Bureau of Reclamation
2800 Cottage Way, MP-170
Sacramento, Calif. 95825-1898

Initial Alternatives Evaluation Criteria

Evaluation Criteria	Performance Measure
Purpose and Need/Project Objectives	
Modifications in San Joaquin River channel capacity necessary to ensure conveyance of at least 475 cfs through Reach 4B	
Modifications at the Reach 4B Headgate on the San Joaquin River channel to ensure fish passage and enable flow routing of between 500 cfs and 4,500 cfs into Reach 4B, consistent with any determination made in Paragraph 11(b)(1)	Fish Passage in Reach 4B
	Flows 500-4,500 cfs in Reach 4B
Modifications to the Sand Slough Control Structure to ensure fish passage	
Modifications to structures in the Eastside and Mariposa Bypass channels to the extent needed to provide anadromous fish passage on an interim basis until completion of the Phase 2 improvements	Fish Passage in Eastside Bypass
	Fish Passage in Mariposa Bypass
Modifications in the Eastside and Mariposa Bypass channels to establish a suitable low-flow channel if the Secretary of the Interior in consultation with the Restoration Administrator determines such modifications are necessary to support anadromous fish migration through these channels	Low Flow Channel in Eastside Reach 2
	Low Flow Channel in Eastside Reach 3
	Low Flow Channel in Mariposa Bypass
Modifications in the San Joaquin River channel capacity (incorporating new floodplain and related riparian habitat) to ensure conveyance of at least 4,500 cfs through Reach 4B, unless the Secretary, in consultation with the Restoration Administrator and with the concurrence of NMFS and USFWS, determines that such modifications would not substantially enhance achievement of the Restoration Goal	New Floodplain in Reach 4B
	4,500 cfs capacity in Reach 4B
Technical Feasibility	
Number of structures with technologies untested for similar conditions	Number
Estimate of complexity	High, Medium, Low
Environmental Acceptability	
Biological Effects	
Acres of Disturbed Habitat	**Habitat Type (Acres)**
	Herbaceous
	Open Water
	Cottonwood Riparian
	Riparian Scrub
	Wetland/Marsh
	Willow Riparian (LD)
	Willow Riparian
	Willow Scrub
	Total Acres
Social Effects	
1) Quantity of Farmland Removed from Production (Acres) 2) Reduction in annual agricultural production values based on crop types ($)	**Crop Type**
	Alfalfa
	Almonds
	Cantaloupes
	Corn
	Cotton
	Dbl. Crop Oats/Corn
	Dbl. Crop Winter Wheat/Corn
	Dry Bean
	Fallow/Idle Cropland

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		Grapes
		Oats
		Other Hay
		Pistachios
		Pomegranates
		Tomatoes
		Walnuts
		Winter Wheat
		Total Acres
Physical Effects		
Total Affected Land		Acres
Number of Parcels Affected		Total Number
Regulatory Effects		
Disturbed waterway in San Joaquin River		Miles
Disturbed Waterway in Eastside and Mariposa bypasses		Miles
Total Disturbed Waterway		Miles
Number of Modified Flood Control Structure		Total Number
Cost		
Construction Cost		Total $
Flood Control		
Increased Operational Flexibility		Increase in overall system capacity (High, Med, Low)
Geomorphology/Sediment Transport		
Sediment in equals sediment out (by subreach)		Tons of sediment
Low flow and migration channels (Bypass and main channel) persist without sediment deposition/plugs or excessive channel enlargement		Change in capacity of low flow channels (cfs)
Channel does not headcut or create fish passage barriers		Design slope gradient relative to equilibrium gradient
Pools and bedforms (fishery habitat complexity) can be naturally sustained		Change in number of features
Riparian native vegetation is present in sufficient density to support channel geomorphic functions and persists over time		Change in acres of vegetation by type
Volume of instream woody debris is consistent with similar size rivers and persists over time		LWD pieces per km
Flood plain is not excessively eroded or undergoes excessive deposition leading to loss of hydraulic capacity		Change in cross section area (sq ft), change in flood capacity (cfs)
Fisheries		
Predation	Large pools in channel or near structures	Number of pools with average depth > 1.5 m
Passage Issues (Adults and Juveniles)	Adequate pool and channel depths	Adults: Habitat area with depths < 1.0 ft Juveniles: Habitat area with depths < 0.5 ft
	River channel and bypass channel flow	Adults: Habitat area with velocities > 6.0 ft/sec
	Obstructions to migration	Adults: Number of obstructions (culverts, fish ladders, or chutes)
		Juveniles: Number of obstructions (agricultural pumps or diversions, culverts, structures that creates a scour pool)

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	Water quality barriers	If any part of reach has DO less than 4.5 mg/l or temps > 70^0F then reach is total barrier (**Low**), DO 4.5-5.0 mg/l or temps between 66 and 70^0F partial barrier (**Medium**), DO > 5 mg/L or temps < 66^0F then suitable for passage (**High**).
	Hydraulic jumps/Vertical Barriers	The number of potential vertical barriers, defined as a change in elevation > 1 ft and a jump pool depth of <1.5 times jump height or <2 ft.
	Length of Channel	Miles
Habitat Complexity	Acres of riparian vegetation	Acres of riparian buffer (30 m from waterline) with at least 80% vegetated
	Quantity of floodplain rearing habitat	Acres of floodplain habitat with inundation more than 6 inches for at least two weeks
	Quality of floodplain rearing habitat	Acres of floodplain cover (grass, trees, woody debris)
		Percent of substrate designated as fines
	Quantity and quality of instream rearing habitat	Fry: Total Annualized habitat area for Fry Juveniles: Total Annualized habitat area for Juveniles
Water Quality	Temperature	Adults: **High**: If zero flows splits occur early (during September) during adult migration when high water temperatures can have deleterious effects, **Medium**: if one flow split, **Low**: if two flow splits. Juveniles: High: If zero flows splits occur late (during June/July) during juvenile emigration when high water temperatures can have deleterious effects, **Medium**: if one flow split, **Low**: if two flow splits.
	Relative Pesticide Concentration	The number of agricultural returns