991 air quality management plan addresses attainment of California air quality standards for ozone and CO.

The San Francisco Bay Area is classified by the CCAA as a moderate nonattainment area. Under the CCAA, moderate nonattainment areas must:

- develop a permit program showing no net increase in emissions from sources that emit 25 tons per year or more of pollutants;
- use reasonably available control technology for all existing stationary sources;
- implement reasonably available transportation control measures; and
- develop indirect and areawide source control programs.

The 1991 CAP recommends adoption of 23 transportation control measures to control emissions of ROG, NO_x, and CO from vehicle travel. The CCAA requires that CAPs be updated every 3 years. Consequently, the 1991 CAP must be updated in 1994.

The BAAQMD has recently released the Draft Bay Area 1994 Clean Air Plan, an update to the 1991 CAP. The goals of the 1994 CAP are to reduce the health impacts from ozone levels to comply with the state ambient standard and to comply with the CCAA. The CCAA requires districts that exceed the State ozone standard to reduce pollutant emissions by 5% per year.

The Bay Area attained the state CO standard in 1993, so the CCAA planning requirements for CO nonattainment areas no longer apply. The Bay Area also attained the national ozone standard during the 1990-1994 time frame and the BAAQMD has applied to the U.S. Environmental Protection Agency for formal redesignation as an ozone attainment area.

Chapter 4. Impacts of the Proposed East Bay Watershed Master Plan

This chapter describes the environmental effects of implementing the proposed EBWMP. The analysis contained in this chapter is programmatic and does not address site-specific issues. Each resource section in this chapter first provides an overview of which programs could affect the resource, and then discusses benefits, impacts, and overall effects of implementing the proposed EBWMP. Mitigation measures for significant impacts are described at the end of each resource section.

WATER QUALITY

Overview

One of the primary objectives of the proposed project is to protect and enhance the quality of the District's reservoirs and tributary streams on watershed lands. Under the proposed project, the District would take numerous actions to accomplish these goals. Actions that would protect and enhance water quality are addressed under the water quality management, biodiversity management, forestry management, fire and fuels management, livestock grazing management, and land acquisition and disposal programs.

Several programs identified under the proposed project have no potential for significant effects on water quality. These programs are those involving environmental education, cultural resources management, visual resources management, and entitlements.

The developed recreation and trails management programs have some potential to degrade water quality. In addition, certain management programs that would have a beneficial impact overall on water quality also may involve some activities that could degrade water quality, particularly programs in forestry and fire and fuels management.

Benefits

Reduction of Erosion

Under the water quality management, biodiversity management, livestock grazing management, and land acquisition and disposal programs, the District would undertake actions to stabilize soils and substantially reduce livestock grazing. These actions would result in reduced erosion and related nonpoint-source pollution throughout the watershed areas.

Improvement of Health and Vigor of Monterey Pine Forest at San Pablo Reservoir

Under the forestry management program, the District would gradually convert the Monterey pine forest on the east side of San Pablo Reservoir, which was planted to prevent erosion of the steep shoreline, to native forest, and would ensure the health of the forest in the interim. The forest is currently an even-aged stand of trees that have reached the end of their normal life-span. If these trees were allowed to die off, shoreline erosion could increase substantially, leading to increased sediment deposition in the reservoir.

Reduction of Point- and Nonpoint-Source Pollution in Tributary Streams

The proposed EBWMP contains policies that would result in the acquisition of strategically located parcels of land to protect water quality. In addition, the proposed EBWMP contains substantive provisions that require and encourage the District to coordinate closely with neighboring jurisdictions to reduce the point- and nonpoint-source discharge of pollutants into streams that are tributary to the District's reservoirs.

Impacts

The primary activities that could take place within the watershed under this alternative and could affect water quality include new recreation facility and trail development, prescribed burning, and the conversion of non-native forest to native forest.

Increase in Impermeable Surfaces and Related Runoff

Although recreation development is not emphasized under the proposed project, any new recreation development would cover soils and increase the amount of impermeable surface within the watershed. In addition, new developed recreation facilities would likely

require additional parking areas, which would also increase the amount of impermeable surface area and could lead to an increase in the amount of contaminated runoff. Relatively few new trails would be constructed under this alternative; however, the construction of new trails would increase the area of soil that is disturbed and subject to erosion. These issues are addressed in the proposed EBWMP, which requires the development and implementation of BMPs to reduce contaminated runoff; therefore, no significant impacts are anticipated.

Potential Increase in Nonpoint-Source Pollution and Runoff

Prescribed burning and forestry management practices could expose relatively large areas of soil and lead to soil erosion and resulting adverse impacts on water quality. Because these impacts are caused primarily by soil erosion, however, they are discussed below under "Soils and Geology".

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

The effects of the proposed project on tributary and reservoir water quality are expected to be beneficial in comparison to existing conditions.

SOILS AND GEOLOGY

Soils

Overview

The proposed EBWMP would initiate new policies and activities to protect soil resources. The proposed EBWMP does not address soil resources separately, but incorporates soil protection measures into the various management programs, particularly water quality management. The management programs for water quality, livestock grazing, and biodiversity management would substantially benefit soil resources throughout the District's watershed lands by encouraging actions that would stabilize soils and reduce erosion.

Several programs identified under the proposed EBWMP have no potential for adverse impacts on soils or geologic resources. These programs include environmental interpretation, cultural resource management, visual resource management, and land acquisition and disposal. Therefore, these programs are not discussed further.

Benefits

Stabilization of Watershed Soils. Under the water quality, livestock grazing, and biodiversity management programs, the District would undertake actions to stabilize soils and reduce erosion. The water quality management activities envisioned under the proposed project include such actions as developing and implementing BMPs to reduce soil erosion and sedimentation; excluding livestock grazing from sensitive areas, including areas prone to erosion; and reducing the total area grazed by livestock.

Impacts

The proposed EBWMP would result in few impacts on soil resources. In general, the proposed plan is designed to improve soil conditions, thereby reducing the effects of erosion and sedimentation on the watershed and reservoirs.

Exposure of Soils to Erosion. Various watershed management activities (e.g., prescribed burning, mechanical fuel reduction, agricultural practices, trail and facility construction, and forestry practices) can lead to the removal of vegetative cover and the exposure of bare soils to potential erosion.

Erosion is particularly a concern when soils that are exposed are located on steep slopes or have a high erosion hazard rating. Soil erosion can lead to long-term reductions in productivity and increased sedimentation and turbidity in the District's reservoirs.

Mechanical fuel reduction is not expected to play a major role in the fire-risk reduction strategy implemented under the proposed EBWMP. Trail and facility construction is also not expected to be a major cause of soil disturbance under the proposed project because few new trails or facilities would be constructed. Similarly, agricultural practices are anticipated to be less intensive than under current conditions on the District's watershed lands and, therefore, are not expected to have a major impact on soils.

Of the activities likely to take place under the proposed project, prescribed burning and forestry management have the greatest potential to affect soil resources. These activities could result in the exposure or disturbance of relatively large areas of soil, which would be subject to erosion. Although the guidelines in the proposed EBWMP stipulate developing and implementing BMPs, these measures are discussed only on a general level and may not adequately address all of the relevant issues. Therefore, this impact is considered significant. Refer to the section of mitigation measures below for a discussion of relevant measures to reduce this impact to acceptable levels. It is important to note, however, that these practices reduce the likelihood of catastrophic fire, which would result in substantially greater impacts on soil resources than the impacts of the practices themselves.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Despite the potential for localized significant impacts, the overall effect of the proposed project would be a substantial improvement of soil conditions throughout the watershed areas in comparison to existing conditions.

Geology

Overview

The proposed EBWMP includes few policies that would affect geologic resources. The environmental education program would encourage the use of the geologic resources of the watershed, such as fossil sites and the Siesta Valley area, for educational purposes. Overall, no significant impacts, either beneficial or adverse, are anticipated.

Mitigation Measures

Reduce Impacts from Exposure of Soils to Erosion

The final EBWMP should be modified to specify that BMPs must be developed and implemented to reduce impacts from exposure of large areas of soil to erosion that might result from management activities.

VEGETATION

Overview

The proposed EBWMP would initiate new policies and activities to ensure the protection, enhancement, and restoration of vegetation resources. The proposed plan would emphasize management of vegetation resources using an ecosystem approach. This approach would, to the extent feasible, use grazing, fire, and other management tools in ways designed to mimic the natural functions of ecosystems.

The management programs for water quality, biodiversity, livestock grazing, and fire and fuels management would provide substantial benefits for vegetation resources throughout District watershed lands. The forestry and agriculture programs would have more localized beneficial effects. The programs for visual resources and cultural resources, recreation and trails management, and environmental education are not expected to have substantial positive or negative effects on vegetation resources.

Benefits

The proposed project would provide benefits to vegetation in comparison to existing conditions. These benefits include general protection of vegetation resources and protection for threatened and endangered species as required under CEQA and the state and federal Endangered Species Acts.

Enhancement of Riparian Habitat

Riparian habitats would be protected and enhanced to improve biological resource conditions and protect water quality. Actions taken to maintain and enhance riparian habitat would include eliminating livestock grazing from some lease areas and restoring riparian, aquatic, and wetland habitats. These habitats contribute substantially to the area's biodiversity and have been degraded by past land uses.

Maintenance of Fire-Dependent Communities

The fire and fuels management program would expand use of prescribed fire to restore fire-dependent vegetation communities, including knobcone pine forest and chamise-sage chaparral. Active management would prevent continued decline in the vigor of these communities under existing fire management policies, which focus primarily on fire

prevention and suppression. The size of individual prescribed burns and the total acreage treated would not exceed the size and frequency of naturally occurring fires.

Reduction of Effects of Large Wildfires

Implementing a strategic fire management program would provide improved wildfire control, thereby reducing the potential for a large, intense fire. Such a fire, although an infrequent event, could substantially reduce biodiversity values by eliminating a sizeable area of habitat (possibly leading to extinction of local species) and reducing age-class diversity of various habitats.

Restoration of Native Woodlands

Implementing the forestry program would involve the long-term replacement of much of the non-native eucalyptus and Monterey pine forest with native woodland species, where such restoration is biologically feasible. This restoration would benefit native plant species.

Reduction in Livestock Grazing Levels

Reducing levels of livestock grazing under the proposed EBWMP would assist the recovery of riparian, native grassland, and other vegetation communities that are sensitive to grazing pressures.

Reduction in Effects of Agricultural Operations

Existing agricultural operations in the Pinole watershed would be discouraged under the proposed EBWMP and would likely be replaced by other, less intensive forms of agricultural activity. This change would probably improve the condition of riparian habitat adjacent to the currently farmed areas.

Impacts

The proposed EBWMP would result in few impacts on vegetation communities. The proposed project is designed to maintain and enhance biodiversity, and measures to prevent other management activities from adversely affecting vegetation have been incorporated into the plan.

Vegetation Modification to Reduce Fire Risk

Fire protection in areas of high fire risk will require regular treatment to maintain or reduce fuel loading in some areas. The plan directs watershed managers to select from available fuel treatment options to reduce or avoid impacts on biological resources. Nonetheless, fuel treatments will require site-specific modification of vegetation by grazing, disking, thinning and pruning, prescribed burning, and other treatments.

The proposed EBWMP incorporates guidelines to ensure that fuel treatments do not result in significant impacts on threatened and endangered species and that effects are avoided wherever possible in important habitat types (e.g., riparian habitats). With these incorporated guidelines, the effects of the plan and individual effects of fuel treatment projects conducted under the plan are considered to be less than significant.

Short-Term Vegetation Disturbance during Conversion of Non-Native Forest

Conversion of Monterey pine and eucalyptus stands to native vegetation is recognized as a long-term benefit of management under the EBWMP. Such conversion, however, would require disturbance of these stands, which support varying amounts of native vegetation that has invaded the understory of the non-native forest stands. Many of these native invaders would be disturbed during removal efforts.

Short-term effects on native vegetation would be reduced by incorporating protection measures into conversion activities. These measures include conducting surveys and protecting special-status plant species and, where feasible, protecting native understory species from disturbance (especially trees and shrubs that could grow to replace non-natives). Therefore, although disturbance to some native species is inevitable, short-term impacts would not be significant.

Loss of Vegetation Resulting from Development of Recreation and Administrative Facilities

Construction of trails, other recreation facilities, and various administrative uses are likely to require removal or modification of vegetation. Disturbance of even a small area of vegetation could result in a significant impact if a special-status species or uncommon vegetation community (e.g., redwood forest) were disturbed. The EBWMP, however, incorporates implementation guidelines for siting ground-disturbing activities to avoid these impacts. Measures specified include surveys for special-status species; consultation as required under state and federal laws; and mitigation to avoid, reduce, or offset impacts.

Vegetation Succession Following Grazing Reduction

Relaxation of grazing in many areas would promote succession from grassland to shrub and woodland habitat types, which would increase the populations of some species and reduce others. This effect would be partially offset by initiating a prescribed burning program to maintain a desirable mix of grassland and scrub habitats. No threatened or endangered species are anticipated to be detrimentally affected by grazing reduction.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Although some localized adverse effects would result, the proposed EBWMP would result in substantial improvements to vegetation resources throughout the watershed areas over time.

WILDLIFE

Overview

Natural resource management programs, including those dealing with water quality, biodiversity, forestry, livestock grazing, and fire and fuels management, would provide benefits to wildlife through enhancement of habitat conditions. Community resource programs regarding developed recreation, trails, visual quality, cultural resources, and trails would not have significant impacts on wildlife resources.

Benefits

The proposed EBWMP would continue to provide benefits to wildlife. These benefits include protection of suitable habitat conditions for many wildlife species and special protection, as required by law, for threatened and endangered species.

Enhancement of Habitat Conditions for Native Wildlife Species

Habitat enhancement activities described under "Vegetation" also would provide benefits for wildlife resources. Riparian habitat enhancement would benefit wildlife species associated with this habitat. Many of the special-status species on District lands, including the California red-legged frog and western pond turtle, would benefit from restoration and recovery of riparian vegetation. Similarly, maintaining a diversity of age classes in fire-dependent communities would enhance the wildlife species diversity in these habitats.

Taking additional actions to prevent large, catastrophic fires also would maintain habitat age-class diversity throughout the entire landscape and encourage a variety of wildlife species. Controlling disruptive non-native species would prevent encroachment of plant species that are of low value to native wildlife. In addition, restoring native woodlands would encourage the spread of species that are native to East Bay habitats.

