CALFED

TECHNICAL REPORT
ENVIRONMENTAL CONSEQUENCES

SUPPLEMENT TO FLOOD CONTROL

DRAFT

March 1998

CALFED
BAY-DELTA
PROGRAM

TABLE OF CONTENTS

Page

SUPPLEMENT TO
FLOOD CONTROL SYSTEM

Table S-1 compares key parameters of flood control for existing conditions, the No Action Alternative, and CALFED configurations.

Table S-2 was used to screen resource elements of the Ecosystem Restoration Program and determine which elements would affect the flood control system. Table S-3 summarizes the actions in the Ecosystem Restoration Program that could affect the flood control system in the Sacramento River Region. Table S-4 summarizes actions in the Ecosystem Restoration Program that could affect the flood control system in the San Joaquin River Region. These tables were based on Appendix A of the Phase II Alternatives Descriptions Report (CALFED 1997). For more specific information regarding the actions, refer to the report.

Parameter	Existing Conditions	No Action	Alternative 1		Alternative 2					Alternative 3							
			1A	1B	1C	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E	3F	3G	3H	3I
STAGE	Delta flood stages range from 6 5 to 17 0 feet above mean sea level	Similar to Existing Conditions		Local south Delta stage increases	Incidental flood storage benefits	Local south Delta stage increases	Incidental flood storage benefits		Reduced stages due to isolated intakes	Incidental flood storage benefits	Potentially significant increased stage on east side tributaries due to isolated facility	Potentially significant increased stage on east side tributaries due to isolated facility			Potentially significant increased stage on east side tributaries due to isolated facility			Potentially significant increased stage on east side tributaries due to isolated facility	Reduced stages due to isolated intakes
					Local south Delta stage increases	Decreased stages in the north Delta.	Decreased stages in the north Delta		Incidental flood storage benefits	Decreased north Delta stages along setback levees and floodways	Incidental flood storage benefits	Incidental flood storage benefits			Incidental flood storage benefits			Incidental flood storage benefits	Incidental flood storage benefits
							Local south Delta stage increases		Decreased north Delta stages along setback levees and floodways		Local south Delta stage increases.	Local south Delta stage increases			Reduced flood flows due to 15,000 cfs isolated facilty			Decreased north Delta stages along setback levees and floodways	
			Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities		Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities			Minor beneficial stage reductions from tributary storage and runoff detention facilities			Minor beneficial stage reductions from tributary storage and runoff detention facilities	Minor beneficial stage reductions from tributary storage and runoff detention facilities
		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program.	Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program
		Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity.	Improvements based on island importance could improve habitat and levee system integrity		Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity.	Improvements based on island importance could improve habitat and levee system integrity			Improvements based on island importance could improve habitat and levee system integrity			Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity
		Increased tributary flooding may occur downstream of removed diversions	Increased tributary flooding may occur downstream of removed diversions	Increased tributary flooding may occur down-stream of removed diversions	Increased tributary flooding may occur downstream of removed diversions	Increased tributary flooding may occur down-stream of removed diversions	Increased tributary flooding may occur downstream of removed diversions		Increased tributary flooding may occur downstream of removed diversions	Increased tributary flooding may occur down-stream of removed diversions	Increased tributary flooding may occur downstream of removed diversions	Increased tributary flooding may occur downstream of removed diversions			Increased tributary flooding may occur downstream of removed diversions			Increased tributary flooding may occur downstream of removed diversions	Increased tributary flooding may occur downstream of removed diversions
		Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages		Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages			Floodplain restoration on tributaries could reduce stages			Floodplain restoration on tributaries could reduce stages	Floodplain restoration on tributaries could reduce stages
SEEPAGE	Minor	Similar to Existing	Similar to	Less than	Less than	Less than	Less than		Increased	Increased	Potential seepage	Potential seepage			Potential seepage from			Potential seepage from	Increased seepage

