

**CALFED Water Quality Actions--Benefits and Constraints  
DRAFT**

Action	Parameters Impacted		Benefits	Constraints	Notes
	Positive	Negative			
<b>Flow Management: Dilution</b>					
2. Acquire water from willing sellers.	DO, Salinity, Temperature				
3. Acquire water by providing incentives for more efficient water management of dams, including reservoir re-operation.	Turbidity, DO, Salinity	Turbidity	May decrease turbidity depending on dam operation	May increase turbidity depending on dam operation	
5. Acquire water through indoor and outdoor urban water conservation, thereby ensuring water remains within streams.	Ammonia, Chlorpyrifos, Diazinon		May decrease diazinon, chlorpyrifos, and ammonia (nitrogen products from lawn fertilizers) concentrations	Reduction of ammonia, chlorpyrifos and diazinon dependent upon level of outdoor water conservation; Increased water demand associated with growth of urban areas may constrain the effectiveness of this action.	
6. Acquire water through wastewater reclamation.			Unclear	Economic	
7. Acquire water by treating agricultural drainage.	Copper?, Selenium, Chlorpyrifos, Ammonia, Salinity		Decreased concentrations of listed parameters	Need to better define "treating"; Economic	

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8. Acquire water by developing additional groundwater supply.				Lack of available groundwater; groundwater quality may be worse than surface water quality	
9. Acquire new water by constructing new storage upstream of the Delta.					
10. Acquire new water by constructing new storage downstream of the Delta.					
11. Acquire new water by constructing new storage in the Delta.					

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<b>Flow Management: Delta Facilities</b>					
12. Develop improvements at the head of Old River to block fish movement into Old River, and to manage water flow and stage down Old River.	DO, Salinity, Turbidity	Selenium, Carbofuran, Chlorpyrifos, DDT, PCBs, Toxaphene, Unknown Toxicity	Possible improved water quality in the rest of the Delta.	Applies to South Delta Facilities; Selenium that currently is exported south, will now be captured in the Delta; Problems with chlorpyrifos and carbofuran in Old River may be exacerbated locally but improved in the rest of the Delta;  Increased sedimentation and therefore DDT, Toxaphene, Chlordane, PCBs; Increased export of organochlorines to the estuary because they are no longer transported south; Questionable impacts.	
13. Implement Delta Long-Term Protection Plan.	Cadmium, Copper, Mercury, Selenium, Zinc, Salinity	Chlordane, DDT, PCBs, Toxaphene, Turbidity, Unknown Toxicity	Removal of pollutants; all noted parameters may be a benefit or a constraint (except salinity)	All noted parameters may be constraints; applies to within Delta dredgings only; Resuspension of pollutants; Location/Placement of levees; Salinity content of dredgings	

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<b>Non Point Source Control: Agricultural Drainage</b>					
1. Alter timing of inflow by detaining agricultural drainage in the San Joaquin Valley.	Chlorpyrifos, Diazinon, Salinity	Chlorpyrifos, Diazinon	May decrease concentrations of diazinon and chlorpyrifos with increased holding time, depending on seasonality	Economic; Unintended consequences (movement to other media, groundwater contamination); Feasibility--pumping; Creation of attractive nuisances for wildlife; Increased chemical usage for pond maintenance; concentration of pollutants in pond sediments	
14. Detain drainage water (restrict drainage discharges during periods of low Delta inflow) and control the timing of release.	Chlorpyrifos, Diazinon, Salinity	Chlorpyrifos, Diazinon	Same as 1.	Same as 1.	
15. Restrict spraying adjacent waterways to reduce overspray	Carbofuran, Chlorpyrifos, Diazinon, Unknown Toxicity			Spraying adjacent to waterways is unregulated	
16. Provide incentives for additional source control, including higher water use efficiency and reduced agrochemical loading.	Copper, Selenium, Chlordane, Chlorpyrifos, DDT, PCBs, Toxaphene, Ammonia, Salinity, Turbidity		Increased water efficiency may decrease selenium loading if agricultural acreage remains constant; Reduced soil erosion and runoff	Increased concentrations of pollutants may enter waterways because a lower volume of water is being used.	