Protection and Enhancement of Special-Status Wildlife Species and Their Habitats

The District, under the proposed EBWMP, would increase management efforts that would benefit listed and other sensitive wildlife species. Efforts to monitor, protect, and enhance habitat conditions and populations of threatened, endangered, and other special-status species would increase, subject to financial and other management constraints.

The District would inventory and monitor listed threatened and endangered species to ensure adequate information to protect species from impacts of management actions. The District would continue implementation of the Biological Survey Studies Program (Stebbins 1994) to collect information on and monitor for other sensitive species. Information would be maintained in a geographic information system (GIS), which would be used by watershed managers to identify protection needs during project planning.

The net result of this increased effort would be to enhance habitat conditions and populations of special-status species and to increase the level of protection for these species during implementation of management actions.

Maintenance of Conditions for Large-Scale Wildlife Dispersal

The EBWMP recognizes the important role of District lands in maintaining habitat connections with other large habitat areas and includes policies to maintain and enhance habitat conditions in key animal movement corridors. The plan also would commit the District to participate in multiagency planning and management efforts to maintain connections between habitat areas. The Caldecott Tunnel corridor (which crosses above SR 24) is one such corridor where management actions must be carefully designed to protect and enhance wildlife movements.

The planning and land management actions proposed in the EBWMP would help maintain habitat connections in the East Bay area. Long-term maintenance of regional movement corridors, however, will require the cooperation of a variety of agencies in addition to the District. Such cooperative planning efforts are underway.

The ultimate benefit of these activities would be the continued existence of populations of mammal species that are most sensitive to habitat fragmentation, such as the mountain lion and other large mammals.

Impacts

Effects of Vegetation Changes on Wildlife

Fuel Treatment. Fuel modification activities that disturb vegetation (e.g., disking, grazing, pruning) also would affect associated wildlife species. The plan specifies that, for individual projects, treatments should be selected that avoid significant impacts on vegetation and wildlife resources. The plan also specifies procedures to ensure that threatened and endangered species will be evaluated and protected as required by law.

Facilities and Trails. Habitat disturbance during construction of developed recreation facilities, administrative facilities and uses, and trails also would affect associated wildlife species. Measures to protect listed species and to mitigate for impacts on wildlife species would be incorporated into individual project plans. Little habitat would be lost because of the facilities proposed under the plan, and impacts are considered less than significant.

Vegetation Succession Following Grazing Reduction. The increase in coastal scrub and decrease in grassland under the proposed EBWMP (caused by grazing reduction and more limited use of prescribed fire to maintain grasslands) would modify wildlife communities. Populations of species that depend on grassland habitats would decline, whereas shrub-dependent species would increase. These effects are considered a less-than-significant impact.

Impacts of Forest Management

Disruption of Nesting and Roosting Areas for Sensitive Species. Several special-status wildlife species nest and roost in non-native forests and could be disturbed during forest management activities. These species include bald eagles, which roost during winter in non-native trees near reservoirs, and golden eagles, which have been reported to nest in Monterey pines. Ospreys also may use Monterey pines for nesting now or in the future.

Non-native trees are used by herons and egrets as communal nest sites (i.e., rookeries). Although herons and egrets are not designated as special-status species, their rookeries are locally important and are susceptible to human disturbance.

Disturbance could be a significant impact if it constituted harassment of an endangered species (e.g., in the case of the bald eagle). Implementation guidelines in the EBWMP specify procedures that meet legal protection requirements for threatened and endangered species. Implementing these measures during site-specific planning for harvesting non-native forest trees would avoid significant impacts.

Other sensitive wildlife species could be disturbed directly if tree harvesting were to occur when the trees were being used by sensitive species. Disturbance that would displace adults from nests and cause mortality of young would be considered a significant impact.

Long-Term Reduction in Nesting and Roosting Habitat for Sensitive Wildlife Species. Conversion of non-native forest to native woodland could reduce the availability of nesting habitat for sensitive raptors, herons, and egrets and roosting habitat for bald eagles. Forest conversion also could reduce the habitat available for these species in the future.

If these habitat changes reduced populations of sensitive species, the impact would be considered significant. Making conclusions regarding the magnitude of population effects

is difficult, however, because comprehensive information is lacking on these species' use of alternative native habitats, and thus on their ability to relocate to alternative sites. In addition, even without active management to convert stands, the suitability of non-native forests will decline in the long term through natural mortality. The impact of long-term habitat conversion is considered potentially significant (i.e., the impact is speculative but would be significant if it occurred).

Reduction in Species That Favor Non-Native Forests. Harvesting non-native forest to restore native woodland and reduce fire hazard could modify habitat for some species that favor these habitats. For example, bird species such as hummingbirds and orioles rely on nectar produced by eucalyptus flowers, and various seed-eating birds feed on eucalyptus seeds. Similarly, certain birds characteristic of native conifer forests (e.g. pygmy nuthatch and golden-crowned kinglets) are more abundant in non-native Monterey pine forests than in native woodlands. Most of these differences in abundance are minor, and potential changes in wildlife populations and diversity are not considered significant.

Impacts of Recreation Disturbance

Increased human access resulting from new hiking trails could increase disturbance of sensitive wildlife species during the nesting season. The potential for this impact is limited to the few new areas where trail access is proposed. The proposed EBWMP contains guidelines that encourage the seasonal closure of trails to protect sensitive species such as nesting raptors. Therefore, this potential impact is considered less than significant.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Although localized significant impacts could result, implementing the proposed EBWMP would substantially improve conditions for most wildlife species, including special-status species, throughout the District's watershed areas.

Mitigation Measures

Provide Buffer Areas to Reduce Disruption of Nesting and Roosting Areas for Sensitive Species during Timber Harvesting Activities

The District should add an implementation guideline to the plan specifying that seasonal buffer areas will be established for timber harvesting activities in non-native forests to avoid displacing raptors, heron, and egrets from active nest sites.

Protect against Long-Term Reduction in Nesting and Roosting Habitat for Sensitive Wildlife Species

The District should include an implementation guideline in the EBWMP that identifies the need for development and implementation of habitat protection guidelines for nesting raptors, herons, and egrets in future forest management plans. Protection measures should be developed to ensure that habitat areas now in use are identified through inventories and protected during harvest operations and that suitable habitat is maintained over the long term through management actions.

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CULTURAL RESOURCES

Overview

Many management activities identified under the proposed EBWMP could affect cultural resources. For example, the construction of new trails, firebreaks, and recreation facilities could disturb known and unknown archeological and historical sites. In addition, forestry and fire and fuels management programs could disturb relatively large areas.

Benefits

Increased Protection of Cultural Resources

The cultural resource management guidelines developed under the proposed EBWMP contain numerous provisions requiring the District to avoid new impacts on cultural resource sites where possible. These guidelines stipulate such actions as conducting records searches and surveys to identify and avoid sites before ground-disturbing activities are begun, and designating areas that may contain buried cultural resources as "sensitive" and ensuring that these areas are monitored during surface-disturbing activities.

Reduced Effects of Ongoing Management Programs

Many of the proposed management programs would reduce the potential for effects from ongoing District programs. For example, reducing the intensity and area subject to livestock grazing would reduce any ongoing effects related to cattle. Similarly, the cultural resource management program calls for the identification and protection of sites that are particularly vulnerable to vandalism.

Impacts

Potential Effects on Known and Unknown Cultural Resources during Ground-Disturbing Activities

The guidelines of the cultural resource management program do not specifically address potential impacts of prescribed burning and other activities related to fuels management because these activities do not meet the typical definition of ground-disturbing activities. Because prescribed burns could damage or destroy important cultural resources

or components of sites, this potential impact is considered significant. It is important to note, however, that by reducing the risk of catastrophic fire, prescribed burning and other fuels management activities also protect cultural resources from fire-related damage.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Based on this analysis, impacts on cultural resources under the proposed plan are generally considered beneficial. Mitigation measures for identified significant impacts are discussed below.

Mitigation Measures

Instruct Fire Management Personnel to Protect Cultural Resources during Fire and Fuels Management Activities

The final EBWMP should be modified to specifically incorporate guidance for fire management personnel regarding the need to protect cultural resources during fire and fuels management activities.

FIRE HAZARD AND RISK

Overview

The proposed EBWMP would establish a fire and fuels management program to conduct fire protection, fuel reduction, coordinated strategic planning, and information gathering activities to achieve a high level of fire protection. By increasing fire management activities according to a focused and coordinated plan, the proposed EBWMP would increase protection of human life and safety and property values at risk, especially near urban/watershed interface or intermix areas. The plan also would provide more comprehensive fire protection on watershed lands to protect public safety, water quality, and other resource values.

The proposed plan incorporates fuel modification, hazard abatement, and risk mitigation to achieve a high level of fire protection. The plan identifies, prioritizes, and strategically links fire and fuels management treatment areas to reduce wildfire hazards and risks throughout the watershed. Natural fuelbreaks, firebreaks, fire roads, and proposed areas for vegetation modification are combined into a strategic fire and fuels management system. Vegetation modification would create a mosaic of habitat types, age classes, and fuel conditions in strategic areas.

The fire and fuels management program would greatly enhance fire response by maintaining firesafe routes to and from preplanned containment or control lines. The proposed project places the highest emphasis on identifying the areas of high hazard and fire risk and the most appropriate method of mitigation for each area. The system would allow low-intensity fires to be contained within defined areas and thus reduce the potential for a catastrophic wildfire.

Fire planning would be integrated with other resource management activities to meet additional management objectives. This balance requires efficient use of planning resources, strategic implementation, and coordination with other management programs and adjacent management jurisdictions.

Benefits

The EBWMP fire and fuels management program would substantially reduce the wildfire threat throughout the watershed. The proposed EBWMP would provide enhanced fire protection for adjacent urban/watershed interface and intermix areas, high-hazard native or non-native forests, and other areas of strategic importance. This program would reduce fire hazard and risk while enhancing fire response.

Provision of a Strategic Fuelbreak and Firesafe Road Network

The program would provide firesafe routes on the existing network of highways, fire roads, and trails. The road network would serve as a foundation to link natural fire barriers, fuelbreaks, and proposed treatments into a strategic fuelbreak network to prevent the spread of a catastrophic wildfire and design preplanned fire suppression containment and control lines. The strategic fuelbreaks and the firesafe road network would substantially reduce the potential for a fire that could have catastrophic effects on the urban/watershed interface and on the watershed.

Mitigation of Highest Fire Hazard

The proposed EBWMP focuses fuels management and fire protection activities within areas of highest fire hazard, especially interface areas. Improving control of livestock grazing through strategic fencing to reduce fuels in key areas near the urban/watershed interface would reduce fuel loading in areas where this is most important.

Reduction of Fire Risk and Potential for Wildfire Ignitions

The fire and fuels management program for the EBWMP would implement various actions to reduce fire risk throughout the watershed. This risk reduction is founded on a program of firesafe fuel treatments along public access roads and trails and the use of a fire danger rating system to regulate public and District activities.

Criteria for closing roads and trails, restricting use, and initiating fire patrols would be established based on a daily fire danger rating. Public education would increase the overall wildfire awareness of watershed users and adjacent interface residents. Strategic treatments around interface or intermix areas also would reduce the potential for and spread of fire from the urban/watershed interface area.

Enhancement of Fire Response

The safety and effectiveness of fire suppression activity would benefit from firesafe road treatments, preplanned containment and control lines, and the strategic fuelbreak network. Ground-based and aerial fire suppression activity would be enhanced by implementing fuels management treatments and linking response planning to the overall resource management planning process. Key natural barriers to wildfire, firebreaks or plowed control lines, and fuelbreaks would be identified during fire management planning and enhanced where feasible by strategic fuels management treatments. Improved

coordination with neighboring urban and wildland fire agencies would enhance the effectiveness of overall wildland fire response.

Proactive Fire Protection Planning

The continuing encroachment of urban development on or near the District's boundary can increase fire risk for such development if land use planning does not include a buffer zone between the development and District watershed land.

The proposed EBWMP encourages more efficient and effective fire protection at the urban/watershed interface by encouraging the District to actively participate in coordinated multiagency fire management planning for existing or potential interface areas. These planning efforts may involve development of coordinated resource management plans, coordinating fire response with other agencies and jurisdictions, homeowner education programs, and active participation in land use planning processes of neighboring jurisdictions.

Watershed Hazard Abatement and Reduction by Other Resource Management Activities

Vegetation treatments performed primarily to address other resource objectives also would provide fire and fuels management benefits. The use of prescribed fire to restore fire-dependent habitats, maintain a mix of grassland and brush, and protect water quality from catastrophic wildfire would reduce the existing fire hazard in these communities.

Long-term replacement of non-native species (e.g., Monterey pine and eucalyptus) with native plant communities also would reduce fire hazard and risk substantially. These species create high-hazard fuel conditions and are extremely susceptible to burning intensely under extreme weather conditions. Selective management of some non-native forests to increase vigor in the short term would also reduce fire hazard. Control of eucalyptus stump sprouting would help to mitigate fire hazard factors such as stand density and understory ladder fuels.

Control of certain noxious weeds and invasive plants would reduce wildfire hazards and risk and prevent invasions that could create complex fuelbeds with a high fire hazard rating.

Impacts

Implementing the proposed EBWMP would satisfactorily manage risks to public safety on watershed and adjacent interface lands. The EBWMP incorporates a framework to identify sensitive areas or areas of conflict and coordinated resource management planning to select the most appropriate management action that would reduce adverse impacts and improve the level of watershed fire protection. This plan provides flexibility for the fire and fuels management program to accommodate avoidance and mitigation during project-level planning and implementation.

Increase in Potential Fire Risk by Relying on Fuel Modification Techniques Other than Extensive Grazing

Livestock grazing has been the primary technique used to maintain low fuel volumes on most of the watershed lands. The EBWMP would reduce the extent and intensity of grazing to about half of its historical level. Grazing would be replaced in some areas by a variety of site-specific fuels management alternatives. Grazing would continue to be conducted along interface areas; where grazing does not occur, mechanical or manual treatments for annual maintenance would increase.

Under the proposed EBWMP program, the District would continue to treat wildland fuels effectively. The proposed program, however, is more expensive and requires more expertise than does the current grazing-based program. Phased implementation would likely occur during the transition period following plan adoption.

Incomplete implementation of fuel control measures could increase fire risk on the watershed and adjacent lands. The likelihood of such an impact cannot be assessed at this time, but if it occurred, it would be significant. Thus, it is considered a significant impact.