Table S-1. Summary of Flood Control Environmental Consequences

C—008248

Parameter	Existing Conditions	No Action	Alternative 1			Alternative 2					Alternative 3						
			1A	1B	1C	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E	3F	3G	3H	3I
	seepage common for Delta levees that act as continuous water barriers	Conditions	Existing Conditions	significant adjacent to south Delta flow control barriers	significant adjacent to south Delta flow control barriers	significant adjacent to south Delta flow control barriers and flooded islands	significant adjacent to south Delta flow control barriers and flooded islands.		seepage beyond Alt 2b	seepage beyond Alt 2d	from isolated transfer facility canal	from isolated transfer facility canal			isolated transfer facility canal			isolated transfer facility canal	near Holland Tract
			Increased as a result of deep-rooted trees and shrubs penetrating levees	Increased as a result of deep-rooted trees and shrubs penetrating levees	Increased as a result of deep-rooted trees and shrubs penetrating levees	Increased as a result of deep-rooted trees and shrubs penetrating levees	Increased as a result of deep-rooted trees and shrubs penetrating levees.		Increased as a result of deep-rooted trees and shrubs penetrating levees	Increased as a result of deep-rooted trees and shrubs penetrating levees	Increased as a result of deep-rooted trees and shrubs penetrating levees.	Increased as a result of deep-rooted trees and shrubs penetrating levees			Increased as a result of deep-rooted trees and shrubs penetrating levees			Increased as a result of deep-rooted trees and shrubs penetrating levees	Increased as a result of deep-rooted trees and shrubs penetrating levees
		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program.	Flood damage reduced through levee system integrity program
		Improvements based on island importance could improve habitat and levee system integrity	*Improvements based on island importance could improve habitat and levee system integrity.*	*Improvements based on island importance could improve habitat and levee system integrity*	*Improvements based on island importance could improve habitat and levee system integrity*	*Improvements based on island importance could improve habitat and levee system integrity*	*Improvements based on island importance could improve habitat and levee system integrity.*		*Improvements based on island importance could improve habitat and levee system integrity*	*Improvements based on island importance could improve habitat and levee system integrity*	*Improvements based on island importance could improve habitat and levee system integrity.*	Improvements based on island importance could improve habitat and levee system integrity.			Improvements based on island importance could improve habitat and levee system integrity			Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity
INSPECTION	Inspection capability reduced as vegetation increases	Similar to Existing Conditions				Easier to inspect setback levees	Easier to inspect setback levees.		Easier to inspect setback levees	Easier to inspect setback levees	Easier to inspect setback levees	Easier to inspect setback levees			Easier to inspect setback levees			Easier to inspect setback levees	Easier to inspect setback levees
			Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation		Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation			Reduced capability due to vegetation			Reduced capability due to vegetation	Reduced capability due to vegetation
MAINTE-NANCE	Maintenance capability reduced as vegetation increases	Similar to Existing Conditions				Easier to maintain setback levees but more costly	Easier to maintain setback levees, but more costly		Easier to maintain setback levees, but more costly	Easier to maintain setback levees, but more costly	Easier to maintain setback levees, but more costly	Easier to maintain setback levees, but more costly			Easier to maintain setback levees, but more costly			Easier to maintain setback levees, but more costly.	Easier to maintain setback levees, but more costly
			Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation		Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation			Reduced capability due to vegetation			Reduced capability due to vegetation	Reduced capability due to vegetation

Table S-1. Summary of Flood Control Environmental Consequences

C—008249

Parameter	Existing Conditions	No Action	Alternative 1			Alternative 2					Alternative 3					
			1A	1B	1C	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E	3F	3G	3H	3I
		Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement		Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base level stability improvement			Reduced maintenance backlogs due to base level stability improvement			Reduced maintenance backlogs due to base level stability improvement	Reduced maintenance backlogs due to base levels ability improvement
REPAIR	Repair capability reduced as vegetation increases	Similar to Existing Conditions	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Easier to repair setback levees	Easier to repair setback levees		Easier to repair setback levees	Easier to repair setback levees	Easier to repair setback levees	Easier to repair setback levees.			Easier to repair setback levees			Easier to repair setback levees	Easier to repair setback levees.
			Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation		Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation	Reduced capability due to vegetation			Reduced capability due to vegetation			Reduced capability due to vegetation	Reduced capability due to vegetation.
		Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available.	Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available		Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available			Levee rehabilitation may require more borrow material than readily available.			Levee rehabilitation may require more borrow material than readily available	Levee rehabilitation may require more borrow material than readily available.
		Reduced repair backlogs due to base level stability improvements.	Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements		Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements			Reduced repair backlogs due to base level stability improvements			Reduced repair backlogs due to base level stability improvements	Reduced repair backlogs due to base level stability improvements.
SUBSIDENCE	Most levee subsidence results from peat oxidation in the Delta	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions		Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions			Similar to Existing Conditions			Similar to Existing Conditions	Similar to Existing Conditions
		Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan		Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan			Increased levee stability as a result of the subsidence control plan			Increased levee stability as a result of the subsidence control plan	Increased levee stability as a result of the subsidence control plan.
		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program