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17. Provide a high quality irrigation water supply.			Potential salinity reduction	Depends on ionic character of water; Water may be moved from one place in the Delta to another so perhaps no net benefit	
18. Land retirement and temporary fallowing (esp. during drought) through incentive programs	Selenium, Chlordane, DDT, PCBs, Toxaphene, Ammonia, Salinity, Turbidity	Chlorpyrifos , Unknown Toxicity			
19. Concentration and disposal of drainage water	Chlorpyrifos, Chlordane, Diazinon, DDT, PCBs, Toxaphene, Salinity, Unknown Toxicity			Wildlife Impacts, Attractive Nuisances, Disposal of By-Products, Impacts to Pond Biota	

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20. Treat agricultural drainage in wetlands.	(In-River) Cadmium, Copper, Mercury, Selenium, Zinc, DDT, PCBs, Toxaphene, Ammonia, Turbidity, Unknown Toxicity	(In-Wetland) Cadmium, Copper, Mercury, Selenium, Zinc, DDT, PCBs, Toxaphene, Ammonia, Turbidity, Unknown Toxicity	Retention time may allow decomposition of pesticides and by products and settling of particulate metals; Plants may uptake dissolved metals; May improve offsite DO levels; May reduce salinity concentrations offsite	Pesticides may decompose into more toxic by products; Selenium and mercury may concentrate in the wetlands; Volatile compounds (ammonia, pesticides) may cause nonpoint source emissions to the atmosphere; Possible onsite problems with DO	
21. Treat agricultural drainage by other means (e.g., reverse osmosis) and recycle or use for flow augmentation.	Cadmium, Copper, Mercury, Selenium, Chlordane, Chlorpyrifos, DDT, PCBs, Toxaphene, Ammonia, DO, Salinity, Temperature, Unknown Toxicity		Point source control-- would reduce all parameters of concern; May improve assimilative capacity of stream	Cost of collection, storage, and disposal of drainage from multiple sources (brine solution with high concentrations of selenium); May decrease assimilative capacity of stream by removing water	

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<b>Non-Point Source Pollution Control: Urban and Industrial Runoff</b>					
22. Detain additional runoff water, time release strategically.	Cadmium, Copper, Zinc, Chlorpyrifos, Diazinon, Ammonia, DO, Salinity, Unknown Toxicity	Salinity	Increased retention time may decrease concentrations of diazinon and chlorpyrifos; May serve as check for mercury in nonpoint urban runoff; Would help to decrease Ammonia inputs from Port of Sacramento.	Targeted to dry weather events only	
23. Enforce existing source control regulations.	Cadmium, Copper, Mercury, Zinc, Chlorpyrifos, Diazinon, Ammonia, DO, Turbidity		Questionable whether mercury will be reduced.	Need to clarify regulations; Lack of enforceable mechanisms	
24. Provide incentives for additional source control.	Chlorpyrifos, Diazinon, Unknown Toxicity		May allow different source control approaches: wet basin vs. dry basin		

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25. Better plan new urban and industrial development.	Cadmium, Copper, Mercury, Selenium, Zinc, Chlorpyrifos, Diazinon, Unknown Toxicity	Cadmium, Copper, Mercury, Selenium, Zinc	Long term cost savings (i.e., less flooding problems)	Cost; Difficult to construct passive systems (green belts) in established communities; County reluctance to maintain green belts; Wetlands designed to treat and trap pollutants may allow percolation of pollutants to groundwater	Action wording needs clarification; Economic incentives needed to encourage consideration of green belts in early stages of community development
<b>Watershed Management</b>					
26. Focus on non-point source components of watershed management.	DO, Salinity, Turbidity		Upstream counties--sedimentation and existing water quality above existing reservoirs	Need to develop agricultural BMPs to limit pesticide impacts to water quality;	
34. Focus on point source components of watershed management.	Needs further clarification				
35. Focus on habitat restoration components of watershed management.	Needs further clarification		Salinity associated with tidal marshes; May decrease ammonia concentrations by converting grazing lands		