Safety Concerns Related to Prescribed Burning Treatment

Prescribed burning activity poses an increased safety risk to District staff, visitors, and adjacent landowners. The EBWMP and fire management plan require that evacuation procedures, containment and control lines, smoke management, burning prescriptions, deployment of fire containment resources, and burning procedures are included in controlled burning plans. These measures are designed to increase the safety of this activity.

The potential for escape of prescribed burning activity also would be substantially reduced through this preplanning process. Because the District sets criteria for prescribed burning, this activity would not be permitted when fire suppression resources are limited or under dangerous weather conditions. Risks necessary for wildfire containment would be

avoided through proper preparation and planning before ignition. Therefore, this impact is considered less than significant.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Implementing the proposed EBWMP would result in substantial improvements to the existing fire and fuels management program operated by the District. Although the risk of a catastrophic fire cannot be entirely eliminated, the proposed fire and fuels management program would substantially reduce the risk of such a fire.

Mitigation Measures

Ensure Implementation of Fuel Treatment Measures

To reduce the potential for incomplete implementation of fuel control measures, the District should adopt clear direction in the EBWMP specifying that:

- implementation of the fuels management program is a critical objective of the EBWMP and
- grazing will continue to be used, as necessary, for fuel control until alternative measures are in place to fully address fire hazards.

VISUAL RESOURCES

Overview

Many of the activities proposed as part of EBWMP management programs could have beneficial effects on watershed visual resources. Activities proposed or encouraged under the water quality, biodiversity, and forest management programs are intended to protect and enhance important watershed resources for water quality and ecosystem management purposes. Water quality management activities would ensure that soil resources are protected and important riparian areas are restored. Biodiversity management would ensure that populations of sensitive and native species are maintained and enhanced and that non-native communities are controlled. Forest management activities would ensure the health of non-native forest stands and provide phased replacement with native forests.

Activities recommended under several of the proposed management programs could disturb watershed lands and affect small areas of the watershed's visual resources. These activities could include prescribed burning and other fuels treatments under the fire and fuels management program, some recreation management activities, trail construction, and livestock grazing.

Benefits

Improved Visual Quality of the Watershed

The proposed EBWMP would provide benefits for visual resources by providing guidelines that would direct watershed managers to consider effects of other watershed programs on visual resources. Watershed programs that may require modification of the natural landscape, such as fire treatment, grazing, and forest management, would be reviewed to ensure that they do not adversely affect important visual resources on watershed lands.

The proposed EBWMP would also provide for improving visual resources in developed portions of the watershed by developing and implementing unified design standards for recreation and administrative facilities, signs, and other improvements. The visual resource program under the plan would also provide for District staff coordination with local land management jurisdictions to ensure that important visual resources on watershed lands adjacent to District property were managed to maintain the current visual character.

Improved Viewing Opportunities

Development of the San Francisco Bay Ridge Trail under the proposed EBWMP would provide additional public viewing opportunities of the San Pablo Reservoir and Pinole watersheds. Designating Inspiration and Bear Creek Trails south of San Pablo and Briones Reservoirs as the American Discovery/Mokelumne Coast-to-Crest Trail, a regional connector, may also provide increased opportunities to view the reservoirs and natural landscape.

Impacts

The proposed EBWMP would result in only minor visual resource impacts. The EBWMP contains guidelines that limit the amount of landscape and vegetation disturbance that is permitted on District-owned watershed. Visual resource guidelines are provided to ensure that management activities are consistent with objectives to maintain and enhance visual resources in the watershed areas.

Site-Specific Changes in Watershed Visual Quality

Watershed management activities under the proposed EBWMP, including fuels treatment activities (e.g., prescribed burning, grazing, disking, and thinning and pruning), forestry practices, and recreational trail and facility construction, could modify the visual quality of the natural landscape. Visual resource effects are a concern on dominant ridges, in wooded areas, along established trails or roads, and at reservoir shorelines where an adverse effect on visual quality would be particularly evident.

Mechanical fuel reduction and trail and facility construction are not expected to increase substantially under the proposed EBWMP and are not expected to affect important watershed visual resource elements. Mechanical fuel reduction would take place only on a limited basis in specific areas near urban development. New trail construction would occur only in the San Pablo Reservoir and Pinole watersheds for the San Francisco Bay Ridge Trail regional connector. Trail construction would involve a relatively small amount of landscape disturbance and is designed to reduce visual resource impacts.

Prescribed burning practices and forest management under the proposed project may create visual resource impacts that are not fully addressed by the EBWMP guidelines. These activities could result in temporary disturbance of relatively large portions of vegetation in the watershed. Prescribed burning of grassland areas near the District watershed boundary could result in relatively large, devegetated, blackened areas that would change the quality of views near urban/watershed interface areas. Forest management, such

as conversion or thinning of non-native forest, could also affect the watershed's visual resource quality in highly visible ridgeline and hillside forests.

The potential for these changes to adversely affect the reservoir watersheds is unlikely; the visual resource effects of the programs would be temporary, and both programs are intended to reduce the potential for a catastrophic fire, which could result in much more severe visual resource impacts. Therefore, this impact is considered less than significant. No mitigation measures are required beyond the visual resource management guidelines that are already proposed under the EBWMP.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Considering all the management programs proposed under the EBWMP, including the beneficial effects of the visual resource management program, the proposed project is expected to result in beneficial visual resource impacts in comparison to existing conditions.

LAND USE

Overview

Management programs under the proposed EBWMP that could potentially result in land use conflicts with adjacent property include fire and fuels, and trails management. Livestock grazing would be reduced under the proposed EBWMP.

Benefits

The proposed EBWMP would provide benefits for the District's management program coordination process by formalizing a mechanism to ensure that program activities take into account possible impacts on other programs. The EBWMP would also provide for increased fire hazard management at the urban interface and ensure that land use proposals on adjacent property are well coordinated and consistent with District watershed management programs.

Impacts

Conflicts with Management Program

Under the proposed EBWMP, conflicts could arise between two or more watershed management programs regarding the preferred allocation of District resources and watershed lands. The proposed EBWMP emphasizes water quality, biodiversity, forestry, and fire and fuels management of the watershed. Management activities implemented under each of these programs may not always be consistent with activities of the other programs.

For example, proposed management programs could conflict with existing uses or programs allowed on the watershed. The District allows recreation and agricultural uses on watershed lands, and no major changes in these programs are proposed. Conflicts could arise between the natural resource management emphasis of the proposed EBWMP and recreation and trail activities allowed on the watershed.

Conflicts could also arise between biodiversity management and the use of watershed lands for red oat hay farming and horse pastures. Because these agricultural leases necessitate maintaining a vegetation monoculture, attempts to enhance species diversity could conflict with these activities.

Although conflicts between existing and proposed watershed management activities are possible under the proposed EBWMP, these impacts are considered less than significant because these conflicts are unlikely to result in adverse environmental effects and because the management programs described in the EBWMP provide a mechanism for coordination with other resource management programs to reduce land use conflicts.

Conflicts with Adjacent Property

Implementing the proposed EBWMP would result in few watershed management conflicts with adjacent non-District watershed property because the primary emphasis would be on preserving and enhancing natural resources in watershed areas. Fire and fuels management activities could result in temporary dust and smoke nuisances when mechanical fuels reduction or prescribed burning activities take place near residential areas. These nuisances are expected to be relatively minor, however, especially considering the long-term benefits of fire hazard mitigation.

The San Francisco Bay Ridge Trail extension through the San Pablo Reservoir and Pinole watersheds crosses non-District watershed land within 0.5 mile of two residential development areas near Sobrante Ridge Road and Goat Road. Because trails would not abut residences in these areas, the potential for increased nuisance or trespass complaints associated with trail use is considered a less-than-significant impact.

Urban and suburban encroachment on adjacent non-District watershed lands could result in new conflicts with programs proposed under the EBWMP, although direct conflict with District management activities would be unlikely unless development occurs at or near the District property boundary. Land use conflicts or nuisances could occur in Canyon in the Upper San Leandro Reservoir watershed; Orinda in the Briones Reservoir watershed; and Richmond, Pinole, and Hercules in the Pinole watershed.

Under the EBWMP, District staff would also increase and formalize coordination efforts with local adjacent land use jurisdictions to ensure that District watershed actions and adjacent property uses are consistent.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Overall, the proposed EBWMP is expected to result in beneficial impacts on adjacent land uses because the recommended use of District property would consist primarily of natural open space and would be better coordinated with adjacent land uses than under existing conditions.

RECREATION

Implementing the proposed EBWMP could result in beneficial and adverse impacts on recreation uses now occurring on East Bay watershed lands. Overall, the proposed EBWMP would continue to allow existing recreation activities on East Bay watershed lands that are compatible with water quality and biodiversity management goals. Proposals for new facilities and uses would be reviewed on a case by case basis.

Overview

Most resource management programs are not expected to result in substantial changes to recreation opportunities now occurring on East Bay watershed lands. The developed recreation management program would continue to allow activities at already developed sites and would require the District to provide a detailed assessment of proposed activities. The water quality and fire and fuels management programs could involve short-term restrictions on existing recreation activities. The biodiversity, forestry, and livestock grazing management programs could result in long-term secondary benefits to recreation by enhancing biodiversity and ensuring that proposed management activities do not substantially alter the open space quality of the watershed lands. Other management programs are not expected to affect recreation.

Benefits

Increased Access to East Bay Watershed Lands

Access to developed recreation sites by the disabled community would be enhanced under the proposed EBWMP. The proposed plan contains substantive provisions to increase access to existing sites and to provide additional access to watershed areas for people of all physical capabilities.

Increased Recreational Opportunities

Under the proposed EBWMP, new regional trail connectors would likely be added to the trail system. The trail permit system may also be modified to ensure that permits can be obtained more easily by the public.

Enhanced Recreation Opportunities

Enhancing biodiversity as proposed under the EBWMP could benefit nonconsumptive recreation opportunities by increasing the diversity and abundance of native plant and wildlife species on East Bay watershed lands.

Impacts

Continuation of Activities at Developed Recreation Sites

Recreation opportunities provided at developed recreation sites (San Pablo, Lafayette, and Chabot Reservoirs) would not be adversely affected by the implementation of the proposed EBWMP. The management program for developed recreation sites would not result in a reduction in the number of developed sites or substantially constrain existing uses at those sites.

Water-dependent (boating and fishing) and water-enhanced (picnicking) activities at these sites would continue. Management of existing recreation facilities may be modified to reflect the goals of the water quality management plan; however, these modifications are not expected to substantially affect existing uses at these sites.

Implementing the proposed EBWMP would not substantially change existing recreation opportunities associated with developed sites.

Restrictions on Trail Use and Access during High-Risk Periods

Use of existing trails within the Briones, San Pablo, Lafayette, Upper San Leandro, and Chabot Reservoir watersheds would continue under the proposed EBWMP. Trails linking Wildcat Canyon Regional Park, Charles Tilden Regional Park, Redwood Regional Park, and Las Trampas Regional Wilderness with East Bay watershed lands would remain open.

Hiking and equestrian trails could be closed to the public during periods when watershed resources are at risk because of wet conditions, high fire danger, or fire and fuels management activities. Restrictions on access are not expected to substantially reduce recreation opportunities associated with the trail system because closures would be of limited duration.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Compared to existing conditions, trail access and use would be enhanced under the proposed EBWMP because access to the trail system would be maintained, regional trail connectors to surrounding open space areas would be provided, the trail permit system would be improved, and biodiversity would be enhanced. Thus, the proposed EBWMP would enhance recreation throughout the watershed areas.

FISCAL EFFECTS

Overview

Under the proposed EBWMP, several programs would result in changes in District expenditures and revenues. Management programs likely to require substantial increases in District expenditures are water quality, biodiversity, forestry, and fire and fuels. Implementing other management programs, such as environmental education and cultural resources, may also result in increased District expenditures, but these increases are expected to be small. Although none of the programs under the proposed EBWMP are likely to enhance revenues, changes in the livestock grazing program are expected to decrease District expenditures. The existing developed recreation and trails programs are not expected to change either revenues or expenditures substantially. Revenues would be enhanced should the multiuse community facility (San Pablo Reservoir) and food service facilities (Lafayette Reservoir) be completed.

Throughout this section, estimates of expenditures and revenues are compared to the figures for 1989-1994 given in Table 3-15.

Benefits

Decreased Expenditures Resulting from Decreased Livestock Grazing Emphasis

Under the proposed EBWMP, the focus of the livestock grazing program would be on strategic grazing to achieve fuel management objectives. This would reduce livestock grazing on watershed lands by approximately 50%.

Reducing the intensity and area of grazing under the proposed EBWMP would substantially reduce these costs over the long term, although some short-term increases in capital expenditures may be required to construct new fences and water sources to implement the modified livestock grazing program.

Impacts

Decreased Revenues Resulting from Decreased Livestock Grazing Emphasis

Although the decreased emphasis on livestock grazing would result in decreased District expenditures, the District would also receive less revenue from a reduced grazing

program. Reducing the area grazed by 50% would probably decrease annual grazing revenues by a similar proportion.

Increased Costs Associated with the Water Quality Management Program

Under the proposed EBWMP, costs of the water quality management program would increase substantially, although the anticipated expenditures cannot be accurately estimated at this time and are subject to the annual budget development process. A large portion of these costs would result from developing and implementing BMPs for watershed activities and from increased staff time required to coordinate with neighboring jurisdictions to decrease nonpoint-source pollution that enters streams tributary to District reservoirs.

Increased Costs Associated with the Biodiversity Management Program

Under the proposed EBWMP, costs of the biodiversity management program would increase substantially, although the anticipated expenditures cannot be accurately estimated at this time and are subject to the annual budget development process. Estimating the costs to implement the biodiversity management program are especially difficult because many of the activities proposed under this program are related to and would be implemented under other management programs. For example, prescribed burning to reduce fuel loading under the fire and fuels management program would also be used, in part, to implement biodiversity management goals. Also, some activities envisioned as part of the water quality management program (e.g., riparian habitat restoration) would benefit the biodiversity management program.

Increased Costs Associated with the Fire and Fuels Management Program

Implementing the fire and fuels management program proposed in the EBWMP would require an increase in expenditures of approximately 100% of current program expenditures.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Implementing the proposed EBWMP is not likely to alter substantially the existing relationship between expenditures and revenues discussed in Chapter 3 under "Fiscal Effects". The proposed EBWMP would require resources to be shifted from some programs to other programs. The net result is likely to be a similar level of District expenditures and a slight decrease in revenues resulting from decreased livestock grazing. This overall impact is considered less than significant.