Table S-1. Summary of Flood Control Environmental Consequences

Parameter	Existing Conditions	No Action	Alternative 1			Alternative 2					Alternative 3							
			1A	1B	1C	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E	3F	3G	3H	3I
SETTLE-MENT	Settlement results when fill materials are placed on soft foundation soils	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Increased settlement for setback levee.	Increased settlement for setback levee		Increased settlement for setback levee	Increased settlement for setback levee	Increased settlement for setback levee.	Increased settlement for setback levee			Increased settlement for setback levee			Increased settlement for setback levee	Increased settlement for setback levee
			Shallow flooding may beneficially *reduce peat* oxidation rates	Shallow flooding may beneficially reduce peat *oxidation rates*	Shallow flooding may *beneficially* reduce peat oxidation rates	Shallow flooding may *beneficially* reduce peat oxidation rates	Shallow flooding may beneficially reduce peat *oxidation rates*		Shallow flooding may beneficially reduce peat *oxidation rates*	Shallow flooding may beneficially *reduce peat* oxidation rates	Shallow flooding may beneficially reduce peat *oxidation rates*	Shallow flooding may beneficially reduce peat *oxidation rates*			Shallow flooding may beneficially reduce peat oxidation rates			Shallow flooding may beneficially reduce peat oxidation rates	Shallow flooding may beneficially reduce peat oxidation rates
		Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence		Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence.	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence			Some levees near tributaries may settle due to groundwater-pumping-induced subsidence			Some levees near tributaries may settle due to groundwater-pumping-induced subsidence	Some levees near tributaries may settle due to groundwater-pumping-induced subsidence
		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program.	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program.	Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program.	Flood damage reduced through levee system integrity program
WIND-GENERATED WAVE EROSION	Erosion increases with wind speed and water surface elevation	Similar to Existing Conditions	Less than significant due to increased vegetative protection.	Less than significant due to increased vegetative protection	Less than significant due to increased vegetative protection	Less than significant for setback levees	Less than significant for setback levees.		Less than significant for setback levees	Less than significant for setback levees	Less than significant for setback levees.	Less than significant for setback levees			Less than significant for setback levees			Less than significant for setback levees	Less than significant for setback levees
						Potential adverse impact on flooded islands	Potential adverse impact on flooded islands		Potential adverse impact on flooded islands	Potential adverse impact on flooded islands	Potential adverse impact on flooded islands	Potential adverse impact on flooded islands			Potential adverse impact on flooded islands			Potential adverse impact on flooded islands	Potential adverse impact on flooded islands
			Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones		Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones			Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones			Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones	Reduced erosion by establishing and enforcing "No Wake" and "No Motorized Boating" zones
SCOUR	Erosion at narrower channels with higher velocities	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Reduced at widened locations	Reduced at widened locations		Reduced at widened locations	Reduced at widened locations	Reduced at widened locations	Reduced at widened locations			Reduced at widened locations			Reduced at widened locations	Reduced at widened locations