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<b>Non-Point Source Control: Mine Drainage</b>					
27. Fund on-site mine drainage remediation measures by using pollution credit trading	Copper, Cadmium, Mercury, Zinc, Turbidity, Unknown Toxicity		Net reduction in metals loading (mainly in the Sacramento River); Reductions nearer the sources will achieve load reductions where rivers have the least assimilative capacity; Reduction in chemical sediments	Short term impacts (runoff from road construction, etc.) associated with remediation efforts; Liability concerns; Difficulty to obtain resources and contracts	Clarify pollution credit trading concept: "load reduction credits"; Clarify inactive vs. abandoned mines
28. Fund on-site mine drainage remediation measures with other monies.	Same as 27.	Same as 27.	Same as 27.	Same as 27.	Clarify inactive vs. abandoned mines
29. Enforce regulation of boat discharges within the Delta and in water bodies tributary to the Delta.	Ammonia, DO		Minimal benefits; Primarily aesthetic		
30. Treat municipal wastewater in wetlands.	Cadmium, Copper, Mercury, Zinc, Chlorpyrifos, Diazinon, Unknown Toxicity		Possible creation of wildlife habitat; Lower cost than conventional tertiary treatment	Requires large amounts of land (may be unavailable in urban areas or costly); May create an attractive nuisance for wildlife by accumulating toxic substances; Salinity and ammonia may accumulate--source to rivers; Pollutant percolation to groundwater	

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31. Encourage pollution credit trading to reduce pollution in a cost-effective manner.			Only benefits system if net loads are reduced	Overall net loads need to be reduced	
32. Incentives for phased conversion of municipal wastewater treatment facilities from processes producing large concentrations of disinfection by product precursors (DBPs)	Pesticides, Unknown Toxicity		Use of carbon columns may reduce pesticide loads to streams; Reduction in toxicity associated with residual chlorine levels		
33. Incentives for reclamation and reuse of industrial and municipal wastewater	Chlorpyrifos, Unknown Toxicity		May increase assimilative capacity of receiving stream;	May decrease assimilative capacity of receiving stream by removing water and consequently increasing concentrations of pollutants	Replace "reclamation" with "wastewater"; Mention alternatives-ozonation
35. Provide incentives to upgrade drinking water treatment through filtration.	Unknown Toxicity		Not much impact	Not much impact	Upstream turbidity issues

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37. Improve riparian habitat in watersheds of participating water districts.	Cadmium, Copper, Mercury, Selenium, Zinc, Pesticides, Ammonia, DO, Temperature, Turbidity		Fish and wildlife benefits; Turbidity reduction; Reduction in all parameters of concern; Passive filtration of pollutants; Benefits water quality in urban and agricultural areas		Define "riparian habitat" for example "riparian corridors"
38. Restore riverine channel features on the Sacramento River upstream of the Delta, including tributaries.	Ammonia, DO, Temperature	Chlordane, DDT, PCBs, Toxaphene, Turbidity			Needs clarification: "channel features". Is this the meandering vs. channelized nature of some streams?
39. Restore and enhance riparian vegetation on the Sacramento River from Verona to Colusa.					Redundant
40. Restore riverine channel features on the San Joaquin River upstream of the Delta (channel configurations to deepen the San Joaquin) and on its tributaries.	Temperature	Chlordane, DDT, PCBs, Toxaphene, Turbidity			Needs clarification: "channel features". Is this the meandering vs. channelized nature of some streams?

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41. Research potential toxicity in water and sediment through toxicity testing and toxicity identification evaluations or other appropriate methods.	Unknown Toxicity		Identification of sources of parameters; Data to allow prioritization of actions; Cost effective	Cost; Length of time needed	Wording of action--insert "ambient"