TRAFFIC

Overview

The management programs identified under the proposed EBWMP would not substantially affect traffic conditions on the local roadway network. Recreationists would continue to visit primarily San Pablo, Lafayette, and Chabot Reservoirs using local roadways. Because the recreation and trails program would not be modified substantially under the proposed project, growth in vehicle trips associated with recreation would be expected to follow the projected regional population growth rate.

Benefits

The proposed EBWMP would not create any direct benefits to the transportation and circulation system because no roadway improvements are proposed under any of the management programs to modify access to watershed lands.

Impacts

Incremental Increase in Traffic Volume

The proposed EBWMP would allow continued incremental growth in watershed recreation and trail use at established facilities that could result in an incremental increase in recreation-related traffic. Because most of this traffic occurs on summer weekends and no acute circulation problems have been identified on local roads, an incremental increase in traffic volumes is expected to have a less-than-significant impact on peak weekend and weekday traffic conditions.

Temporary Traffic Congestion Related to Special Events

Temporary traffic congestion at entrances to District recreation facilities would likely continue to occur on holiday weekends or during special events. This has been a concern particularly at San Pablo Reservoir on San Pablo Dam Road, at the Lafayette Reservoir entrance, and at the Lake Chabot entrance on Lake Chabot Road. This impact is considered less than significant.

Incremental Increase in Parking Demand

The proposed EBWMP is not expected to create adverse parking conditions at designated recreation areas because parking demand is closely linked to the expected incremental increase in recreation demand. This impact is considered less than significant.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Implementing the proposed EBWMP would have no substantial effects on traffic conditions near the District's East Bay watershed lands.

AIR QUALITY

Overview

Management programs under the proposed EBWMP are not expected to substantially affect regional or local air quality conditions. Recreationists would continue to visit recreation facilities, thus contributing vehicle emissions. A minor increase in vehicle trips associated with recreation would be expected based on the projected regional population growth rate.

Prescribed burning and mechanical fuel reduction activities under the fire and fuels management program could generate additional PM10 emissions.

Benefits

The proposed EBWMP would benefit local and regional air quality directly and indirectly by preserving watershed natural resources, reducing or avoiding landscape disturbances, restricting the level of increase of recreation facility development and use, and reducing the potential for catastrophic fire.

Impacts

Incremental Increase in Vehicle Emissions of Ozone Precursors

Under the proposed EBWMP, vehicle trips associated with recreation facilities would be expected to increase incrementally as the local population and the demand for recreation opportunities increase.

Implementing the EBWMP could result in an increase in the generation of ozone precursors (i.e., ROG and NO_x) that would be related to watershed recreation opportunities in an air basin that is already considered an ozone nonattainment area. This impact is considered less than significant, however, because the increase would be minimal and because recreation demand exists regardless of recreation opportunities on District watershed lands and, therefore, these trips would probably simply offset other trips that would occur in the absence of District recreation opportunities. In addition, by continuing to provide recreation opportunities at or near existing levels, the District is not taking any action that directly contributes to an increase in emissions.

Minor Increase in Generation of PM10

The proposed EBWMP is expected to generate relatively minor amounts of PM10 associated with watershed development and fire and fuels management because the proposed plan would not provide for increased levels of watershed development or landscape disturbance, and because mechanical and prescribed burning as fuels reduction methods would be implemented in compliance with federal, state, and local air pollution laws and regulations. The District would also provide a monitoring program to evaluate air resource impacts, if any, associated with its fuels reduction activities. This impact is considered less than significant because the watershed is not within a PM10 nonattainment area and the annual PM10 contribution of the proposed EBWMP to regional air quality is expected to be relatively small.

Overall Effects of Implementing the Proposed East Bay Watershed Master Plan

Implementing the proposed EBWMP would not result in any substantial effects on regional air quality conditions.

Chapter 5. Impacts of Alternative 2 - No-Project Alternative

This chapter describes the environmental effects of implementing the No-Project Alternative. The analysis in this chapter is programmatic and does not address most site-specific issues. Each resource section in this chapter first provides an overview of programs that could affect the resource under this alternative, and then discusses benefits and impacts. Benefits and impacts of the No-Project Alternative are compared to existing conditions.

WATER QUALITY

Overview

Under the No-Project Alternative, actions to protect and enhance water quality would be limited to the continuation of actions already being implemented by the District, along with some additional, as yet unidentified actions that may be necessary to comply with anticipated changes in drinking water quality standards.

Benefits

Under Alternative 2, it is likely that some additional actions taken to comply with anticipated changes in drinking water standards. These actions would most likely consist of reductions in the level of livestock grazing and some restoration of riparian areas and would result in some water quality improvements.

Impacts

Water Quality Effects from Facility and Trail Construction

Developed recreation and trails construction would be increased under the No-Project Alternative. Construction of new developed recreation facilities and trails would increase the amounts of impermeable surfaces, nonpoint-source pollution, erosion, and

sedimentation on District watershed lands and could adversely affect water quality. These impacts would be substantially greater than those likely to occur under the proposed project because of the increased emphasis on recreation and trails development under this alternative.

SOILS AND GEOLOGY

Soils

Overview

Under the No-Project Alternative, little change would be made in the District's ongoing management programs. Because water quality regulations are anticipated to become increasingly stringent, some increased emphasis would probably be placed on water quality protection.

Benefits

No benefits are anticipated under this alternative.

Impacts

Erosion Effects from Continued Livestock Grazing. Under Alternative 2, little additional effort would be invested to stabilize soils in areas where erosion is occurring. Livestock grazing would continue in areas that are being adversely affected, and grazing would also continue throughout the watershed at levels similar to recent historical levels. This level of grazing could result in long-term loss of soil resources through erosion and reduced soil productivity.

Soil Erosion from Facility and Trail Construction. Developed recreation and trails would be much more heavily emphasized under the No-Project Alternative. Construction of developed recreation facilities and substantial new trails would increase the amount of soil exposed to erosion and the loss of productive soils through facility placement.

Potential for Soil Erosion Following Large, Intense Wildfires. Continued management of watershed lands under the No-Project Alternative would result in a higher risk of large, intense wildfires than under the proposed project because no organized effort would be made to substantially reduce fire risk. A large, intense wildfire could result in substantial effects on soils by destroying vegetation, thereby subjecting extensive areas to erosion, and by subjecting soils to intense heat, which can have various adverse effects on soils.

Geology

As stated for the proposed project, the No-Project Alternative would not have an adverse effect on geologic resources.

VEGETATION

Overview

The programs for visual resources, cultural resources, developed recreation and trails, and environmental education are not expected to have substantial beneficial or adverse effects on vegetation.

Increased efforts to improve water quality under this alternative would likely lead to reduced livestock access to riparian areas and some restoration of degraded habitat in these areas.

The other major natural resource programs (i.e., biodiversity, forestry, fire and fuels, livestock grazing, and agriculture) would continue to operate as under existing procedures.

Benefits

Alternative 2 would not involve active enhancement of vegetation resources, and few benefits would occur as compared to existing conditions. Measures already being implemented to protect threatened and endangered species, manage vegetation through livestock grazing, and control pest species would continue in force.

Impacts

Vegetation Changes Resulting from Fire and Fuels Management

Fire Suppression. Continuation of the existing fire suppression program would cause some fire-dependent knobcone pine and manzanita chaparral and chamise-black sage scrub communities to decline in vigor. Impacts of fire suppression activities would accumulate gradually in these communities and could lead to the loss of species that are dependent on fire-created conditions. Changes in these vegetation communities could be biologically important, given the regional scarcity of these vegetation types and the potential for loss of special-status species within these habitats.

Large, Intense Fires. Emphasis on fire suppression and continuation of a limited fire containment strategy under this alternative would result in a greater potential for infrequent, intense fires of large size than would be likely under the proposed project.

Large fires would consume much of the vegetation and set back successional processes in shrub, woodland, and non-native forest habitats. In general, although such changes appear dramatic, they are part of natural ecosystem function. Because fuel may accumulate under ongoing fire suppression efforts, however, fires that start under extreme weather conditions would be likely to burn more intensely and spread more widely than would be the case under natural conditions. The need to stabilize watershed soils to prevent water quality impacts following large fires could lead the District to implement broadcast seeding of non-native grass species, which could disrupt or preclude recovery of native vegetation communities.

Loss or substantial degradation of rare communities or of listed or other special-status species resulting from intense fires and the resulting emergency watershed stabilization would be a significant impact.

WILDLIFE

Overview

Under the No-Project Alternative, most natural resource management programs would continue to be conducted as they are under existing conditions. Water quality protection would receive more emphasis, with associated benefits from habitat enhancement. Increases in construction and use of developed recreation and trails would affect wildlife species through changes in habitat and direct disturbance.

Benefits

The No-Project Alternative would not greatly benefit most wildlife species as compared to existing conditions because no increase in wildlife management enhancement activities.

Impacts

Effects of Fire-Related Changes on Wildlife Communities

Wildlife resources would be affected by vegetation changes resulting from changes in the fire regime. These changes would result from continued fire suppression and increased potential for large, intense fires. Continued fire suppression would lead to increased decadence of fire-dependent habitats. Although the resulting vegetation changes would favor the survival of some wildlife species and discourage that of others, the effect is considered detrimental because it departs from the desired mix of species, as determined based on the probable size and frequency of natural fires.

Management under the No-Project Alternative also would increase the probability of a large, intense fire. Such a fire could substantially reduce wildlife diversity by creating an artificially even-aged habitat condition.

Maintenance of High Livestock Grazing Levels

Livestock grazing would remain at high levels over much of the watershed. Maintenance of a more uniform, heavily grazed habitat condition over the watershed would favor wildlife species associated with low vegetation conditions (e.g., gophers and red-tailed hawks). Species that prefer dense grass (e.g., voles and northern harriers) would be maintained at low population levels.

CULTURAL RESOURCES

As discussed under the proposed project, some activities likely to be implemented under Alternative 2 could affect cultural resources. Under this alternative, however, the District would have no formal management plan for cultural resources. The District would attempt to limit impacts on these resources, but some effects would likely occur. Compliance with laws and regulations governing the treatment of historic and archeological resources would be implemented on a project-by-project basis, and no organized effort to establish a liaison with the Native American community would take place.

Based on this analysis, adverse impacts on cultural resources are more likely to occur under this alternative than under the proposed project.

FIRE HAZARD AND RISK

Overview

The No-Project Alternative would continue the District's fuel management and fire suppression program, which relies largely on grazing as a fuel reduction technique (see "Fire and Fuels Management" in Chapter 3, "Environmental Setting"). No new activities would be implemented under the No-Project Alternative to reduce the hazards.

Benefits

Fuel Loading Modification from High-Intensity Grazing

Livestock would continue to graze at a high intensity over much of the watershed, thereby maintaining a low fuel volume over most District lands.

Impacts

Increased Fire Hazard in High-Hazard Areas

The No-Project Alternative would continue the current, level of management afforded to high-hazard non-native forest communities (e.g., eucalyptus, Monterey pine). No plan would be implemented to convert the non-native forests to native woodlands. Forest and woodland management would be limited to those activities necessary to address the highest fire and fuels management concerns and hazardous tree removal.

High-hazard vegetative types would continue to decline in stand vigor, which would increase the amount of dead fuel and substantially increase fire hazard levels in high-risk stands. The amount of surface and aerial fuels would substantially increase in many forest and woodland areas, increasing the understory fuel ladder in areas with fuels that burn at high intensity. This fuel accumulation would substantially increase the potential for wildfires, especially under high or extreme weather conditions.

Increased Risk of Fire Ignition

Continued urban development would increase both the potential for wildfire ignition along the urban/watershed interface and visitor use of the District's watershed lands. The current level of hazardous fuels reduction and abatement treatments along roadways would be maintained under the No-Project Alternative; however, these treatments may not be adequate to offset the increased ignition potential posed by increased use of roadways and trails. As a result, potential for rapid fire spread from ignition sources along traveled routes would increase.

Limited Fire Response Capability and Resulting Safety Concerns

The fire management strategy under this alternative would not incorporate a comprehensive system of strategic fuel treatments. The No-Project Alternative would not provide firesafe routes, enhance effectiveness of fire suppression activity, or allow strategic preplanning for fire control activities. Because of the increased risk of fire ignition and increased fire hazard prompted by this alternative, the lack of strategic planning would result in a lower level of safety for personnel during fire suppression activities than is currently provided.

Because protection of life and property is the primary mission of fire protection, evacuation of watershed users could divert crucial resources from fire suppression during a wildfire. This concern could lead to more aggressive use of closure and restrictions on use to reduce fire risk during high or extreme weather conditions.

Increased Threat to Interface Lands

As fuel levels accumulate over time, the potential for a wildfire to move from the watershed boundary into developed portions of the interface or intermix area would increase. The District's lack of active involvement with adjacent jurisdictions in land use planning could lead to additional urban development along District boundaries where fire protection would be inadequate. These conditions could increase the potential for threats to life and property on adjacent lands.

Increased Potential for Large, Intense Wildfires

Under the No-Project Alternative, the potential for spread of a large, intense wildfire under high or extreme weather conditions would increase over time. This potential threat to life and property is higher under this alternative than under current conditions.

VISUAL RESOURCES

Overview

Under the No-Project Alternative, no change would take place in the District's natural resource management programs and no visual resource management guidelines would be implemented. No formal guidelines would be implemented to ensure that watershed management programs take into consideration the visual resource effects of watershed activities.

Benefits

No benefits are anticipated under this alternative.

Impacts

Effects of Recreation Development

Recreation facility and trails construction would be emphasized to a much greater degree under this alternative than under the proposed EBWMP. New facility and trail construction would create new watershed viewing opportunities and would increase the number of permanent recreation facilities, resulting in modification of the natural landscape.

Effects of Large, Intense Wildfires

Under this alternative, the risk of severe impacts on important visual resources from a large, intense fire would be greater than under the proposed EBWMP because no new organized effort to reduce fire hazards would be undertaken.

LAND USE

Overview

Management programs under the No-Project Alternative that could result in land use conflicts with adjacent property are those dealing with fire and fuels, recreation and trails, and livestock grazing.

Under Alternative 2, the District would maintain current priorities regarding reservoir water quality and expand the recreation opportunities it offered.

Benefits

No benefits are anticipated under this alternative.