Table S-1. Summary of Flood Control Environmental Consequences

C-008251

Parameter	Existing Conditions	No Action	Alternative 1			Alternative 2					Alternative 3							
			1A	1B	1C	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E	3F	3G	3H	3I
		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program.			Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program
		Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity		Improvements based on island importance could improve habitat and levee system integrity.	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity.			Improvements based on island importance could improve habitat and levee system integrity			Improvements based on island importance could improve habitat and levee system integrity.	Improvements based on island importance could improve habitat and levee system integrity
LEVEE STABILITY	Stability is at or below HMP levee design standard at many locations	Similar to Existing Conditions	Potentially reduced as a result of stage and seepage effects noted above	Potentially reduced as a result of stage and seepage effects noted above.	Potentially reduced as a result of stage and seepage effects noted above	Potentially reduced as a result of stage and seepage effects noted above	Potentially reduced as a result of stage and seepage effects noted above		Potentially reduced as a result of stage and seepage effects noted above	Potentially reduced as a result of stage and seepage effects noted above	Potentially reduced as a result of stage and seepage effects noted above	Potentially reduced as a result of stage and seepage effects noted above			Potentially reduced as a result of stage and seepage effects noted above			Potentially reduced as a result of stage and seepage effects noted above	Potentially reduced as a result of stage and seepage effects noted above
			Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion		Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion			Shallow-rooted species may beneficially reduce erosion			Shallow-rooted species may beneficially reduce erosion	Shallow-rooted species may beneficially reduce erosion
		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program		Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program			Flood damage reduced through levee system integrity program	Flood damage reduced through levee system integrity program
		Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity		Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity			Improvements based on island importance could improve habitat and levee system integrity			Improvements based on island importance could improve habitat and levee system integrity	Improvements based on island importance could improve habitat and levee system integrity
EMERGENCY RESPONSE	Improvements needed in response capabilities and resource allocations	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions		Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions	Similar to Existing Conditions			Similar to Existing Conditions			Similar to Existing Conditions	Similar to Existing Conditions
		Improved understanding of Delta	Improved understanding of Delta levee	Improved understanding of Delta levee	Improved understanding of Delta	Improved understanding of Delta	Improved understanding of Delta levee		Improved understanding of Delta levee	Improved understanding of Delta levee	Improved understanding of Delta levee perfor-	Improved understanding of Delta levee			Improved understanding of Delta levee performance during an			Improved understanding of Delta levee performance	Improved understanding of Delta levee

Table S-1. Summary of Flood Control Environmental Consequences

C—008252

Parameter	Existing Conditions	No Action	Alternative 1			Alternative 2					Alternative 3							
			1A	1B	1C	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E	3F	3G	3H	3I
		levee performance during an earthquake	performance during an earthquake	performance during an earthquake	levee performance during an earthquake	levee performance during an earthquake	performance during an earthquake		performance during an earthquake	performance during an earthquake	mance during an earthquake	performance during an earthquake			earthquake			during an earthquake	performance during an earthquake
		Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment		Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment			Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment			Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment	Reduced levee vulnerability to catastrophic failure as a result of seismic risk assessment
CHANNEL CAPACITY	Needs improvement, especially in North Delta	Similar to Existing Conditions	Improved capacity at widened locations	Improved capacity at widened locations.	Improved capacity at widened locations	Improved capacity at widened locations	Improved capacity at widened locations		Improved capacity at widened locations	Improved capacity at widened locations	Improved capacity at widened locations	Improved capacity at widened locations			Improved capacity at widened locations			Improved capacity at widened locations	Improved capacity at widened locations
			Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures		Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures			Reduced conveyance capacity due to gate structures			Reduced conveyance capacity due to gate structures	Reduced conveyance capacity due to gate structures.
	Increased capacity at setback levees	Increased capacity at setback levees	Increased capacity at setback levees	Increased capacity at setback levees	Increased capacity at setback levees	Increased capacity at setback levees	Increased capacity at setback levees		Increased capacity at setback levees	Increased capacity at setback levees	Increased capacity at setback levees	Increased capacity at setback levees			Increased capacity at setback levees			Increased capacity at setback levees	Increased capacity at setback levees
		Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands		Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands			Improved channel capacity maintenance due to reduced sediment load from agricultural lands			Improved channel capacity maintenance due to reduced sediment load from agricultural lands	Improved channel capacity maintenance due to reduced sediment load from agricultural lands
						Increased capacity due to intake	Increased capacity due to intake		Increased capacity due to intake	Increased capacity due to intake									

Table S-1. Summary of Flood Control Environmental Consequences

Resource Element	Flood-Related Actions	Potentially Significant Impact on Flood Management
Stream flows	Provide pulse flows	No
Delta channel hydraulics	Reduce flows in selected channels	Yes
	Construct network of channels and reduce constrictions in the Yolo Bypass	No
Water temperature	None	No
Floodplain inundation and sediment retention	Convert selected leveed lands to tidal marsh/slough complexes, construct setback levees, connect dead end sloughs, construct overflow basins	Yes
Food web	None	No
Levees and bank protection	Modify levee and berm vegetation management practices on water side of levee	Yes
Dredging	None	No
Exotic species	None	No
Predators	None	No
Unscreened and poorly screened diversions	None	No
Contaminants	None	No
Boat wake erosion	Reduce boat traffic in selected channels	No
Illegal and legal harvest of fish and wildlife	None	No
Shallow water habitat	Flood selected islands, primarily with land elevations between 5 and 9 feet below sea level	Maybe; volume provided by additional storage too small (for example, 10 to 70 TAF) relative to size of Delta (for example, over 700,000 acres) and duration of flood events (several days). However, could provide localized flood control benefits
Non-tidal perennial aquatic habitat	Acquire and develop deeper open-water areas in restored saline emergent wetland habitats	No; too small an area
Tidal slough habitat	Restore tidal slough habitat	No; it was assumed that new sloughs would not contribute significantly to conveyance in Delta
Seasonal wetland habitat	Restore and manage additional acreage	No; largest restoration would be in designated floodplain expansion areas
Riparian scrub habitat	Obtain conservation easements or purchase land needed to restore riparian habitat from willing sellers	Yes
Riparian woodlands	Purchase riparian woodland property or easements	No
Tidal emergent wetland habitat	Develop tidal wetlands	Yes
Non-tidal emergent wetland habitat	Restore non-tidal emergent wetland habitat	No; however, could result in local flood control benefits
Mid-channel islands	Protect and improve existing channels in the Delta	No

Table S-2. Ecosystem Restoration Program Plan Resource Elements and Impacts of Actions on Flood Management in the Delta Region

Resource Element	Flood-Related Actions
Shaded riverine aquatic habitat (SR)	Vegetate barren riprapped banks and construct setback levees to provide wider floodplains.
Diversion dams-fish passage and predators (SR)	Make physical changes to structures in the Sacramento River, such as bridge abutments, diversion dams, and water intakes.
Stream meander belts (NSV)	Restore the 50- to 100-year floodplain of Cedar Creek.
Dams, reservoirs, and other human-made structures (NSV)	Remove diversions from South Cow, Old Cow, North Cow, and Clover creeks that are barriers to migrating salmon.
Stream meander belts (CC)	Preserve or restore the 50- to 100-year floodplain. Evaluate the construction of setback levees to allow channel meander in areas presently confined by levees.
Dams, reservoirs, and other human-made structures	Reconstruct facilities and structures that impair fish passage.
Floodwater and sediment detention and retention (CB)	Improve the sediment deposition capacity of the Colusa Basin.
Dams, reservoirs, and other human-made structures (CB)	Reduce hindrances to fish passage and reduce the use of seasonal barriers.
Stream meander belts (BB)	Preserve or restore the 50- to 100-year floodplains along the lower reaches of stream; evaluate the construction of setback levees to allow channel meander in areas presently confined by levees.
Dams, reservoirs, and other human-made structures (BB)	Evaluate the feasibility of removing diversion dams on Butte Creek.
Dams, reservoirs, and other human-made structures (FRS)	Remove dams on Yuba River; remove or modify culvert crossings on Bear River.
Natural stream channel process (ARB)	Maintain floodplain along the lower American River. Develop a floodplain management program.
Stream channel configuration (YB)	Evaluate the feasibility of modifying cross-sections and channel configurations in Cache and Putah creeks; reconfigure the Yolo Bypass to restore its natural configuration with slough connections to Cache and Putah creeks.
Floodwater and sediment detention and retention (YB)	Evaluate the feasibility of reoperating and modifying the Yolo Basin to increase its capacity for floodwater detention and sediment retention.