Impacts

Potential Conflicts between Watershed Programs

Conflicts between current District management programs are expected to be greater under the No-Action Alternative than under the proposed EBWMP because increased development of recreation and trails and expansion of environmental education programs could present more opportunities for conflicts with the District's objective of water quality protection and because no integrated mechanism exists to ensure that the various management programs are consistent with one another.

Conflicts with Adjacent Land Uses

Conflicts between District goals and uses of adjacent property could be substantially greater under Alternative 2 than under the proposed EBWMP. The potential for developed recreation conflicts at the urban/watershed interface and potential nuisance conflicts associated with cattle grazing would also be greater under this alternative.

RECREATION

Overview

Continued management of East Bay watershed lands under the 1970 Land Use Master Plan (as amended) would allow an increase in the number of developed recreation facilities and allow access to portions of the watershed that are now closed to the public. Major additions to existing recreation opportunities include allowing public access to the east shore of San Pablo Reservoir, recreation development in Oursan Valley, and recreation development at Briones Reservoir.

Benefits

Increased Recreation Opportunities at Developed and New Sites

Management of recreation under the No-Project Alternative would continue to allow recreation at developed sites and would also permit development of new sites. Both water-dependent and water-enhanced activities would be allowed at the five East Bay reservoirs. Recreation development would be allowed in Oursan Valley.

Allowing the continued use of developed recreation sites at current levels would provide recreation opportunities at the same level as under the proposed project. Developing new sites and allowing access to all reservoirs would provide greater recreational benefits than under the proposed EBWMP.

Increased Trail Use and Access

Use of existing trails would continue under the No-Project Alternative. Establishment of new trails would be permitted in areas of the watershed not currently accessible to the public, including Oursan Valley, Scow Canyon, and lands around Upper San Leandro Reservoir.

Continuing to allow access to the trail system would benefit recreationists in the same way as would the proposed EBWMP. Allowing construction of new trails would increase the level of trail-related recreation in comparison to that under the proposed EBWMP.

Secondary benefits associated with passive recreation activities would not occur at the same level as under the proposed EBWMP because the existing plan does not emphasize biodiversity management, and thus neither does Alternative 2.

Impacts

No impacts are anticipated under this alternative.

FISCAL EFFECTS

Overview

Under the No-Project Alternative, East Bay watershed lands would continue to be managed under the existing master plan. The plan provides for increased recreation opportunities, including development of recreation sites and expansion of the existing trail system. The relative intensities of other resource management programs are not described in the existing master plan.

Benefits

Under the No-Project Alternative, expenditures for management programs relating to biodiversity, forestry, fire and fuels, livestock grazing, cultural resource, visual resource, land acquisition, and entitlements are not expected to change from their current conditions. In comparison to the proposed EBWMP, these expenditures under the No-Project Alternative would be lower.

Impacts

Increase in Costs Associated with Managing Developed Recreation Sites

Continuing to manage East Bay watershed lands under the existing Land Use Master Plan could increase the number of developed recreation sites and allow access to portions of the watershed that are currently closed to the public. Increasing public access to developed recreation sites and trails would require an increase in staffing and maintenance expenditures.

From 1989 through 1994, District expenditures for management of developed recreation sites averaged \$1.4 million annually, whereas revenues averaged \$521,000 (not including funds added to the major maintenance/capital improvement fund). Management expenses for recreational trails averaged \$231,000 annually, whereas revenues averaged \$15,900.

The current expenditure-to-revenue ratio could change if new recreation sites were developed or if public access to additional trails were allowed, based on the number of additional District staff needed to manage those facilities and whether concessionaires are hired to operate them. The ratio between expenditures and revenues probably would not

change greatly; however, because the District already heavily subsidizes recreation development, the difference between expenditures and revenues would probably increase.

Increase in Costs Associated with Maintaining Water Quality

Although the No-Project Alternative does not emphasize improving water quality, costs would probably increase as a result of increasingly stringent water quality standards expected to be imposed on the District in the future. These additional costs would be limited if no new recreation development were allowed on East Bay watershed lands. If recreation development were to increase as projected in the existing master plan, expenditures to maintain water quality could increase substantially because the District would be required to resolve water quality problems caused by additional recreation.

TRAFFIC

Overview

Under the No-Project Alternative, recreation and trail use would be greater than that described for the proposed EBWMP.

Benefits

This alternative would have no direct benefits for the transportation and circulation system because no roadway improvements are proposed under any of the management programs to modify access to watershed lands.

Impacts

Increase in Generation of Traffic Volume

The No-Project Alternative would encourage additional growth in recreation and trail use by encouraging expansion of recreation opportunities at San Pablo, Briones, and Upper San Leandro Reservoirs. Increased recreation use on watershed lands would result in traffic volumes on local roadways greater than those expected under the proposed EBWMP. Most recreation-related traffic would occur on summer weekends and no acute circulation problems have been identified on local roads. Therefore, although increased weekend traffic volumes associated with this alternative are expected to create greater circulation problems than under the proposed EBWMP, the impact would still be relatively minor.

Increase in Special-Event Traffic

Temporary traffic congestion at recreation facility entrances would likely continue to occur on holiday weekends and during special events. This concern is especially severe at San Pablo Reservoir on San Pablo Dam Road, at the Lafayette Reservoir entrance, and at the Lake Chabot entrance on Lake Chabot Road. Therefore, access problems would be greater under this alternative than under the proposed EBWMP. In addition, possible recreation development under this alternative at Briones and Upper San Leandro Reservoirs could result in additional traffic congestion compared to levels under the proposed EBWMP.

Increase in Demand for Parking

The No-Project Alternative could create greater parking demand associated with new recreation opportunities than that under the proposed EBWMP. The impact on parking facilities is expected to be relatively minor, however, because parking or staging areas would be developed for any new recreation facilities.

AIR QUALITY

Overview

Under the No-Project Alternative, recreation and trail use would increase compared to their levels. Recreation development in new watershed areas is more likely than under the proposed EMWMP; however, prescribed burning and mechanical fuels reduction could take place at slightly lower levels than under the proposed EBWMP.

Benefits

The No-Project Alternative would provide no air quality benefits.

Impacts

Under the No-Project Alternative, generation of ozone precursor and PM10 emissions would be greater than under the proposed EBWMP because the District would provide substantial new recreation opportunities, probably increasing the number of vehicle trips to the watershed. In addition, ground-disturbing activities associated with recreation use would likely be more widespread than those expected under the proposed EBWMP.

Chapter 6. Impacts of Alternative 3 - Increased Water Quality Emphasis

This chapter describes the environmental effects of implementing Alternative 3, the increased water quality emphasis alternative. The analysis in this chapter is programmatic and does not address most site-specific issues. Each resource section in this chapter first provides an overview of programs that could affect the resource under this alternative, and then discusses benefits and impacts. Benefits and impacts are compared to both existing conditions and the benefits and impacts of the proposed EBWMP.

WATER QUALITY

Overview

Under Alternative 3, protection and enhancement of water quality would take precedence over all other watershed programs. Livestock grazing and developed recreation and trails would receive much less emphasis than under the proposed project, whereas biodiversity and forestry management would have lower priority. Land acquisition and disposal would have higher priority under this alternative than under the proposed project and would focus on acquiring lands for water quality protection purposes.

As under the proposed project, environmental education, cultural resource management, visual resource management, and entitlement programs would have little or no effect on water quality.

Benefits

The actions that would be implemented under this alternative are similar to those described under the proposed project. Under the increased water quality emphasis alternative, however, the District would allocate more resources to water quality protection and enhancement than under the proposed project and additional measures would be implemented.

Impacts

Under this alternative, the primary activities that could affect water quality are related to fire and fuels management and forestry management. The impacts of the fire and fuels management program are identical to those described for the proposed project. The impacts associated with the forestry management program under this alternative would be similar to those described for the proposed project; however, because less emphasis would be placed on this program, the potential for impacts to occur would be lower and the intensity of the impacts would also be lower.

SOILS AND GEOLOGY

Soils

Overview

With the increased water quality emphasis proposed under Alternative 3, the District would focus its management programs on enhancing water quality in its East Bay reservoirs. Programs that would receive emphasis under this alternative are water quality management and fire and fuels management. The allocation of additional District resources to the water quality management program would increase the level of effort directed toward soil stabilization.

Benefits

Compared to the proposed project, Alternative 3 would result in greater benefits to soil resources because there would be an increase in the allocation of District resources to prevent soil erosion to protect water quality. Major efforts would be directed toward stabilizing soils in eroding areas, recreation and trail development and use would be deemphasized, and livestock grazing would largely be eliminated throughout the watershed.

Impacts

The fire and fuels management program would be similar to the proposed project but would focus fuel reduction efforts on mechanical and manual methods rather than grazing. These methods would probably reduce the potential for exposing soils to erosion compared to those programs as implemented under the proposed project.

The forestry management program would receive less emphasis under this alternative. Therefore, the conversion of non-native forests to native forests would take place over a longer period, reducing the amount of soil being exposed to erosion at one time.

Geology

As discussed for the proposed project, this alternative would have no adverse effects on geologic resources.

VEGETATION

Overview

Vegetation would continue to be protected under the increased water quality alternative, but efforts to restore vegetation would be focused mainly on riparian habitats.

The water quality, biodiversity, forestry, fire and fuels, and livestock grazing management programs would provide benefits for vegetation resources, but the extent of most of these benefits would be less than under the proposed project. Other programs under this alternative would have minimal effects on vegetation.

Benefits

This alternative would provide many of the benefits identified for the proposed project, including:

- riparian habitat enhancement,
- maintenance of fire-dependent communities,
- reduction of the effects of large wildfires, and
- restoration of native woodlands.

These benefits are described in detail under "Vegetation" in Chapter 4, "Impacts of the Proposed East Bay Watershed Master Plan". Consistent with the water quality emphasis of this alternative, however, several of these benefits would differ in magnitude compared to those of the proposed project.

Riparian Habitat Enhancement

More riparian vegetation would be restored under Alternative 3 through elimination of grazing from much of the watershed and active revegetation efforts. Grazing would be reduced to levels below those discussed for the proposed project. Grazing reduction also would lead to recovery of some overused areas of upland vegetation.

Maintenance of Fire-Dependent Vegetation

Fire-dependent communities would be maintained through prescribed burning only in areas where wildfire would threaten water quality or where such efforts were needed to

reduce fire hazard for public safety. Similarly, non-native forests would be converted to native forests only where water quality or public safety concerns were substantial.

Restoration of Native Woodlands

Restoration of native woodland in areas occupied by non-native forests would be restricted to areas where fire danger was high or where wildfire could result in substantial water quality impacts. Thus, benefits of restoration under Alternative 3 would be less than those under the proposed EBWMP.

Impacts

The increased water quality emphasis under Alternative 3 would result in impacts similar to those under the proposed EBWMP, including:

- vegetation succession following grazing reduction,
- vegetation modification to reduce fire danger, and
- loss of vegetation for development of trails and recreation and administrative facilities.

The magnitude of these impacts would differ slightly from those under the proposed EBWMP. Vegetation succession from grassland to scrub habitat would occur over a greater area because less land would be managed by grazing and prescribed burning under this alternative. Less vegetation would be lost to recreation and administrative facilities because fewer trails and recreation facilities would be constructed than under the proposed project.

WILDLIFE

Overview

Wildlife (including fish) would continue to be protected under the increased water quality alternative. Habitat restoration associated with water quality protection would enhance conditions for wildlife associated with riparian and aquatic habitats. Other programs would have little effect on wildlife.

Benefits

Wildlife and fish species would benefit from management programs to enhance riparian habitat, maintain fire-dependent habitats, limit the effects of large wildfires, and restore native woodlands. These benefits are similar to those described for the proposed EBWMP. Several effects would differ slightly, however, from those described for the proposed EBWMP.

An increase in riparian and aquatic habitat restoration, resulting from riparian revegetation and reduced grazing, would provide more benefits for the many wildlife and fish species that depend on these habitats.

Wildlife benefits of maintaining fire-dependent communities and restoring native forests would be restricted to key areas where treatment was needed for water quality or fire protection.

Impacts

The increased water quality alternative would have few impacts on wildlife species. Wildlife communities would be subjected to minimal impacts caused by vegetation succession under reduced grazing, localized vegetation treatment for fuels management, and loss of vegetation for development of trails and recreation and administrative facilities. Reduced grazing intensity would shift habitat conditions in favor of wildlife species that require dense grassland conditions and away from those that prefer more open conditions.

CULTURAL RESOURCES

As under the proposed project, some activities implemented under this alternative could affect cultural resources. However, the management guidelines included in this alternative, which are identical to those developed under the proposed EBWMP, require the District to avoid new impacts on cultural resource sites where possible. In addition, because of the increased water quality emphasis of this alternative, fewer activities that could affect cultural resources are likely to be implemented than under the proposed project.

Alternative 3 provides less potential for impacts on cultural resources than does the proposed project, and the impacts are generally considered beneficial. As with the proposed project, impacts could result from fire and fuels management activities.

FIRE HAZARD AND RISK

Overview

Fire and fuels management activities under Alternative 3 would be similar to those described for the No-Project Alternative; however, more emphasis would be given to providing fire protection that also meets water quality objectives (especially in areas where wildfire-related erosion, sedimentation, and siltation could occur). Some emphasis would be placed on the prevention of catastrophic wildfire spread to limit water quality impacts. Grazing extent and intensity would be reduced to protect water quality, thereby providing lower levels of fuel reduction.

Benefits

Reduced Fire Risk on Lands with High Water Quality Value

The increased water quality emphasis under this alternative would provide some fuel reduction benefits. Prescribed burning or other fuels treatments would be planned to protect water quality from effects of uncontrolled, intense wildfire. Such treatments would reduce the potential spread of ignitions in treated areas. Treatment would be of particular value in remote areas with long fire suppression response times.

Reduced Risk of Ignition Because of Human Use Restrictions

Closures and restrictions on public use to protect water quality under this alternative could reduce the potential for wildfire ignitions by further limiting access to watershed areas. The benefit, however, would be small because access to most watershed lands already is restricted somewhat.

Impacts

Increased Fire Risk from Reduced Livestock Grazing

Reduction in the extent and intensity of livestock grazing would increase fuel loading in grassland areas. Use of mechanical and manual treatments would be less cost-effective and could be constrained by water quality concerns. Increased costs and limitations would likely limit the amount of fuel reduction that could be achieved over District lands. Fire

risk would increase correspondingly for visitors, District watershed personnel, and adjacent residents.