NOTES:

SR = Sacramento River Ecological Zone.
NSV = North Sacramento Valley Ecological Zone.
CC = Cottonwood Creek Ecological Zone.
CB = Colusa Basin Ecological Zone.
BB = Butte Basin.
FRS = Feather River/Sutter Basin Ecological Zone.
ARB = American River Basin Ecological Zone.
YB = Yolo Basin.

Table S-3. Ecosystem Restoration Program Plan Resource Elements That Could Affect Flood Management in the Sacramento River Region

Resource Element	Flood-Related Actions
Shaded riverine aquatic habitat (EDT)	Restore 15 stream miles of self-sustaining diverse riparian community along the Mokelumne River
Stream meander migration (SJR)	Restore the defined floodplain; reestablish stream meander zone on the San Joaquin River between Vernalis and the mouth of the Merced River
Levees, bridges, and bank protection (SJR)	Set back 10 miles of levees along the San Joaquin River between the Merced River and Vernalis
Shaded riverine aquatic habitat (SJR)	Restore 50 stream miles of self-sustaining diverse riparian community
Shaded riverine aquatic and riparian habitat (ESJB)	Restore 15 stream miles of self-sustaining diverse riparian community along each river

NOTES:

EDT = Eastside Delta Tributaries Ecological Zone.
SJR = San Joaquin River Ecological Zone.
ESJB = East San Joaquin Basin Ecological Zone.

Table S-4. Ecosystem Restoration Program Plan Resource Elements That Could Affect Flood Management in the San Joaquin River Region

FLOOD CONTROL

LIST OF PREPARERS

Mark W. Cowin
- B.S., Civil Engineering, Stanford University
- Years of Experience: 18
- Planning Chief of Storage Facilities Unit, CALFED Bay-Delta Program
- Preparation of system operations studies to support evaluation of Program Alternatives.

Gerald L. Horner
- Ph.D., Resource Economics, Washington State University
- Years of experience: 27
- Preparation of Economics of Flood Control Technical Appendices

Peter M. Standish-Lee
- M.S., Water Resources, California State University, Sacramento
- B.S., Oceanography, California State University, Humboldt
- A.B., Zoology, University of California, Berkeley
- Years of experience: 27
- Alternatives Planning
- Lead Consultant for Flood Management technical report

Michelle G. Lynch
- M.S., Civil Engineering, University of California, Davis
- Years of experience: 2
- Preparation of Flood Control Technical Appendix

Lynn Moquette O'Leary
- M.S., Civil Engineering, University of California, Davis
- B.S., Civil Engineering University of California, Davis
- Years of Experience: 13
- Leader, Flood Control Impact Team

Loren Bottorff
- M.S., Civil Engineering in Water Resources, University of Nevada, Reno
- Years of Experience: 24
- Development of Alternatives

Rick Breitenbach
- M.S., Biological Conservation, California State University, Sacramento
- Years of Experience: 25
- Environmental Documentation Program Manager

Elizabeth Dyer
M.S., Earth Science, Northern Arizona University
B.A., History, University of California, Berkeley
Years of Experience: 3
Report preparation and coordination

Trina D. Farris
Years of Experience: 25
Text edits and preparation of figures and tables

Ted M. Frink
B.S., Fisheries Ecology, California State University Humboldt
Years of Experience: 15
Report preparation and technical review

Wendy S. Halverson Martin
B.S., Environmental Studies, California State University, Sacramento
Years of Experience: 17
Project Manager. Technical and Editorial preparation and review

Mark McCourt
B.A., Gonzaga University
Years of Experience: 16 months
Graphics

Ray McDowell
B.A., Geography, California State University, Sacramento
Years of Experience: 10
Environmental Specialist-Coordination of NEPA/CEQA documentation

Frank Piccola
M.A., Government Administration, Rider University
B.S., Environmental Science, Rutgers University
AASc. Laboratory Technology, Middlesex County College
Years of Experience: 25
Environmental Manager-Coordination of NEPA/CEQA documentation