Increased Potential for Large, Intense Wildfires

The benefits of fuels treatment to protect water quality would likely be more than offset by increased loading of fuels resulting from reduced livestock grazing and constraints on strategic fuel reduction. Areas chosen for fuel treatment to improve or protect water quality would not necessarily coincide with areas most susceptible to catastrophic wildfire spread during extreme or Foehn weather conditions. Most of the treatment areas are just east or northeast of existing reservoirs, limiting their strategic value under these weather conditions.

Reduced Involvement in Cooperative Fire Management Planning

Under Alternative 3, the focus of fire management planning would shift from reducing risk on interface lands to protecting water quality on interior watershed lands. Such a shift would reduce the effectiveness of fire safety planning compared to existing conditions. Protection would be substantially less than that provided under the proposed EBWMP.

VISUAL RESOURCES

Overview

Under this alternative, management of visual resources would receive the same emphasis as under existing conditions, which would be less emphasis than under the proposed EBWMP. Several management programs that could indirectly improve visual resources in the watershed (e.g., water quality and fire and fuels management) would be emphasized under this alternative. Alternative 3 would also slightly deemphasize the rate of conversion of non-native forest to native forest relative to the proposed EBWMP, which could reduce visual resource effects in woodland areas. An increased emphasis on acquiring adjacent watershed land for water quality protection could also provide visual resource benefits for parcels that would otherwise receive pressure from urban encroachment and development.

Benefits

Compared to the proposed EBWMP, this alternative would result in fewer benefits to watershed visual resources because no formal visual resource management program would be implemented to ensure that watershed management activities take into account visual resource consequences. This alternative would not encourage improvements in the quality of watershed facilities and signs through an integrated design approach. Visual resource benefits could occur indirectly through greater emphasis on water quality and fire management, and potentially through acquisition of adjacent parcels for watershed water quality protection. A reduced emphasis on developed recreation and trails would reduce the possibility that major physical modifications of the watershed would take place.

Impacts

The increased water quality emphasis under this alternative would likely result in only minor visual resource impacts because the water quality and forestry management programs would encourage planning of activities to preserve the natural landscape. Visual resource impacts from the fire and fuels management program would be slightly less than under the proposed EBWMP because this program would use primarily mechanical and manual methods of fuel reduction. Visual resource impacts from non-native forest conversion and developed recreation and trail management would also be less than under the proposed EBWMP because this alternative would deemphasize these landscape-disturbing programs.

This alternative would not provide a visual resource management program to ensure that important visual resources are considered when other programs are implemented. Therefore, watershed management activities under this alternative could conflict with the need to maintain and enhance important watershed visual resources.

LAND USE

Overview

Under Alternative 3, land use conflicts with adjacent property could result from activities implemented as part of the fire and fuels management and land acquisition and disposal management programs. Management of recreation and trails and livestock grazing would be substantially reduced under this alternative.

Benefits

Alternative 3 would have the greatest benefit to reservoir water quality of the alternatives considered. Alternative 3 would benefit management program coordination by formalizing procedures to ensure that program activities are planned with consideration for implications on other programs. This alternative would also provide for increased fire hazard management at the urban/watershed interface. Alternative 3 would ensure that land use proposals on adjacent property are well coordinated and consistent with District watershed management programs.

Impacts

District management programs are expected to conflict less under Alternative 3 than under the proposed EBWMP because livestock grazing, recreation and trail development, and environmental education management programs would be substantially reduced under this alternative, and because a mechanism for ensuring consistency of management programs would be implemented as under proposed EBWMP.

Conflicts with land uses adjacent to District property could be similar to those expected under the proposed EBWMP. Fire hazard management activities would be increased, reducing the potential for a catastrophic fire. The potential for conflicts with developed recreation at the urban/watershed interface and potential nuisance conflicts associated with cattle grazing would be less than under the proposed EBWMP. An increased emphasis on acquisition and disposal of watershed lands under this alternative for water quality protection purposes could ultimately eliminate some adjacent land ownership conflicts by reducing the amount of District land adjacent to conflicting uses.

RECREATION

Overview

Implementation of resource management programs under this alternative could affect recreation opportunities on East Bay watershed lands. The developed recreation management program would continue to allow activities at developed sites and require a detailed assessment of proposed activities before they are approved. The water quality management program could result in both short- and long-term restrictions on recreation activities and severe restrictions on new recreation development or uses. Implementation of other management programs under this alternative are not expected to affect recreation opportunities or associated use.

Benefits

No benefits to recreation are anticipated under this alternative.

Impacts

Developed Recreation Sites

Recreation opportunities provided at developed sites could be curtailed as a result of the water quality emphasis of this alternative. Restrictions could be placed on recreation activities at San Pablo and Lafayette Reservoirs. Development of new recreation facilities would not be expected at these sites. Recreation at Upper San Leandro and Briones Reservoirs would not be affected because these reservoirs do not have developed recreation sites.

Recreation opportunities at San Pablo Reservoir could be adversely affected because of restrictions placed on uses that affect water quality. Such restrictions could include seasonal closure of developed sites, reduced boat speeds, banning of gasoline-powered boat engines, and limited access to the lakeshore. These restrictions would enhance reservoir water quality by reducing sedimentation associated with shoreline erosion and water pollution caused by engine exhaust and fuel and oil spills. Additional restrictions could be placed on recreation activities at San Pablo Reservoir if water quality were not enhanced sufficiently after these or other restrictions were implemented.

Recreation opportunities at Lafayette Reservoir could be curtailed because of reallocation of District management resources. The emphasis on water quality could require the District to reallocate funds from the developed recreation management and trail management programs to water quality management. Impacts on recreation at Lafayette Reservoir could include seasonal or permanent closure of selected facilities.

Implementing this alternative could result in a substantial reduction in reservoir recreation opportunities at San Pablo and Lafayette Reservoirs in comparison to conditions under the proposed EBWMP.

Trail Use and Access

Use of existing trails in the Briones, San Pablo, Lafayette, Upper San Leandro, and Chabot Reservoir watersheds would continue under the proposed EBWMP. As under the proposed project, hiking and equestrian trails could be closed to the public during periods when watershed resources are at risk. These closures could be more frequent if warranted by water quality considerations. Additional restrictions on trail access compared to those imposed by the proposed EBWMP are not expected to substantially reduce recreation opportunities, however, because closures would be of limited duration.

FISCAL EFFECTS

Overview

With the increased water quality emphasis under this alternative, the District would place increased emphasis on management programs related to water quality, biodiversity, forestry, fire and fuels, cultural resources, and land acquisition. The livestock grazing, developed recreation and trails, and entitlement programs would receive less emphasis. Other programs would be funded at the same level as under the proposed EBWMP.

Benefits

Decreased Expenditures Resulting from Decreased Livestock Grazing

Compared to the proposed EBWMP, much less emphasis would be placed on the livestock grazing program under Alternative 3. The revenue lost by reducing the level of grazing would be offset by corresponding reductions in management costs. Because livestock grazing would be eliminated or substantially reduced, other expenditures required under the proposed EBWMP (fencing and water development) would not be required.

Increased Revenue Associated with Disposal of Lands

Under this alternative, the District would sell lands not needed to protect water quality. Selling excess District lands would result in a one-time increase in revenues. The amount of revenue generated by these sales would depend on the location and size of the parcels sold. The Pinole watershed is by far the largest area of land owned by the District that does not contribute to the protection of water quality in existing District reservoirs. Under this alternative, the District could consider disposing of its Pinole watershed holdings to increase revenue, which could then be used to fund additional water quality protection programs. Sale of all or a portion of the Pinole watershed would result in substantial additional revenue for the District.

Impacts

Increased Costs Associated with Fire and Fuels Management

The cost of the fire and fuels management program under Alternative 3 could be higher than that estimated under the proposed EBWMP because of the reduced emphasis on livestock grazing. Manual and mechanical methods of fuels management would be used instead of livestock grazing. Using these treatment methods could result in substantially higher costs because of increased labor expenditures and the loss of grazing revenues.

Decreased Revenues from Developed Recreation Sites

Management of East Bay watershed lands under this alternative could result in restrictions on or elimination of recreation activities at developed recreation sites. Because of the increased water quality emphasis of this alternative, these restrictions would probably be placed on activities at San Pablo Reservoir.

Restricting recreation activities at San Pablo Reservoir would result in a reduction in District revenues generated by recreation. From 1989 through 1994, revenues generated by recreation at San Pablo Reservoir and paid to the District's general fund averaged \$28,000 annually, or approximately 5% of the total annual revenue generated from developed recreation sites. The effects on the District of losing this revenue would be minimal.

Reducing activities at San Pablo Reservoir would also affect the amount of revenue earmarked for capital improvement projects. This revenue is a portion of the sales made by the concessionaire operating the facilities at the reservoir. Although the loss of this revenue would adversely affect the amount of money available for improvements to recreation facilities, the number of facilities would likely decrease as a result of restricting use at San Pablo Reservoir. Therefore, the overall impact would be less than significant.

Decreased Revenues from Sale of Recreational Trail Permits

Under this alternative, use of the recreational trail system could be restricted. District revenues from the sale of trail use permits averaged \$15,900 annually during 1989-1994. This represents approximately 7% of the annual cost of managing the recreational trail system. The amount of this revenue is minor, therefore, and would be offset by reduced management expenditures.

Increased Expenditures for Other Resource Management Programs

Expenditures for the biodiversity, forestry, and cultural resource management programs would be the same under Alternative 3 as under the proposed EBWMP. Expenditures for the visual resource and entitlement programs would be the same as or less than their estimated levels under the proposed EBWMP.

TRAFFIC

Overview

Under Alternative 3, levels of recreation and trail use would be lower than under the proposed EBWMP, reducing the potential for adverse traffic and parking impacts, especially at San Pablo Reservoir.

Benefits

This alternative would have no direct benefits for the transportation and circulation system because no roadway improvements are proposed under any of the management programs to modify access to watershed lands.

Impacts

Traffic Volume Generation

Under this alternative, recreation and trail use in reservoir watersheds would be maintained or reduced, with boating possibly eliminated at San Pablo Reservoir. Reduced recreation use on watershed lands would result in traffic volumes on local roadways that are below what is expected under the proposed EBWMP. Recreation traffic would occur primarily on summer weekends, and no acute circulation problems have been identified on local roads. Therefore, this alternative would create fewer traffic and circulation problems than under the proposed EBWMP.

Special-Event Traffic

Temporary traffic congestion at recreation facility entrances on holiday weekends or during special events could be reduced or eliminated under this alternative in comparison to conditions under the proposed EBWMP.

Parking

This alternative would create less demand for parking than would the proposed EBWMP, and no adverse impact on parking facilities is anticipated.

AIR QUALITY

Overview

Under Alternative 3, recreation and trail use would be reduced from the levels expected under the proposed EBWMP, reducing the amount of traffic-related ozone precursor emissions compared to that under the proposed EBWMP. Less dust would be generated than under the proposed EBWMP because less recreation development would occur in watershed areas. The impacts of prescribed burning and mechanical fuel reduction activities would be similar to those described for the proposed EBWMP.

Benefits

Alternative 3 would have air quality benefits similar to those described for the proposed EBWMP.

Impacts

Under Alternative 3, fewer ozone precursor and PM10 emissions would be generated than under the proposed EBWMP because vehicle trips to the watershed would likely be reduced and ground-disturbing activities associated with recreation use would take place at levels lower than those expected under the proposed EBWMP. PM10 generation from prescribed burning and mechanical fuels reduction would be similar to that expected under the proposed EBWMP.

Chapter 7. Impacts of Alternative 4 - Revenue Emphasis

This chapter describes the environmental effects of implementing Alternative 4, the revenue emphasis alternative. The analysis in this chapter is programmatic and does not address most site-specific issues. Each resource section in this chapter first provides an overview of programs that could affect the resource under this alternative, and then discusses benefits and impacts. Benefits and impacts are compared to both existing conditions and the benefits and impacts of the proposed EBWMP.

WATER QUALITY

Overview

The management programs proposed under this alternative would generally be similar to those under the No-Project Alternative. Minor differences between these alternatives are the moderately increased emphasis on forest management and fire and fuels management, and the moderately decreased emphasis on developed recreation and trails management and biodiversity management under Alternative 4 in comparison to the No-Project Alternative.

Benefits

The benefits under this alternative would be similar to those described under the No-Project Alternative.

Impacts

Under this alternative, the emphasis of the forestry management program would be to manage the non-native forests primarily to provide revenue to the District rather than to convert non-native forests to native forests. The fire and fuels management program would have a somewhat increased emphasis on fuel reduction compared to existing programs, but prescribed burning would be used less frequently because of the costs involved. Therefore,

this alternative would result in less short-term exposure of tributary and reservoir waters to nonpoint-source pollution and sedimentation but an increased risk of large, intense wildfires and associated water quality effects compared to the proposed project.

Overall, the impacts of the revenue emphasis alternative would be similar to those of the No-Project Alternative and would result in a deterioration of water quality conditions compared to existing conditions.

SOILS AND GEOLOGY

Soils

Overview

The management programs proposed under this alternative would generally be similar to those of the No-Project Alternative. Minor differences would be the moderately increased emphasis on forest management, the increased emphasis on fire and fuels management, and the moderately decreased emphasis on developed recreation and trails management under this alternative in comparison to the No-Project Alternative.

Benefits

No benefits to soils and geology are anticipated under this alternative.

Impacts

Under the revenue emphasis alternative, the focus of the forest management program would be on managing the non-native forests primarily to provide revenue to the District. The fire and fuels management program would have a somewhat increased emphasis on fuels reduction, but prescribed burning would be used less frequently because of the costs involved. Therefore, the fire and fuels management program would have less impact in the short term from the exposure of soils to erosion but an increased risk of large, intense wildfires as compared to the proposed EBWMP.

Overall, the impacts of the revenue emphasis alternative on soil resources would be similar to those of the No-Project Alternative and would result in a deterioration of soil resources compared to existing conditions.

Geology

As with to the proposed project, this alternative would have no adverse effects on geologic resources.

VEGETATION

Overview

The emphasis on protection, maintenance, and enhancement of vegetation resources would be a lower priority under this alternative than under the proposed EBWMP. This reduced emphasis would derive from differences in major natural resource programs, such as the water quality, biodiversity, forestry, fire and fuels, and livestock grazing programs. Other programs would have minimal effects on vegetation resources.

Benefits

Relative to existing conditions, actions taken under this alternative to increase water quality protection and fire and fuels management would provide some benefits, such as enhancement of riparian resources and reduced potential for large, intense fires. The risk of such fires, however, would be greater than under the proposed EBWMP.

Impacts

Management activities conducted under the revenue emphasis alternative would result in the continuation of some adverse conditions and cause some new impacts on vegetation resources. Maintaining high levels of livestock grazing would perpetuate overuse of some grassland habitats and preclude recovery of riparian habitats, except where they would be explicitly treated to protect water quality.

Forest management would focus more on generating revenue than on restoring native woodlands; as a result, non-native forest habitats would be regenerated as a source of future income. Fire and fuels management activities would be limited to attempts to reduce liability; thus, fire-dependent vegetation types would continue to deteriorate.

WILDLIFE

Overview

The revenue emphasis alternative would place less emphasis on wildlife and fishery resources than would occur under the No-Project Alternative and the proposed EBWMP.

Management emphasis in natural resource programs would focus on activities that generate revenue for the district, including increased livestock grazing, forest management to encourage non-native commercial species, and an increased level of developed recreation. Activities that do not generate revenue would decrease, including biodiversity management and fire and fuels management.

Benefits

The revenue emphasis alternative would have few wildlife resource benefits. Activities to increase water quality protection would provide some improvement in habitat conditions for riparian and aquatic species.

Impacts

Impacts of existing grazing and recreation programs on wildlife species would increase under intensified management to increase revenue generation. The increase in land area subjected to intensive grazing would reduce the diversity of grassland conditions (e.g., grazed and ungrazed), which currently provides habitat for a variety of wildlife species.

Forest management that encourages non-native trees over native woodland species would reduce wildlife diversity in these stands, although a few species that favor conifers or eucalyptus would also benefit. Continued degradation of fire-dependent communities under a fire suppression emphasis would discourage wildlife species that favor a variety of age classes in these habitats.

CULTURAL RESOURCES

As with the proposed project, some activities likely to be implemented under this alternative could affect cultural resources. Under this alternative, however, less prescribed burning and other intensive fuels management activities are likely because of their expense. Livestock grazing would be the primary method of fuel control. The cultural resource management guidelines included in this alternative, which would be identical to those developed under the proposed EBWMP, require the District to avoid new impacts on cultural resource sites where possible.

Based on this analysis, cultural resources have less potential to be disturbed under this alternative than under the proposed project. Impacts are considered beneficial.

FIRE HAZARD AND RISK

Overview

Under the revenue emphasis alternative, the District would generally continue to implement the existing fire and fuels management practices. Fire and fuels management programs would not be emphasized because such activities would require investment and would not produce annual revenue. The revenue emphasis alternative does not address long-term potential fire risk and increased fire suppression costs that may result from a lower level of fire protection.

The fire and fuels management program would be based on other management activities conducted to generate revenue, especially livestock grazing. Other, more costly treatment methods, such as mechanical and manual techniques or prescribed burning, would not be substantially employed under this alternative. Non-native forests would be managed to increase the commercial value of the forests to generate revenues for the District.

This alternative would not emphasize cooperative programs to reduce hazards on developed interface lands or actively address future threats of encroaching urban development.

Benefits

Fuel Reduction from Revenue-Generating Activity

Grazing extent and intensity would be high under this alternative, which would maintain low fuel levels in many grassland areas of the watershed. Livestock grazing areas would be designated based largely on revenue potential rather than on strategic fuel reduction needs. Many of the highest hazard areas are relatively inaccessible to livestock (e.g., at higher elevation and far from water) and therefore not suitable for increasing grazing revenue. Reliance on an economic grazing program for fuels management would provide less comprehensive and strategic fire protection than under the proposed EBWMP.

The forest harvesting activity conducted under this alternative also would reduce fuels, but efforts would not be targeted on highest priority areas for fire safety, as would the proposed EBWMP.

Sale of surplus lands would be designed primarily to enhance revenue generation and water quality protection. Failing to consider the value of land for strategic fire protection could increase fire safety risk and costs to mitigate hazards.

This alternative would provide a level of fire protection similar to that under existing conditions. This level of management and protection has been sufficient to avoid major impacts on public safety from wildfire. The fire safety benefits of this alternative, however, would be substantially less than under the proposed EBWMP.

Impacts

Higher Safety Risk to Visitors, District Firefighters and Other Personnel, and Adjacent Residents

Fuels treatment under this alternative would rely largely on revenue-generating activity (i.e., livestock grazing and forest harvesting). Many of the high-hazard and high-risk areas would receive some treatment. Treatment would not be strategically interlinked with other areas, road networks, or a strategic fuelbreak network. The revenue emphasis alternative reduces the flexibility and extent of fire and fuels management, thereby increasing the potential for catastrophic fire and providing a lower level of safety to visitors, District firefighters and other personnel, and adjacent residents than would occur under the proposed EBWMP.

VISUAL RESOURCES

Overview

In terms of the visual resource analysis, management programs under this alternative would be generally similar to those under the No-Project Alternative. This alternative would deemphasize the natural resource protection programs and focus on the fires and fuels management, recreation, and land acquisition programs. No visual resource management program would be implemented.

Benefits

This alternative is expected to provide fewer benefits than the proposed EBWMP because no visual resource protection program would be implemented and other programs would be operated with the goal of maximizing revenue rather than protecting natural resources. Public views of watershed lands could be improved under this alternative by a slightly increased emphasis on developed recreation and trails.

Impacts

Under this alternative, visual resource impacts would be similar to those described for the No-Project Alternative. No visual resource management program would be implemented, natural resource protection programs would be deemphasized, and recreation and trails development would be increased compared to the proposed EBWMP. Under these management conditions, this alternative could have a greater impact on important visual resources than the proposed EBWMP.

LAND USE

Overview

Under Alternative 4, several management programs could result in land use conflicts with adjacent property. These programs are those dealing with management of fire and fuels, recreation and trails, livestock grazing, and land ownership.

Benefits

The District would maintain current reservoir water quality priorities and provide expanded recreation opportunities and livestock grazing to maximize the revenue generation capabilities of District property.

Impacts

Conflicts between current District management programs are expected to be greater under Alternative 4 than under the proposed EBWMP because increased recreation and trails development, livestock grazing, and lease agreements could present more opportunities for land use conflicts.

The potential for developed recreation conflicts at the urban/watershed interface and potential nuisance conflicts associated with cattle grazing would be greater under this alternative than under the proposed project.

Increased emphasis on acquiring or disposing of property could reduce conflicts with adjacent land uses, however, if land were disposed of and acquired primarily to protect water quality. Disposing of property to generate revenue may not reduce conflicts with adjacent land uses if the land were ultimately used for urban development (e.g., the Pinole watershed adjacent to the San Pablo Reservoir watershed).

RECREATION

Overview

Resource management programs implemented under this alternative would not affect recreation opportunities now present on East Bay watershed lands. The developed recreation management program would continue to allow activities at developed sites and would require a detailed assessment of proposed activities before they were approved. The water quality and fire and fuels management programs could impose short-term restrictions on recreation activities. The biodiversity, forest, and visual resource management programs could have long-term secondary benefits for recreation by enhancing biodiversity and ensuring that proposed management activities do not substantially alter the open space quality of the watershed lands. The land ownership program would not substantially affect recreation opportunities because most recreation occurs on lands that would be retained to protect reservoir water quality.

Benefits

Developed Recreation Sites

Recreation opportunities provided at developed sites would continue under this alternative and proposed development of new sites would require a detailed, site-specific assessment before being approved by the District. Recreation opportunities would be similar to those provided under the proposed EBWMP.

Consideration would also be given to allowing additional uses that are consistent with the District's water quality objectives and would enhance District revenues. These uses could include development of a community center and authorization for special events. Compared to the proposed EBWMP, these additional uses would enhance the overall availability of recreation opportunities on East Bay watershed lands.

Trail Use and Access

Use of trails at Briones, San Pablo, Lafayette, Upper San Leandro, and Chabot Reservoir watersheds would continue under this alternative. The trail system would be managed as under the proposed EBWMP, and the trail system would not be expanded. When compared to the proposed EBWMP, recreation opportunities associated with trail use would not change under Alternative 4.

Secondary, passive recreation benefits associated with enhanced plant and wildlife habitat would probably be less notable under this alternative than under the proposed EBWMP because the biodiversity management program would not be emphasized.

Impacts

No impacts on recreation are anticipated under this alternative.

FISCAL EFFECTS

Overview

Under the revenue emphasis alternative, the District would place greater emphasis on increasing revenues by encouraging livestock grazing, increasing recreation opportunities, and disposing of lands not necessary to maintain water quality. Water quality, biodiversity, forest, fire and fuels, environmental education, and visual resource management programs would receive less emphasis than under the proposed EBWMP. The cultural resource and entitlement management programs would receive the same emphasis as under the proposed EBWMP.

Benefits

Increased Revenues Associated with Disposal of Lands

Under this alternative, the District could sell lands not needed to protect water quality. Selling excess District lands would result in a one-time increase in revenue. The amount of revenue generated by these sales would depend on the location and size of the parcels sold. For example, revenues would be increased substantially if District lands such as Pinole Valley were sold.

Decreased Costs Associated with Fire and Fuels Management

The costs of the fire and fuels management program would be lower under Alternative 4 than under the proposed EBWMP because of the increased emphasis on livestock grazing. More expensive fuels treatment methods, such as the use of manual and mechanical means, would be replaced by livestock grazing. When compared to methods prescribed in the proposed EBWMP, using livestock grazing as a primary fuels treatment method could reduce the costs associated with fuels treatment and increase grazing revenues.

Increased Revenues Associated with Enhanced Recreation Opportunities

Under this alternative, the number and type of special events would increase. These special events could enhance revenues through either permit sales or special-use fees. Because of the unpredictability of the timing and location of these events, the amount of

additional revenue that would accrue to the District from such events cannot be estimated. In addition, some of this increased revenue would be offset by increased management costs.

Impacts

Increased Costs to Maintain Water Quality

As under the No-Project Alternative, the cost to maintain water quality at an acceptable level would increase under Alternative 4. A large portion of these costs would result from developing and implementing BMPs for watershed activities and from increased staff time associated with coordinating with outside jurisdictions to decrease nonpoint source pollution that enters streams tributary to District reservoirs.

Because livestock grazing would be increased to higher levels than under existing conditions, District costs would also increase. These additional costs would involve increases associated with lease administration, as well as fencing and water development costs.

TRAFFIC

Overview

Under Alternative 4, recreation and trail use would be slightly greater than under the proposed EBWMP, increasing the potential for adverse traffic and parking impacts, especially at San Pablo Reservoir.

Benefits

This alternative have no direct benefits on the transportation and circulation system because no roadway improvements are proposed under any of the management programs to modify access to watershed lands.

Impacts

Traffic and circulation, special-event access, and parking impacts under this alternative would be greater than those under the proposed EBWMP and slightly less than those under the No-Project Alternative.

AIR QUALITY

Overview

Under the revenue emphasis alternative, recreation and trail use would be slightly greater than under the proposed EBWMP, increasing the levels of traffic-related ozone precursor emissions in comparison to those under the proposed EBWMP. Dust generation could be greater than under the proposed EBWMP because recreation development in new watershed areas is more likely; however, prescribed burning and mechanical fuels reduction activities could be much less widespread than under the proposed EBWMP.

Benefits

No air quality benefits would result under Alternative 4.

Impacts

Under Alternative 4, generation of ozone precursor and PM10 emissions would be slightly greater than under the proposed EBWMP because vehicle trips to the watershed would likely increase and ground-disturbing activities associated with recreation use would likely be greater than those expected under the proposed EBWMP.

Chapter 8. Impacts of Alternative 5 - Recreation Emphasis

This chapter describes the environmental effects of implementing Alternative 5, the recreation emphasis alternative. The analysis in this chapter is programmatic and does not address most site-specific issues. Each resource section in this chapter first provides an overview of programs that could affect the resource under this alternative, and then discusses benefits and impacts. Benefits and impacts are compared to both existing conditions and the benefits and impacts of the proposed EBWMP.

WATER QUALITY

Overview

The management programs proposed under the recreation emphasis alternative would generally be similar to those under the No-Project Alternative.

Benefits

The benefits of this alternative would be similar to those described for the No-Project Alternative.

Impacts

The impacts of Alternative 5 on water quality would be similar to those described for the No-Project Alternative. The moderate decrease in emphasis on biodiversity management may result in fewer actions being taken to restore riparian and wetland areas, which help filter pollutants from tributary streams. This change would slightly reduce the quality of water flowing into the reservoirs as compared to existing conditions. The moderate increase in fire and fuels management activities under this alternative could result in higher levels of nonpoint-source pollution from areas of exposed soil but would also decrease the risk of large, intense wildfires and the resulting potential for large quantities of sediment and contaminants to enter the tributary streams and reservoirs. Reductions in

livestock grazing under the recreation emphasis alternative would also reduce adverse impacts on water quality effects to some extent.

Under Alternative 5, mountain bikes would be allowed on a substantial proportion of District trails. Mountain bike use of trails would result in additional erosion along trails. The effects of this additional erosion on water quality are dependent upon the intensity and location of such use and are considered potentially significant.

Overall, the impacts of this alternative on water quality would be similar to those of the No-Project Alternative and would result in a deterioration of water quality compared to existing conditions.

SOILS AND GEOLOGY

Soils

Overview

As under Alternative 4, the management programs under Alternative 5 would generally be similar to those of the No-Project Alternative. Differences in programs that could affect soil and geologic resources include a moderately increased emphasis on fire and fuels management, a moderately decreased emphasis on biodiversity management, livestock grazing under the recreation emphasis alternative compared to the No-Project Alternative, and increased recreation use and activity.

Benefits

No benefits to soils and geology are anticipated under this alternative.

Impacts

Generally, the impacts of this alternative would be similar to those described for the No-Project Alternative. The moderate decrease in emphasis on biodiversity management could result in fewer actions being taken to stabilize soils, and the increase in fire and fuels management as well as recreation use (e.g., mountain bicycles) could result in an increase in the area of soils subject to erosion. The recreation emphasis alternative also would result in reduced levels of cattle grazing throughout the watershed areas, however, slightly reducing this impact.

Overall, the impacts of this alternative on soil and geologic resources would be similar to those of the No-Project Alternative and would result in a deterioration of soil resources compared to existing conditions.

Geology

Similar to the proposed project, this alternative would have no adverse effect on geologic resources.

VEGETATION

Overview

Under the recreation emphasis alternative, more of the District's available staff and financial resources would be allocated to the developed recreation and trails programs than under the proposed EBWMP. The management programs for water quality, biodiversity, forestry, fire and fuels management, and livestock grazing would decline in priority relative to their emphasis under the proposed project.

Benefits

This alternative would provide substantially fewer overall benefits for vegetation resources than would the proposed EBWMP. Some enhancement of riparian habitats would occur as part of the water quality management program. Reduction in grazing intensity to reduce conflicts with recreation users would allow for vegetation recovery in areas of grassland habitat that have been heavily grazed.

Conversion of non-native forest to native woodlands would take place gradually and naturally; therefore, it would occur at a much slower rate than under the proposed EBWMP.

Impacts

Vegetation Changes Caused by Increased Acreage Subject to Burning from Wildfire

The most substantial impact of the recreation emphasis alternative on vegetation would result from the increased potential for human-caused fire. As noted under "Fire Hazard and Risk" below, increased fire ignitions would likely result from higher levels of human use and could lead to increased acreage burned by wildfire.

Such burning would partially offset the effects of relaxing grazing restrictions by preventing encroachment of shrub species into grasslands. Wildfires are unpredictable, however, and could burn excessive acreages or sensitive habitats.

Vegetation Loss during Facility and Trail Construction

Increased development of recreation facilities, trails, and interpretive facilities would result in the loss of more natural vegetation than would occur under the proposed EBWMP. Nonetheless, the total acreage of this loss would be small.

CULTURAL RESOURCES

As under the proposed project, some activities likely to be implemented under Alternative 5 could affect cultural resources. Because of the recreation emphasis of this alternative, impacts related to recreation and trails development and recreation use are more likely to occur. The cultural resource management program under this alternative, which would be identical to that developed under the proposed EBWMP, requires the District to avoid new impacts on cultural resource sites where possible.

Overall, cultural resources are more likely to be disturbed under this alternative than under the proposed project. Any such disturbance, however, would require that appropriate research activities be conducted at those sites.

FIRE HAZARD AND RISK

Overview

Under the recreation emphasis alternative, the fire and fuels management program would be maintained at its current level. Fewer resources would be allocated for fire and fuels management than under the proposed EBWMP, which would result in a lower level of protection for visitors, District firefighters and other personnel, and adjacent residents.

The recreation emphasis under this alternative would require a shift in the focus of fire management to focus on managing fire ignition risk and firefighting response rather than on treating fire hazards and mitigation.

Benefits

Improved Road Networks for Fire Access and Protection

Increased recreation use of District lands would require improved road access, safety, and maintenance for visitors, which would enhance fire response and suppression activities. Specific treatments would depend on the type, location, and risks of recreation activities. Such treatments would provide safer routes for fire suppression activity and watershed users and increase fire control opportunities.

Fuel Reduction Through More Frequent Wildfire

Increased recreation use would likely lead to a corresponding increase in wildfire ignitions. The increase in uncontrolled fire frequency would reduce accumulations of wildland fuels. Such a reduction, however, is of minimal benefit and does not outweigh the safety threats posed by these fires to visitors, District firefighters and other staff, and adjacent residents. Wildfires are not an acceptable fuels management tool. Fuels treatment through a controlled, strategic program, as proposed under the EBWMP, offers more fuels reduction benefits with less safety risk.

Impacts

Increased Potential for Large, Intense Wildfires

The level of fire and fuels management proposed under the recreation emphasis alternative would be lower than under the proposed EBWMP because more of the available funding and staff resources would be allocated for recreation management. The reduced fire management emphasis would leave the watershed more susceptible to extreme weather conditions.

Increased recreation use of District lands would increase the potential for wildfire ignitions during the fire season. More extensive public use would require increased management emphasis on treating fuels and providing fire protection for lower intensity fires. Fewer management resources would be available to address high-hazard areas that are susceptible to the less frequent, but more intense, fires.

Increased Conflicts with Fire Risk and Fire Response

In addition to increasing potential for wildfire ignitions throughout the watershed, increased public use could inhibit effective firefighting response to incidents. Fire response access could be physically impeded by evacuation of recreational users. Also, fire suppression activity could be delayed as emergency resources were diverted from dealing with the initial wildfire attack to ensuring visitor evacuation. Delayed response time could increase the potential for a fire to escape established control lines and threaten adjacent residences.

Non-fire-related visitor incidents such as injuries, rescues, legal infractions, and vehicle accidents could divert fire management or suppression resources. Alternatively, the increased need for recreation area patrol and policing could provide benefits of more prompt reporting and response to wildfire ignitions.

Constraints on Fire and Fuels Management Resulting from Conflicts with Recreation Uses

Increased visitor use of watershed lands would create conflicts with fire and fuels management activities. Visitors may object to fuels management activities (e.g., use of equipment, livestock, and prescribed burning) that would create noise, smoke, or aesthetic conditions perceived as adverse. Resulting restrictions on fuels management activities could reduce their effectiveness or increase their costs and ultimately result in reduced levels of protection.

Required Allocation of Fire Management Resources to Protecting Human Life and Safety

Increased levels of recreation would focus the fire and fuels management program on protection of human life and safety as the primary mission of fire protection. This effort would divert fire and fuels management resources from the treatment and protection of high-hazard or urban/watershed interface areas. This redirection could increase safety hazard on adjacent lands.

VISUAL RESOURCES

Overview

In the context of this visual resource analysis, management programs under Alternative 5 would be generally similar to those under the No-Project Alternative. This alternative would deemphasize the natural resource protection programs and emphasize the programs dealing with fire and fuels management and recreation and trails. No visual resource management program would be implemented under this alternative.

Benefits

Opportunities for the public to view watershed lands could be improved under this alternative because of the emphasis on increasing developed recreation and trails.

Impacts

Under this alternative, visual resource impacts would be similar to those described for the No-Project Alternative. No visual resource management program would be implemented, natural resource management programs would be deemphasized, and recreation and trails development would be increased compared to the proposed EBWMP. Under these management conditions, this alternative could have a greater adverse impact on important watershed visual resources than under the proposed EBWMP.

LAND USE

Overview

Management programs under the recreation emphasis alternative that could potentially result in land use conflicts with adjacent property are those dealing with fire and fuels, recreation and trails, and livestock grazing. Use of mountain bikes on watershed trails could also result in recreation use conflicts within District-owned watershed.

Benefits

Under this alternative, the District would maintain current reservoir water quality priorities and provide substantially expanded recreation and trail opportunities.

Impacts

Current conflicts between District management programs are expected to increase substantially under Alternative 5 compared to under the proposed EBWMP because increased recreation and trail development and environmental education could present more opportunities for watershed use conflicts and because no integrated mechanism exists to ensure the consistency of the various management programs.

In particular, mountain bike use on watershed trails could result in trail conflicts, accidents, and safety concerns commonly associated with such multiuse trail facilities. Trail conflicts commonly occur when trail use is moderate to high, visibility is restricted, and wide variations are permitted in the type of trail use and speeds (e.g., hiking versus bicycling).

The potential for conflicts between developed recreation uses and adjacent land uses at the urban/watershed interface and potential nuisance conflicts associated with cattle grazing would increase substantially this alternative compared to under the EBWMP.

RECREATION

Implementing the recreation emphasis alternative could result in substantial changes to the amount and types of recreation activities allowed on East Bay watershed lands.

Overview

Resource management programs implemented under this alternative would not affect recreation opportunities now occurring on East Bay watershed lands. This alternative would continue to allow activities at developed sites and would provide for new development and activities on East Bay watershed lands.

Benefits

Developed Recreation Sites

Recreation opportunities provided at developed recreation sites would continue. Additional recreation facilities would be allowed at San Pablo Reservoir, and other new facilities, such as play fields, could be constructed in suitable locations. Recreation facilities at Chabot and Lafayette Reservoirs would be maintained, and no new facilities would be constructed at Upper San Leandro or Briones Reservoirs.

The construction of additional recreation facilities would benefit recreation activities associated with developed sites. These benefits would be greater than those provided under the proposed EBWMP because a wider range of recreation activities would be provided and more recreationists could be accommodated.

Trail Use and Access

Use of trails at Briones, San Pablo, Lafayette, Upper San Leandro, and Chabot Reservoir watersheds would continue under this alternative. Hikers, equestrians, and mountain bikers would be allowed access to fire roads currently closed to the public. As under the proposed EBWMP, these trails could be closed to the public during periods when watershed resources are at risk. These closures could be more frequent if warranted by water quality considerations.

Allowing access to fire roads would benefit a broader range of activities such as hiking, horseback riding, and mountain biking than under the proposed EBWMP.

Impacts

No impacts on recreation are anticipated under this alternative.

FISCAL EFFECTS

Overview

Under the recreation emphasis alternative, the District would place increased emphasis on enhancing revenues by emphasizing recreation uses of East Bay watershed lands.

Management programs receiving less emphasis would include water quality, biodiversity, forestry, fire and fuels, land ownership, and entitlements. Expenditures on these programs would be reduced from levels under the proposed EBWMP.

Benefits

Increased Revenues Associated with Enhanced Recreation Opportunities

Under this alternative, a broad range of recreation activities could be allowed on East Bay watershed lands. These activities would be supported by increasing the number of developed recreation sites and enhancing access to the trail system. District revenues would increase as a result of additional fees collected at developed recreation sites and increased sale of trail permits. Increases in revenues would depend on the District managing these facilities or opting to use concessionaires.

Impacts

Increases in Recreation Management Expenditures

District expenditures would increase for management of developed recreation sites and trails. The extent of increased management expenditures for developed recreation sites would depend on District staffing needs. Compared to the proposed EBWMP, the ratio of revenues to expenditures could be higher if access fees are increased or concessionaires are allowed to operate new developed recreation sites. District expenditures would increase and would probably not be covered by increased revenues.

Management costs of allowing expanded access to the District trail and fire road system would also increase. Costs would increase as a result of increases in patrol and maintenance activities to a higher level than under the proposed EBWMP. Allowing new activities, such as mountain biking, could further increase patrol and maintenance costs.

Allowing less passive activities on the trail system could also expose the District to increased liability. Costs associated with the recreation management program would be higher than under the proposed EBWMP.

TRAFFIC

Overview

Under the recreation emphasis alternative, recreation and trail use would be similar to that described for the No-Project Alternative, thus substantially increasing the potential for traffic and parking effects.

Benefits

This alternative would have no direct benefits for the transportation and circulation system because no roadway improvements are proposed under any of the management programs to modify access to watershed lands.

Impacts

Traffic and circulation, special-event access, and parking impacts under this alternative would be substantially greater than those under the proposed EBWMP and similar to impacts of the No-Project Alternative.

AIR QUALITY

Overview

Under the recreation emphasis alternative, recreation and trail use would be substantially greater than under the proposed EBWMP and similar to that under the No-Project Alternative. The potential for traffic-related ozone precursor emissions to increase in comparison to the proposed EBWMP would be substantial. Dust generation could be greater than under the proposed EBWMP because recreation development in new watershed areas is more likely; however, prescribed burning and mechanical fuels reduction activities could be much less than under the proposed EBWMP.

Benefits

Alternative 5 would provide no air quality benefits.

Impacts

Under Alternative 5, generation of ozone precursor and PM10 emissions would be substantially greater than under the proposed EBWMP because vehicle trips to the watershed would likely increase and ground-disturbing activities associated with recreation use would likely be greater.

Chapter 9. Impact Conclusions

CUMULATIVE EFFECTS

The State CEQA Guidelines require that the cumulative impacts of a proposed project be addressed in an EIR when they are expected to be significant (Section 15130). Cumulative impacts are those impacts on the environment that result from the incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions. These impacts can result from individually minor but collectively significant actions taking place over time.

Implementing the proposed EBWMP would result in very minor impacts on the environment. The proposed EBWMP is primarily focused on protecting and enhancing water quality in the District's five reservoirs, and on protecting the natural resources on the District's watershed lands. Although some minor site-specific impacts could result from implementing the proposed EBWMP, overall, implementing the EBWMP would result in substantial beneficial effects to the environment, thereby helping to offset the cumulative impacts of actions taken by others in the East Bay area. The proposed EBWMP is therefore not expected to contribute to any cumulative impacts.

GROWTH-INDUCING EFFECTS

Section 15126(g) of the State CEQA Guidelines requires agencies to address the potential growth-inducing effects of their actions. Growth-inducing effects are defined as the ways in which the proposed project could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the surrounding environment. As described above, the purpose of the proposed EBWMP is to protect water quality and natural resources on the District's watershed lands. Thus, the proposed EBWMP has no potential to foster or otherwise contribute to growth in the surrounding region.

SIGNIFICANT, IRREVERSIBLE ENVIRONMENTAL CHANGES

Section 15126(f) of the State CEQA Guidelines requires agencies to discuss in an EIR the uses on nonrenewable resources during the initial and continued phases of a

proposed project because a large commitment of such resources makes removal or nonuse thereafter unlikely. The proposed EBWMP would not require any substantial commitment of nonrenewable resources. In fact, the proposed EBWMP would preserve many natural resources on the District's watershed lands.

SIGNIFICANT EFFECTS THAT CANNOT BE AVOIDED

The State CEQA Guidelines also require agencies to describe any significant effects that cannot be avoided should the proposed project be implemented (Section 15126[b]). The proposed EBWMP would result in only a few site-specific significant impacts, which could be reduced to less-than-significant levels by implementing the mitigation measures described in Chapter 4 of this EIR. Therefore, no unavoidable impacts would result from implementation of the proposed project.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Section 15126(d)(2) of the State CEQA Guidelines requires agencies to identify the environmentally superior alternative considered in an EIR. For the EBWMP, the environmentally superior alternative is difficult to identify. The proposed EBWMP and the increased water quality emphasis alternative (Alternative 3) would both result in overall benefits to the environment. Under the proposed EBWMP, certain programs that have ongoing environmental impacts, such as recreation and livestock grazing, would continue, although at a somewhat reduced level. Under the increased water quality emphasis alternative, these activities would be substantially reduced, thereby resulting in greater environmental benefits than would occur under the proposed EBWMP.

Conversely, the proposed EBWMP would extend greater emphasis and resource allocation toward enhancing biodiversity, converting non-native forests to native forests, and reducing fire risk, for example, than would the increased water quality emphasis alternative.

Overall, these two alternatives are considered to be approximately equal in protecting and enhancing the environment.

Chapter 10. List of Preparers

This document was prepared by Jones & Stokes Associates based on guidance and information provided by the District EBWMP consultant team. The individuals involved in preparing this EIR are listed below.

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